

LG ELECTRONICS, INC. v. BIZCOM ELECTRONICS, INC.: SOLVING THE FOUNDRY PROBLEM IN THE SEMICONDUCTOR INDUSTRY

By Mehdi Ansari

Smaller chip designers cannot afford to operate manufacturing plants. Instead, they hire manufacturers to build their designs and sell back chips made to the designer's specifications. In an effort to secure "patent peace" and focus on innovation, leading semiconductor manufacturers entered blanket cross-licensing agreements in the 1980s and 1990s. The combination of contract manufacturing and these broad licensing agreements creates "the foundry problem," in which a third-party competitor can free-ride on the licensing agreements between patentees and foundries to gain access to technologies without negotiating their own license.¹ A recent case, *LG Electronics, Inc. v. Bizcom Electronics, Inc.*,² demonstrated how carefully defined licensing agreements can overcome the foundry problem. This Note analyzes the foundry problem and the solution employed by LG Electronics as compared to other approaches. It also recommends further devices a patent licensor can use to avoid the foundry problem.

Section I.A provides a background on the semiconductor industry. Section I.B explains the doctrine of patent exhaustion, which prevents a patentee from suing its licensee's customers for patent infringement. Section I.C then explores the roots of the foundry problem in the semiconductor industry. Part II discusses *LG Electronics* and how the court resolved the foundry problem. Part III examines other potential solutions to the foundry problem and analyzes *LG Electronics* in light of these solutions.

I. BACKGROUND

A. Licensing Practices in the Semiconductor Industry

For forty years, the semiconductor industry has been characterized by its rapid product innovation.³ For example, the number of transistors that

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1. The term "foundry" refers to a company that is equipped with a fabrication plant and manufactures devices based on designs of other companies

2. *LG Elecs., Inc. v. Bizcom Elecs., Inc. (Bizcom)*, 453 F.3d 1364 (Fed. Cir. 2006).

3. INTERNATIONAL TECHNOLOGY ROADMAP FOR SEMICONDUCTORS, INTERNATIONAL TECHNOLOGY ROADMAP FOR SEMICONDUCTORS: EXECUTIVE SUMMARY 1 (2005),

can fit on a chip has doubled every year, a sign of the progress of semiconductor technology.⁴ This trend has been accompanied by exponential reductions in the cost of transistors.⁵ These significant improvements in productivity have in turn contributed to a higher quality of life through popularization of personal computers and consumer electronics.⁶

Rapid growth and high demand have made the semiconductor industry extremely competitive. Cutting-edge technology is essential to success, and firms make large investments in research and development.⁷ The growing cost of research has motivated companies to collaborate and form partnerships and cooperative ventures.⁸ Despite all of this collaboration, every company still runs a high risk of infringing another's patents because companies accidentally develop similar technology. To overcome this problem, the semiconductor industry has chosen to share patents through broad cross-licensing transactions, even licensing entire patent portfolios.⁹ This practice provides companies with patent peace and allows development of parallel technology without worry of innocent infringement.

Broad cross-licensing creates problems, however, because of the manufacturing structure of the semiconductor industry. There are two kinds of semiconductor companies: those that are capable of both designing and fabricating (manufacturing) chips, and those that only design. A complete fabrication facility costs over one billion dollars, so only the largest and most profitable companies can afford to operate one.¹⁰ Smaller companies follow a different business model. These "fabless"¹¹ companies focus solely on designing and developing new technology, as opposed to manufacturing it. They then enter into agreements with companies that have fabri-

available at <http://www.itrs.net/Links/2005ITRS/ExecSum2005.pdf> [hereinafter ITRS REPORT].

4. George M. Scalise, Semiconductor Industry Association: President's 2005 Letter, http://www.sia-online.org/abt_president.cfm [hereinafter SIA Letter] (noting that Gordon Moore first noticed this trend about forty years ago, and it has since been called "Moore's law").

5. *Id.*

6. See ITRS REPORT, *supra* note 3, at 1.

7. See *id.*; SIA Letter, *supra* note 4.

8. ITRS REPORT, *supra* note 3, at 1.

9. See *Intel Corp. v. ULSI Sys. Tech., Inc. (ULSI)*, 995 F.2d 1566, 1571 (Fed. Cir. 1993).

10. Alfonso Velosa, *Semiconductor Manufacturing: Boom Busts, and Globalization*, 35-1 THE BRIDGE, Spring 2005, at 28.

11. "Fabless" is a term of art used to describe companies that do not have their own fabrication facility.

cation facilities to produce their designs. The term “foundry” refers to a company that is equipped with a fabrication plant and manufactures devices based on designs of other companies.

B. The Doctrine of Patent Exhaustion

A patentee’s right to exclude others from making, using, or selling its patented invention is limited by the doctrine of patent exhaustion. Section 154 of the Patent Act codifies the patentee’s exclusive rights and provides that the patentee may authorize third parties to exercise those exclusive rights.¹² The patent exhaustion doctrine limits the patentee’s right by permitting purchasers of patented goods to use and resell them without the consent of the patent owner.¹³ This limitation is justified because the patent owner surrendered his rights to control the patented article by selling it for a desired consideration.¹⁴ The purchaser has paid for the patented article and should have the same rights as owners of other goods, namely the rights to use and resell.

Adams v. Burke is the origin of the patent exhaustion doctrine.¹⁵ In *Adams*, the Supreme Court held that when a patentee sells a product whose sole value is in its use, “he receives the consideration for its use and he parts with the right to restrict that use. The article . . . passes without the limit of the monopoly.”¹⁶ Later, in *Keeler v. Standard Folding-Bed Co.*, the Supreme Court held that under the *Adams* doctrine, the purchaser of a patented article could freely resell it as well because the court found no distinction between the right to use and the right to resell.¹⁷

The patent exhaustion doctrine applies to sales by the patentee’s licensees as well.¹⁸ In *Intel Corp. v. ULSI Sys. Tech., Inc.*, the Federal Circuit held, “[the] longstanding principle [of patent exhaustion] applies similarly to sale of a patented product manufactured by a licensee acting within the scope of the license.”¹⁹ The rule is that an authorized sale of a patented product, whether by the patentee or its licensees, places that product

12. 35 U.S.C. § 154 (1988).

13. The patent exhaustion doctrine is also referred to as the first-sale doctrine. *Bizcom*, 453 F.3d at 1369.

14. *See id.*

15. *Adams v. Burke*, 84 U.S. 453 (1873).

16. *Id.* at 456.

17. *Keeler v. Standard Folding-Bed Co.*, 157 U.S. 659, 662, 666 (1895).

18. *Unidisco, Inc. v. Schattner*, 824 F.2d 965, 968 (Fed. Cir. 1987).

19. *ULSI*, 995 F.2d at 1568 (citing *Unidisco*, 824 F.2d at 968).

beyond the reach of the patent, and ends the patentee's rights with respect to the product.²⁰

The patent exhaustion doctrine only applies to unconditional sales. In a contract for sale, the parties are free to include conditions as long as those conditions do not violate law or policy.²¹ If a contract includes an enforceable condition, then insofar as that condition allows the patentee to retain certain rights, those rights are not exhausted.²² "The principle of exhaustion of the patent right [does] not turn a conditional sale into an unconditional one."²³ It is presumed that a patentee who sells the patented device subject to a restriction receives consideration only for the restricted use. The purchaser may only use the device without violating that restriction.²⁴ Nonetheless, in the absence of such restriction, patent exhaustion is the default rule.

C. The Foundry Problem in the Semiconductor Industry: The Intel Cases

The patent exhaustion doctrine, combined with broad cross-licensing, has created the "foundry problem." The foundry problem exists because many companies need to contract out the manufacturing of semiconductor devices. A typical scenario starts when company X grants a broad license to company Y. Such a license would include the rights to use, sell, and make the patented invention. A third company, Z, develops a new design for a semiconductor chip, but cannot make the chip itself, either because it has no manufacturing capability or because its design would infringe one of X's patents. Z contracts with Y to have the chip fabricated. Y can use its license with X to make products to Z's specifications that are covered by X's patents. This is a problem because Z could be X's competitor and X might have denied Z a license to use the technology. By going through

20. *Id.*

21. *Mallinckrodt, Inc. v. Mediport, Inc.*, 976 F.2d 700, 708 (Fed. Cir. 1992) (citing *United States v. Univis Lens Co.*, 316 U.S. 241 (1942)). Patent misuse and antitrust violations are examples of how a conditional sale may violate law or policy. *See id.*

22. *Id.* at 709-10.

23. *Id.* at 706.

24. *See generally* 5 DONALD S. CHISUM, CHISUM ON PATENTS § 16.03[2][a][iii] (2004) (discussing *Kendall Co. v. Progressive Medical Tech., Inc.*, 85 F.3d 1570 (Fed. Cir. 1996), and *Mallinckrodt, Inc. v. Mediport, Inc.*, 976 F.2d 700 (Fed. Cir. 1992), in which the Federal Circuit clarified that the breach of an enforceable condition may leave the breaching party open to infringement).

foundry Y, Z has gained protection through Y's licensing agreement without asking for X's consent.²⁵

Intel, the largest semiconductor company in the world, has been involved in a number of situations that resemble the above scenario. A trio of Intel cases introduced the foundry problem and illustrated its effects.

1. *Intel Corp. v. U.S. International Trade Commission*

Intel entered into a broad cross-licensing agreement with Sanyo, granting Sanyo the right to make, use and sell "any Sanyo . . . products" covered by Intel's patents.²⁶ Sanyo then manufactured products for various third-party companies incorporating Intel's patented technologies.²⁷ Intel brought suit against the third-party companies alleging patent infringement. One of the defendants, Atmel, argued that it did not infringe Intel's patents because Sanyo, an authorized licensee of Intel, sold the products.²⁸

The Federal Circuit stated that if the agreement permitted Sanyo to act as a foundry, the purchase of those licensed products exhausted Intel's rights and the purchaser would be free to use or resell the products.²⁹ Intel argued that, as the agreement put forth, Sanyo was only authorized to manufacture "Sanyo . . . products."³⁰ Intel argued that "Sanyo . . . products" included only products designed by Sanyo.³¹ The court examined the contract as a whole and held that the words "Sanyo . . . products" should be construed to cover only Sanyo-designed and manufactured products.³² The court pointed out that if the term were construed to include foundry rights, it would result in conflicts and ambiguities in the agreement.³³ Therefore, the court held that in the interest of the consistency of the agreement, the license here did not give Sanyo foundry rights and Sanyo was only authorized to sell Sanyo-designed products.³⁴ Hence, the unauthorized sales did not exhaust Intel's patents.³⁵

25. See *ULSI*, 995 F.2d at 1571 (Plager, J., dissenting).

26. *Intel Corp. v. U.S. Int'l Trade Comm'n (ITC)*, 946 F.2d 821, 826 (Fed. Cir. 1991) (quoting the Intel-Sanyo licensing agreement).

27. *Id.*

28. *Id.*

29. *Id.* (citing *United States v. Univis Lens Co.*, 316 U.S. 241, 250-52 (1942)).

30. *Id.*

31. *Id.*

32. *Id.* at 828.

33. *Id.*

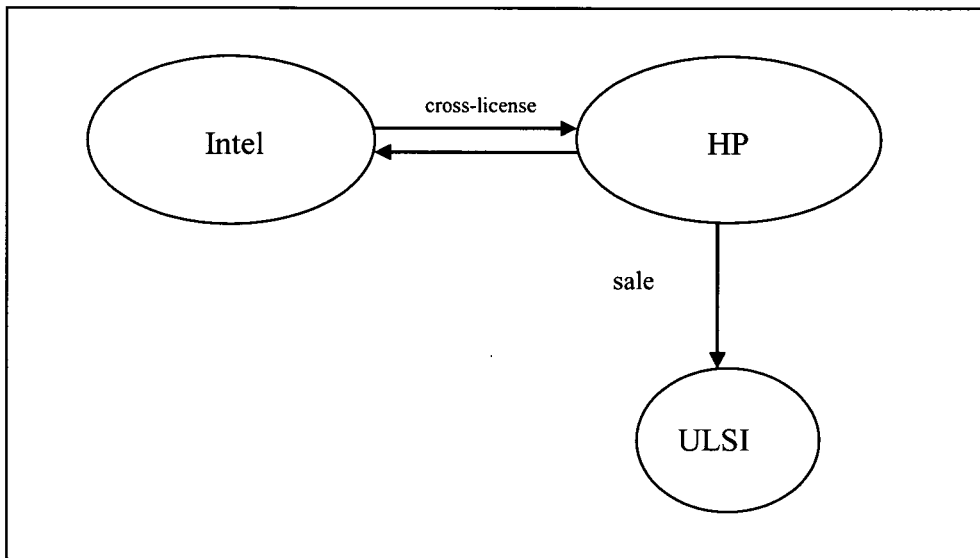
34. *Id.*

35. *Id.*

2. *Intel Corp. v. ULSI System Technology, Inc.*

The *ULSI* case involved a dispute over a patent for the design and operation of a floating-point math processor. Intel owned the patent and developed a line of math coprocessors using the patented technology.³⁶ Intel and Hewlett-Packard (“HP”) entered into a broad cross-licensing agreement, under which each company granted the other a broad license to all present and future patents.³⁷ The companies intended this broad license to increase the freedom of design.³⁸

ULSI sold a math coprocessor that directly competed with Intel’s coprocessors.³⁹ ULSI did not have the capability to manufacture its coprocessors, so it formed a foundry relationship with HP. In addition, an Intel patent covered the ULSI coprocessors.⁴⁰ Under the manufacturing agreement, ULSI purchased coprocessors made by HP to ULSI’s specifications.⁴¹



As in *ITC*, Intel sued the third-party chip designer for patent infringement. Unlike the license agreement with Sanyo in *ITC*, there was no lan-

36. *ULSI*, 995 F.2d at 1567.

37. *Id.*

38. *Id.* at 1573 (Plager, J., dissenting).

39. *Id.* at 1567.

40. *Id.*

41. *Id.*

guage in the Intel-HP agreement to limit the license to "HP products." Intel therefore argued that HP's sale constituted a *de facto* sublicense prohibited by the Intel-HP agreement.⁴² The Federal Circuit found this argument unpersuasive.⁴³ The court noted the difference between a sale and a sublicense; if HP had empowered ULSI to make the chips or to use or sell any such chips other than the ones purchased, then a sublicense would have been granted.⁴⁴ However, HP only sold completed products, and therefore, HP did not grant a sublicense to ULSI.⁴⁵

Intel further argued that HP did not sell a product to ULSI, but actually sold fabrication services.⁴⁶ The Federal Circuit rejected this argument as well, pointing out that the contract between HP and ULSI called for sale of semiconductor wafers that incorporated ULSI's coprocessor design.⁴⁷ The court stated that the fact that the design and the specifications came from ULSI had no bearing on whether there was a sale of coprocessors and concluded that HP sold the patented coprocessors.⁴⁸ Hence, the Federal Circuit accepted ULSI's argument that under the Intel-HP agreement, HP was authorized to manufacture coprocessors using third-party designs and act as a "foundry."⁴⁹ HP's sale of the coprocessors was an authorized sale and thus, patent exhaustion insulated ULSI from infringement of Intel's patent.⁵⁰

3. *Cyrix Corp. v. Intel Corp.*

The foundry problem continued to haunt Intel, culminating in 1996 in *Cyrix Corp. v. Intel Corp.*⁵¹ Cyrix designed and sold microprocessors.⁵² It provided the microprocessor designs to its foundries, International Business Machines ("IBM") and SGS-Thomson Microelectronics ("ST"), to manufacture chips containing those microprocessor designs.⁵³ Both foundries

42. *Id.*

43. *Id.* at 1569-70.

44. *Id.* at 1569.

45. *Id.* (citing *Lisle Corp. v. Edwards*, 777 F.2d 693, 695 (Fed. Cir. 1985)).

46. *Id.*

47. *Id.*

48. *Id.*

49. *Id.* at 1568. The court justified its finding by stating that HP's foundry right was a result of the broad license granted by Intel, and that Intel presumably received adequate consideration for it. *Id.* at 1569.

50. *Id.* at 1570.

51. *Cyrix Corp. v. Intel Corp.*, 77 F.3d 1381 (Fed. Cir. 1996).

52. *Id.* at 1383.

53. *Id.*

dries were Intel licensees and their agreements with Intel included the right to make semiconductors covered by the licensed patents.⁵⁴

The question presented to the Federal Circuit was whether the Intel-IBM agreement gave IBM the right to act as a foundry or whether the agreement was limited to products designed and made by IBM.⁵⁵ Intel argued that the inclusion of the word "IBM" in certain terms in the agreement (for example, "Intel . . . hereby grants to IBM . . . a license . . . to make, use, lease, sell and otherwise transfer *IBM Licensed Products*") created a limitation similar to the "Sanyo products" limitation in the *ITC* case, and hence, restricted the license to products designed by IBM.⁵⁶ Unlike *ITC*, this agreement specifically defined "IBM Licensed Products" so the Federal Circuit focused on this definition when evaluating Intel's argument.⁵⁷ The definition did not include any terms that limited the license's application to products designed by IBM.⁵⁸ The Federal Circuit found that absent any reason to limit the term, it should be construed broadly to cover any products manufactured by IBM, and that the mere existence of the word "IBM" in the term did not modify its meaning.⁵⁹ The Federal Circuit thus held that IBM had the right to make and sell the chips as a foundry.⁶⁰ The court also held that unlike the *ITC* case, inclusion of foundry rights did not create conflicts or ambiguities within the agreement.⁶¹ Therefore, in contrast to the language in the agreement with Sanyo in *ITC*, the agreement here gave IBM foundry rights and IBM was authorized to sell products to third parties that were covered under Intel's patents. Accordingly, IBM's manufacture of chips based on Cyrix's design and the subsequent sale of the chips to Cyrix were authorized under the IBM-Intel agreement and therefore, resulted in patent exhaustion.⁶²

54. *Id.* ST acquired its license by assignment from Mostek, who was the original licensee of Intel.

55. With respect to patent exhaustion and the foundry problem, the ST agreement was analogous to the IBM agreement; however, the ST agreement had other immaterial complications regarding ST's contracting out its manufacturing process. For this reason, this Note focuses only on the IBM agreement.

56. *Id.* at 1384-85. Intel relied on *ITC*, in which the court construed "Sanyo products" as limiting the grant of rights to Sanyo-designed and manufactured products.

57. *Id.* at 1385.

58. *Id.*

59. *Id.*

60. *Id.* at 1386.

61. *Id.*

62. *Id.* The court reached a similar result regarding the ST agreement. *Id.* at 1388-89.

II. *LG ELECTRONICS, INC. V. BIZCOM ELECTRONICS, INC.*

A. LGE's Foundry Problem and the District Court's Decision

LG Electronics, Inc. ("LGE") owned multiple patents relating to personal computer technology.⁶³ LGE entered into a licensing agreement with Intel, under which Intel acquired the right to manufacture products covered by LGE's patents.⁶⁴ The license expressly stated that Intel's customers were not allowed to combine the products covered by the license with non-Intel products.⁶⁵

Bizcom Electronics, Inc. ("Bizcom") manufactured computers using microprocessors and chipsets purchased from Intel.⁶⁶ The chips Intel manufactured for Bizcom were covered by the patents Intel licensed from LGE. Intel had informed Bizcom of the limitation on the LGE-Intel license in a letter Intel sent to all of its customers explaining that the license between LGE and Intel "does not extend, expressly or by implication[,] to any product that [Intel's customers] may make by combining an Intel product with any non-Intel product."⁶⁷ Nevertheless, Bizcom combined the chips with its own parts and pieces.

LGE brought suit in the Northern District of California against Bizcom and other Intel customers asserting that the combination of Intel-manufactured microprocessors or chipsets with other computer components infringed LGE's patents covering those combinations. LGE did not assert any rights to the microprocessors or chipsets themselves.⁶⁸

The district court held that Intel's sale of microprocessors and chipsets to the defendants constituted an unconditional sale, and therefore, exhausted LGE's patent rights.⁶⁹ In analyzing the issue of patent exhaustion, the district court stated that in order for the patent exhaustion doctrine to

63. *LG Elecs., Inc. v. Asustek Computer, Inc. (Asustek)*, 248 F. Supp. 2d 912, 914 (N.D. Cal. 2003), *rev'd in part sub nom.*, *LG Elecs., Inc. v. Bizcom Elecs., Inc. (Bizcom)*, 453 F.3d 1364, 1368 (Fed. Cir. 2006).

64. *Asustek*, 248 F. Supp. 2d at 914.

65. *Bizcom*, 453 F.3d at 1368.

66. *Asustek*, 248 F. Supp. 2d at 914.

67. *Id.*

68. Note that the microprocessors and chipsets were not themselves patented. LGE held patents on computer systems, which utilized the microprocessors. LGE's suit was for infringement of LGE's rights in the system. The defendants' argument was that the sales of the unpatented products, which were to be used in patented systems, exhausted the patentee's rights.

69. *Id.* at 917.

apply, an unconditional sale was required.⁷⁰ LGE argued that Intel's sale to defendants was not unconditional because Intel had informed all its customers of the limitation on the LGE-Intel license.⁷¹ While the court agreed that a patentee is free to impose limitations on the sale of its products, it disagreed that such limitations were imposed by the letter.⁷² The court held that the letters sent by Intel to its customers were not sufficient to transform the unconditional sale of microprocessors and chipsets into conditional ones.⁷³ The court concluded that defendants' purchase of Intel products were unconditional and exhausted LGE's patent rights.⁷⁴

B. The Federal Circuit's Analysis

LGE appealed the decision arguing that the district court erred in applying the patent exhaustion doctrine to the system claims. LGE argued that Intel's sales were conditional sales, and that patent exhaustion should not apply. The Federal Circuit reiterated that only an unconditional sale triggers patent exhaustion.⁷⁵ To determine whether the sale was conditional, the court examined the sale in two stages: LGE's license to Intel and Intel's sale to defendants.⁷⁶

70. *Id.* at 916 (citing *B. Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1426 (Fed. Cir. 1997)).

71. *Id.* at 916.

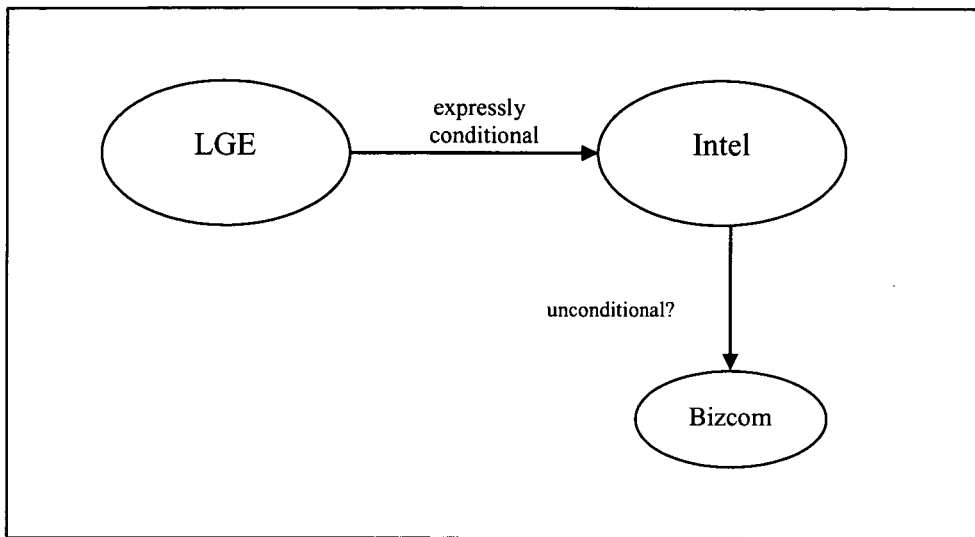
72. *Id.* (citing *Mallinckrodt, Inc. v. Mediport, Inc.*, 976 F.2d 700, 706-08 (Fed. Cir. 1992)).

73. *Id.* at 917.

74. *Id.* at 916. Since the court found the patents exhausted, it did not analyze the application of the implied license doctrine. Implied licensing would provide Defendants with another argument in case patent exhaustion failed. Since patent exhaustion was successful, the implied licensing argument was not necessary.

75. *Bizcom*, 453 F.3d at 1369 (citing *Mitchell v. Hawley*, 83 U.S. 544, 547 (1873)).

76. *Id.* at 1370.



The Federal Circuit held the LGE-Intel license conditioned later sales.⁷⁷ The license included a provision expressly disclaiming allowing Intel's customers to combine the licensed parts with non-Intel products.⁷⁸ This license was conditional, and thus, did not exhaust LGE's patent rights.

As to Intel's sale to the defendants, the Federal Circuit rejected the district court's holding regarding the ineffectiveness of the letters. The district court had held that the letters were not part of the defendants' contracts, and did not make the sale conditional.⁷⁹ The Federal Circuit rejected this argument, reasoning that consistent additional terms may supplement a contract unless the contract was intended to be complete and exclusive.⁸⁰ The Federal Circuit held that Intel's sale to the defendants was subject to the letters' restrictions, and thus was a conditional sale.⁸¹ Since both transactions in the chain from LGE to the defendants were conditional, the exhaustion doctrine did not apply, and LGE's rights in its patents were not exhausted.⁸²

77. *Id.*

78. *Id.* The LGE-Intel license required Intel to notify its customers of the existence of the limitation.

79. *Asustek*, 248 F. Supp. 2d at 917.

80. *Bizcom*, 453 F.3d at 1370 (citing as an example, N.Y. U.C.C. § 2-202).

81. *Id.*

82. *Id.* at 1370 (citing *B. Braun Med., Inc. v. Abbott Lab.*, 124 F.3d 1419, 1426 (Fed. Cir. 1997), for the principle that the exhaustion doctrine does not apply to an expressly conditional sale or license).

III. DISCUSSION

The *Cyrix* and *ULSI* cases exposed serious loopholes in broad licensing agreements between patent owners and foundries that allowed third party-competitors to gain access to patents at a significantly discounted price.⁸³ Because the semiconductor industry is highly innovative and highly competitive, these loopholes presented a threat to the licensing culture that pervaded the industry. Intel, and others in a similar position, quickly moved to remedy the problem.

Section III.A explores possible solutions for licensors in response to the foundry problem. Section III.B examines *LG Electronics, Inc. v. Bizcom Electronics, Inc.* in light of the solutions considered to understand how LGE solved the problem. Section III.B also analyzes the shortcomings in LGE's approach and how they may be improved.

A. How Licensors Can Avoid Inadvertent Grants of Foundry Rights

The foundry problem is an obstacle to the otherwise beneficial practice of forming foundry relationships that are integral to the semiconductor industry. The intense competition among semiconductor companies and the high cost of manufacturing creates a need for foundry relationships.⁸⁴ Companies are constantly trying to develop cutting edge technology and might find themselves approaching a problem that someone else has already solved and patented. Licensing the patent is the best way to legally use such technology. Foundry agreements provide an alternative way to gain a right to use the patented invention without requiring a license directly from the original inventor.⁸⁵ This allows companies to focus on new developments and advance the semiconductor technology. A solution to the foundry problem must account for the important role of foundry relationships in the semiconductor industry.

The source of the foundry problem has been broad cross-licensing of patent portfolios, so one potential solution would be for companies to avoid broad cross-licenses and negotiate on a patent-by-patent basis. This

83. Some scholars have criticized with the results of the foundry cases. See, e.g., R. Trevor Carter, *Legalizing Patent Infringement: Application of the Patent Exhaustion Doctrine to Foundry Agreements*, 28 IND. L. REV. 689 (1995) (arguing that *ULSI* was decided incorrectly); Mark Rozman, *Intel v. ULSI System Technology, Inc.*, 1 J. INTELL. PROP. L. 373, 383 (1994) (characterizing the *ULSI* decision as "flawed").

84. See Amber Hatfield, *Patent Exhaustion, Implied Licenses, and Have-Made Rights: Gold Mines or Mine Fields?*, 2000 COMPUTER L. REV. & TECH. J. 1, 1-2 (2000).

85. See *id.* at 2.

proposition eliminates the broad-licensing practice. However, there are strong incentives for companies to continue to engage in broad licensing deals. Fast changing and competitive markets often spawn parallel development, which creates the risk of innocent infringement.⁸⁶ Sharing patents saves companies time and the cost of monitoring competitors and litigating infringement suits.⁸⁷ It also lessens the risk that the patents will be invalidated during litigation.⁸⁸ The semiconductor industry derives a significant advantage from competitors granting each other broad licenses and attaining “patent peace,” allowing each company to sell its own product under a license from a competitor.⁸⁹ The importance of broad cross-licensing to the semiconductor industry suggests that ending the practice is not the best way to solve the foundry problem.⁹⁰

A better solution to the foundry problem is careful drafting of licensing agreements; however, determining what restraints to place on the agreements is difficult. The *ULSI* case suggests that contractually limiting a licensee’s ability to sublicense is not an effective solution by itself. In *ULSI*, Intel argued that the agreement forbade HP from producing ULSI’s chip designs using Intel’s patents because the Intel-HP agreement had expressly prevented HP from granting any sublicenses.⁹¹ Intel argued that because ULSI was able to design the product and provide the schematics to HP, ULSI was in effect using the patent and was, therefore, a sublicensee.⁹² The Federal Circuit rejected this argument focusing on the fact that the transaction between HP and ULSI was for sales of chips, not patent rights.⁹³ The court held that the source of the design was irrelevant to the

86. See Michael Lake, *Patent and Know-how (Technology) Licenses and Licensing Strategies*, in UNDERSTANDING THE INTELLECTUAL PROPERTY LICENSE 2003 45, 52 (PLI Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series No. G0-01BF, 2003).

87. See *id.* In fast moving industries, by the time the litigation is over, the market and the technology may have moved past the issue, which provides yet another incentive not to litigate. See *id.*

88. See Hatfield, *supra* note 84, at 3. About half of all patents litigated are invalidated. See *id.*

89. See Lake, *supra* note 86, at 52; Hatfield, *supra* note 84, at 1 (citing Cyrix Corp. v. Intel Corp., 803 F. Supp. 1200, 1205 (E.D. Tex. 1992)).

90. See generally Hatfield, *supra* note 84.

91. *ULSI*, 995 F.2d at 1567.

92. See *id.*

93. *Id.* at 1569-70.

issue of patent exhaustion.⁹⁴ If HP, for example, had granted ULSI the right to manufacture, then Intel's argument would be valid. Hence, restrictions on sublicensing are not by themselves effective solutions to the foundry problem.

A different licensing-based solution is to directly deal with the foundry problem during negotiations and to contractually limit the grant of foundry rights.⁹⁵ In *ULSI* and *Cyrix*, the Federal Circuit in essence held that broad licenses convey foundry rights. Intel had not accounted for foundry rights in the contracts and it thus gave up more rights than it desired. The lesson from the *Intel* cases is that licensors should foresee the problem and either contractually restrict foundry rights or adjust the consideration for the agreement accordingly.

One way of restricting foundry rights is by expressly prohibiting licensees from acting as foundries in the agreement.⁹⁶ Licensors are legally allowed to impose conditions on the contract,⁹⁷ and they can prohibit licensees from using the licensed patents to manufacture products for third parties. Licensors can also take away foundry rights indirectly by limiting the license to only those products designed and sold by the licensee. Whether or not foundry rights exist is determined by the construction of these terms of the contract.⁹⁸ In *ITC*, Intel successfully argued that the right to sell products based on Intel patents was restricted by the agreement between Intel and Sanyo to only those products designed by Sanyo itself. This case demonstrates that, as scholars have suggested, contractual limitations on the rights of the licensee can control the foundry problem.⁹⁹ Such control requires careful drafting of the license terms to limit the rights granted to

94. See William Martin Jr., *Intel Corp. v. ULSI System Technology, Inc.: Patent Exhaustion and Post-Sale Restrictions on the Use of a Component Made Under License*, 2 TEX. INTELL. PROP. L.J. 5, 16 (1993).

95. See David Barr, *Recent Federal Circuit Decisions on Interpretation of Agreements Relating to Patents*, in TECHNOLOGY LICENSING AND LITIGATION 1996 1085, 1099 (PLI Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series No. G4-4001, 1996).

96. See *id.*

97. See *Mallinckrodt, Inc. v. Mediport, Inc.*, 976 F.2d 700, 706-08 (Fed. Cir. 1992).

98. See Ronald Yin, *Hardware and Software Licensing Issues for the 1990s*, 19 HASTINGS INT'L & COMP. L. REV. 691, 694-95 (1996).

99. See Lake, *supra* note 86, at 64; Bradford Lyerla, *Things to Think About When Drafting Patent Licenses*, in UNDERSTANDING THE INTELLECTUAL PROPERTY LICENSE 2001 353, 358 (PLI Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series No. G0-00PW, 2001).

the licensee.¹⁰⁰ By limiting the rights to “Sanyo . . . products,” Intel successfully eliminated foundry rights.

The Federal Circuit followed the same analytical approach in *ULSI* and *Cyrrix*, but found that those agreements had not adequately limited the scope of the license. For example, in *ULSI*, the court focused on the fact that the agreement between HP and ULSI called for the sale of chips and wafers, not manufacturing services, to conclude that the license exhausted Intel’s patents.¹⁰¹ In *Cyrrix*, the court examined the definition of “IBM Licensed Products” and determined that it did not limit the contract to only those products designed by IBM.¹⁰² In all of these cases, the court focused its analysis on how the agreement was written and what limitations were placed on the rights.¹⁰³

While Intel was successful in *ITC*, its approach was risky. The language in the agreement was ambiguous. The court construed the limitation in light of the contract as a whole, and to preserve its consistency, ruled in favor of limiting foundry rights.¹⁰⁴ This is far from a safe strategy from the licensor’s perspective. If the inclusion of foundry rights would not have created conflicts and ambiguities within the agreement, the court could have come out the other way.¹⁰⁵ *ULSI* and *Cyrrix* illustrate that in ambiguous cases, the court will allow the licensee to act as a foundry. By incorporating terms that more forthrightly address the foundry problem, licensors can avoid ambiguity and prevent granting foundry rights.

B. The Solution Employed By LGE

LGE employed the contractual foundry limitation approach to somewhat successfully control the foundry problem. *ITC* showed that if the contract included limitations on foundry rights, courts would respect those limitations. LGE could have used Intel’s strategy in the *ITC* case by limiting the grant of rights to only those products designed and sold by the licensee. However, LGE had learned from the court’s analysis in *ITC* that

100. *See id.*

101. *See ULSI*, 995 F.2d at 1569; Paul Mendosa, *Patent Prosecution for Multimedia Products*, in MULTIMEDIA AND THE LAW 1996: PROTECTING YOUR CLIENTS’ INTERESTS 147, 160 (PLI Patents, Copyrights, Trademarks, and Literary Property Course Handbook Series No. G4-3955, 1996).

102. *See Cyrrix*, 77 F.3d at 1385.

103. Note that interpretation of a contract is a question of law, which the Federal Circuit reviews de novo. *See ULSI*, 995 F.2d at 1569 (citing *Interstate Gen. Gov’t Contractors, Inc. v. Stone*, 980 F.2d 1433, 1434 (Fed. Cir. 1992)).

104. *See ITC*, 946 F.2d at 828.

105. *See id.*

ambiguity could result in the inadvertent granting of foundry rights. Therefore, LGE implemented a clear contractual restriction by limiting the products made under the license to be used only with other Intel products.¹⁰⁶ In other words, a semiconductor device produced by Intel under LGE's patents could not be combined with any non-Intel pieces. This requirement accommodated the danger of the foundry problem, while allowing Intel complete freedom to use the patented technologies. Third-party companies that would use Intel as a foundry would do so in order to get a device from Intel, combine it with their own pieces, and sell it as their own product. LGE was aware that a third-party company could not sell a product composed of only Intel parts; it would have to either add parts of its own or parts from other companies. If a third-party company combined the Intel chip with other non-Intel parts, it would lose its license to use and sell the chip because LGE had expressly forbidden such a combination. Therefore, unlike the ambiguous "Sanyo products" limitation of the *ITC* case, LGE opted for a more practical solution with well-defined boundaries.

LGE's practical approach to limiting foundry rights was eventually validated by the Federal Circuit's decision. The Federal Circuit, unlike its analysis in *ITC*, did not have to look at the contract as a whole and search for conflicts or ambiguities; it stated that "[t]he LGE-Intel license expressly disclaims granting a license allowing [third parties] to combine Intel's licensed parts with non-Intel components."¹⁰⁷ This was sufficient for the court to call the license a "conditional agreement" and hold that LGE's patent rights were not exhausted.¹⁰⁸

One potential problem with this strategy that LGE foresaw and preempted was that defendants could argue that they were never informed of the restrictions of the LGE-Intel license. LGE addressed this by contractually obligating Intel to inform its customers of the limitation on combining the chip with non-Intel pieces.¹⁰⁹ This guaranteed that third parties received notice of the limitation and could not contend that they were unaware of the limitation of the license and were therefore unconditional purchasers.

Although LGE's strategy was significantly better than Intel's, one improvement can be implemented. Note that the district court ruled against

106. See *Bizcom*, 453 F.3d at 1368.

107. *Id.* at 1370.

108. See *id.*

109. See *id.*

LGE.¹¹⁰ It held that Intel's sale to the defendants was unconditional, and that the letters were insufficient to make the sale conditional.¹¹¹ The lower court thus held that the unconditional sale exhausted LGE's rights and protected the defendants against infringement.¹¹² Although the Federal Circuit later reversed the district court's decision, the conflict between the courts suggests that simply sending letters may be ineffective.

For patent exhaustion to apply, the licensor-licensee agreement and the licensee-third party sale must both be unconditional.¹¹³ LGE made the LGE-Intel license conditional. To make sure that it would not leave the door open to a possible argument of lack of knowledge by potential defendants, LGE required Intel to notify its customers of the restriction.¹¹⁴ But the broad requirement-to-inform allowed Intel to carry out the obligation however it chose. Intel decided to send stand-alone letters notifying its customers of the license restriction.¹¹⁵ Defendants argued, and the district court agreed, that the letters were outside the four corners of the manufacturing contract and did not bind the defendants. The Federal Circuit later rejected this argument by stating, without detail, that the letters were permissible modifications to the contract and thus, enforceable. The court did not explain its analysis on contract interpretation and enforceability of the modifications. Given the district court's decision and the Federal Circuit's lack of explanation regarding the letters, simply notifying customers by letter may not be a safe practice. Although LGE had foreseen that giving customers fair notice of the license limitations was a possible area for trouble, it did not craft an adequate solution.

A safer strategy would have been for LGE to require Intel to communicate the license restrictions in a particular way. For example, LGE could have obliged Intel to inform its customers of the limitation by including a clause in each of their manufacturing agreements. This would negate the district court's argument that the letters did not serve as conditions of sale, because the defendants would have read and signed the agreement including the limitation.

110. See *LG Elecs., Inc. v. Asustek Computer, Inc. (Asustek)*, 248 F. Supp. 2d 912, 917 (N.D. Cal. 2003).

111. See *id.*

112. See *id.* at 916.

113. See *Bizcom*, 453 F.3d at 1370.

114. See *id.*

115. *Asustek*, 248 F. Supp. 2d at 914.

IV. CONCLUSION

The semiconductor industry has experienced rapid growth over the past few decades. With thousands of semiconductors in every electronic device, the industry will continue to grow. To facilitate such growth, companies have found effective solutions to their problems, like broad cross-licensing to avoid patent litigation. The foundry problem is one more challenge for the semiconductor industry to overcome. It is important for the solution to account for the state of the industry today. Many valuable and innovative companies cannot afford fabrication facilities and have to use foundries to fabricate semiconductor devices. The foundry problem is a harmful consequence of this beneficial practice.

Contractual limits on the rights transferred in a licensing agreement present the best way to solve the foundry problem while not impeding the use of foundries. These agreements should also require that these limitations be adequately communicated to third parties who contract with the foundry. This way, third-party companies in need of fabrication who contract with a licensee-foundry know which patents are under what restrictions and do not have to run the risk of infringement. This practice would also make licensors safe from competitors gaining access to important technologies by going through licensee foundries that they would not have otherwise licensed.