Substantiation for EE's Mobile Network Operator Comparison Campaign claims from 28.06.2021

RootMetrics Testing Methodology Facts

- RootMetrics uses a well-controlled “drive” test to perform a geographically and temporally diverse “apples-to-apples” comparison of the four major wireless operators’ network performance.
- RootMetrics performs these tests using unmodified, off-the-shelf smartphones acquired from each operator. Testing in the second half of 2020 was done using the Samsung Galaxy Note 10+ 5G for EE, O2, Three, and Vodafone. Testing in the first half of 2021 was done using the Samsung Galaxy Note 20 Ultra 5G for EE, O2, and Vodafone and the Samsung Galaxy S20 5G for Three.
- Testing is done simultaneously across all four operators to show a same-place, same-time view of performance differences between operators.
- RootMetrics physically drives the phones around the country, to all four nations and extensively in the most populous 16 urban areas, performing a variety of performance tests on each operators’ network. To ensure that its data remain current, RootMetrics performs tests in each nation at least every six months.
- RootMetrics tests data, call, and text performance by downloading and uploading files, downloading small files that represent web and app usage (secure and non-secure connections), making mobile-to-mobile phone calls, and sending and receiving text messages. Test data is categorized into “speed”, “reliability”, and “accessibility” measures (as, for instance, JD Powers might categorize and assess different aspects of auto performance or safety). Drive tests are conducted along freeways and motorways, major arterials, and residential streets where the population within a market generally lives and travels. Due to government restrictions and safety concerns caused by COVID-19, testing from the second half of 2020 does not include testing at indoor locations.
- RootMetrics’ drive-based methodology successfully controls for numerous variables that fundamentally distort the data obtained through certain alternative, “crowd”-based methodologies. In so doing, RootMetrics ensures that the results obtained accurately reflect the difference between operators’ actual network performance and not—for example—differences in types of devices owned by different operator customers, differences in operator customer testing locations, or differences in a consumer’s willingness to run a speed test at a particular moment. RootMetrics testing also includes calling and texting, which is completely lacking in crowd-based data.
- The FCC, the Better Business Bureau, and British telecom regulators Ofcom and Clearcast have all relied upon data from RootMetrics. As an industry analyst at Wells Fargo noted: “RootMetrics is well regarded as one of the most respectable (if not THE) network monitoring services.”
- RootMetrics has intentionally decided not to consider deprioritization as part of its testing. Deprioritization being defined as an artificial limitation of network performance intentionally caused by a network operator based on a user’s rate plan or data usage. We exclude this limitation because the objective of the testing is to isolate for network performance and not for restrictions artificially imposed by a rate plan. When RootMetrics purchases the flagship phones that it uses for its testing from each operator, it also purchases an unlimited data plan from each operator. In order to control for deprioritization and ensure it is not skewing the results, RootMetrics ensures that the plans it buys are not subject to throttling. Thus, the lack of deprioritization is reflected in the results for all four operators.
- The purpose of RootMetrics’ testing is to assess network capabilities. Deprioritization is a feature that is implemented according to the terms of a customer’s pricing plan, not as a

direct product of the operator's network performance. Accordingly, RootMetrics tests to more accurately reflect each network's actual technological capability, as opposed to the impact of a separate, pricing-related feature that will vary with the consumer's particular plan.

- RootMetrics' RootScore calculation is based on the accepted, standard set of data points described above. None of these data is omitted when RootMetrics calculates a RootScore—its algorithm is the method by which it weighs and combines the data to arrive at a bottom-line measurement that accurately reflects the overall results.
- A customer license with RootMetrics buys it a yearly subscription to the company's data (which customers use internally to analyse their network performance), as well as permission to cite
- RootMetrics' testing in its advertising. This payment does not provide the customer with any influence or control over RootMetrics' testing.
- In addition to Wireless Operators, RootMetrics has other international licensees, such as Tower and Infrastructure companies.
- RootMetrics also solicits information from other Wireless Operators, including EE, O2, Three and Vodafone, with respect to its results and testing methods.
- RootMetrics also has other performance benchmarking comparison products such as gaming console networks.
- RootMetrics is not bound to make changes based on any licensee's input.

City level key performance indicator (KPI) based claims

Claim support for: Mobile Network Operator Comparison Campaign claims beginning 28.06.2021

Why are these results robust?

RootMetrics uses scientific methodologies to design tests, measure activities, and collect data about mobile network performance that are representative of a consumer's mobile experience within a given market. RootMetrics then employs statistical techniques to verify and validate the results. This approach ensures all operators are measured on a level playing field, removes unintentional bias, and allow RootMetrics to provide actual, in-the-field data that confirms or challenges performance numbers that are otherwise only theoretical and based on ideal conditions. Weighting and stratification methods are used to ensure that test data correctly represents the overall national population distribution.

Coverage

The below coverage claims come from RootMetrics testing taken place in H2 2020 and H1 2021 across 16 different metros. Coverage is determined to be present when a RootMetrics test device is able to establish a 5G network connection to perform an activity during data testing. RootMetrics coverage testing is intended to collect samples in a uniform, thorough manner across the entirety of an area.

Disclaimer: below KPI tables are based on RootMetrics testing whilst coverage maps are sourced from public facing mobile network coverage maps. Coverage maps used for illustrative purposes. More data is available on mobile network websites.

London

Claim: EE has 2x more 5G coverage in London than O2 & Vodafone & Three (H1 2021 Data)

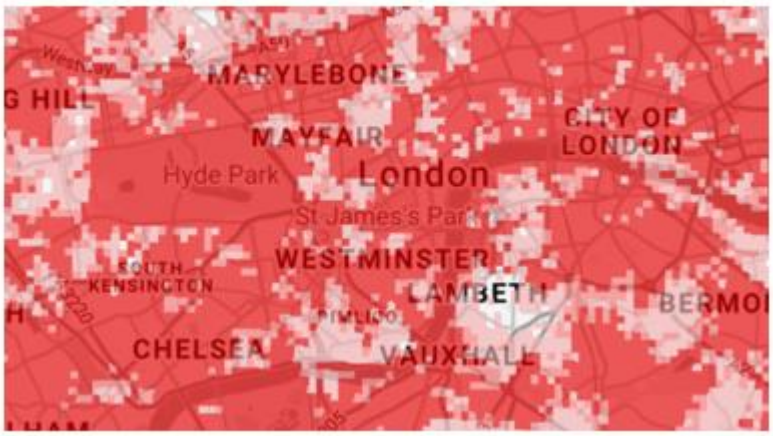
EE	O2	Vodafone	Three
46.3%	4.7%	17.2%	10.3%

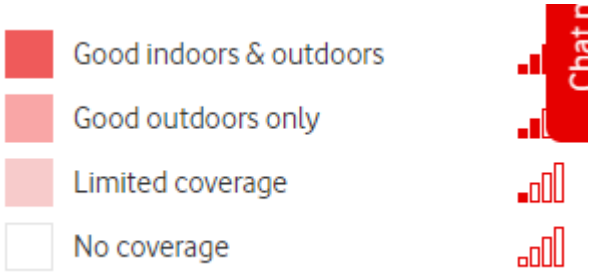
EE – 46.3%

5G
4G Outdoor and indoor
4G Outdoor only

O2 – 16.23%

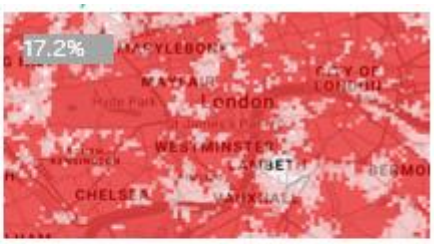
VODAFONE – 17.2%





THREE – 10.3%

Indoor & Outdoor Outdoor No Coverage



Birmingham

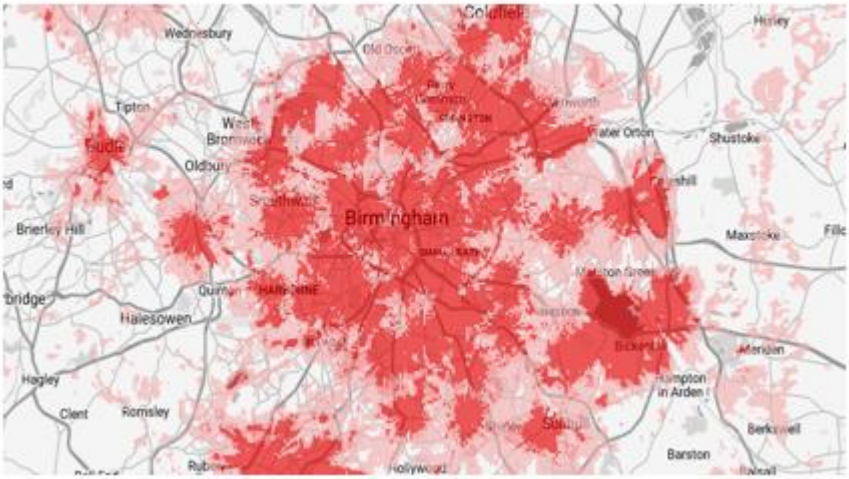
Claim: EE has more 5G coverage In Birmingham than O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
73.42%	13.91%	28.73%	48.30%

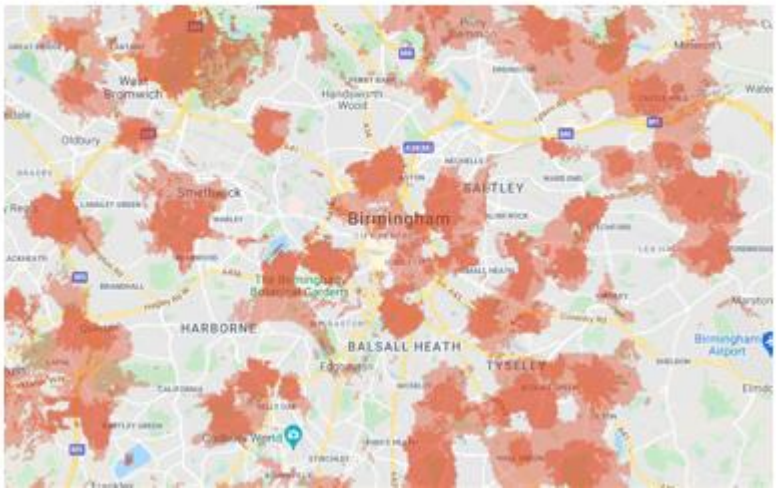
EE – 73.42%

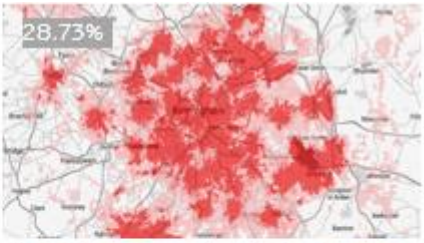
O2 – 13.91%

VODAFONE – 28.73%



THREE – 48.30%





Leeds

Claim: EE has more 5G coverage in Leeds than O2, Vodafone & Three (H2 2020 Data)

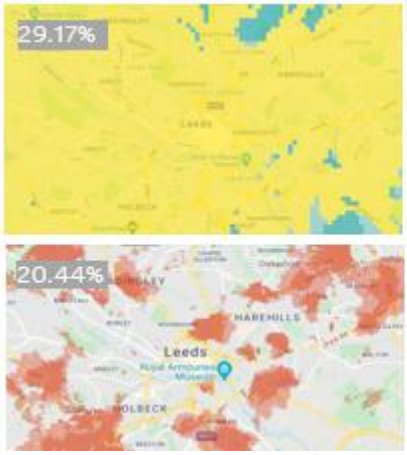
EE	O2	Vodafone	Three
29.17%	15.70%	3.30%	20.44%

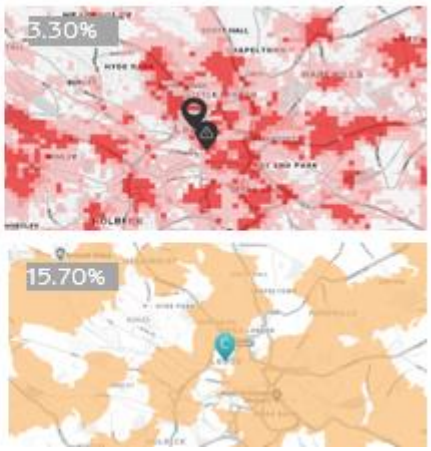
EE – 29.17%

O2 – 15.70%

VODAFONE – 3.30%

THREE – 20.44%





Edinburgh

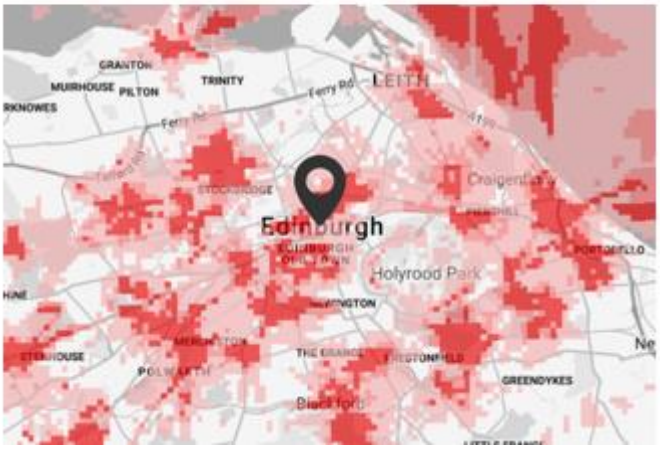
Claim: EE has 2x more 5G coverage in Edinburgh than Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
27.56%	26.84%	13.64%	13.81%

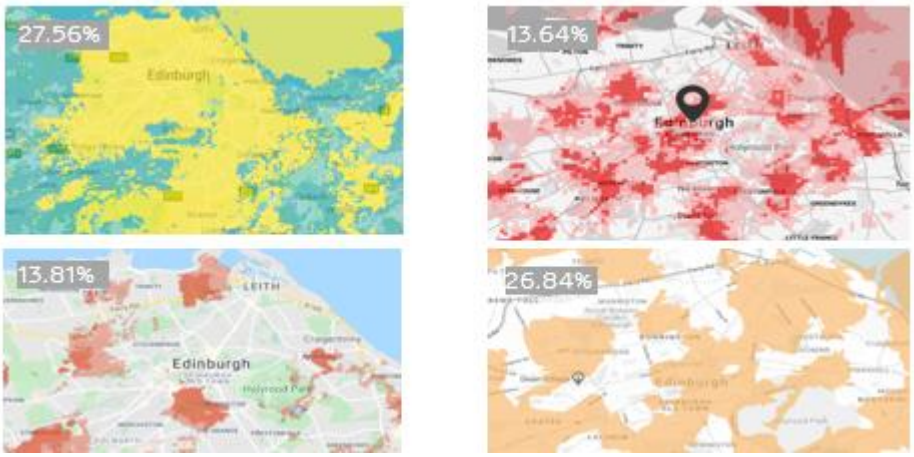
EE – 27.56%

O2 – 26.84%

VODAFONE – 13.64%



THREE – 13.81%



Glasgow

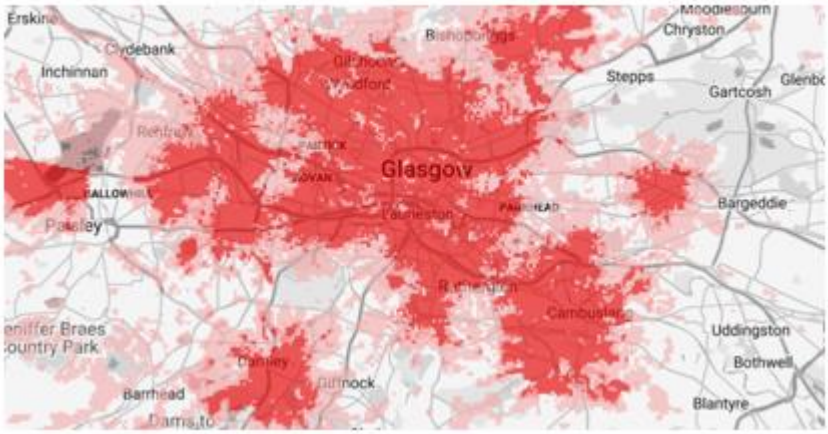
Claim: EE has more 5G coverage in Glasgow than O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
36.73%	8.93%	23.53%	26.36%

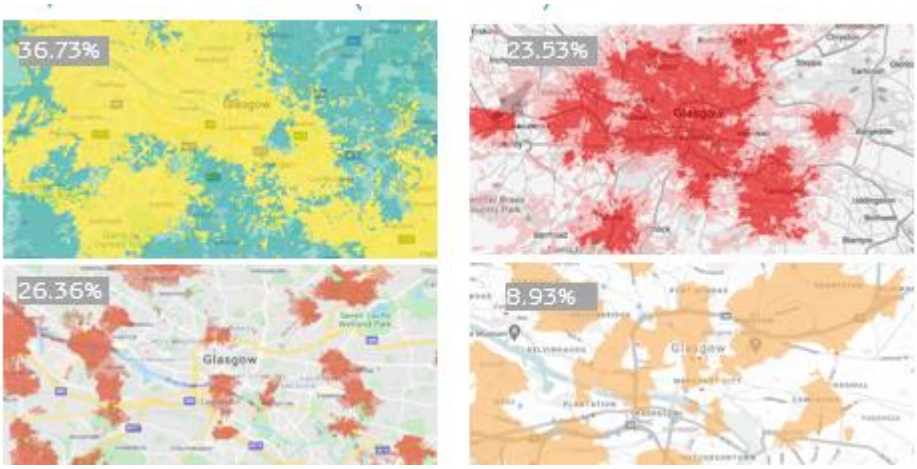
EE – 36.73%

O2 – 8.93%

VODAFONE – 23.53%



THREE – 26.36%



Belfast

Claim: EE has 4x more 5G coverage in Belfast than O2, Vodafone & Three (H2 2020 Data)

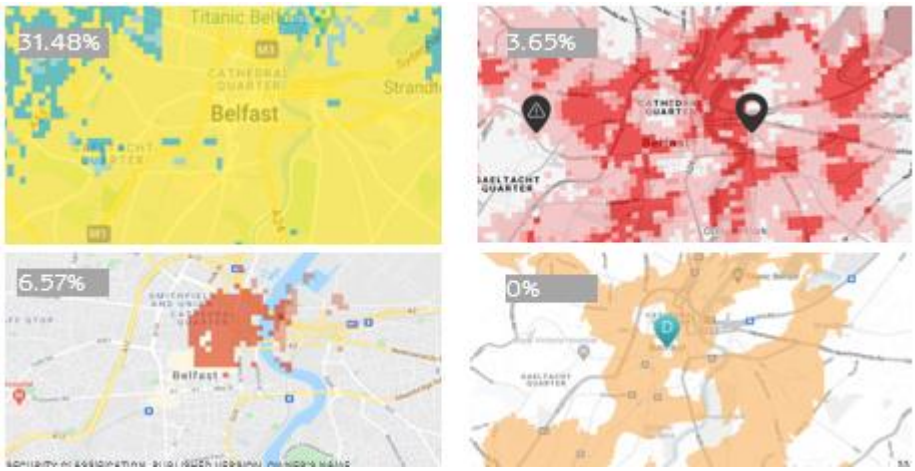
EE	O2	Vodafone	Three
31.48%	0.00%	3.65%	6.57%

EE – 31.48%

O2 – 0%

VODAFONE – 3.65%

THREE – 6.57%

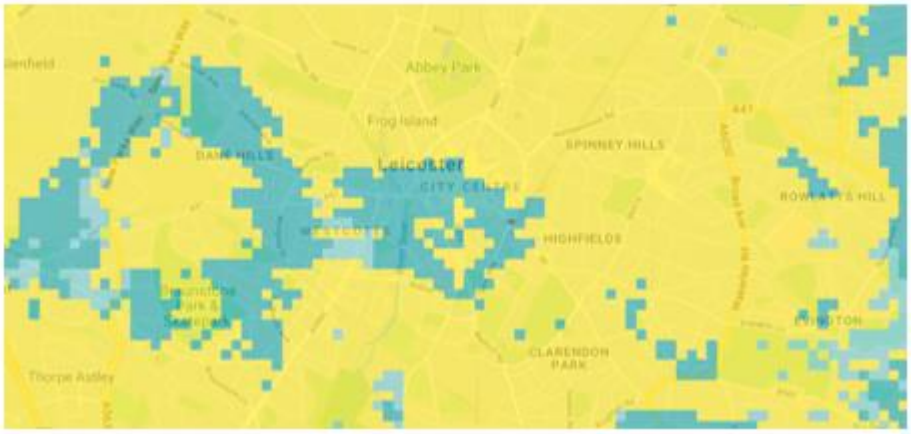


Leicester

Claim: EE has 2x more 5G coverage In Leicester than O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
46.44%	16.23%	0.00%	22.88%

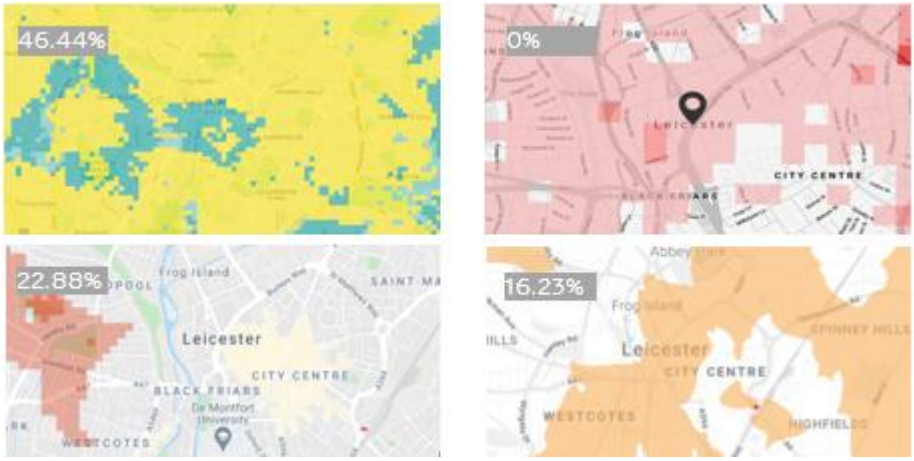
EE – 46.44%



O2 – 16.23%

VODAFONE – 0% LIMITED COVERAGE

THREE – 22.88%

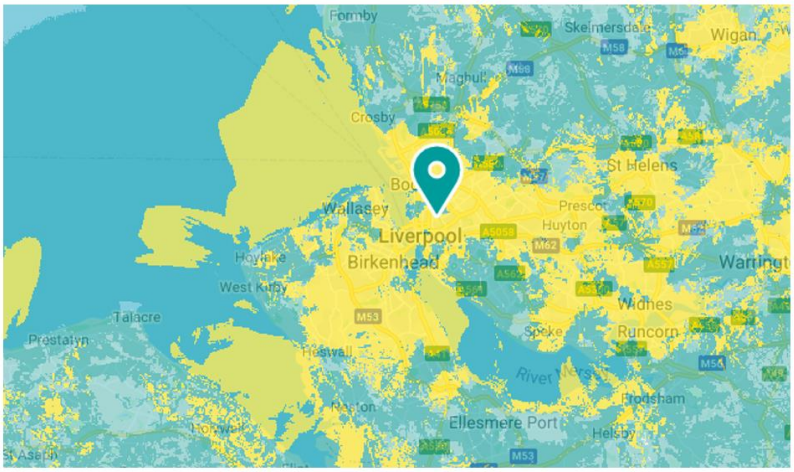


Liverpool

Claim: EE has 3x more 5G coverage in Liverpool than O2 & Three (H2 2020 Data)

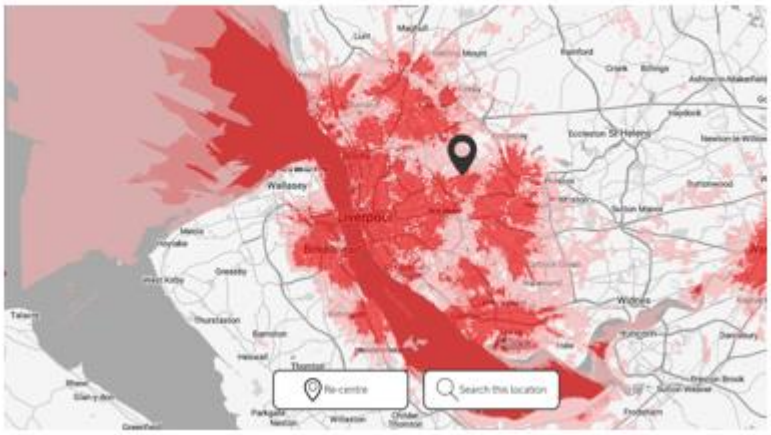
EE	O2	Vodafone	Three
41.00%	7.85%	37.68%	12.20%

EE – 41%

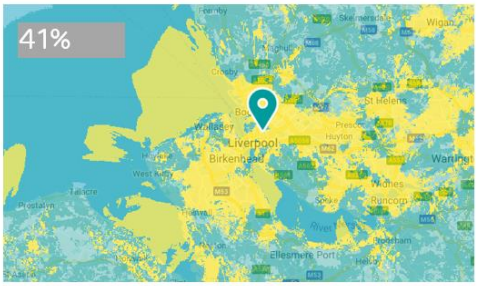


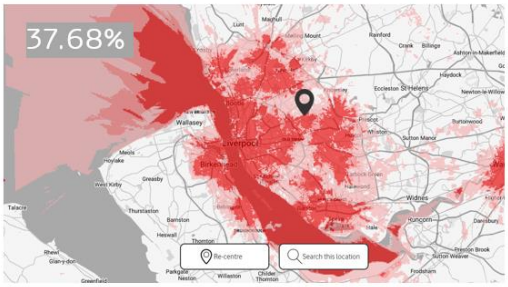
O2 – 7.85%

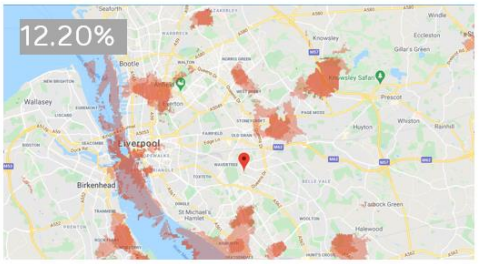
VODAFONE – 37.68%

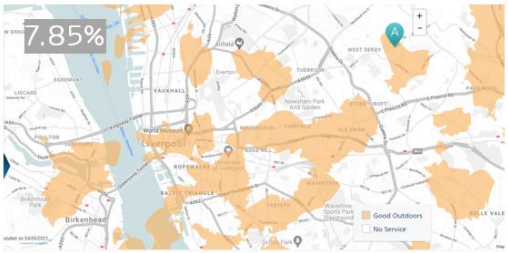


THREE – 12.20%









Manchester

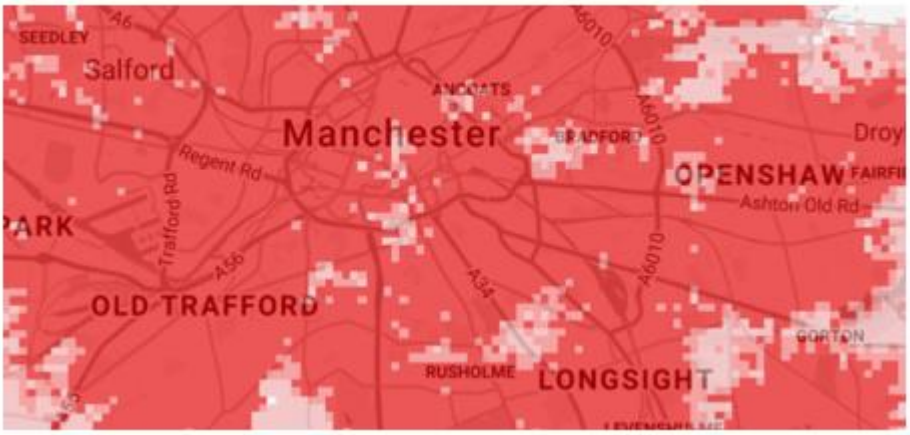
Claim: EE has more 5G coverage In Manchester than O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
53.94%	15.94%	32.85%	30.98%

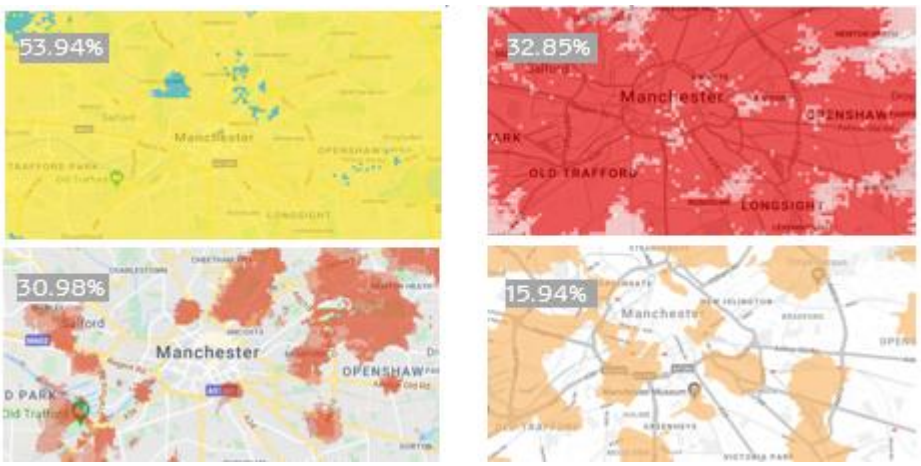
EE – 53.94%

O2 – 15.94%

VODAFONE – 32.85%



THREE – 10.3%

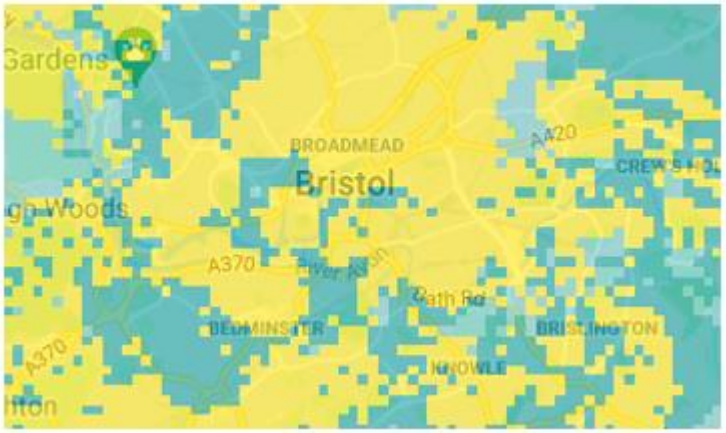


Bristol

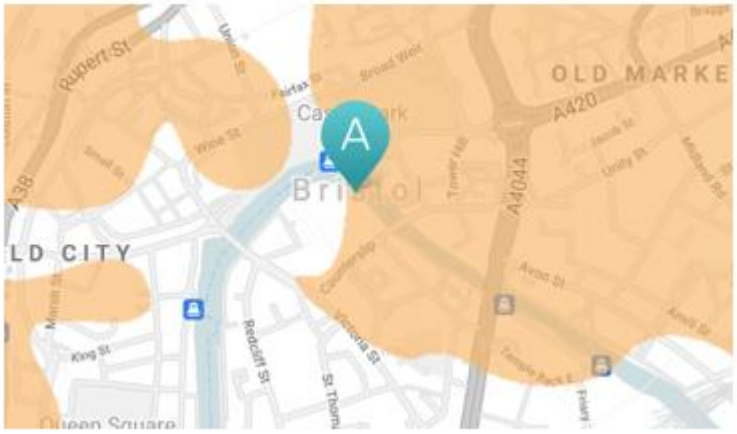
Claim: EE has more 5G coverage in Bristol than O2 & Three (H1 2021 Data)

EE	O2	Vodafone	Three
42.85%	23.42%	43.25%	14.13%

EE – 42.85%

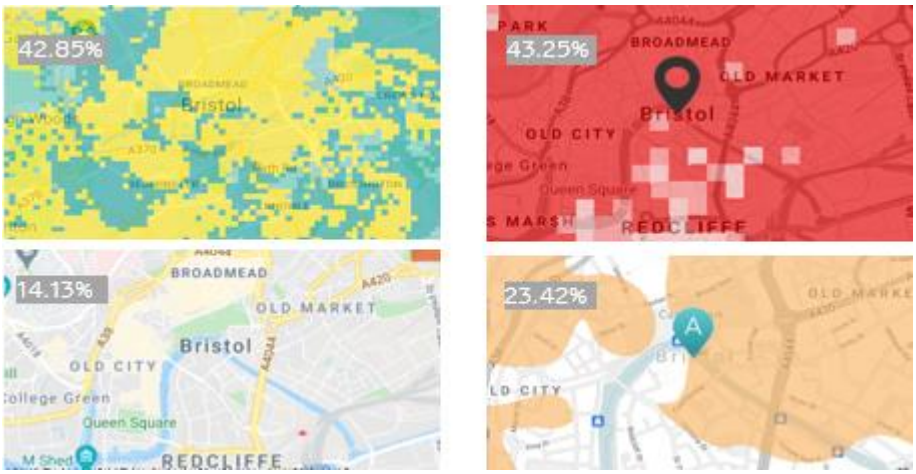


O2 – 23.42%



THREE – 14.13%

VODAFONE – 43.25%



Coventry

Claim: EE has more 5G coverage in Coventry than O2, Vodafone & Three (H1 2021 Data)

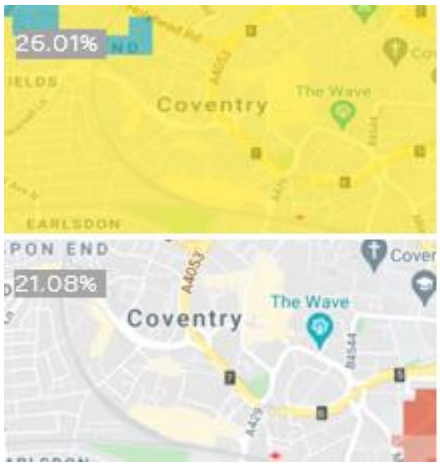
EE	O2	Vodafone	Three
26.01%	17.62%	0.00%	21.08%

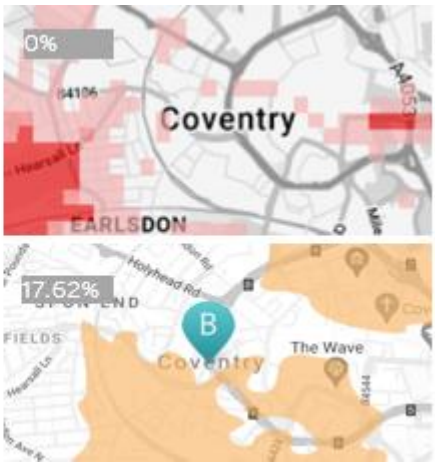
EE – 26.01%

O2 – 17.62%

VODAFONE – 0%

THREE – 21.08%





Nottingham

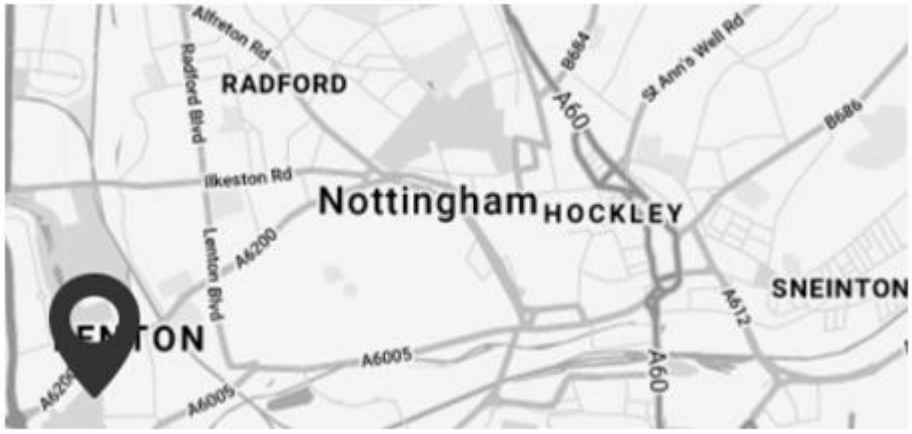
Claim: EE has more 5G coverage in Nottingham than O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
61.19%	12.59%	0.00%	31.41%

EE – 61.19%

O2 – 12.59%

VODAFONE – 0%



THREE – 31.41%

Hull

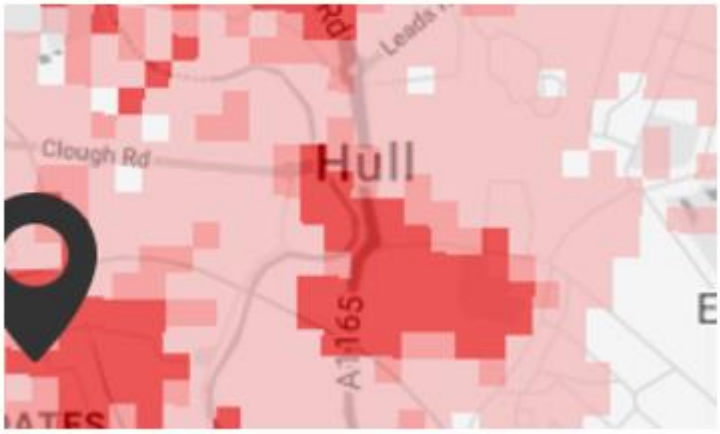
Claim: EE has 4x more 5G coverage in Hull than O2 & Vodafone (H2 2020)

EE	O2	Vodafone	Three
51.84%	11.09%	2.07%	28.91%

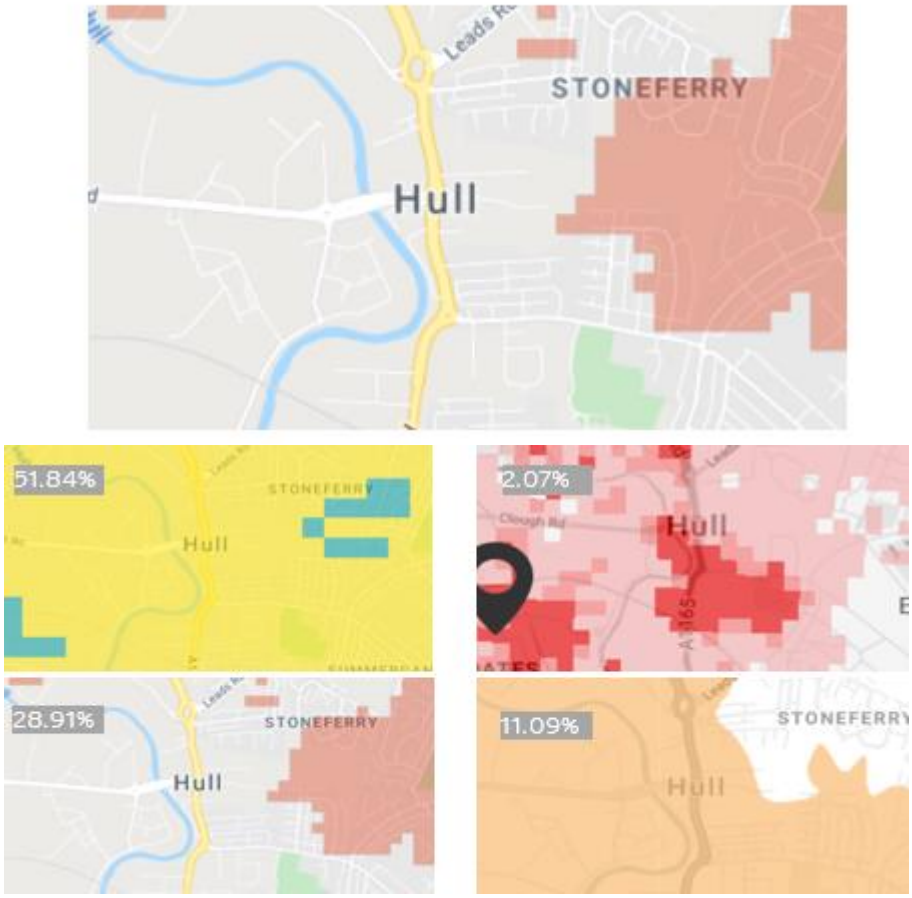
EE – 51.84%

O2 – 11.09%

VODAFONE – 2.07%



THREE – 28.91%



Sheffield

Claim: EE has 3x more 5G coverage in Sheffield than O2, Vodafone & Three (H2 2020 Data)

EE	O2	Vodafone	Three
43.54%	8.81%	2.66%	11.69%

EE – 43.54%

O2 – 8.81%

VODAFONE – 2.66%

THREE – 11.69%

Newcastle

Claim: EE has more 5G coverage in Newcastle than O2, Vodafone & Three (H1 2021 Data)

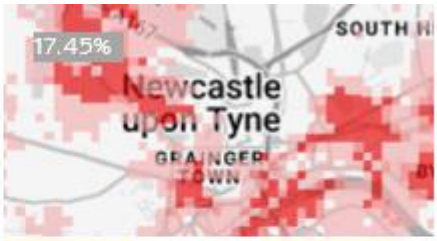
EE	O2	Vodafone	Three
46.41%	24.98%	17.45%	12.09%

EE – 46.41%

O2 – 24.98%

VODAFONE – 17.45%

THREE – 12.09%



Cardiff

Claim: EE has 2x more 5G coverage in Cardiff than O2 & Three (H1 2021 Data)

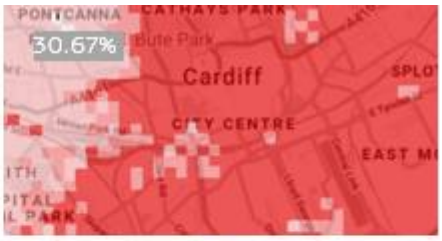
EE	O2	Vodafone	Three
41.57%	17.12%	30.67%	16.34%

EE – 41.57%

O2 – 17.12%

VODAFONE – 30.67%

THREE – 16.34%



Speed

RootMetrics collects a variety of network speed measurements during testing, including download speeds via a full buffer throughput test. RootMetrics produces a network speed RootScore award using a combination of speed performance across data network testing. EE was ranked above the competitors references in each of the below claims, offering faster network performance. In addition, to provide a quantifiable difference between the operators beyond the RootScore, the multiplier portion of the below claims are based on median download speeds in Mbps as noted in the below charts.

London

Claim: EE is 2x faster in London than O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
76.8	25.6	31.7	25.1

Leeds

Claim: EE is 2x faster in Leeds than O2, Vodafone & Three (H2 2020 Data)

EE	O2	Vodafone	Three
37.7	18.9	15.2	16.3

Edinburgh

Claim: EE is 2x faster in Edinburgh than O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
74.9	26.9	29.1	22.0

Glasgow

Claim: EE is 2x faster in Glasgow than O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
65.3	9.5	29.4	25.7

Belfast

Claim: EE is faster in Belfast than O2, Vodafone & EE (H2 2020 Data)

EE	O2	Vodafone	Three
51.8	18.9	27.6	11.6

Leicester

Claim: EE is 2x faster in Leicester than O2, Vodafone & Three (H1 2021

EE	O2	Vodafone	Three
79.0	39.1	28.6	26.3

Liverpool

Claim: EE is 3x faster in Liverpool than O2 & Three (H2 2020 Data)

EE	O2	Vodafone	Three
61.3	19.7	73.5	20.1

Manchester

Claim: EE is 3x faster in Manchester than O2 & Three (H1 2021 Data)

EE	O2	Vodafone	Three
97.3	12.1	55.1	31.2

Reliability

RootMetrics produces a score and bestows awards based on network reliability measurements collected during metro-level testing. Encompassing a holistic look at reliability performance across data, call, and text testing, the reliability category addresses the question: can I access the network (and stay connected once I access it)? The numbers below represent the RootScores and ranks from RootMetrics metro-level testing in each relevant market. Ties may occur when the results of two or more operators are statistically indistinguishable; operator rankings are provided in parentheses with an asterisk (*) denoting a tie.

London

Claim: EE's network is more reliable in London than O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three

98.2 (1)	96.9 (2*)	97.4 (2*)	94.8 (4)

Birmingham

Claim: EE's network is more reliable in Birmingham than O2 & Three (H1 2021 Data)

EE	O2	Vodafone	Three
98.1 (1*)	93.2 (3*)	97.3 (1*)	94.8 (3*)

Edinburgh

Claim: EE's network is more reliable in Edinburgh than O2 & Three (H1 2021 Data)

EE	O2	Vodafone	Three
99.7 (1*)	98.1 (3)	99.3 (1*)	96.1 (4)

Glasgow

Claim: EE's network is more reliable in Glasgow that O2, Vodafone & Three (H1 2021 Data)

EE	O2	Vodafone	Three
99.4 (1)	97.9 (2*)	98.3 (2*)	97.7 (2*)

Belfast

Claim: EE's network is more reliable in Belfast than O2, Vodafone & Three (H2 2020 Data)

EE	O2	Vodafone	Three
99.1 (1)	97.1 (2*)	97.7 (2*)	96.3 (4)

Liverpool

Claim: EE's network is more reliable in Liverpool than O2, Vodafone & Three (H2 2020 Data)

EE	O2	Vodafone	Three
99.6 (1)	98.7 (2*)	98.3 (2*)	94.4 (4)