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UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA
WESTERN DIVISION

SOL IP, LLC,

Plaintiff,

vs.

VINFAST AUTO, LLC; VINFAST USA DISTRIBUTION, LLC; VINGROUP USA, LLC; VINFAST TRADING AND PRODUCTION JSC; and VINFAST AUTO LTD.,

Defendants.

Case No.: 2:24-cv-05959

PLAINTIFF SOL IP, LLC's COMPLAINT FOR PATENT INFRINGEMENT

JURY TRIAL DEMANDED

Plaintiff Sol IP, LLC ("Sol IP") hereby files this Complaint for Patent Infringement under 35 U.S.C. § 271 against Defendants VinFast Auto, LLC; VinFast USA Distribution, LLC; Vingroup USA, LLC; VinFast Trading and Production JSC; and Vinfast Auto Ltd. (collectively, "VinFast" or "Defendants").

BACKGROUND

1. This action arises under the patent laws of the United States, namely 35 U.S.C. §§ 271, 281, and 284-285, among others. Defendants have infringed and continue to infringe Sol IP's patents referenced in Counts One through Five, including U.S. Patent No. 8,320,337 ("the '337 patent"), U.S. Patent No. 8,971,168 ("the '168 patent"), U.S. Patent No. 11,076,383 ("the '383 patent"), U.S. Patent No. 11,363,547 ("the '547 patent"), and U.S. Patent No. 11,425,633 ("the '633 patent") (collectively, "the Asserted Patents").

2. Sol IP holds an exclusive license to more than 600 patents and patent applications that are fundamental to a variety of core technologies relating to wireless telecommunications.

3. The Asserted Patents were invented by researchers at the Electronics and Telecommunications Research Institute ("ETRI").

4. ETRI is a South Korean government-funded research institution based in Daejeon, South Korea. ETRI is the national leader in South Korea in the research and development of information technologies.

5. Since its inception in 1976, ETRI has developed new technologies in 4M DRAM (dynamic random-access memory), LCDs (liquid crystal displays), large-scale computer storage, CDMA (code-division multiple access) communications, 3G CDMA2000, 3G WCDMA (wideband CDMA), 4G WiBro (wireless broadband), 4G LTE (Long-Term Evolution) cellular communications, 5G NR (New Radio) cellular communications, and WLAN (wireless local area networking, or Wi-Fi).

6. ETRI employs over 2,200 research and technical staff, of whom around 90% hold post-graduate degrees and 51% have earned doctorate degrees. Over the five years from 2018 to 2022, ETRI applied for nearly 14,000 patents, contributed more than 3,100 proposals adopted by various international and domestic standards organizations, and published over 1,300 articles in peer-reviewed technology publications. ETRI actively contributed to the development of advanced telecommunications platforms including 3G CDMA2000, 3G WCDMA, LTE, and 5G NR. ETRI has invested heavily into inventing standardized telecommunications technologies, supporting its thousands of research engineers and spending around $600 million KRW annually on research and development. As a result, ETRI has developed one of the industry's strongest intellectual-property portfolios, which includes more than 21,000 patents and patent applications worldwide. *See* https://www.etri.re.kr/file/predicalFile.etri?filename=ETRI_BR_guid_2023.pdf (last visited July 11, 2024) (ETRI 2023 Brochure).

7. ETRI has a long history of innovative technical contributions, including its patents relating to LTE, LTE-Advanced, 5G NR, and Wi-Fi technology. Some of ETRI's other accomplishments include introducing the first domestic all-digital telephone exchange in 1986[1], introducing one of the world's first commercial CDMA networks in 1996[2], developing the IMT 2000 (CDMA2000) STP system in 1999[3], introducing the world's first 4G WiBro network in 2004[4], establishing core technology for the LTE system in 2007[5], and developing core LTE-Advanced technology in 2010.[6]

8. Sol IP holds an exclusive license to the Asserted Patents from ETRI, which transferred to Sol IP all substantial rights in those patents.

9. Sol IP is a licensor in Avanci, LLC's ("Avanci") essential patent licensing platform, and the patents-in-suit are licensable nonexclusively through Avanci's essential patent licensing platform.

10. Sol IP, through its licensing agent Avanci, LLC, has offered a license to the Asserted Patents on FRAND terms, and is prepared to grant a license agreement

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[1] *First Domestic Switchboard TDX*, ETRI 40TH ANNIVERSARY, (last visited July 11, 2024).
[2] *World's First Commercialization of CDMA*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_8.html (last visited July 11, 2024).
[3] *Wideband CDMA Communication System*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_11.html (last visited July 11, 2024); *Overview*, ETRI, (last visited July 11, 2024).
[4] *Mobile Internet System and Standard WiBro*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_20.html (last visited July 11, 2024).
[5] *LTE-Advanced Mobile Telecommunication System*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_31.html (last visited July 11, 2024); *Overview*, ETRI, https://www.etri.re.kr/engcon/sub1/sub1_02.etri (last visited July 11, 2024).
[6] *LTE-Advanced Mobile Telecommunication System*, ETRI 40TH ANNIVERSARY, (last visited July 11, 2024); *Overview*, ETRI, (last visited July 11, 2024).

to Defendant's infringing products on terms and conditions that are fair, reasonable, and non-discriminatory ("FRAND"). Sol IP brings this action because Defendant has not accepted the FRAND offers of Sol IP's licensing agent, but continues to sell products that practice, use, or otherwise comply with the standards covered by the Asserted Patents.

THE PARTIES

11. Sol IP is an intellectual-property licensing company organized and existing as a limited liability company under the laws of Virginia with a principal place of business at 8287 Spring Leaf Court, Vienna, Virginia 22182.

12. Defendant VinFast Auto, LLC is a corporation organized under the laws of Delaware, with its principal place of business at 12777 West Jefferson Boulevard, Suite A-101, Los Angeles, California 90066. *See* VinFast Auto Ltd., Form 20-F at F-12 (04/25/24) (available at https://www.sec.gov/ix?doc=/Archives/edgar/data/0001913510/000110465924051842/vfs-20231231x20f.htm) (last visited July 11, 2024) ("VinFast Form 20-F").

13. Defendant VinFast USA Distribution, LLC is a corporation organized under the laws of Delaware, with its principal place of business at 12777 West Jefferson Boulevard, Suite A-101, Los Angeles, California 90066. VinFast Form 20-F at F-11.

14. Defendant Vingroup USA, LLC is a corporation organized under the laws of Delaware, with its principal place of business at 12777 West Jefferson Boulevard, Suite A-101, Los Angeles, California 90066. VinFast Form 20-F at F-11.

15. Defendant VinFast Trading and Production JSC is a corporation organized under the laws of Vietnam, with its principal place of business at Dinh Vu – Cat Hai Economic Zone Cat Hai Islands, Cat Hai Town, Cat Hai District Hai Phong City, Vietnam. VinFast Form 20-F at F-11.

16. Defendant VinFast Auto Ltd. is a corporation organized under the laws of Singapore, with its principal place of business at Dinh Vu – Cat Hai Economic Zone Cat Hai Islands, Cat Hai Town, Cat Hai District Hai Phong City, Vietnam. VinFast Auto Ltd. is a parent of, or otherwise controls, Defendants VinFast Auto, LLC, VinFast USA Distribution, LLC, Vingroup USA, LLC, and VinFast Trading and Production JSC. VinFast Form 20-F at F-11.

JURISDICTION AND VENUE

17. Sol IP realleges and incorporates each of preceding paragraphs 1–16.

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

19. Each Defendant is subject to this Court's specific and general personal jurisdiction pursuant to due process and/or the California Long Arm Statute, Cal. Code

Civ. Proc § 410.10, due at least to its substantial business conducted in this District, including: (i) having solicited business in the State of California, transacted business within the State of California and attempted to derive financial benefit from residents of the State of California in this District, including benefits directly related to the instant patent infringement causes of action set forth herein; (ii) having placed its products and services into the stream of commerce throughout the United States and having been actively engaged in transacting business in California and in this District, and (iii) having committed the complained of tortious acts in California and in this District.

20. VinFast, directly and/or through subsidiaries and agents (including distributors, retailers, and others), makes, imports, ships, distributes, offers for sale, sells, uses, and advertises (including offering products and services through its website as well as other retailers) its products and/or services in the United States, the State of California, and the Central District of California.

21. VinFast, directly and/or through its subsidiaries and agents (including distributors, retailers, and others), has purposefully and voluntarily placed one or more of its infringing products and/or services, as described below, into the stream of commerce with the expectation that they will be purchased and used by consumers in the Central District of California. These infringing products and/or services have been and continue to be purchased and used by consumers in the Central District of

California. VinFast has committed acts of patent infringement within the State of California and, more particularly, within the Central District of California as evidenced by its principal place of business being located in the Central District of California at 12777 West Jefferson Boulevard, Suite A-101, Los Angeles, California 90066.

22. This Court's exercise of personal jurisdiction over VinFast is consistent with the California Long Arm Statute, Cal. Code Civ. Proc § 410.10, and traditional notions of fair play and substantial justice.

23. Venue is proper in this judicial district under 28 U.S.C. § 1400(b) because, *inter alia*, Defendants VinFast Auto, LLC, VinFast USA Distribution, LLC, and Vingroup USA, LLC have a regular and established place of business in this judicial district, as evidenced by their principal place of business being located in the Central District of California at 12777 West Jefferson Boulevard, Suite A-101, Los Angeles, California 90066, and have committed and continue to commit acts of patent infringement in this judicial district and in the State of California. Venue is proper as to Defendants VinFast Trading and Production JSC and VinFast Auto Ltd., which are resident in foreign countries, under 28 U.S.C. § 1391(c)(3), which provides that "a defendant not resident in the United States may be sued in any judicial district, and the joinder of such a defendant shall be disregarded in determining where the action may be brought with respect to other defendants."

24. Joinder of Defendants is proper under 28 U.S.C. § 299(a) because Defendants are related parties and Plaintiff's right to relief is asserted against them jointly, severally, or in the alternative with respect to or arising out of the same transaction, occurrence, or series of transactions or occurrences relating to the making, using, importing into the United States, offering for sale, or selling of the same accused products, which practice the same features and/or standards, and there are questions of fact common to Defendants.

ACCUSED STANDARDS AND INSTRUMENTALITIES

25. Sol IP realleges and incorporates each of preceding paragraphs 1–24.

26. The 3rd Generation Partnership Project ("3GPP") is a consortium of seven telecommunications-standard-development organizations, also known as organizational partners, from around the world. These 3GPP organizational partners include, among others, the Alliance for Telecommunications Industry Solutions ("ATIS"), which represents North America; the European Telecommunications Standards Institute ("ETSI"), which represents Europe; and the Telecommunications Technology Association ("TTA"), which represents Korea.[7]

[7] *See, e.g.*, *About 3GPP Home*, 3GPP, https://www.3gpp.org/about-3gpp/about-3gpp (last visited July 11, 2024); *Partners*, 3GPP, (last visited July 11, 2024).

27. 3GPP maintains and develops globally applicable technical specifications for mobile systems, including the specifications for implementation and use of wireless communications for high-speed data referred to as the LTE standards.

28. Implementation and use of the LTE standards, including but not limited to wireless communications for high-speed data compliant with the LTE specifications as detailed in the 3GPP specification series TS 36.101–36.978, have increased in recent years and continue to increase at a rapid pace.

29. 3GPP uses a system of parallel "releases" to provide developers with a stable platform for the implementation of features at a given point, which then allows for the addition of new functionality in subsequent releases.[8] In 2008, 3GPP Release 8 was finalized and formed the basis for the deployment of the LTE standards.[9] Subsequent enhancements to the LTE standards were incorporated into later releases. Release 10 was the basis for the deployment of an advanced form of LTE called LTE-Advanced ("LTE-A"), which maintained backwards compatibility with the earlier releases.[10] The main "new technological innovations" introduced in Release 10/LTE-A include "Carrier Aggregation," enhanced use of multi-antenna [MIMO]

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[8] *Releases*, 3GPP, (last visited July 11, 2024).

[9] *Description Releases*, 3GPP, https://www.3gpp.org/ftp/Information/WORK_PLAN/Description_Releases/Previous_versions?sortby=date (last visited July 11, 2024); *see also Overview of LTE 3GPP releases*, CABLEFREE (Dec. 2015), (last visited July 11, 2024).

[10] *See, e.g.*, Intel LTE-Advanced Backgrounder, https://download.intel.com/newsroom/kits/atom/comms/pdfs/LTE-Advanced_backgrounder.pdf (last visited July 11, 2024).

techniques, and "support for Relay Nodes (RN)."[11] Release 11 further provided enhancements to LTE Advanced features, including enhanced downlink control channel (ePDCCH), coordinated multipoint (CoMP) transmission and reception, and user equipment (UE) signaling for discontinuous reception (DRX) to optimize battery consumption.[12]

30. These 3GPP technical specifications, including 3GPP Release 8, Release 10, Release 11, and others, are officially transcribed and published by the respective organizational partners, as a part of their standards series.[13] For North America, the 3GPP technical specifications for LTE are officially published by ATIS.[14] Accordingly, references to 3GPP TS ("technical specifications") in this Complaint should be understood to include the corresponding ATIS documents.

31. VinFast makes, uses, sells, offers for sale, and/or imports into the United States vehicles and/or devices that comply with the LTE standards. VinFast has partnered with T-Mobile "to be the exclusive provider of connectivity for VinFast's smart electric vehicles in North America . . . ."[15] Under the agreement between

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[11] *See, e.g.*, Intel LTE-Advanced Backgrounder, https://download.intel.com/newsroom/kits/atom/comms/pdfs/LTE-Advanced_backgrounder.pdf (last visited July 11, 2024); *see alsoOverview of LTE 3GPP releases*, CABLEFREE (Dec. 2015), (last visited July 11, 2024).

[12] Takehiro Nakamura, *LTE Release 12 and Beyond* 5-6 (3GPP TSG-RAN 2013) https://www.3gpp.org/IMG/pdf/lte_africa_2013_3gpp_lte_release_12.pdf (last visited July 11, 2024); *see also Overview of LTE 3GPP releases*, CABLEFREE (Dec. 2015), https://www.cablefree.net/wirelesstechnology/4glte/overview-of-lte-3gpp-releases/ (last visited July 11, 2024).

[13] *Official Publications*, 3GPP, (last visited July 11, 2024).

[14] *Official Publications*, 3GPP, (last visited July 11, 2024).

[15] *See VinFast Chooses T-Mobile as Exclusive Global Connectivity Provider for Electric Vehicles*, Press Release (Dec. 8, 2022) (available at https://vinfastauto.us/investor-relations/news/vinfast-chooses-t-mobile-as-exclusive-global-connectivity-provider-for) (last visited July 11, 2024) ("VinFast-T-Mobile Press Release").

VinFast and T-Mobile, "T-Mobile will provide connectivity for VinFast's electric vehicles in North America and Europe, including the VF 6, VF 7, VF 8 and VF 9."[16] T-Mobile offers "connectivity for all" including by "delivering an advanced 4G LTE . . . network."[17]

32. By way of example, and on information and belief, VinFast's products with LTE and/or LTE-Advanced (collectively, "4G" or "LTE") connectivity ("VinFast LTE Products") include, but are not limited to, all products incorporating VF Connect, including VF Standard Connect and/or VF Prime Connect, including but not limited to the VinFast's VF 6, VF 7, VF 8 and VF 9 vehicles.[18]

33. The VinFast LTE Products are further operable with the VinFast App which "serves as a comprehensive hub for all maintenance and charging needs" and is "a one-stop solution designed to enhance convenience and accessibility for every driver."[19] The VinFast App includes a number of features, such as, e.g., "theft alert"

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[16] *Id*.
[17] *Id*.
[18] *See, e.g.*, VF9 Specification Sheet (available at https://static-cms-prod.vinfastauto.us/cms-vinfast-us/Specs/VF-9-Spec.pdf?_gl=1*goevrh*_gcl_au*MTQ4MzM1NjMwNC4xNzE4ODM1NzEz*_ga*MzI1MTU4MzIyLjE3MTg4MzU3MTM.*_ga_YLJ2NQJGE4*MTcxODkxOTQ4My4zLjEuMTcxODkxOTk0My4zNC4wLjA) (last visited July 11, 2024) ("VF 9 Spec."); VF 8 Specification Sheet (available at https://static-cms-prod.vinfastauto.us/cms-vinfast-us/Specs/VF-8-Spec.pdf?_gl=1*yxu6n6*_gcl_au*MTQ4MzM1NjMwNC4xNzE4ODM1NzEz*_ga*MzI1MTU4MzIyLjE3MTg4MzU3MTM.*_ga_YLJ2NQJGE4*MTcxODkxOTQ4My4zLjEuMTcxODkyMDI5OS41My4wLjA.) (last visited July 11, 2024); VF 7 Specification Sheet (available at https://static-cms-prod.vinfastauto.us/cms-vinfast-us/Specs/VF-7-Spec.pdf?_gl=1*c2orze*_gcl_au*MTQ4MzM1NjMwNC4xNzE4ODM1NzEz*_ga*MzI1MTU4MzIyLjE3MTg4MzU3MTM.*_ga_YLJ2NQJGE4*MTcxODkxOTQ4My4zLjEuMTcxODkyMDM0MS4xMS4wLjA.) (last visited July 11, 2024); VF 6 Specification Sheet (available at https://static-cms-prod.vinfastauto.us/cms-vinfast-us/Specs/VF-6-Spec.pdf?_gl=1*uhnqpk*_gcl_au*MTQ4MzM1NjMwNC4xNzE4ODM1NzEz*_ga*MzI1MTU4MzIyLjE3MTg4MzU3MTM.*_ga_YLJ2NQJGE4*MTcxODkxOTQ4My4zLjEuMTcxODkyMDM2Ni41NC4wLjA.) (last visited July 11, 2024); *see also* VinFast-T-Mobile Press Release.
[19] *See*, e.g., *VinFast Service Page* (available at https://vinfastauto.us/service) (last visited July 11, 2024).

and "Remote vehicle access" that are enabled in part by the wireless modem for LTE connectivity included in each of the VinFast LTE Products.[20]

34. "Accused Products" in this case refers to any products, including the VinFast LTE Products, that are made, used, offered for sale, sold, or imported by VinFast and support LTE features in accordance with at least 3GPP Release 8 and Release 10.

ASSERTED PATENTS

35. Sol IP realleges and incorporates each of preceding paragraphs 1–34.

36. As a member of TTA, ETRI declared that the intellectual property rights reflected in the Asserted Patents or their applications or patent families may be or may become standard-essential to certain telecommunications standards, including the LTE standards.

37. Sol IP, through its licensing agent Avanci, LLC, has offered a license to the Asserted Patents on FRAND terms since at least as early as August 2022.

38. To date, VinFast has not agreed to license Sol IP's Patents on fair, reasonable, and non-discriminatory terms.

39. Sol IP and its predecessors in interest to the Asserted Patents complied with the requirements of 35 U.S.C. § 287.

[20] *See*, e.g., *VinFast App* (https://apps.apple.com/us/app/vinfast/id6444273385) (last visited July 11, 2024).

COUNT ONE

INFRINGEMENT OF U.S. PATENT NO. 8,320,337

40. Sol IP realleges and incorporates each of preceding paragraphs 1–40.

41. On November 27, 2012, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,320,337 B2 ("the '337 patent"), titled "Method and apparatus for transmitting ACK/NACK."

42. Sol IP is the exclusive licensee of the '337 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

43. The '337 patent is valid and enforceable.

44. VinFast, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the '337 patent, including at least claim 11,[21] by making, using, selling, offering for sale, and/or importing into the United States the Accused Products that practice the subject matter claimed in the '337 patent without authority, either literally and/or under the doctrine of equivalents.

[21] Throughout this Complaint, wherever Sol IP identifies specific claims of the Asserted Patents infringed by VinFast, Sol IP expressly reserves the right to identify additional claims and products in its infringement contentions in accordance with applicable local rules and the Court's case management orders. Specifically identified claims throughout this Complaint are provided for notice pleading only.

45. VinFast makes, uses, sells, offers for sale, and/or imports the Accused Products, which are configured to implement at least the features of 3GPP Release 8, thereby infringing at least claim 11 of the '337 patent.

46. The preamble of claim 11 of the '337 patent recites "[a] non-transitory computer-readable recording medium storing a program for implementing a method of receiving ACK or NACK information." To the extent the preamble limits the claim, each Accused Product includes a non-transitory computer-readable recording medium storing a program for implementing a method of receiving ACK or NACK information.

47. Claim 11 of the '337 patent further provides that the method comprises the step of "receiving cyclic shift information for a reference signal from a base station." As recited in claim 11 of the '337 patent and in accordance with at least 3GPP Release 8, TS 36.212 Section 5.3.3, each Accused Product incorporates a medium storing a program for implementing the step of receiving cyclic shift information for reference signal from the base station, including for example by receiving the cyclic shift for DMRS field in DCI format 0. *See* 3GPP TS 36.212, V8.8.0, §5.3.3.

48. Claim 11 of the '337 patent recites the step of "transmitting, to the base station, the data and a reference signal having a cyclic shift value, the cyclic shift value being determined based on a dynamic cyclic shift value mapped one-to-one to the cyclic shift information for the reference signal, wherein the cyclic shift information

for the reference signal is mapped one-to-one to the dynamic cyclic shift value according to Table 9." The referenced "Table 9" is as follows:

TABLE 9

Cyclic shift information for reference signal	Dynamic cyclic shift value
000	0
001	6
010	3
011	4
100	2
101	8
110	10
111	9.

As recited in claim 11 of the '337 patent and in accordance with at least 3GPP Release 8, TS 36.211 Sections 5.1.1, 5.1.2, 5.3, 5.5, 5.5.1, and 5.5.2, each Accused Product incorporates a medium storing a program for implementing the step of transmitting, to the base station, the data and a reference signal having a cyclic shift value, the cyclic shift value being determined based on a dynamic cyclic shift value mapped one-to-one to the cyclic shift information for the reference signal, wherein the cyclic shift information for the reference signal is mapped one-to-one to the dynamic cyclic shift value according to Table 9. For example, each Accused Product transmits data on a PUSCH, with the claimed reference signal corresponding to the demodulation reference signal, DMRS, for PUSCH, and the cyclic shift value corresponding to cyclic shift α in the standard. The dynamic cyclic shift value in the claim corresponds to $n_{\mathrm{DMRS}}^{(2)}$ in the standard. Table 1 in the standard corresponds to Table 5.5.2.1.1-1 in the standard. *See* 3GPP TS 36.211 V8.9.0, §§ 5.1.1, 5.1.2, 5.3, 5.5, 5.5.1, and 5.5.2.

49. Claim 11 of the '337 patent recites the step of "receiving, from the base station, ACK or NACK information about the transmitted data through a radio resource of a downlink channel, the radio resource of the downlink channel being identified based on a modifier mapped one-to-one to the cyclic shift information for the reference signal." As recited in claim 11 of the '337 patent and in accordance with at least 3GPP Release 8, TS 36.211 Sections 6.1.1, 6.9, and TS 36.213 Section 9.1.2, each Accused Product incorporates a medium storing a program for implementing the step of receiving, from the base station, ACK or NACK information about the transmitted data through a radio resource of a downlink channel, the radio resource of the downlink channel being identified based on a modifier mapped one-to-one to the cyclic shift information for the reference signal. For example, each Accused Product receives ACK/NACK information with the radio resource of the downlink channel being identified based on the modifier identified as n_{DMRS} in the standard. *See* 3GPP TS 36.211 V8.9.0, §§ 6.1.1 and 6.9; 3GPP TS 36.213 V8.8.0, § 9.1.2 and Table 9.1.2-2.

COUNT TWO

INFRINGEMENT OF U.S. PATENT NO. 8,971,168

50. Sol IP realleges and incorporates each of preceding paragraphs 1–49.

51. On March 3, 2015, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,971,168 B2 ("the '168 patent"), titled "Carrier aggregation in wireless communications systems."

52. Sol IP is the exclusive licensee of the '168 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

53. The '168 patent is valid and enforceable.

54. VinFast, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the '168 patent, including at least claim 11, by making, using, selling, offering for sale, and/or importing into the United States the Accused Products that practice the subject matter claimed in the '168 patent without authority, either literally and/or under the doctrine of equivalents.

55. VinFast makes, uses, sells, offers for sale, and/or imports the Accused Products, which are configured to implement at least the features of 3GPP Release 10, thereby infringing at least claim 11 of the '168 patent.

56. The preamble of claim 11 of the '168 patent recites "[a] user equipment (UE)." To the extent the preamble limits the claim, each Accused Product comprises a user equipment (UE). *See, e.g.*, 3GPP TS 36.211 V10.1.0, §§ 5.1.1, 5.4, 3GPP TS 36.212 V10.0.0, § 5.2.3, 3GPP TS 36.213 V10.1.0, §§ 10.1, 10.1.1.

57. Claim 11 of the '168 patent recites "a processor configured to multiply a plurality of data symbols with a first scrambling sequence and a first orthogonal sequence; to map the data symbols multiplied by the first scrambling sequence and the first orthogonal sequence to a first slot." As recited in claim 11 of the '168 patent and in accordance with at least 3GPP Release 10, TS 36.211 Sections 5.4 and 5.4.2A, each Accused Product comprises a processor configured to multiply a plurality of data symbols with a first scrambling sequence and a first orthogonal sequence and to map the data symbols multiplied by the first scrambling sequence and the first orthogonal sequence to a first slot. For example, each Accused Product multiplies the modulation symbols d(i) in the standard by a first scrambling sequence, which is $e^{j\pi\lfloor n_{cs}^{cell}(n_s,l)/64\rfloor/2}$ in the standard, and a first orthogonal sequence ,which is $w_{n_{oc},0}^{(\tilde{p})}(\bar{n})$ in the standard, and maps them to a first slot when $n < N_{SF,0}^{PUCCH}$. *See* 3GPP TS 36.211 V10.1.0, § 5.4 and 5.4.2A.

58. Claim 11 of the '168 patent recites further that the processor is configured "to multiply a plurality of data symbols with a second scrambling sequence and a second orthogonal sequence" and "to map the data symbols multiplied by the second scrambling sequence and the second orthogonal sequence to a second slot." As recited in claim 11 of the '168 patent and in accordance with at least 3GPP Release 10, TS 36.211 Sections 5.4 and 5.4.2A, each Accused Product comprises a processor configured to multiply a plurality of data symbols with a second scrambling sequence

and a second orthogonal sequence and to map the data symbols multiplied by the second scrambling sequence and the second orthogonal sequence to a second slot. For example, each Accused Product multiplies modulation symbols $d(N_{sc}^{RB}+i)$ by a second scrambling sequence $e^{j\pi\lfloor n_{cs}^{cell}(n_s,l)/64\rfloor/2}$ and second orthogonal sequence $w_{n_{oc},1}^{(\tilde{p})}(\overline{n})$, and maps the modulation symbols to a second slot when $n \geq N_{SF,0}^{PUCCH}$. *See* 3GPP TS 36.211 V10.1.0, § 5.4 and 5.4.2A.

59. Claim 11 of the '168 patent recites "a transmitter configured to transmit the first slot and the second slot to a base station." As recited in claim 11 of the '168 patent and in accordance with at least 3GPP Release 10, TS 36.211 Sections 5.4, 5.4.2A, and 5.4.3, each Accused Product comprises a transmitter configured to transmit the first slot and the second slot to a base station. *See* 3GPP TS 36.211 V10.1.0, § 5.4, 5.4.2A, 5.4.3.

60. Claim 11 of the '168 patent further provides that "the first slot includes five DFT-S-OFDM symbols to transmit the data symbols and the second slot includes four DFT-S-OFDM symbols to transmit the data symbols." As recited in claim 11 of the '168 patent and in accordance with at least 3GPP Release 10, TS 36.211 Sections 4, 4.1, 5.2, 5.2.1, 5.2.2, 5.2.3, 5.4.2A, 3GPP TS 36.300 Section 5.2.1, in each Accused Product the first slot includes five DFT-S-OFDM symbols to transmit the data symbols and the second slot includes four DFT-S-OFDM symbols to transmit the data symbols. For example, in an LTE subframe using shortened PUCCH format 3, the

first slot sends the data mapped to the first slot on 5 symbols, and data mapped to the second slot on 4 symbols. *See* 3GPP TS 36.211 V10.1.0, §§ 4, 4.1, 5.2, 5.2.1, 5.2.2, 5.2.3, 5.4.2A; 3GPP TS 36.300 V8.12.0, §5.2.1.

61. Claim 11 of the '168 patent further provides that "the first orthogonal sequence is selected from orthogonal sequences listed in Table 3 and the second orthogonal sequence is selected from orthogonal sequences listed in Table 4" and "the sequence index of the first orthogonal sequence is the same as the sequence index of the second orthogonal sequence."

TABLE 3

Sequence Index	DFT Sequence
0	[1 1 1 1 1]
1	[1 $e^{j2\pi/5}$ $e^{j4\pi/5}$ $e^{j6\pi/5}$ $e^{j8\pi/5}$]
2	[1 $e^{j4\pi/5}$ $e^{j8\pi/5}$ $e^{j12\pi/5}$ $e^{j16\pi/5}$]
3	[1 $e^{j6\pi/5}$ $e^{j12\pi/5}$ $e^{j18\pi/5}$ $e^{j24\pi/5}$]

TABLE 4

Sequence Index	Walsh Sequence
0	[1 1 1 1]
1	[1 −1 1 −1]
2	[1 1 −1 −1]
3	[1 −1 −1 1].

As recited in claim 11 of the '168 patent and in accordance with at least 3GPP Release 10, TS 36.211 Section 5.4.2A, in each Accused Product the first and second orthogonal sequences are selected from Table 5.4.2A-1 in the standard, which corresponds to Tables 1 and 2 in the claim, and for the shortened PUCCH format 3 the sequence index for the first slot, $n_{oc,0}^{(\tilde{p})}$, is used to derive the sequence index for the

second slot, $n_{oc,1}^{(\tilde{p})}$, using the relationship $n_{oc,1}^{(\tilde{p})} = n_{oc,0}^{(\tilde{p})} \bmod 4$. Because $n_{oc,0}^{(\tilde{p})}$ can only take the values 0 to 3, it holds that $n_{oc,1}^{(\tilde{p})} = n_{oc,0}^{(\tilde{p})}$. *See* 3GPP TS 36.211 V10.1.0, § 5.4.2A.

COUNT THREE

INFRINGEMENT OF U.S. PATENT NO. 11,076,383

62. Sol IP realleges and incorporates each of preceding paragraphs 1–61.

63. On July 27, 2021, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 11,076,383 B2 ("the '383 patent"), titled "Method for paging information in cellular system."

64. Sol IP is the exclusive licensee of the '383 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

65. The '383 patent is valid and enforceable.

66. VinFast, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the '383 patent, including at least claim 17, by making, using, selling, offering for sale, and/or importing into the United States the Accused Products that practice the subject matter claimed in the '383 patent without authority, either literally and/or under the doctrine of equivalents.

67. VinFast makes, uses, sells, offers for sale, and/or imports the Accused Products, which are configured to implement at least the features of 3GPP Release 8, thereby infringing at least claim 17 of the '383 patent.

68. The preamble of claim 17 of the '383 patent recites "[a]n apparatus for wireless communication." To the extent the preamble limits the claim, each Accused Product is an apparatus for wireless communication.

69. Claim 17 of the '383 patent recites "a circuitry." Each Accused Product includes one or more circuitries, wherein the one or more circuitries are configured to implement at least the features of 3GPP Release 8.

70. Claim 17 of the '383 patent recites that "the circuitry is configured to" "cause the apparatus to receive at least a part of a frame, wherein (a) the frame consists of a plurality of transmission time intervals (TTI) including a first TTI, (b) the first TTI comprises a control channel and a shared channel, (c) first information is received at the apparatus through the control channel of the first TTI, and (d) at least a portion of the first information identifies physical layer radio resources." As recited in claim 17 of the '383 patent and in accordance with at least 3GPP Release 8, TS 36.300 Section 5, TS 36.213 Section 7.1, TS 36.321 Section 5.5, TS 36.212 Section 5.3.3, each Accused Product includes circuitry to cause the apparatus to receive at least a part of a frame, wherein (a) the frame consists of a plurality of transmission time intervals (TTI) including a first TTI, (b) the first TTI comprises a control channel and a shared channel, (c) first information is received at the apparatus through the control channel of the first TTI, and (d) at least a portion of the first information identifies physical layer radio resources. For example, the TTI in the claim corresponds to a

subframe in the standard, the first information in the claim corresponds to the Downlink Control Information (DCI) in the standard, the control channel in the claim corresponds to the Physical Downlink Control Channel (PDCCH) in the standard, the shared channel in the claim corresponds to the Physical Downlink Shared Chanel (PDSCH) in the standard, and the physical layer radio resources in the claim correspond to PDSCH resources for paging messages in the standard. *See* 3GPP TS 36.300 V8.12.0, § 5, 3GPP TS 36.213 V8.8.0, § 7.1, 3GPP TS 36.321 V8.10.0, § 5.5, 3GPP TS 36.212, § 5.3.3.

71. Claim 17 of the '383 patent recites that "the circuitry is configured to" "determine that an identifier is used in the first information." As recited in claim 17 of the '383 patent and in accordance with at least 3GPP Release 8, TS 36.213 Section 7.1, TS 36.321 Section 5.5 and 7.1, and Table 7.1-2: RNTI usage, each Accused Product includes circuitry to determine that an identifier is used in the first information. For example, the identifier in the claim corresponds to P-RNTI in the standard. *See* 3GPP TS 36.213 V8.8.0, § 7.1, 3GPP TS 36.321 V8.10.0, § 5.5, 7.1, and Table 7.1-2.

72. Claim 17 of the '383 patent recites that "the circuitry is configured to" "cause the apparatus to obtain paging information transmitted through the shared channel in the first TTI in response to determining that the identifier is used in the first information, wherein (a) the paging information is obtained without determining

whether or not the paging information is intended for the user equipment, and (b) the paging information is obtained based on the physical layer radio resources identified by the portion of the first information." As recited in claim 17 of the '383 patent and in accordance with at least 3GPP Release 8, TS 36.331 Sections 5.3.2, 6.2.2, TS 36.213 Section 7.1, TS 36.321 Section 5.5, 7 and Table 7.1-2: RNTI usage, TS 36.212 Section 5.3.3.1.3, each Accused Product includes circuitry to cause the apparatus to obtain paging information transmitted through the shared channel in the first TTI in response to determining that the identifier is used in the first information, wherein (a) the paging information is obtained without determining whether or not the paging information is intended for the user equipment, and (b) the paging information is obtained based on the physical layer radio resources identified by the portion of the first information. For example, according to the standard, the UE obtains, without determining whether or not the paging information (paging message) is intended for the user equipment (UE), the paging information transmitted through the shared channel in the subframe (paging message on the PDSCH) in response to the identifier (P-RNTI) being used in the first information (processed DCI). The paging information (paging message) is obtained based on the physical layer radio resources indicated by the portion of the first information (PDSCH resources for paging messages indicated within the processed DCI scrambled by the P-RNTI). As part of the paging procedure, the UE searches for a P-RNTI within the PDCCH. For example,

the UE searches for processed Downlink Control Information (DCI), such as, for example, DCI format 1A, which have had their CRC bits scrambled by the P-RNTI. DCI format 1A is transmitted on the PDCCH, and allocates PDSCH resources to, among other things, the PCH. Multiple UEs share the same P-RNTI; the UE does not determine whether or not the paging information is intended for that UE. *See* 3GPP TS 36.331 V8.16.0, §§ 5.3.2, 6.2.2, 3GPP TS 36.213 V8.8.0, § 7.1, 3GPP TS 36.321 V8.10.0, § 5.5, 7 and Table 7.1-2, 3GPP TS 36.212 V8.8.0, § 5.3.3.1.3.

COUNT FOUR

INFRINGEMENT OF U.S. PATENT NO. 11,363,547

73. Sol IP realleges and incorporates each of preceding paragraphs 1–72.

74. On June 14, 2022, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 11,363,547 B2 ("the '547 patent"), titled "Cell search method, forward link frame transmission method, apparatus using the same and forward link frame structure."

75. Sol IP is the exclusive licensee of the '547 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

76. The '547 patent is valid and enforceable.

77. VinFast, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the '547 patent, including at least claim 7, by making,

using, selling, offering for sale, and/or importing into the United States the Accused Products that practice the subject matter claimed in the '547 patent without authority, either literally and/or under the doctrine of equivalents.

78. VinFast makes, uses, sells, offers for sale, and/or imports the Accused Products, which are configured to implement at least the features of 3GPP Release 8, thereby infringing at least claim 7 of the '547 patent.

79. The preamble of claim 7 of the '547 patent recites "[a]n apparatus for a terminal." To the extent the preamble limits the claim, each Accused Product comprises an apparatus for a terminal.

80. Claim 7 of the '547 patent recites "a circuitry" "wherein the circuitry is configured to" "cause the terminal to receive at least a part of a frame, wherein the frame consists of twenty units including a first unit and a second unit, wherein the first unit comprises a first set of Orthogonal Frequency Division Multiplexing (OFDM) symbols including a first OFDM symbol and a second OFDM symbol, the second unit comprises a second set of OFDM symbols including a third OFDM symbol and a fourth OFDM symbol, the first OFDM symbol comprises a first primary synchronization signal, the second OFDM symbol comprises a first secondary synchronization signal, the third OFDM symbol comprises the first primary synchronization signal and the fourth OFDM symbol comprises a second secondary synchronization signa." As recited in claim 7 of the '547 patent and in accordance

with at least 3GPP Release 8, TS 36.211 Section 4, 4.1, 6.2.2, 6.11.1, 6.11.2.2, each Accused Product comprises circuitry configured to cause the terminal to receive at least a part of a frame, wherein the frame consists of twenty units including a first unit and a second unit, wherein the first unit comprises a first set of Orthogonal Frequency Division Multiplexing (OFDM) symbols including a first OFDM symbol and a second OFDM symbol, the second unit comprises a second set of OFDM symbols including a third OFDM symbol and a fourth OFDM symbol, the first OFDM symbol comprises a first primary synchronization signal, the second OFDM symbol comprises a first secondary synchronization signal, the third OFDM symbol comprises the first primary synchronization signal and the fourth OFDM symbol comprises a second secondary synchronization signal. For example, the claimed unit corresponds to a slot in the standard, the first unit in the claim corresponds to slot 0, and the first OFDM symbol in the claim corresponds to the last OFDM symbol in slot 0 in the standard. The first secondary synchronization signal in the claim corresponds to the secondary synchronization signal in slot 0 in the standard, the second OFDM symbol in the claim corresponds to the next to last OFDM symbol in slot 0 in the standard, and the second unit in the claim corresponds to slot 10 in the standard. The third OFDM symbol in the claim corresponds to the last OFDM symbol in slot 10 in the standard. The second secondary synchronization signal in the claim corresponds to the secondary synchronization signal in slot 10 in the standard. The fourth OFDM symbol in the

claim corresponds to the next to last OFDM symbol in slot 10 in the standard. *See* 3GPP TS 36.211 V8.9.0, §§ 4, 4.1, 6.2.2, 6.11.1, 6.11.2.2.

81. Claim 7 of the '547 patent recites that the circuitry is further configured to "determine a first identifier based on the first primary synchronization signal." As recited in claim 7 of the '547 patent and in accordance with at least 3GPP Release 8, TS 36.213 Section 4.1, TS 36.211 Sections 6.11, 6.11.1, each Accused Product comprises circuitry configured to determine a first identifier based on the first primary synchronization signal. For example, the first identifier in the claim corresponds to the physical-layer identity within a physical-layer cell-identity group $N_{ID}^{(2)}$ in the standard. *See* 3GPP TS 36.213 V8.8.0, § 4.1, 3GPP TS 36.211 V8.9.0, §§ 6.11 and 6.11.1.

82. Claim 7 of the '547 patent recites the circuitry is further configured to "determine a second identifier based on one of the first secondary synchronization signal and the second secondary synchronization signal" and "determine a cell identifier based on the first identifier and the second identifier." As recited in claim 7 of the '547 patent and in accordance with at least 3GPP Release 8, TS 36.213 Section 4.1, TS 36.211 Sections 6.11, 6.11.2, 6.11.2.1, each Accused Product comprises circuitry configured to determine a second identifier based on one of the first secondary synchronization signal and the second secondary synchronization signal and determine a cell identifier based on the first identifier and the second identifier.

For example, the second identifier in the claim corresponds to the physical-layer cell-identity group $N_{ID}^{(1)}$ in the standard, and the cell identifier in the claim corresponds to the physical-layer cell identity N_{ID}^{cell} in the standard. *See* 3GPP TS 36.213 V8.8.0, § 4.1, 3GPP TS 36.211 V8.9.0, §§ 6.11, 6.11.2, and 6.11.2.1.

83. Claim 7 of the '547 patent recites that "the first secondary synchronization signal and the second secondary synchronization signal are different, the first OFDM symbol comprising the first primary synchronization signal and the second OFDM symbol comprising the first secondary synchronization signal are last two OFDM symbols of the first unit, the third OFDM symbol comprising the first primary synchronization signal and the fourth OFDM symbol comprising the second secondary synchronization signal are last two OFDM symbols of the second unit, the first OFDM symbol comprises a first set of subcarriers ranging from a first subcarrier to a second subcarrier and the second OFDM symbol comprises a second set of subcarriers ranging from a third subcarrier to a fourth subcarrier; the first primary synchronization signal occupies the first set of subcarriers and the first secondary synchronization signal occupies the second set of subcarriers; and both the first subcarrier and the third subcarrier occupy a first frequency and both the second subcarrier and fourth subcarrier occupy a second frequency." As recited in claim 7 of the '547 patent and in accordance with at least 3GPP Release 8, TS 36.211 Sections 6.11.1.1, 6.11.1.2, 6.11.2.1, and 6.11.2.2, in each Accused Product, for example, the

first secondary synchronization signal and the second secondary synchronization signal are different, the first OFDM symbol comprising the first primary synchronization signal and the second OFDM symbol comprising the first secondary synchronization signal are last two OFDM symbols of the first unit, the third OFDM symbol comprising the first primary synchronization signal and the fourth OFDM symbol comprising the second secondary synchronization signal are last two OFDM symbols of the second unit, the first OFDM symbol comprises a first set of subcarriers ranging from a first subcarrier to a second subcarrier and the second OFDM symbol comprises a second set of subcarriers ranging from a third subcarrier to a fourth subcarrier; the first primary synchronization signal occupies the first set of subcarriers and the first secondary synchronization signal occupies the second set of subcarriers; and both the first subcarrier and the third subcarrier occupy a first frequency and both the second subcarrier and fourth subcarrier occupy a second frequency. *See* 3GPP TS 36.211 V8.9.0, §§ 6.11.1, 6.11.1.2, 6.11.2.1, and 6.11.2.2.

COUNT FIVE

INFRINGEMENT OF U.S. PATENT NO. 11,425,633

84. Sol IP realleges and incorporates each of preceding paragraphs 1–83.

85. On August 23, 2022, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 11,425,633 B2 ("the '633 patent"), titled "Generating downlink frame and searching for cell."

86. Sol IP is the exclusive licensee of the '633 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

87. The '633 patent is valid and enforceable.

88. VinFast, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the '633 patent, including at least claim 8, by making, using, selling, offering for sale, and/or importing into the United States the Accused Products that practice the subject matter claimed in the '633 patent without authority, either literally and/or under the doctrine of equivalents.

89. VinFast makes, uses, sells, offers for sale, and/or imports the Accused Products, which are configured to implement at least the features of 3GPP Release 8, thereby infringing at least claim 8 of the '633 patent.

90. The preamble of claim 8 of the '633 patent recites "[a] mobile station." To the extent the preamble limits the claim, each Accused Product comprises a mobile station.

91. Claim 8 of the '633 patent recites "a circuitry which is configured to" "cause the mobile station to receive at least a part of a first frame comprising a first primary synchronization signal and a first secondary synchronization signal, wherein the first secondary synchronization signal comprises a first sequence scrambled with a first scrambling sequence and a second sequence scrambled with a second

scrambling sequence and a third scrambling sequence." As recited in claim 8 of the '633 patent and in accordance with at least 3GPP Release 8, TS 36.213 Section 4.1, TS 36.211 Sections 6.11.1.1 and 6.11.2.1, each Accused Product comprises circuitry configured to cause the mobile station to receive at least a part of a first frame comprising a first primary synchronization signal and a first secondary synchronization signal, wherein the first secondary synchronization signal comprises a first sequence scrambled with a first scrambling sequence and a second sequence scrambled with a second scrambling sequence and a third scrambling sequence. For example, the first sequence in the claim corresponds to $s_0^{(m0)}(n)$ in the standard and the first scrambling sequence in the claim corresponds to $c_0(n)$ in the standard. The second sequence in the claim corresponds to $s_1^{(m1)}(n)$ in the standard, and the second scrambling sequence in the claim corresponds to $c_1(n)$ in the standard. The third scrambling sequence in the claim corresponds to $z_1^{(m0)}(n)$ in the standard. *See* 3GPP TS 36.213 V8.8.0 (2009-09), § 4.1, 3GPP TS 36.211 V8.9.0, § 6.11.1.1, 6.11.2.1.

92. Claim 8 of the '633 patent recites that the circuitry is further configured to "determine a cell identifier at least based on the first primary synchronization signal, the first sequence and the second sequence" and "identify a cell at least based on the cell identifier." As recited in claim 8 of the '633 patent and in accordance with at least 3GPP Release 8, TS 36.211 Sections 6.11, 6.11.1, 6.11.2.1, each Accused Product comprises circuitry configured to determine a cell identifier at least based on the first

primary synchronization signal, the first sequence, and the second sequence and identify a cell at least based on the cell identifier. *See* 3GPP TS 36.211 V8.9.0, §§ 6.11, 6.11.1, 6.11.2.1.

93. Claim 8 of the '633 patent recites that the circuitry is further configured to "cause the mobile station to receive at least a part of a second frame from the cell." As recited in claim 8 of the '633 patent and in accordance with at least 3GPP Release 8, TS 36.213 Section 4.1, each Accused Product comprises circuitry configured to cause the mobile station to receive at least a part of a second frame from the cell. For example, after performing the cell search using the primary and secondary synchronization signals, a UE in LTE performs normal operations, including receiving a second frame. *See* 3GPP TS 36.213 V8.8.0, § 4.1.

PRAYER FOR RELIEF

WHEREFORE, Sol IP respectfully requests that the Court enter judgment in its favor on the claims set forth above and respectfully requests the following relief:

A. Entry of judgment that VinFast has infringed the '337, '168, '383, '546, and '633 patents, and continues to do so.

B. Entry of judgment against VinFast, awarding Sol IP damages adequate to compensate Sol IP for VinFast's infringement of the '337, '168, '383, '546, and '633 patents, and for any continuing or future infringement through the date such judgment is entered, including pre-judgment interest and post-judgment interest,

costs, and expenses, as well as an accounting and award of damages against VinFast for all future infringing acts occurring after the date such judgment is entered; and

C. Entry of judgment in favor of Sol IP granting any further or additional relief the Court deems just and proper.

DEMAND FOR JURY TRIAL

Sol IP demands a trial by jury of any and all issues triable of right before a jury pursuant to Fed. R. Civ. P. 38(b).

Dated: July 16, 2024

Respectfully submitted,

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