

'423 patent") (attached as Exhibit 2), U.S. Patent No. 7,867,557 ("the '557 patent") (attached as Exhibit 3), U.S. Patent No. 8,524,365 ("the '365 patent") (attached as Exhibit 4) and U.S. Patent No. 9,680,068 ("the '068 patent") (attached as Exhibit 5).

3. On information and belief Defendant Samsung Electronics Co., Ltd. is a corporation organized and existing under the laws of the Republic of Korea with a principal place of business at 129 Samsung-Ro, Yeongtong-Gu, Suwon, Gyeonggi, 16677, Korea.

4. On information and belief Defendant Samsung Display Co., Ltd. is a wholly owned subsidiary company of Samsung Electronics Co., Ltd. organized and existing under the laws of the Republic of Korea with a principal place of business at 1 Samsung-Ro, Giheung-Gu, Yongin-City, Gyeonggi-Do 17113, Korea.

5. On information and belief Defendant Samsung Advanced Institute of Technology is Samsung Electronics Co., Ltd.'s research and development hub, established as an incubator for technology innovation with a principal location at 130, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16678, Korea.

6. On information and belief Defendant Samsung Electronics Co., Ltd. Visual Display Division is a wholly owned subsidiary company of Samsung Electronics Co., Ltd., organized and existing under the laws of the Republic of Korea with a principal place of business at 416 Metan 3-Dong, Paldal-Gu Suwon, Gyeonggi, 31454, Republic of Korea.

7. On information and belief Defendant Samsung Electronics America, Inc. is a wholly owned subsidiary corporation of Samsung Electronics Co. Ltd. organized and existing under the laws of New York with a principal place of business at 85 Challenger Road, Ridgefield Park, New Jersey 07660. Samsung Electronics America, Inc. is registered to do business in Texas and has maintained regular and established places of business with offices and/or other

facilities in this Judicial District of Texas at least at 6625 Excellence Way Plano, Texas 75023 and 1301 E. Lookout Drive, Richardson, Texas 75082.

8. Samsung Electronics America, Inc. may be served through its registered agent for service of process, CT Corporation System, 1999 Bryan St., Suite. 900, Dallas, Texas 75201.

9. On information and belief, Samsung Electronics Co., Ltd is liable for any act for which Samsung Display Co., Ltd., Samsung Advanced Institute of Technology, Samsung Electronics Co., Ltd. Visual Display Division, or Samsung Electronics America, Inc. and its subsidiaries would be or would have been liable, including for any infringement alleged in this matter, and references herein to Samsung Display Co., Ltd. or Samsung Electronics America, Inc. should be understood to encompass such acts by Samsung Electronics Co. Ltd.

JURISDICTION AND VENUE

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

11. This Court has specific personal jurisdiction over Defendants at least in part because Defendants conduct business in this Judicial District. Nanoco's causes of action arise, at least in part, from Defendant's contacts with and activities in the State of Texas and this Judicial District. Upon information and belief, the Defendants have committed acts of infringement within the State of Texas and this Judicial District by, *inter alia*, directly and/or indirectly making, using, selling, offering to sell, or importing products that infringe one or more claims of Nanoco's U.S. Patent Nos. 7,588,828; 7,803,423; 7,867,557; 8,524,365; and 9,680,068. Defendants' infringing acts within this Judicial District give rise to this action and have established minimum contacts with the forum state of Texas.

12. Defendants conduct business in this District and maintain regular and established places of business within this District. For example, Samsung has maintained regular and established places of business with offices and/or other facilities in this Judicial District of Texas at least at 6625 Excellence Way Plano, Texas 75023 and 1301 E. Lookout Drive, Richardson, Texas 75082. *See e.g., Samsung, Samsung Electronics America to Open Flagship North Texas Campus* (2018), available at <https://news.samsung.com/us/samsung-electronics-america-open-flagship-north-texas-campus/>. On information and belief, Defendants have placed or contributed to placing infringing products including, but not limited to, Samsung's QLED TVs into the stream of commerce knowing or understanding that such products would be sold and used in the United States, including in this Judicial District. On information and belief, Samsung also has derived substantial revenues from infringing acts in this Judicial District, including from the sale and use of infringing products including, but not limited to, Samsung's QLED TVs.

13. Defendants have established minimum contacts with this forum such that the exercise of jurisdiction over Defendants would not offend traditional notions of fair play and substantial justice.

14. Venue in this Judicial District is proper as to Samsung Electronics Co., Ltd., Samsung Display Co., Ltd., Samsung Electronics Co., Ltd. Visual Display Division, and Samsung Advanced Institute of Technology under 28 U.S.C. § 1391(c)(3) because they are foreign corporations. *In re HTC Corp.*, 889 F.3d 1349, 1354 (Fed. Cir. 2018).

15. Venue in this Judicial District is also proper as to Samsung Electronics America, Inc. under 28 U.S.C. §§ 1391(b), (c) and 1400(b) because it has (1) committed and continues to commit acts of patent infringement in this Judicial District by, *inter alia*, directly and/or indirectly using, selling, offering to sell, or importing products that infringe one or more claims

of U.S. Patent Nos. 7,588,828; 7,803,423; 7,867,557; 8,524,365; and 9,680,068 and (2) has done and continue to do business in this Judicial District by maintaining regular and established places of business at least at 6625 Excellence Way Plano, Texas 75023 and 1301 E. Lookout Drive, Richardson, Texas 75082. *In re Cray Inc.*, 871 F.3d 1355, 1362-63 (Fed. Cir. 2017).

FACTUAL BACKGROUND

16. Nanoco established its research and manufacturing headquarters in 2001, and since then has been a leading innovator in nanoparticle and quantum dot technology.

17. Originally born from a university research group, Nanoco has since transformed into a pioneer in the quantum dot industry as a result of innovating in the areas of heavy metal free quantum dots and “molecular seeding” processes for the large-scale synthesis of quantum dots.

18. Nanoco’s heavy metal-free quantum dots mitigate health risks presented by the use of quantum dots containing cadmium, mercury, lead and chromium in commercial applications.

19. Nanoco also solved a key problem related to quantum dots: the unique capability to scale-up from lab to volume production.

20. Quantum dots created using Nanoco’s patented innovations have improved the visual aspects of consumer electronic display devices and made their large-scale synthesis and implementation commercially viable. Accordingly, quantum dots created by Nanoco’s patented innovations have become fundamental components of many premium LED TV models.

21. In recognition of its innovations, Nanoco has been awarded hundreds of patents, and, to date, has amassed one of the largest intellectual property portfolios in quantum dot technology.

22. Numerous companies have taken a license to Nanoco's quantum dot patents, and Nanoco has also entered joint development agreements with major electronics companies in connection with the use of Nanoco's cadmium-free quantum dots.

23. Further, Nanoco has entered supply agreements with manufacturing companies for the production and distribution of optical films containing quantum dots.

24. Samsung also engaged with Nanoco as early as 2010 in order to evaluate Nanoco's quantum dot technology for use in the emission material of Samsung's LCD modules.

25. As part of its engagement with Samsung, Nanoco provided samples of its quantum dots to Samsung.

26. Interaction between Nanoco and Samsung did not result in a license for Samsung to use Nanoco's patented innovations or an agreement for Nanoco to provide Samsung with its patented quantum dots.

27. Nevertheless, after Nanoco disclosed its technology to Samsung, Samsung debuted a TV comprising quantum dots for the first time at Consumer Electronics Show in 2015¹. See e.g., Consumer Reports, *Samsung joins the quantum dot crowd at CES 2015 with super SUHD TVs* (January, 2015), available at <https://www.consumerreports.org/cro/news/2015/01/samsung-joins-the-quantum-dot-crowd-at-ces-2015-with-super-suhd-tvs/index.htm>.

28. Samsung began incorporating cadmium-free quantum dot technology in its TV displays when it launched its newly-branded, premium QLED TV in 2017, starting in North America. See e.g., Samsung, *Quantum Dot Artisan: Dr. Eunjoon Jang, Samsung Fellow* (2017),

¹ See also e.g., *What's the Difference Between OLED and Samsung's QLED TVs* (2017), available at <https://www.howtogeek.com/327047/whats-the-difference-between-oled-and-samsungs-qled-tvs/> (explaining that, starting in 2015, and continuing until 2017, Samsung branded its QLED TVs as "Quantum Dot SUHD" or "SUHD" TVs).

available at <https://news.samsung.com/global/quantum-dot-artisan-dr-eunjoo-jang-samsung-fellow>; see also e.g., Samsung, *This is QLED TV, Part 7: QLED TV – How Samsung Achieved Market Dominance in the Premium TV Market* (2017), available at <https://www.samsung.com/global/tv/news/this-is-qled-tv-part-7-qled-tv-how-samsung-achieved-dominance-in-the-premium-tv-market/>.

29. Samsung’s share in North America’s high-end TV market, including QLED TVs, has increased sharply following its launch of QLED TVs in 2017. *Id.*

30. Since its launch, Samsung claims that its QLED TV has led the performance of Samsung premium TV all over the world. *Id.* In particular, Samsung claims to have “achieved dominance in the premium TV market” as a result of its QLED TVs. *Id.*

31. As Samsung explains, its premium TV sales have a “large[] business impact, accounting for 20 percent of sales revenue and 40 percent of profits.” *Id.*

32. The technologies disclosed and claimed in the asserted patents generally relate to heavy metal-free quantum dots, synthesis of quantum dots, and use of quantum dot film resins in electronic display devices.

33. United States Patent No. 7,588,828 (“the ’828 patent”), titled “preparation of nanoparticle materials,” generally relates to the synthesis of nanoparticles using molecular compounds comprising groups 12 and 16 ions as well as groups 13 and 15 ions.

34. United States Patent No. 8,524,365 (“the ’365 patent”), titled “preparation of nanoparticle materials,” generally relates to the synthesis of nanoparticles by effecting the conversion of nanoparticle precursor compositions into the material of the nanoparticle.

35. United States Patent No. 7,803,423 (“the ’423 patent”), titled “preparation of nanoparticle materials,” generally relates to the synthesis of nanoparticles by effecting the conversion of nanoparticle precursor compositions into the material of the nanoparticle.

36. United States Patent No. 7,867,557 (“the ’557 patent”), titled “nanoparticles,” generally relates to the synthesis of a nanoparticle comprised of a core, first outer shell, and second outer shell.

37. United States Patent No. 9,680,068 (“the ’068 patent”), titled “quantum dot films utilizing multi-phase resins,” relates to materials comprising light emitting semiconductor quantum dots, and more specifically, multi-phase polymer films incorporating quantum dots.

38. Generally, quantum dots are small, semiconductor particles that have unique optical and electronic properties, including the ability to produce pure monochromatic red, green, and/or blue light.

39. A widespread commercial application is using a quantum dot enhancement film (QDEF) layer to improve the LED backlighting in LCD TVs. In this application, light from a blue LED backlight is converted by quantum dots to relatively pure red and green. This combination of blue, green and red light incurs less blue-green crosstalk and light absorption in the color filters after the LCD screen, thereby increasing useful light throughput and providing a better color gamut.

40. The QDEF layer is able to replace a diffuser used in traditional LCD backlight units.

41. The use of quantum dots to produce monochromatic red, green and blue light is an improvement over traditional LCD backlight units which fed a blue LED through a yellow filter to create white light which was then passed through red, green and blue color filters.

42. Each of the Defendants has been aware of U.S. Patent Nos. 7,588,828; 8,524,365; 7,803,423; 7,867,557; and 9,680,068 since, at least, March 31, 2019 when Nanoco presented to the Defendants detailed claim charts related to each of these asserted patents.

43. Defendants have been aware of U.S. Patent Nos. 7,588,828; 8,524,365; 7,803,423; 7,867,557; and 9,680,068 no later than February 14, 2020 when Nanoco filed this lawsuit detailing Defendants' infringing acts based on each of these asserted patents.

COUNT I

DEFENDANTS' INFRINGEMENT OF U.S. PATENT NO. 7,588,828

44. Nanoco restates and incorporates by reference all of the allegations made in the preceding paragraphs as though fully set forth herein.

45. Nanoco is the owner, by assignment, of U.S. Patent No. 7,588,828. A true copy of U.S. Patent No. 7,588,828 granted by the U.S. Patent & Trademark Office is attached as Exhibit 1.

46. Defendants have directly infringed, and are continuing to directly infringe, literally or under the doctrine of equivalents, at least independent claim 1 of Nanoco's '828 patent by making, using, selling, and/or offering for sale, at least, its QLED TV products in the United States, in violation of 35 U.S.C. § 271(a).

47. On information and belief, Defendants have violated 35 U.S.C. § 271(g) by unlawfully importing into the United States or offering to sell, selling, or using within the United States, at least, QLED TV products incorporating quantum dots made by a process that infringes independent claim 14 of Nanoco's '828 patent.

48. An exemplary list of Defendants' products that infringe Nanoco's '828 patent are identified in Exhibit 6.

49. An exemplary claim chart comparing the asserted independent claims of the '828 patent to an exemplary accused QLED TV product (model number Q60R) is attached as Exhibit 7.

50. Nanoco has made a reasonable effort to determine the process used by Defendants to produce, at least, QLED TVs containing Quantum Dots. Exhibit 7 demonstrates a substantial likelihood that, at least, Defendants' QLED TVs were made using Nanoco's patented process. Pursuant to 35 U.S.C. § 295, at least, Defendants' QLED TVs should be presumed to have been so made, and the burden of establishing that the product was not made by the process shall be on Defendants, to the extent they assert that it was not so made.

51. Defendants had knowledge of the '828 patent, at least, as of March 31, 2019 when Nanoco presented to the Defendants detailed claim charts related to each of these asserted patents.

52. Defendants had knowledge of the '828 patent, at least, as of the filing of this complaint.

53. Defendants' acts of direct infringement of the '828 patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Nanoco, and Nanoco has no adequate remedy at law.

54. As a result of Defendants' direct and willful infringement of at least claim 1 and 14 of Nanoco's '828 patent, Nanoco has suffered and is continuing to suffer monetary damages and is entitled to a monetary judgment in an amount adequate to compensate for Defendants' past infringement, together with enhanced damages, attorneys' fees, interest, and costs.

COUNT II

DEFENDANTS' INFRINGEMENT OF U.S. PATENT NO. 7,803,423

55. Nanoco restates and incorporates by reference all of the allegations made in the preceding paragraphs as though fully set forth herein.

56. Nanoco is the owner, by assignment, of U.S. Patent No. 7,803,423. A true copy of U.S. Patent No. 7,803,423 granted by the U.S. Patent & Trademark Office is attached as Exhibit 2.

57. Defendants have violated 35 U.S.C. § 271(g) by unlawfully importing into the United States or offering to sell, selling, or using within the United States, at least, QLED TV products incorporating quantum dots made by a process that infringes at least independent claim 1 of Nanoco's '423 patent.

58. An exemplary list of Defendants' products that infringe at least independent claim 1 of Nanoco's '423 patent are identified in Exhibit 8.

59. An exemplary claim chart comparing the asserted independent claims of the '423 patent to an exemplary accused QLED TV product (model number Q60R) is attached as Exhibit 6.

60. Nanoco has made a reasonable effort to determine the process used by Defendants to produce QLED TVs containing Quantum Dots. Exhibit 8 demonstrates a substantial likelihood that, at least, Defendants' QLED TVs were made using Nanoco's patented process. Pursuant to 35 U.S.C. § 295, at least, Defendants' QLED TVs should be presumed to have been so made, and the burden of establishing that the product was not made by the process shall be on Defendants, to the extent they assert that it was not so made.

61. Defendants had knowledge of the '423 patent, at least, as of March 31, 2019 when Nanoco presented to the Defendants detailed claim charts related to each of these asserted patents.

62. Defendants had knowledge of the '423 patent, at least, as of the filing of this complaint.

63. Defendants' acts of direct infringement of the '423 patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Nanoco, and Nanoco has no adequate remedy at law.

64. As a result of Defendants' direct and willful infringement of at least claim 1 of Nanoco's '423 patent, Nanoco has suffered and is continuing to suffer monetary damages and is entitled to a monetary judgment in an amount adequate to compensate for Defendants' past infringement, together with enhanced damages, attorneys' fees, interest, and costs.

COUNT III

DEFENDANTS' INFRINGEMENT OF U.S. PATENT NO. 7,867,557

65. Nanoco restates and incorporates by reference all of the allegations made in the preceding paragraphs as though fully set forth herein.

66. Nanoco is the owner, by assignment, of U.S. Patent No. 7,867,557. A true copy of U.S. Patent No. 7,867,557 granted by the U.S. Patent & Trademark Office is attached as Exhibit 3.

67. Defendants have violated 35 U.S.C. § 271(g) by unlawfully importing into the United States or offering to sell, selling, or using within the United States, at least, QLED TV products incorporating quantum dots made by a process that infringes at least independent claim 1 of Nanoco's '557 patent.

68. An exemplary list of Defendants' products that infringe at least independent claim 1 of Nanoco's '557 patent, in violation of 35 U.S.C. § 271(g), are identified in Exhibit 6.

69. An exemplary claim chart comparing the asserted independent claims of the '557 patent to an exemplary accused QLED TV product (model number Q60R) is attached as Exhibit 9.

70. Nanoco has made a reasonable effort to determine the process used by Defendants to produce QLED TVs containing Quantum Dots. Exhibit 9 demonstrates a substantial likelihood that, at least, Defendants' QLED TVs were made using Nanoco's patented process. Pursuant to 35 U.S.C. § 295, at least, Defendants' QLED TVs should be presumed to have been so made, and the burden of establishing that the product was not made by the process shall be on Defendants, to the extent they assert that it was not so made.

71. Defendants had knowledge of the '557 patent, at least, as of March 31, 2019 when Nanoco presented to the Defendants detailed claim charts related to each of these asserted patents.

72. Defendants had knowledge of the '557 patent, at least, as of the filing of this complaint.

73. Defendants' acts of direct infringement of the '557 patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Nanoco, and Nanoco has no adequate remedy at law.

74. As a result of Defendants' direct and willful infringement of at least claim 1 of Nanoco's '557 patent, Nanoco has suffered and is continuing to suffer monetary damages and is entitled to a monetary judgment in an amount adequate to compensate for Defendants' past infringement, together with enhanced damages, attorneys' fees, interest, and costs.

COUNT IV

DEFENDANTS' INFRINGEMENT OF U.S. PATENT NO. 8,524,365

75. Nanoco restates and incorporates by reference all of the allegations made in the preceding paragraphs as though fully set forth herein.

76. Nanoco is the owner, by assignment, of U.S. Patent No. 8,524,365. A true copy of U.S. Patent No. 8,524,365 granted by the U.S. Patent & Trademark Office is attached as Exhibit 4.

77. Defendants have directly infringed, and are continuing to directly infringe, literally or under the doctrine of equivalents, at least independent claim 1 of Nanoco's '365 patent by making, using, selling, and/or offering for sale, at least, its QLED TV products in the United States, in violation of 35 U.S.C. § 271(a).

78. An exemplary list of Defendants' products that infringe Nanoco's '365 patent are identified in Exhibit 6.

79. An exemplary claim chart comparing the asserted independent claims of the '365 patent to an exemplary accused QLED TV product (model number Q60R) is attached as Exhibit 10.

80. Defendants had knowledge of the '365 patent, at least, as of March 31, 2019 when Nanoco presented to the Defendants detailed claim charts related to each of these asserted patents.

81. Defendants had knowledge of the '365 patent, at least, as of the filing of this complaint.

82. Defendants' acts of direct infringement of the '365 patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Nanoco, and Nanoco has no adequate remedy at law.

83. As a result of Defendants' direct and willful infringement of at least claim 1 of Nanoco's '365 patent, Nanoco has suffered and is continuing to suffer monetary damages and is entitled to a monetary judgment in an amount adequate to compensate for Defendants' past infringement, together with enhanced damages, attorneys' fees, interest, and costs.

COUNT V

DEFENDANTS' INFRINGEMENT OF U.S. PATENT NO. 9,680,068

84. Nanoco restates and incorporates by reference all of the allegations made in the preceding paragraphs as though fully set forth herein.

85. Nanoco is the owner, by assignment, of U.S. Patent No. 9,680,068. A true copy of U.S. Patent No. 9,680,068 granted by the U.S. Patent & Trademark Office is attached as Exhibit 5.

86. Defendants have violated 35 U.S.C. § 271(g) by unlawfully importing into the United States or offering to sell, selling, or using within the United States, at least, QLED TV products incorporating quantum dot films made by a process that infringes at least independent claim 1 of Nanoco's '068 patent.

87. An exemplary list of Defendants' products that infringe at least independent claim 1 of Nanoco's '068 patent, in violation of 35 U.S.C. § 271(g), are identified in Exhibit 6.

88. An exemplary claim chart comparing the asserted independent claims of the '068 patent to an exemplary accused QLED TV product (model number Q60R) is attached as Exhibit 11.

89. Nanoco has made a reasonable effort to determine the process used by Defendants to produce QLED TVs containing Quantum Dots. Exhibit 11 demonstrates a substantial likelihood that, at least, Defendants' QLED TVs were made using Nanoco's patented process. Pursuant to 35 U.S.C. § 295, at least, Defendants' QLED TVs should be presumed to have been so made, and the burden of establishing that the product was not made by the process shall be on Defendants, to the extent they assert that it was not so made.

90. Defendants had knowledge of the '068 patent, at least, as of March 31, 2019 when Nanoco presented to the Defendants detailed claim charts related to each of these asserted patents.

91. Defendants had knowledge of the '068 patent, at least, as of the filing of this complaint.

92. Defendants' acts of direct infringement of the '068 patent are willful, and have caused and will continue to cause substantial damage and irreparable harm to Nanoco, and Nanoco has no adequate remedy at law.

93. As a result of Defendants' direct and willful infringement of at least claim 1 of Nanoco's '068 patent, Nanoco has suffered and is continuing to suffer monetary damages and is entitled to a monetary judgment in an amount adequate to compensate for Defendants' past infringement, together with enhanced damages, attorneys' fees, interest, and costs.

PRAYER FOR RELIEF

WHEREFORE, Nanoco requests the Court grant the relief set forth below:

A. Enter judgment that Defendant has directly infringed, and continues to directly infringe, one or more claims of U.S. Patent Nos. 7,588,828; 7,803,423; 7,867,557; 8,524,365; and 9,680,068;

B. Enter judgment that Defendant's acts of patent infringement are willful;

- C. Order Defendant to account for and pay damages caused to Nanoco by Defendant's unlawful acts of patent infringement;
- D. Award Nanoco increased damages and attorney fees pursuant to 35 U.S.C. §§ 284 and 285;
- E. Award Nanoco the interest and costs incurred in this action;
- F. Temporarily, preliminarily, or permanently enjoin Defendants, its parents, subsidiaries, affiliates, divisions, officers, agents, servants, employees, directors, partners, representatives, all individuals and entities in active concert and/or participation with it, and all individuals and/or entities within its control from engaging in the aforesaid unlawful acts of patent infringement; and
- G. Grant Nanoco such other and further relief, including equitable relief, as the Court deems just and proper.

DEMAND FOR JURY TRIAL

Plaintiff demands a jury trial for all issues deemed to be triable by a jury.

Dated: February 14, 2020

Respectfully submitted,

/s/ Michael C. Newman by permission Claire Henry

Michael Newman
Massachusetts BBO No. 667520
MCNewman@mintz.com
James Wodarski
Massachusetts BBO No. 627036
JWodarski@mintz.com
Michael T. Renaud
Massachusetts BBO No. 629783
MTRenaud@mintz.com
Matthew Galica
Massachusetts BBO No. 696916
MSGalica@mintz.com
MINTZ LEVIN COHN FERRIS
GLOVSKY AND POPEO PC

One Financial Center
Boston, MA 02111
Tel: (617) 542-6000
Fax: (617) 542-2241
www.mintz.com

T. John Ward, Jr.
Texas State Bar No. 00794818
E-mail: jw@wsfirm.com
Claire Abernathy Henry
Texas State Bar No. 24053063
E-mail: claire@wsfirm.com
WARD, SMITH & HILL, PLLC
PO Box 1231
Longview, Texas 75606-1231
(903) 757-6400 (telephone)
(903) 757-2323 (facsimile)

Counsel for Plaintiff Nanoco Technologies Ltd.