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LITIGATION OF STANDARDS-ESSENTIAL PATENTS IN EUROPE: A COMPARATIVE ANALYSIS

*Jorge L. Contreras,[†] Fabian Gaessler,^{††} Christian Helmers^{†††} &
Brian J. Love^{††††}*

ABSTRACT

Despite the significance of patent litigation in the EU and the looming structural overhaul of the European patent litigation system, there has been comparatively little empirical or statistical analysis of European patent cases across member states. This absence has largely been due to the lack of harmonized case-level data across European jurisdictions. Over the past few years, however, researchers in Europe have developed patent litigation databases that have enabled robust quantitative analysis. As a result, comparative empirical studies have recently been published concerning European patent litigation overall, as well as litigation by so-called non-practicing entities (NPEs). The present study extends this work to the important area of litigation relating to standards-essential patents (SEPs) in the EU. We find that SEPs has been asserted in Europe at significant levels, and that PAEs play a large role in this activity.

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I. INTRODUCTION

The European Union (EU) is among the world's largest markets and technology development regions. As such, patent litigation has emerged as a significant market phenomenon across the EU. Currently, each European state maintains its own judiciary, and patent cases are adjudicated at the national level with recourse to the European Court of Justice (CJEU) only on questions pertaining to EU-wide directives.¹ This will all change soon, however, with the pending introduction of the EU Unified Patent Court (UPC), which will provide a coordinated adjudicatory framework for patent disputes.²

1. See generally LUKE McDONAGH, EUROPEAN PATENT LITIGATION IN THE SHADOW OF THE UNIFIED PATENT COURT 88–90 (2016).

2. The Rules of Procedure of the UPC were adopted in October 2015. See *Rules of Procedure* (“Rules”) of the Unified Patent Court, UNIFIED PATENT COURT (Oct. 19, 2015)

Despite the significance of patent litigation in the EU and the looming structural overhaul of the European patent litigation system, there has been comparatively little empirical or statistical analysis of European patent cases across member states.³ This absence has largely been due to the lack of harmonized case-level data across European jurisdictions.⁴ Over the past few years, however, researchers in Europe have developed patent litigation databases that have enabled robust quantitative analysis.⁵ As a result, comparative empirical studies have recently been published concerning European patent litigation overall,⁶ as well as litigation by so-called nonpracticing entities (NPEs).⁷ The present study extends this work to the important area of litigation relating to standards-essential patents (SEPs) in the EU.

II. BACKGROUND: SEPs AND NPEs

Technical interoperability standards enable telecommunications, computing, and other devices produced by different firms to interoperate without significant user intervention. Many interoperability standards are developed by private firms that collaborate in standards-development organizations (SDOs) such as ITU, ISO and ETSI.⁸

Because successful standards embody numerous technological advances, firms that develop standards may obtain patents covering the technical contributions that they make to a standard. Many patents cover important interoperability standards in fields such as wireless communications, computer networking, and semiconductor design.

<https://www.unified-patent-court.org/sites/default/files/UPC-Rules-of-Procedure.pdf>. See generally EUROPEAN PATENT OFFICE, PATENT LITIGATION IN EUROPE: AN OVERVIEW OF NATIONAL LAW AND PRACTICE IN THE EPC CONTRACTING STATES 135–38 (4th ed. 2016), [http://documents.epo.org/projects/babylon/eponot.nsf/0/05B84848CBCF7338C1257833003C2531/\\$File/patent_litigation_in_europe_2016_en.pdf](http://documents.epo.org/projects/babylon/eponot.nsf/0/05B84848CBCF7338C1257833003C2531/$File/patent_litigation_in_europe_2016_en.pdf).

3. See Katrin Cremers et al., *Patent Litigation in Europe*, 44 EUR. J.L. & ECON. 1, 3–4 (2016) (noting the lack of previous empirical research in this area).

4. *Id.*

5. *Id.* at 4.

6. *Id.* See also generally Stuart J.H. Graham & Nicolas van Zeebroeck, *Comparing Patent Litigation Across Europe: A First Look*, 17 STAN. TECH. L. REV. 655 (2014).

7. See generally Brian J. Love et al., *Patent Assertion Entities in Europe*, in PATENT ASSERTION ENTITIES AND COMPETITION POLICY 104 (D. Daniel Sokol ed., 2017).

8. See Knut Blind & Brian Kahin, *Standards and the Global Economy*, in CAMBRIDGE HANDBOOK OF TECHNICAL STANDARDIZATION LAW: COMPETITION, ANTITRUST AND PATENTS, CH. 1 (Jorge L. Contreras ed., 2017).

A. STANDARDS AND STANDARDS-ESSENTIAL PATENTS (SEPs)

In order to promote broad adoption of their standards, many SDOs require that their participants disclose and license SEPs. Ideally, participants license SEPs to manufacturers of standardized products either royalty-free (RF) or subject to “fair, reasonable and nondiscriminatory” (FRAND) royalties.⁹ These commitments are intended to assure manufacturers that they will be able to obtain licenses to SEPs on terms that are, at a minimum, reasonable, and also that they will not be prevented from manufacturing products incorporating a standard due to the disclosed patents.

B. SEP LITIGATION

Despite these assurances, over the past decade significant litigation involving SEPs has arisen in the United States, Europe, and Asia. This litigation occurs in several contexts. For example, the holder of a SEP and its potential licensee may disagree whether an offered royalty rate is, indeed, FRAND. Several well-known cases in the United States, including *Microsoft Corp. v. Motorola Inc.*¹⁰ and *Ericsson Inc. v. D-Link Sys.*,¹¹ involved such disagreements. In these cases, the manufacturer often concedes that a license under the asserted SEPs is required but claims that the SEP holder’s royalty demand is unreasonably high.¹² That is, the manufacturer brings a breach of contract, estoppel, or similar claim against the SEP holder, asserting that the SEP holder’s breach of its FRAND commitment has damaged the manufacturer in some way.¹³ Such arguments may also be made by a manufacturer as affirmative defenses to a claim of infringement by the SEP holder (i.e., the manufacturer may argue that it is

9. See RUDI BEKKERS & ANDREW UPDEGROVE, A STUDY OF IPR POLICIES AND PRACTICES OF A REPRESENTATIVE GROUP OF STANDARDS SETTING ORGANIZATIONS WORLDWIDE 89 tbl. 13 (2012), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2333445 (examining ten SDOs and finding that eight required FRAND licensing); Brad Biddle et al., *How Many Standards in a Laptop? (And Other Empirical Questions)*, in PROCEEDINGS OF THE 2010 ITU-T KALEIDOSCOPE ACADEMIC CONFERENCE 125 fig. 2 (2010), www.itu.int/dms_pub/itu-t/opb/proc/T-PROC-KALEI-2010-PDF-E.pdf (finding that 75% of the standards incorporated in a typical laptop computer were subject to a RAND commitment and 22% were royalty-free); Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CALIF. L. REV. 1889, 1906 (2002) (examining thirty-six SDO policies, and finding that twenty-nine required FRAND licensing and three encouraged it).

10. 795 F.3d 1024 (9th Cir. 2015).

11. 773 F.3d 1201 (Fed. Cir. 2014).

12. See *Microsoft Corp.*, 795 F.3d at 1032; see also *Ericsson Inc.*, 773 F.3d at 1229.

13. See *id.*

entitled to a license on FRAND terms, thereby nullifying the SEP holder's infringement claims).¹⁴

C. NPES, PAES, AND SEP LITIGATION

As a result of the recent surge of litigation concerning SEPs and their enforcement, an extensive literature has emerged in this field.¹⁵ However, much of this literature focuses on firms that participated in the standard-setting process and have themselves made FRAND and other licensing commitments with respect to their SEPs.¹⁶ These firms are typically product manufacturers, service providers, and technology developers that are repeat players in the SDO that developed a particular standard.

Yet an increasing number of these firms are transferring patents to NPEs, including patent assertion entities (PAEs),¹⁷ for a variety of financial and strategic reasons (a practice sometimes referred to as "privateering").¹⁸ In both the United States and Europe, the majority of patents held by PAEs were obtained from operating technology companies.¹⁹ Thus, it stands to

14. *See id.*

15. *See, e.g.,* Jorge L. Contreras, *Patents, Technical Standards and Standard-Setting Organizations: A Survey of the Empirical, Legal and Economics Literature*, in RESEARCH HANDBOOK ON THE ECONOMICS OF INTELLECTUAL PROPERTY LAW, VOL. II – ANALYTICAL METHODS (Peter S. Menell & David Schwartz eds., 2017).

16. *Id.*

17. Numerous definitions have been proposed for the terms "non-practicing entity" and "patent assertion entity." *See, e.g.,* John R. Allison et al., *How Often Do Non-Practicing Entities Win Patent Suits?*, 32 BERKELEY TECH. L.J. 235, 240–42 (2017) (collecting and discussing the literature on NPE and PAE nomenclature).

18. *See generally* Daniel L. Rubinfeld, *Privateering in the Markets for Desktop and Mobile Operating Systems*, 33 BERKELEY TECH. L.J. (forthcoming 2018) (describing the origins and modern development of "IP privateering"); D. Daniel Sokol, *Patent Privateering: The Rise of Hybrid Patent Assertion Entities*, in PATENT ASSERTION ENTITIES AND COMPETITION POLICY, Ch. 5 (D. Daniel Sokol, ed. 2017); Erik Hovenkamp & Thomas F. Cotter, *Anticompetitive Patent Injunctions*, 100 MINN. L. REV. 871 (2016).

19. *See* Brian J. Love et al., *An Empirical Look at the "Brokered" Market for Patents*, 83 MO. L. REV. (forthcoming 2018) (manuscript at 31 tbl. 12) (finding that approximately sixty-one percent of brokered patent packages acquired by PAEs between 2012 and 2017 were purchased from operating companies); Colleen V. Chien, *Software Patents as a Currency, Not Tax, On Innovation*, 31 BERKELEY TECH. L.J. 1669, 1676 (2016) ("[T]he majority of the patents held by NPEs were bought in the marketplace from operating companies"); EUROPEAN COMM'N JOINT RESEARCH CTR., PATENT ASSERTION ENTITIES IN EUROPE: THEIR IMPACT ON INNOVATION AND KNOWLEDGE TRANSFER IN ICT MARKETS 19 (Nikolaus Thumm & Garry Gabison eds., 2016) [hereinafter JRC Report], <http://publications.jrc.ec.europa.eu/repository/bitstream/JRC103321/lfn28145enn.pdf> (reporting that "[t]he consensus among our interviewed stakeholders was that in Europe, patents asserted by PAEs are acquired from third parties and, primarily, large practicing firms," with one interviewed expert estimating that eighty percent of PAE patents were purchased from operating companies).

reason that some portion of the patents that PAEs acquire and assert will be SEPs. There are already a number of well-known cases involving SEP assertions by PAEs and other NPEs,²⁰ including *In re Negotiated Data Solutions LLC (N-Data)*,²¹ *In re Innovatio IP Ventures*,²² *Rembrandt v. Samsung*,²³ and *CSIRO v. Cisco*.²⁴ Moreover, there is increasing evidence that operating firms, often participants in SDOs, have transferred significant numbers of SEPs to PAEs for enforcement purposes in privateering transactions.²⁵ In one recent case, Apple alleged that Nokia conspired with a number of PAEs, including Acacia Research and Conversant Intellectual Property Management, to divide Nokia's portfolio of SEPs amongst themselves in order to collect excessive licensing fees in violation of Nokia's FRAND commitments and U.S. antitrust laws.²⁶

PAE activity is significant in Europe as well. Love and coauthors found that PAEs accounted for approximately nineteen percent of patent assertions between 2000 and 2008 in Germany and nine percent of patent assertions between 2000 and 2013 in England and Wales.²⁷ Several individual cases of SEP assertion by PAEs in Europe have also attracted attention, particularly in Germany and the UK.²⁸ General fears regarding SEP assertion by PAEs have been expressed by market participants, particularly in view of the potential for PAEs to utilize the new UPC

20. Each of the following cases is discussed in greater detail in Contreras, *infra* note 48.

21. Decision and Order, *In re Negotiated Data Solutions LLC*, FTC File No. 051-0094, Docket No. C-4234 (Sept. 22, 2008).

22. *In re Innovatio IP Ventures, LLC Patent Litig.*, 921 F. Supp. 2d 903, 907 (N.D. Ill. 2013).

23. *Rembrandt Wireless Techs. LP v. Samsung Elecs. Co.*, No. 2:13-CV-213-JRG, 2014 WL 3385125 (E.D. Tex. July 10, 2014).

24. *Commonwealth Sci. & Indus. Research Org. v. Cisco Sys., Inc.*, No. 6:11-CV-343, 2014 WL 3805817 (E.D. Tex. July 23, 2014), *rev'd and remanded*, 809 F.3d 1295 (Fed. Cir. 2015).

25. See BJÖRN LUNDQVIST, STANDARDIZATION UNDER EU COMPETITION RULES AND US ANTITRUST LAWS: THE RISE AND LIMITS OF SELF-REGULATION 412 (2014) (discussing Microsoft's and Nokia's patent transfers to Mosaid, Philips's transfer to Sisvel, and Ericsson's transfer to Unwired Planet).

26. Complaint ¶ 4, *Apple Inc. v. Acacia Research Corp.*, No. 16-CV-7266 (N.D. Cal. Dec. 20, 2016), 2016 WL 7403907.

27. See Love et al., *supra* note 7, at 109 (presenting data on German and United Kingdom PAE litigation).

28. See, e.g., *Unwired Planet v. Huawei* [2017] EWHC (Pat) 711 (UK) (involving PAE assertion of patent essential to ETSI's 4G LTE standard in UK); Landgericht Mannheim [LG] [Mannheim Regional Court] Judgement of Nov. 17, 2015 - Case No. 2 O 106/14 (involving PAE assertion of patent essential to AMR-WB standard relevant for wideband audio coding used in HD-Voice transmission in Germany).

framework to obtain EU-wide injunctive relief in the near future.²⁹ Finally, a pattern of aggregation and enforcement of SEPs by European PAEs has been confirmed by at least one recent qualitative study by the European Commission's Joint Research Centre (JRC).³⁰ The JRC conducted eighteen in-depth interviews with industry participants, finding that PAEs in Europe are acquiring significant numbers of SEPs, particularly in the telecommunications sector.³¹

This trend raises several questions, as well as several concerns. First, will the acquisition of SEPs by PAEs increase the overall rate of SEP litigation, thereby increasing costs of standardization and financial burdens on standardized products? PAEs, by their nature, are litigious, and the assertion of patents by NPEs has become increasingly prevalent both in the United States³² and Europe.³³ Unlike operating firms, the principal reason that many PAEs obtain patents is to assert them for the purpose of generating revenue, either through licensing or litigation settlements and awards.³⁴ As such, PAEs that assert SEPs would likely prioritize short term financial returns over the success of an ongoing standardization effort—which is unlike SDO participants, whether they are technology developers or product manufacturers. SEPs, in fact, may be particularly attractive to PAEs, as the purported essentiality of a SEP to a particular standard could make proof of infringement less difficult for the enforcer.

29. See, e.g., Letter from Adidas AG et al. to Member States of the European Union et al. (Sept. 26, 2013) <https://graphics8.nytimes.com/packages/pdf/business/26trolls-letter.pdf>; Joff Wild, *Why Europe's New Patent Regime Could be an Exciting One for NPEs*, IAM (Oct. 14, 2014), <http://www.iam-media.com/Blog/Detail.aspx?g=d1f4ed0a-23c3-47b5-998c-a35b5d710440>.

30. JRC Report, *supra* note 19, at 121.

31. *Id.* at 6 (“Large portions of the Telecoms portfolios that have been passed to PAEs comprise SEPs which can be asserted against a wide range of products.”).

32. See, e.g., RPX CORP., 2015 REPORT: NPE LITIGATION, PATENT MARKETPLACE, AND NPE COST (2016), www.rpxcorp.com/wp-content/uploads/sites/2/2016/07/RPX-2015-Report-072616.FinalZ.pdf; David L. Schwartz & Jay P. Kesan, *Analyzing the Role of Non-Practicing Entities in the Patent System*, 99 CORNELL L. REV. 425 (2014); John R. Allison et al., *Understanding the Realities of Modern Patent Litigation*, 92 TEX. L. REV. 1769 (2014); Christopher A. Cotropia et al., *Unpacking Patent Assertion Entities (PAEs)*, 99 MINN. L. REV. 649, 669–70 (2014); Sara Jeruss et al., *The America Invents Act 500: Effects of Patent Monetization Entities on US Litigation*, 11 DUKE L. & TECH. REV. 357 (2012); Mark A. Lemley & A. Douglas Melamed, *Missing the Forest for the Trolls*, 113 COLUM. L. REV. 2117 (2013).

33. See Love et al., *supra* note 7.

34. See JRC Report, *supra* note 19, at 5 (“[L]icensing fees collected from alleged infringers represent the primary source of revenue for PAEs.”).

Second, to what degree are PAEs bound by the licensing commitments made by SDO participants with respect to their SEPs? In most cases, the typical PAE likely played no role in the development of a standard covered by a given SEP, nor made any affirmative commitment, FRAND or otherwise, to the relevant SDO. As such, the PAE is an “outsider” to the standards process and cannot rightly be bound by the SDO’s rules and policies.³⁵ Is the SEP still encumbered by the commitments made by its prior owners?³⁶ While at least one U.S. FTC enforcement action suggests that FRAND commitments should bind subsequent owners of SEPs,³⁷ this theory has not yet been validated by the courts. And while, in recent years, an increasing number of SDOs have required that transferors of SEPs contractually bind transferees to abide by prior licensing commitments,³⁸ the effect of such requirements also remains untested in the courts, both in the United States and Europe. Accordingly, PAEs may not be bound by FRAND and other commitments previously made with respect to the SEPs that they are asserting. As such, assumptions made by industry participants regarding the level of royalties that a SEP holder may claim could be inaccurate.³⁹

Third, to the extent that PAEs and other SDO outsiders are *not* bound by the FRAND and other commitments made with respect to the SEPs that they enforce, is injunctive relief available to a greater degree than generally

35. See Jorge L. Contreras, *When a Stranger Calls: Standards Outsiders and Unencumbered Patents*, 12 J. COMPETITION L. & ECON. 507, 507–10 (2016) (introducing the concept of SDO “outsiders” and their assertion of SEPs); Michael Mattioli, *Patent Pool Outsiders*, 33 BERKELEY TECH. L.J. (forthcoming 2018) (exploring “outsiders” to patent pools and related legal regimes).

36. See NAT’L RESEARCH COUNCIL, *Transfers of Patents with Licensing Commitments*, in PATENT CHALLENGES FOR STANDARD-SETTING IN THE GLOBAL ECONOMY 81, 81–88 (Keith Maskus & Stephen A. Merrill eds., 2013) (discussing issues arising from transfer of SEPs); see also Contreras, *supra* note 35, at 514–15.

37. This issue first gained prominence in a 2008 action brought by the U.S. Federal Trade Commission against Negotiated Data Solutions LLC (N-Data). Decision and Order, *In re Negotiated Data Solutions LLC*, FTC File No. 051-0094, Docket No. C-4234 (Sept. 22, 2008). In 2003, N-Data acquired a patent from National Semiconductor that covered IEEE’s 802.3 Fast Ethernet standard. *Id.* National was an IEEE participant and committed to license the patent to all manufacturers of standard-compliant products at a flat rate of \$1,000. *Id.* When N-Data acquired the patent, it announced that it would seek higher royalties. *Id.* The FTC brought an action against N-Data, arguing, among other things, that N-Data’s disavowal of National’s earlier \$1,000 licensing commitment constituted an unfair method of competition in violation of Section 5 of the FTC Act. *Id.* The matter settled with N-Data agreeing to honor National’s prior commitment. *Id.*

38. See, e.g., IEEE, IEEE-SA STANDARDS BOARD BYLAWS § 6.1 at 16 (2017), https://standards.ieee.org/develop/policies/bylaws/sb_bylaws.pdf.

39. See Contreras, *supra* note 35, at 537.

believed in SEP cases? Courts in both the United States (*Apple Inc. v. Motorola Inc.*⁴⁰) and Europe (*Huawei v. ZTE*⁴¹) have limited the ability of SEP holders to seek injunctive relief if they have previously made commitments to licensee their SEPs on FRAND terms. Similarly, competition enforcement agencies in the United States⁴² and Europe⁴³ have initiated investigations and enforcement actions against holders of FRAND-encumbered SEPs who have sought or threatened to seek injunctions against implementers of a standard. Recently, one major SDO incorporated such a limitation on injunctive relief into its internal policies, making this prohibition binding on all of its participants.⁴⁴ Thus, it is commonly asserted that injunctive relief is seldom available in SEP enforcement cases.⁴⁵ This common assumption, however, may not hold if PAEs are not bound by applicable FRAND commitments.⁴⁶

And finally, policymakers around the world are considering whether, and to what degree, to intervene in cases involving SEP assertions.⁴⁷ To a large degree, the dialog surrounding these potential interventions assumes that SEP holders have been participants in the standard-setting process and are bound by relevant FRAND and other licensing commitments. If these assumptions do not hold, then the basis for potential regulatory or legislative action may need to be reconsidered.

40. 757 F.3d 1286 (Fed. Cir. 2014). This limitation stems from the fact that the patent holder has committed to grant licenses to all implementers of a standardized technology, a commitment that is increasingly seen as inconsistent with enjoining the implementer from using the technology unless the implementer is itself unwilling or unable to take a license.

41. Case C-170/13, *Huawei Tech. Co. v. ZTE Corp.*, 2015 E.C.R. 477.

42. Decision and Order, *In re Motorola Mobility LLC & Google Inc.*, FTC File No. 1210120, Docket No. C-4410 (July 23, 2013) (imposing procedural requirements before patent holder is permitted to seek injunctive relief); Decision and Order, *In re Robert Bosch GmbH*, FTC File No. 1210081, Docket No. C-4377, at 3 (Apr. 23, 2013).

43. See Summary of Commission Decision of 29 April 2014 (Case AT.39939 — Samsung — Enforcement of UMTS standard essential patents), 2014 OJ (C 350).

44. IEEE, *supra* note 38, § 6.1 at 16.

45. See, e.g., JRC Report, *supra* note 19, at 7 (“[I]n Europe . . . under FRAND terms one cannot obtain an injunction for SEPs unless the alleged infringer is unwilling to take out a license.”).

46. See Contreras, *supra* note 35, at 520.

47. Makan Delrahim, Assistant Att’y Gen., U.S. Dep’t. of Justice, Assistant Attorney General Makan Delrahim Delivers Remarks at the USC Gould School of Law’s Center for Transnational Law and Business Conference (Nov. 10, 2017), www.justice.gov/opa/speech/assistant-attorney-general-makan-delrahim-delivers-remarks-usc-gould-school-laws-center.

D. QUANTIFYING PAE SEP LITIGATION

In order for market actors and policymakers to assess the potential impact of SEP assertion by outsiders, it is necessary to develop a more accurate understanding of the degree to which SDO outsiders, and PAEs in particular, have acquired and asserted SEPs. In 2015, Contreras conducted the first empirical study of SEP assertion by SDO outsiders.⁴⁸ This study reviewed the assertion of patents covering seven widely-adopted ICT standards (GSM, USB, 802.11, Bluetooth, UMTS, H.264 and LTE) in U.S. district courts over a sixteen-year period. The standards covered included five that were subject to FRAND licensing commitments and two subject to royalty-free (RF) licensing commitments. The study found that NPEs were responsible for 446 of 577 total defendant-assertion events involving these standards (77%).⁴⁹ With respect to IEEE's 802.11 family of standards, 89% of all defendant-assertion events were initiated by NPEs; and with respect to ETSI's wireless telecommunications standards, NPEs initiated 79% of GSM assertions, 89% of LTE assertions, and 93% of UMTS assertions.⁵⁰

These findings are consistent with those of the JRC's recent interview-based study.⁵¹ The JRC found that PAEs in Europe, particularly in the telecommunications sector, have acquired large quantities of SEPs⁵² and regularly enforce them.⁵³ As observed by the JRC: "A common strategy that has been observed in Germany in relation to the assertion of SEPs against telecom operators involves PAEs presenting the standard, providing evidence of how technology infringes the standard, and then demanding the relief sought from the alleged infringements."⁵⁴

48. Contreras, *supra* note 35, at 520 (updating 2015 study data); Jorge L. Contreras, *Assertion of Standards-Essential Patents by Non-Practicing Entities*, in *PATENT ASSERTION ENTITIES AND COMPETITION POLICY* 50 (D. Daniel Sokol, ed., 2017) (original 2015 study).

49. A "defendant-assertion event" is a claim of infringement brought by a plaintiff against a single defendant under one or more patents. In cases in which multiple unrelated defendants are named, the number of defendant-assertion events is equal to the number of individual defendants (aggregated with their corporate affiliates). See Contreras, *supra* note 35, at 525 n.76.

50. JRC Report, *supra* note 19.

51. *Id.*

50. *Id.*

53. *Id.* at 21 ("Our interviews confirmed that PAEs enforce SEPs.")

54. *Id.* at 26.

III. METHODOLOGY

A gap exists, however, between prior empirical studies of U.S. litigation and the JRC's qualitative study of EU litigation. This Article fills that gap by providing the first empirical data regarding the assertion of SEPs by NPEs in two major European jurisdictions: Germany and the UK. It then compares trends and modalities on both sides of the Atlantic.

A. JURISDICTIONS

We selected Germany and the UK as the jurisdictions for this study for several reasons. First, Germany is widely recognized as the most important European jurisdiction for patent litigation, both in terms of the quantity of cases adjudicated and the size of the German market.⁵⁵ One unique feature of the German litigation system that has made it particularly attractive for patent assertion is its bifurcated system for obtaining injunctions and monetary relief.⁵⁶ In this system, a patent holder's entitlement to injunctive relief is adjudicated in a proceeding separate from the adjudication of infringement and validity, a feature that allows plaintiffs to obtain interim injunctive relief quickly and more readily.⁵⁷

The UK⁵⁸ offers an important contrast to Germany. Although the volume of patent litigation in the UK is substantially less than in Germany, the UK is still viewed as one of the major centers for patent litigation in Europe.⁵⁹ It is also the principal common law jurisdiction in the EU, in contrast to the civil law systems of Germany and most other continental European states. Prior to the "Brexit" vote, London was scheduled to be the site of one of the three centralized European patent courts and, according to

55. See *id.* at 5 ("The majority of [PAE] assertions in Europe have been initiated in Germany."); Cremers et al., *supra* note 3, at 23 tbl. 3 (finding 8,424 German patent cases filed between 2000 and 2008).

56. See generally JRC Report, *supra* note 19, at 25–26; Cremers et al., *supra* note 3, § 2.5.1 (presenting an overview of bifurcation in German patent litigation).

57. See Katrin Cremers et al., *Invalid but Infringed? An Analysis of the Bifurcated Patent Litigation System*, 131 J. ECON. BEHAV. & ORG. 218 (2016).

58. Technically, the United Kingdom of Great Britain and Northern Ireland (UK) consists of England, Wales, Scotland, and Northern Ireland. As discussed below, we utilize case data only from the courts of England and Wales. However, for convenience, we refer to England and Wales, by far the most commercially significant components of the UK, as well as the site of virtually all patent suits filed in the UK, as "the UK." This usage is consistent with other empirical studies of UK patent litigation. See, e.g., Cremers et al., *supra* note 3, at 4 n.6; Love et al., *supra* note 7, at 107 n.2.

59. See Christian Helmers & Luke McDonagh, *Patent Litigation in the UK: An Empirical Survey 2000-2008*, 8 J. INTEL. PROP. L. & PRAC. 846 (2013) (finding that over 100 patent suits are filed each year in England and Wales); see also Cremers, *supra* note 3, at 23 tbl. 3.

subsequent reports, may continue in this role even after a UK withdrawal from the EU.⁶⁰

B. CASE-LEVEL DATA

To identify lawsuits enforcing SEPs in Germany and the UK, we analyzed case-level data on patent litigation in both jurisdictions.⁶¹ Unlike in the United States, case-level data is not readily accessible online in these jurisdictions; we therefore accessed and digitized paper records for over 5,800 cases at five different courts in the two jurisdictions combined, as described in greater detail below.

For Germany, we obtained data on all infringement actions brought in Germany's three busiest regional courts—Mannheim, Düsseldorf, and Munich—between 2000 and 2008.⁶² We estimate that this data comprises roughly eighty percent of all patent litigation undertaken in the country during this nine year period.⁶³ Though we lack more recent data, litigation activities in Germany seem to have remained quite stable between now and then.⁶⁴ The Patent Law Modernization Act of 2009 amended several aspects of German patent law; however, rules concerning patent enforcement in the civil courts remain untouched.⁶⁵ To our knowledge, this data is also the best collection of patent litigation in Germany presently in existence.⁶⁶ For each case in our German database, we collected information related to each case's filing date, the outcome, the identities of the litigating parties, and the litigated patent(s).

60. See Clive Cookson, *Britain to Ratify Single European Patent System*, FIN. TIMES (Nov. 28, 2016), <https://www.ft.com/content/6a07fdb8-b56f-11e6-ba85-95d1533d9a62>.

61. Love et al., *supra* note 7.

62. For a detailed discussion of the data construction, see Cremers et al., *supra* note 3, § 3.1.

63. *Id.*

64. For example, the annual total of validity challenges litigated in Germany's Federal Patent Court remained between 217 and 297 each year from 2009 to 2015. *The Annual Reports of the Federal Patent Court*, BUNDESPATENTGERICHT, www.bundespatentgericht.de/cms/index.php?option=com_content&view=article&id=29&Itemid=18&lang=en (last visited Mar. 15, 2018) (listing reports for each year).

65. Note that several cases with (appellate) decisions up to 2013 are part of our data, because the timeframe restriction applies to the initial filing date at entry court level. See generally Cremers et al., *supra* note 3, § 2.1 (providing an overview of German patent litigation).

66. Collecting litigation data in Germany entails considerable effort. Regional courts do not systematically list cases and types of cases, so an update of the data would require the manual identification of relevant patent cases. Furthermore, with digital case files still being optional these days, a thorough data collection is only possible by physically accessing the court dockets.

For the UK, we have data on patent litigation in the Patents Division of the High Court of England and Wales—often referred to simply as the “Patents High Court” or PHC—from 2000 to 2013.⁶⁷ The PHC is the UK’s most popular venue for patent litigation, as well as the sole venue in England and Wales for patent suits with more than GBP 500,000 at stake.⁶⁸ We estimate that the PHC heard slightly more than eighty percent of all patent suits filed in the UK during the period covered.⁶⁹ Smaller and less complex patent suits can also be brought in the Intellectual Property Enterprise Court (IPEC), previously referred to as the “Patents County Court.”⁷⁰

As with the German data, we collected case-level information related to each UK case’s filing, outcome, litigants, and patent(s)-in-suit. For the IPEC, however, we lack data on the identity of litigants for cases filed prior to 2007 because this information was not publicly available until then. Thus, the patentee-related statistics for the UK that we present below include data for cases filed in the IPEC only during the years 2007 to 2013.

The unit of case measurement was a single action brought against a single defendant or group of related defendants, irrespective of the number of patents asserted in the action.⁷¹ This measurement methodology corresponds with the “defendant-assertion” measure contained in Contreras’s U.S. litigation data.⁷²

Finally, for all suits in our data, we categorized the party or parties enforcing patent rights as either operating companies or NPEs. In addition, we further categorized NPEs using the classification system of Love et al. to distinguish among PAEs, individuals, universities, and IP-holding subsidiaries of operating companies.⁷³

67. For a detailed discussion of this data, see Love et al., *supra* note 7, at 107; Cremers et al., *supra* note 3, § 3.1 (discussing the scope of coverage of this German data).

68. For a detailed discussion of the distinction between the PHC and IPEC as well as the reforms that have transformed the PCC into the IPEC between 2010 and 2013, see generally ANGELA FOX, INTELLECTUAL PROPERTY ENTERPRISE COURT: PRACTICE AND PROCEDURE (2014); see also Cremers et al., *supra* note 3, § 2.2 (providing an overview of UK patent litigation).

69. See Cremers et al., *supra* note 3, § 3.2 (discussing the scope of coverage of this UK data).

70. See FOX, *supra* note 68.

71. For a detailed discussion of our case counting methodology, see Cremers et al., *supra* note 3, § 3.6.

72. See Contreras, *supra* note 35, at 525–26 (describing case counting methodology).

73. See Love et al., *supra* note 7, at 108 tbl. 1 (describing the NPE classification system used). This classification system is similar to that utilized in Allison et al., *supra*

C. SEP DATA

Next, we identified which of these NPE-asserted patents were declared essential to a technology standard.⁷⁴ To do this, we relied on the publicly available dataset dSEP.⁷⁵ This dataset includes information on publicly available intellectual property disclosure records collected from the archives of thirteen major SDOs through March 2011. The declarations also include information on the date of disclosure, the standard and/or committee the declaration refers to, and the licensing commitment with respect to the disclosed patent.⁷⁶ Table 1 below lists the principal standards and corresponding SDOs that were studied.⁷⁷

note 17, at 249. *See also* Cotropia et al., *supra* note 32, at 669–70 (describing a slightly different NPE classification system).

74. Several major SDOs, including IEEE, ITU and ETSI, require participants to self-declare whether they hold any patents that are “essential” to implement a standard under development or consideration. *See* Bekkers & Updegrove, *supra* note 9, at ch. 4. There is generally no external verification of this determination. As a result, over-declaration of SEPs is a well-known phenomenon. Recent studies have found that only 28%, 29%, and 50% of patent families declared “essential” to ETSI’s 2G, 3G, and 4G wireless telecommunications standards, respectively, were actually essential to implementation of those standards. ROBERT A. MYERS, FAIRFIELD RES. INT’L, REVIEW OF PATENTS DECLARED AS ESSENTIAL TO LTE AND SAE (4G WIRELESS STANDARDS) THROUGH JUNE 30, 2009, at 2 (2010), <http://www.frlicense.com/LTE%20Final%20Report.pdf>; FAIRFIELD RES. INT’L, ANALYSIS OF PATENTS DECLARED AS ESSENTIAL TO GSM AS OF JUNE 6, 2007, at 7 (2007), http://frlicense.com/GSM_FINAL.pdf; ROBERT A. MYERS, FAIRFIELD RES. INT’L, REVIEW OF PATENTS DECLARED AS ESSENTIAL TO WDCMA THROUGH DECEMBER, 2008, at 1 (2009), <http://www.frlicense.com/wcdma1.pdf>.

75. The dSEP dataset is freely accessible. Rudi Bekkers et al., *Disclosed Standard Essential Patents (dSEP) Database*, SSOPATENTS.ORG, <http://ssopatents.org> (last visited Mar. 15, 2018) [hereinafter Bekkers et al., *dSEP Database*]; *see also* Rudi Bekkers et al., *Declared Essential Patents* (Hoover Inst. Working Grp. on Intellectual Prop., Innovation, & Prosperity, Working Paper No. 16003, 2016), <https://hooverip2.org/wp-content/uploads/ip2-wp16003-paper.pdf> (describing this data set); Rudi Bekkers et al., *Intellectual Property Disclosure in Standards Development*, in PROCEEDINGS FROM THE NBER CONFERENCE ON STANDARDS, PATENTS & INNOVATION 1 (2012).

76. *See* Bekkers, et. al., *dSEP Database*, *supra* note 75.

77. The dSEP database contains records for more standards than are represented in Table 1. We omit standards for which there was no match between UK or German NPE assertions and patents declared essential to the standard. One such omission that is notable is IEEE’s popular 802.11 series of wireless networking standards, which is included in dSEP but for which we found no UK or German NPE assertions. Notably, Contreras’s study of U.S. SEP litigation identified 209 separate actions involving IEEE 802.11 from 2000–2015. Contreras, *supra* note 35, at 527.

Table 1: Principal Standards Studied

<u>Standard</u>	<u>SDO</u>	<u>First Version Released</u>
802.3 (Ethernet)	IEEE	1983
GSM (2G)	ETSI	1992
GSM / TDMA (2G)	ETSI	1992
DVB	ETSI	1994
13818 (MPEG-2)	ISO/IEC	1996
G.729	ITU	1996
H.222 (MPEG-2)	ITU	1996
H.262 (MPEG-2 Part 2)	ITU	1996
DAB (digital audio broadcast)	ETSI	1997 ⁷⁸
Smart Card	ETSI	1997
UMTS (3G)	ETSI	2000
UMTS / CDMA (3G)	ETSI	2000
OMA [not specified]	OMA	2002
UICC	ETSI	2003
H.264	ITU	2003
LTE (4G)	ETSI	2008

Because many SEP disclosures reference application numbers, rather than issued patents, we performed our search across patent families, as well as individual patent numbers. For all patents asserted in our data set, as well as all patents included in the dSEP database, we identified the DOCDB family members using the European Patent Office's Patstat database.⁷⁹

D. U.S. DATA FOR COMPARISON

Finally, for comparative purposes, we reference Contreras's data on U.S. SEP assertions.⁸⁰ Contreras collected this data by searching the text of all patent litigation documents for cases filed in U.S. federal district courts between 2000 and 2015 available on Lex Machina for references to one of

78. The DAB (digital audio broadcast) specification was finalized in 1993 by the EU's EUREKA project. It was adopted by ITU-T in 1994 and by ETSI in 1997. Because dSEP records relate to the ETSI standard, we use 1997 as the release date.

79. The DOCDB family follows the definition of Espacenet and includes all patents that share the same set of priorities. For more information, see EUROPEAN PATENT OFFICE, *DOCDB Simple Patent Family*, <https://www.epo.org/searching-for-patents/helpful-resources/first-time-here/patent-families/docdb.html> (last visited Mar. 15, 2018).

80. See Contreras, *supra* note 48; see also Contreras, *supra* note 35 (updating 2015 data).

seven widely-adopted standards. Four of these standards (GSM, UMTS, LTE and H.264) correspond with the standards studied here, and thereby constitute the basis for comparison of the German/UK and U.S. results. It is also worth noting that Contreras's U.S. study examined standards subject to both FRAND and royalty-free licensing commitments. Because none of the SDOs in the German or UK studies required royalty-free licensing, the comparisons in this Article focus solely on standards subject to FRAND licensing commitments.

IV. FINDINGS

Combining the data described above, we were able to identify suits filed by NPEs in Germany and the UK to enforce patents declared essential to one of the standards cataloged in dSEP. Below we summarize our findings.

A. OVERALL SEP LITIGATION PICTURE

We identified 422 German and 36 UK cases involving the assertion of patents declared essential to a total of twenty-nine different standards. These figures correspond to roughly 8% and 6% of all patent cases in our German and UK datasets, respectively. Of these totals, PAEs initiated 330 (78%) German cases and 8 (22%) UK cases. There is a striking difference in the overall number of SEP suits brought per country. This result is consistent with the view, as reported by the JRC, that Germany is, by far, the most important European jurisdiction for PAE litigation.⁸¹

Figure 1 shows the number of cases involving SEPs over time. As shown in the figure, there is a large increase in case filings in Germany starting in 2004; Sisvel, a single NPE, filed a significant number of these cases (discussed in Section III.B). In the UK, the share of cases involving SEPs brought by NPEs is consistently smaller over time than in Germany. Also, there is no similar increase in SEP enforcement by Sisvel in the UK during the 2004 to 2008 period.

81. See JRC Report, *supra* note 19, at 5 ("The majority of [PAE] assertions in Europe have been initiated in Germany."); Cremers et al., *supra* note 3, at 43 (reporting that Germany has over half the patent assertion suits filed in Europe).

Figure 1: SEP Assertions by NPEs and non-NPEs in Germany (2000–2008) and the UK (2000–2013) Over Time

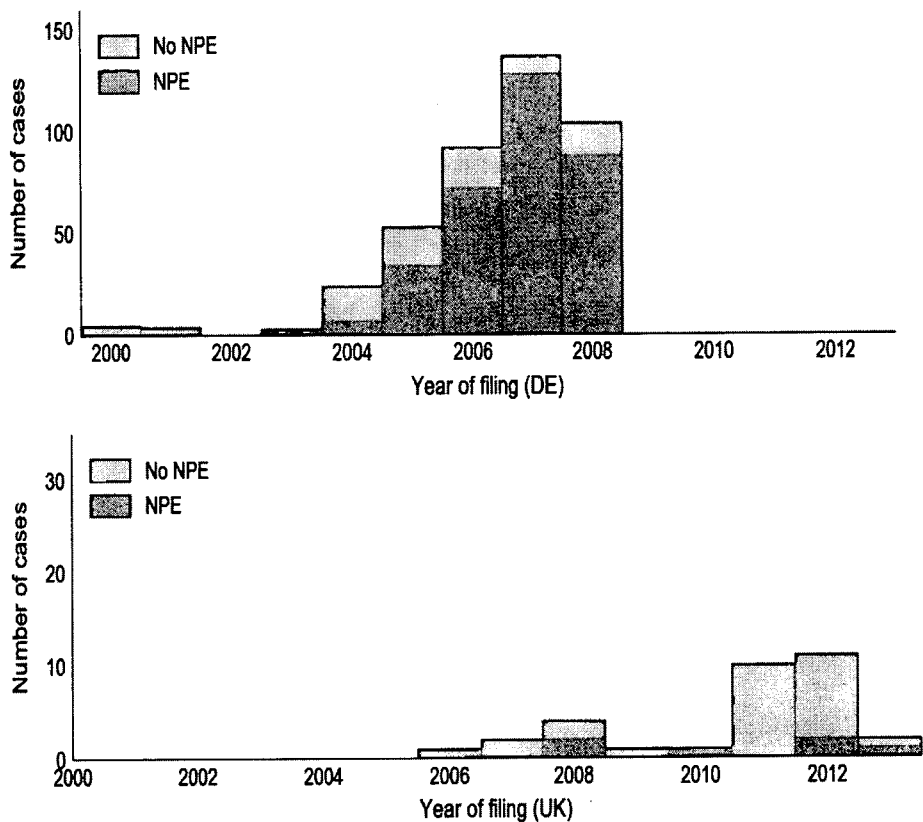


Table 2 breaks down aggregate SEP assertions according to the 29 standards covered by our data. Consequently, the unit of observation is now the number of assertions by standard. Because a single patent can cover multiple standards, a single case can involve multiple standards. Therefore, the total standard–differentiated case count in Table 2 exceeds the total number of unique cases identified.

Table 2: SEP Assertions in Germany (2000–2008) and UK (2000–2013)

<u>Standard</u>	<u>SEP Patent Families</u>	<u>Germany PAE Cases</u>	<u>Germany All Cases</u>	<u>UK PAE Cases</u>	<u>UK All Cases</u>	<u>Total Cases</u>
ISO/IEC 13818 (MPEG-2)	3	316	322	0	3	325
ETSI DAB	2	312	313	0	3	316
OMA [not specified]	3	225	225	0	2	227
ITU H.262 (MPEG-2)	3	1	32	0	2	34
ETSI GSM	22	2	18	6	11	29
ITU H.222 (MPEG- 2)	1	1	16	0	2	18
ETSI UMTS	12	0	12	3	6	18
ETSI GPRS	6	0	14	0	2	16
ETSI 3GPP ⁸²	9	0	10	0	2	12
OMA WAP	6	0	2	0	7	9
IEEE 802.3	2	8	8	0	0	8
ETSI DCS 1800	3	0	8	0	0	8
ITU H.264	1	0	2	0	0	2
ETSI DVB	2	0	0	0	2	2
ETSI LTE	1	0	2	0	0	2
ETSI UMTS / CDMA	1	0	0	1	1	1
ETSI UICC	2	0	0	0	1	1
ITU G.729	1	0	0	1	1	1
ETSI GSM / TDMA	2	0	0	1	1	1
ETSI Smart Card	1	1	1	0	0	1
Other ⁸³	11	0	13	0	7	20
Total	92	866	998	12	53	1051

The most active standards from a German litigation standpoint are ETSI's DAB standard (digital audio broadcasting) (313 cases), ISO/IEC's 13818 MPEG-2 standard (322 cases), and unspecified standards developed

82. This classification refers to unspecified standards projects conducted at the 3rd Generation Platform Partnership (3GPP).

83. Includes ANSI UL 464, ISO/IEC 24727, ISO/IEC 7816, ITU G.992, ITU H.261, ITU H.263, OMA DRM, ETSI TETRA, ISO/IEC 14496.

at the Open Mobile Alliance (OMA) (225 cases). However, as discussed below, the vast majority of assertions of SEPs covering these standards was by a single PAE, Sisvel.

The widely-adopted wireless telecommunications standards developed at ETSI (e.g., GSM, GPRS, UMTS, LTE) were moderately litigated (84 assertions), but the large majority (98%) were brought by operating companies. As noted in Section III.C, this result differs substantially from that observed in the United States, where the large majority of assertions of SEPs covering these standards were by NPEs.

B. NPE CHARACTERISTICS

Table 3 below offers a more detailed picture of NPE assertions in Germany and the UK by individual NPE.

Table 3: SEP Assertions by NPEs in Germany (2000–2008) and the UK (2000–2013)

<u>Rank</u>	<u>NPE</u>	<u>NPE Type</u>	<u>Jurisdiction</u>	<u>Total Cases</u>	<u>SSO(s)</u>	<u>Unique SEPs Asserted</u>	<u>Prior (or Current) SEP⁸⁴ Owner⁸⁵</u>
1	SISVEL INT'L	PAE (pool)	Germany	316	ETSI, IEC-JTC1, ISO-JTC1, OMA	2	France Telecom, TDF, Philips
2	CIF LICENSING	PAE	Germany	9	IEEE, ITU	3	JVC, Motorola
3	IPCOM	PAE	Germany + UK	6	ETSI, ITU	3	Robert Bosch
4	INTERDIGITAL TECH.	Tech dev.	UK	2	ETSI	5	-
5	VRINGO INFASTRUC.	PAE	UK	2	ETSI	3	Nokia
6	GEMPLUS	Tech dev.	Germany	1	ETSI	1	-
7	PEARL AGENCY	PAE	Germany	1	OMA	1	Bayerische Rundfunkwerb ung
8	THOMSON LICENSING	Tech dev.	Germany	1	ITU	1	Panasonic

84. Data on patent assignees/owners was obtained from the German Patent Office (Deutsche Patent- und Markenamt (DPMA)) and European Patent Office (EPO) registers.

85. In some cases, especially those involving Sisvel, the asserting entity does not own the patents in question and instead has a contractual right to assert.

As shown in Table 3, Sisvel International is the most active NPE asserting SEPs in Germany and the UK during the time periods studied. Sisvel obtained SEPs covering a number of standards (MPEG-2, DAB and OMA) from large patent holders including France Telecom and Philips. Sisvel and its subsidiaries manage patent pools in a number of technology areas including wireless communications, audio and video coding and decoding (CODEC), broadband and digital displays.⁸⁶

As a patent pool administrator, Sisvel is not a typical PAE. Rather than asserting patents against an entire industry, a pool administrator only targets infringing firms that are not currently pool members.⁸⁷ While this enforcement pattern is somewhat different from that of the typical PAE, analytically speaking there is little difference between a PAE that asserts patents in order to raise revenue, and a pool administrator that asserts patents to obtain revenue for the pool or to encourage membership in the pool. For this reason, patent pools are classified as PAEs under our framework.⁸⁸

Despite its active enforcement in Germany, Sisvel did not file a single case in the UK over the 2000 to 2013 period. The German firm IPCom is the only NPE actively enforcing SEPs (GSM) in both Germany and the UK. Other than Sisvel and IPCom, only 12 NPE assertions were brought in Germany by other NPEs including CIF (transferee from Motorola as to IEEE 802.3), and three single-suit NPEs (Gemplus, Thomson, and Pearl). Compared to the United States, this is a relatively small number of NPEs/PAEs. By way of comparison, Contreras found that 26 different NPEs initiated SEP enforcement suits in the United States from 2000 to 2015, led

86. *Licensing Programs Background*, SISVEL INT'L S.A., <http://www.sisvel.com/licensing-programs/background> (last visited Mar. 15, 2018).

87. *See, e.g., 3G Licensing S.A. Enforces its 3G Patents at IFA 2016*, 3G LICENSING S.A., <http://3g-licensing.com/news-events/56-3g-licensing-s-a-enforces-its-3g-patents-at-ifa-2016> (last visited Mar. 15, 2018). This article states:

We are a negotiation first licensing administrator . . . however, to secure FRAND conditions and a level playing field for all the users of the patented technology, in these two cases we were left with no other choice than enforcing the 3G SEPs which are owned by [Sisvel subsidiary] 3G Licensing S.A.

Id. (internal quotation marks omitted). In an email communication, Roberto Dini, the founder of Sisvel, explains that the large number of patent assertions by Sisvel is attributable, at least in part, to a requirement under EU law that civil litigation be initiated in order to bring a border seizure action against counterfeit goods per Regulation (EU) No. 608/2013 of the European Parliament and of the Council of 12 June 2013 Concerning Customs Enforcement of Intellectual Property Rights and Repealing Council Regulation (EC) No. 1383/2003. *See* Email from Roberto Dini, Founder, Sisvel, to author (Mar. 8, 2018) (on file with BTLJ).

88. *See* LUNDQVIST, *supra* note 25, at 412 (referring to Sisvel as a “privateer”).

by U.S.-based PAE firms such as Acacia Research, Wi-LAN, and Golden Bridge. None of these entities appear in the German or UK assertion data; nor does Sisvel, the principal European enforcement PAE, appear in the United States. This data suggests that PAEs may tend to litigate in their “home” jurisdictions, perhaps for administrative convenience, to benefit from home court advantage, or to minimize their litigation costs. One exception to this hypothesis arises in the UK, where Interdigital and Vringo, both large U.S.-based PAEs, have asserted a total of eight SEPs. But in both cases, these assertions, which also have counterparts in the United States, appear to be part of global patent litigation campaigns that span multiple jurisdictions.

Table 4 shows the types of NPEs that enforced SEPs versus non-SEPs in Germany and the UK during the periods studied.

Table 4: Comparison of NPE Types with SEPs and without SEPs (Germany & UK)

<u>NPEs</u>	<u>Non-SEP</u>	<u>SEP</u>
PAE: IP licensing (acquired patents)	26	5
PAE: IP licensing (owned by inventor)	31	1
University or Research Inst.	8	1
Startup (pre-product)	1	0
Individual	241	0
Industry consortium	3	0
IP subsidiary (producing comp)	35	3
N	345	10

As Table 4 shows, of the ten total NPEs asserting SEPs, six were PAEs (60%), three were IP subsidiaries of operating companies (30%), and one was a university (10%). In the U.S. study, of 26 identified NPEs that asserted SEPs, twenty (77%) were PAEs, three (11%) were technology development firms, and one each were an academic/governmental institution, IP subsidiary, or an individual.⁸⁹

The profile of NPEs asserting non-SEPs is strikingly different. As shown in Table 4, the most significant type of NPE observed in German and UK cases over the period studied were individuals (69.9%). PAEs represented 16.5% of the total number of NPEs, followed by IP subsidiaries of operating companies (10.1%), and universities (2.3%).⁹⁰ Individuals

89. Contreras, *supra* note 48, at fig.4, app.2.

90. Allison, Lemley, and Schwartz studied all U.S. patent assertions in 2008 and 2009 and found that, among NPE assertions (27.9% of the total), the breakdown of NPEs by

represent the lion's share of all NPE plaintiffs in Germany and the UK; but asserted no SEPs. Meanwhile, PAEs and IP subsidiaries represented 60% and 30% of the NPEs asserting SEPs, but only 16.5% and 10.1% of the NPEs asserting other patents in Germany and the UK. This data suggests that the assertion of SEPs may require a greater degree of expertise than the assertion of other patents and is thus pursued primarily by firms with deep technological expertise and ties to industry.

C. COMPARISON TO U.S. DATA

Table 5 compares German, UK, and U.S.⁹¹ assertions of SEPs covering the four standards common to both studies: GSM, UMTS, LTE and H.264. In order to form an accurate comparison, only cases filed between 2000 and 2008 were considered for all three jurisdictions.

Table 5: Comparison of German, UK, and U.S. SEP Litigation (2000–2008)

	DE PAE Cases	DE All Cases	UK PAE Cases	UK All Cases	U.S. PAE Cases ⁹²	U.S. All Cases ⁶⁵
2G GSM ⁹³	2	18	2	2	1	3
3G UMTS ⁹⁴	0	12	1	3	10	12
4G LTE	0	2	0	0	0	1
H.264	0	2	0	0	0	1

Table 5 gives rise to several observations. First, the level of litigation surrounding GSM, ETSI's 2G wireless standard, is significantly higher in Europe than the United States (eighteen and twelve assertions, respectively, versus three). This result is not entirely surprising, as the 2G GSM standard was deployed primarily in Europe, while competing 2G CDMA standards were prevalent in the United States.⁹⁵ Moreover, the major holders of patents covering GSM were European firms.⁹⁶ It thus stands to reason that,

category was: Individual (11.8%), PAE (11.0%), Failed Startup (3.8%) and University (1.4%). Allison et al., *supra* note 17, at 293 tbl. A1.

91. See Contreras, *supra* note 35, at 528 tbl. 3.

92. Jorge L. Contreras, *Dataset of U.S. SEP Assertions 2000-2015* (on file with author), GSM, UMTS, LTE, H.264.

93. Includes patents declared both as to ETSI GSM and ETSI GSM/TDMA.

94. Includes patents declared both as to ETSI UMTS and ETSI UMTS/CDMA.

95. See generally RUDI BEKKERS & JAN SMITS, *MOBILE TELECOMMUNICATIONS: STANDARDS, REGULATION, AND APPLICATIONS* (Artech House trans., 1999) (1997).

96. By the time that GSM was approved by ETSI in 1990, four European firms (Ericsson, Nokia, Siemens, and Alcatel), together with U.S.-based Motorola, held most

at least in the early years, GSM patents and products were concentrated in Europe, as was GSM litigation.⁹⁷ Further confirming this theory, the single U.S. NPE assertion of GSM SEPs (in which three different SEPs were asserted) was initiated by ICom, a Munich-based PAE,⁹⁸ against HTC, a Chinese handset manufacturer.⁹⁹ The U.S. operating company-initiated GSM suits were brought by Research in Motion (RIM, now Blackberry) and Broadcom—a handset manufacturer and wireless chip vendor, respectively.¹⁰⁰ In Germany, ICom was also responsible for the GSM suits identified. However, ICom was the only NPE active in Germany with respect to GSM during this period. The remainder of German GSM suits were brought by operating companies active in the telecommunications market (Ericsson, Philips, and Motorola).

The level of assertions relating to UMTS, ETSI's 3G standard that replaced GSM, are comparable in Germany and the United States (twelve assertions each), and half that level in the UK. Again, this result is consistent with the development of the global mobile industry, which sought a uniform 3G solution to replace the geographically fragmented and incompatible 2G protocols.¹⁰¹ As a result, UMTS was adopted at similar rates in the United States and Europe and U.S. firms—including Qualcomm and Motorola—held significant patent positions. One significant difference between German and U.S. assertions covering UMTS, however, is the degree to which NPE suits dominate U.S. litigation (eighty-three of UMTS assertions) but play no role in German litigation. With respect to U.S. UMTS suits during this period, four different PAEs were active: U.S.-based Golden Bridge, SPH, and MSTG, as well as the German PAE ICom.¹⁰² The two UMTS suits brought in the United States by operating companies were initiated by RIM and Broadcom in the same actions in which they also asserted GSM-related patents (discussed above).¹⁰³ In Germany, in

patents covering the standard. Rudi Bekkers et al., *Intellectual Property Rights and Standardization: The Case of GSM*, 26 TELECOMM. POL'Y 171, 175–76 (2002).

97. Despite this slow start, GSM litigation did pick up in the United States after 2008, fueled primarily by NPE assertions. By 2015, there had been twenty-nine GSM cases in the United States, with twenty-three (79%) initiated by NPEs. Contreras, *supra* note 35, at 528 tbl. 3.

98. ICom was formed in 2007 to monetize SEPs in the mobile communications field. See *About Us*, ICOM, http://www.ipcom-munich.com/home_en.html (last visited Mar. 15, 2018).

99. Contreras, *supra* note 92, at GSM.

100. *Id.*

101. See BEKKERS & SMITS, *supra* note 95.

102. Contreras, *supra* note 92, at UMTS.

103. *Id.*

contrast, all suits concerning UMTS were brought by operating companies based in Europe (i.e., Ericsson, France Telecom, and Siemens) or the United States (Motorola and Qualcomm).¹⁰⁴ When U.S. litigation data is extended through 2015, the number of assertions rises dramatically to 123 cases, but the proportion of NPE suits (115 or 93%) remains consistent.¹⁰⁵

Data relating to LTE, ETSI's 4G mobile standard that replaced UMTS, is difficult to compare during this period, as LTE was not publicly released until 2008, at the tail end of our German dataset. Nevertheless, it is significant that two German actions asserting LTE patents were brought even in this very early stage. In the United States, a single LTE suit was brought in 2008 by RIM. Projecting outward, U.S. data through 2015 shows that 95 LTE suits were brought, including 85 (89%) by PAEs.¹⁰⁶ Interestingly, however, UK data through 2013 shows no LTE suits at all.

D. LITIGATION OUTCOMES

Tables 6 and 7 present data regarding the outcomes of the cases studied: a final decision that the asserted patent was valid and infringed, a final decision of noninfringement, or a settlement.¹⁰⁷ Table 6 compares the outcomes of cases involving SEP assertion by NPEs and operating firms. Table 7 compares the outcomes of all NPE-initiated cases, whether SEPs or non-SEPs were asserted. Both tables aggregate German and UK data for the periods studied.

Table 6: Comparison of Outcomes of SEP cases: Operating Companies vs. NPEs (German and UK)

<u>Outcome</u>	<u>Operating Co.</u>		<u>NPE</u>		<u>Difference</u>	<u>p-value</u>
All SEPs	N	Share	N	Share		
Infringed	21	0.186	85	0.253	-0.067	0.147

104. It is curious that IPCom, a German PAE, did not assert UMTS SEPs in Germany during the same period that it asserted them in the United States (in the same case in which it also asserted its GSM SEPs). This may be an artifact of timing, as IPCom's U.S. case (a counterclaim against HTC) was initiated in November 2008, and a corresponding German filing may have come shortly after the U.S. filing, but after the cutoff for our 2008 dataset.

105. We can draw no firm conclusion regarding the growth of German UMTS suits after 2008. However, qualitative studies such as the JRC Report suggest that PAE litigation concerning telecom technologies has grown significantly in Germany in recent years. *See* JRC Report, *supra* note 19, at 27 (“[B]y 2013 almost all of the [telecommunications patent] claims were made by entities that do not have any practicing activities.”).

106. *See* Contreras, *supra* note 35, at 528 tbl. 3.

107. This table only considers cases that have, as of the time of collection, reached a final adjudication. Cases still in progress are not represented.

Not infringed	4	0.035	4	0.011	0.023	0.103
Settled	88	0.779	247	0.735	0.044	0.358
N	113		336			

As shown in Table 6, settlement rates of SEP assertion cases in Germany and the UK do not vary substantially based on whether they were initiated by NPEs or operating companies. NPE-initiated cases settled 77.9% of the time, while 73.5% of operating company cases settled: a difference of only 4.4% that is not statistically significant ($p=0.358$). A similar level of consistency was found by Contreras in U.S. SEP cases (71% and 68% of operating company-initiated and NPE-initiated SEP assertions settled, respectively).¹⁰⁸ Both sets of results are consistent with broader studies of patent litigation, which find that actions initiated by operating companies and NPEs settle at roughly the same rates.¹⁰⁹

However, when decisions on the merits are considered, differences emerge. In the cases studied, NPEs had higher success rates proving infringement (25.3%) than operating companies (18.6%). That said, the difference is still not statistically significant ($p=0.147$).¹¹⁰ This result is somewhat contrary to the results of Contreras's study of U.S. SEP litigation, which found that operating companies asserting SEPs were five times more likely to prove infringement than NPEs (10% versus 2% of cases resulting in substantive judgments in favor of the plaintiff).¹¹¹ More general studies of U.S. patent litigation also find that operating company plaintiffs are much more likely to prevail on the merits of infringement claims than NPEs.¹¹² Given these statistics, it is difficult to explain European NPEs' higher rates of success with SEP infringement claims relative to operating companies. One possibility is simply that in the cases studied, which are heavily represented by Sisvel's patent pool assertions, the patents are particularly strong, making it more likely that judgments of infringement will be reached.

108. See Contreras, *supra* note 48, at 60.

109. See, e.g., Jeruss et al., *supra* note 32, at 385.

110. This pattern was also observed by Love et al., *supra* note 7, at 115 ("PAEs were reasonably successful in proving infringement. This is especially true in Germany, where infringement was found in eighty of the ninety-seven PAE cases decided on the merits.").

111. Contreras, *supra* note 48, at 60.

112. This result is shown most strikingly by Allison et al., *supra* note 17, at 268 tbl. 6a, which shows that in U.S. patent litigation from 2008 to 2009, operating companies obtained judgments of infringement more than four times as often as NPEs (160 versus 37 instances). See also John R. Allison et al., *Patent Quality and Settlement Among Repeat Patent Litigants*, 99 GEO. L.J. 677, 693 (2011); Jeruss et al., *supra* note 32, at 387.

In a different vein, Love et al. have hypothesized that higher rates of infringement may generally be found in German cases due to the bifurcated nature of the German litigation system.¹¹³ That is, in Germany, invalidity challenges are not made until after infringement is found and, in many instances, cases settle.¹¹⁴ In the United States, on the other hand, a verdict of infringement would not be reached if the relevant patents were found to be invalid. This hypothesis does little, however, to explain the difference between success rates of NPEs and operating companies within Germany.

Table 7: Comparison of Outcomes of NPE cases with SEPs and without SEPs

<u>Outcome</u>	<u>Non-SEP</u>		<u>SEP</u>		<u>Difference</u>	<u>p-value</u>
	N	Share	N	Share		
All NPEs						
Infringed	82	0.170	85	0.254	-0.084	0.003
Not infringed	96	0.199	4	0.011	0.188	0.000
Settled	305	0.631	247	0.735	-0.103	0.002
N	483		336			

Table 7 compares the outcomes of NPE cases that enforce SEPs with the outcomes of NPE cases that do not. In his U.S. study, Contreras found that outcomes of SEP-related NPE cases were generally consistent with published reports describing outcomes of general patent cases brought by NPEs.¹¹⁵ The data in Table 6, however, shows distinct differences in terms of settlement likelihood (63.1% for non-SEP cases versus 73.5% for SEP cases) and findings of infringement (17.0% for non-SEP cases versus 25.4% for SEP cases). Thus, in the European cases studied, NPE cases involving SEPs were both more likely to settle (difference being 10.3%) and more likely to result in a finding of infringement if they did not settle (difference being 8.4%).

One explanation for this difference may lie in the nature of SEPs. If a patent is declared as essential to a standard, and if that declaration is accurate, then, by definition, any product implementing the standard must infringe the patent. As such, one might expect that SEP cases would, in general, be more likely to result in findings of infringement than non-SEP cases. However, there is no external validation of patent holders'

113. See Love et al., *supra* note 7, at 115 n.18 (discussing the potential impact that Germany's bifurcated system has on infringement outcomes); see also Cremers et al., *supra* note 57.

114. See *id.*

115. Contreras, *supra* note 48, at 60. The Contreras U.S. SEP study did not collect or analyze data regarding non-SEP cases.

declarations of essentiality. Thus, in U.S. cases, a SEP holder must prove infringement as a factual matter to a jury, as in any other patent case.¹¹⁶ It is possible that European courts, which do not rely on jury determinations of infringement, may give greater deference to the patent holders' declarations of essentiality, thus making it easier to prove infringement when a SEP is involved.

Another potential factor at work, at least in the sample of cases studied, is the significant number of repeat assertions by Sisvel of the same few patents.¹¹⁷ It is possible that, while the patent holder may have been required to prove infringement in the normal course, after it did so once, it may have been easier to do so in cases against similarly situated accused products. If so, then the higher rate of success for SEPs may simply be attributable to repeat litigation by the SEP holder, rather than any particular attribute of the SEPs themselves.

V. LIMITATIONS AND OPPORTUNITIES FOR FURTHER STUDY

This study is the first to attempt to quantify the level of SEP assertion by NPEs in Europe. Because we largely relied on existing data sets and publicly-available data, there are limitations inherent in our findings, as well as numerous opportunities for further study.

First, this study's temporal coverage could be expanded. As noted above, comprehensive litigation data for Germany is currently only available for the years 2000 to 2008. Yet it appears that a significant amount of SEP litigation has arisen after 2008.¹¹⁸ Thus, extending the temporal scope of our study in Germany through a more recent date would likely reveal further interesting data. In particular, it would be informative to compare rates of SEP assertion before and after the CJEU's 2015 decision in *Huawei v. ZTE*.¹¹⁹ Likewise, it is not clear whether the introduction of the UPC in Europe will have an impact on jurisdictions in which litigants, and PAEs in particular, elect to file suit. This being said, our analysis through 2008 encompasses the adoption and deployment of several

116. See, e.g., *Ericsson, Inc. v. D-Link Sys., Inc.*, 773 F.3d 1201, 1213 (Fed. Cir. 2014) (noting that, while the district court held a bench trial on FRAND issues, a jury trial was held to determine infringement).

117. See Table 3, *supra*.

118. See Jorge L. Contreras, *Fixing FRAND: A Pseudo-Pool Approach to Standards-Based Patent Licensing*, 79 ANTITRUST L.J. 47, 95–97 (2013) (cataloging all U.S. FRAND-related litigation by year, through 2012).

119. Case C-170/13, *supra* note 41, ¶ 37 (judgment).

significant and heavily-litigated standards, particularly ETSI's 2G GSM and 3G UMTS wireless telecommunications standards. This end date also fits well with the most recent and comprehensive studies of NPEs and patent litigation both in Europe and in the United States.¹²⁰

Likewise, expanding the geographic scope of this study could yield informative results. The JRC has observed that PAE activity in Europe is concentrated in the UK, Germany, France, Sweden, Italy, Switzerland, Finland, the Netherlands, Norway, and Spain.¹²¹ The recent empirical study of EU patent litigation by Cremers et al. covered Germany, the UK, France, and the Netherlands.¹²² Given that major SEP holders in the wireless telecommunications space are based in Sweden (Ericsson) and Finland (Nokia), expanding our study to one or more of these additional countries could shed additional light on the extent of PAE activity in Europe. Moreover, expanding our research to the major Asian jurisdictions (China, Korea, Japan, and India) could offer illuminating comparisons worth considering, though the inability to identify and search cases in these jurisdictions still presents significant practical hurdles.

From a methodological standpoint, this study is limited by its dependence on patents that are publicly declared as being essential to particular standards and which are cataloged in dSEP. As a result, we had no ability to identify litigation involving other SEPs, even those relating to widely adopted standards that are not included in dSEP. For this reason, the scope of our study did not overlap precisely with the seven standards studied by Contreras with respect to U.S. SEP litigation, nor did our study include any standards subject to RF licensing policies (i.e., all were FRAND-based policies). In future work, we could use a combination of overlapping case harvesting methodologies, including the dSEP correlation utilized in the present study together with text-based searching of litigation records, as performed by Contreras for U.S. cases.¹²³

VI. CONCLUSIONS

By matching case-level data from two major patent litigation jurisdictions, Germany (2000 to 2008) and the UK (2000 to 2013), with

120. See Cremers et al., *supra* note 3 (analyzing German patent litigation data through 2008); Love et al., *supra* note 7 (analyzing German NPE litigation data through 2008); Allison et al., *supra* note 17 (analyzing U.S. NPE litigation data for 2008 and 2009).

121. JRC Report, *supra* note 19, at 41.

122. Cremers et al., *supra* note 3.

123. The ability to perform text-based searching on European cases does not yet exist in a convenient form. Though some commercial legal databases have recently emerged, their coverage for Europe falls short compared to the United States.

declared patents in the dSEP database, we have collected all assertions of SEPs by NPEs over the selected jurisdictions and timeframes. We analyzed these results in terms of frequency of assertion by standard, plaintiff, timing of assertion, plaintiff characteristics, and litigation outcome. We also compare our results with a recent study of NPE SEP assertion in the United States. These analyses suggest the following conclusions.

First, Germany surpasses the UK in terms of the frequency with which SEP cases are filed (422 versus 36 SEP assertions initiated). This observation is consistent with general patent litigation trends in these two jurisdictions and the view that Germany is the most important patent litigation venue in Europe.¹²⁴ However, it is significant that the vast majority of German SEP assertions that we observed were initiated by a single PAE, Sisvel. In addition, viewed as a percentage of all patent litigation, SEP assertions in Germany and the UK are actually comparable. German SEP assertions represented approximately 8% of all German patent cases filed during the period studied, and UK SEP assertions represented approximately 6% of all UK patent cases filed during the period.¹²⁵ Thus, when taking into account the lower overall rates of patent litigation in the UK, Germany and the UK appear to have similar rates of SEP assertion. In fact, were we to exclude Sisvel, the number of SEP assertions as a percentage of overall German patent assertions would fall well below that of the UK. Thus, it does not appear that Germany presents any compelling benefits to SEP plaintiffs over holders of non-SEPs.

This said, Sisvel's selection of Germany as its preferred litigation venue can hardly be ascribed to chance. Sisvel is based in Italy, and the principal owners of the SEPs asserted by Sisvel are also based outside of Germany (Philips in the Netherlands and France Telecom in France). Thus, Germany presents no "home court advantage" for Sisvel and was likely selected due to its perception as a plaintiff-friendly jurisdiction. It may also have been selected because of its bifurcated system in which injunctions can be readily obtained before adjudication on the merits. It is unclear whether these advantages will continue following the implementation of the UPC.

Our observations also confirm that the large majority of NPE SEP assertions in Europe during the periods studied have been by Europe-based NPEs, and not by U.S. entities. Thus, while large numbers of NPEs operate

124. See JRC Report, *supra* note 19, at 5 ("[T]he majority of [PAE] assertions in Europe have been initiated in Germany . . ."); Cremers et al., *supra* note 3, at 23 tbl. 3 (identifying 8,424 German patent cases from 2000 to 2008 and 326 UK patent cases from 2000 to 2013).

125. See *supra* Section IV.A.

in the United States,¹²⁶ our results show that few of them availed themselves of the European courts during the periods studied. One possible explanation for the avoidance of European courts by U.S. PAEs has been suggested by the JRC, which speculates that U.S. NPEs may simply lack the “know how” to litigate effectively in Europe.¹²⁷ U.S. PAEs may also find that lower average damages awards in Europe¹²⁸ coupled with the risk of the loser paying the winner’s litigation costs,¹²⁹ and the necessity to engage European counsel may make European litigation less profitable than litigation in favorable jurisdictions in the United States.¹³⁰ As such, at least for the periods studied, European NPE SEP litigation has largely been dominated by Europe-based entities.¹³¹

The observed characteristics of NPEs asserting SEPs versus non-SEPs are also informative. As described in Section III.B, the large majority of patent assertions by NPEs in Germany and the UK were by individuals (69.9%). PAEs and IP subsidiaries of operating companies represented a total of only 26.6% of non-SEP assertions. For SEPs, the results were strikingly different, with PAEs and IP subsidiaries collectively representing 90% of assertions, and no individuals represented at all. These results, which are consistent with those in the United States,¹³² suggest that the assertion (and acquisition) of SEPs may require a greater degree of expertise than the average patent assertion and is thus pursued primarily by firms with deep technological expertise and ties to industry.

Finally, a direct comparison of German, UK, and U.S. assertion of SEPs covering the GSM and UMTS standards over the period 2000 to 2008 reveals that even in a globalized economy, litigation over SEPs has numerous localized tendencies. For example, as illustrated in Table 5, the

126. See, e.g., Cotropia et al., *supra* note 32, at 676 (finding that more than 1,500 unique NPEs filed suit between 2010 and 2012).

127. JRC Report, *supra* note 19, at 55.

128. See *id.*

129. See *id.* at 54.

130. European patent litigation costs are estimated in more detail in Cremers et al., *supra* note 57.

131. One exception to this rule is litigation brought in Germany and the UK by large U.S.-based PAEs such as Interdigital and Vringo as part of global patent litigation campaigns. See *supra* Section IV.B.

132. Allison, Lemley, and Schwartz observed that of all U.S. NPE patent assertions in 2008 and 2009, Individuals brought 11.8%, PAEs 11.0%, Failed Startups 3.8%, and Universities 1.4%. Allison et al., *supra* note 17, at 293 tbl. A1. In Contreras’s U.S. SEP-assertion study, of 26 identified NPEs that asserted SEPs, 20 (77%) were PAEs, 3 (11%) were technology development firms, and one each were an academic/governmental institution, IP subsidiary and an individual.

assertion of SEPs covering GSM—the 3G wireless telecommunications standard deployed primarily in Europe—was largely focused in Germany (eighteen cases) with relatively few cases in the United States (two cases). And of the two U.S. NPE GSM cases brought during this period, both were initiated by a German PAE, IPCom. But with ETSI's 3G UMTS standard, which was adopted worldwide, SEP assertion rates in the United States and Germany became equivalent. NPE suits dominate U.S. litigation but play no role in German litigation.¹³³ This finding suggests, again, that while PAE activity is meaningful in Europe, it is still surpassed by U.S. PAE litigation, particularly with respect to standardized technologies not included in Sisvel's patent pools.¹³⁴

In summary, these results indicate that the assertion of SEPs has occurred in Europe at significant levels, and that PAEs played a large role in this activity. Further research is encouraged to illuminate more recent trends, particularly in view of the implementation of the UPC and the CJEU's decision in *Huawei v. ZTE*.¹³⁵

133. See *supra* Table 5 and accompanying text.

134. Today, Sisvel administers a patent pool covering 3G technology through its subsidiary 3G Licensing S.A. See 3G LICENSING S.A., *supra* note 86.

135. Case C-170/13, *supra* note 41, ¶ 37 (judgment).

