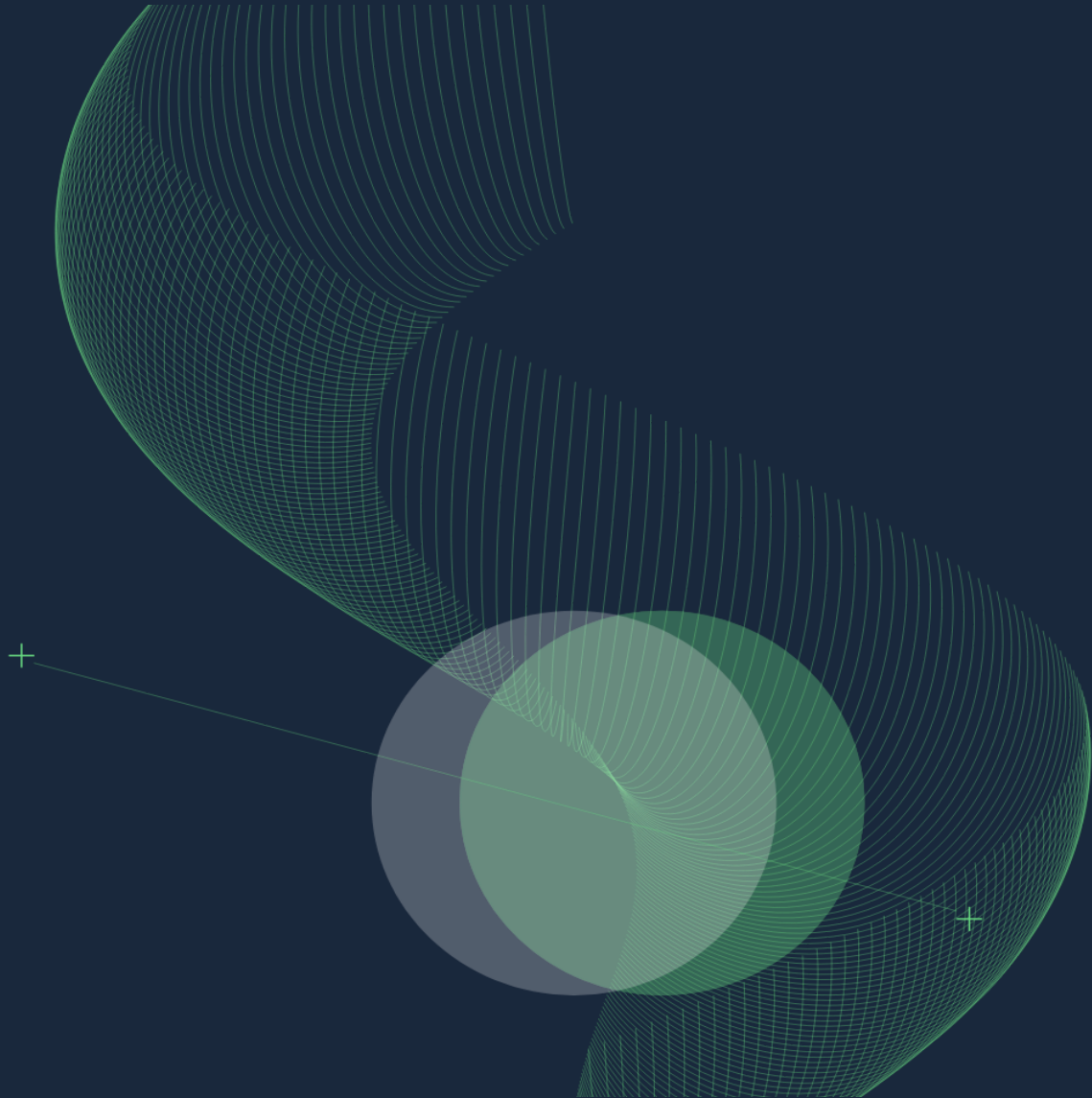




Comparing operators' 5G SA deployment

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Introduction

In Europe, the rollout of 5G standalone and 5G non-standalone has been variable in its speed and consistency, with noticeable differences existing between the continent's largest mobile operators and the markets they are choosing to invest in to upgrade their networks.

5G Standalone (5G SA) is the term used for a mobile network built entirely on a dedicated 5G infrastructure, operating independently of older 4G systems.

5G non-standalone (5G NSA) differs in that 5G radio antennas connect to an existing 4G LTE network.

Deploying a non-standalone network is a way operators can progress and ultimately build towards launching a full-fledged 5G Standalone service.

This white paper analyses the deployment of 5G standalone and non-standalone by four major European operators – Vodafone, Deutsche Telekom, O2/Telefonica and Orange.

Each mobile operator provides services in several markets:

- Vodafone: Germany, United Kingdom, Iceland, Czech Republic, Netherland, Ireland, Portugal, Romania, Hungary, Italy, Greece, Albania and Spain (where Telefonica trades as Movistar).
- Telekom: Germany, Hungary, Macedonia, Romania, Slovakia, Slovenia.
- O2/Telefonica: Czech Republic, Germany, Slovakia, United Kingdom, Spain.
- Orange: Belgium, France, Luxembourg, Moldova, Poland, Romania, Slovakia, Spain.

There is no country all four operators operate in. Spain, Germany, Romania and Slovakia each host three of the four major operators. The Czech Republic, UK and Hungary each host two of the four operators.

Vodafone is the most prolific of these operators, providing services in 13 different countries, followed by Orange which operates in 8.

All data used in this White Paper has come from the PolicyTracker Mobile Deployment Database (MDD) and the Policytracker Spectrum Database (PSD).

Comparing operators' 5G SA deployment

Map showing the markets in which Vodafone, Orange, O2 and Deutsche Telekom operate



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1: Vodafone: widespread but inconsistent 5G

Vodafone's deployment of 5G standalone differs greatly from country to country.

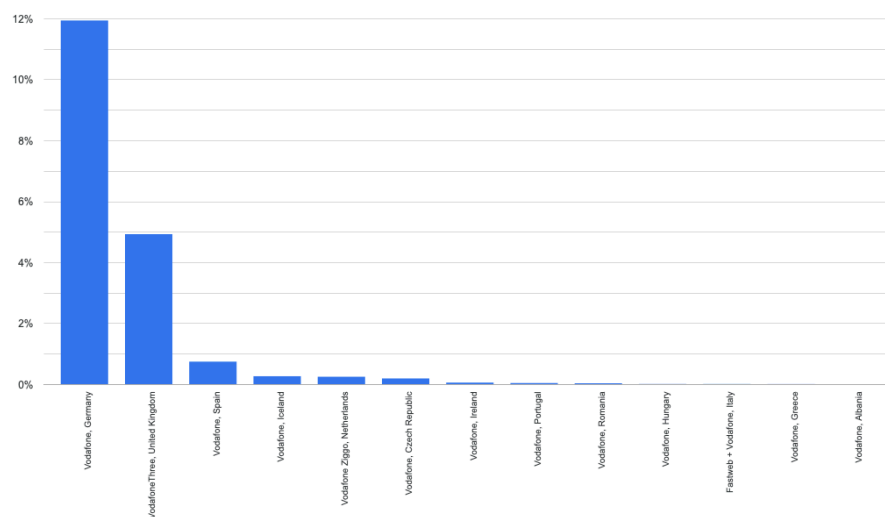
In Germany, 11.93% of Vodafone's deployments use 5G standalone.

This is the highest percentage of any of the markets that Vodafone operates in, and there is a significant gap between Germany and its second most 5G SA equipped country, the UK, which has 4.92% 5G SA deployment.

Despite how widespread Vodafone is, the remaining 11 countries it operates in have between 0% and 1% 5G SA deployment.

However, Vodafone does have a widespread 5G NSA network across its 13 countries of operation.

Selected technology deployment as % of total



Graph showing Vodafone's % 5G SA deployment across all countries

The highest percentage is in Italy where Vodafone has merged with fixed-broadband provider Fastweb.

In Italy, 44.45% of base stations can provide 5G non-standalone services.

Both Portugal and Greece are above 40% as well for 5G NSA deployments, making this consistently better than results from rival operator O2/Telefonica.

Telefonica's highest percentage of 5G NSA deployment is in Slovakia, where 41.6% of their base stations are 5G NSA.

The 5G SA network in Slovakia from O2 is almost non-existent at 0.2%.

Comparing operators' 5G SA deployment

Vodafone's lowest 5G NSA deployments are some of the lowest in this survey however, and reflect the variety of markets they operate in.

In Romania, Vodafone offers almost no 5G SA and only 20.3% of its deployments are 5G NSA in the country.

This is poor compared to Orange, which similarly offers almost no 5G SA in Romania but has 28.3% of its base stations offering 5G NSA instead.

The Romanian deployment is the only market where Vodafone has less than 25% of its base stations providing 5G NSA.

All of Vodafone's other markets have figures ranging from 29% to 34% deployment for 5G NSA.

On the other hand, several countries – Hungary, Italy, Greece and Albania have 0% 5G SA deployment by Vodafone and the higher percentages of 5G NSA base stations reflect Vodafone's modernisation of its already widespread 4G network.

This difference in priorities is clear, as other operators offer more widespread 5G NSA deployment in some of these countries.

In Hungary, 40.9% of Deutsche Telekom's network is 5G NSA with 1% of their deployments being 5G SA.

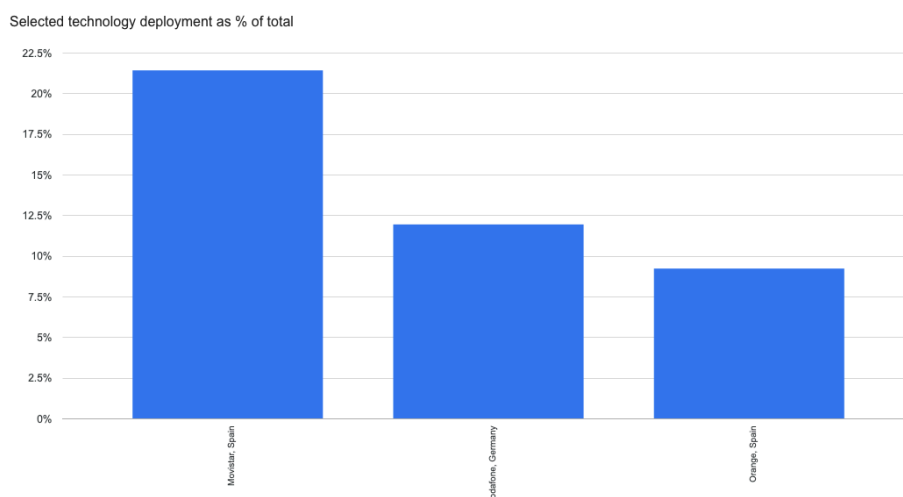
While the standalone performance is not much improved over Vodafone, Deutsche Telekom has clearly been moving to have more of their 4G network superseded by 5G NSA.

Overall, with this added perspective from comparison of Vodafone against its competitors, it is clear that although Vodafone boasts impressive 5G SA and 5G NSA deployment across the countries it operates in, there is a clear inconsistency in where it is choosing to divert its resources and invest in its networks.

2: Telefonica: 5G SA leader which favours its home country.

Analysis of the data in our Mobile Deployment Database (MDD) shows that Telefonica – operating as O2 and Movistar in the Czech Republic, Germany, Slovakia, the UK and Spain – has the highest percentage of 5G standalone deployments of any of the major operators.

In Spain, Movistar Spain has 21.4% of its base station deployments equipped for 5G SA and 31.2% equipped for 5G NSA.



Graph showing the three highest 5G SA deployments across all four operators

This is 9.47% more deployments than the next highest figure for 5G SA deployments – Vodafone in Germany.

Telefonica is a leader for 5G SA deployments in its other markets as well.

In Germany, 6.1% of O2's deployments are 5G SA, and in the UK 8.5% of their deployments are 5G SA.

Telefonica is focusing its resources on Spain where its 5G SA deployment does eclipse that of its efforts in other markets.

Spain would seem the natural fit for heavy investment from Telefonica, as it is the Spanish company's home market.

However neither Orange in France nor Vodafone in the UK have invested in 5G SA in their home market quite as heavily as Telefonica..

Comparing operators' 5G SA deployment

Orange has invested heavily in 5G SA in Spain as well, while Vodafone's chosen Germany over the UK for 5G SA deployment, though both companies do have good deployment of 5G SA in their home countries.

Using the MDD, you can also analyse the percentage deployment of different technologies through the lens of geography.

21% of Telefonica's Spanish deployments for 5G SA are in urban areas, while 21.60% are in non-urban areas.

Our data also shows, additionally, how a high deployment of 5G SA affects deployment of 5G NSA.

In Spain, Telefonica's 5G NSA deployment is 31.2%, lower than the four other markets they operate in. However, this can be attributed to their heightened deployment of 5G SA, though 47.40% of deployments remain on 4G LTE.

This is a pattern you can see across the MDD data but Telefonica reflects this the best in their pattern of deployment and investment across Europe.

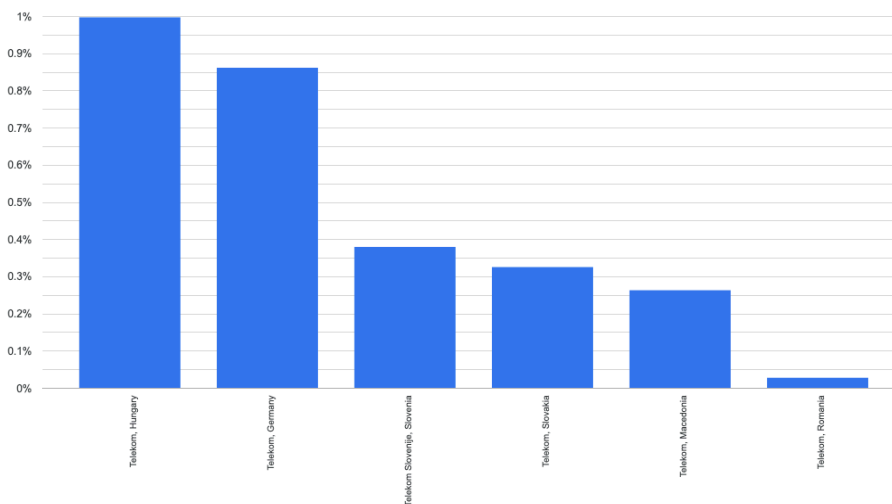
3: Deutsche Telekom: the 5G SA laggard

Deutsche Telekom has the worst 5G SA deployments of any of the four operators but makes up for this with good 5G NSA deployments.

Despite having deployments in six markets – Germany, Hungary, Macedonia, Romania, Slovakia and Slovenia – Deutsche Telekom consistently has the lowest deployments of 5G SA in its networks.

The highest 5G SA deployment by Deutsche Telekom is 1% across the whole country in Hungary.

Selected technology deployment as % of total



Graph showing % 5G SA deployment across all of Deutsche Telekom's markets

Every other country in which Deutsche Telekom operates has between 0% and 0.9% 5G SA deployment for the whole country.

The situation is not entirely negative for Deutsche Telekom though – its percentage of 5G NSA deployment is good when compared to the other major operators though it is very inconsistent.

Romania has only 13.7% 5G NSA deployment, while Hungary, Macedonia and Slovakia all have deployment ranging from 40% to 43%.

This does not disguise how 4G LTE dependent Deutsche Telekom truly is – its figure of 86.30% 4G deployment in Romania is the highest of any country – bringing Orange, Vodafone and Telefonica into comparison.

Deutsche Telekom's 43.1% deployment on 5G NSA in Slovakia is however, a standout across the four major operators and is only outdone by Vodafone's percentage in Italy and deployments made by Orange.

Comparing operators' 5G SA deployment

The approach of the company has evidently been more cautious than its rivals - particularly in Germany.

From the data in the MDD, it is clear that Deutsche Telekom is likely still building up to 5G SA from its 5G NSA core - which is highly deployed.

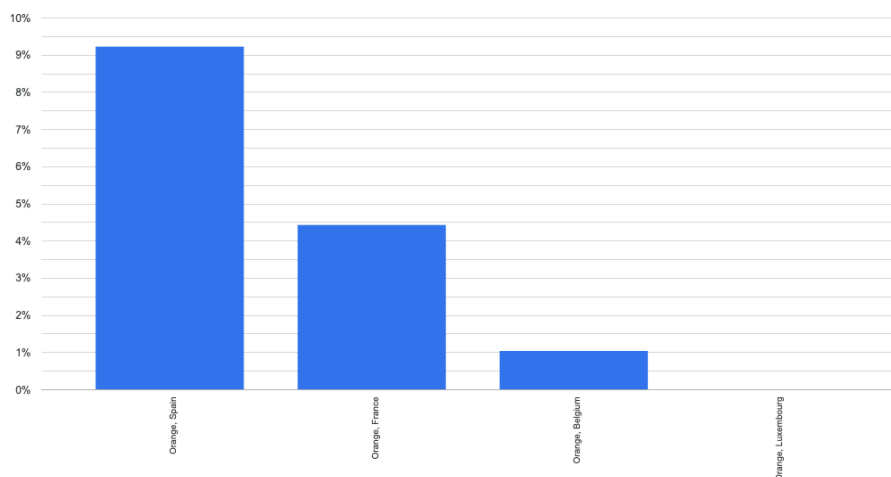
4: Orange: deployed more 5G SA in Spain than the French-speaking countries

Orange operates in eight European countries – and has been traditionally associated with the French speaking world. The French Government owns a stake in Orange as a company, linking it to the nation.

However, Spain is where the highest 5G SA deployment by Orange has taken place. 9.2% of Orange's network in Spain is 5G SA and 35.7% is 5G NSA.

Compared to France, which has 4.4% 5G SA and 34.4% 5G NSA, it can be concluded that the MNO is offering a more advanced service away from what is seen as its traditional customer base.

Selected technology deployment as % of total



5G SA deployment by Orange in Spain, France, Belgium and Luxembourg

Belgium, another Orange hotspot, is also underserved for 5G with only 1% of Orange's network providing 5G SA and 35.6% providing 5G NSA.

Spain has 35.7% 5G NSA deployment, marginally better than Belgium despite the history of the company in the country.

Luxembourg presents another interesting case for Orange, the operator provides no 5G SA service in the country (even Slovakia has 1.9% 5G SA deployment in Orange's network).

Despite this, Luxembourg has the highest 5G NSA deployment percentage of any country covered by the major operators.

Comparing operators' 5G SA deployment

46.3% of Orange's network in Luxembourg is providing 5G NSA services, though it is likely that this is an easier feat than it seems for Orange as Luxembourg is one of Europe's smallest nations.

46.20% of Orange's Luxembourg 5G NSA is Urban and 46.30% of it is non-urban, an even divide between the countries 5G NSA deployments.

Of Orange's Spanish deployments, 13.40% of its 5G SA network is urban. For its 5G NSA network, 38.80% is urban and for its 4G network, 47.80% is urban.

Conclusion

Using PolicyTracker's MDD, it is possible to make several valuable conclusions about the deployment strategies of Orange, Vodafone, Deutsche Telekom and Telefonica.

We have been able to show the markets in which each operates,– find which company has the highest 5G SA and 5G NSA and understand the market priorities of each of these operators.

While the clear leader for 5G SA remains Vodafone, Telefonica's abnormally high percentage of 5G SA in Spain is the highest percentage deployment of the technology according to our data.

Deutsche Telekom has been shown to lack momentum on a 5G SA network, while making clear preparation through the investment into their 5G NSA network. Telekom boasts some of the highest percentages for 5G NSA deployment of these operators in Europe, according to our data.

Meanwhile, our data has shown that Orange has been making significant investments in Spain despite its traditional connection to the Francophone world.

Orange has leveraged its resources to have the second-best 5G SA deployment in Spain.