IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

NIPPON TELEGRAPH AND TELEPHONE CORPORATION and ESSENTIAL WIFI LLC,	)	
Plaintiffs,	)	C.A. No. 6:20-cv-226
v.	)	
TEXAS INSTRUMENTS INC.,	)	**JURY TRIAL DEMANDED**
Defendant.	)	

COMPLAINT

Plaintiffs Nippon Telegraph and Telephone Corporation ("NTT") and Essential WiFi, LLC ("EWF") (collectively "Plaintiffs") bring this action against Texas Instruments Inc. ("TI" or "Defendant") and allege as follows.

NATURE OF THE ACTION

1. This is an action for patent infringement. Defendant TI has infringed and continues to infringe, contributes to the infringement of, and/or actively induces others to infringe U.S. Patent Nos. 7,280,551 ("the '551 Patent"), No. 7,545,781 ("the '781 Patent"), No. 7,400,616 ("the '616 Patent"), and No. 7,242,720 ("the '720 Patent") (collectively, the "Patents in Suit").

2. The Patents in Suit are "Standard Essential Patents" ("SEPs"), meaning that they are essential to the implementation of widely adopted standards, in this case pertaining to wireless communications over local area networks ("WiFi").

3. Plaintiffs bring this action because TI has failed to respond to Plaintiffs' fair, reasonable, and non-discriminatory ("FRAND") offers or to negotiate in good faith, but

continues to practice, use, or otherwise comply with the WiFi standards covered by the Patents in Suit.

4. Specifically, TI is an unwilling licensee in the face of Plaintiffs' good faith offers to license the Patents in Suit under FRAND terms. Instead, because TI continues to willfully practice the Patents in Suit without a license, Plaintiffs have been forced to bring this action.

THE PARTIES

5. Plaintiff Nippon Telegraph and Telephone Corporation is a corporation organized under the laws of Japan, and headquartered in Tokyo, Japan.

6. Plaintiff Essential WiFi, LLC is a company organized under Texas law with its principal offices in Austin, Texas.

7. On information and belief, Defendant TI is a corporation organized and existing under the laws of the Delaware, with a place of business at 12357 Riata Trace Pkwy, Austin, Texas 78727.

JURISDICTION AND VENUE

8. This action arises under the Patent Laws of the United States, 35 U.S.C. § 1 *et seq*. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

9. This Court has personal jurisdiction over Defendant TI because, directly or through intermediaries, TI has committed acts within the Western District of Texas giving rise to this action and/or has established minimum contacts with the Western District of Texas, such that the exercise of jurisdiction would not offend traditional notions of fair play and substantial justice.

10. In addition, TI has placed or contributed to placing products that infringe the Patents in Suit (the "Accused Products") into the stream of commerce via an established

distribution channel knowing or understanding that such products would be sold and used in the United States, including in the Western District of Texas.

11. On information and belief, TI has derived substantial revenue from infringing acts in the Western District of Texas, including from the sale and use of Accused Products.

12. Venue is proper as to TI because, on information and belief, TI maintains one or more physical fixed places of business in Texas, including offices at 12357 Riata Trace Pkwy, Austin, Texas 78727.

BACKGROUND

13. NTT is one of the largest telecommunications companies in the world. For decades, NTT has devoted considerable resources to the research and development of wired and wireless communications technology. NTT scientists have made significant advances in this field and many of their inventions have been patented by NTT in the United States. As a result, NTT owns or has rights to various intellectual property.

14. The Institute of Electrical and Electronics Engineers ("IEEE") is a professional association whose activities span a broad range of disciplines, including telecommunications. As part of its activities, the IEEE develops and publishes industrial standards, including standards pertaining to wireless communications.

15. The IEEE 802.11 standards, developed by the IEEE LAN/MAN Standards Committee (IEEE 802), provide a set of media access control (MAC) and physical layer (PHY) specifications for implementing WiFi. WiFi usage is widespread in modern electronic products, including laptops, smartphones, routers, televisions, cameras and other devices that have wireless connections.

16. The 802.11 family of standards includes multiple versions, which can differ from each other in terms of speed, transmission ranges, and frequency used.

17. For example, the first widely-adopted WiFi standard is 802.11b, which provides a maximum data rate of 11 Mbps using "single-input, single output" ("SISO") antenna technology, or transmission of a single data stream.

18. By contrast, the IEEE 802.11n-2009 ("802.11n") standard utilizes multiple antennas to dramatically increase data throughput over that provided by prior standards. In particular, a primary basis for 802.11n's increased speed is its use of "multiple-input, multiple-output" ("MIMO") technology, whereby multiple data streams may be transmitted and received simultaneously. 802.11n further provides for 40MHz transmissions over two bonded adjacent 20MHz channels, which are designated as primary and secondary channels. The 802.11n standard can support a maximum theoretical data rate of up to 300 Mbps. Additional features implementing and enabling the advantages of the 802.11n standard are described, as appropriate, with reference to specific Patents in Suit below.

19. IEEE 802.11ac is an amendment to IEEE 802.11 that further builds on 802.11n. In particular, the 802.11ac standard substantially simplified the methods used for beamforming, or focusing transmitted energy toward particular receivers. 802.11ac further provided for an application of MIMO methods in combination with beamforming, whereby, for example, an access point may transmit to multiple distinct users at the same time ("MU-MIMO"). Additional features implementing and enabling the advantages of the 802.11ac standard are described, as appropriate, with reference to specific Patents in Suit below.

20. The IEEE requires participants to commit to abide by their Intellectual Property Rights ("IPR") policies, which set forth the rights and obligations of their members. For example, members are required to disclose intellectual property rights that disclose standard essential and potentially standard essential patents and patent applications relevant to IEEE

standards. Further, the IEEE requires members disclosing IPR to indicate, via a Letter of Assurance ("LOA"), whether they will commit to granting implementer members a license under terms that are FRAND.

21. NTT has been an active participant in the IEEE's development of industry standards, including many of the 802.11 standards, since at least 1998. NTT scientists have participated in the drafting of the specifications for WiFi standards and have disclosed NTT technology to the IEEE for adoption in the WiFi standards.

22. EWF is the exclusive licensee of the Patents in Suit and has the right to grant sublicenses, exclude others, and to enforce, sue and recover damages for past and future infringement of the Patents in Suit.

THE PATENTS IN SUIT

23. On October 9, 2007, United States Patent No. 7,280,551 entitled "Wireless packet communication method and wireless packet communication apparatus," was duly and legally issued to NTT, as assignee of the inventors Kengo Nagata, Tomoaki Kumagai, Shinya Otsuki, Kazuyoshi Saito, and Satoru Aikawa. A copy of the '551 Patent is attached hereto as Exhibit A.

24. On June 9, 2009, United States Patent No. 7,545,781, entitled "Wireless packet communication method and wireless packet communication apparatus," was duly and legally issued to NTT, as assignee of the inventors Shinya Otsuki, Tomoaki Kumagai, Kengo Nagata, Kazuyoshi Saito, Satoru Aikawa, and Yasuhiko Inoue. A copy of the '781 Patent is attached hereto as Exhibit B.

25. On July 15, 2008, United States Patent No. 7,400,616 entitled "Wireless packet communication method and wireless packet communication apparatus," was duly and legally issued to NTT, as assignee of the inventors Kazuyoshi Saito, Tomoaki Kumagai, Shinya Otsuki,

Kengo Nagata, Satoru Aikawa, Atsushi Ohta, and Akinori Hirukawa. A copy of the '616 Patent is attached hereto as Exhibit C.

26. On July 10, 2007, United States Patent No. 7,242,720 entitled "OFDM signal communication system, OFDM signal transmitting device and OFDM signal receiving device," was duly and legally issued to NTT, as assignee of the inventors Takatoshi Sugiyama, Yusuke Asai, Satoshi Kurosaki, Masahiro Umehira, Daisei Uchida, and Yasuo Suzuki. A copy of the '720 Patent is attached hereto as Exhibit D.

27. On November 15, 2011, NTT notified the IEEE in a public LOA that each of the Patents in Suit could include Essential Patent Claims with respect to at least the IEEE 802.11n standard. NTT further indicated that it will grant a license to the identified SEPs under terms that are FRAND.

DEFENDANT IS AN UNWILLING LICENSEE

28. On May 31, 2016, EWF provided a letter to TI conveying Plaintiffs' willingness to license its portfolio of WiFi patents that included the Patents In Suit on fair, reasonable, and non-discriminatory ("FRAND") terms. EWF further provided detailed exemplary claim charts explaining the manner in which TI's Accused Products infringe. TI provided no response to this offer letter.

29. On June 27, 2016, EWF provided a follow-up letter to TI. Again, TI provided no response.

30. On August 15, 2016, EWF provided a second follow-up letter to TI. Again, TI provided no response.

31. On October 28, 2016, EWF provided a third follow up letter to TI. Again, TI provided no response.

32. On January 9, 2020, EWF provided a final offer letter to TI, which offer expired on January 24 if no response was provided, or on February 29 if the parties proceeded to negotiate. However, TI provided no response to date.

33. TI has been operating and continues to operate without a license to the Patents in Suit. Given TI's complete failure to engage in any licensing discussions, to license the Patents in Suit, or otherwise to cease infringing the Patents in Suit, Plaintiffs NTT and EWF initiated this action for the purpose of protecting their patent rights in the United States.

GENERAL ALLEGATIONS RELATING TO INFRINGEMENT

34. The Accused Products implement IEEE standard 802.11n and/or 802.11ac "WiFi" technology for wireless communication. The Accused Products include, but are not limited to: The SimpleLink Wi-Fi Series products, including the SimpleLink CC3xxx Series, including CC3100, CC3200, the CC313x Series (including CC3135), the CC323x Series, the CC3x20 Series (including CC3120, CC3220S, and CC3220SF), and the CC3x35 Series (including the CC3235x Series, CC3235S, and CC3235SF); the CC235MOD Series, including CC3235MODSF, CC3235MODAS, and CC3235MODASF; the CC3XXXMOD Series, including CC3100MOD, CC3120MOD, CC3135MOD, CC3200MOD, and CC3220MOD. The CC3XXXMODA Series, including CC3220MODA; and the WL18xxMOD Series, including WL1801MOD, WL1805MOD, WL1807MOD WL1831MOD, WL1835MOD, and WL1837MOD. Additional infringing products may be identified in discovery.

35. On information and belief, Defendant TI designs, makes, uses, imports, offers to sell, and sells (and/or has made, used, imported, offered to sell, and sold) in the United States and in this judicial district, Accused Products.

36. TI has therefore infringed and continues to infringe one or more claims of the Patents in Suit under 35 U.S.C. § 271(a), including the claims set forth in the sections below,

literally or under the doctrine of equivalents, by making, using, selling, and/or offering for sale in the United States, and/or importing into the United States, the Accused Products, without authorization.

37. TI has previous actual knowledge of the Patents in Suit, knew they were identified by NTT in connection with the 802.11 standard, and knew of Plaintiffs' allegation of its infringement thereof no later than May 31, 2016, and therefore prior to the filing of this complaint.

38. On information and belief, TI has induced and is inducing infringement of one or more claims of the Patents in Suit under 35 U.S.C. § 271(b), including the claims set forth below. TI actively, knowingly, and intentionally induced and induces infringement of the Patents in Suit by selling, offering to sell and/or importing into the United States the Accused Products after being notified of their infringement by Plaintiffs; with the knowledge and specific intent that third parties, including its customers or downstream consumers, will continue to use, sell, offer for sale, and/or import the Accused Products or products incorporating the Accused Products to infringe the Patents in Suit; and with the knowledge and specific intent to encourage and facilitate the infringement through the dissemination of the Accused Products and/or the creation and dissemination of promotional and marketing materials, supporting materials, instructions, product manuals, technical information, and provision of technical support and/or training relating to the Accused Devices and infringing uses thereof.

39. TI's acts of direct and indirect infringement have independently and collectively caused damage to Plaintiffs, and Plaintiffs are entitled to recover from TI the damages they have has sustained as a result of TI's wrongful acts in an amount subject to proof at trial.

40. TI has actively and knowingly infringed and are infringing the Patents in Suit with knowledge of Plaintiffs' patent rights and without reasonable basis for believing that TI's conduct is lawful. TI's acts of infringement have been and continue to be willful, deliberate, and in reckless disregard of Plaintiffs' patent rights.

41. In the interest of providing detailed averments of infringement, Plaintiffs provide below as to each of the Patents in Suit at least one exemplary claim to demonstrate infringement by the Accused Products. However, the selection of claims and Accused Products are merely exemplary, and should not be considered limiting. Additional infringing products and infringed claims of the Patents in Suit will be disclosed in compliance with the Court's rules and scheduling order.

COUNT I: INFRINGEMENT OF THE '551 PATENT

42. The foregoing paragraphs are incorporated by reference as if fully restated herein.

43. The Accused Products are devices that implement "carrier sense multiple access" ("CSMA") functionality in accordance with at least IEEE standard 802.11n and/or 802.11ac, and in accordance with at least claims 1 and 5 of the '551 Patent. The CSMA functionality allows a transmitting station to determine whether a channel for transmission is in busy or idle state.

44. The '551 Patent is valid and enforceable. The '551 Patent relates to apparatuses and methods for transmitting wireless communication, including transmitting a plurality of wireless packets simultaneously under conditions where multiple channels and/or MIMO capability are present.

45. With respect to claim 1, the Accused Products set a mandatory channel that is always used for transmission. For example, the 802.11n standard defines a distinct "primary channel" and "secondary channel." *E.g.*, 802.11n-2009, 3.240, 3A.61, 11.14. The primary

channel is always used for transmission. *See e.g.*, 802.11n-2009, 11.14.2, 11.14.9. The secondary channel is not always used for transmission. *Id.*

46. The Accused Products further transmit wireless packets by using a wireless channel/wireless channels that includes/include the mandatory channel, only when the mandatory channel is idle. For example, the 802.11n standard requires a transmitting station to first sense whether the primary channel is idle. *E.g.*, 802.11n-2009, 11.14.9. If the primary channel is idle, transmission may occur over the primary channel, or both the primary and secondary channels. *See e.g.*, 3A.29, 3A.34, 11.14.2, 11.14.9, 20.3.7, 20.3.11.11.

47. With respect to claim 5, because the Accused Products implement at least the functionality provided by the 802.11n standard set forth above, they include a unit for setting a mandatory channel, and transmitting wireless packets only when the mandatory channel is idle by using a wireless channel or wireless channels that includes/include the mandatory channel.

48. Thus, for at least the reasons described above, the Accused Products infringe one or more claims of the ’551 Patent, including claims 1 and 5.

49. TI has and continues to directly and indirectly infringe the ’551 Patent, including in the manner set forth in paragraphs 34-40 above.

COUNT II: INFRINGEMENT OF THE ‘781 PATENT

50. The foregoing paragraphs are incorporated by reference as if fully restated herein.

51. The Accused Products are wireless packet communication devices that implement “carrier sense” functionality in accordance with at least IEEE standard 802.11n and/or 802.11ac, and in accordance with at least claim 1 of the ’781 Patent.

52. The ’781 Patent is valid and enforceable. The ’781 Patent relates to apparatuses and methods for wireless communication, and in particular transmitting a plurality of wireless packets simultaneously where multiple wireless channels may be available.

53. With respect to claim 1, the Accused Products provide a physical carrier sense determining a wireless channel to be busy or idle from received power. For example, the 802.11n standard provides for a PHY-CCA that indicates the channel as BUSY in response to received power. *See e.g.*, 802.11n-2009, 20.3.22.5.2.

54. The Accused Products further provide a virtual carrier sense determining a wireless channel to be busy during a set transmission inhibition time. For example, 802.11 provides for a NAV mechanism, which is a virtual carrier sense mechanism. *See e.g.*, 802.11-2007, 9.2.1. The NAV includes a value that reflects the duration of the longest transmission sent on a channel. *See id*.

55. The Accused Products further include a transmit-side station (STA) that sets a transmission inhibition time (Tmax + Ts) to a paired wireless channel other than a wireless channel which requires longest transmission time Tmax among wireless channels used for simultaneous transmission, when an existing set transmission inhibition time for the virtual carrier sense is smaller than the time (Tmax+Ts). For example, the 802.11n standard provides that a transmitting STA may transmit 40 MHz PPDUs or 20 MHz PPDUs during a transmit opportunity. *See e.g.*, 802.11n-2009, 11.14.9. A transmission inhibition time applies to the secondary channel based on a value used in a virtual carrier sense, or NAV vector. In an exemplary scenario, the time Tmax may include to the longest transmission duration of a PPDU, while Ts may include a predetermined duration, such as a duration based on SIFS intervals. *See e.g.*, 802.11-2007, 9.2.5.4

56. Thus, for at least the reasons described above, the Accused Products infringe one or more claims of the ’781 Patent, including claim 1.

57. TI has and continues to directly and indirectly infringe the ’781 Patent, including in the manner set forth in paragraphs 34-40 above.

COUNT III: INFRINGEMENT OF THE ’616 PATENT

58. The foregoing paragraphs are incorporated by reference as if fully restated herein.

59. The Accused Devices are OFDM signal transmitting devices that implement “block acknowledgment” functionality in accordance with at least IEEE standard 802.11n and/or 802.11ac, and in accordance with at least claim 1 of the ‘616 Patent.

60. The ’616 Patent is valid and enforceable. The ’616 patent relates to apparatuses and methods for wireless communication, and in particular to communication of a plurality of packets wherein transmission of data may use MIMO techniques.

61. With respect to claim 1, the Accused Products include predetermined sequence numbers in a plurality of data packets, the predetermined sequence numbers being for distinguishing said plurality of packets from each other. For example, the 802.11n standard defines sequence numbers provided in a sequence number field, and fragment numbers provided in a fragment number field. *See e.g.*, 802.11n, 7.1.3.4.1-2.

62. Further, the Accused Products generate a single acknowledgement (“ACK”) packet which has received a plurality of data packets transmitted using MIMO and transmit the single ACK packet to a transmit-side STA without using MIMO. For example, the 802.11n standard requires implementation of a “BlockAck” feature, which, for example, would not be a MIMO transmission when carried in a non-HT PPDU or in communications with legacy devices. *See e.g.*, 802.11n-2009, 9.10.1-2, 9.6.0e.4. Further, a BlockAck packet contains information that corresponds to a sequence number of a data packet successfully received. *See e.g.*, 802.11-2007, 7.2.1.8.

63. Thus, for at least the reasons described above, the Accused Products infringe one or more claims of the ’616 Patent, including claim 1.

64. TI has and continues to directly and indirectly infringe the ’616 Patent, including in the manner set forth in paragraphs 34-40 above.

COUNT IV: INFRINGEMENT OF THE ’720 PATENT

65. The foregoing paragraphs are incorporated by reference as if fully restated herein.

66. The Accused Products are OFDM signal transmitting and receiving devices that implement “beamforming” functionality in accordance with at least IEEE standard 802.11n and/or 802.11ac, and in accordance with at least claim 18 of the ’720 Patent.

67. The ’720 Patent is valid and enforceable. The ’720 relates to methods, systems and devices for transmitting and receiving OFDM signals. In particular, certain embodiments involve devices comprising multiple receiving and/or transmitting antennas.

68. With respect to claim 18, the Accused Products comprise an OFDM signal transmitting device used in an OFDM signal communication system for transmitting signals over the same radio frequency from the OFDM signal transmitting device comprising a plurality of N transmitting antennas to an OFDM signal device comprising N receiving antennas. For example, the 802.11n standard provides for OFDM transmission over multiple antennas (MIMO). As a further example, the 802.11ac-2013 standard provides for Very High Throughput (“VHT”) transmission using beamforming for SU-MIMO or MU-MIMO.

69. The Accused Products comprise an interference canceller, among an inverse matrix computer, the interference canceller, and a pilot signal generator. For example, the 802.11n standard utilizes an inverse matrix computer to compute a steering matrix Q_k to account for each channel and Gaussian noise. *See, e.g.*, 802.11n-2009, 20.3.12. Further, PLCP training fields are provided by a pilot signal generator. *Id.* at 20.3.4. Similarly, the 802.11ac standard

provides that SU-MIMO and MU-MIMO beamforming utilizes a steering matrix Q_k determined from the beamforming feedback matrix V_k. 802.11ac-2013, 22.3.11. One or more training fields in the VHT PPDU are generated by a pilot signal generator. *See id.* at 22.3.2, 22.3.8.3.4.

70. Further, the inverse matrix computer of the Accused Products computes each of inverse matrices of N-dimensional square matrices for each subcarrier constituted by the propagation coefficients for the respective propagation paths. For example, 802.11n provides that the steering matrix Q_k is comprised of N_{tx} rows and N_{sts} columns, where N_{tx} represents the number of transmit chains, and N_{sts} represents the number of space-time streams. See 802.11n-2009, 20.3.12. The computation is based on channel estimation, including propagation path measurements. *See e.g.*, 203.12.2. The steering matrix provided by 802.11ac operates similarly. *See e.g.*, 802.11ac-2013, 9.29.1-3, 22.3.11. Upon information and belief, details concerning the use of inversion, or equivalents thereof, are implemented in software and/or source code for the Accused Products and may be verified through discovery.

71. Further, the interference canceller of the Accused Products cancels interference components based on the inverse matrix computed by the inverse matrix computer. For example, after computing the steering matrix Q_k, the beamformer provided by 802.11n utilizes an interference canceller to replace the transmitted vector x_k with $Q_k x_k$, such that $y_k = H_k Q_k x_k + n$. *See e.g.*, 802.11n-2009, 20.3.12. A similar method is provided by 802.11ac.

72. The pilot signal generator of the Accused Products generates N kinds of pilot signals for use by the inverse matrix computer to compute the inverse matrix. For example, the 802.11n standard provides for PLCP preamble training fields provided by a pilot signal generator. *See, e.g.*, 802.11n-2009, 20.3.4.a. The 802.11ac standard's training fields are similarly generated by a pilot signal generator. *See, e.g.*, 802.11ac-2013, 22.3.2.

73. The Accused Products comprise a data converter for respectively converting the transmission information signals of N systems into OFDM symbols. For example, the 802.11n standard provides that the stream parser and constellation mapper convert data into OFDM symbols. *See e.g.*, 802.11n-2009, 20.3.11.7. A similar process is provided by 802.11ac. *See e.g.*, 802.11ac-2013, 22.3.3.

74. The Accused Products further comprise an interference canceller, as discussed above, for multiplying the respective subcarriers of the respective OFDM symbols generated by the data converter.

75. The Accused Products comprise inverse fast Fourier transformer circuitry for performing inverse Fourier transformation on the outputs from the interference canceller. *See e.g.*, 802.11n-2009, 20.3.9.4.6; 802.11ac-2013, 22.3.3.

76. The Accused Products comprise transmission frequency converters for converting the frequency band of the output from the inverse fast Fourier transformers into radio frequency. *See e.g.*, 802.11n-2009, 20.3.4.t; 802.11ac-2013, 22.3.4.2.

77. Thus, for at least the reasons described above, the Accused Products infringe one or more claims of the ’720 Patent, including claim 18.

78. TI has and continues to directly and indirectly infringe the ’720 Patent, including in the manner set forth in paragraphs 34-40 above.

JURY DEMAND

Plaintiffs demand a trial by jury on all triable issues in this action.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs respectfully request the following relief:

A. A judgment that the Patents-in-Suit are valid and enforceable;

B. A judgment that Defendant has directly infringed, contributorily infringed, and induced infringement of the Patents-in-Suit;

C. An order awarding Plaintiffs statutory damages and damages according to proof resulting from Defendant's infringement of the Patents-in-Suit, together with prejudgment and post-judgment interest and costs under 35 U.S.C. § 284;

D. An order trebling or otherwise enhancing damages under 35 U.S.C. § 284 in view of the willful and deliberate nature of Defendant's infringement of the Patents-in-Suit;

E. A judgment that this is an exceptional case under 35 U.S.C. § 285 and that Plaintiffs be awarded their costs and attorneys' fees;

F. A judgment that Defendant is an unwilling licensee to the Patents in Suit; and

Any and all other relief as may be available under law and which the Court may deem proper.

Dated: March 25, 2020

Respectfully submitted,

DICKINSON WRIGHT PLLC

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