10 Aug 2020

Avanci’s share of mobile SEPs far higher than previously reported

A detailed examination of the 3G and 4G standard essential patents licensed through Avanci indicates that the platform is the dominant player in both markets, write Richard Vary and Matthew Noble of Bird & Bird

Recent articles and reports, including **an October 2019 article in *IAM***, have addressed the share of 3G and 4G standard essential patent (SEP) families which are licensed through Avanci, and have predominantly relied on counts of patent families declared to the European Telecommunications Standards Institute (ETSI). Whilst this sort of methodology is commonly seen, such metrics are limited in their ability to account for variations in patent family value and essentiality rates between companies.

In order to demonstrate what further analysis could be done, we carried out an investigation into the 3G and 4G market share of the portfolio licensed through Avanci. We analysed both declared patent families and SEPs held by the Avanci licensors, the latter being patent families which have been assessed in third party studies as essential to the relevant standard generation.

We found:

- Higher 3G and 4G market shares for Avanci's platform than have been reported previously. We found that the October 2019 *IAM* study does not accurately reflect the Avanci licensors' market share of declared 3G or 4G patent families or SEPs in spring 2020. When applying a range of different filters and metrics, we could not reproduce the levels previously reported by *IAM*.
- A number of data points which indicate that Avanci's portfolio equates to a market share of between two-thirds and four-fifths of 3G SEPs, and approximately two-thirds of 4G SEPs. However, we have not attempted to assess the exact share of 3G and 4G declarations or SEPs which are licensed through the Avanci marketplace, and there is no one, agreed method of calculating a licensor's market share. Our case study indicates a range of possible scores for Avanci's 3G and 4G market share.
- That the Avanci platform's market share is more resilient to changes to the methodology than portfolios of individual patent holders. This may be because the strengths and weakness of individual portfolios are balanced out when combined into larger groups.

Methodology to investigate the Avanci licensors' market share in 3G and 4G

In **a previous article published by *IAM***, we examined studies of patent leadership of SEPs for the newer 5G standard. We found that in many of the studies: (i) the methodologies used were not transparent; and (ii) the reports did not distinguish between patent families which have merely been identified as potentially essential, and those which have been assessed to be essential.

We found that the methodology used, as well as the date of analysis, can have a significant effect on the rankings of individual patent owners, with different approaches and datasets favouring one patent owner or another.

Using multiple methodologies to study patent portfolios may provide a more complete picture of the strength of the relevant portfolios. Identifying the methodologies that favour or disfavour a specific portfolio could be of interest to a patentee seeking to demonstrate the strengths of its own portfolio, or to a party wishing to criticise the value of an opponent's portfolio.

In processing the data, we used a range of methods, in order to determine whether these choices had a significant impact on the Avanci licensors' market share. Next, we applied a number of filters to the results and tested a number of different value metrics to assess the degree of variability that was introduced; as consistency may indicate reliability. The filters and metrics were chosen to reflect those which the academic literature and/or the cellular industry have proposed reflect the value, and not just the size, of patent portfolios.

Assessing the patent families declared to 3G and 4G

Accurately identifying the patent families declared to ETSI as potentially essential to 3G and 4G is not straightforward: the assessment requires data analytics capability as well as legal, technical and industry knowledge.

We carried out the steps described below:

- cleaning and de-duplicating declaration data acquired from ETSI;
- matching cleaned declaration data to patent office data;
- tagging declarations to 3G and/or 4G standard generations;
- converting declarations to patent families using the ETSI family definition (or the INPADOC definition for the metrics overlaying third party essentiality data);
- determining the legal status of each patent family and its current ownership;

- grouping patents into companies, cleaning, harmonising and mapping company names to applicant, assignee and declarant names (allowing for translation, transliteration, and typographical errors, and misspellings);
- assigning companies to the correct corporate group as at the relevant date and matching corporate groups to the named Avanci licensors (sourced from Avanci's website).

Accounting for value considerations

Calculating the market share of patents declared to the standard using a count of patent families assumes that there is no variation between companies as to patent family value. More sophisticated methods deal with this issue by filtering the patent families to the most relevant ones, and/or using metrics other than patent family counting, to try to assess the value, rather than just the number, of patent families. We used both approaches.

We do not claim here that any of the filters or metrics that we have relied on is better than any other. We chose each filter and metric because it has been used in the industry or proposed in academic papers that relate to measuring patent value. A list of those papers would be too long for this article, but the authors will supply them on request.

Filters

We tested each of the following filters, as well as combinations of filters, for example: combining the lapse filter with the grant filter to find patent families which are both alive and granted (referred to as "enforceable" families for simplicity).

Lapse status

This step filters the patent families to those which contain at least one member that is alive; ie, was not abandoned, lapsed or invalid due to expiry of term.

We also applied a variation of this filter that required the patent family to have a live family member in an "IP5" patent jurisdiction, i.e. the USA, Japan, Korea, China, and/or a European patent ("EP"). This filter addresses an issue common in the underlying patent data, whereby a patent family appears to be alive (even though all members have lapsed) due to a country not recording the lapse event correctly. IP5 data is less prone to this issue.

Grant status

This step filters the patent families to those which contain at least one granted member. We also applied a variation of this filter which required the patent family to have a granted member in an IP5 jurisdiction.

Priority date filters

This sort of filter is typically used to restrict the patent families analysed to those which relate to a specific date range or specific release of a standard generation.

Priority date filters have been used on the premise that the patent families which relate to an earlier release of a standard generation are more relevant, or more valuable, than the others. In *Unwired Planet v Huawei*, Unwired Planet used a priority date filter of 31st December 2008 for 4G, to identify those patent families which it called "core" LTE. We included this priority date filter in our analysis.

An alternative application of a priority date filter is to assist in preventing declarations which exclusively or primarily relate to later standard generations from affecting the market share of earlier standard generations. This is a common problem, because declarations to later generations are more numerous than those the prior generations and new standard documents can be tagged as relating to earlier generations; eg, for reasons of interoperability. We tested priority date filters which were set to the "start date" of first release of the following standard generation; ie, 23rd January 2006 for the start date of Release 8 for 3G and 1st June 2016 for the start date of Release 15 for 4G.

Jurisdiction filters

Jurisdiction filters have been used on the premise that patents filed in some jurisdictions are more valuable or more relevant than those filed in other jurisdictions. This may be on the basis of: a trait of the patent system in that jurisdiction; the value of that jurisdiction to an implementer; or because it suggests something about the patentee's opinion of the importance of that patent family.

We implemented the following jurisdiction filters:

- IP2 – the patent family requires at least one US or EP patent.
- IP3 application and an enforceable patent – the patent family requires at least one US, EP or Chinese patent and an enforceable patent in the family.
- Two IP3 authorities, both enforceable – the patent family has to have at least one enforceable patent in at least two of: USA, EP and/or China.

Metrics

We tested each of the following metrics. In each case: (i) relevant filters (described above) were applied prior to testing each metric; and (ii) phantom patents (entries which appear in patent databases but do not give rise to an independent enforceable right, such as translations of EP patents) were not included in the counts.

Patent family counting

This metric is simple to calculate and is commonly used in the industry. Patents are grouped into patent families, and patent families which have been declared more than once are de-duplicated.

Patent counting

This metric counts the total number of patents within each of the relevant patent families. As opposed to a patent family count, which treats all patent families equally irrespective of their size, this metric reflects the size of each patent family in the final score. We also used a variation of this metric whereby only the enforceable patents in IP5 jurisdictions were counted.

Authority counting

This metric is similar to the patent counting metric, but each unique IP5 authority is only counted once. For example, a patent family containing two US patents and one Japanese patent only receives a score of two.

GDP-weighted patent counting

This metric is similar to the authority counting metric, but each jurisdiction is weighted by its GDP. This metric reflects a finding supported by some academic papers that a GDP-weighted authority count better reflects the value of patent family than simply counting unique jurisdictions.

Accounting for essentiality rates

A declaration to the 3G or 4G standard is merely a statement that the patent family "may be or may become essential", rather than actually being essential. Some degree of over-declaration is inevitable because the set of patents that may be essential is larger than the set of patents which are essential.

During examination, there is no systematic independent assessment of essentiality by patent offices. Assessments of essentiality have demonstrated that there can be significant variation in essentiality rates between companies. Therefore, it is important to consider essentiality rates.

Differentiating between a patent that is truly essential to the standard and one that is merely related to the standard can take years of litigation (see, for example, *Nokia v Interdigital* in the UK). However, there are a number of sources of essentiality data that rely on sampling and/or short reviews to cover entire standards. In our investigation, we used PA Consulting's WCDMA, LTE and LTE-A essentiality reports, which PA Consulting kindly permitted us to use for this case study. The reports may be obtained from PA Consulting directly. In each case we filtered the 3G and 4G patent families to those which were assessed as essential in the dataset in question.

PA Consulting is not sponsored by any industry player as their work is later paid for by selling licences to the data to interested buyers, and PA Consulting's reviewers have at least one degree in a relevant subject matter. This removes the potential concerns that have been expressed about sponsored studies and those involving less qualified reviewers.

As a cross-check we also ran the same exercise using data from Concur IP's essentiality assessments performed for the *TCL v Ericsson* case in California. We note that Yuxi Meng and Jonathan Putnam of Competition Dynamics found significant disagreement when comparing the PA Consulting and Concur IP datasets at a patent by patent level, although they suggested that this may be because of the "relatively cursory technical and legal review" carried out by Concur IP.

Findings

We tested the Avanci platform's portfolio using a declared patent family counting metric, with these filters:

- No filter.
- Granted.
- Alive and granted.
- IP5, alive and granted.
- IP2.
- IP2, alive and granted.
- IP3 application and an enforceable patent.
- Two IP3 authorities, alive and granted.

We found that the results varied by ±2% and ±3% for 3G and 4G respectively. In other words, the differences introduced by the filters were significant but of relatively low magnitude.

These results indicate that the combined portfolio represented by Avanci is more resilient to changes in methodology and filters (ie, it is less sensitive) than SEP portfolios of individual patent holders. This may be because particular traits seen in a single company's portfolio are balanced out when combining multiple portfolios together.

Adding priority date filters

We found that the addition of priority date filters had a relatively minimal effect on the variability observed in the results. The application of the 2006 priority date filter had no effect on the range observed for the Avanci platform's share of 3G declared patent families. Whereas, both the 2009 and 2016 priority date filters slightly increased the variability of the results for the Avanci platform's share of 4G declared patent families, solely due to increasing the upper end of the range (by 5-10%).

This suggests that the Avanci platform's combined portfolio is not heavily weighted to any era of 3G or 4G development. However, we see that Avanci's portfolio contains a slightly larger-than-average proportion of 4G patents which predate the beginning of 5G development, and a larger-than-average proportion of 4G patents which pre-date the end of the first LTE release.

Using metrics based on patent family size

We tested each of the metrics below and applied each of the filters to each metric:

- Patent count (all patents).
- Patent count (IP5 enforceable only).

- Authority count (IP5 only).
- GDP-weighted patent count (all families).
- GDP-weighted patent count (IP5 only).

For both 3G and 4G we found that these metrics did not affect the bottom end of the range of market shares that we had already observed. However, they increased the top end of the range, with some metrics reaching 75% of the entire industry for 3G and over 70% of the entire industry for 4G.

We concluded that the Avanci platform's portfolio performs well under the additional scrutiny of such metrics, but they also introduce a greater degree of variability into the results.

Using a patent family counting metric, with essentiality data applied

Studies reporting on ownership of actually-essential patents suggest that metrics based on ETSI declarations alone correlate poorly with SEP ownership, at least for some SEP holders. The application of essentiality data to the Avanci platform revealed that the problem was less pronounced when assessing the Avanci licensors' combined market share. This may be because variability in essentiality between individual portfolios is greater than for the Avanci and non-Avanci combined groups.

In both 3G and 4G, the application of PA Consulting essentiality data to the results slightly increased the Avanci platform's market share. Remarkably, we observed this trend for all the filters tested, as well as for both the patent family counting and the patent counting metrics. For 3G, we observed values for the Avanci platform's market share with a mean of 75%. For 4G, we observed values for the Avanci platform's market share with a mean of 65%.

Switching to Concur IP's data made relatively little difference, which was not predicted, given the disagreement between Concur IP data and PA Consulting data described by others. It had the effect of increasing and decreasing the Avanci platform's 3G and 4G market shares respectively, but in both cases the observed effect was extremely slight and may not be statistically significant.

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