IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

ALIDOUBLE INC., Plaintiff, v. TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY LIMITED, Defendant.	CASE NO. 2:21-cv-452 **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Alidouble Inc. ("Plaintiff"), by and through its attorneys, files this Complaint for Patent Infringement against Defendant TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY LIMITED ("TSMC" or "Defendant"), and hereby alleges as follows:

THE NATURE OF THE ACTION

1. This is an action for infringement of U.S. Patent Nos. 6,168,965 ("the '965 patent"), 6,169,319 ("the '319 patent"), 9,356,169 ("the '169 patent"), and 9,431,455 ("the '455 patent") (collectively, "the Asserted Patents") arising under the Patent Laws of the United States, 35 U.S.C. § 1, *et seq.*

THE PARTIES

2. Alidouble Inc. is a corporation organized and existing under the laws of the State of Texas, having a place of business at 12333 Snowden Road, Suite B, #79525, Houston, TX 77080. Plaintiff is the assignee and sole owner of the Asserted Patents, and has the right to enforce (including for past infringement) each of the Asserted Patents.

3. TSMC is a company organized and existing under the laws of Taiwan, with a principal place of business at 8, Li-Hsun Road 6, Hsinchu Science Park, Hsinchu 300-78,

Taiwan, R.O.C. TSMC engages in business in the State of Texas. Pursuant to §17.044 of the Texas Civil Practice & Remedies Code, TSMC has designated the Secretary of State as its agent for service of process and may be served with process through the Secretary of State. The Secretary of State may forward service to TSMC at its home office address located at 8, Li-Hsin Rd. 6, Hsinchu Science Park, Hsinchu 300-78, Taiwan, R.O.C. Alternatively, TSMC may be served with process by serving the Registered Agent of TSMC NA, Steven A. Schulman at 2851 Junction Avenue, San Jose, CA 95134. American depository shares of TSMC have been traded on the New York Stock Exchange since October 8, 1997.

4. Defendant TSMC designs, manufactures, imports, distributes, markets, and/or sells backside illuminated ("BSI") sensor products that are patented and the manufacture of which is patented in the United States.

JURISDICTION AND VENUE

5. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

6. TSMC develops and manufactures BSI sensor products that are marketed, sold, imported, and used throughout the United States, including in this judicial district, by TSMC itself or in collaboration with its customers based in the United States.

7. TSMC, either itself and/or through the activities of its subsidiaries, makes, uses, sells, offers for sale, and/or imports throughout the United States, including within this District, BSI sensors that infringe and/or the manufacture of which infringe the Asserted Patents, as defined below. TSMC's customers incorporate TSMC's BSI sensors into downstream products that are made, used, sold, offered for sale, and/or imported throughout the United States,

including within this District. These downstream products may include, but are not limited to, cameras, smartphones, tablets, and various other products that include BSI sensors.

8. On information and belief, this Court has personal jurisdiction over TSMC. As a foreign corporation, personal jurisdiction exists over TSMC at least by virtue of Federal Rule of Civil Procedure 4(k)(2).

9. Further, this Court has personal jurisdiction over TSMC because its infringing BSI sensor products that are made by infringing processes are regularly offered for sale, sold, and imported into the United States, including this jurisdiction by TSMC, and TSMC derives substantial revenue from those infringing products.

10. This Court has personal jurisdiction over TSMC because TSMC's infringing BSI sensor products are designed and manufactured with TSMC's knowledge of the Asserted Patents and are regularly offered for sale, sold, and imported into the United States, including this jurisdiction.

11. TSMC is subject to this Court's jurisdiction pursuant to due process and/or the Texas Long Arm Statute due at least to its substantial business in this State and District, including (a) at least part of its past infringing activities, (b) regularly doing or soliciting business in Texas, and/or (c) engaging in persistent conduct and/or deriving substantial revenue from goods and services provided to customers in Texas. Upon information and belief, TSMC, directly or indirectly, participates in the stream of commerce that results and resulted in products, including the accused products, being made, used, offered for sale, and/or sold in the State of Texas and/or imported into the United States to the State of Texas.

12. Venue is proper against TSMC in this District pursuant to 28 U.S.C. § 1391(c)(3) and 28 U.S.C. § 1400(b). TSMC is not a resident of the United States and may be sued in any

district, including this District. As explained further herein, TSMC has committed acts of infringement within this District.

13. For these reasons, personal jurisdiction exists, and venue is proper in this Court under 28 U.S.C. §§ 1391(b), (c) and/or 28 U.S.C. § 1400(b).

FACTUAL BACKGROUND

14. Plaintiff is the owner of the entire right, title, and interest in the Asserted Patents. The Asserted Patents are directed to BSI sensors and processes for manufacturing the same, as well as circuits and devices that incorporate the claimed sensors.

U.S. Patent No. 6,168,965

15. U.S. Patent No. 6,168,965 ("the '965 patent") is entitled "Method for Making Backside Illuminated Image Sensor," and was issued by the U.S. Patent and Trademark Office (the "PTO") to inventors Yacov Malinovich and Ephie Koltin on January 2, 2001. A copy of the '965 patent is attached to this complaint as Exhibit A.

16. The PTO's publicly accessible patent assignment records indicate that inventors Yacov Malinovich and Ephie Koltin assigned the entire right, title, and interest in the '965 patent to Tower Semiconductor Ltd. (reel 010171; frame 0466), which assigned its rights to Keystone Intellectual Property Management Limited (reel 057109; frame 0406), which then assigned the '965 patent to Alidouble (reel 058130; frame 0548). As a result, Alidouble owns the entire right, title, and interest in the '965 patent.

17. The '965 patent's claims are directed to patent-eligible subject matter, and the '965 patent is valid and enforceable.

18. TSMC is not licensed to practice the '965 patent in either an express or implied manner.

19. The ’965 patent is directed generally to methods of manufacturing BSI sensors, also commonly known as back-illuminated CMOS image sensors. *See* Exhibit A at 1 (Abstract).

20. Claim 1 of the ’965 patent is directed to:

> A method of producing backside illuminated image sensors comprising the steps of:
>
> producing a plurality of image sensor circuits on a wafer having first and second surfaces each of the image sensor circuits being formed on the first surface and including a matrix of light-sensitive pixel regions extending into the wafer from the first surface;
>
> securing the wafer onto a protective substrate such that the first surface faces the protective substrate;
>
> removing material from the second surface of the wafer until the light-sensitive pixel regions of each image sensor circuit are effectively exposed through the second surface;
>
> securing a transparent substrate onto the second surface of the wafer, thereby producing a waferwise sandwich; and
>
> slicing the waferwise sandwich, thereby defining a plurality of backside illuminated image sensors.

Exhibit A, col. 11:15-33.

21. Claim 7 of the ’965 patent is directed to:

> The method according to claim 1, wherein the step of securing a transparent substrate onto the second surface comprises depositing an adhesive onto the second surface, and then placing the transparent substrate onto the deposited adhesive.

Exhibit A, col. 12:19-23.

22. Claim 8 of the ’965 patent is directed to:

> The method according to claim 7, wherein the step of removing material includes separating each of the plurality of image sensor circuits; and wherein the step of depositing the adhesive onto the second surface further comprises depositing adhesive into interstices located between the plurality of image sensor circuits, thereby protecting the image sensor circuits.

Exhibit A, col. 12:24-31.

23. Claim 10 of the ’965 patent is directed to:

> The method according to claim 1, wherein the step of securing the wafer onto a protective substrate further comprises: forming a passivation layer on the first surface of the wafer; forming openings in the passivation layer; and securing the protective substrate onto the passivation layer.

Exhibit A, col. 12:37-44.

U.S. Patent No. 6,169,319

24. U.S. Patent No. 6,169,319 (“the ’319 patent”) is entitled “Backside Illuminated Image Sensor,” and was issued by the PTO to inventors Yacov Malinovich and Ephie Koltin on January 2, 2001. The ’319 patent is a Division of the ’965 patent. A copy of the ’319 patent is attached to this complaint as Exhibit B.

25. The PTO’s publicly accessible patent assignment records indicate that inventors Yacov Malinovich and Ephie Koltin assigned the entire right, title, and interest in the ’319 patent to Tower Seminconductor Ltd. (reel 010171; frame 0466), which assigned its rights to Keystone Intellectual Property Management Limited (reel 057109; frame 0965), which subsequently assigned the ’319 patent to Alidouble (reel 058130; frame 0548). As a result, Alidouble owns the entire right, title, and interest in the ’319 patent.

26. The ’319 patent’s claims are directed to patent-eligible subject matter, and the ’319 patent is valid and enforceable.

27. TSMC is not licensed to practice the ’319 patent in either an express or implied manner.

28. Claim 1 of the ’319 patent is directed to:

> A backside illuminated image sensor comprising:
>
> a semiconductor substrate having a first surface and a second surface;

> a plurality of light-sensitive pixel regions formed on the first surface of the semiconductor substrate and including a photodiode diffusion region extending into the semiconductor substrate from the first surface;
>
> a metal line formed adjacent the first surface of the semiconductor substrate;
>
> a protective substrate secured to the semiconductor substrate such that the metal line is located between the protective substrate and the semiconductor substrate; and
>
> a transparent substrate secured to the second surface of the semiconductor substrate such that the semiconductor substrate is sandwiched between the transparent substrate and the protective substrate;
>
> wherein the semiconductor substrate has a thickness defined such that the light-sensitive pixel region is effectively exposed through the second surface.

Exhibit B, col. 11:21-42.

29. Claim 2 of the ’319 patent is directed to:

> The backside illuminated image sensor according to claim 1, further comprising a first adhesive layer located between the protective substrate and the semiconductor substrate, and a second adhesive layer located between the transparent substrate and the semiconductor substrate.

Exhibit B, col. 12:1-5.

30. Claim 6 of the ’319 patent is directed to:

> The backside illuminated image sensor according to claim 1, further comprising a plurality of metal leads formed on the protective layer.

Exhibit B, col. 12:37-39.

U.S. Patent No. 9,356,169

31. U.S. Patent No. 9,356,169 (“the ’169 patent”) is entitled “Apparatus, System and Method of Back Side Illumination (BSI) Complementary Metal-Oxide-Semiconductor (CMOS)

Pixel Array," and was issued by the PTO to inventors Assaf Lahav and Amos Fenigstein on May 31, 2016. A copy of the '169 patent is attached to this complaint as Exhibit C.

32. The PTO's publicly accessible patent assignment records indicate that inventors Assaf Lahav and Amos Fenigstein assigned the entire right, title, and interest in the '169 patent to Tower Semiconductor Ltd. (reel 038324; frame 0383), which assigned its rights to Keystone Intellectual Property Management Limited (reel 057110; frame 0159), which subsequently assigned the '169 patent to Alidouble (reel 058130; frame 0548). As a result, Alidouble owns the entire right, title, and interest in the '169 patent.

33. The '169 patent's claims are directed to patent-eligible subject matter, and the '169 patent is valid and enforceable.

34. TSMC is not licensed to practice the '169 patent in either an express or implied manner.

35. Claim 1 of the '169 patent is directed to:

> A back-side illumination (BSI) complementary metal-oxide-semiconductor (CMOS) pixel array comprising:
>
> a plurality of pixels, a pixel of said plurality of pixels comprising:
>
> one or more Metal-Oxide-Semiconductor (MOS) transistors comprising one or more well regions, a well region of said one or more well regions comprising an N-Well (NW) region or a P-well (PW) region;
>
> a photodiode;
>
> an epitaxial (epi) layer comprising an absorption area and a collection area, said absorption area to absorb incoming photons and to generate electrons responsive to absorbed photons, and said collection area connecting said absorption area to said photodiode to provide said electrons from said absorption area to said photodiode; and
>
> a barrier layer separating said absorption area from said one or more well regions.

Exhibit C, col. 15:42-58.

36. Claim 2 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 1, wherein said photodiode comprises a low fill factor (FF) diode.

Exhibit C, col. 15:59-60.

37. Claim 3 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 1, wherein said collection area extends from said absorption area to said photodiode through said barrier layer.

Exhibit C, col. 15:61-63.

38. Claim 4 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 1, wherein said collection area is configured to perform the functionality of an electrostatic lens to collect said electrons from said absorption area.

Exhibit C, col. 15:64-67.

39. Claim 5 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 1, wherein said barrier layer is configured to prevent diffusion of said electrons from said absorption area to said well regions.

Exhibit C, col. 16:1-3.

40. Claim 10 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 1 comprising a micro lens, said absorption area is between said micro lens and said barrier layer.

Exhibit C, col. 16:13-15.

41. Claim 11 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 10 comprising an anti-reflective coating (ARC) layer, said ARC layer is between said micro lens and said absorption area.

Exhibit C, col. 16:15-18

42. Claim 12 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 1, wherein said one or more MOS transistors comprise one or more transistors selected from a group consisting of one or more P-type MOS (PMOS) transistors and one or more N-type MOS (NMOS) transistors.

Exhibit C, col. 16:19-23.

43. Claim 13 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 1, wherein said barrier layer comprises a deep PW implant.

Exhibit C, col. 16:24-25.

44. Claim 14 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 1, wherein said barrier layer comprises a boron implant.

Exhibit C, col. 16:26-27.

45. Claim 15 of the ’169 patent is directed to:

> The BSI CMOS pixel array of claim 1, wherein said photodiode comprises a fully pinned diode.

Exhibit C, col. 16:28-29.

U.S. Patent No. 9,431,455

46. U.S. Patent No. 9,431,455 (“the ’455 patent”) is entitled “Back-End Processing Using Low-Moisture Content Oxide Cap Layer,” and was issued by the PTO to inventors Amos Fenigstein, Yakov Roizin, and Avi Strum on August 30, 2016. A copy of the ’455 patent is attached to this complaint as Exhibit D.

47. The PTO’s publicly accessible patent assignment records indicate that inventors Amos Fenigstein, Yakov Roizin, and Avi Strum assigned the entire right, title, and interest in the ’455 patent to Tower Semiconductor Ltd. (reel 034131; frame 0905), which assigned its rights to Keystone Intellectual Property Management Limited (reel 057110; frame 0190), which

subsequently assigned the ’455 patent to Alidouble (reel 058130; frame 0548). As a result, Alidouble owns the entire right, title, and interest in the ’455 patent.

48. The ’455 patent’s claims are directed to patent-eligible subject matter, and the ’455 patent is valid and enforceable.

49. TSMC is not licensed to practice the ’455 patent in either an express or implied manner.

50. Claim 1 of the ’455 patent is directed to:

> A method for fabricating a semiconductor integrated circuit, the method comprising:
>
> generating front-end structures including one or more doped diffusion regions disposed in a semiconductor substrate, one or more polycrystalline silicon structures disposed over a surface of the substrate, and a pre-metal dielectric layer over the one or more polycrystalline silicon structures;
>
> forming a plurality of metallization layers over the pre-metal dielectric layer,
>
> wherein forming at least one of said metallization layers includes:
>
> forming a patterned metal structure;
>
> forming an interlevel dielectric (ILD) layer comprising a TEOS-based oxide over the patterned metal structure; and
>
> forming a cap layer over the ILD layer over said ILD layer of all of said plurality of metallization layers except an uppermost said metallization layer,
>
> wherein forming the cap layer comprises forming a high-density, low-moisture content oxide material having a minimum thickness of 100 Å

Exhibit D, col. 17:56 – 18:9.

51. Claim 19 of the ’455 patent is directed to:

> An image sensor comprising:

> a semiconductor substrate including a plurality of doped diffusion regions disposed below an upper substrate surface;
>
> a plurality of polycrystalline silicon structures disposed on the semiconductor substrate over the upper substrate surface;
>
> a pre-metal dielectric layer formed over the polycrystalline silicon structures; and
>
> a back-end metallization structure formed on the pre-metal dielectric layer, the back-end metallization structure including a plurality of metallization layers formed in a stack, each of the metallization layers including a patterned aluminum layer and an interlevel dielectric (ILD) layer comprising TEOS-based oxide that is formed over the patterned aluminum layer,
>
> wherein at least one of the plurality of metallization layers includes a cap layer formed on the ILD layer, and
>
> wherein the cap layer of all of said plurality of metallization layers except an uppermost said metallization layer comprises a silane oxide layer having a minimum thickness of 100 Å.

Exhibit D, col. 20:37-59.

The Infringing Processes and Products

52. TSMC is the world's largest foundry that designs, manufactures, markets, sells, and imports BSI sensor products for a wide range of products and customers. "As a dedicated semiconductor foundry, the company [TSMC] does not design, manufacture, or market semiconductor products under its own brand name, ensuring that TSMC does not compete directly with its customers." TSMC 2007 Annual Report at 8 (available at https://investor.tsmc.com/english/annual-reports). In TSMC's 2007-2012, 2014, and 2015 Annual Reports (all of which are publicly available at https://investor.tsmc.com/english/annual-reports), TSMC discusses its design and manufacturing capabilities for BSI sensors and CMOS image sensors, for example, as follows:

- "Color backside illumination image capability was also successfully demonstrated." (2007 Annual Report at 48.)

- CMOS Image Sensor Technology
  A high-performance, 0.11µm 4T CMOS image sensor (CIS) process with back side illumination (BSI) technology was successfully developed by TSMC in 2008. This new process aimed at high-end imaging applications with a small pixel size of 1.4µm and high resolutions of greater than five megapixels. It is compatible with TSMC's 0.13µm CMOS logic, which enables SoC platforms in mobile phones, digital cameras, security sensors, automotive applications and other image sensor markets. Color backside illumination image capability was also successfully demonstrated. This technology can extend to N90 CIS technology with smaller pixel sizes (1.1µm) and ultra-high resolutions (larger than eight megapixels).
  (2008 Annual Report at 50.)

- CMOS Image Sensor Technology
  In 2009, TSMC was the first semiconductor company to have 1.4µm pixel with Back Side Illumination (BSI) technology in production that propelled our key customer to their performance leadership position. On top of that, we also successfully demonstrated world-first 12" bulk Si BSI technology with 1.1µm pixel size using 65nm design rules, with optical performance surpassing 1.75µm pixel. This technology would allow high performance sensors at density up to 16M pixels to achieve the performance not attainable by the conventional front side illumination at the same pixel size.
  (2009 Annual Report at 51.)

- "We use 65-nanometer and back-side illumination (BSI) technology to achieve the best quantum efficiency for CMOS image sensors."
  (2010 Annual Report at 6.)

- "TSMC further strengthened its comprehensive development of specialty technologies in 2010, including Back-side Illumination CMOS image sensor (BSI CIS), 90/65nm embedded flash and 0.13µm analog technologies."
  (2010 Annual Report at 10.)

- "CMOS Image Sensor Technology
  In 2010, TSMC extended our leadership in back-side illumination (BSI) to enable our key customer to win more visible business with popular handheld products. At the same time, BSI wafer processing in 12" bulk-silicon also started risk production with the 65nm 8-megapixel product to be ramped up in early 2011, followed by many others. TSMC also won the business for another leading CIS provider for 12" technology development, with wafer loading scheduled for 2012."
  (2010 Annual Report at 51.)

- "TSMC further strengthened its comprehensive development of specialty technologies in 2011, including Backside Illumination CMOS image sensor (BSI CIS)"
  (2011 Annual Report at 10.)

- "In addition, TSMC further strengthened its comprehensive development of specialty technologies in 2012, including . . . 40nm automotive and Backside Illumination CMOS Image Sensor (BSI CIS), which successfully migrated to 65nm from 0.11μm and to volume production in 12-inch fabs."
  (2012 Annual Report at 6.)

- "65nm TSI CIS (TSMC Stacked Illumination CMOS Image Sensor) technology was fully qualified, and is ready for customer tape-outs in the first quarter of 2015."
  (2014 Annual Report at 009.)

- "45nm 1.0 pixel TSMC Stacked Illumination CMOS Image Sensor technology was fully qualified and started production in the fourth quarter of 2015 for mid- to high-end mobile cameras."
  (2015 Annual Report at 009.)

53. Through the above-noted 2007-2012, 2014, and 2015 Annual Reports, which were publicly available to investors, customers, and potential customers in the United States, TSMC disclosed its manufacturing and design capabilities for BSI sensors that infringe at least the '965 and '319 patents and/or are prepared by processes that infringe at least the '965 and '319 patents.

54. Further, in TSMC's 2016-2020 Annual Reports (all of which are publicly available at https://investor.tsmc.com/english/annual-reports), TSMC discusses its design and manufacturing capabilities for BSI sensors and CMOS image sensors, for example, as follows:

- "Complementary Metal-Oxide-Semiconductor (CMOS) Image Sensor Technology
  In 2016, CMOS image sensor technology made the following breakthroughs: (1) high-density wafer hybrid bond technology; (2) second-generation wafer backside trench isolation for pixels; and (3) composite metal grid structure for SNR (signal-to-noise ratio) per pixel improvement. The first breakthrough achieved the world's most advanced pitch density. The second and third breakthroughs reduced per-pixel electrical and optical cross-talk for better image quality compared to previous generations of optical structures. All three technologies passed product and process qualification and are progressing toward mass production."
  (2016 Annual Report at 079.)

- "Complementary Metal-Oxide-Semiconductor (CMOS) Image Sensor Technology
  In 2017, TSMC had several achievements in CMOS image sensor technology including: (1) high-performance sub-micron pixel development, which was completed and made ready for mass production; (2) quantum efficiency (QE), which gained significant boost on near-infrared sensors by innovated structure and usage of new material; and (3) pitch

density of wafer bond technology, which was pushed higher to maintain the Company's world-wide leading position."
(2017 Annual Report at 077.)

- "Complementary Metal-Oxide-Semiconductor (CMOS) Image Sensor Technology
In 2018, TSMC had several achievements in CMOS image sensor technology including: (1) mass-production of new generation sensors of sub-micron pixel for mobile application; (2) successful development of Ge-on-Si sensor for 3D range sensing applications with performance superior to Si sensor; (3) successful application of wafer stack technology to prototype Single Photon Avalanche Diode (SPAD) sensor array technology for 3D time-of-flight applications."
(2018 Annual Report at 75.)

- "CMOS Image Sensor (CIS) technology was further refined to support the strong demand in advanced smartphone cameras. In early 2020, TSMC helped customers lead the market in rolling out 0.8μm pixel products. Pixel size was further reduced to 0.7μm within nine months with timely volume production. The smaller pixel size enables 30% higher resolution for CIS with the same chip size."
(2020 Annual Report at 013.)

- "Complementary Metal-Oxide-Semiconductor (CMOS) Image Sensors
In 2020, TSMC made several technical innovations in CMOS image sensor technology. The top four accomplishments were: (1) pixel size scaling demonstrating 15% shrinkage from the previous year with mass production for mobile, high-resolution imaging applications now underway; (2) technology transfer and start of mass production of automotive grade, ultra-wide dynamic-range image sensors with high reliability standard; (3) start of risk production phase of Germanium time-of-flight (TOF) sensors, which provide higher 3D object accuracy and use longer wavelength optical sources, resulting in lower system power consumption compared to silicon-type sensors – suitable for mobile devices and machine vision applications; (4) successful development of phase-II 3D metal-insulator-metal (MiM) high-density pixel-embedded capacitors with three times higher capacitance density than the previous generation for global shutter and high dynamic-range image sensor applications."
(2020 Annual Report at 084.)

55. Through the above-noted 2016-2020 Annual Reports, which were publicly available to investors, customers, and potential customers in the United States, TSMC disclosed its manufacturing and design capabilities for BSI sensors that infringe the Asserted Patents and/or are prepared by processes that infringe the Asserted Patents.

56. TSMC has also authored, co-authored, and/or published numerous scientific papers concerning the design and its manufacture of BSI sensors that infringe one or more claims

of the ’965 and ’319 patents and/or are prepared by processes that infringe one or more claims of the ’965 and ’319 patents. For example, a 2010 publication by TSMC (Exhibit E, S.G. Wuu *et al*., “A Leading-Edge 0.9μm Pixel CMOS Sensor Technology with Backside Illumination: Future Challenges for Pixel Scaling,” *Int’l Electron Devices Meeting* 14.1.1-14.1.4 (2010)), discloses TSMC’s manufacturing process for BSI sensors that infringes one or more claims of the ’965 and ’319 patents. *See* Exhibit E at 14.4.1, 14.1.3, Figure 1. Specifically, this publication states that:

> A schematic of BSI process flow is shown in Fig.1. P/P+ epi wafers provide a cost-effective solution compared with SOI wafers. After Back-End-of-Line (BEOL) process is completed, a device wafer runs through a planarization process and is bonded with a carrier wafer. The bonded wafer is then mechanically and chemically thinned down from the bottom side of the device wafer to the target thickness. The new backside Si surface is implanted with a shallow P+ layer followed by laser anneal for dopant activation. Backside antireflection (BARC) layers are coated to further enhance optical sensitivity. Pad opening, color filter array, and packaging process are performed to complete the BSI sensor manufacturing.

Exhibit E at 14.1.1, cols. 1-2. Further, Figure 1 of Exhibit E discloses the following process schematic:

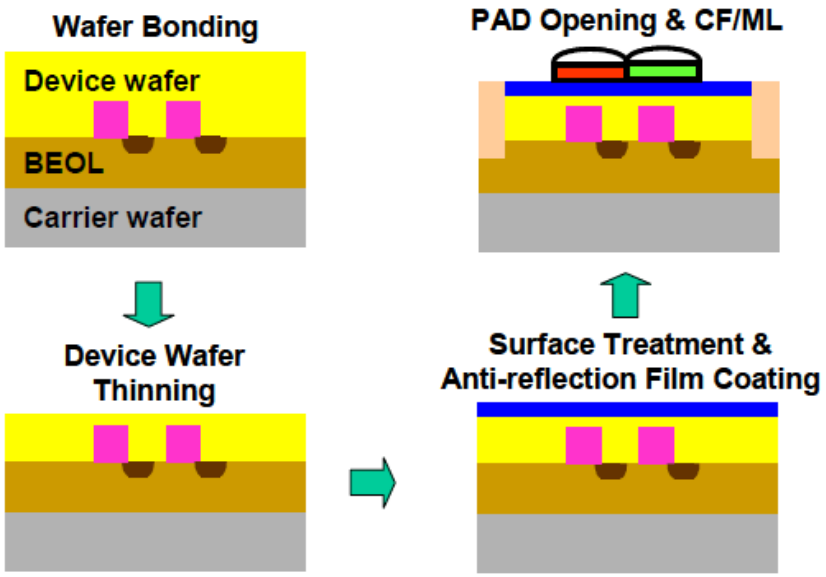

Figure1. Schematic of BSI process flow

Exhibit E at 14.1.3. Thus, in a 2010 publication TSMC informed customers and potential customers of its process for preparing BSI sensors that infringe one or more claims of the '965 and '319 patents, stating that "[t]he major steps are wafer bonding, thin-down process, and laser anneal." Exhibit E at 14.1.1, col. 2.

57. Further, one of TSMC's primary customers, OmniVision Technologies, Inc. ("OmniVision"), which is based in Sunnyvale, CA, has announced on numerous occasions that its BSI sensor products are developed and designed in collaboration with TSMC and manufactured by TSMC for the U.S. market. For example, in 2008 OmniVision announced that it had developed a BSI sensor product (OminBSI) "with the support of its long-time foundry and process technology partner," TSMC. *See, e.g.,* Exhibit F at 2.

58. In another example, a 2009 publication by OmniVision and TSMC (Exhibit G, S.G. Wuu *et al*., "A Manufacturable Back-Side Illumination Technology using Bulk-Si Substrate for Advanced CMOS Image Sensor," *Proc. Int'l Image Sensor Workshop*, Bergen, NO (June

2009)), discloses TSMC's manufacturing process for BSI sensors that infringes one or more claims of the '965 and '319 patents. *See* Exhibit G at 3, 5, Figure 1.

COUNT I
(Past Infringement of the '965 Patent Under 35 U.S.C. § 271(g))

59. Paragraphs 1-58 are incorporated herein as set forth above.

60. The PTO thoroughly examined the '965 patent, and it was presumed valid. 35 U.S.C. § 282.

61. The '965 patent expired on or about August 12, 2019.

62. Under 35 U.S.C. § 271(g), "[w]however without authority imports into the United States or offers to sell, sells, or uses within the United States a product which is made by a process patented in the United States shall be liable as an infringer, if the importation, offer to sell, sale, or use of the product occurs during the term of such process patent."

63. TSMC is liable for its past infringement of the '965 patent. In particular, TSMC is liable for its past manufacture of BSI sensors, the offer for sale, sale, importation, and use of which in the United States infringes at least claims 1, 7, 8, and 10 of the '965 patent under 35 U.S.C. § 271(g).

64. TSMC owns and operates a foundry in Taiwan that manufactures BSI sensors according to the patented method covered by at least claims 1, 7, 8, and 10 of the '965 patent. A foundry manufactures products for its customers, and TSMC's customers either include TSMC's BSI sensors in their own products or sell them to other companies for inclusion in other products. For example, TSMC has manufactured BSI sensors for its U.S.-based customer OmniVision since at least 2008. TSMC is a foundry that has contracts to manufacture BSI sensors that are offered for sale, sold, imported, and used within the United States, or that are integrated into consumer products that are offered for sale, sold, imported, and used within the United States

such as, but not limited to, the iPhone 6S and iPhone X. On information and belief, TSMC collaborates with its customers in the United States, such as OmniVision, regarding the design of the BSI sensors.

65. OmniVision is a U.S. company that partners with TSMC to design BSI sensors that are manufactured by TSMC and purchased by OmniVision. OmniVision is based in the United States and designs, markets, offers for sale, sells and/or imports BSI sensors within the United States.

66. The term "Accused Products" used hereafter, refers to all products manufactured by practicing the patented processes covered by one or more claims of the '965 Patent. The Accused Products include, but are not limited to, the following OmniVision BSI sensors:

- OV24A1Q (color 24 MP, stacked, back-illuminated CMOS image sensor);
- OV24B (color CMOS 24-Megapixel (5664x4248) Image Sensor with PureCel®Plus-S Technology);
- OV4688 (color CMOS 4-Megapixel (2688x1520) Image Sensor with OmniBSI™-2 Technology); and
- OS05A20 (color CMOS 5-Megapixel (2688x1944) PureCel® Image Sensor with Nyxel® Technology).

67. On information and belief, one or more of the Accused Products are integrated into consumer products that are offered for sale, sold, imported, and/or used within the United States such as, but not limited to, the iPhone 6S and iPhone X. The Accused Products and/or BSI sensors that are an integral part of the Accused Products are manufactured in accordance with the method covered by at least claims 1, 7, 8, and 10 of the '965 patent. *See* Exhibits H and I.

68. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, have in the past and continue to infringe at least claims 1, 7, 8, and 10 of the '965 patent pursuant to 35 U.S.C. § 271(g) by making, using, selling, or offering to sell, and/or importing BSI sensors made by processes that practice the inventions claimed in the '965 patent, within the United States and this District. By way of example, TSMC owns and operates one or more foundries responsible for the manufacturing of the Accused Products. In addition, TSMC uses, imports, offers for sale, and/or sells the Accused Products within the United States. The Accused Products made by the processes claimed in the '965 patent are not materially changed by subsequent processes prior to the importation, use, sale, or offer for sale in the United States.

69. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, have in the past and continue to infringe at least claims 1, 7, 8, and 10 of the '965 patent pursuant to 35 U.S.C. § 271(g) by making, using, selling, or offering to sell, and/or importing BSI sensors devices made by processes that practice the inventions claimed in the '965 patent, within the United States and this District. TSMC is responsible for using, importing, marketing, offering for sale, and/or selling the Accused Products to customers within the United States. OmniVision has a presence within the United States and is a customer for BSI sensors designed and manufactured by TSMC and sold, offered for sale, imported, and/or used by TSMC, such as the Accused Products, manufactured, offered for sale, sold and/or imported by TSMC.

70. TSMC is aware that a significant amount of the Accused Products were eventually sold in the United States.

71. TSMC has known of the '965 patent since at least 2006, as evidenced by TSMC's citation of the '965 patent during prosecution of U.S. Patent Appl. No. 11/424,286, titled "Light Reflection for Backside Illuminated Sensor," filed June 15, 2006. *See* Exhibit J (excerpts from

the publicly available prosecution file of U.S. Patent Appl. No. 11/424,286) at 20 showing that the application was assigned to TSMC); at 28-30 (Information Disclosure Statement dated June 15, 2006, citing the '965 patent).

72. TSMC similarly cited the '965 patent during prosecution of U.S. Patent Appl. No. 11/532,674, titled "Method for Providing Metal Extension in Backside Illuminated Sensor for Wafer Level Testing," filed Sept. 18, 2006. *See* Exhibit K (excerpts from the publicly available prosecution file of U.S. Patent Appl. No. 11/532,674) 2-6 (Information Disclosure Statement dated December 19, 2007, citing the '965 patent); at 13 (showing that the application was assigned to TSMC).

73. Plaintiff is entitled to a judgment that TSMC's BSI sensors were manufactured by a process that infringes claims 1, 7, 8, and 10 of the '965 patent by the importation of the BSI sensors and/or consumer products that included TSMC's BSI sensors.

74. Plaintiff is entitled to damages not less than a reasonable royalty for TSMC's past infringement of one or more claims of the '965 patent.

75. TSMC's past knowledge of the '965 patent demonstrates that its infringement of the '965 patent was deliberate, willful, and unlicensed, permitting Plaintiff to seek enhanced damages under 35 U.S.C. § 284.

76. Plaintiff reserves the right to assert additional claims of the '965 patent during the course of this Action.

COUNT II
(Past Infringement of the '319 Patent Under 35 U.S.C. §§ 271(a)-(c))

77. Paragraphs 1-76 are incorporated herein as set forth above.

78. The PTO thoroughly examined the '319 patent, and was presumed valid. 35 U.S.C. § 282.

79. The ’319 patent expired on or about August 12, 2019.

80. TSMC is liable for its past infringement of the ’319 patent. In particular, TSMC is liable for its past manufacture, marketing, sale, importation, and use of BSI sensors in the United States that infringe at least claims 1, 2, and 6 of the ’319 patent under 35 U.S.C. §§ 271(a)-(c).

81. TSMC owns and operates a foundry in Taiwan that manufactured BSI sensors covered by at least claims 1, 2, and 6 of the ’319 patent. A foundry manufactures products for its customers, and TSMC’s customers either include TSMC’s BSI sensors in their own products or sell them to other companies for inclusion in other products. For example, TSMC has manufactured BSI sensors for its U.S.-based customer OmniVision since at least 2008. *See* Exhibits F and G. TSMC is a foundry that has contracts to manufacture BSI sensors that are offered for sale, sold, imported, and used within the United States, or that are integrated into consumer products that are offered for sale, sold, imported, and used within the United States such as, but not limited to, the iPhone 6S and iPhone X. TSMC collaborates with its customers in the United States, such as OmniVision, regarding the design of the BSI sensors. *See* Exhibits F and G.

82. TSMC markets and sells, *inter alia*, BSI sensors in the United States, including those that are covered by at least claims 1, 2, and 6 of the ‘319 patent. TSMC designs, manufactures, imports, distributes, markets, and/or sells products that are manufactured according to processes patented in the United States.

83. OmniVision is a U.S. company that partners with TSMC to design BSI sensors that are manufactured by TSMC and purchased by OmniVision. *See* Exhibits F and G.

OmniVision is based in the United States and designs, markets, offers for sale, sells and/or imports BSI sensors within the United States. *See* Exhibits F and G.

84. On information and belief, one or more of the Accused Products are integrated into consumer products that are offered for sale, sold, imported, and/or used within the United States such as, but not limited to, the iPhone 6S and iPhone X. The Accused Products and/or BSI sensors that are an integral part of the Accused Products are covered by at least claims 1, 2, and 6 of the '319 patent. *See* Exhibits L and M.

85. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, have in the past manufactured BSI sensors that infringed at least claims 1, 2, and 6 of the '319 patent pursuant to 35 U.S.C. § 271(a). By way of example, TSMC owns and operates one or more foundries responsible for the manufacturing of the Accused Products. In addition, TSMC uses, imports, offers for sale, and/or sells the Accused Products within the United States.

86. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, has in the past and continues to infringe at least claims 1, 2, and 6 of the '319 patent pursuant to 35 U.S.C. § 271(a) by making, using, selling, or offering to sell, and/or importing BSI sensors covered by the '965 patent, within the United States and this District. For example, TSMC is responsible for using, importing, marketing, offering for sale, and/or selling the Accused Products to customers within the United States. OmniVision has a presence within the United States and is a customer for BSI sensors designed and manufactured by TSMC and sold, offered for sale, imported, and/or used by TSMC, such as the Accused Products, manufactured, offered for sale, sold and/or imported by TSMC.

87. TSMC is aware that a significant amount of the Accused Products were eventually sold in the United States.

88. TSMC has known of the '319 patent since at least 2006, as evidenced by TSMC's citation of the '319 patent during prosecution of U.S. Patent Appl. No. 11/424,286, titled "Light Reflection for Backside Illuminated Sensor," filed June 15, 2006. *See* Exhibit J (excerpts from the publicly available prosecution file of U.S. Patent Appl. No. 11/424,286) at 20 showing that the application was assigned to TSMC); at 28-30 (Information Disclosure Statement dated June 15, 2006, citing the '319 patent).

89. TSMC similarly cited the '319 patent during prosecution of U.S. Patent Appl. No. 11/532,674, titled "Method for Providing Metal Extension in Backside Illuminated Sensor for Wafer Level Testing," filed Sept. 18, 2006. *See* Exhibit K (excerpts from the publicly available prosecution file of U.S. Patent Appl. No. 11/532,674) 2-6 (Information Disclosure Statement dated December 19, 2007, citing the '319 patent); at 13 (showing that the application was assigned to TSMC).

90. TSMC induced infringement of the '319 Patent under 35 U.S.C. § 271(b). TSMC actively encouraged its customers (e.g., OmniVision) to directly infringe the '319 patent by using, selling, offering for sale, and/or importing BSI sensors as well as devices and products containing the BSI sensors (e.g., iPhone 6S and iPhone X). TSMC actively encouraged its customers to utilize infringing BSI sensors (and for their customers' customers to utilize the same) by and through TSMC's sales engineering and technical marketing efforts and staff. TSMC's sales engineers and technical marketing staff interfaced with customers and potential customers to develop and manufacture BSI sensors that infringed one or more claims of the '319 patent. *See, e.g.,* Exhibits E, F, and G. In doing so, TSMC's sales engineers and technical marketing staff touted the technological and economic benefits of the infringing BSI sensors and actively encouraged use of the infringing BSI sensors. TSMC has known that its customers'

products (including the Accused Products) constituted direct infringement of at least one claim of the ’319 patent since at least 2006, when TSMC cited the ’319 patent as prior art to two of TSMC’s own U.S. patent applications. *See* Exhibits J and K. As a result of TSMC’s active encouragement and intentional inducement, TSMC’s customers have offered for sale, sold, imported, and used products that directly infringed the ’319 Patent (including but not limited to the Accused Products).

91. Plaintiff is entitled to a judgment that TSMC induced its customers to offer for sale, sell, import, and/or use utilize BSI sensors and consumer products that incorporated BSI sensors that infringed at least claims 1, 2, and 6 of the ’319 patent.

92. TSMC is also liable for past contributory infringement of the ’319 patent under 35 U.S.C. § 271(c). TSMC offered to sell and/or sold within the United States services for manufacturing and designs for BSI sensors that practiced one or more claims of the ’319 Patent. For example, the Accused Products comprise BSI sensors, each of which constitutes a material part of the ’319 patent’s invention, namely the claimed BSI structure, that was integrated into consumer products that were offered for sale, sold, imported, and/or used within the United States such as, but not limited to, the iPhone 6S and iPhone X. *See* Exhibits L and M. For example, such manufacturing services and designs were offered for sale, sold, and marketed by and through TSMC’s sales engineering and technical marketing efforts and staff. Such efforts resulted in the infringing process to be used to make the A9 chip. Upon information and belief, TSMC’s customers did not themselves manufacture infringing BSI sensors, but instead contracted with TMSC to manufacture such infringing BSI sensors. TSMC knew that its BSI sensors (including the Accused Products), and consumer products incorporating TSMC’s BSI sensors, were especially designed to practice, and thus infringe the ’319 patent since at least

2006, when TSMC cited the '319 patent as prior art to two of TSMC's own U.S. patent applications. *See* Exhibits J and K. Neither the claimed BSI sensors nor the Accused Products are staple articles or a commodity of commerce suitable for substantial noninfringing use(s) because they are not used individually without incorporation into electronic components and products. Thus, TSMC is liable as a contributory infringer.

93. Plaintiff is entitled to a judgment that TSMC's BSI sensors contributed to the infringement of at least claims 1, 2, and 6 of the '319 patent by their manufacture, offer for sale, sale, importation, and/or use in the United States of the BSI sensors and/or consumer products that include TSMC's BSI sensors.

94. Plaintiff is entitled to damages not less than a reasonable royalty for TSMC's past infringement of one or more claims of the '319 patent.

95. TSMC's past knowledge of the '319 patent demonstrates that its infringement of the '319 patent was deliberate, willful, and unlicensed, permitting Plaintiff to seek enhanced damages under 35 U.S.C. § 284.

96. Plaintiff reserves the right to assert additional claims of the '319 patent during the course of this Action.

COUNT III
(Infringement of the '169 Patent Under 35 U.S.C. §§ 271(a)-(c))

97. Paragraphs 1-96 are incorporated herein as set forth above.

98. The PTO thoroughly examined the '169 patent, and it is currently in force and presumed valid. 35 U.S.C. § 282.

99. TSMC is liable for its past and future infringement of the '169 patent. In particular, TSMC is liable for its past and future manufacture, marketing, sale, importation, and

use of BSI sensors in the United States that infringe at least claims 1-5 and 10-15 of the '169 patent under 35 U.S.C. §§ 271(a)-(c).

100. TSMC owns and operates a foundry in Taiwan that manufactured BSI sensors covered by at least claims 1-5 and 10-15 of the '169 patent. A foundry manufactures products for its customers, and TSMC's customers either include TSMC's BSI sensors in their own products or sell them to other companies for inclusion in other products. For example, TSMC has manufactured BSI sensors for its U.S.-based customer OmniVision since at least 2008. *See* Exhibits F and G. TSMC is a foundry that has contracts to manufacture BSI sensors that are offered for sale, sold, imported, and used within the United States, or that are integrated into consumer products that are offered for sale, sold, imported, and used within the United States such as, but not limited to, the iPhone 6S and iPhone X. TSMC collaborates with its customers in the United States, such as OmniVision, regarding the design of the BSI sensors. *See* Exhibits F and G.

101. TSMC markets and sells, *inter alia*, BSI sensors in the United States, including those that are covered by at least claims 1-5 and 10-15 of the '169 patent. TSMC designs, manufactures, imports, distributes, markets, and/or sells products that are manufactured according to processes patented in the United States.

102. OmniVision is a U.S. company that partners with TSMC to design BSI sensors that are manufactured by TSMC purchased by OmniVision. *See* Exhibits F and G. OmniVision is based in the United States and designs, markets, offers for sale, sells and/or imports BSI sensors within the United States. *See* Exhibits F and G.

103. On information and belief, one or more of the Accused Products are integrated into consumer products that are offered for sale, sold, imported, and/or used within the United

States such as, but not limited to, the iPhone 6S and iPhone X. The Accused Products and/or BSI sensors that are an integral part of the Accused Products are covered by at least claims 1-5 and 10-15 of the '169 patent. *See* Exhibit N.

104. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, have and continue to manufacture BSI sensors that infringe at least claims 1-5 and 10-15 of the '169 patent pursuant to 35 U.S.C. § 271(a). By way of example, TSMC owns and operates one or more foundries responsible for the manufacturing the Accused Products. In addition, TSMC uses, imports, offers for sale, and/or sells the Accused Products within the United States.

105. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, has and continues to infringe at least claims 1-5 and 10-15 of the '169 patent pursuant to 35 U.S.C. § 271(a) by making, using, selling, or offering to sell, and/or importing BSI sensors covered by the '169 patent, within the United States and this District. For example, TSMC is responsible for using, importing, marketing, offering for sale, and/or selling the Accused Products to customers within the United States. OmniVision has a presence within the United States and is a customer for BSI sensors designed and manufactured by TSMC and sold, offered for sale, imported, and/or used by TSMC such as the Accused Products, manufactured, offered for sale, sold and/or imported by TSMC.

106. TSMC is aware that a significant amount of the Accused Products were eventually sold in the United States.

107. TSMC will be aware of the '169 patent at least as of the date it is served with this complaint. To the extent TSMC does not modify its BSI sensor products in the future, TSMC will induce infringement of the '169 Patent under 35 U.S.C. § 271(b). Specifically, TSMC will

actively encourage its customers (e.g., OmniVision) to directly infringe the '169 patent by using, selling, offering for sale, and/or importing BSI sensors as well as devices and products containing the BSI sensors (e.g., iPhone 6S and iPhone X). TSMC will actively encourage its customers to utilize infringing BSI sensors (and for their customers' customers to utilize the same) by and through TSMC's sales engineering and technical marketing efforts and staff. TSMC's sales engineers and technical marketing staff interface with customers and potential customers to develop and manufacture BSI sensors that infringe one or more claims of the '169 patent. *See, e.g.,* Exhibits E, F, and G. In doing so, TSMC's sales engineers and technical marketing staff tout the technological and economic benefits of the infringing BSI sensors and actively encouraged use of the infringing BSI sensors. As a result of TSMC's active encouragement and intentional inducement, TSMC's customers will offer for sale, sell, import, and use products that directly infringe the '169 Patent (including but not limited to the Accused Products).

108. Plaintiff is entitled to a judgment that TSMC will induce its customers to offer for sale, sell, import, and/or use utilize BSI sensors and consumer products that incorporated BSI sensors that infringe at least claims 1-5 and 10-15 of the '169 patent.

109. TSMC is also liable for contributory infringement of the '169 patent under 35 U.S.C. § 271(c). TSMC offers to sell and/or sells within the United States services for manufacturing and designs for BSI sensors having a barrier layer separating the absorption area from one or more well regions that practice one or more claims of the '169 Patent. For example, the Accused Products comprise BSI sensors, each of which constitutes a material part of the '169 patent's invention, namely the claimed BSI structure, that are integrated into consumer products that are offered for sale, sold, imported, and/or used within the United States such as, but not

limited to, the iPhone 6S and iPhone X. *See* Exhibit N. For example, such manufacturing services and designs are offered for sale, sold, and marketed by and through TSMC's sales engineering and technical marketing efforts and staff. Upon information and belief, TSMC's customers do not themselves manufacture infringing BSI sensors, but instead contract with TSMC to manufacture such infringing BSI sensors. TSMC now knows that its BSI sensors (including the Accused Products), and consumer products incorporating TSMC's BSI sensors, are especially designed to practice, and thus infringe the '169 patent. Neither the claimed BSI sensors nor the Accused Products are staple articles or a commodity of commerce suitable for substantial noninfringing use(s) because they are not used individually without incorporation into electronic components and products. Thus, TSMC is liable as a contributory infringer.

110. Plaintiff is entitled to a judgment that TSMC's BSI sensors contribute to the infringement of at least claims 1-5 and 10-15 of the '169 patent by their manufacture, offer for sale, sale, importation, and/or use in the United States of the BSI sensors and/or consumer products that include TSMC's BSI sensors.

111. Plaintiff is entitled to damages not less than a reasonable royalty for TSMC's infringement of one or more claims of the '169 patent.

112. Plaintiff reserves the right to assert additional claims of the '169 patent during the course of this Action.

COUNT IV
(Infringement of the '455 Patent Under 35 U.S.C. §§ 271(a)-(c) and (g))

113. Paragraphs 1-112 are incorporated herein as set forth above.

114. The PTO thoroughly examined the '455 patent, and it is currently in force and presumed valid. 35 U.S.C. § 282.

115. TSMC is liable for its past and future infringement of the ’455 patent. In particular, TSMC is liable for its past and future manufacture, marketing, sale, importation, and use of BSI sensors in the United States that infringe at least claims 1 and 19 of the ’455 patent under 35 U.S.C. §§ 271(a)-(c) and (g).

116. TSMC owns and operates a foundry in Taiwan that manufactures BSI sensors covered by at least claim 19 the ’455 patent using a process that is covered by at least claim 1 of the ’455 patent. A foundry manufactures products for its customers, and TSMC’s customers either include TSMC’s BSI sensors in their own products or sell them to other companies for inclusion in other products. For example, TSMC has manufactured BSI sensors for its U.S.-based customer OmniVision since at least 2008. *See* Exhibits F and G. TSMC is a foundry that has contracts to manufacture BSI sensors that are offered for sale, sold, imported, and used within the United States, or that are integrated into consumer products that are offered for sale, sold, imported, and used within the United States such as, but not limited to, the iPhone 6S and iPhone X. TSMC collaborates with its customers in the United States, such as OmniVision, regarding the design of the BSI sensors. *See* Exhibits F and G.

117. TSMC markets and sells, *inter alia*, BSI sensors in the United States, including those that are made via the patented processes covered by at least claim 1 of the ’455 patent and/or that are covered by at least claim 19 of the ‘455 patent.

118. OmniVision is a U.S. company that partners with TSMC to design BSI sensors that are manufactured by TSMC and purchased by OmniVision. *See* Exhibits F and G. OmniVision is based in the United States and designs, markets, offers for sale, sells and/or imports BSI sensors within the United States. *See* Exhibits F and G.

119. On information and belief, one or more of the Accused Products are integrated into consumer products that are offered for sale, sold, imported, and/or used within the United States such as, but not limited to, the iPhone 6S and iPhone X. The Accused Products and/or BSI sensors that are an integral part of the Accused Products are covered by at least claim 19 of the '455 patent. *See* Exhibit O.

120. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, have and continue to manufacture BSI sensors that infringe at least claim 19 of the '455 patent pursuant to 35 U.S.C. § 271(a). By way of example, TSMC owns and operates one or more foundries responsible for manufacturing the Accused Products. In addition, TSMC directly or through its subsidiaries, uses, imports, offers for sale, and/or sells the Accused Products within the United States.

121. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, has and continues to infringe at least claim 19 of the '455 patent pursuant to 35 U.S.C. § 271(a) by making, using, selling, or offering to sell, and/or importing BSI sensors covered by the '455 patent, within the United States and this District. For example, TSMC is responsible for using, importing, marketing, offering for sale, and/or selling the Accused Products to customers within the United States. OmniVision has a presence within the United States and is a customer for BSI sensors designed and manufactured by TSMC and sold, offered for sale, imported, and/or used by TSMC, such as the Accused Products, manufactured, offered for sale, sold and/or imported by TSMC.

122. TSMC is aware that a significant amount of the Accused Products were eventually sold in the United States.

123. TSMC will be aware of the '455 patent at least as of the date it is served with this complaint. To the extent TSMC does not modify its BSI sensor products in the future, TSMC will induce infringement of the '455 patent under 35 U.S.C. § 271(b). Specifically, TSMC will actively encourage its customers (e.g., OmniVision) to directly infringe the '455 patent by using, selling, offering for sale, and/or importing BSI sensors as well as devices and products containing the BSI sensors (e.g., iPhone 6S and iPhone X). TSMC will actively encourage its customers to utilize infringing BSI sensors (and for their customers' customers to utilize the same) by and through TSMC's sales engineering and technical marketing efforts and staff. TSMC's sales engineers and technical marketing staff interface with customers and potential customers to develop and manufacture BSI sensors that infringe one or more claims of the '455 patent. *See, e.g.,* Exhibits E, F, and G. In doing so, TSMC's sales engineers and technical marketing staff tout the technological and economic benefits of the infringing BSI sensors and actively encourage use of the infringing BSI sensors. As a result of TSMC's active encouragement and intentional inducement, TSMC's customers will offer for sale, sell, import, and use products that directly infringed the '455 Patent (including but not limited to the Accused Products).

124. Plaintiff is entitled to a judgment that TSMC will induce its customers to offer for sale, sell, import, and/or use utilize BSI sensors and consumer products that incorporated BSI sensors that infringe at least claim 19 of the '455 patent.

125. TSMC is also liable for contributory infringement of the '455 patent under 35 U.S.C. § 271(c). TSMC offers to sell and/or sells within the United States services for manufacturing and designs for BSI sensors having a barrier layer separating the absorption area from one or more well regions that practice one or more claims of the '455 Patent. For example,

the Accused Products comprise BSI sensors, each of which constitutes a material part of the '455 patent's invention, namely the claimed BSI structure, that are integrated into consumer products that are offered for sale, sold, imported, and/or used within the United States such as, but not limited to, the iPhone 6S and iPhone X. *See* Exhibit O. For example, such manufacturing services and designs are offered for sale, sold, and marketed by and through TSMC's sales engineering and technical marketing efforts and staff. Upon information and belief, TSMC's customers do not themselves manufacture infringing BSI sensors, but instead contract with TSMC to manufacture such infringing BSI sensors. TSMC now knows that their BSI sensors (including the Accused Products), and consumer products incorporating TSMC's BSI sensors, are especially designed to practice, and thus infringe the '455 patent. Neither the claimed BSI sensors nor the Accused Products are staple articles or a commodity of commerce suitable for substantial noninfringing use(s) because they are not used individually without incorporation into electronic components and products. Thus, TSMC is liable as a contributory infringer.

126. Plaintiff is entitled to a judgment that TSMC's BSI sensors contribute to the infringement of at least claim 19 of the '455 patent by their manufacture, offer for sale, sale, importation, and/or use in the United States of the BSI sensors and/or consumer products that include TSMC's BSI sensors.

127. Under 35 U.S.C. § 271(g), "[w]however without authority imports into the United States or offers to sell, sells, or uses within the United States a product which is made by a process patented in the United States shall be liable as an infringer, if the importation, offer to sell, sale, or use of the product occurs during the term of such process patent."

128. TSMC is liable for its past infringement of the ’455 patent. In particular, TSMC is liable for its past manufacture of BSI sensors, the offer for sale, sale, importation, and use of which in the United States infringes at least claim 1 of the ’965 patent under 35 U.S.C. § 271(g).

129. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, have in the past and continue to infringe at least claim 1 of the ’455 patent pursuant to 35 U.S.C. § 271(g) by making, using, selling, or offering to sell, and/or importing BSI sensors made by processes that practice the inventions claimed in the ’455 patent, within the United States and this District. By way of example, TSMC owns and operates one or more foundries responsible for the manufacturing of the Accused Products. In addition, TSMC directly or through its subsidiaries, uses, imports, offers for sale, and/or sells the Accused Products within the United States. The Accused Products made by the processes claimed in the ’455 patent are not materially changed by subsequent processes prior to the importation, use, sale, or offer for sale in the United States.

130. TSMC directly and/or through its subsidiaries, affiliates, agents and/or business partners, have in the past and continue to infringe at least claim 1 of the ’455 patent pursuant to 35 U.S.C. § 271(g) by making, using, selling, or offering to sell, and/or importing BSI sensors devices made by processes that practice the inventions claimed in the ’455 patent, within the United States and this District. For example, TSMC is responsible for using, importing, marketing, offering for sale, and/or selling the Accused Products to customers within the United States. OmniVision has a presence within the United States and is a customer for BSI sensors designed and manufactured by TSMC and sold, offered for sale, imported, and/or used by TSMC, such as the Accused Products, manufactured, offered for sale, sold and/or imported by TSMC.

131. Plaintiff is entitled to a judgment that TSMC's BSI sensors are manufactured by a process that infringes at least claim 1 of the '455 patent by the importation of the BSI sensors and/or consumer products that included TSMC's BSI sensors.

132. Plaintiff is entitled to damages not less than a reasonable royalty for TSMC's infringement of one or more claims of the '455 patent.

133. Plaintiff reserves the right to assert additional claims of the '455 patent during the course of this Action.

JURY TRIAL DEMAND

134. Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiff hereby demands a trial by jury of all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff respectfully requests that the Court find in its favor and against Defendant TSMC, and that the Court grant Plaintiff the following relief:

A. Judgment that one or more claims of the Asserted Patents have been directly infringed, either literally or under the doctrine of equivalents, by Defendant;

B. Judgment that one or more claims of the Asserted Patents have been indirectly infringed, either literally or under the doctrine of equivalents, by Defendant;

C. Judgment that TSMC contributed to the direct infringement, either literally or under the doctrine of equivalents, of one or more claims of the Asserted Patents;

D. Judgment that Defendant account and pay to Plaintiff all damages adequate to compensate Plaintiff for Defendant's infringement of the Asserted Patents;

E. Enhanced damages under 35 U.S.C. § 284 based on Defendant's willful infringement of the '965 and '319 patents;

F. An accounting for acts of infringement;

G. That the Court award pre-judgment and post-judgment interest on all damages;

H. Costs and expenses in this action; and

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

Dated: December 14, 2021

Respectfully submitted,

By: */s/ DRAFT*

THE DAVIS FIRM
213 N. Fredonia
Longview, TX 75601
Telephone: (903) 230-9090
Facsimile: ()
Email:

Of Counsel:

W. Blake Coblentz (*pro hac vice*)
Aaron S. Lukas (*pro hac vice*)
COZEN O'CONNOR
1200 Nineteenth Street N.W.
Washington, DC 20036
Telephone: (202) 912-4800
Facsimile: (202) 861-1905
Email: wcoblentz@cozen.com
alukas@cozen.com

Attorneys for Plaintiff Alidouble Inc.