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Attorneys for Plaintiff
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UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF CALIFORNIA

Fractus, S.A., Plaintiff, v. ResMed Inc. and ResMed Corp., Defendants.	Case No. '25CV2680 LL JLB **COMPLAINT** **DEMAND FOR JURY TRIAL**

Plaintiff Fractus S.A. ("Fractus" or "Plaintiff"), hereby submits this Complaint for patent infringement against Defendants ResMed Inc. and ResMed Corp. (collectively, "Resmed" or "Defendants"). Plaintiff alleges the following:

THE PARTIES

1. Fractus, S.A. is a foreign corporation duly organized and existing under the laws of Spain with its principal place of business in Barcelona, Spain.

2. Fractus is the owner by assignment of all right, title, and interest in U.S Patents Nos. 8,362,960, 8,456,365, 8,593,349, 8,674,887, and 11,031,677 (collectively, the "Patents-in-Suit").

3. On information and belief, Defendant ResMed Inc. is a corporation organized under the laws of the State of Delaware with its principal place of business in this district in San Diego, California.

4. On information and belief, Defendant ResMed Corp. is a corporation organized under the laws of the State of Minnesota with its principal place of business in this district in San Diego, California.

JURISDICTION AND VENUE

5. This action arises under the patent laws of the United States, 35 U.S.C. § 1 *et seq*., including but not limited to §§ 271, 281, 282(a), 283, 284, and 285. This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

6. This Court has personal jurisdiction over Defendants. On information and belief, Defendants reside in the State of California in this judicial district. On information and belief, Defendants have regularly conducted and continue to conduct business in the State of California and in this judicial district. On information and belief, Defendants have committed acts of infringement in the United States, in California, and in this judicial district by making, using, offering for sale, selling, or importing products that infringe the Patents-in-Suit, or by inducing others to infringe the Patents-in-Suit.

7. Venue is proper in this judicial district pursuant to 28 U.S.C. § 1400(b) and 28 U.S.C. § 1391. On information and belief, Defendants reside in this judicial district. On information and belief, Defendants maintain a regular and established place of business in this federal judicial district, including Defendants' corporate offices at 9001 Spectrum Center Blvd., San Diego, CA 92123; and Defendants have committed acts of infringement in this judicial district by making, using, offering for sale, selling, or importing products that infringe the Patents-in-Suit, or by inducing others to infringe the Patents-in-Suit.

PATENTS-IN-SUIT

8. On June 4, 2013, the United States Patent and Trademark Office (the "USPTO") issued U.S. Patent No. 8,456,365 (the "'365 Patent) to Fractus for an invention entitled, "Multi-Band Monopole Antennas for Mobile Communications Devices." A true and correct copy of the '365 Patent is attached hereto as Exhibit A.

9. On March 18, 2014, the USPTO issued U.S. Patent No. 8,674,887 (the "'887 Patent) to Fractus for an invention entitled, "Multi-Band Monopole Antenna for a Mobile Communications Device." A true and correct copy of the '887 Patent is attached hereto as Exhibit B.

10. On November 26, 2013, the USPTO issued U.S. Patent No. 8,593,349 (the "'349 Patent) to Fractus for an invention entitled, "Miniature Antenna Having a Volumetric Structure." A true and correct copy of the '349 Patent is attached hereto as Exhibit C.

11. On January 29, 2013, the USPTO issued U.S. Patent No. 8,362,960 (the "'960 Patent) to Fractus for an invention entitled, "Handheld Device with Two Antennas, and Method of Enhancing the Isolation Between the Antennas." A true and correct copy of the '960 Patent is attached hereto as Exhibit D.

12. On June 8, 2021, the USPTO issued U.S. Patent No. 11,031,677 (the "'677 Patent) to Fractus for an invention entitled, "Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices." A true and correct

copy of the ’677 Patent is attached hereto as Exhibit E.

FACTUAL ALLEGATIONS

13. Fractus is a company specializing in advanced antenna technologies based in Barcelona, Spain. Fractus was founded by two college friends, Ruben Bonet and Carles Puente. Dr. Puente, a Professor at the Universitat Politècnica de Catalunya, is the lead inventor on the Patents-in-Suit. Dr. Puente’s early research work focused on fractal antennas and evolved over time into the widely applicable and flexible antenna designs that appear in and are covered by the Patents-in-Suit.

14. Fractus has designed antennas for and/or has licensed the right to use its technology to leading companies across a variety of industries, including HTC, LG, RIM, Motorola, Samsung, Asus, ZTE, CommScope, Vivint, and ADT. Since its incorporation Fractus has cumulatively sold more than 40 million antennas to customers. Among the numerous awards and honors the company has received for its innovative work, Fractus won the 2004 Frost & Sullivan Award for technological innovation and was named a 2005 Davos World Economic Forum Technology Pioneer and one of Red Herring’s top innovative companies for 2006. Fractus inventors were finalists for the European Patent Office (“EPO”) European Inventor Award in 2014, and in April 2017 Fractus received the “European Inspiring Company Award” by the London Stock Exchange and the Elite Group. In October 2017, Fractus was selected by the EPO as an example of an IP strategist for small and medium-sized enterprises. In 2021, Fractus endowed a chair at Pompeu Fabra University in Spain, to enhance technology transfer and research into 6G wireless communications. And, in September 2022, Fractus and the Universitat Politècnica de Catalunya partnered in the creation of a research and technology hub to develop “deep tech” solutions for global challenges.

15. The Patents-in-Suit were filed as a result of novel research by Fractus into antenna design for wireless devices, spanning across miniature antennas, multi-band monopole internal antennas, wireless devices comprising multiple antennas,

and antennas for multifunctional wireless devices. Designers of wireless devices often face a number of challenges related to internal antennas capable of enabling efficient multiband operation. As with all antennas, these components both radiate and respond to electromagnetic waves. In the cramped confines of wireless devices, electromagnetic waves given off or absorbed by neighboring components in close proximity to an antenna can significantly impair the antenna's performance and efficiency. Without careful design, these problems may degrade an antenna's electromagnetic performance to the point that the device ceases to function in its intended manner or may require the designer to compromise on other desirable device attributes, such as size. The Patents-in-Suit solve these problems through a variety of novel solutions enabling multiband operation and small size without the efficiency impairments normally faced by these antennas.

RESMED'S INFRINGING PRODUCTS

16. Resmed makes, uses, sells, offers for sale, and/or imports products in the United States, including, but not limited to the Resmed AirSense 10 products, the Resmed AirCurve 10 products, the Resmed Connectivity Module products, the Resmed AirSense 11 products, and the Resmed AirCurve 11 products (collectively, the "Infringing Products"). The Infringing Products use Fractus's patented technology to provide built-in wireless connectivity, including for remote monitoring and management, which is central to the health benefits and commercial value of the Infringing Products.

17. The above list is representative. The above list and the information provided in this Complaint regarding the listed example products is representative, and should not be construed as limiting the scope of this Complaint.

NOTICE AND WILLFULNESS

18. Fractus first provided Resmed with notice of the Patents-in-Suit via a letter in June, 2021. The letter informed Resmed that Fractus believed Resmed was infringing Fractus's patents. The letter provided a full list of Fractus's patents

(including every Patent-in-Suit) and specifically identified particular Fractus patents—including the ’887 Patent, the ’349 Patent, and the ’365 Patent—which Resmed’s products infringed.

19. In July, 2021, Resmed acknowledged receiving Fractus’s letter, and indicated that Resmed was willing to review claim charts supporting Fractus’s infringement claims. Fractus responded in August, 2021 and offered to share claim charts under a non-disclosure agreement in order to protect the information exchanged. In September 2021, Resmed stated that there was no need for a non-disclosure agreement. Fractus once again offered to share information under a non-disclosure agreement in October, 2021, and Resmed responded in December, 2021, stating again that a non-disclosure agreement was unnecessary.

20. In November, 2022, Fractus informed Resmed of additional infringing Resmed products and additional Fractus patents infringed by Resmed—including the ’960 Patent and the ’677 Patent. Yet again, Fractus reiterated its request to share claim charts under a non-disclosure agreement in order to protect the information exchanged. In December, 2022, Resmed responded by again refusing to sign a non-disclosure agreement with Fractus.

21. Thus, Resmed has had actual knowledge of each of the Patents-in-Suit since at least June, 2021.

22. On information and belief, Resmed has never disputed the validity of the Patents-in-Suit.

23. Despite being on notice of its infringement of Fractus’s patents, Resmed continued to make, use, sell, offer for sale, and/or import products into the United States that infringe the Patents-in-Suit.

24. On information and belief, Resmed has infringed or induced others to make, use, sell, offer to sell, and/or import the Infringing Products with knowledge of and/or willful blindness to the fact that such use infringes the Patents-in-Suit, and have acted, and continue to act, willfully, wantonly, and in deliberate disregard of

Fractus's rights.

25. As a direct and proximate result of Resmed's infringement of the Patents-in-Suit, Fractus has suffered and will continue to suffer irreparable harm for which there is no adequate remedy at law. Because Fractus's remedy at law is inadequate, Fractus seeks, in addition to damages, injunctive relief.

COUNT ONE: INFRINGEMENT OF U.S. PATENT NO. 8,456,365

26. The '365 Patent, entitled "Multi-Band Monopole Antennas for Mobile Communications Devices," was duly and legally issued by the USPTO on June 4, 2013, after a full and fair examination. Fractus owns the '365 Patent by assignment. (Exhibit A).

27. The '365 Patent is valid and enforceable. Resmed does not have, and at no time has had, a license to practice any of the inventions claimed in the '365 Patent.

28. The '365 Patent describes multiband antennas for use in mobile communication devices.

29. As one example, claim 1 of the '365 Patent recites:

A mobile communication device, comprising:

a device housing;

a printed circuit board, the printed circuit board comprising:

a ground plane layer;

a feeding point;

a communication circuitry, the communication circuitry being mounted on the printed circuit board;

wherein the communication circuitry is coupled to the feeding point and to the ground plane layer;

a multi-band antenna capable of operating at multiple frequency bands, the multi-band antenna including an antenna element;

wherein the antenna element operates in cooperation with the ground plane

layer;

the antenna element comprising:

a common conductor;

a first radiating arm connected to the common conductor;

a second radiating arm connected to the common conductor;

wherein the common conductor includes a feeding port, the feeding port being coupled to the feeding point;

wherein at least a portion of the first radiating arm and at least a portion of the second radiating arm are arranged on different planes;

wherein the first radiating arm is at least partially shaped according to a grid-dimension curve; and

wherein the printed circuit board, the communication circuitry, and the multi-band antenna are arranged inside the device housing.

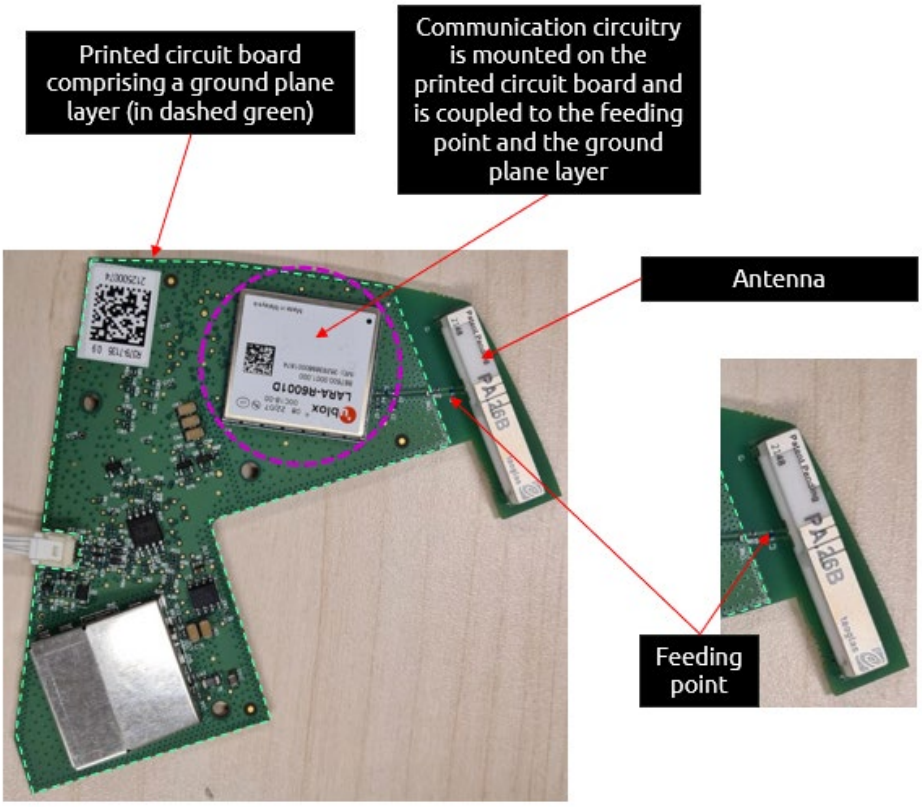
30. Resmed has directly infringed at least claim 1 of the ’365 Patent by making, using, selling, offering to sell, and/or importing products that infringe the ’365 Patent—including the Resmed AirCurve 10 products, the Resmed AirSense 10 products, and the Resmed Connectivity Module products—which meet every limitation of at least claim 1 of the ’365 Patent literally or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(a).

31. As an example, the Resmed AirCurve 10 satisfies all claim limitations of at least claim 1 of the ’365 Patent.[1]

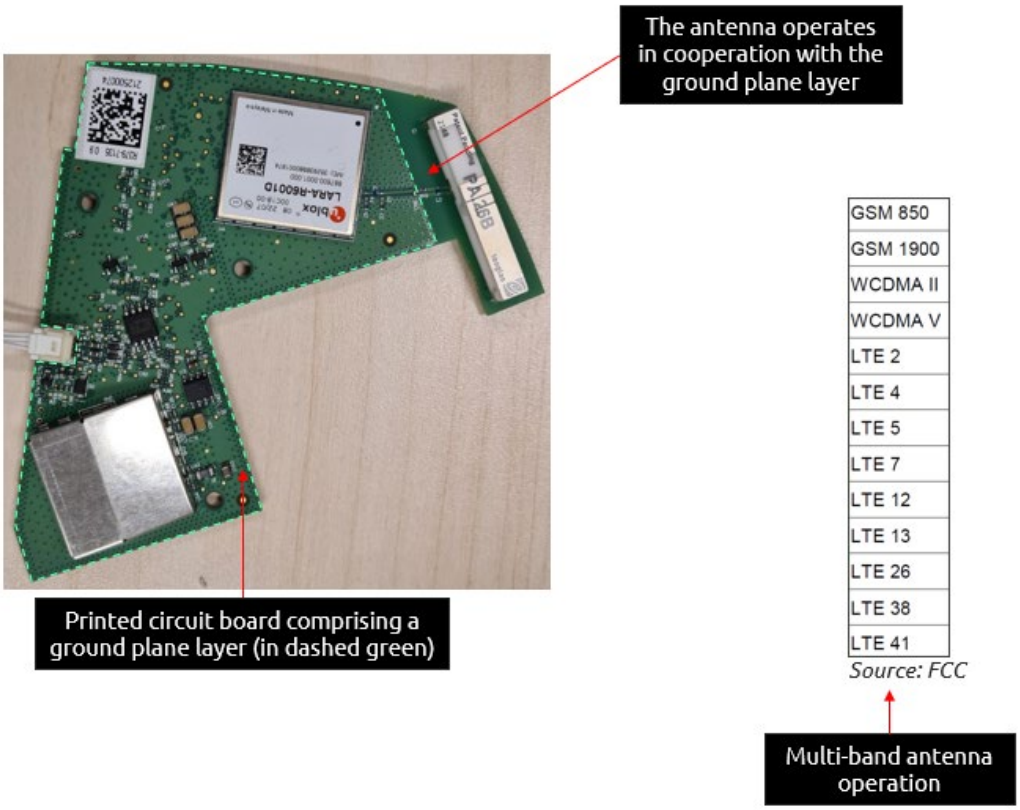
a. A mobile communication device, comprising: a device housing; a printed circuit board, the printed circuit board comprising: a ground plane layer; a feeding point; a communication circuitry, the communication circuitry being mounted on the printed circuit board;

[1] This description is illustrative and is not intended to be an exhaustive or limiting explanation of any manner in which each Infringing Product infringes the ’365 Patent.

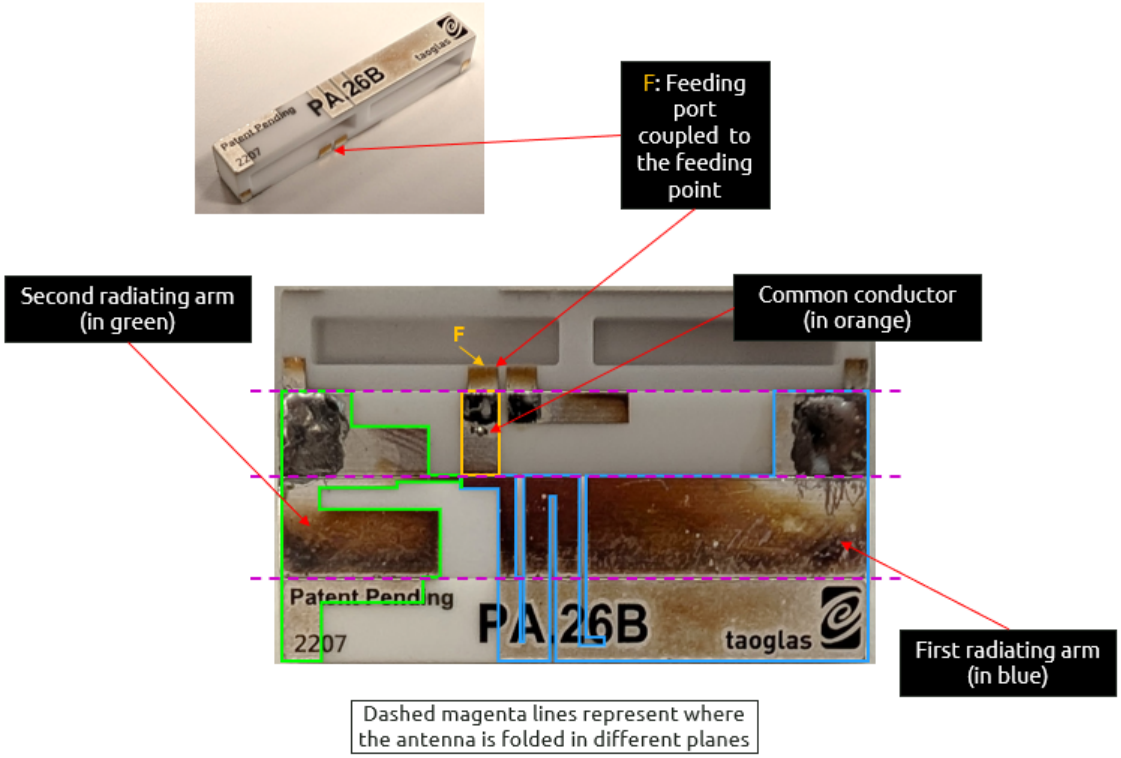
wherein the communication circuitry is coupled to the feeding point and to the ground plane layer;



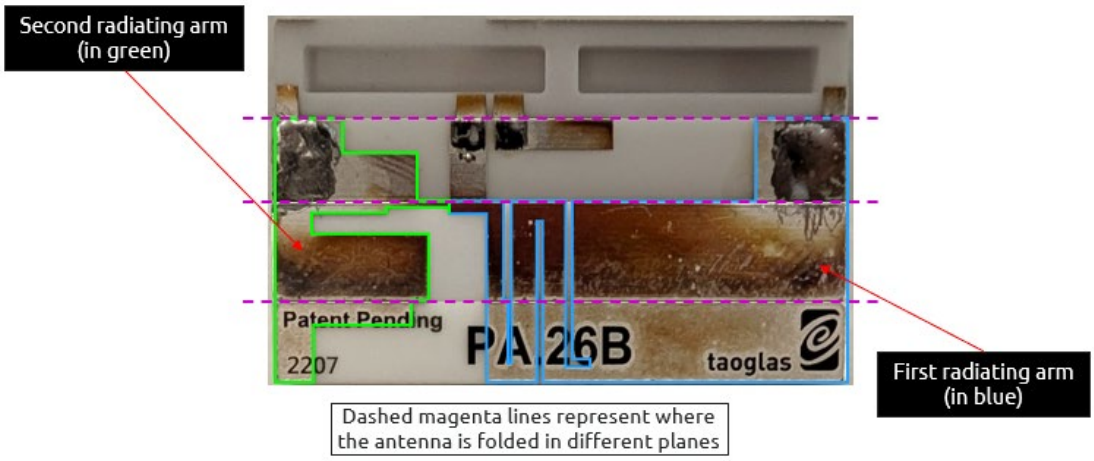
b. a multi-band antenna capable of operating at multiple frequency bands, the multi-band antenna including an antenna element; wherein the antenna element operates in cooperation with the ground plane layer;

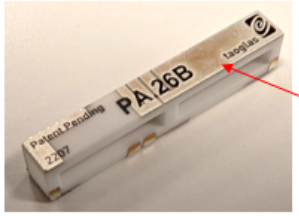


c. the antenna element comprising: a common conductor; a first radiating arm connected to the common conductor; a second radiating arm connected to the common conductor; wherein the common conductor includes a feeding port, the feeding port being coupled to the feeding point;



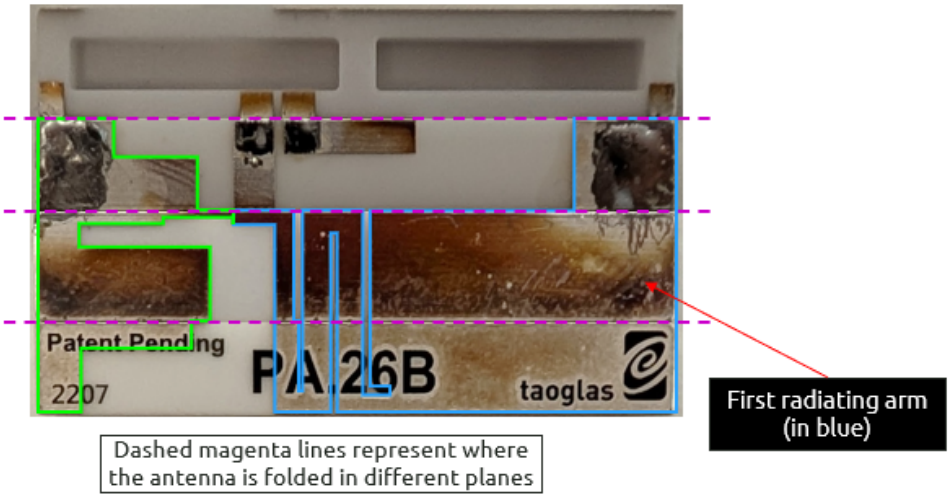
d. wherein at least a portion of the first radiating arm and at least a portion of the second radiating arm are arranged on different planes;





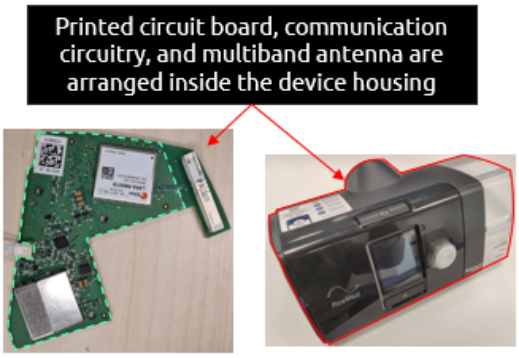
Antenna's radiating arms on different planes

e. wherein the first radiating arm is at least partially shaped according to a grid-dimension curve; and



$$\text{Grid dimension } (D_g) = \frac{\log(N_2) - \log(N_1)}{\log(2)} = \frac{\log(62) - \log(24)}{\log(2)} = 1.37 > 1$$

f. wherein the printed circuit board, the communication circuitry, and the multi-band antenna are arranged inside the device housing.



32. In addition to directly infringing the '365 Patent, on information and belief, Resmed has actively induced others to directly infringe at least claim 1 of the '365 Patent, in violation of 35 U.S.C. § 271(b). Defendants have induced, caused, urged, encouraged, aided, and abetted Defendants' direct and indirect customers, business partners, and/or end users, to make, use, offer for sale, and/or import products infringing at least claim 1 of the '365 Patent. Defendants have done so by acts including but not limited to distributing the Infringing Products, advertising and marketing infringing products, selling infringing products to their customers, and providing training, instructions and technical support directing customers and/or end users to use the infringing products in an infringing manner (available via, e.g., https://www.Resmed.com/en-us/?s=aircurve+10). For example, Resmed advertises on its website that, "With each AirCurve 10 device offering built-in cellular technology, you get unprecedented access to therapy data and remote access to device settings, helping you to be more connected with your patients and even more efficient in your business." (https://www.Resmed.com/en-us/health-professionals/products/cpap/machines/aircurve-10-s/). Such conduct was intended to and actually resulted in direct infringement of the '365 Patent.

33. On information and belief, Defendants knew that their actions, including, but not limited to the Infringing Products, would induce, have induced, and would continue to induce infringement by their customers, clients, business partners, developers, and/or end users, by continuing to sell, support, and instruct them on making, using, or selling the Infringing Products.

34. With knowledge of the '365 Patent, Defendants have willfully, deliberately, and intentionally infringed the '365 Patent.

35. As a direct and proximate result of Defendants' infringement of the '365 Patent, Fractus has suffered damages in an amount to be determined, together with interest and costs determined by the Court.

36. Fractus has complied with the requirements of 35 U.S.C. § 287 with

respect to the ’365 Patent.

COUNT TWO: INFRINGEMENT OF U.S. PATENT NO. 8,674,887

37. The ’887 Patent, entitled “Multi-Band Monopole Antenna for a Mobile Communications Device,” was duly and legally issued by the USPTO on March 18, 2014, after a full and fair examination. Fractus owns the ’887 Patent by assignment. (Exhibit B).

38. The ’887 Patent is valid and enforceable. Resmed does not have, and at no time has had, a license to practice any of the inventions claimed in the ’887 Patent.

39. The ’887 Patent describes multiband antennas for use in mobile communication devices.

40. As one example, claim 1 of the ’887 Patent recites:

A mobile communication device comprising:

communications circuitry;

a circuit board comprising a ground plane and a feeding point, the feeding point being coupled to the communications circuitry;

a mounting structure positioned within the mobile communication device, a section of the mounting structure extending over the circuit board; and

a multi-band antenna secured to the mounting structure and laterally offset from an edge of the ground plane, the multi-band antenna comprising:

a common conductor coupled to the feeding point;

first and second radiating arms coupled to and extending from the common conductor; and

a space-filling curve constituting at least a part of the first radiating arm, wherein the space-filling curve comprises at least ten segments that are shorter than a tenth of a free-space operating wavelength of the multi-band antenna, each of the segments being connected to its neighboring segments at an angle such

that no pair of adjacent segments defines a longer straight segment, wherein any periodicity of the space-filling curve along a fixed straight direction of space involves a periodic structure having a period defined by a non-periodic curve comprising at least ten connected segments in which no pair of adjacent ones of the connected segments defines a longer straight segment.

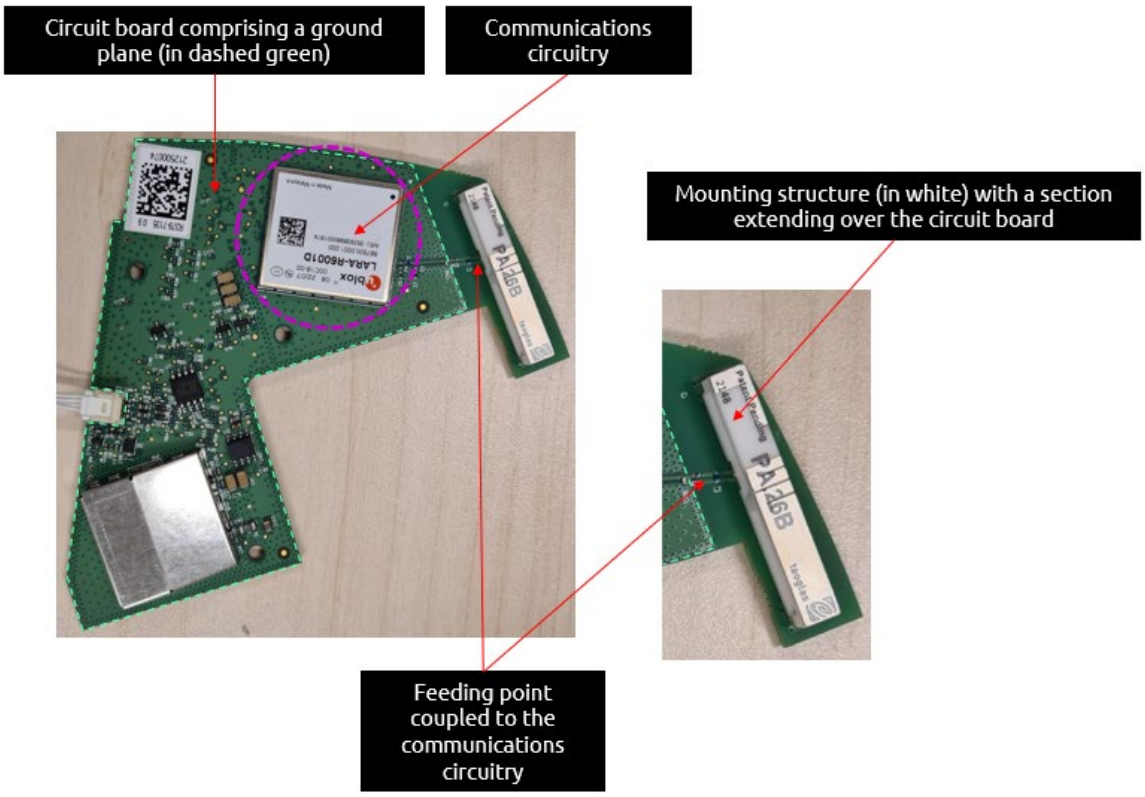
41. Resmed has directly infringed at least claim 1 of the '887 Patent by making, using, selling, offering to sell, and/or importing products that infringe the '887 Patent—including the Resmed AirCurve 10 products, the Resmed AirSense 10 products, and the Resmed Connectivity Module products—which meet every limitation of at least claim 1 of the '887 Patent literally or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(a).

42. As an example, the Resmed AirCurve 10 satisfies all claim limitations of at least claim 1 of the '887 Patent.[2]

a. A mobile communication device comprising: communications circuitry; a circuit board comprising a ground plane and a feeding point, the feeding point being coupled to the communications circuitry; a mounting structure positioned within the mobile communication device, a section of the mounting structure

[2] This description is illustrative and is not intended to be an exhaustive or limiting explanation of any manner in which each Infringing Product infringes the '887 Patent.

extending over the circuit board; and



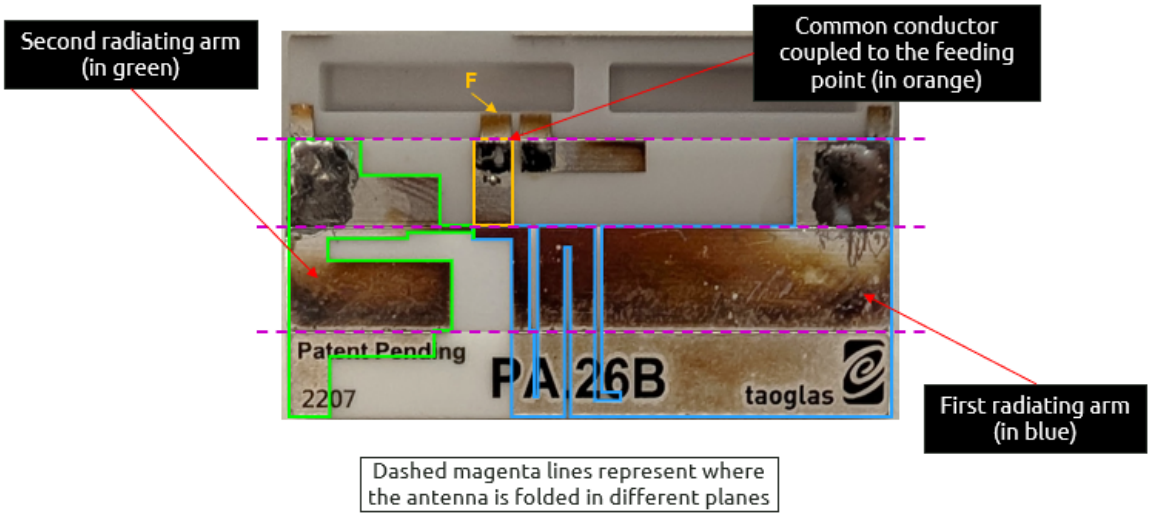
b. a multi-band antenna secured to the mounting structure and laterally offset from an edge of the ground plane,

GSM 850
GSM 1900
WCDMA II
WCDMA V
LTE 2
LTE 4
LTE 5
LTE 7
LTE 12
LTE 13
LTE 26
LTE 38
LTE 41

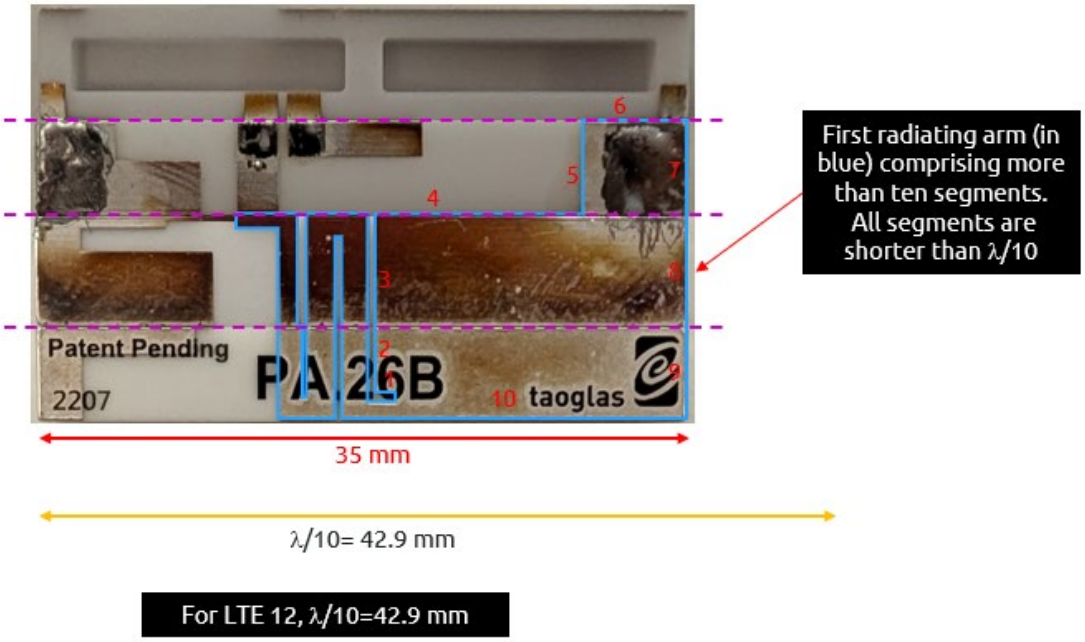
Source: FCC

Multi-band antenna operation

c. the multi-band antenna comprising: a common conductor coupled to the feeding point; first and second radiating arms coupled to and extending from the common conductor; and



d. a space-filling curve constituting at least a part of the first radiating arm, wherein the space-filling curve comprises at least ten segments that are shorter than a tenth of a free-space operating wavelength of the multi-band antenna, each of the segments being connected to its neighboring segments at an angle such that no pair of adjacent segments defines a longer straight segment, wherein any periodicity of the space-filling curve along a fixed straight direction of space involves a periodic structure having a period defined by a non-periodic curve comprising at least ten connected segments in which no pair of adjacent ones of the connected segments defines a longer straight segment.



43. In addition to directly infringing the '887 Patent, on information and belief, Resmed has actively induced others to directly infringe at least claim 1 of the '887 Patent, in violation of 35 U.S.C. § 271(b). Defendants have induced, caused, urged, encouraged, aided, and abetted Defendants' direct and indirect customers, business partners, and/or end users, to make, use, offer for sale, and/or import products infringing at least claim 1 of the '887 Patent. Defendants have done so by acts including but not limited to distributing the Infringing Products, advertising and marketing infringing products, selling infringing products to their customers, and providing training, instructions and technical support directing customers and/or end users to use the infringing products in an infringing manner (available via, e.g., https://www.Resmed.com/en-us/?s=aircurve+10). For example, Resmed advertises on its website that, "With each AirCurve 10 device offering built-in cellular technology, you get unprecedented access to therapy data and remote access to device settings, helping you to be more connected with your patients and even more efficient in your business." (https://www.Resmed.com/en-us/health-professionals/products/cpap/machines/aircurve-10-s/). Such conduct was intended

to and actually resulted in direct infringement of the ’887 Patent.

44. On information and belief, Defendants knew that their actions, including, but not limited to the Infringing Products, would induce, have induced, and would continue to induce infringement by their customers, clients, business partners, developers, and/or end users, by continuing to sell, support, and instruct them on making, using, or selling the Infringing Products.

45. With knowledge of the ’887 Patent, Defendants have willfully, deliberately, and intentionally infringed the ’887 Patent.

46. As a direct and proximate result of Defendants’ infringement of the ’887 Patent, Fractus has suffered damages in an amount to be determined, together with interest and costs determined by the Court.

47. Fractus has complied with the requirements of 35 U.S.C. § 287 with respect to the ’887 Patent.

COUNT THREE: INFRINGEMENT OF U.S. PATENT NO. 8,593,349

48. The ’349 Patent, entitled “Miniature Antenna Having a Volumetric Structure,” was duly and legally issued by the USPTO on November 26, 2013, after a full and fair examination. Fractus owns the ’349 Patent by assignment. (Exhibit C).

49. The ’349 Patent is valid and enforceable. Resmed does not have, and at no time has had, a license to practice any of the inventions claimed in the ’349 Patent.

50. The ’349 Patent describes antennas for use in wireless devices.

51. As one example, claim 15 of the ’349 Patent recites:

A miniature antenna system comprising:

an antenna element comprising at least one radiating arm and a feeding point coupled to a transmission medium;

a perimeter of the at least one radiating arm defines a grid dimension curve;

the antenna element forming a non-planar structure;

the at least one radiating arm being coupled to the feeding point;

a ground plane;

a dielectric material;

the perimeter of the at least one radiating arm comprising at least ten segments, each segment of the at least ten segments forms an angle with an adjacent segment of the at least ten segments and is shorter than one-tenth of a longest free-space operating wavelength;

the grid dimension curve being a non-periodic curve that has a grid dimension (D_g) greater than 1.3; and

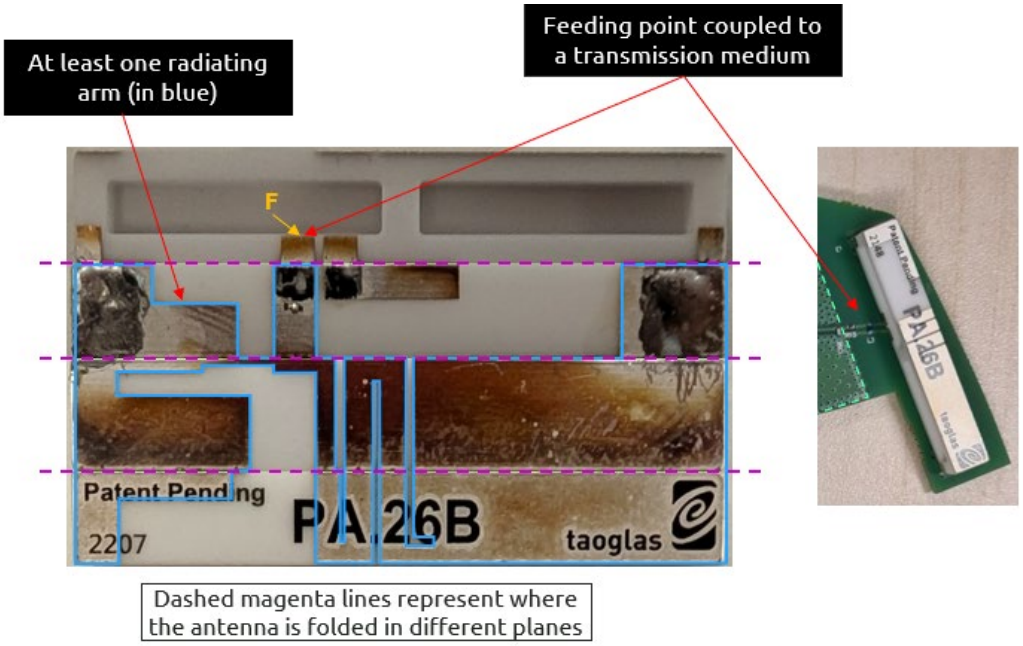
physical dimensions of the antenna element being smaller than the longest free-space operating wavelength of the antenna element divided by two times π.

52. Resmed has directly infringed at least claim 15 of the ’349 Patent by making, using, selling, offering to sell, and/or importing products that infringe the ’349 Patent—including the Resmed AirCurve 10 products, the Resmed AirSense 10 products, and the Resmed Connectivity Module products—which meet every limitation of at least claim 15 of the ’349 Patent literally or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(a).

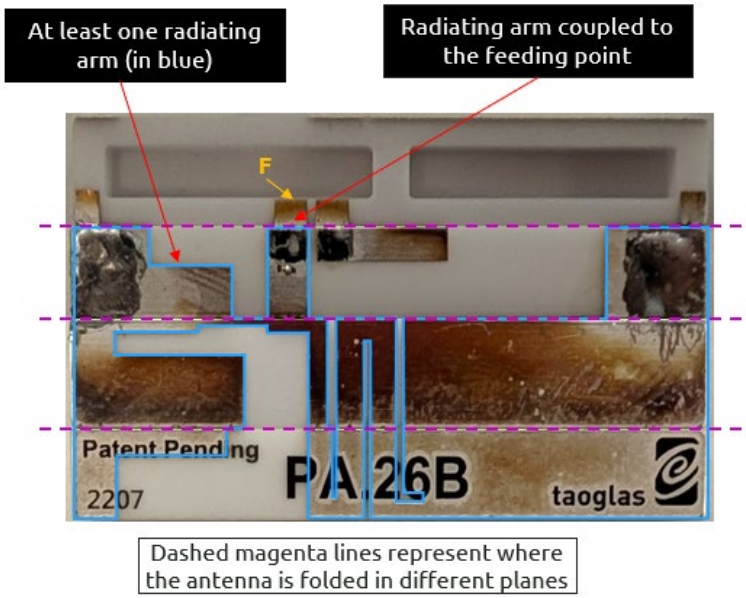
53. As an example, the Resmed AirCurve 10 satisfies all claim limitations of at least claim 15 of the ’349 Patent.[3]

a. A miniature antenna system comprising: an antenna element comprising at least one radiating arm and a feeding point coupled to a transmission medium;

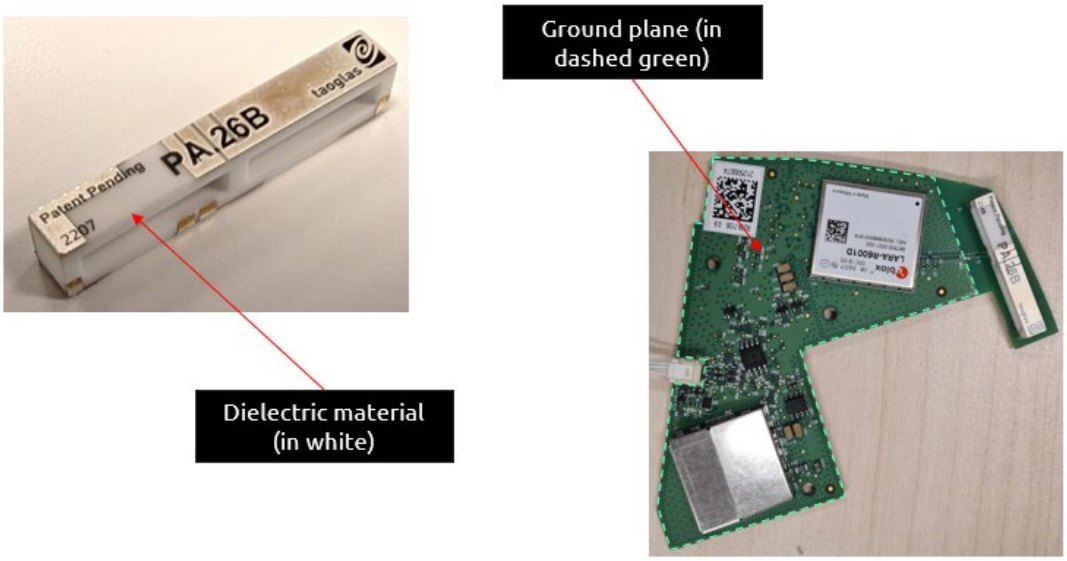
[3] This description is illustrative and is not intended to be an exhaustive or limiting explanation of any manner in which each Infringing Product infringes the ’349 Patent.



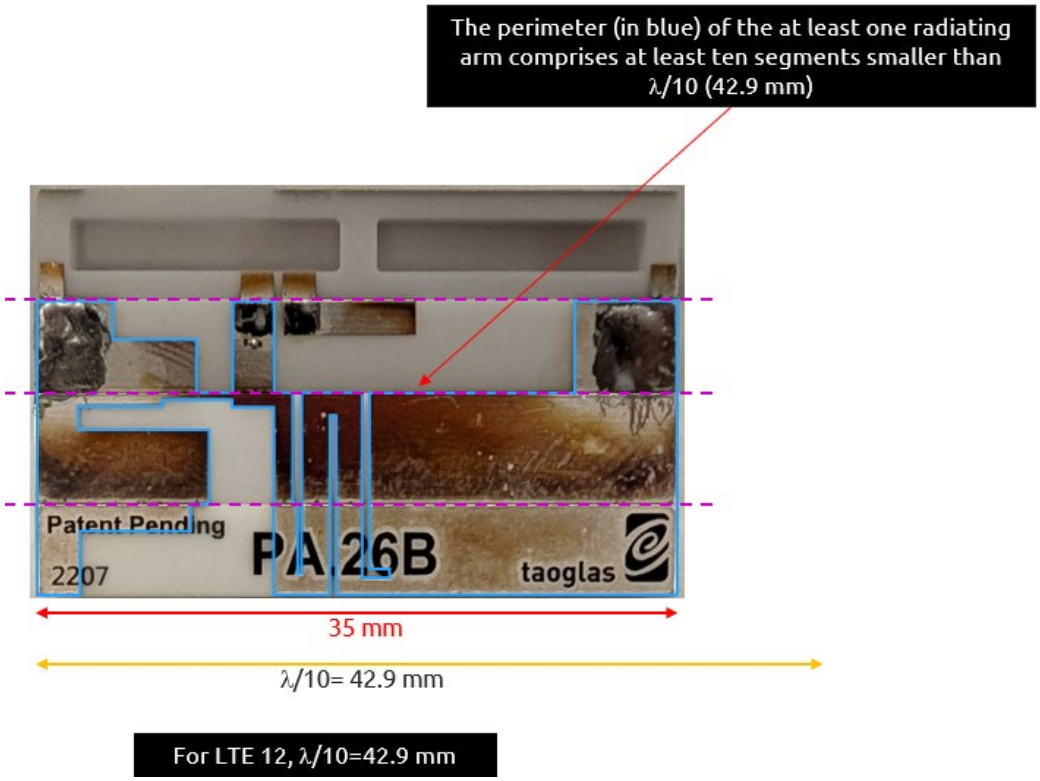
b. a perimeter of the at least one radiating arm defines a grid dimension curve; the antenna element forming a non-planar structure; the at least one radiating arm being coupled to the feeding point;



c. a ground plane; a dielectric material;

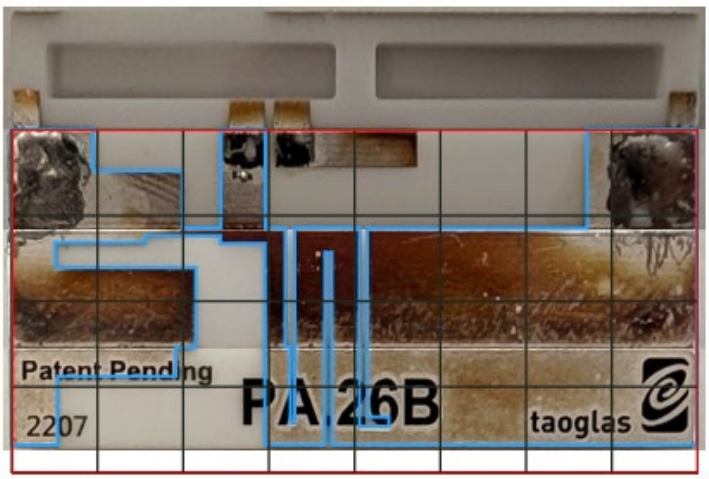


d. the perimeter of the at least one radiating arm comprising at least ten segments, each segment of the at least ten segments forms an angle with an adjacent segment of the at least ten segments and is shorter than one-tenth of a longest free-space operating wavelength;

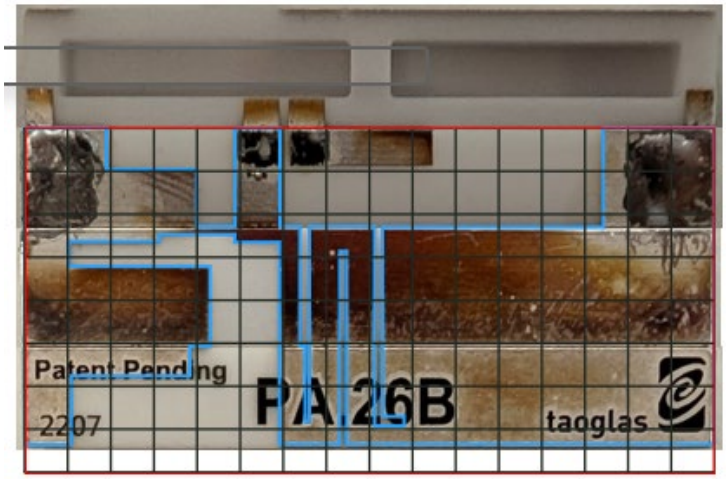


For LTE 12, λ/10=42.9 mm

e. the grid dimension curve being a non-periodic curve that has a grid dimension (D_g) greater than 1.3; and



$N_1 = 26$

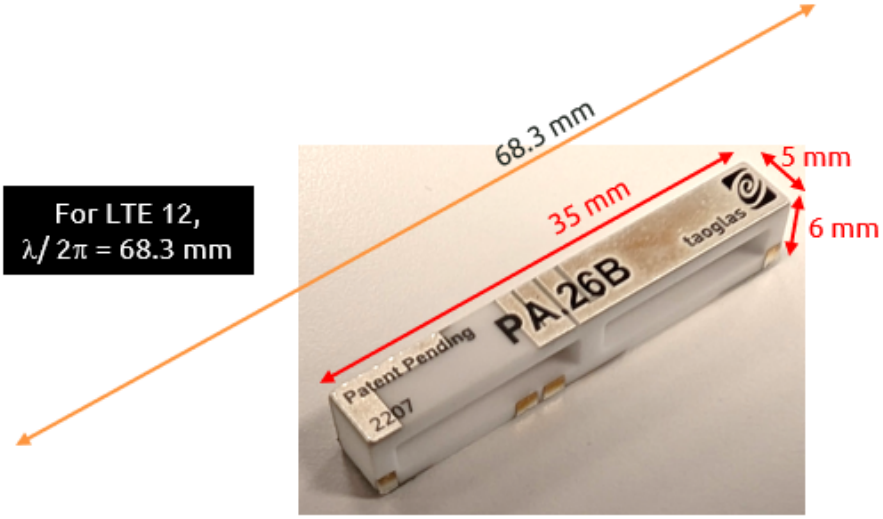


$N_2 = 77$

$$\text{Grid dimension } (D_g) = \frac{\log(N_2) - \log(N_1)}{\log(2)} = \frac{\log(77) - \log(26)}{\log(2)} = 1.57 > 1.3$$

f. physical dimensions of the antenna element being smaller than the longest free-space operating wavelength of the antenna element divided by two times π.

For LTE 12,
λ/ 2π = 68.3 mm



The dimensions of the antenna are smaller than λ/ 2π (68.3 mm)

54. In addition to directly infringing the ’349 Patent, on information and belief, Resmed has actively induced others to directly infringe at least claim 15 of the ’349 Patent, in violation of 35 U.S.C. § 271(b). Defendants have induced, caused, urged, encouraged, aided, and abetted Defendants’ direct and indirect customers, business partners, and/or end users, to make, use, offer for sale, and/or import products infringing at least claim 15 of the ’349 Patent. Defendants have done so by acts including but not limited to distributing the Infringing Products, advertising and marketing infringing products, selling infringing products to their customers, and providing training, instructions and technical support directing customers and/or end users to use the infringing products in an infringing manner (available via, e.g., https://www.Resmed.com/en-us/?s=aircurve+10). For example, Resmed advertises on its website that, “With each AirCurve 10 device offering built-in cellular technology, you get unprecedented access to therapy data and remote access to device settings, helping you to be more connected with your patients and even more efficient in your business.” (https://www.Resmed.com/en-us/health-professionals/products/cpap/machines/aircurve-10-s/). Such conduct was intended to and actually resulted in direct infringement of the ’349 Patent.

55. On information and belief, Defendants knew that their actions, including, but not limited to the Infringing Products, would induce, have induced, and would continue to induce infringement by their customers, clients, business partners, developers, and/or end users, by continuing to sell, support, and instruct them on making, using, or selling the Infringing Products.

56. With knowledge of the ’349 Patent, Defendants have willfully, deliberately, and intentionally infringed the ’349 Patent.

57. As a direct and proximate result of Defendants’ infringement of the ’349 Patent, Fractus has suffered damages in an amount to be determined, together with interest and costs determined by the Court.

58. Fractus has complied with the requirements of 35 U.S.C. § 287 with

respect to the ’349 Patent.

COUNT FOUR: INFRINGEMENT OF U.S. PATENT NO. 8,362,960

59. The ’960 Patent, entitled “Handheld Device with Two Antennas, and Method of Enhancing the Isolation Between the Antennas,” was duly and legally issued by the USPTO on January 29, 2013, after a full and fair examination. Fractus owns the ’960 Patent by assignment. (Exhibit D).

60. The ’960 Patent is valid and enforceable. Resmed does not have, and at no time has had, a license to practice any of the inventions claimed in the ’960 Patent.

61. The ’960 Patent describes wireless devices with two antennas and the isolation between those antennas.

62. As one example, claim 1 of the ’960 Patent recites:

A handheld device comprising:

a substantially rectangular ground plane;

a first antenna configured to transmit and receive electromagnetic wave signals in at least three frequency bands used for mobile communication services;

a second antenna configured to operate in at least one frequency band;

the first antenna extends in a direction substantially parallel to a first side of the substantially rectangular ground plane;

the second antenna extends in a direction substantially parallel to a second side of the substantially rectangular ground plane;

the first antenna is arranged near a short side of the substantially rectangular ground plane; and

the first side and the second side are substantially orthogonal.

63. Resmed has directly infringed at least claim 1 of the ’960 Patent by making, using, selling, offering to sell, and/or importing products that infringe the ’960 Patent—including the Resmed AirCurve 11 products and the Resmed

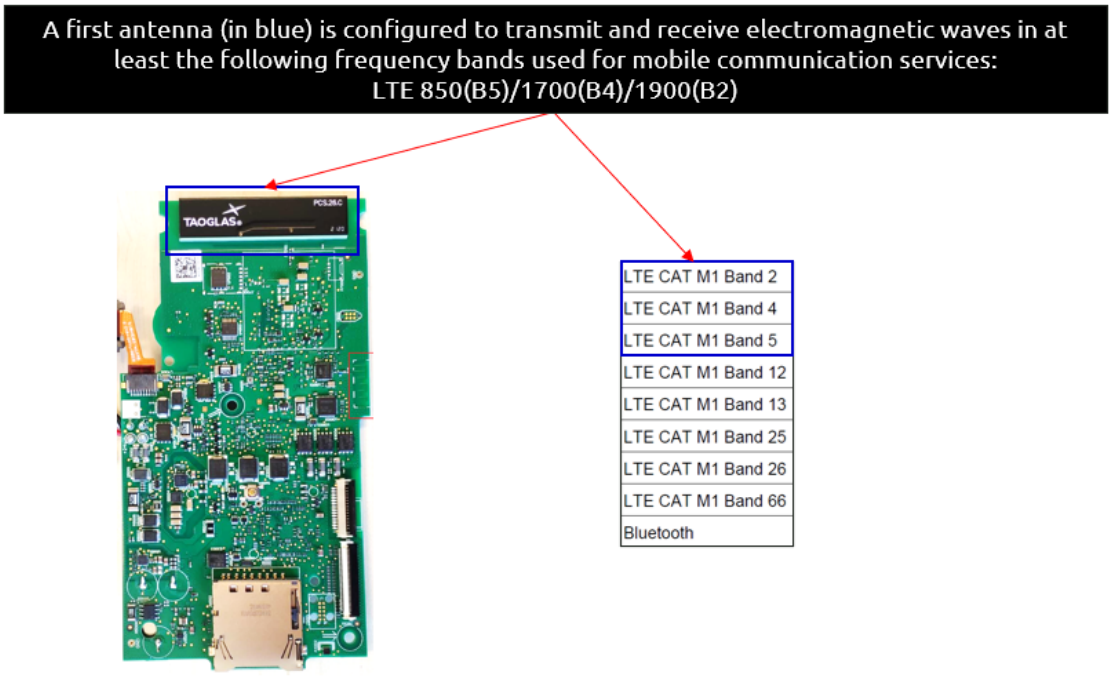
AirSense 11 products—which meet every limitation of at least claim 1 of the ’960 Patent literally or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(a).

64. As an example, the Resmed AirCurve 11 satisfies all claim limitations of at least claim 1 of the ’960 Patent.[4]

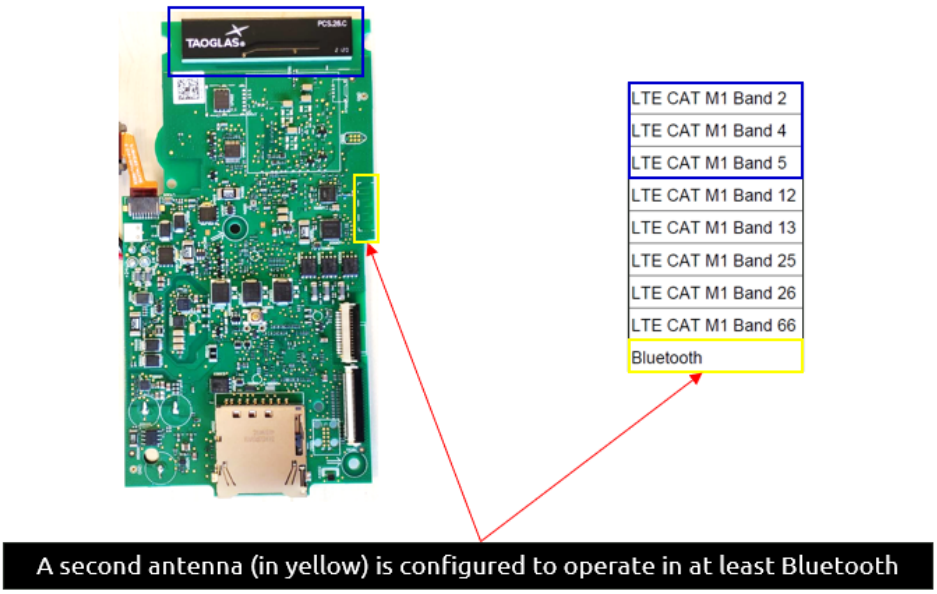
a. A handheld device comprising: a substantially rectangular ground plane;

[4] This description is illustrative and is not intended to be an exhaustive or limiting explanation of any manner in which each Infringing Product infringes the ’960 Patent.

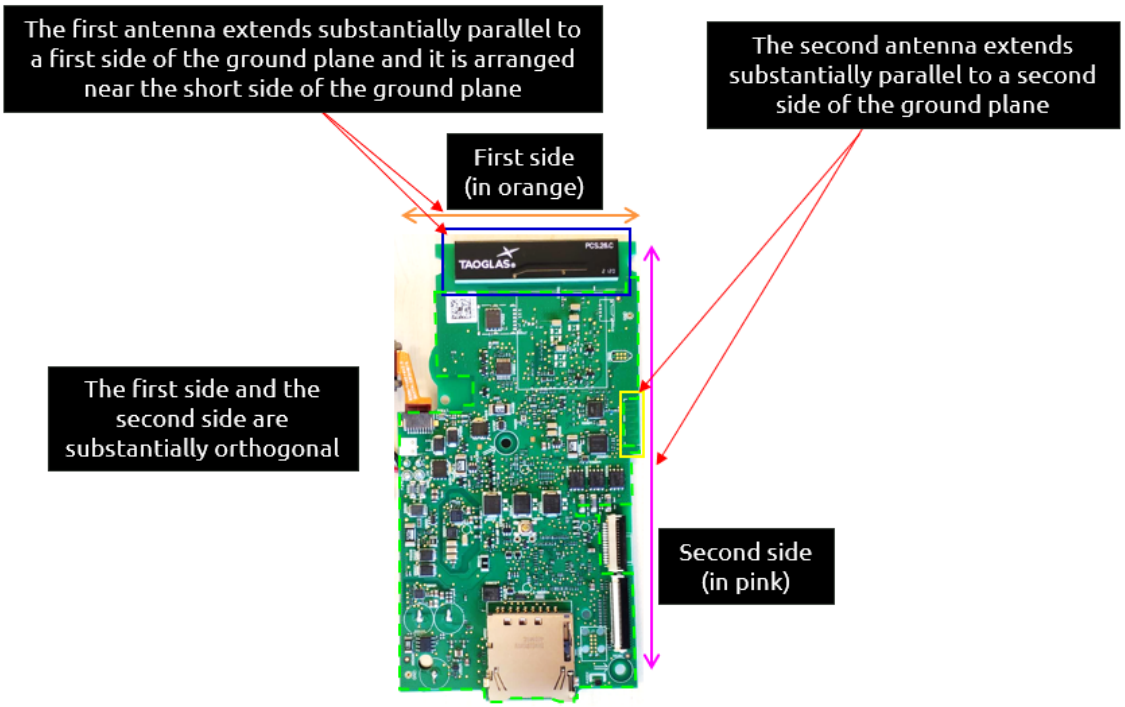
b. a first antenna configured to transmit and receive electromagnetic wave signals in at least three frequency bands used for mobile communication services;



c. a second antenna configured to operate in at least one frequency band;



d. the first antenna extends in a direction substantially parallel to a first side of the substantially rectangular ground plane; the second antenna extends in a direction substantially parallel to a second side of the substantially rectangular ground plane; the first antenna is arranged near a short side of the substantially rectangular ground plane; and the first side and the second side are substantially orthogonal.



65. In addition to directly infringing the ’960 Patent, on information and belief, Resmed has actively induced others to directly infringe at least claim 1 of the ’960 Patent, in violation of 35 U.S.C. § 271(b). Defendants have induced, caused, urged, encouraged, aided, and abetted Defendants’ direct and indirect customers, business partners, and/or end users, to make, use, offer for sale, and/or import products infringing at least claim 1 of the ’960 Patent. Defendants have done so by

acts including but not limited to distributing the Infringing Products, advertising and marketing infringing products, selling infringing products to their customers, and providing training, instructions and technical support directing customers and/or end users to use the infringing products in an infringing manner (available via, e.g., https://www.Resmed.com/en-us/?s=aircurve+11). For example, Resmed advertises on its website that, the Resmed AirSense 11 includes "wireless connectivity." (https://www.resmed.com/en-us/health-professionals/products/cpap/machines/airsense-11-elite/). Such conduct was intended to and actually resulted in direct infringement of the '960 Patent.

66. On information and belief, Defendants knew that their actions, including, but not limited to the Infringing Products, would induce, have induced, and would continue to induce infringement by their customers, clients, business partners, developers, and/or end users, by continuing to sell, support, and instruct them on making, using, or selling the Infringing Products.

67. With knowledge of the '960 Patent, Defendants have willfully, deliberately, and intentionally infringed the '960 Patent.

68. As a direct and proximate result of Defendants' infringement of the '960 Patent, Fractus has suffered damages in an amount to be determined, together with interest and costs determined by the Court.

69. Fractus has complied with the requirements of 35 U.S.C. § 287 with respect to the '960 Patent.

COUNT FIVE: INFRINGEMENT OF U.S. PATENT NO. 11,031,677

70. The '677 Patent, entitled "Multiple-Body-Configuration Multimedia and Smartphone Multifunction Wireless Devices," was duly and legally issued by the USPTO on June 8, 2021, after a full and fair examination. Fractus owns the '677 Patent by assignment. (Exhibit E).

71. The '677 Patent is valid and enforceable. Resmed does not have, and at no time has had, a license to practice any of the inventions claimed in the '677

Patent.

72. The ’677 Patent describes wireless devices that include an antenna system.

73. As one example, claim 1 of the ’677 Patent recites:

A wireless device comprising:

an antenna system comprising:

a ground plane;

a first antenna within the wireless device and configured to support at least three frequency bands contained within first and second frequency ranges of the electromagnetic spectrum, the second frequency range being higher in frequency than the first frequency range and at least one of the three frequency bands being associated with a 4G communication standard, the first antenna being proximate to a first short side of a ground plane rectangle enclosing the ground plane and defining a first antenna contour comprising an entire perimeter of the first antenna, wherein the first antenna contour has a level of complexity defined by complexity factor F_{21} having a value of at least 1.20 and complexity factor F_{32} having a value less than 1.75; and

a second antenna within the wireless device and configured to support at least one frequency band different from the at least three frequency bands supported by the first antenna, the second antenna being arranged completely within the ground plane rectangle.

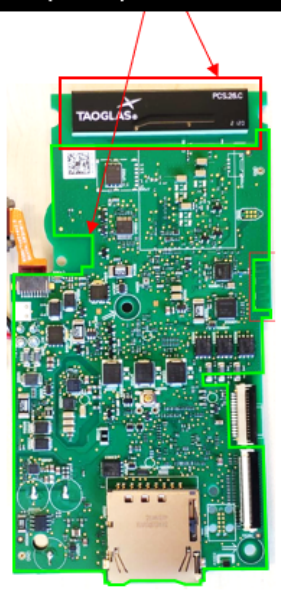
74. Resmed has directly infringed and continue to infringe at least claim 1 of the ’677 Patent by making, using, selling, offering to sell, and/or importing products that infringe the ’677 Patent—including the Resmed AirCurve 11 products and the Resmed AirSense 11 products—which meet every limitation of at least

claim 1 of the ’677 Patent literally or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(a).

75. As an example, the Resmed AirCurve 11 satisfies all claim limitations of at least claim 1 of the ’677 Patent.[5]

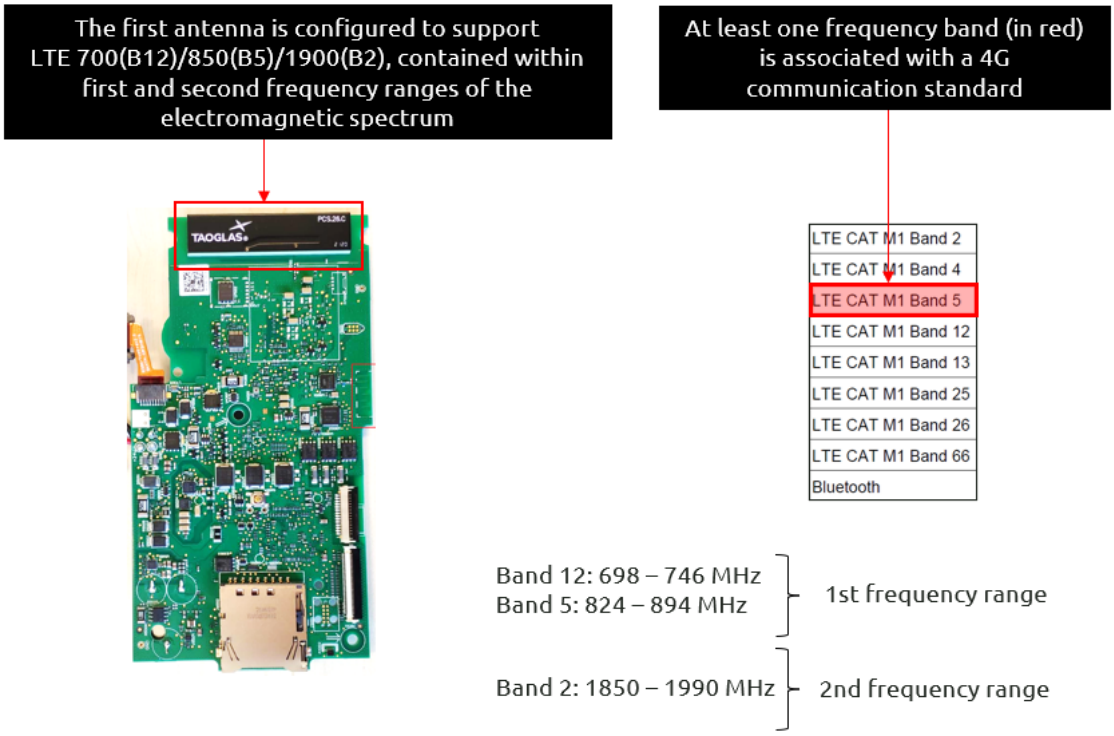
a. A wireless device comprising: an antenna system comprising: a ground plane; a first antenna within the wireless device and

The antenna system comprises a ground plane (in green), and a first antenna (in red) within the wireless device

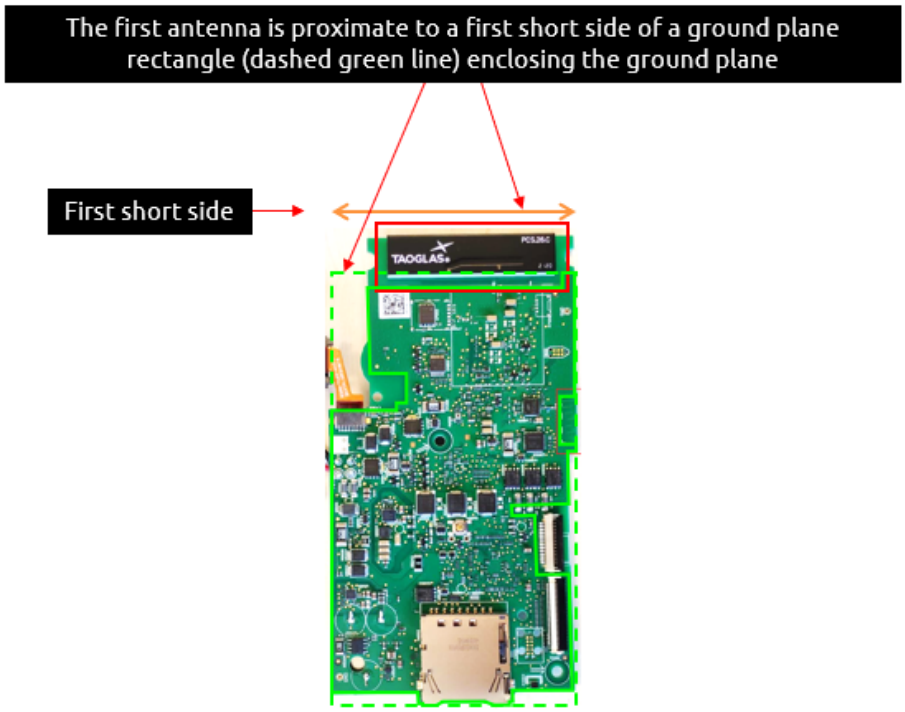


[5] This description is illustrative and is not intended to be an exhaustive or limiting explanation of any manner in which each Infringing Product infringes the ’677 Patent.

b. configured to support at least three frequency bands contained within first and second frequency ranges of the electromagnetic spectrum, the second frequency range being higher in frequency than the first frequency range and at least one of the three frequency bands being associated with a 4G communication standard,

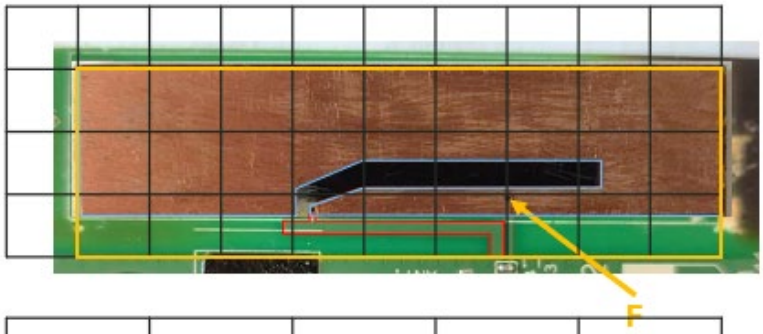


c. the first antenna being proximate to a first short side of a ground plane rectangle enclosing the ground plane and

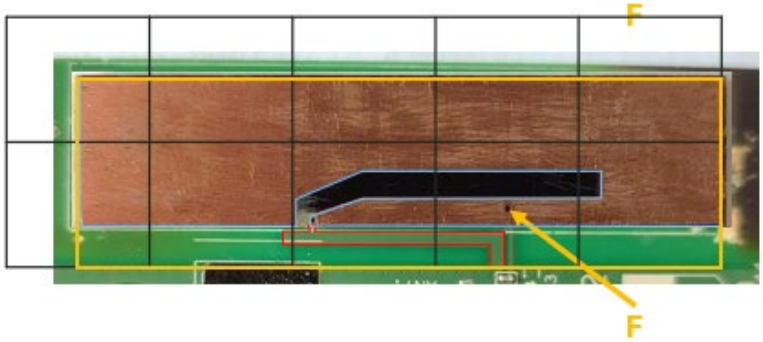


d. defining a first antenna contour comprising an entire perimeter of the first antenna, wherein the first antenna contour has a level of complexity defined by complexity factor F_{21} having a value of at least 1.20 and

$N2 = 25\ cells$



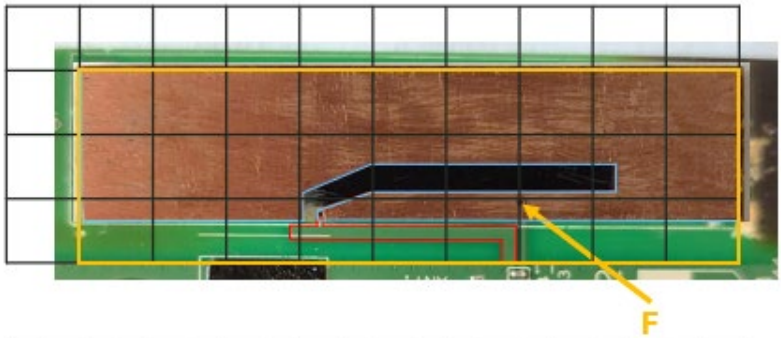
$N1 = 10\ cells$



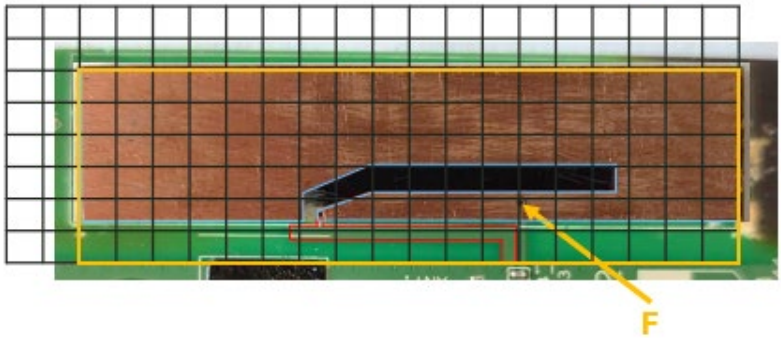
$$F_{21} = -\frac{\log(N2) - \log(N1)}{\log\left(\frac{1}{2}\right)} = -\frac{\log(25) - \log(10)}{\log\left(\frac{1}{2}\right)} = 1.32 \geq 1.20$$

e. complexity factor F_{32} having a value less than 1.75; and

$N2 = 25\ cells$

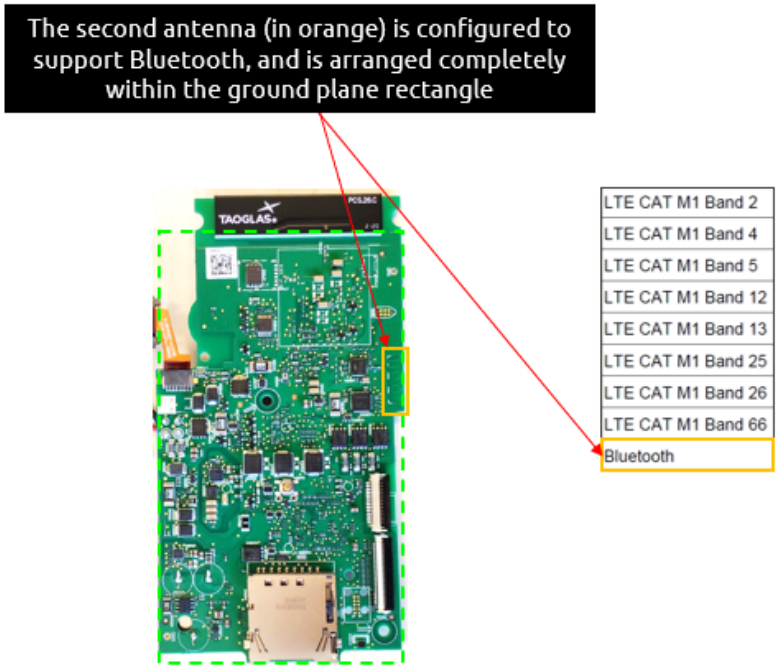


$N3 = 66\ cells$



$$F_{32} = -\frac{\log(N3) - \log(N2)}{\log\left(\frac{1}{2}\right)} = -\frac{\log(66) - \log(25)}{\log\left(\frac{1}{2}\right)} = 1.40 < 1.75$$

f. a second antenna within the wireless device and configured to support at least one frequency band different from the at least three frequency bands supported by the first antenna, the second antenna being arranged completely within the ground plane rectangle.



76. In addition to directly infringing the '677 Patent, on information and belief, Resmed has actively induced and continue to actively induce others to directly infringe at least claim 1 of the '677 Patent, in violation of 35 U.S.C. § 271(b). Defendants have induced, caused, urged, encouraged, aided, and abetted Defendants' direct and indirect customers, business partners, and/or end users, to make, use, offer for sale, and/or import products infringing at least claim 1 of the '677 Patent. Defendants have done so by acts including but not limited to distributing the Infringing Products, advertising and marketing infringing products, selling infringing products to their customers, and providing training, instructions and technical support directing customers and/or end users to use the infringing products in an infringing manner (available via, e.g., https://www.Resmed.com/en-

us/?s=aircurve+11). For example, Resmed advertises on its website that, the Resmed AirSense 11 includes "wireless connectivity." (https://www.resmed.com/en-us/health-professionals/products/cpap/machines/airsense-11-elite/). Such conduct was intended to and actually resulted in direct infringement of the '677 Patent.

77. On information and belief, Defendants knew that their actions, including, but not limited to the Infringing Products, would induce, have induced, and would continue to induce infringement by their customers, clients, business partners, developers, and/or end users, by continuing to sell, support, and instruct them on making, using, or selling the Infringing Products.

78. With knowledge of the '677 Patent, Defendants have willfully, deliberately, and intentionally infringed the '677 Patent.

79. As a direct and proximate result of Defendants' infringement of the '677 Patent, Fractus has suffered damages in an amount to be determined, together with interest and costs determined by the Court.

80. Fractus has complied with the requirements of 35 U.S.C. § 287 with respect to the '677 Patent.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff respectfully prays for entry of judgment as follows:

a) That Defendants have infringed and continue to infringe one or more claims of the Patents-in-Suit;

b) That Plaintiff recover all damages to which it is entitled under 35 U.S.C. § 284, but in no event less than a reasonable royalty;

c) That Defendants' conduct was willful and that Plaintiff should therefore recover an enhanced damages award pursuant to 35 U.S.C. § 284;

d) That this case is exceptional and that Plaintiff shall therefore recover its attorneys' fees and other recoverable expenses, under 35 U.S.C. § 285;

e) That Plaintiff shall recover from Defendants all pre- and post-judgment

interest on the damages award, calculated at the highest interest rates allowed by law;

f) That Plaintiff, as the prevailing party, shall recover from Defendants all taxable costs of court;

g) That Defendants be permanently enjoined from further infringement of the Patents-in-Suit; and

h) Awarding Plaintiff further relief as the Court deems appropriate.

Dated: October 9, 2025

Respectfully submitted,

/s/ Michael Ng

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DEMAND FOR JURY TRIAL

Pursuant to Federal Rule of Civil Procedure 38(b) and Local Rule 38.1, Fractus hereby demands a jury trial on all issues triable to a jury.

Dated: October 9, 2025

Respectfully submitted,

/s/ Michael Ng

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