

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

PHOTONIC IMAGING SOLUTIONS, INC.)	
)	
Plaintiff,)	C.A. No. 1:18-cv-00636-GMS
)	
v.)	JURY TRIAL DEMANDED
)	
LENOVO GROUP LTD., LENOVO)	
(UNITED STATES) INC., and LENOVO)	
HOLDING CO., INC.,)	
)	
Defendants.)	

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Photonic Imaging Solutions, Inc. (“Photonic Imaging” or “Plaintiff”), for its Complaint against Defendants Lenovo Group Ltd. (“Lenovo Group”), Lenovo (United States) Inc. (“Lenovo US”), and Lenovo Holding Co., Inc. (“Lenovo Holding”) (collectively, “Defendants”), alleges as follows.

THE PARTIES

1. Photonic Imaging is a corporation organized and existing under the laws of the State of Texas, with its principal place of business located at 411 Theodore Fremd Ave., Suite 206S, Rye, NY 10580.

2. Upon information and belief, Defendant Lenovo Group Ltd. is a corporation organized and existing under the laws of China, with its principal place of business located at No 6 Chuang Ye Road, Haidian District, 100085 Beijing, China and may be served pursuant to the provisions of the Hague Convention. Lenovo Group is a manufacturer and seller of consumer electronic equipment such as laptop computers. Upon information and belief, Lenovo Group does business in Delaware directly or by selling its products through intermediaries such as Best

Buy. Lenovo Group may be served with process under the Delaware long arm statute, 10 *Del. C.* § 3104.

3. Upon information and belief, Defendant Lenovo (United States) Inc. is a corporation organized and existing under the laws of the State of Delaware, with its principal place of business located at 1009 Think Place, Morrisville, NC 27560. Lenovo US is a manufacturer and seller of consumer electronic equipment such as laptop computers. Upon information and belief, Lenovo US does business in Delaware directly or by selling its products through intermediaries such as Best Buy. Lenovo US may be served with process upon its registered agent, The Corporation Trust Company, Corporation Trust Center, 1209 Orange Street, Wilmington, DE, 19801.

4. Upon information and belief, Defendant Lenovo Holding Co., Inc. is a corporation organized and existing under the laws of the State of Delaware, with its principal place of business located at 1009 Think Place, Morrisville, NC 27560. Lenovo Holding is a manufacturer and seller of consumer electronic equipment such as laptop computers. Upon information and belief, Lenovo Holding does business in Delaware directly or by selling its products through intermediaries such as Best Buy. Lenovo Holding may be served with process upon its registered agent, The Corporation Trust Company, Corporation Trust Center, 1209 Orange Street, Wilmington, DE, 19801.

JURISDICTION

5. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. §§ 1, *et seq.* This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

6. This Court has personal jurisdiction over Lenovo Group because, on information and belief, Lenovo Group regularly conducts business and has committed acts of patent infringement and/or has induced acts of patent infringement by others in this Judicial District and/or has contributed to patent infringement by others in this Judicial District, the State of Delaware, and elsewhere in the United States, that give rise to this action. For example, Lenovo Group has placed and continues to place infringing products into the stream of commerce via an established distribution channel with the knowledge and/or understanding that such products are being and will continue to be sold in this Judicial District and the State of Delaware.

7. This Court has personal jurisdiction over Lenovo US because, on information and belief, Lenovo US resides in this judicial district because Lenovo US is a corporation organized and existing under the laws of the State of Delaware and maintains a registered agent for service of process in Delaware, The Corporation Trust Company, Corporation Trust Center, 1209 Orange Street, Wilmington, DE, 19801. On information and belief, Lenovo US regularly conducts business and has committed acts of patent infringement and/or has induced acts of patent infringement by others in this Judicial District and/or has contributed to patent infringement by others in this Judicial District, the State of Delaware, and elsewhere in the United States, that give rise to this action. For example, Lenovo US has placed and continues to place infringing products into the stream of commerce via an established distribution channel with the knowledge and/or understanding that such products are being and will continue to be sold in this Judicial District and the State of Delaware.

8. This Court has personal jurisdiction over Lenovo Holding because, on information and belief, Lenovo Holding resides in this judicial district because Lenovo Holding is a corporation organized and existing under the laws of the State of Delaware and maintains a

registered agent for service of process in Delaware, The Corporation Trust Company, Corporation Trust Center, 1209 Orange Street, Wilmington, DE, 19801. On information and belief, Lenovo Holding regularly conducts business and has committed acts of patent infringement and/or has induced acts of patent infringement by others in this Judicial District and/or has contributed to patent infringement by others in this Judicial District, the State of Delaware, and elsewhere in the United States, that give rise to this action. For example, Lenovo Holding has placed and continues to place infringing products into the stream of commerce via an established distribution channel with the knowledge and/or understanding that such products are being and will continue to be sold in this Judicial District and the State of Delaware.

9. Venue is proper in this Judicial District pursuant to 28 U.S.C. §§ 1391 and 1400(b).

PATENTS-IN-SUIT

10. On February 6, 2001, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 6,184,055 (the "'055 Patent") entitled "CMOS Image Sensor with Equivalent Potential Diode and Method for Fabricating the Same," naming Woodward Yang, Ju Il Lee, and Nan Yi Lee as inventors. A true and correct copy of the '055 Patent is attached as Exhibit A.

11. On May 13, 2003, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 6,563,187 (the "'187 Patent") entitled "CMOS Image Sensor Integrated Together with Memory Device," naming Sang Hoon Park as inventor. A true and correct copy of the '187 Patent is attached as Exhibit B.

12. On September 27, 2005, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 6,949,388 (the "'388 Patent") entitled "CMOS Image Sensor

Integrated Together with Memory Device,” naming Sang Hoon Park as inventor. A true and correct copy of the ’388 Patent is attached as Exhibit C.

13. On September 26, 2006, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 7,113,203 (the “’203 Patent”) entitled “Method and System for Single-Chip Camera,” naming Ben S. Wu, James Cape, and Shang-Hung Lin as inventors. A true and correct copy of the ’203 Patent is attached as Exhibit D.

14. Photonic Imaging is the sole and exclusive owner of all right, title and interest in the ’055 Patent, the ’187 Patent, the ’388 Patent, and the ’203 Patent, (collectively, the “Patents-in-Suit”), and holds the exclusive right to take all actions necessary to enforce its rights to the Patents-in-Suit, including the filing of this patent infringement action. Photonic Imaging also has the right to recover all damages for past, present, and future infringement of the Patents-in-Suit and to seek injunctive relief as appropriate under the law.

15. Photonic Imaging has at all times complied with the marking provisions of 35 U.S.C. § 287 with respect to the Patents-in-Suit. On information and belief, prior assignees and licensees have also complied with the marking provisions of 35 U.S.C. § 287.

COUNT I
(Infringement of the ’055 Patent)

16. Paragraphs 1 through 15 are incorporated by reference as if fully set forth herein.

17. Photonic Imaging has not licensed or otherwise authorized Defendants to make, use, offer for sale, sell, or import any products that embody the inventions of the ’055 Patent.

18. Defendants have and continue to directly infringe the ’055 Patent, including at least claim 1, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271 (including but not limited to 271(g)), by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every

limitation of one or more claims of the '055 Patent. Such products include laptop computers, tablets, desktop computers, all in one computers, and smartphones each of which incorporate one or more CMOS image sensors, such as Defendants' Yoga Book YB1-X90L, shown below:



19. Upon information and belief, the Yoga Book YB1-X90L contains a CMOS image sensor supplied by Omnivision with a model number OV8858.

20. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is fabricated using a method that includes providing a semiconductor layer of a first conductive type, *e.g.*, a P-epi layer.

21. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is fabricated using a method

that includes forming an isolation layer dividing the semiconductor layer into a field region (*e.g.*, the area between each unit cell) and an active region (*e.g.*, the photodiode within each unit cell).

22. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is fabricated by forming a first impurity region of a second conductive type (*e.g.*, the N-Diffusion layer forming a pinned photodiode) within the semiconductor layer. Upon information and belief, this layer is formed using a first ion implantation mask and is structurally apart from the isolation layer.

23. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is fabricated by forming a second impurity region of the first conductive type (*e.g.*, the P-Pinning layer of the pinned photodiode) beneath the surface of the P-epi layer and on the first impurity region (the active region) using a second ion implantation mask, which opens a portion of the semiconductor layer so that the width of the second impurity region (the P-pinning layer) is wider than that of the first impurity region (the N-Diffusion layer) and a portion of the second impurity region (the P-pinning layer) is in contact with the semiconductor layer (the P-epi layer).

24. Defendants have and continue to indirectly infringe one or more claims of the '055 Patent by knowingly and intentionally inducing others, including customers and end-users, to directly infringe to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling and/or importing into the United States products that include infringing technology, including products such as the Yoga Book YB1-X90L which contain CMOS image sensors.

25. Defendants, with knowledge that these products, or the use thereof, infringe the '055 Patent at least as of the date of this Complaint, knowingly and intentionally induced, and

continue to knowingly and intentionally induce, direct infringement of the '055 Patent by supplying these products to end users for use in an infringing manner.

26. Defendants induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others, including end users, infringe the '055 Patent, but while remaining willfully blind to the infringement.

27. Photonic Imaging has suffered damages as a result of Defendants' direct and indirect infringement of the '055 Patent in an amount to be proved at trial.

COUNT II
(Infringement of the '187 Patent)

28. Paragraphs 1 through 15 are incorporated by reference as if fully set forth herein.

29. Photonic Imaging has not licensed or otherwise authorized Defendants to make, use, offer for sale, sell, or import any products that embody the inventions of the '187 Patent.

30. Defendants have and continue to directly infringe the '187 Patent, including at least claim 4, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '187 Patent. Such products include laptop computers, tablets, desktop computers, all in one computers, and smartphones each of which incorporate one or more CMOS image sensors, such as Defendants' Yoga Book YB1-X90L, shown below:



31. Upon information and belief, the Yoga Book YB1-X90L contains a CMOS image sensor supplied by Omnivision with a model number OV8858.

32. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is a chip divided into first, second, and third sections which are formed in a single P-type layer.

33. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains a unit pixel array formed in the first section, which detects light from an object.

34. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains logic circuit (such as

data processing logic which contains at least sample and hold logic) formed in the second section, which processes signals from the pixel array.

35. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains memory such as SRAM formed in the third section, which stores outputs from the logic circuit.

36. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains a first, second, and third sections that are isolated from each other by insulating layers.

37. Defendants have and continue to indirectly infringe one or more claims of the '187 Patent by knowingly and intentionally inducing others, including customers and end-users, to directly infringe to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling and/or importing into the United States products that include infringing technology, including products such as the Yoga Book YB1-X90L which contain CMOS image sensors.

38. Defendants, with knowledge that these products, or the use thereof, infringe the '187 Patent at least as of the date of this Complaint, knowingly and intentionally induced, and continue to knowingly and intentionally induce, direct infringement of the '187 Patent by supplying these products to end users for use in an infringing manner.

39. Defendants induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others, including end users, infringe the '187 Patent, but while remaining willfully blind to the infringement.

40. Photonic Imaging has suffered damages as a result of Defendants' direct and indirect infringement of the '187 Patent in an amount to be proved at trial.

COUNT III
(Infringement of the '388 Patent)

41. Paragraphs 1 through 15 are incorporated by reference as if fully set forth herein.

42. Photonic Imaging has not licensed or otherwise authorized Defendants to make, use, offer for sale, sell, or import any products that embody the inventions of the '388 Patent.

43. Defendants have and continue to directly infringe the '388 Patent, including at least claim 31, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271 (including but not limited to 271(g)), by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '388 Patent. Such products include laptop computers, tablets, desktop computers, all in one computers, and smartphones each of which incorporate one or more CMOS image sensors, such as Defendants' Yoga Book YB1-X90L, shown below:



44. Upon information and belief, the Yoga Book YB1-X90L contains a CMOS image sensor supplied by Omnivision with a model number OV8858.

45. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is fabricated by forming a unit pixel, *e.g.*, at least one photodiode and associated circuitry.

46. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is fabricated by forming a logic cell, *e.g.*, a logic circuit (such as data processing logic which contains at least sample and hold logic).

47. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is fabricated by forming a first isolation region between the unit pixel and the logic cell.

48. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is fabricated by forming a memory cell, *e.g.*, SRAM memory blocks.

49. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, is fabricated by forming a second isolation region between the logic cell and the memory cell.

50. Defendants have and continue to indirectly infringe one or more claims of the '388 Patent by knowingly and intentionally inducing others, including customers and end-users, to directly infringe to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling and/or importing into the United States products that include infringing technology, including products such as Yoga Book YB1-X90L which contain CMOS image sensors.

51. Defendants, with knowledge that these products, or the use thereof, infringe the '388 Patent at least as of the date of this Complaint, knowingly and intentionally induced, and continue to knowingly and intentionally induce, direct infringement of the '388 Patent by supplying these products to end users for use in an infringing manner.

52. Defendants induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others, including end users, infringe the '388 Patent, but while remaining willfully blind to the infringement.

53. Photonic Imaging has suffered damages as a result of Defendants' direct and indirect infringement of the '388 Patent in an amount to be proved at trial.

COUNT IV
(Infringement of the '203 Patent)

54. Paragraphs 1 through 15 are incorporated by reference as if fully set forth herein.

55. Photonic Imaging has not licensed or otherwise authorized Defendants to make, use, offer for sale, sell, or import any products that embody the inventions of the '203 Patent.

56. Defendants have and continue to directly infringe the '203 Patent, including at least claims 1 and 27, either literally or under the doctrine of equivalents, without authority and in violation of 35 U.S.C. § 271, by making, using, offering to sell, selling, and/or importing into the United States products that satisfy each and every limitation of one or more claims of the '203 Patent. Such products include laptop computers, tablets, desktop computers, all in one computers, and smartphones each of which incorporate one or more CMOS image sensors, such as Defendants' Yoga Book YB1-X90L, shown below:



57. Upon information and belief, the Yoga Book YB1-X90L contains a CMOS image sensor supplied by Omnivision with a model number OV8858.

58. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains a single-chip integrated circuit camera which includes at least an image sensor.

59. Upon information and belief, the Yoga Book YB1-X90L and other similar products from Defendants, contains one or more optical elements, *e.g.*, a lens or microlens.

60. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains an image-processing element such as an image sensor processor, which receives raw image data and timing signals from the image sensor.

61. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains a data storage element such as memory which stores the image data produced by the image processing element.

62. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains a communication interface element such as I/O pins for controlling input and output data and control signals for the camera.

63. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains an on-chip multiplexer and a register set.

64. Upon information and belief, the Omnivision OV8858 CMOS image sensor, and other similar CMOS image sensors found in Defendants' products, contains a test access element that comprises one or more IO pins, which verifies camera internal functionality by outputting a test pattern.

65. Upon information and belief, the I/O pins that form the test access element are either connected to the register set for controlling external functions (when not in test mode) or connected to internal data inputs and outputs for testing purposes (when in test mode).

66. Upon information and belief, the connection of the one or more I/O pins is controlled by the on-chip multiplexer.

67. Upon information and belief, each of the above-mentioned components is on a single-chip integrated circuit camera.

68. Defendants have and continue to indirectly infringe one or more claims of the '203 Patent by knowingly and intentionally inducing others, including customers and end-users,

to directly infringe to directly infringe, either literally or under the doctrine of equivalents, by making, using, offering to sell, selling and/or importing into the United States products that include infringing technology, including products such as the Yoga Book YB1-X90L which contain CMOS image sensors.

69. Defendants, with knowledge that these products, or the use thereof, infringe the '203 Patent at least as of the date of this Complaint, knowingly and intentionally induced, and continue to knowingly and intentionally induce, direct infringement of the '203 Patent by supplying these products to end users for use in an infringing manner.

70. Defendants induced infringement by others, including end users, with the intent to cause infringing acts by others or, in the alternative, with the belief that there was a high probability that others, including end users, infringe the '203 Patent, but while remaining willfully blind to the infringement.

71. Photonic Imaging has suffered damages as a result of Defendants' direct and indirect infringement of the '203 Patent in an amount to be proved at trial.

DEMAND FOR JURY TRIAL

Plaintiff hereby demands a jury for all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Photonic Imaging prays for relief against Defendants as follows:

- a. Entry of judgment declaring that Defendants have directly and/or indirectly infringed one or more claims of each of the Patents-in-Suit;
- b. An order awarding damages sufficient to compensate Photonic Imaging for Defendants' infringement of the Patents-in-Suit, but in no event less than a reasonable royalty, together with interest and costs;

c. Entry of judgment declaring that this case is exceptional and awarding Photonic Imaging its costs and reasonable attorney fees under 35 U.S.C. § 285; and

d. Such other and further relief as the Court deems just and proper.

Dated: May 4, 2018

BAYARD, P.A.

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