

# Who is leading 5G development?

## 2020 update

### 5G patent leadership by country

In our last infographic we included a figure which charted 5G patent leadership by country. Unlike most studies, rather than assuming that all patents declared to the standards body are truly essential to the 5G standard, we incorporated data from the High Court of England and Wales to take account of individual companies' essentiality rates.

This infographic refreshes the figure for 2020 data, using the methodologies developed in our previous publications.

We find that it is European Union companies that hold the highest combined share of 5G patent families. This is in contrast to some recent publications by industry analysts and media outlets which have suggested that China is leading 5G.

### Why is 5G patent leadership of interest?

Fifth generation (5G) cellular technology is heralded as a game-changer due to vastly improved speed, responsiveness, reliability and flexibility.

Due to the potential economic benefits of 5G, countries around the globe are racing to get ahead in its development and roll out. 5G has also made headlines due to various political considerations.

As 5G commercialisation is still in its infancy, some industry analysts and media outlets have looked to 5G patent leadership as a proxy for 5G leadership generally. However, assessing 5G patent leadership accurately is extremely complex, and, most articles on the topic have overestimated the accuracy or the scope of the data that has been reported on.

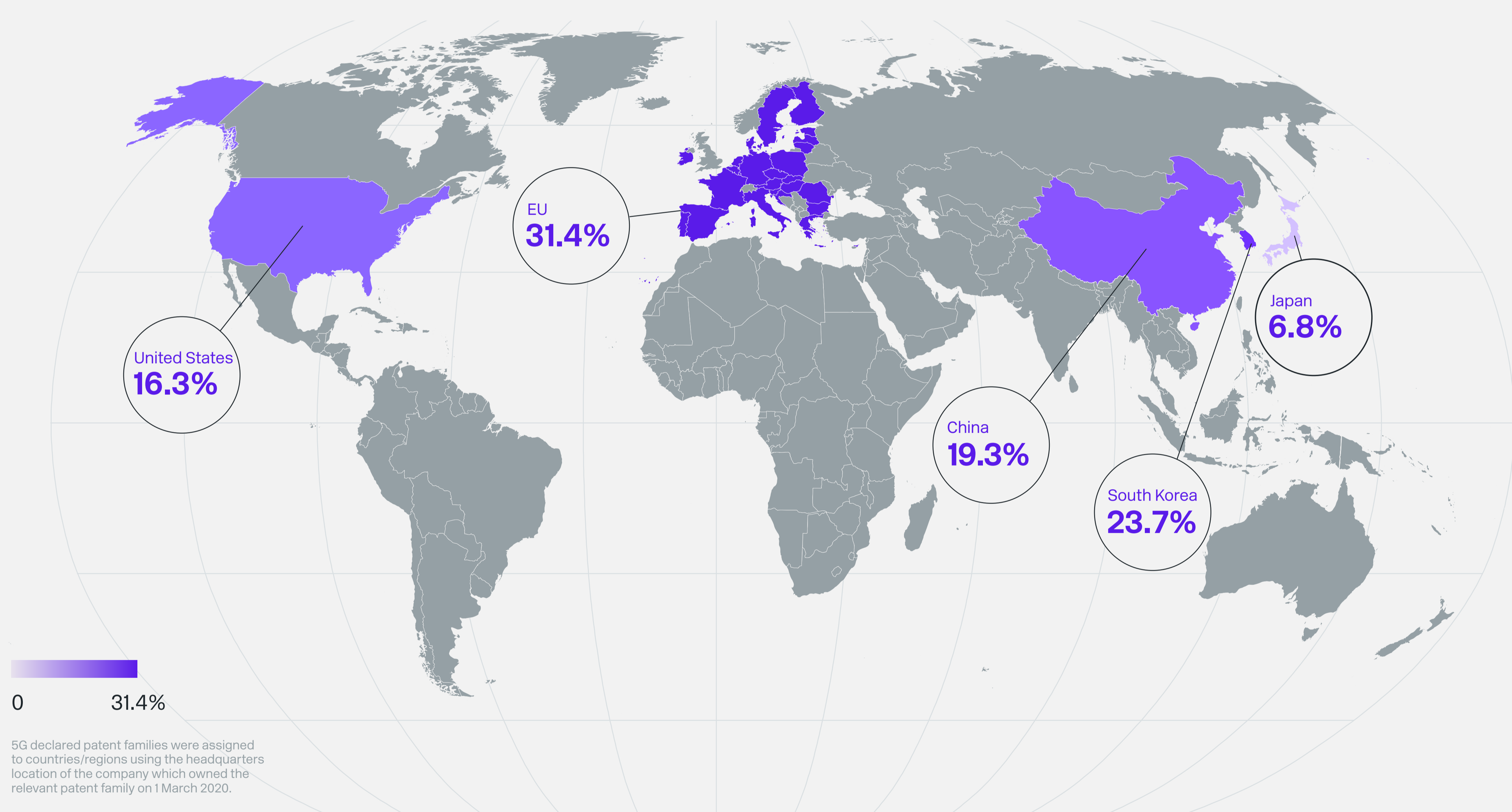
### Recapping our 2019 infographic: Who is leading 5G?

Last year we demonstrated that there is no conclusive evidence that China is leading 5G patent development, even though a number of recent publications have made this claim.

Declarations made to the 5G standards body are simply declarations that the patents may be or may become essential. So, it is important to consider the proportion of patents which are truly essential to the 5G standard when evaluating who is leading in 5G patents.

We showed that, when looking at a broader range of metrics and considering what proportion of each company's declared patents are truly essential, several different companies can take the top spot and countries other than China can be shown to be leading.

### Assigning 5G declared patent families to countries/regions puts the European Union in the lead when essentiality and jurisdiction quality filters are applied



### How we measured which patents are essential to 5G

When measuring 5G standard essential patent (SEP) leadership, many studies primarily rely on counting declarations to the 5G standard body without considering which patents are actually essential, even though not every declared patent is truly essential. Patent declarations are not independently assessed by patent examiners or the standards body for actual essentiality, and patent holders have no obligation to identify which patents are truly essential.

We have adjusted for this by relying on audits of truly essential patents found to be reasonable by the High Court of England and Wales in *Unwired Planet v Huawei*, where Samsung and Huawei's 4G patent portfolios were assessed for essentiality. Since then, the expert from the case has used a similar methodology

to publish equivalent figures for Ericsson and the entire industry.<sup>1</sup> We have relied on the essentiality rates found in these 4G audits as the best high-level prediction of each company's 5G essentiality rate, given that no 5G audits of a similar quality have yet been published.

We note that a report on 5G essentiality rates has recently been published by Amplified. However, very little information is available on the report or its methodology, so it is not possible for us to review or critique it. Therefore, instead, we rely on the court-approved approach.

1. See "Evaluating Standards Essential Patents in Mobile Cellular", David Edward Cooper, Hillsbrand Consulting Engineers les Nouvelles – Journal of the Licensing Executives Society, Volume LIV No. 4, December 2019. These rates are expressed differently to the *Unwired Planet v Huawei* figures as they use 'all declared families' as the denominator rather than just those 'declared families which are relevant to user equipment', so we have adjusted them accordingly.

### Applying a further quality measure

The patent families plotted in the figure above have been filtered to those which have been filed in the US, Europe, or both. This filter is based on the *Unwired Planet v Huawei* decision, where the judge opined that it was a serious measure and that "a serious player in the telecommunications market, including a major Chinese company, would likely file essential patents in the US and/or Europe".

#### Data processing

This analysis relies on international patent data derived from the EPO's data feeds in July 2020.

ETSI is the main standards body which maintains a database of 5G declarations. For this analysis we filter back our data to 1 March 2020 to control uneven delays in how long it takes each company's declarations to appear in ETSI's database.

The data is processed to correct for duplications, errors, ownership events and lapse status. Declared patents and patent families were assigned to their country of origin using the headquarters location of the company which owned the relevant patent or patent family on 1 March 2020.