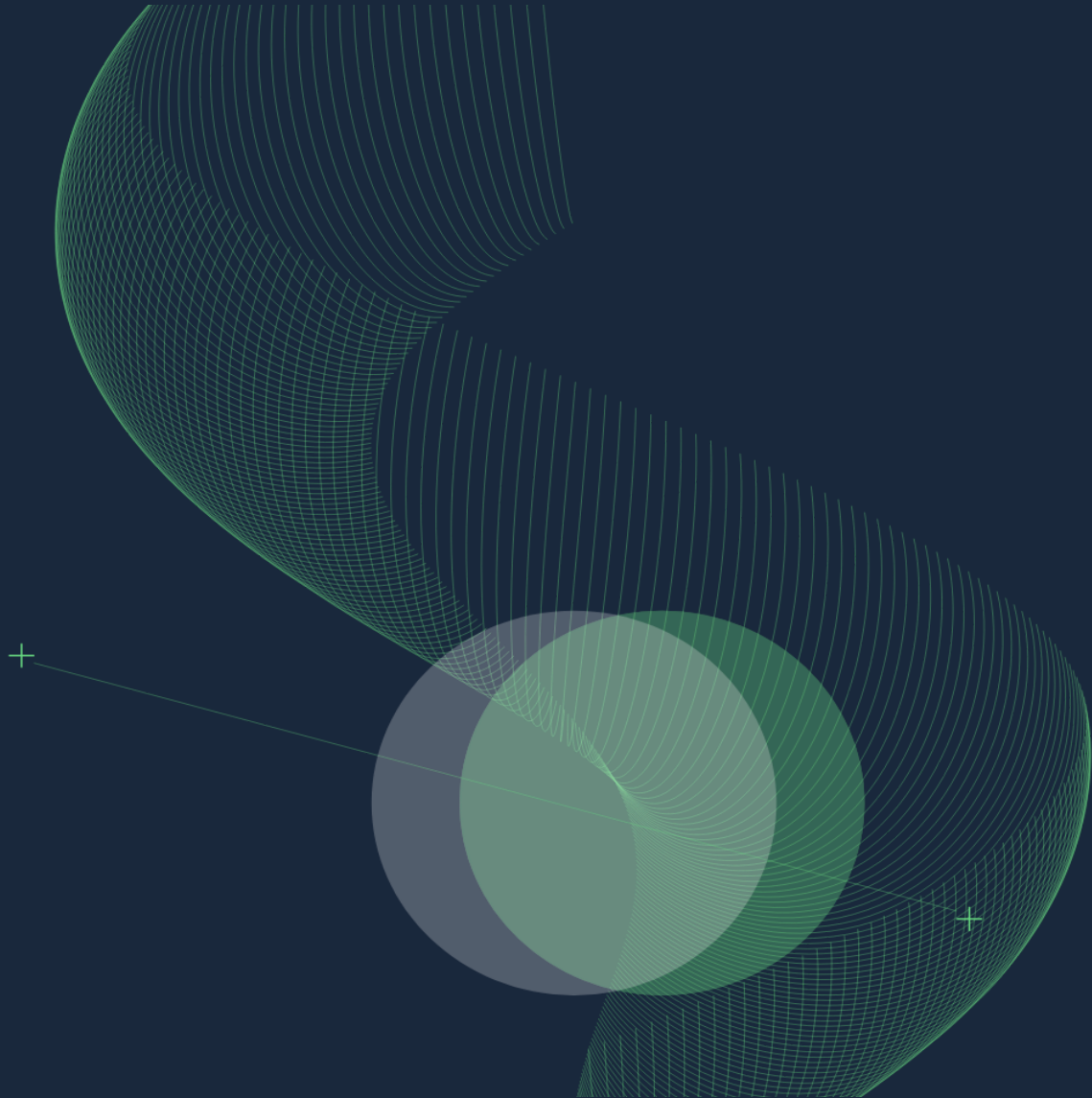




Spain is Europe's 5G SA leader

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Table of Contents

Introduction.....	3
1: Spain is Europe's 5G SA leader but the picture is complex.....	4
2: Why does Spain top Europe's league?.....	8
3: The impact of consolidation.....	11
4: The state aid factor.....	13
Conclusion.....	16

Introduction

The extent of 5G standalone deployment varies significantly across Europe but one country is ahead of all others, convincingly so with the exception of one rival.

Spain is perhaps a surprising country to see in such a position.

A 5G standalone (5G SA) network is made up of entirely 5G radio antennas and core, unlike a 5G non standalone network which maintains a 4G core.

The transition to 5G SA has a number of attractions including ultra low latency, faster upload speed and network slicing.

However, 5G SA has not been deployed evenly around the world. For instance, Europe has lagged some major economic rivals with its coverage. The continent is behind the US and China, for instance, when measured by population covered.

Europe's underperformance has been attributed by some observers to a variable level of demand – higher in those countries with a major industrial base and less in knowledge-based economies.

Yet Spain clearly has a smaller industrial base than some other European countries, Germany for instance.

Nevertheless, a number of European countries established targets for 5G SA coverage and funding to encourage deployment, particularly in underserved areas. Spain is among those countries.

In this white paper, I will study the extent of Spain's lead over its European peers in 5G SA, and whether it is substantial as first appears. Moreover, I will look at which spectrum bands it has favoured in its rollout, and why. There are marked differences with other countries. Finally, I will theorise about what domestic factors have enabled Spain to perform so well in 5G SA.

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

1: Spain is Europe's 5G SA leader but the picture is complex

Our research found that 12 per cent of deployments in Spain by mobile operators were of 5G SA, the most in Europe.

A 5G SA deployment is defined as the installation of a radio in a band, by a particular operator, using 5G in a sector on a base station. Most macro base stations have three sectors and band radios are typically deployed in all three sectors.

Second-placed United Kingdom has ten per cent of all deployments as 5G SA. All other countries bar the UK are less than half of Spain's figure.

Also striking is that more than two thirds of the 41 countries in the database have less than one per cent of 5G SA deployments.

The MDD measures how countries performed not only in regard to 5G SA but also 5G non-standalone (NSA) and 4G. Perhaps unsurprisingly, countries fluctuated in their performance between the three measures for 5G SA, 5G NSA and 4G.

The bands used for 5G SA deployment in Spain are 700 MHz, 3.6 GHz, 2.1 GHz, 1800 MHz and 2.6 GHz.

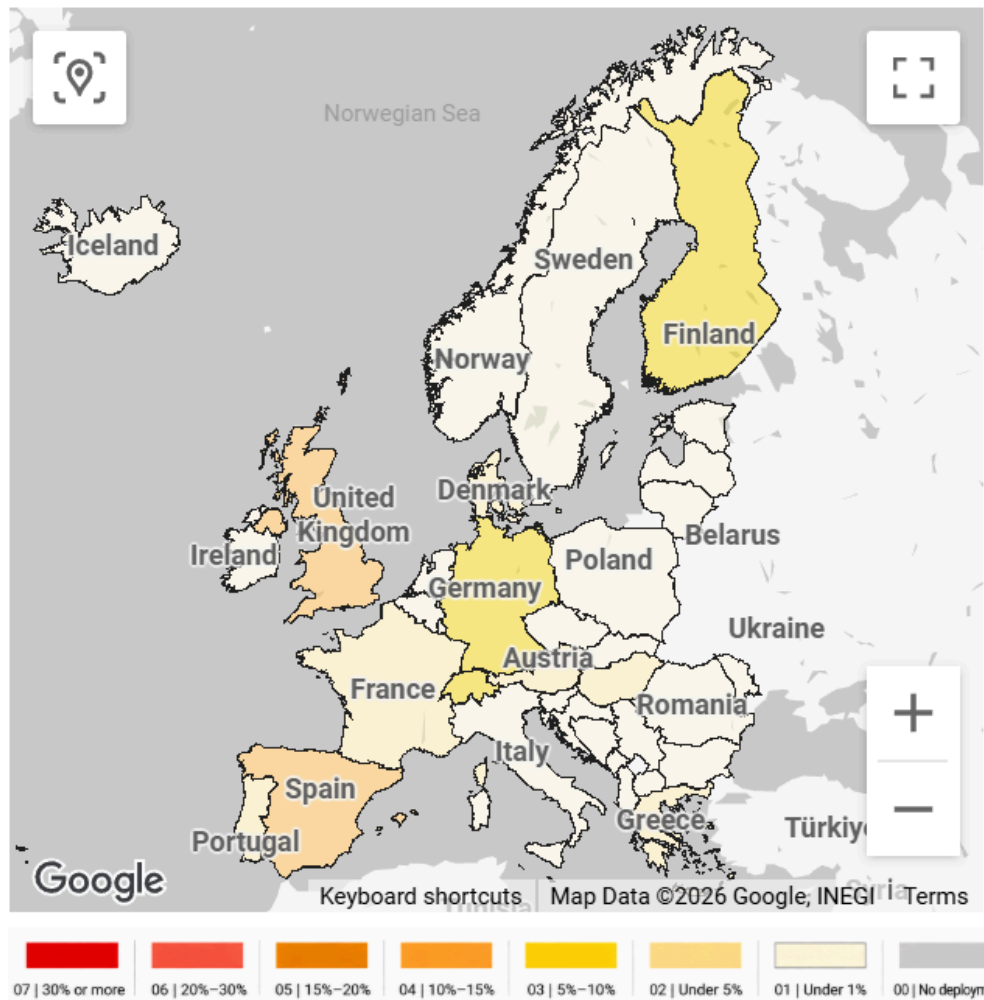
There is a definite split between how 5G SA is deployed in urban and non-urban areas of the country.

The database uses the same definition of an urban centre as the satellite-based EU Global Human Settlement Layer project. It defines an urban centre as having a population density of at least 1,500 inhabitants per square kilometre and a total population of at least 50,000.

In urban areas, Spain has a greater share of radios (37 per cent) deployed in 3.6 GHz, perhaps unsurprisingly given the band has less range but a greater capacity, while in non-urban areas the figure is 30 per cent.

By contrast, in urban areas, the proportion of radios deployed in 700 MHz is 34 per cent compared to the significantly higher figure of 46 per cent in non urban areas. Again perhaps this is unsurprising given the strength of 700 MHz as a coverage band in areas where population is more dispersed.

5G SA deployment as a percentage of all national deployment



The total number of 5G SA radios is lower in urban areas (52,000) than non-urban areas (71,000) but, as a proportion of all radios, urban areas are higher (13.7 per cent) than non-urban (11 per cent), although not by a massive amount.

However, it is worth noting the picture in Spain is more nuanced than first appears when compared with other countries. Digging further into the database shows this.

Table showing 5G SA deployments as a percentage of all national deployments (top and bottom ten countries)

Country	Technol...	Country	Technol...
1. Spain	12.02%	1. Isle of Man	0%
2. United Kingdom	10.12%	2. Moldova	+0%
3. Liechtenstein	6.67%	3. Serbia	0.01%
4. Germany	5.93%	4. Poland	0.01%
5. Switzerland	5.3%	5. Lithuania	0.03%
6. Finland	5.13%	6. Romania	0.04%
7. Austria	4.73%	7. Montenegro	0.04%
8. Greece	4.55%	8. Latvia	0.04%
9. France	3.98%	9. Bulgaria	0.05%
10. Denmark	2.9%	10. Ireland	0.05%

Approximately 40 per cent of Spain's 5G SAs radios are deployed in the 700 MHz band (the European average is 31 per cent), followed by 33 per cent in 3.6 GHz (European average is 41 per cent). The remainder is roughly split between 2.1 GHz (20 per cent), 1800 MHz (five per cent) and 2.6 GHz (two per cent).

In fact, Spain has approximately twice the proportion of 5G SA radios in the 700 MHz than the UK which has 20 per cent in that band, as well as 37 per cent in 3.6 GHz, a higher figure than Spain. The remainder in the UK is a mix of 2.1 GHz, 1800 MHz, 2.6 GHz and 900 MHz.

In numeric terms, Spain has 40,600 5G SA radios in 3.6 GHz against the UK's 53,330. On this basis one would expect network speeds in Spain to be behind those in the UK. It is also worth noting also that Spain is a much bigger country geographically than the UK.

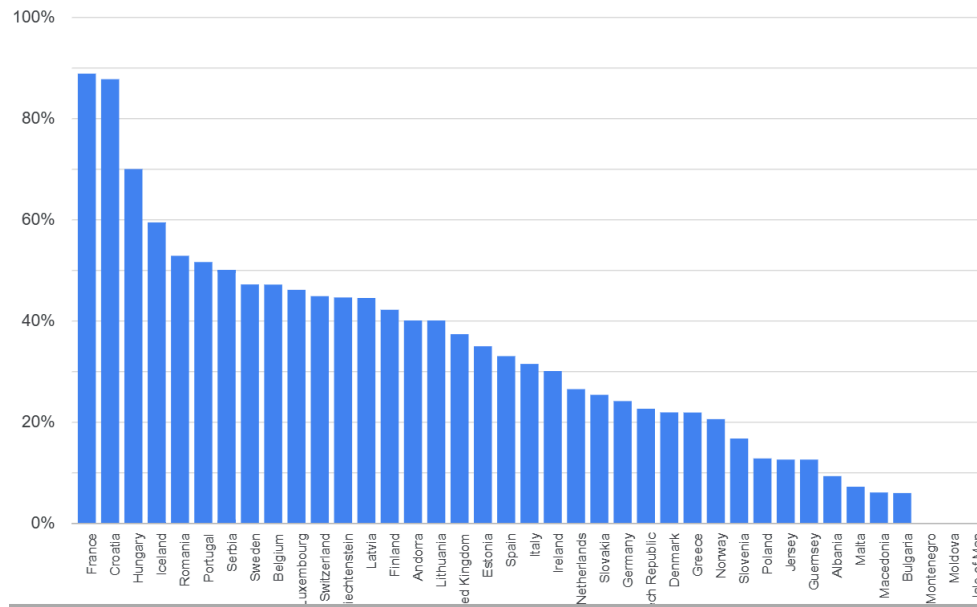
Hence, while Spain might lead on deployment that does not necessarily mean the speed of its 5G SA network is the fastest.

Looking further, our research reveals that numerically France has the most 5G SA radios in the 3.6 GHz band with 67,000, more than either Spain or the UK. It also leads on a proportionate basis with this band representing nearly 90 per cent of its total 5G SA deployments. Croatia is close behind.

And measuring the proportion of 3.6 GHz deployments as a proportion of both 5G SA and 5G NSA puts Italy on top with 30 per cent. Its total number of deployments stands at 505,000, perhaps not surprising given [it was one of the first countries in Europe](#) to auction the 3.6 GHz band. It has been slower to make the transition to 5G standalone though.

Numerically, Italy's figure for 5G SA and NSA in the 3.6 GHz band is topped by only that of France with 551,000 deployments.

Deployment of 3.6 GHz band as a percentage of all 5G SA deployments



Studying the figures reveals that leadership is really a product of which metric we chose to value most highly.

Next, we will study the reasons behind Spain's 5G SA achievement.

2. Why does Spain top Europe's league ?

Spain awarded the 700 MHz band via auction in July 2021 with conditions that were intended to encourage investment by the spectrum winners.

The country's Ministry of Economic Affairs and Digital Transformation took a view that 700 MHz would be "the most important band" for 5G, which was why [it made changes](#) to the final auction conditions.

The contest offered seven licences for a combined reserve price of €995.5 million. This is down from the initial €1.17 billion proposed and was one of the lowest starting prices among European 700 MHz auctions.

The actual contest lasted just two days and 12 rounds of bidding, raising a total of €1.01 billion.

The winners were:

- Telefonica acquired a 2 x 10 MHz block for €310 million.
- Vodafone acquired a 2 x 10 MHz block for €350 million.
- Orange acquired two 2 x 5 MHz blocks for €175 million each, or a total of €350 million.

In addition, on offer in the auction were three unpaired blocks of 5 MHz of supplementary downlink frequencies, also in the 700 MHz band. The three SDL blocks went unsold in the auction.

The 2 x 10 MHz block won by Telefonica was offered with a reduced reserve price of €270 million because it carried greater coverage obligations.

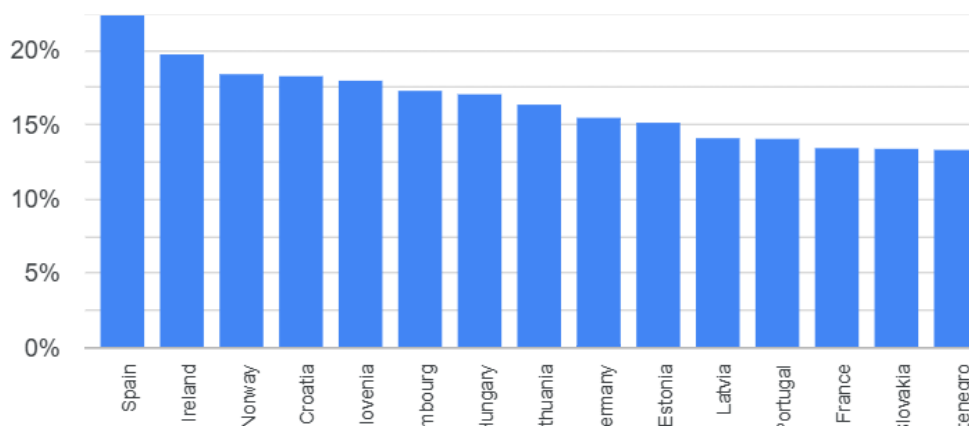
The three winners were the only bidders. Fourth MNO MasMovil did not bid in the auction.

Also, prior to the contest, the ministry [doubled the duration of 700 MHz licences to a maximum of 40 years](#). As long as the operators meet their coverage requirements, their initial 20-year licence will be extended by another 20 years with no additional upfront cost. This 40-year licence length is the maximum allowed under law in Spain.

The 700 MHz was the first band where Spain extended licence duration to 40 years. In 2022, it adopted the same approach to the 26 GHz band. Then, in 2024, the ministry retrospectively [extended the duration of older licences by a maximum of ten years](#).

The bands covered retrospectively were 800 MHz, 900 MHz, 1800 MHz, 2.6 GHz and 3.6 GHz. The 3.6 GHz licences, which along with those at 700 MHz are central to Spain's deployment of 5G SA, were extended to 30 years.

Deployment of 700 MHz band as percentage of all national deployments (5G SA, 5G NSA and 4G)



The government's stated strategy with lengthening licence duration was to offer predictability and the opportunity for MNOs to earn an improved return on investment.

Supporters argue licence holders feel more confident about investing when the continuation of their rights is assured.

The notion of long term, or even indefinite, spectrum licensing is a key proposal in the European Commission's Digital Networks Act, indicating growing political support.

However, [critics have questioned](#) whether longer licence durations do actually induce operators to invest greater sums in infrastructure.

There certainly could be balance-sheet benefits for operators. These include spreading auction costs over a longer period of time; amortising network investment over an extended period; and securing bank loans on better terms when lenders know spectrum assets are secured for decades

Finally, under the revised rules for the 700 MHz contest, coverage obligations were altered. The winner of the 2 x 10 MHz block with a discounted reserve price (Telefonica) had to cover all localities with more than 20,000 inhabitants by June 2025—one year later than originally proposed.

The other two operators with a higher reserve pricing had an easier rollout schedule, having to cover all localities with over 50,000 inhabitants by the same date of June 2025.

Mobile operators had to cover an additional 450 locations by 2025, with 30 per cent of those being covered by the end of 2022 and 70 per cent by July 2024. By

2022, the country's 10 main airports, three main ports, six main railway stations and eight main highways had to see 700 MHz rollouts.

The government also decided to remove the obligation to offer wholesale access at set prices. Mobile network operators may continue to lease access to their networks but will be able to do so without having to offer a state-determined price. Such a move will likely reduce MVNO competition while improving the business model for mobile network operators.

3. The impact of consolidation

Orange Spain launched [the country's first commercial 5G SA](#) service in February 2023. As well as being a debut in Spain, it was the first such launch within the Orange group, ahead even of Orange France, the company's home market.

And Orange Spain continues to score better on 5G SA deployment, which is remarkable given the company is the established incumbent in France.

Approximately nine per cent of Orange's deployments in Spain are 5G against half that figure in its home market of France.

Spain's second commercial 5G SA network was launched by Telefonica in July 2023 followed by Vodafone in 2025.

Masmovil had not launched 5G SA prior to it announcing the signing of [a merger agreement in July 2022](#) with Orange.

The aim of the merger was to create the country's largest mobile and fixed network operator (by subscribers). Orange and Masmovil argued the combination would create "a sustainable player with the financial capacity and scale to continue investing to foster the future of infrastructure competition in Spain...."

Specifically the two companies said the combined entity would accelerate investment in FTTH and 5G.

The European Commission (EC) approved the merger between the two companies in February 2024 [although with conditions](#), including divestment of radio spectrum to the country's largest MVNO, Digi, along with an optional roaming agreement for the same company.

The EC's intention is to encourage Digi to become an additional MNO. No merger conditions related specifically to 5G SA network rollout.

In March 2024, Orange and Masmovil completed their merger. As well as being the country's largest mobile and fixed operator, the 50-50 joint venture has the largest spectrum holdings even after divestment. The joint venture rebranded to MasOrange and in September 2026 renamed itself Orange Spain.

MasOrange [awarded a contract to Ericsson](#) for the supply of a unified 5G SA core network in February 2026. The vendor said the new 5G core will offer advanced 5G SA services to MasOrange's joint subscriber base. It will replace dual legacy cores.

In June 2026 Orange took [100 per cent control of MasOrange](#).

Effectively, Spain has transitioned from being a four to three operator market since Digi is a nascent player and will remain so for some years.

Operators typically argue when a market is concentrated down from four to three operators, each may be able to make a higher profit which can then be reinvested

in their networks, including 5G SA. There is some evidence that consolidation leads to higher investment, although support for the argument is not universal..

Critics suggest additional profits from market concentration will likely be returned to shareholders rather than invested in infrastructure.

In February 2024, Telefonica [criticised the conditions](#) placed on the merger by the European Commission. It argued Orange/Masmovil's forced spectrum divestment "prevents Spanish operators from achieving sufficient scale to make large investments in next generation infrastructure".

If Orange/Masmovil had not been obliged to divest to MVNO Digi then it might have ceded the frequencies to a rival, including Telefonica, it suggested.

Telefonica pointed to how the Spanish government even loosened the spectrum cap to enable operators to acquire more frequencies because it believed this would speed 5G rollout. The new cap per operator in the 3.5 GHz band (important for 5G SA) was raised to 140 MHz. By insisting on a divestment to a smaller player, the EC decision nullified this opportunity, argued Telefonica.

MasOrange's post-merger spectrum holding was 190 MHz in 3.5 GHz, obliging it to dispose of 50 MHz. Of this total, 20 MHz was sold to Digi.

However, a further 20 MHz was in fact sold to Telefoncia (in August 2024), leaving 10 MHz still with MasOrange. Unable to find a buyer, MasOrange was ultimately forced to return these frequencies to the government in December 2024.

3.State aid is a factor

The deployment of 5G SA in Spain has undoubtedly been influenced by state aid. In June 2023, the European Commission [approved a €680 million Spanish scheme](#) to roll out equipment and infrastructure for 5G SA network standalone network in the country's underserved rural areas.

The scheme was part of the Spanish government's UNICO active networks programme which was funded by the EU's post-Covid Recovery and Resilience Facility.

The government wants to encourage the take up of innovative services such as digital health and smart farming, take off in rural areas.

Its funding can be used for deploying both active and passive parts of 5G networks.

The scheme has financed the deployment of 5G SA services with download and upload speeds of respectively at least 100 Mbps and 5 Mbps. The areas covered had less than 10,000 inhabitants, and no current or planned investment in 4G networks providing speeds of at least 50 Mbps download.

The aid was available from the Spanish government until end-December 2025 and the 5G networks had to enter into operation by February 2026. That deadline was subsequently relaxed to June 2026.

Direct grants were made to mobile operators on the basis of competitive tendering. The maximum amount of aid per beneficiary was equal to 90 per cent of the eligible costs.

A total of €669 million of the available €680 million was awarded across two phases in 2024 and 2025 of €508 million and €161 million, respectively.

It is noticeable the extent to which Telefonica dominated the two phases of funding, despite Orange being the earlier leader in the country's 5G SA deployment.

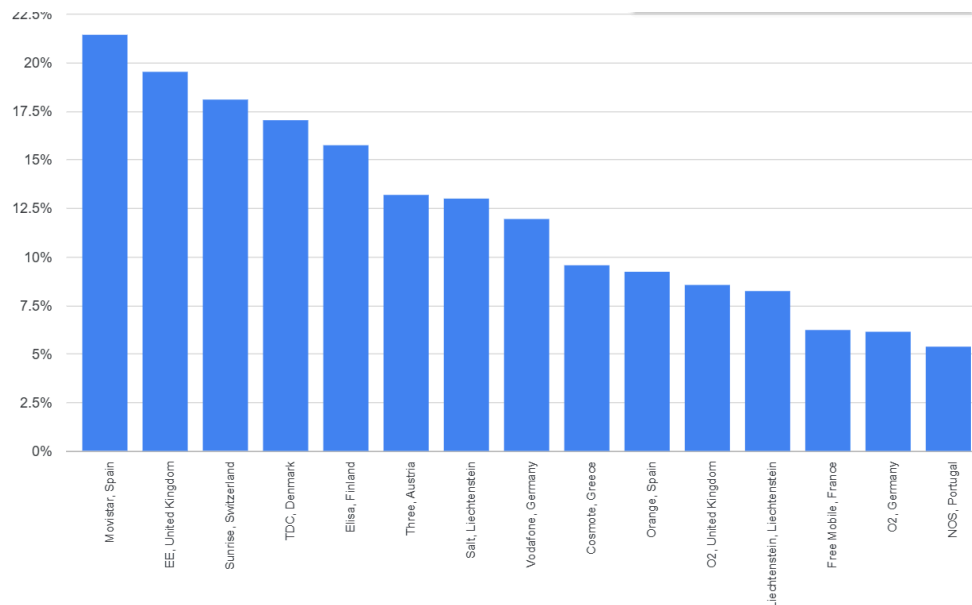
Telefonica's success in winning state funding is possibly a reflection of its historic position as the country's mobile and fixed incumbent with potentially more infrastructure in rural parts of Spain.

[The company received €102.7 million](#) in the most recent award to extend 5G coverage in 1,116 locations, and MasOrange, which has been allocated €58.6 million to enable 5G in 845 locations.

Telefonica was also the main beneficiary of the first phase of grants when [it received €298 million](#) of the €508 million awarded to extend 5G coverage to 4,123 sites. MasOrange received €143 million to upgrade 1,948 sites and Vodafone received €66 million for 1,200 sites.

Again, the effects of this state support are borne out in the database that shows Telefonica in Spain has the highest percentage deployment of 5G SA of any operator in Europe at 21 per cent.

Operator 5G SA deployment as a percentage of total deployments (leading countries)



In March 2025, the Spanish government said [the sum of both funding phases in 2024 and 2025](#) has enabled more than two million inhabitants and more than 36,800 km of the road network to have 5G coverage.

As part of their deployments, the three mobile operators agreed to share the 700 MHz frequencies in the locations where state funding is available.

Auction regulations from 2021 placed a cap of 2 x 15 MHz on the amount of 700 MHz an operator could hold (and a joint limit of 2 x 35 MHz together with 800 MHz and 900 MHz bands). But in 2023 this cap was relaxed in the case of publicly funded deployments in rural areas.

Under their agreement, whichever operator secured the state support would deploy a 5G SA network locally on behalf of itself and the other operators.

Each won a total of 2 x 10 MHz nationally in the 700 MHz band (in the case of Orange made up of two lots of 2 x 5 MHz), making the arrangement straightforward.

Pooling frequencies in this way enables operators to hit the download speed of 100 Mbps, as specified by the government, solely by using the 700 MHz band which is more spectrally efficient for the operators. This shared approach has also proved cost effective because it does not require any other bands to be deployed in support of 700 MHz. The strategy has been a significant contribution to Spain's 5G SA success.

Conclusion

PolicyTracker's MDD reveals how Spain has led other European countries in delivering a widespread deployment of 5G SA. The database also demonstrates how central the 700 MHz band has been to achieving this outcome..

But we can also see from the database that the claim of a country to be the sole leader in Europe is relative. By another analysis of the data we can see other countries have a stronger performance than Spain in the higher speed 3.6 GHz band. Indeed, France, Italy and the UK all have worthwhile claims for one kind of leadership or another in 5G SA.

In the case of Spain, Telefonica is the outstanding performer in rural parts of the country, due to its success in securing state funds. Of the three MNO, it has received the most support for 700 MHz rollouts in underserved locations.

Competitive reserve pricing in 700 MHz; extended licence duration in the same band and four-to-three mobile operator consolidation might all have contributed to Spain's 5G SA rollout, as has the significant financial support of the Spanish government and the three operators' network sharing arrangement.