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COREPHOTONICS, LTD.

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA - SAN JOSE DIVISION

COREPHOTONICS, LTD. Plaintiff, vs. APPLE INC. Defendant.	Case No. **COMPLAINT FOR PATENT INFRINGEMENT** **DEMAND FOR JURY TRIAL**

COMPLAINT

1. Plaintiff Corephotonics, Ltd. ("Corephotonics") hereby submits its Complaint against Defendant Apple Inc. ("Apple") and alleges as follows:

NATURE OF THE ACTION

2. This is a civil action for infringement under the patent laws of the United States, 35 U.S.C. § 1, *et seq*.

3. The United States Patent and Trademark Office duly and legally issued U.S. Patent 9,568,712 (the "'712 patent"), entitled "Miniature Telephoto Lens Assembly," on February 14, 2017. Corephotonics is the legal owner of the '712 patent by assignment. A true and correct copy of the '712 patent is attached hereto as Exhibit A.

4. The United States Patent and Trademark Office duly and legally issued U.S. Patent No. 9,857,568 (the "568 patent"), entitled "Miniature Telephoto Lens Assembly," on January 2, 2018. Corephotonics is the legal owner of the '568 patent by assignment. A true and correct copy of the '568 patent is attached hereto as Exhibit B.

5. Apple has infringed and continues to infringe one or more claims of each of the'712 patent and the '568 patent (collectively the "Asserted Patents") at least by importing, using, selling, and/or offering to sell the iPhone 7 Plus, iPhone 8 Plus, and iPhone X (the "Accused Products"), as set forth in detail below. Corephotonics seeks, among other things, monetary damages and injunctive relief.

THE PARTIES

6. Plaintiff Corephotonics is a company organized and existing under the laws of the State of Israel with its principal place of business at 25 HaBarzel St., Tel Aviv 6971035, Israel.

7. Defendant Apple is a corporation organized and existing under the laws of the State of California with its principal place of business at 1 Infinite Loop, Cupertino, California.

JURISDICTION AND VENUE

8. This Court has subject matter jurisdiction over Corephotonics' claims for patent infringement pursuant to the 28 U.S.C. §§ 1331 and 1338(a).

9. Apple is subject to this Court's personal jurisdiction because Apple resides and has its primary place of business within this District. This Court also has personal jurisdiction over Apple because Apple has committed and induced acts of patent infringement and has regularly and systematically conducted and solicited business in this District by and through at least its sales and offers for sale of Apple products and services, and other contractual arrangements with Apple customers and third parties using such Apple products and services located in and/or doing business in this District.

10. Venue is proper in this District under 28 U.S.C. §§ 1391(b) and 1400(b) because Apple resides in this District, has a regular and established place of business in this District, and has committed acts of infringement in this District.

INTRADISTRICT ASSIGNMENT

11. This action for patent infringement is assigned on a district-wide basis under Civil L.R. 3-2(c).

FACTUAL ALLEGATIONS

A. Corephotonics' Dual Camera Technology Innovations

12. Corephotonics is a pioneer in the development of dual camera technologies for mobile devices. Corephotonics was founded in 2012 to develop the next generation of mobile phone cameras. Its founders brought with them decades of experience in the fields of optics and miniature digital cameras and were led by Dr. David Mendlovic, a Professor at Tel Aviv University and former Chief Scientist of the Israeli Ministry of Science.

13. Corephotonics' dual-aperture camera technology changes the way smartphones take pictures by using advanced lens design and sophisticated computational optics. The advanced lens design is used to create a miniature telephoto lens that can fit within the confines of a modern, thin smartphone but still provide the superior image quality and light sensitivity demanded by smartphone consumers.

14. Corephotonics' innovative dual-aperture camera technology uses two fixed-focal length lenses, a wide-angle lens as typically found in smartphones with single-aperture cameras, and a miniature telephoto lens. Traditional optical zoom is accomplished by using a variable focal

length lens array. At the small formats required for smartphones, however, it is difficult to reliably include movable components, so smartphones were stuck with small, fixed lenses. This means that in a typical single-aperture smartphone camera, all zoom functionality is provided with digital zoom, *i.e.*, a processor digitally modifies the image to create a magnified but poorer resolution image. With Corephotonics' dual-aperture camera technology, by contrast, the second camera with telephoto lens provides much higher optical resolution than the wide-angle camera. Images from both of these cameras can also be processed by computational algorithms to create an effectively greater level of zoom without degrading image quality by combining digital and optical zoom.

15. For video, which captures thirty or more frames per second, Corephotonics discovered that implementing image fusion for each frame demands higher than normal processing resources and power. At the same time, the beneficial pixel finesse achieved by image fusion is less observable at the rapid frame rate of HD video due to human perception limits. Corephotonics thus developed technology for dual-aperture cameras where image fusion is only used when taking still pictures, but not for video. In video, when zooming in, digital zoom is used first on the image from the wide-angle camera only and then switched to the image from the telephoto camera only. When zooming back out, a similar transition happens from using the telephoto camera only, switching back to the wide-angle camera only. This approach conserves resources and power. Because the two lenses are different and necessarily view the subject from different points of view, Corephotonics also developed special processing that can ensure that the transition from the wide lens to the telephoto lens and back would be smooth.

16. Corephotonics has filed for and received patents on its advanced telephoto lens designs, multi-aperture camera technologies, and optical processing technologies, including the patents-in-suit. Corephotonics is continuing to develop multi-aperture camera technologies, and it has filed and obtained patents on these technologies as well.

17. The press recognized Corephotonics' pioneering advances in dual-aperture camera technology for smartphones. For example, Corephotonics demonstrated its dual-aperture camera technology at Mobile World Congress (MWC) 2014 and received very positive reviews from the tech media, including headlines such as "Corephotonics' dual-camera tech will change smartphone

imaging"[1] and statements like "We think [the Corephotonics dual camera technology] has the potential to change the direction of smartphone photography."[2]

18. Corephotonics now employs over 60 staff, the majority of whom are engineers, scientists, and technologists. Corephotonics depends on its patents to protect its business and continue to develop its innovative miniaturized multi-camera technologies, for mobile devices and new applications. The customers of Corephotonics' technology offerings include leading camera module and mobile device manufacturers.

19. Corephotonics spent years demonstrating its technologies to Apple and discussing potential collaborations and business arrangements. Apple, however, refused. Instead, Apple has gone ahead and marketed its newest generations of iPhones with dual cameras that employ Corephotonics' innovative designs – without any regard to Corephotonics' intellectual property rights.

B. Apple's Interest in Corephotonics' Technology and Intellectual Property

20. As one of its first acts as a company, Corephotonics reached out to Apple in the hopes of establishing a strategic partnership. The founding team contacted someone they knew from their previous work in digital camera technology, Graham Townsend, then Senior Director Camera Hardware at Apple, highlighting some of the innovations Corephotonics was working on related to a high-end compact camera module ("CCM") solution. Throughout 2012, Corephotonics and Apple had meetings regarding the early technologies that Corephotonics was developing during that time. At an early meeting in June 2012, Corephotonics told Apple of its intention to protect its current and future developments in multi-camera technology with patents.

21. In May 2013, an Apple engineer emailed Corephotonics communicating Apple's interest in learning more about Corephotonics' other technology offerings and intellectual

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[1] "Corephotonics' dual-camera tech will change smartphone imaging," *C|Net*, https://www.cnet.com/news/corephotonics-dual-camera-tech-will-change-smartphone-imaging/

[2] "Best of Mobile World Congress: Samsung Galaxy S5, Mozilla $25 phone, smart glove and more," *C|Net*, "https://www.cnet.com/news/best-of-mobile-world-congress-samsung-galaxy-s5-mozilla-25-phone-smart-glove-and-more/

property, in particular a telephoto lens that for a dual-aperture camera that included a telephoto lens and associated software algorithms and expressed interest in learning more about that invention. Corephotonics provided a brief description of its telephoto lens architecture that was part of its intellectual property and referenced other pending patents.

22. In June 2013, a meeting was held at Corephotonics' headquarters in Tel Aviv, Israel with Mr. Townsend and other Apple camera engineers. At this meeting Corephotonics described its intellectual property and technology plans, which included a detailed presentation and discussion of computational algorithms for dual-aperture cameras and numerous system architecture and design details for a dual system. These design details closely resembled what was eventually deployed in the market by Apple. At the same time, Corephotonics also engaged in engineering discussions of its telephoto lens design, and sent a file describing the lens design and including key design details. Corephotonics provided Apple with a full set of technology descriptions covering what was discussed. At the meeting, Corephotonics provided Mr. Townsend with a USB drive containing presentation files, which included a Corephotonics' five element telephoto lens design layout, information about Corephotonics' algorithm, and a slide describing Corephotonics' pending patent applications and patent plans, including filing of applications underlying the Asserted Patents. Corephotonics followed up with further correspondence, which included technical descriptions and responses to Apple's technical inquiries. Later, in October 2013, a larger team, this time including members of Apple's image processing and system groups, visited Corephotonics' Tel Aviv office again for more in-depth discussions, which included dual camera processing methods.

23. During this period through late 2014, Corephotonics personnel visited Apple's facilities in California on numerous occasions, meeting with key members of Apple's camera team, including the leaders of Apple's hardware and software efforts. Corephotonics personnel set up numerous simulations and demonstrations of its technology for Apple. Apple further evaluated Corephotonics' test boards, lens modules, and simulation files at its own facilities, in the absence of Corephotonics personnel.

24. During this period in 2014, Corephotonics learned from the contractor who was manufacturing Corephotonics' prototype telephoto lens modules that Apple had sought Corephotonics' samples from them without notifying Corephotonics, and the contractor had rejected that request. Corephotonics then contacted Apple and agreed to provide Apple with physical samples of Corephotonics' lens and camera modules, which embody the claimed designs of Corephotonics' '712 and '568 patents.

25. In May 2014, Corephotonics was told by Apple that high-level technical staff and executives in Apple's camera engineering group had observed a demonstration of Corephotonics' technology and had reacted very positively. Corephotonics understood that Apple's management had determined to move forward and engage with Corephotonics.

26. In June 2014, Apple expressed interest in licensing Corephotonics' dual camera algorithms and software for commercial use in its devices, and a meeting was arranged for July 30, 2014. Apple provided a business proposal prior to that meeting. Corephotonics provided Apple's business team with a description of its range of technology offerings and provided Apple with a description of its (then) over ten patent families, including low-profile telephoto lens designs for mobile cameras and algorithms for improving dual-aperture cameras with telephoto lenses. During this meeting, in response to Corephotonics claim about the commercial value of its patents, Apple's lead negotiator responded that even if Apple infringed, it would take years and millions of dollars in litigation before Apple might have to pay something.

27. After the meeting, Apple asked Corephotonics to provide a sample of its telephoto lens. Apple indicated that it intended to evaluate Corephotonics' lens design, and it also suggested that it could potentially engage with Corephotonics on lens design technology as well, depending on the outcome of that evaluation.

28. By late August, business negotiations were halted by Apple. Technical discussions between Apple and Corephotonics continued until later that year, while Corephotonics was waiting to hear from Apple's business team.

29. On November 18, 2014, an article appeared in the media reporting that Apple would potentially adopt dual-aperture camera technology, suggesting that it would be similar to the dual

camera technology that Corephotonics had developed and presented earlier that year, and which Corephotonics had been discussing over this period with Apple.[3] Apple did not engage in further efforts to obtain a license to Corephotonics' intellectual property.

30. In January 2016, after sporadic contacts with Apple personnel through 2015, Corephotonics again reached out to Apple. Corephotonics' CEO, Dr. Mendlovic, emailed a high-level hardware executive suggesting continued collaboration. Corephotonics pointed out, "Corephotonics had the privilege to be the first to invent, implement and demonstrate dual cameras which outperform the best single compact cameras. Thus, our IP portfolio is the widest and, in our opinion, has the best defensive value for such applications." Corephotonics offered to discuss collaboration and joint projects with Apple. The Apple executive wrote back that he was looking into it, and that another Apple engineer would be in touch. That engineer and a colleague from Apple visited Corephotonics' facility in Israel for an in-person meeting, at which Corephotonics presented some of its most recent technology offerings.

31. At that meeting and in subsequent meetings and communications, Apple expressed interest in learning more about Corephotonics' technologies. Corephotonics indicated a desire to formalize a business arrangement, and in June 2016, Mr. Townsend emailed Corephotonics introducing them to Apple personnel on its business side to engage in setting up a deal that would govern the technology collaboration. Corephotonics sent Apple a proposal, and in August 2016, Apple followed up and asked Corephotonics to provide a proposal for licensing its intellectual property to Apple. Corephotonics informed Apple that its intellectual property included over 25 patent families, and discussions continued to proceed.

32. On September 7, 2016, Apple announced the iPhone 7 Plus, which included, for the first time for Apple, a real dual camera assembly including a telephoto camera for enhanced zoom – one of Corephotonics' core innovative concepts. Apple specifically touted the telephoto camera on iPhone 7 Plus as a key feature. The hardware specifications and important software

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[3] *See* "Apple May Introduce 'Biggest Camera Jump Ever' in Next-Generation iPhone," https://www.macrumors.com/2014/11/18/apple-biggest-camera-jump-ever/.

functionalities were similar to what Corephotonics had shown and demonstrated to Apple throughout the aforementioned exchanges starting in 2013.

33. By October 2016, negotiations between Corephotonics had stopped progressing, and Corephotonics arranged a face-to-face meeting with Apple. Two meetings were set up, which included technical and business personnel from Apple. During these meetings, Corephotonics offered to negotiate an agreement with Apple for access to Corephotonics' technology offerings and patents. Corephotonics offered to share its patents with Apple employees at both meetings. At the second meeting, Mr. Townsend stated that he was not permitted by his company to look at the patents, and he asked Corephotonics instead to send it to Apple's business personnel instead. One of Apple's business personnel followed up immediately thereafter with an unsolicited email stating, "Please do not send any patents to us until further notice. Legal counsel might reach out with any questions."

34. Corephotonics did not hear from Apple's legal counsel after receiving that email. In an attempt to continue efforts to develop a business relationship, during 2017 Corephotonics again met with and communicated with individuals from Apple's camera team on several occasions, but Apple no longer expressed interest in continuing to discuss a collaboration with Corephotonics.

35. On October 31, 2017, Corephotonics wrote to Apple informing it that after examining Apple's iPhone 7 Plus and 8 Plus cameras and zoom functionality, it believed that these products infringed Corephotonics' patents, including *inter alia* the '712 patent. (The '568 patent, which is related to the '712 patent, did not issue until January of 2018.) Apple did not respond.

36. On November 6, 2017, Corephotonics filed a Complaint alleging and describing the infringement by Apple's iPhone 7 Plus product of the '712 and other patents. That case is now pending in this District before the Honorable Judge Lucy Koh, Case No. 5:15-cv-06457-LHK.

37. Prior to the filing of this Complaint, Corephotonics wrote to Apple informing it that after its examination of Apple's iPhone X camera, it believes that the iPhone X product infringes the '712 and '568 patents. Corephotonics further informed Apple that it believes, after examining Apple's iPhone 7 Plus and 8 Plus cameras, that these products also infringe the '568 patent.

C. Apple's Analysis of Corephotonics' Patents and Patent Applications During Apple's Pursuit of its Own Patents

38. During the period that Apple was in discussions with Corephotonics, and investigating and evaluating Corephotonics' technology, Apple was filing its own patent applications on small-format camera designs, including telephoto cameras that could be used in a mobile device. During this time, Corephotonics' patents and related patent applications were significant in the art. Apple was well aware of Corephotonics' patents and related patent applications, including the patents in suit and applications that issued as the patents in suit, as it sought to obtain its own patents over Corephotonics' prior art.

39. For instance, Apple filed U.S. Patent Application No. 14/069,027 (the "'027 application"), which later issued as U.S. Patent No. 9,223,118. On February 18, 2015, the U.S. Patent & Trademark Office issued an Office Action in the prosecution of the '027 application. The examiner cited published application U.S. Pub. App. No. 2015/0029601A1 to Dror, *et al.* (the "Dror Application"), as anticipating, or rendering obviousness in combination with other references, all the pending claims of the '027 application. The Dror Application is a family member of the '712 and '568 patents asserted by Corephotonics in this action, and it shares the same specification and discloses embodiments described in the claims of the '712 and '856 patents. Amendments and arguments associated with those amendments were filed on May 15, 2015, which extensively discussed Corephotonics' patent application and analyzed purported differences between its disclosures and the claims of Apple's '027 application. The inventor of Apple's '027 application, Roman Mercado continued to work for Apple through the introduction of the iPhone 7 Plus, and he appears to still be an employee of Apple.

40. Apple was familiar with and had analyzed the extent of Corephotonics' patent portfolio throughout its pursuit of Apple's own patents. By way of example, the earliest IDS that Apple filed for the '720 application, filed on September 30, 2015, included four references, of which two of the four were Corephotonics patent applications.

41. Apple also disclosed the Dror Application as prior art to its '720 application, submitted in Apple's March 24, 2016 IDS filing. Apple further disclosed the Dror Application as prior art to its '716 application and its '136 application.

FIRST CAUSE OF ACTION

Infringement of Patent No. 9,568,712

42. Corephotonics incorporates the foregoing paragraphs as though fully set forth herein.

43. Apple has directly infringed, and continues to directly infringe, at least claim 14 of the '712 patent pursuant to 35 U.S.C. § 271, by making, using, selling, offering to sell, and/or importing within the United States, without authority, the iPhone X.

44. Set forth below (with claim language in italics) is an exemplary and non-limiting description of infringement of claim 14 of the '712 patent in connection with the iPhone X. Corephotonics reserves the right to modify this description, including, for example, on the basis of information about the iPhone X that it obtains during discovery:

Claim 14

[*1. A lens assembly, comprising:* To the extent the preamble is limiting, the iPhone X telephoto lens is a lens assembly.

[1a] *a plurality of refractive lens elements arranged along an optical axis,* The iPhone X telephoto lens consists of at least five refractive lens elements arranged along an optical axis.

[1b] *wherein at least one surface of at least one of the plurality of lens elements is aspheric,* each of the lens elements in the iPhone X telephoto lens is aspheric.

[1c] *wherein the lens assembly has an effective focal length (EFL), a total track length (TTL) of 6.5 millimeters or less and a ratio TTL/EFL of less than 1.0, and* The TTL of the iPhone X telephoto lens is less than approximately 5.75 mm and its EFL is greater than 5.9 mm. Therefore, the ratio of TTL/EFL in the iPhone X telephoto lens is less than 1 (e.g., 5.75/5.9 < 1).

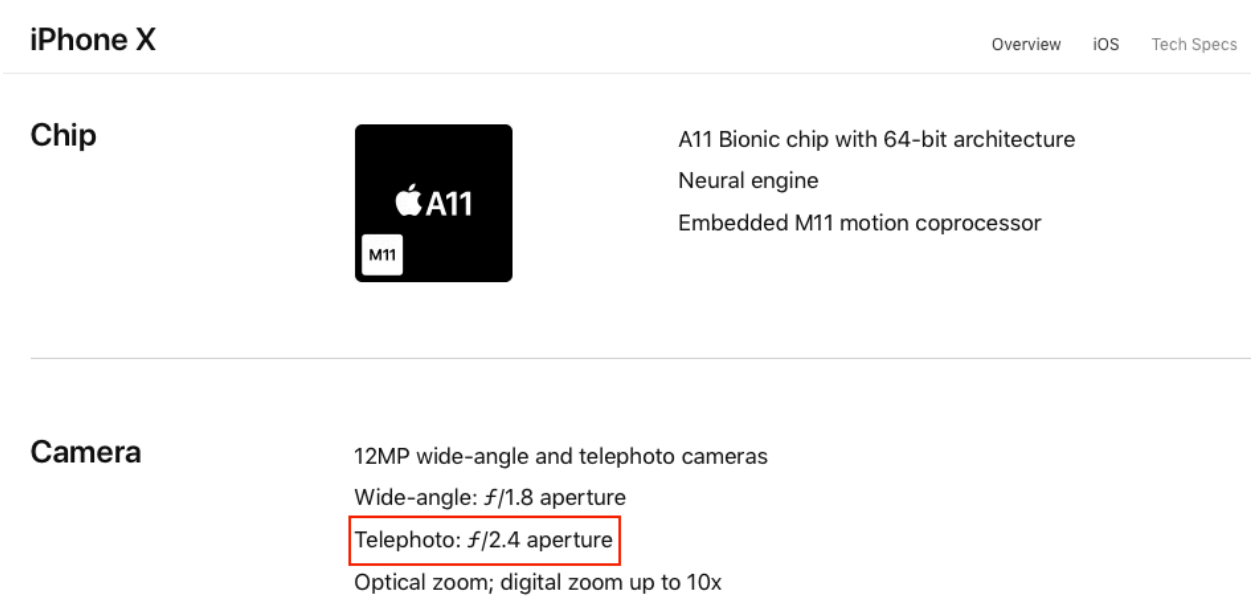
[1d] *wherein the plurality of lens elements comprises, in order from an object side to an image side, a first lens element with a focal length f1 and positive refractive power, a second lens element with a focal length f2 and negative refractive power and a third lens element with a focal*

length f3, the focal length f1, the focal length f2 and the focal length f3 fulfilling the condition 1.2×|f3|>|f2|>1.5×f1. The iPhone X telephoto lens assembly has, from an object side, a first lens with a positive refractive power and a focal length approximately greater than 3.1; a second lens with a negative refractive power and a focal length approximately around -8.3; and a third lens with a focal length approximately less than -10. These lenses satisfy the condition, by way of example, as 1.2×|f3|>|f2|>1.5×f1, e.g., ((1.2 x 10) > 8.3 > (1.5 x 3.1)) or (12 > 8.3 > 4.65).

12. The lens assembly of claim 1, wherein the first lens element has an Abbe number greater than 50 and the second lens element has an Abbe number smaller than 30. The first lens in the iPhone X telephoto lens, from an object side, has an Abbe number greater than 50. The second lens, from the object side, in the iPhone X telephoto lens has an Abbe number less than 30.

13. The lens assembly of claim 12, wherein the first lens element has a convex object-side surface and a convex or concave image-side surface and wherein the second lens element is a meniscus lens having a convex object-side surface. The first lens of the iPhone X telephoto lens, from an object side, has a convex shape on its object-side surface and a concave shape on its image-side surface. The second lens of the iPhone X telephoto lens, from the object side, is a meniscus lens having a convex shape on its object-side surface.

14. The lens assembly of claim 13, wherein a lens assembly F # is smaller than 2.9. The iPhone X telephoto lens has a F# of 2.4. *See, e.g.* https://www.apple.com/iphone-x/specs/:



45. As set forth in its Factual Allegations of this Complaint, Apple's infringement of the '712 patent has been and continues to be wanton, deliberate, egregious, and willful. Prior to the introduction of the Accused Products, Apple was engaged in five years of technical and business discussions surrounding a potential collaboration. Apple repeatedly expressed interest in learning more about and ultimately obtaining the right to use Corephotonics' technology and intellectual property in the software and hardware associated with small-format multi-aperture cameras for use in mobile devices. Corephotonics disclosed a telephoto lens assembly design to Apple and told Apple that it was seeking patent protection on its small photo telephoto lens assembly designs as early as June 2013. Apple later sought and obtained samples of lens assemblies like those disclosed in the '712 patent. Corephotonics continued to inform Apple that it had a substantial and growing portfolio of patents and patent applications in that space, which included the lens design that could be used for a small-format telephoto camera suitable for use in mobile devices, the subject matter of the '712 patent. Apple further learned of and had to analyze the features claimed in the '712 patent in its own patenting efforts. Even while the '712 patent was pending and after its underlying and related application had published, Apple knew that patents on a small format telephoto design that claimed the design features of the embodiments, like the '712 patent and its related applications, were potentially going to issue. Shortly after Apple announced the iPhone 7 Plus, Corephotonics tried to inform Apple of its specific patents and patent applications in the context of a business negotiations. Apple's employees, however, refused to receive the patents in the context of business and technical discussions. Accordingly, on or after the date the '712 patent issued Apple knew of, or should have known but was willfully blind to, the patent's existence.

46. Apple further compounded its infringement, either with knowledge or willful blindness and in wanton disregard to Corephotonics' rights under the '712 patent, with Apple's introduction of the iPhone X to the marketplace. Corephotonics ultimately sent Apple a letter stating that Corephotonics had examined at least Apple's iPhone 7 Plus and 8 Plus products and believed that they were infringing the '712 patent, and Corephotonics thereafter filed a Complaint alleging Apple's infringement of the '712 patent (now pending in this Court under Case No. 5:15-

cv-06457-LHK). Even in spite of that Complaint being filed in November 2017, and in spite of Apple prior extensive knowledge and recognition of Corephotonics' inventive contributions in the '712 patent, including Apple's utilization and testing of Corephotonics' innovative telephoto lens assembly design, Apple has continued to infringe the '712 patent. Before the filing of the Complaint in this action, Corephotonics wrote to Apple informing it that based on Corephotonics' review of Apple's iPhone X product, that product infringes the '712 patent. Notwithstanding, Apple has refused to alter its conduct. Apple's conduct, and its past and continued willful infringement of the '712 patent, has been egregious.

47. For at least the foregoing and other reasons set forth herein, Corephotonics is entitled to enhanced damages for Apple's infringement of the '712 patent in accordance with 35 U.S.C. § 284.

48. As described in the Factual Allegations in this Complaint, Apple has also had knowledge of or been willfully blind to its infringement of the '712 patent such that based on that knowledge or willful blindness, it has also indirectly infringed the '712 patent since at least as early as the date of issuance of the '712 patent.

49. Apple has also had actual knowledge of Corephotonics' rights in the '712 patent and details of Apple's infringement of the '712 patent based on at least the filing of Corephotonics' original Complaint and, based on that knowledge, is also indirectly infringing the '712 patent.

50. Apple manufactures, uses, imports, offers for sale, and/or sells the Accused Products with knowledge of or willful blindness to the fact that its actions will induce Apple's customers and end users to infringe the '712 patent by using the telephoto lens on the iPhone X.

51. Apple actively and knowingly induces its customers and end users to infringe the '712 patent by publishing information promoting the zoom features of the iPhone X, and by providing its customers and end users with instructions for using those features. For example, Apple touts its telephoto lens in the product description for the iPhone X. *See* https://www.apple.com/iphone-x/. As another example, Apple provides how-to video tutorials on photography, which include one on "How to compose with telephoto camera" using the iPhone 7+, iPhone 8+, and the iPhone X. *See* https://www.apple.com/iphone/photography-how-to/.

52. As the direct and proximate result of Apple's conduct, Corephotonics has suffered and, if Apple's conduct is not stopped, will continue to suffer, severe competitive harm, irreparable injury, and significant damages, in an amount to be proven at trial. Because Corephotonics' remedy at law is inadequate, Corephotonics seeks, in addition to damages, permanent injunctive relief. Corephotonics' business operates in a competitive market and will continue suffering irreparable harm absent injunctive relief.

53. Corephotonics is entitled to injunctive relief and damages of no less than a reasonable royalty in accordance with 35 U.S.C. §§ 271, 281, 283, and 284.

54. Apple's infringement of the '712 patent is exceptional and entitles Corephotonics to attorneys' fees and costs under 35 U.S.C. § 285.

SECOND CAUSE OF ACTION

Infringement of Patent No. 9,857,568

55. Corephotonics incorporates the foregoing paragraphs as though fully set forth herein.

56. Apple has directly infringed, and continues to directly infringe, claims 1, 2, 3, and 4 of the '568 patent pursuant to 35 U.S.C. § 271, by making, using, selling, offering to sell, and/or importing within the United States, without authority, the iPhone 7 Plus, the iPhone 8 Plus, and the iPhone X.

57. As just one non-limiting example, set forth below (with claim language in italics) is a description of infringement of exemplary claim 1 of the '568 patent in connection with the iPhone 7 Plus, which applies similarly to the iPhone 8 Plus. Corephotonics reserves the right to modify this description, including, for example, on the basis of information about the Accused Products that it obtains during discovery:

Claim 1 of the '568 patent

1. A lens assembly, comprising: To the extent the preamble is limiting, the iPhone 7 Plus telephoto lens is a lens assembly.

[1a] *a plurality of refractive lens elements arranged along an optical axis with a first lens element on an object side,* The iPhone 7 Plus telephoto lens consists of multiple refractive lens elements arranged along an optical axis, including a first lens on an object side.

[1b] *wherein at least one surface of at least one of the plurality of lens elements is aspheric,* each of the multiple lens elements in the iPhone 7 Plus telephoto lens is aspheric.

[1c] *wherein the lens assembly has an effective focal length (EFL), a total track length (TTL) of 6.5 millimeters or less, a ratio TTL/EFL of less than 1.0,* The TTL of the iPhone 7 Plus telephoto lens is less than approximately 6.0 mm and its EFL is greater than approximately 6.5 mm. Therefore, the ratio of TTL/EFL in the iPhone 7 Plus telephoto lens is less than 1 (e.g., 6/6.5 < 1).

[1d] *a F number smaller than 3.2 and* The F # of the iPhone 7 Plus telephoto lens is 2.8, which is smaller than 3.2. *See* https://www.apple.com/iphone-7/specs/:

[1e] *a ratio between a largest optical axis thickness Lll and a circumferential edge thickness L1e of the first lens element of Lll/Lle<4.* The largest optical axis thickness of the first lens of the iPhone 7 Plus telephoto lens assembly, on the object side, L11, is less than approximately 0.9 mm. The circumferential edge thickness of that first iPhone 7 Plus telephoto lens, L1e, is greater than approximately 0.4 mm. The ratio of L11/L1e for the iPhone 7 Plus telephoto lens is less than 4, e.g., 0.9 divided by 0.4 is approximately equal to 2.28, which is less than 4.

58. As a further non-limiting example, set forth below (with claim language in italics) is a description of infringement of exemplary claim 1 of the '568 patent in connection with the iPhone X. Corephotonics reserves the right to modify this description, including, for example, on the basis of information about the Accused Products that it obtains during discovery:

Claim 1 of the '568 patent

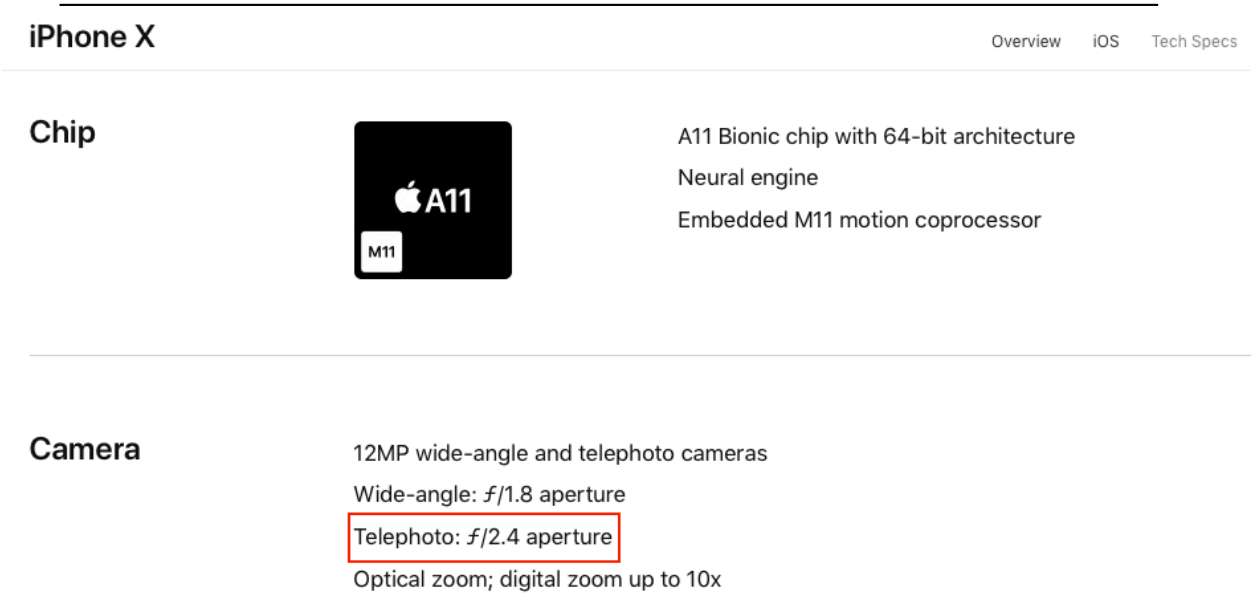
1. A lens assembly, comprising: To the extent the preamble is limiting, the iPhone 7 Plus telephoto lens is a lens assembly.

[1a] *a plurality of refractive lens elements arranged along an optical axis with a first lens element on an object side,* The iPhone X telephoto lens assembly consists of multiple refractive lens elements arranged along an optical axis, including a first lens on an object side.

[1b] *wherein at least one surface of at least one of the plurality of lens elements is aspheric,* each of the multiple lens elements in the iPhone X telephoto lens assembly is aspheric.

[1c] *wherein the lens assembly has an effective focal length (EFL), a total track length (TTL) of 6.5 millimeters or less, a ratio TTL/EFL of less than 1.0,* The TTL of the iPhone X telephoto lens assembly is less than approximately 5.8 mm and its EFL is greater than 5.9 mm. Therefore, the ratio of TTL/EFL in the iPhone X telephoto lens is less than 1 (e.g., 5.8/5.9 < 1).

[1d] *a F number smaller than 3.2 and* The F # of the iPhone X telephoto lens assembly is 2.4, which is smaller than 3.2. *See, e.g.* https://www.apple.com/iphone-x/specs/:



[1e] *a ratio between a largest optical axis thickness Lll and a circumferential edge thickness L1e of the first lens element of Lll/Lle<4*. The largest optical axis thickness of the first lens of the iPhone 7 Plus telephoto lens, on the object side, L11, is less than approximately 0.9 mm. The circumferential edge thickness of that first iPhone X telephoto lens, L1e, is greater than approximately 0.33 mm. The ratio of L11/L1e for the iPhone X telephoto lens is less than 4, e.g., 0.9 divided by 0.33 is approximately equal to 2.7, which is less than 4.

59. As set forth in its Factual Allegations of this Complaint, Apple's infringement of the '568 patent has been and continues to be wanton, deliberate, egregious, and willful. Prior to the introduction of the Accused Products, Apple was engaged in five years of technical and business discussions surrounding a potential collaboration. Apple repeatedly expressed interest in learning more about and ultimately obtaining the right to use Corephotonics' technology and intellectual property in the software and hardware associated with small-format multi-aperture cameras for use in mobile devices. Corephotonics disclosed a telephoto lens assembly design to Apple and told Apple that it was seeking patent protection on its small photo telephoto lens assembly designs as early as June 2013. Apple later sought and obtained samples of lens assemblies like those disclosed in the '568 patent. Corephotonics continued to inform Apple that it had a substantial and growing portfolio of patents and patent applications in that space, which included the lens design that could be used for a small-format telephoto camera suitable for use in mobile devices, the subject matter of the '568 patent. Apple further learned of and had to analyze the features claimed in the '568 patent in its own patenting efforts. Even while the '568 patent was pending and after its underlying and related application had published, Apple knew that patents on a small format telephoto design that claimed the design features of the embodiments, like the '568 patent and its related applications, were potentially going to issue. Shortly after Apple announced the iPhone 7 Plus, Corephotonics tried to inform Apple of its specific patents and patent applications in the context of a business negotiations. Apple's employees, however, refused to receive the patents in the context of business and technical discussions. Accordingly, by the date the '568 patent issued or thereafter Apple should have known of the patent's existence.

60. Apple further compounded its infringement, either with knowledge or willful blindness and in wanton disregard to Corephotonics' rights under the '568 patent, with Apple's introduction of the iPhone 7 Plus to the marketplace, and its subsequent introduction of the iPhone 8 Plus and iPhone X to the marketplace. Apple knew about patents related to the '568 patent and had been served a Complaint alleging it of infringing these related patents, and Apple's infringement of the '568 patent occurred while Apple knew of, or should have known but was willfully blind to, the existence of the '568 patent. For example, Corephotonics sent Apple a letter stating that Corephotonics had examined at least Apple's iPhone 7 Plus and 8 Plus products and believed that they were infringing patents that were related to the '568 patent, and Corephotonics filed, thereafter, a Complaint alleging Apple's infringement of these related patents, such as the '712 patent, which is now pending in this Court under Case No. 5:15-cv-06457-LHK. Even in spite of that Complaint being filed, and Apple having already had extensive knowledge and recognition of Corephotonics' inventive contributions in the '568 patent, including Apple's utilization and testing of Corephotonics' innovative telephoto lens assembly design, Apple continued its conduct infringing the '568 patent after it issued. Before the filing of the Complaint in this action, which alleges Apple's infringement of the '568 patent, Corephotonics wrote to Apple informing it that based on Corephotonics' review of the Accused Products, the Accused Products infringe the '568 patent. Notwithstanding, Apple has refused to alter its conduct both after receiving that letter and, to Corephotonics knowledge, has no plans to alter its conduct after filing this Complaint. Apple's conduct, and its past and continued willful infringement of the '568 patent has been egregious.

61. For at least the foregoing and other reasons set forth herein, Corephotonics is entitled to enhanced damages for Apple's infringement of the '568 patent in accordance with 35 U.S.C. § 284.

62. As described in the Factual Allegations in this Complaint, Apple has also had knowledge of or been willfully blind to its infringement of the '568 patent such that based on that knowledge or willful blindness, it has also indirectly infringed the '568 patent since at least as early as the date of issuance of the '568 patent.

63. Apple has also had actual knowledge of Corephotonics' rights in the '568 patent and details of Apple's infringement of the '568 patent based on at least the filing of Corephotonics' original Complaint and, based on that knowledge, is also indirectly infringing the '568 patent.

64. Apple manufactures, uses, imports, offers for sale, and/or sells the Accused Products with knowledge of or willful blindness to the fact that its actions will induce Apple's customers and end users to infringe the '568 patent by using the telephoto camera in the Accused Products.

65. Apple actively and knowingly induces its customers and end users to infringe the '568 patent by publishing information promoting the zoom features of the Accused Products, and by providing its customers and end users with instructions for using those features. For example, Apple touts its telephoto lens in the product description for the Accused Products. *See, e.g.*, https://www.apple.com/iphone-x/, https://www.apple.com/iphone-7/specs/, and https://-www.apple.com/iphone-8/specs/. As another example, Apple provides how-to video tutorials on photography, which include one on "How to compose with telephoto camera" using the "iPhone 7+, iPhone 8+, and the iPhone X." *See* https://www.apple.com/iphone/photography-how-to/. As a further example, Apple highlighted the benefits of the telephoto lens when it introduced the iPhone 7 Plus. *See, e.g.*, https://www.youtube.com/watch?v=NS0txu_Kzl8 at 1:08:22, and https://www.youtube.com/watch?v=Q6dsRpVyyWs at 1:05.

66. As the direct and proximate result of Apple's conduct, Corephotonics has suffered and, if Apple's conduct is not stopped, will continue to suffer, severe competitive harm, irreparable injury, and significant damages, in an amount to be proven at trial. Because Corephotonics' remedy at law is inadequate, Corephotonics seeks, in addition to damages, permanent injunctive relief. Corephotonics' business operates in a competitive market and will continue suffering irreparable harm absent injunctive relief.

67. Corephotonics is entitled to injunctive relief and damages of no less than a reasonable royalty in accordance with 35 U.S.C. §§ 271, 281, 283, and 284.

68. Apple's infringement of the '568 patent is exceptional and entitles Corephotonics to attorneys' fees and costs under 35 U.S.C. § 285.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff Corephotonics respectfully requests the following relief:

A. Judgment in Corephotonics' favor and against Apple on all causes of action alleged herein;

B. An award of damages to Corephotonics in an amount to be further proven at trial;

C. Permanent injunctive relief against Apple;

D. A finding that this case is exceptional under 35 U.S.C. § 285 and that Corephotonics be awarded its attorneys' fees;

E. An award of enhanced damages to Corephotonics as a result of Apple's willful infringement;

F. An award of prejudgment and post-judgment interest, costs and other expenses; and

Such other and further relief as the Court may deem to be just and proper.

DEMAND FOR A JURY TRIAL

Corephotonics hereby demands a jury trial for all causes of action, claims, or issues in this action that are triable as a matter of right to a jury.

DATED: April 30, 2018

Respectfully submitted,

RUSS, AUGUST & KABAT

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