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5G Network Equipment: Huawei vs. The Rest, and What Happens Next

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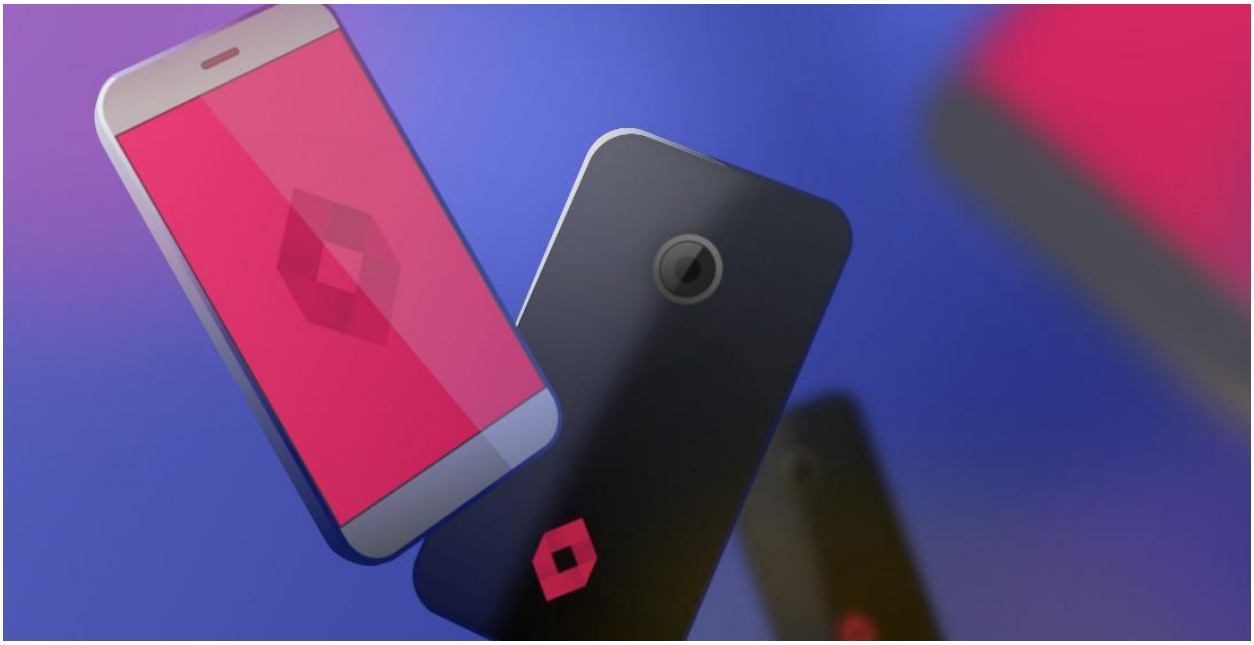


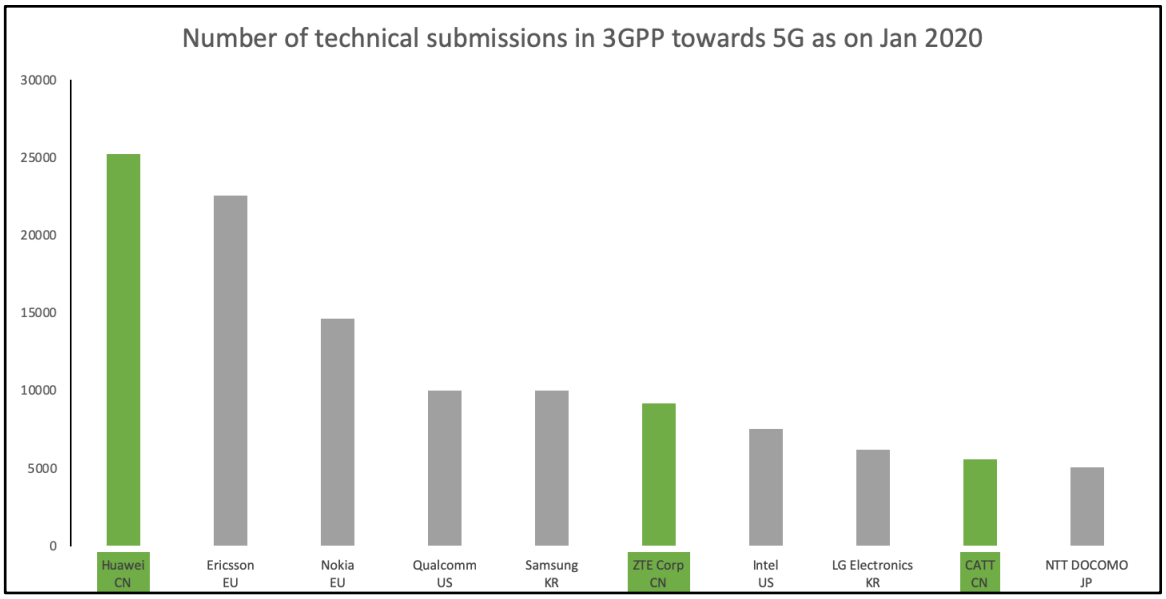
According to Gartner Inc., worldwide 5G wireless network infrastructure revenues will reach $4.2 billion in 2020, an 89% increase over the 2019 revenues of $2.2 billion.

Clearly, 5G technology is making its way into mobile networks finally after years of anticipation, with more than 61 telecom carriers announcing commercial deployments thus far. Many of these telecom carriers are working with more than one 5G network equipment vendor, so the number of 5G contracts announced exceeds the number of deployments made so far.

Geopolitics of the Race to 5G

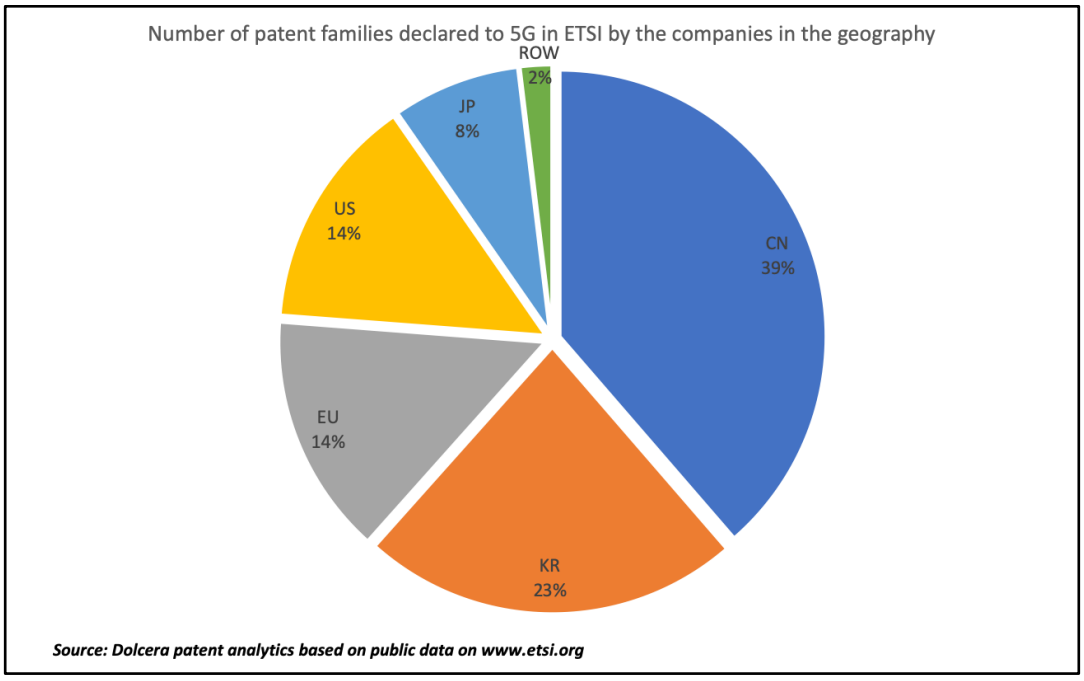
In deployments of 5G infrastructure around the world, US and European players have a major role from a research and development (R&D) perspective. But unlike with the LTE (4G) standard, where US and European companies were the most prominent investors in R&D, 5G saw a surge of R&D investments from Chinese companies too. For example, Huawei, per its own estimates, has invested $14.3 billion on R&D in 2018, which is 30% more than the combined R&D spending of Ericsson and Nokia in the same year.

Chinese companies have been more active in participating in the development of 5G standards. The work on developing standards for 5G has begun as early as late 2016. 3GPP, the standard setting body in telecommunications industry saw an avalanche of participation from Chinese companies during this period of developing 5G standards.



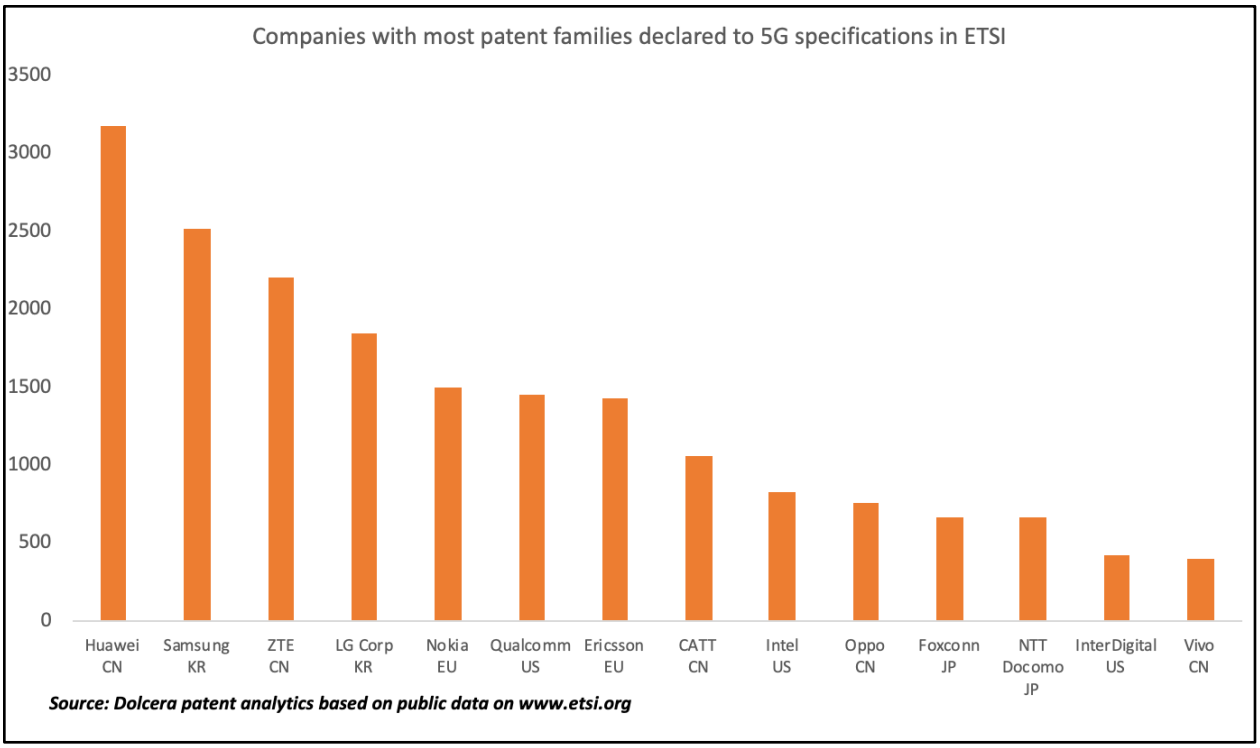
An increase in R&D efforts can also be seen in the patents around the technologies enabling 5G. Although there are many arguments that patent quantity alone would not equate to technology innovation, and that the quality and impact of the solutions claimed in the patent matters more, there is no denying the Chinese players are winning the game of numbers here.

As of January 2020, the global telecommunication standards body ETSI has seen a massive number of voluntary disclosures of standard-essential patents (SEPs) to 5G standards from Chinese players. Chinese players account for 40% of all the patent families disclosed to 5G standards in ETSI thus far.



With the ban on Chinese network vendors to supply US telecom carriers due to alleged security and trade-war related reasons, these carriers (e.g. Verizon, AT&T, Sprint, and T-Mobile) are left with European players Ericsson and Nokia for their 5G deployments.

US companies that have developed technologies around 5G are centered around handset or user equipment (UE) capabilities. For example, the only US companies that declared a significant amount of standard essential patents (SEPs) to 5G standards in ETSI are Qualcomm, Intel, Apple, and InterDigital. None of these companies have products to supply to network vendors.



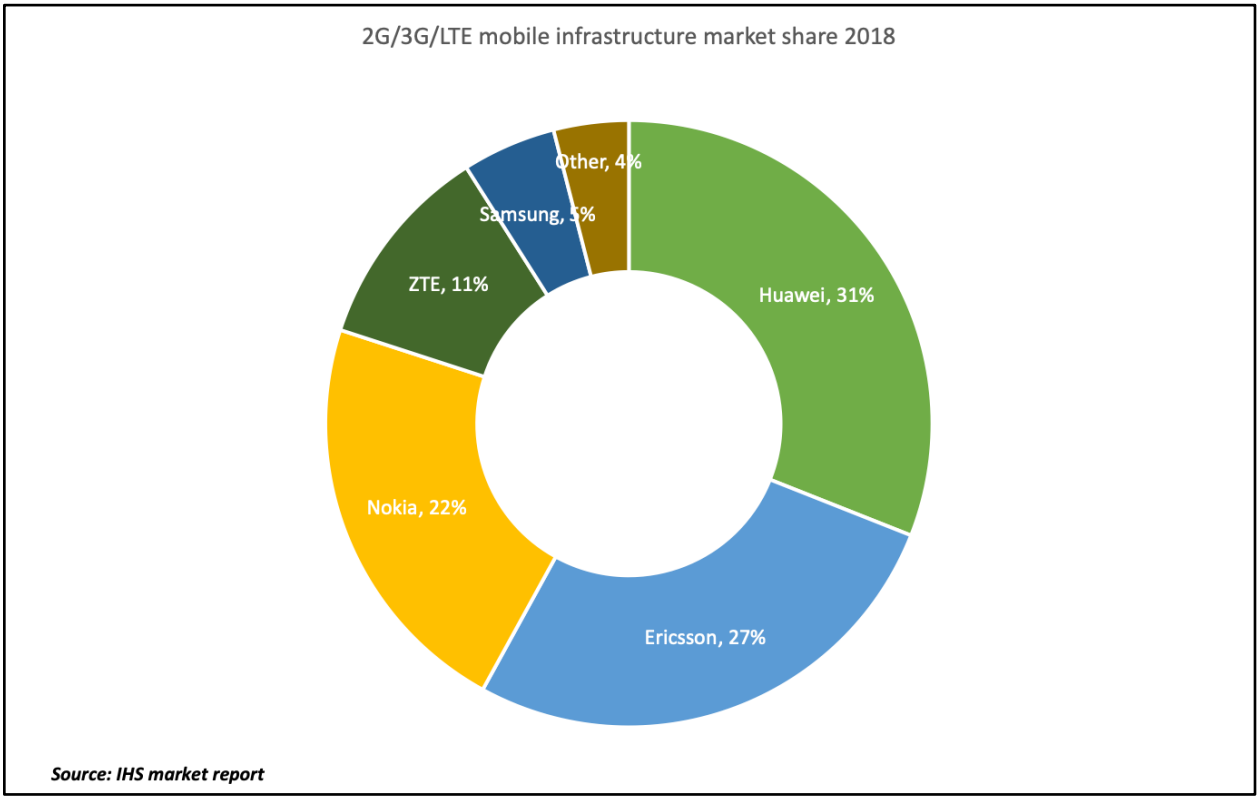
Recent actions by the US government – such as blocking Qualcomm's acquisition by Broadcom citing national security concerns, as well as rumors of supporting a 5G national network – all point to the possibility of US government making plans to support home-grown companies to develop 5G network equipment.

Network Equipment Vendors

Network equipment vendors play the key role for 5G to become reality. They are key for deployments and world wide adaptation of 5G networks. In fact, as of January 2020, all of the

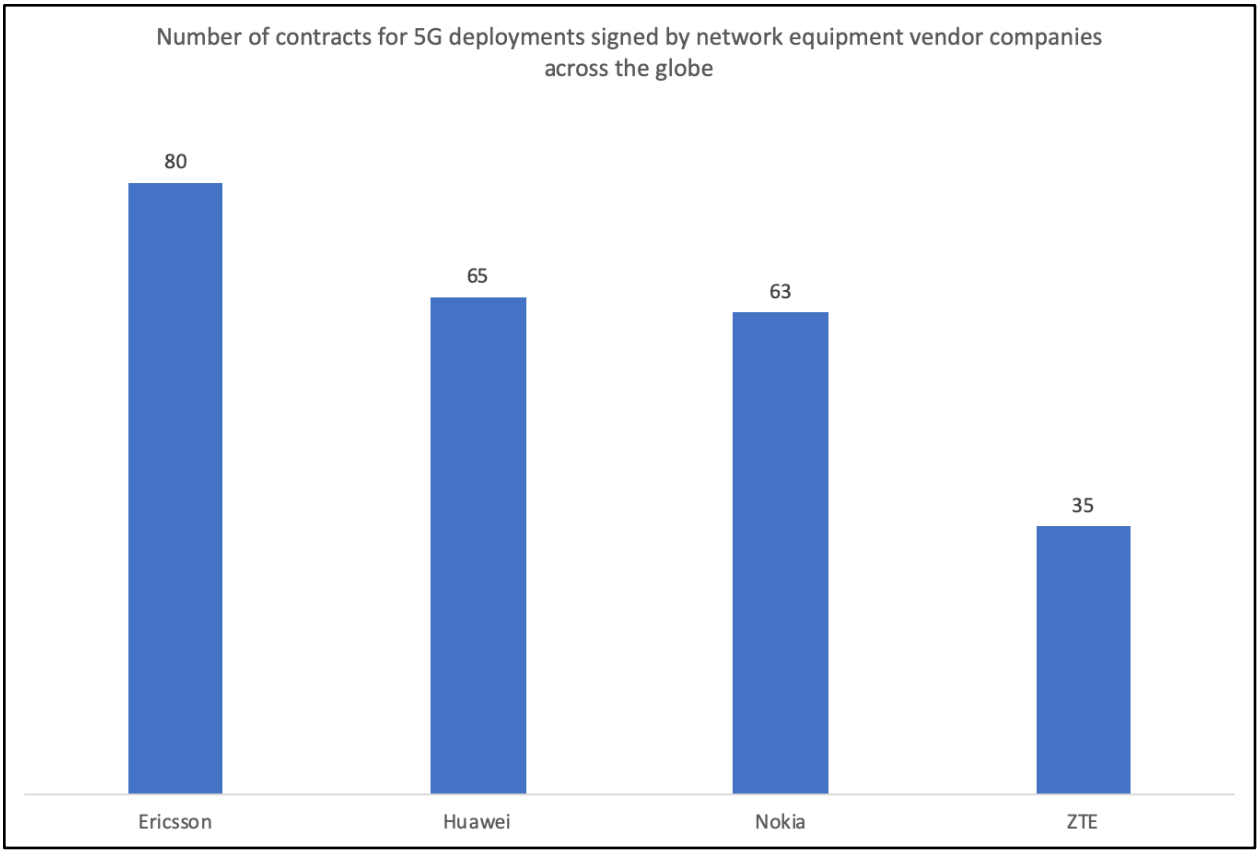
top five companies with most SEP families declared to 5G standards in ETSI have network equipment products in their product portfolios.

According to a report by IHS markit, In 2018, Huawei took the top spot in the overall global telecommunication equipment market with a market share of 31%, followed by Ericsson with 27%, and Nokia with 22%. ZTE & Samsung were distant 4th and 5th with 11% and 5% market share respectively.



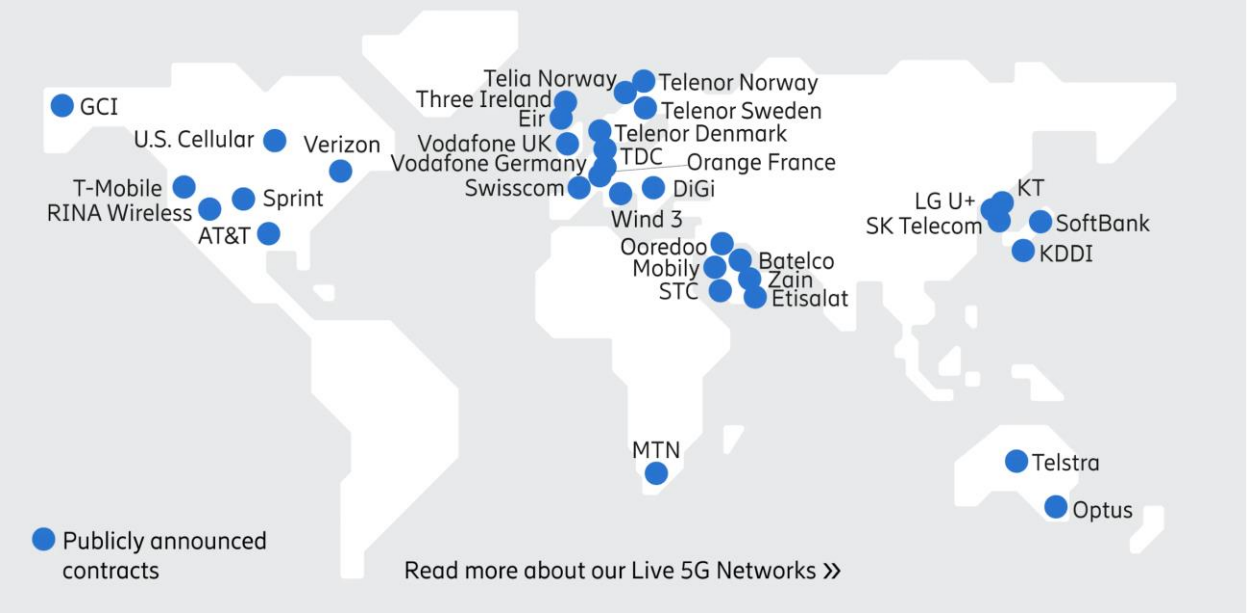
Who Leads the Race among 5G Network Vendors?

With rapid rise in the number of countries deploying 5G, it's an important time for network equipment vendors to materialize and monetize billions of dollars in R&D in developing 5G technologies. This is considered a “race” because of the “winner takes it all” nature of the industry. Unlike, smartphone industry, it's not easy to swap or replace network equipment once installed. That means, a partner once chosen for deployment is not easily replaceable unless the replacement is worth the relatively huge capex barrier. And, network equipment vendors generally sell “solutions” rather than individual products which further increases the capex barrier for replacement. So, the early leader in the race has a healthy edge over the competitors. Following chart shows the number of 5G deployment contracts signed by various network equipment vendors worldwide.



Ericsson

No surprises here! With first-mover advanced markets like US, Australia shunning Huawei, Swedish vendor Ericsson was expected to be on top. The company keeps a public tally of its 5G wins and puts the total tally at 80, with 34 of those publicly named. The icing on the cake is 24 live networks across the globe.



The geographic spread of Ericsson contracts is also quite wide, with company landing contracts in the US, South Korea, Japan, Europe, South Africa, and even China.
Ericsson is one of the top 10 SEP holders in 5G. It holds over 1,300 patent families declared to 5G standards in ETSI.

Huawei

Chinese giant Huawei bags the silver medal, signing 65 contracts across the globe by the end of 2019. The Chinese vendor has nearly 60 percent of its contracts from Europe including Germany, Switzerland, the United Kingdom, Finland and more. In all, the Shenzhen-based firm has shipped more than 400,000 active antenna units, according to an official statement.

Even though Huawei is next to Ericsson in terms of 5G contracts signed, Huawei pips every other company in the world in terms of SEPs declared to 5G standards. It holds close to 3000 patent families declared to 5G standards in ETSI, which is more than double that of Ericsson. This huge number of SEPs is also due to the fact that Huawei also makes 5G smartphones and modems in addition to 5G network equipment.

Nokia

Nokia stands a close 3rd behind Huawei with 63 commercial contracts in its kitty. The figure includes customers such as AT&T, KDDI, Korea Telecom, LG Uplus, NTT DOCOMO, O2, SK Telecom, SoftBank, Sprint, STC, T-Mobile US, Verizon, Vodafone Italy and Zain Saudi from key 5G early adopter and progressive markets.

The contracts signed by the Finland based company spread across geographies, spectrum bands and across traditional and cloud network architectures.

Amongst European companies, Nokia holds most SEP families declared to 5G standards. It holds close to 2000 patent families declared to 5G standards in ETSI

ZTE

Chinese brand ZTE is the distant 4th by securing 35 contracts across globe and 20,000 units of its end-to-end products shipped by September, 2019

Again, like its Chinese neighbor, ZTE scores high on the number of SEP families declared to 5G standards. With more than 2500 patent families declared, ZTE is the second largest holder of SEP families declared to 5G standards in ETSI.

Samsung

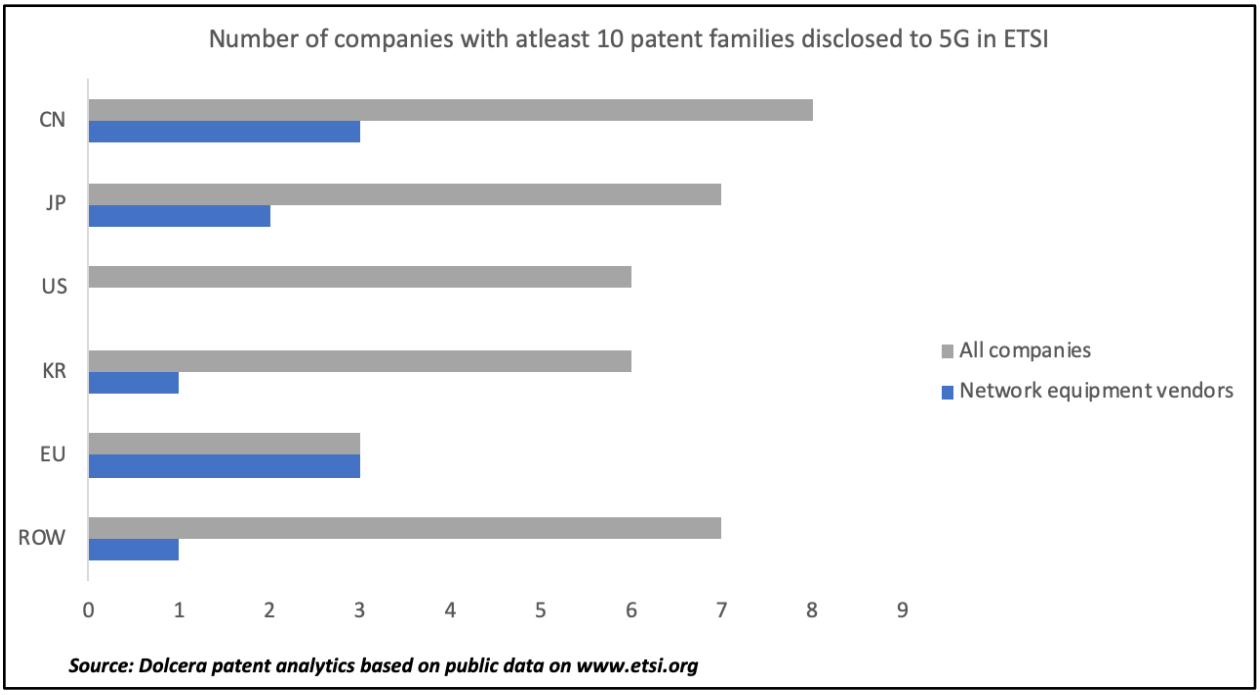
Samsung has not explicitly stated the number of contracts. However, it provides 5G equipment to 2 of the world's (and South Korea's) first 5G service providers, SK Telecom and KT. Samsung also supplies 5G gear to Verizon and Sprint in the US.

Samsung is the top non-chinese SEP holder with close to 2500 patent families disclosed to 5G standards in ETSI.

US Woes: None of the Market Leaders is based in the US

5G deployments across the globe continue to remain a headache for the US administration. The geopolitical noise vis-à-vis 5G is increasing every day, with various European and Asian governments and operators allowing Huawei for 5G deployment. The reasons cited more often than not are "economic unviability of keeping Huawei out," and a "lack of concrete proof of spying by Huawei (or Chinese government)."

5G SEP's reflect the same story, with none of the 5G SEP holders in the US having any products to cater network providers. Which indicates a null space for the US in the 5G technology landscape



The Road Ahead: Merger ***and*** Acquisition?

US companies have a dominant presence across the value chain, with Apple being the market leader in smartphones across the globe in terms of value, and Qualcomm having a mammoth share in smartphone chip and modem market. However, US companies need to raise their game in network infrastructure, which is often hailed as the most critical component in the

telecommunications market. The need is even stronger, as 5G technology may impact industries such as healthcare.

Given the current situation, the possible future paths for the US administration can be:

Apple, Qualcomm, Intel... Anyone?

The most obvious step will be to assist an existing local giant in the hi-tech market (Intel, Qualcomm, Apple) to enter the network infrastructure market. Some of these giants already have existing relationships with companies across the telecom value chain. Howsoever tempting and easy it may sound, there are certain roadblocks:

- **Too little too late:** 61 commercial deployments have already taken place, more than 200+ contracts have been signed. The new entrant, regardless of its size, will face difficulty. The situation will be more complex for US telecom carriers which are in advance stages of their trials and deployments.
- **Once bitten, twice shy:** Intel has already burned its hand in the smartphone market and sold the division to Apple in mid-2019 due to its non-preparedness with the 5G modem. Qualcomm failed to acquire NXP and had to pay $2 billion for its misadventure and narrowly escaped getting acquired by Broadcom (thanks to US policymakers). It is highly unlikely that these players will try out a new adventure where investments required are already quite high.

This path may yield favorable results in future generations of technology, but the advent of the next wave (6G?) is nearly half-a-decade away, and this does not solve the 5G problem.

Cisco Acquires Ericsson: Why Not?

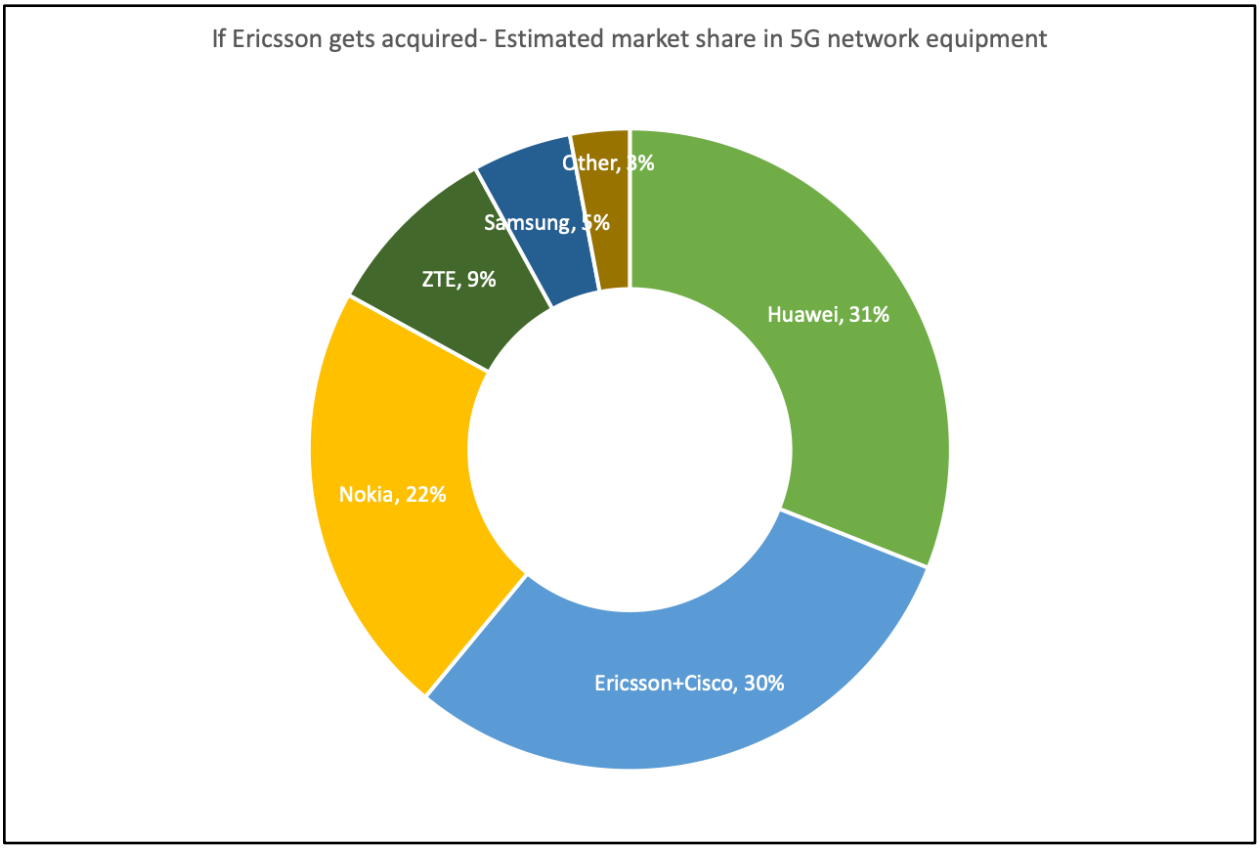
Ericsson's revenues are stagnant (shrinking, if we ignore 2017). They lost market share to Huawei in recent years, and no longer enjoy pole position in the overall telecommunication equipment market. Their employee strength has reduced from 116,000 in 2016 to 95,000 in 2019. In a nutshell, Ericsson is not in the best financial health.

Cisco, on the other hand can stimulate the core network router business, and its Ultra Packet Core is effectively a way to run a 4G and 5G evolved Packet Core (ePC) in software only – the guts and intelligence of a 4G network. It, however, needs to have radio access network products to build and manage carrier networks in their entirety. And Ericsson can help.

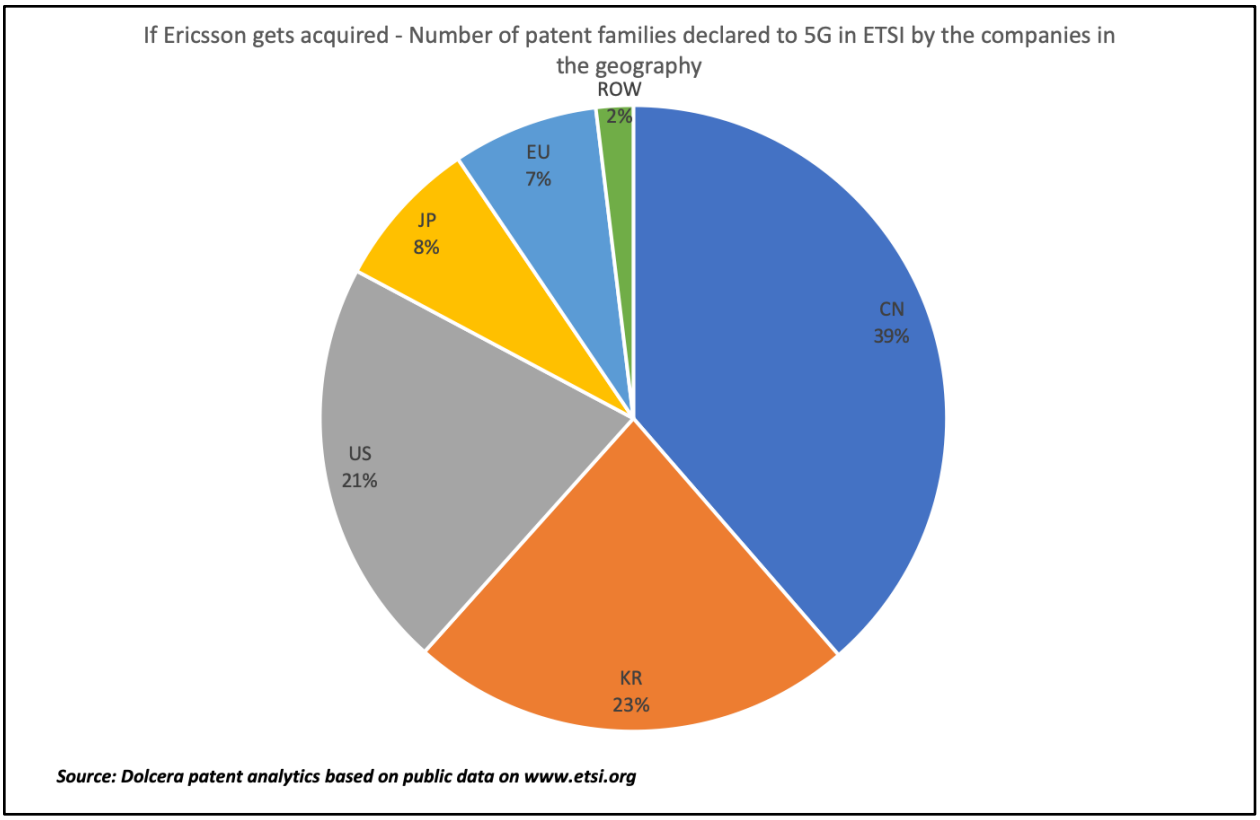
We understand that even with Cisco's $51.9 Billion revenue, this is way beyond the scope of normal Cisco acquisitions. But what options do US carriers have? If Ericsson keeps on shrinking, Nokia might have a near-monopoly, assuming Huawei remains off-limits. Ericsson, owing to its financial woes, might be propped up by a Chinese player (assuming not a direct acquisition).

Since many of the European nations have allowed Huawei for deployments, Ericsson dependence on US is extremely high. Cisco + Ericsson is expected to have decent negotiating power, and will likely bag a mammoth share of future contracts against Nokia and Samsung from US carriers. With backing from the government, they are certain to make favorable gains in other business segments as well.

The acquisition will also help in improving overall market share and global footprint of the combined mammoth company. Acquisition gives Cisco access to ready-to-ship technology and Ericsson loyal customer base and probable state support in the US.



Cisco + Ericsson also gives the US a boost in terms of its IP share in the 5G standards world. Injection of Ericsson's huge portfolio of SEPs would put US on the map again in the race of top three geographies.



Cisco and the US government certainly have a lot to gain and also offset possible losses in future (indirect Chinese intervention).