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

SOL IP, LLC,	)	
	)	
Plaintiff,	)	
	)	Case No. 2:22-cv-00097
v.	)	
	)	
FORD MOTOR COMPANY,	)	
	)	**JURY TRIAL DEMANDED**
Defendant.	)	
	)	

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Sol IP, LLC ("Sol IP") files this Complaint for Patent Infringement under 35 U.S.C. § 271 against Defendant Ford Motor Company ("Ford" or "Defendant").

Plaintiff states on information and belief as follows:

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. Defendant infringes and has infringed Sol IP's patents referenced in Counts One through Five, including U.S. Patent No. 10,938,534 ("the '534 patent"), U.S. Patent No. 10,231,211 ("the '211 patent"), U.S. Patent No. 10,932,298 ("the '298 patent"), U.S. Patent No. 8,320,571 ("the '571 patent"), and U.S. Patent No. 10,148,477 ("the '477 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 91% hold post-graduate degrees and 49% have earned technological doctorate degrees. Over the last five years, ETRI has applied for nearly 14,000 patents, contributed more than 5,300 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 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.

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. Prior to filing this Complaint, Sol IP provided Ford with notice of the Asserted Patents. For example, Sol IP sent Ford a written communication identifying the Asserted Patents by their patent number and/or the application number that resulted in the Asserted Patents. The communication also included details of Ford's infringement of the Asserted Patents.

10. 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.

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[1] *First Domestic Switchboard TDX*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_3.html (last visited Mar. 31, 2022).
[2] *World's First Commercialization of CDMA*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_8.html (last visited Mar. 31, 2022).
[3] *Wideband CDMA Communication System*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_11.html (last visited Mar. 31, 2022); *Overview*, ETRI, https://www.etri.re.kr/engcon/sub1/sub1_02.etri (last visited Mar. 31, 2022).
[4] *Mobile Internet System and Standard WiBro*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_20.html (last visited Mar. 31, 2022).
[5] *LTE-Advanced Mobile Telecommunication System*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_31.html (last visited Mar. 31, 2022); *Overview*, ETRI, https://www.etri.re.kr/engcon/sub1/sub1_02.etri (last visited Mar. 31, 2022).
[6] *LTE-Advanced Mobile Telecommunication System*, ETRI 40TH ANNIVERSARY, https://www.etri.re.kr/40th/eng/sub04_31.html (last visited Mar. 31, 2022); *Overview*, ETRI, https://www.etri.re.kr/engcon/sub1/sub1_02.etri (last visited Mar. 31, 2022).

11. Sol IP, through its agent Avanci, has offered to license the patents-in-suit to Ford on FRAND terms and conditions as part of the joint license offered by the 2G/3G/4G connected vehicles licensing program administered by the Avanci essential patent licensing platform, which includes almost 50 licensors. Other automakers have taken licenses from Avanci on the same terms per connected vehicle that has been offered to Ford, including but not limited to Volkswagen, Seat, Skoda, BMW, Audi, Porsche, Volvo, Jaguar Land Rover, Mercedes Benz, Daimler Truck, Aston Martin, Scania, MAN, and Volvo Group. In all, more than thirty automotive brands are Avanci licensees.

12. Sol IP brings this lawsuit against Ford seeking this Court's protection of its valuable intellectual property rights.

PARTIES

13. Sol IP realleges and incorporates each of preceding paragraphs 1–12.

14. 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.

15. Defendant Ford Motor Company is a corporation organized and existing under the laws of the State of Delaware. Ford Motor Company may be served with process through its registered agent, CT Corporation System, 1999 Bryan St., Ste. 900, Dallas, TX 75201-3136.

16. Upon information and belief, Ford conducts business, either directly or through one or more of its subsidiaries, agents, affiliates, and/or intermediaries, in this judicial district and elsewhere in the United States, including, without limitation, making, using, offering to sell, selling, and/or importing products containing integrated wireless communications devices that embody the patented technology, and enabling end-user purchasers to use such connected vehicles throughout the United States, including this judicial district.

JURISDICTION AND VENUE

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

18. This patent infringement action arises under the United States Patent Laws, Title 35 U.S.C. §§ 1, et seq. This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

19. This Court has personal jurisdiction over Ford because Ford has minimum contacts with Texas and this district such that this venue is a fair and reasonable one. Ford conducts substantial business in this forum, including (i) engaging in the infringing conduct alleged herein and (ii) regularly doing or soliciting business, engaging in other persistent courses of conduct, and/or deriving substantial revenue from goods and services in Texas and this district, as described below.

20. Venue is proper in this district under 28 U.S.C. §§ 1391(b) and (c) and 1400(b).

21. On information and belief, Ford has committed infringing acts in this district by using, offering for sale, and/or selling products that infringe the Asserted Patents in this district. In addition, Ford has induced infringement by others in this district. For example, Ford has induced end users to use products that infringe the Asserted Patents in this district. In addition, Ford has induced car dealerships (to the extent they are not agents of Ford) in this district to sell and offer to sell infringing products.

22. Ford maintains a regular and established place of business in this district. For example, Ford maintains its Central Market Area Office at 5700 Granite Parkway, Suite 1000, Plano, Texas 75024, which is in this district. Ford is listed in the online directory for the Granite Park development at this address.[7] Ford has previously described this office as "the principal

[7] https://www.granitepark.com/directory/ (last visited Mar. 31, 2022).

office of Ford in the State of Texas." *See Ford Motor Co. v. Johnson*, 473 S.W.3d 925, 927 (Tex. Ct. App. 2015). Collin County property records confirm that Ford maintains significant amounts of commercial personal property at this office. *See* Ex. A. On information and belief, Ford has a number of employees that work at this location. Moreover, Ford has a number of employees that are located in this district. For example, on information and belief, Tim Witt is the General Manager of Ford's Central Market Area Office and resides in Frisco, Texas, which is in this district. Mr. Witt explains that his job includes "Sales, Marketing, Fixed Operations responsibility for 750 Ford and Lincoln Dealers." Ex. B.

23. In addition, Ford maintains regular and established places of business in this district through its authorized dealerships, which act as agents for Ford for the purposes of conducting Ford's business, including, at least, selling cars (including infringing cars) to consumers and performing warranty services. On information and belief, one such dealership is Marshall Ford, located at 4200 East End Blvd. S., Marshall, Texas 75672.

24. On information and belief, every Ford dealership must be authorized by Ford. Once authorized, Ford controls the way in which the dealership performs Ford's business.

25. For example, Ford establishes the geographic location in which each dealership is required to operate and requires that each dealership sell cars and parts and offer warranty services in that location. Moreover, each Ford dealership is an agent of Ford tasked with, among other things, assessing warranty claims and performing work on behalf of Ford pursuant to the warranties. Ford directs and controls the guidelines with which each Ford dealership evaluates warranty claims. Throughout the warranty process, Ford has control over the evaluation of the warranty claims. On information and belief, Ford has final control over whether a warranty claim is honored or refused. Ford consents to the dealers acting as its agents by requiring that warranty

repair work be completed by an authorized Ford dealer.[8] The Ford dealerships consent to their role in administering the vehicle warranties by, among other things, holding themselves out as authorized Ford dealers and by operating repair facilities that honor and process the vehicle warranties and submit claims to Ford.

26. Ford requires its dealerships to maintain specific levels of inventory of Ford vehicles and parts, and requires the use of Ford advertising and sales materials. Ford also requires dealerships to distribute Ford publications with the sale of each vehicle and to perform any dealer responsibilities listed in such publications.

27. Each dealer must maintain a service department for Ford vehicles that operates in accordance with standards and procedures established by Ford (known as customer service bulletins) and uses tools, equipment, and machinery in accordance with guidelines established by Ford. In addition, each dealer must perform warranty services in accordance with Ford's warranty and procedures promulgated by Ford (in, at least, the Warranty and Policy Manual and any customer service bulletins). When performing warranty services, Ford requires that each dealership use specific parts that are provided by Ford and that the dealership prioritize warranty services over other service work. Ford reimburses the dealership for the parts and labor used in performing warranty services.

28. Ford also requires its dealerships to maintain facilities in accordance with guidelines promulgated by Ford, and Ford provides its own personnel to advise dealerships regarding dealership facilities. Each dealership must maintain signs consistent with Ford

[8] *Where can I get warranty work done for my Ford?*, FORD.COM, https://www.ford.com/support/how-tos/warranty/warranties-and-coverage/where-do-i-get-warranty-work-performed/ (last visited Mar. 31, 2022).

guidelines. Ford prohibits dealerships from moving or substantially modifying dealership facilities without Ford's prior written consent.

29. Ford requires each dealership to employ and train personnel, and provides assistance to each dealership in determining personnel requirements. Ford requires each dealership to cause its personnel to attend training schools or courses conducted by Ford.

30. Ford requires that each dealership use an accounting system that complies with Ford's accounting procedures.

31. Ford holds out Ford authorized dealerships as its own. For example, Ford maintains a dealership locator on its Ford-branded website that allows a user to locate Ford dealerships at https://www.ford.com/dealerships/.

32. In light of the significant control that Ford exercises over its authorized dealerships, Ford authorized dealerships act as agents of Ford and are properly deemed places of business of Ford.

ACCUSED STANDARDS AND INSTRUMENTALITIES

33. Sol IP realleges and incorporates each of preceding paragraphs 1–32.

34. 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.[9]

[9] *See, e.g.*, *About 3GPP Home*, 3GPP, https://www.3gpp.org/about-3gpp/about-3gpp (last visited Mar. 31, 2022); *Partners*, 3GPP, https://www.3gpp.org/about-3gpp/partners (last visited Mar. 31, 2022).

35. 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.

36. 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.

37. 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.[10] In 2008, 3GPP Release 8 was finalized and formed the basis for the deployment of the LTE standards.[11] 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.[12] The "main new functionalities" introduced in Release 10 are "Carrier Aggregation (CA)," "enhanced use of multi-antenna [MIMO] techniques," and "support for Relay Nodes (RN)."[13] Release 11 further provided enhancements to LTE Advanced features, including enhanced downlink control channel (ePDCCH), coordinated multipoint (CoMP) transmission and

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[10] *Releases*, 3GPP, https://www.3gpp.org/specifications/releases (last visited Mar. 31, 2022).
[11] *LTE*, 3GPP, https://www.3gpp.org/technologies/keywords-acronyms/98-lte (last visited Mar. 31, 2022); *see also Overview of LTE 3GPP releases*, CABLEFREE (Dec. 2015), https://www.cablefree.net/wirelesstechnology/4glte/overview-of-lte-3gpp-releases/ (last visited Mar.31, 2022).
[12] *LTE-Advanced*, 3GPP, https://www.3gpp.org/technologies/keywords-acronyms/97-lte-advanced (last visited Mar. 31, 2022).
[13] *LTE-Advanced*, 3GPP, https://www.3gpp.org/technologies/keywords-acronyms/97-lte-advanced (last visited Mar. 31, 2022); *see also Overview of LTE 3GPP releases*, CABLEFREE (Dec. 2015), https://www.cablefree.net/wirelesstechnology/4glte/overview-of-lte-3gpp-releases/ (last visited Mar. 31, 2022).

reception, and user equipment (UE) signaling for discontinuous reception (DRX) to optimize battery consumption.[14]

38. These 3GPP technical specifications, including 3GPP Release 8, Release 10, Release 11, and others, are officially transposed and published by the respective organizational partners, as a part of their standards series.[15] For North America, the 3GPP technical specifications for LTE are officially published by ATIS.[16] Accordingly, references to 3GPP TS ("technical specifications") in this Complaint should be understood to include the corresponding ATIS documents.

39. Ford makes, uses, sells, offers for sale and/or imports into the United States connected vehicles and devices that comply with the LTE standards. Ford states that its Sync Connect service "allows Ford owners to stay connected to their vehicles in a way they've never been able to before. This available built-in technology—powered by a 4G LTE modem and the AT&T network—connects owners to their vehicles through FordPass™ on their smartphones."[17] On information and belief, Sync Connect is now known as FordPass Connect.[18]

40. By way of example, on information and belief, Ford's products with LTE and/or LTE-Advanced (collectively, "4G" or "LTE") connectivity (the "Ford LTE Products") are

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[14] 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 Mar. 31, 2022); *see also Overview of LTE 3GPP releases*, CABLEFREE (Dec. 2015), https://www.cablefree.net/wirelesstechnology/4glte/overview-of-lte-3gpp-releases/ (last visited Mar. 31, 2022).

[15] *Official Publications*, 3GPP, https://www.3gpp.org/specifications/63-official-publications (last visited Mar. 31, 2022).

[16] *Official Publications*, 3GPP, https://www.3gpp.org/specifications/63-official-publications (last visited Mar. 31, 2022).

[17] *https://www.ford.com/support/how-tos/sync/getting-started-with-sync/sync-connect-overview/* (last visited Mar. 31, 2022)

[18] *FordPass*, FORD.COM, https://www.ford.com/support/category/fordpass/ (last visited Mar. 31, 2022).

believed to include, but are not limited to, all products with Sync Connect, FordPass Connect, or Lincoln Connect. On information and belief, such products include, but are not limited to, the Ford Bronco, Ford Edge, Ford Mustang Mach-E, Ford Expedition, Ford F-150, Ford F-150 Lightning, Ford Super Duty, Ford Transit, Ford Transit CC-CA, Ford E-Transit, Ford EcoSport, Ford Escape, Ford Bronco Sport, Ford Explorer, Ford Maverick, Ford Ranger, Ford Transit Connect, Ford Mustang, Ford Fusion, Ford Fusion Hybrid, Lincoln Aviator, Lincoln Continental, Lincoln Corsair, Lincoln MKZ, Lincoln Nautilus, and Lincoln Navigator.[19] [20]

41. On information and belief, each of the Ford LTE Products includes a 4G LTE modem that enables Ford LTE Products and their users to transmit and receive data over cellular networks including LTE and LTE-A.

42. On information and belief, the Ford LTE Products include a factory-installed integrated in-vehicle communications system referred to as FordPass Connect™, SYNC® Connect, and/or Lincoln Connect™. Ford's webpage demonstrates that vehicles equipped with FordPass Connect™, SYNC® Connect, and/or Lincoln Connect™ include a touchscreen that indicates when the vehicle is connected to a cellular network.[21] Ford's website further states that software updates to the system with FordPass Connect™, SYNC® Connect, and/or Lincoln

[19] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022); FordPass Connect Reference Guide, https://pictures.dealer.com/billcolwellfordfd/7a1277d70a0e0ca3664f2f8f0e02ad54.pdf (last visited Mar. 31, 2022).
[20] *How does Lincoln Connect work?*, LINCOLN.COM, https://www.lincoln.com/support/how-tos/lincoln-way-app/lincoln-connect/how-does-lincoln-connect-work/ (last visited Mar. 31, 2022).
[21] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022).

Connect™ are automatically delivered to the vehicle wirelessly (or over-the-air). These wireless software updates are made over the cellular network, including LTE and LTE-A.[22]

43. On information and belief, the Ford LTE Products are operable with Ford's FordPass or Lincoln Way mobile application (collectively, "Ford's Mobile App"). Ford's Mobile App works in conjunction with the FordPass Connect™, SYNC© Connect, and/or Lincoln Connect™ system to provide users the ability to remotely control their vehicles, for example, to remotely start their vehicle, locate their vehicle, and lock or unlock their vehicle. On information and belief, such remote functionality of Ford's Mobile App is enabled in part by the wireless modem included in each of the Ford's LTE Products.[23] [24]

44. "Accused LTE Products" refer to any products, including Ford LTE Products, equipped with an embedded LTE modem, that are made, used, offered for sale, sold, or imported by Ford and support LTE features in accordance with at least 3GPP Release 8 and Release 10, excluding any devices subject to a license, covenant not to sue, or standstill for the applicable Asserted Patents.

NOTICE OF THE ASSERTED PATENTS

45. Sol IP realleges and incorporates each of preceding paragraphs 1–44.

46. At least as early as June 7, 2021, Ford was on notice of Sol IP's patent portfolio, including the Asserted Patents, when Sol IP sent Ford a letter (the "Notice Letter"). The Notice Letter provided a list of Sol IP's LTE Patents.

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[22] *The Future of Vehicle Technology with Ford Power-Up Software Updates*, FORD.COM, https://www.ford.com/support/how-tos/sync/sync-updates/the-future-of-vehicle-technology-with-ford-power-up-software-updates/ (last visited Mar. 31, 2022).

[23] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022).

[24] *How does Lincoln Connect work?*, LINCOLN.COM, https://www.lincoln.com/support/how-tos/lincoln-way-app/lincoln-connect/how-does-lincoln-connect-work/ (last visited Mar. 31, 2022)

47. The Notice Letter stated: "We believe that all LTE-capable Products - including any products equipped with an embedded LTE modem - made, used, offered for sale, sold, or imported by your company infringe at least one or more of the claims of each of Sol IP's LTE Patents listed in the Attachment." An attachment to the Notice Letter lists, among others, the patents referenced in this Complaint by patent number and/or the application number resulting in such patent or from which such patent was later derived. The Notice Letter further stated that Sol IP "hereby offer[s] a license under Sol IP's LTE Patents … on fair, reasonable, and non-discriminatory terms, and are willing to negotiate the details with your company." Ford did not respond to the Notice Letter.

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

49. 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.

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

COUNT ONE
INFRINGEMENT OF U.S. PATENT NO. 10,938,534

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

52. On March 2, 2021, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 10,938,534 ("the '534 patent"), titled "Carrier Aggregation in Wireless Communication Systems." A true and correct copy of the '534 patent is attached as Exhibit C.

53. Sol IP is the exclusive licensee of the '534 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

54. The ’534 patent is valid and enforceable.

55. Ford, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the ’534 patent, including at least claim 17, by making, using, selling, offering for sale, and/or importing into the United States the Accused LTE Products that practice the subject matter claimed in the ’534 patent without authority, either literally and/or under the doctrine of equivalents.

56. Ford makes, uses, sells, offers for sale, and/or imports the Accused LTE Products, which are configured to implement at least the features of 3GPP Release 10, thereby infringing at least claim 17 of the ’534 patent.

57. The preamble of claim 17 of the ’534 patent recites “[a] device for a terminal.” To the extent the preamble limits the claim, each Accused LTE Product is a device for a terminal.

58. Claim 17 of the ’534 patent recites “a circuitry.” Each Accused LTE Product includes one or more circuitries, wherein the one or more circuitries are configured to implement at least the features of 3GPP Release 10. For example, the Accused LTE Products include a 4G embedded processor comprising such circuitry.[25]

59. Claim 17 of the ’534 patent recites that the circuitry is configured to “cause the terminal to generate a first set of bits based on first data.” As recited in claim 17 of the ’534 patent and in accordance with at least 3GPP Release 10, TS 36.212 Section 5.2.3, each Accused LTE Product includes one or more circuitries configured to cause the terminal to generate a first set of

[25] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022); FordPass Connect Reference Guide, https://pictures.dealer.com/billcolwellfordfd/7a1277d70a0e0ca3664f2f8f0e02ad54.pdf (last visited Mar. 31, 2022).

bits $b(0),...,b(M_{\text{bit}}-1)$ based on first data for transmitting uplink control information on a physical uplink control channel (PUCCH). *See, e.g.*, 3GPP TS 36.212 V10.0.0 § 5.2.3.

60. Claim 17 of the '534 patent recites that the circuitry is configured to "cause the terminal to generate a first set of complex-valued symbols based on the first set of bits." As recited in claim 17 of the '534 patent and in accordance with at least 3GPP Release 10, TS 36.211 Section 5.4.2A, each Accused LTE Product includes one or more circuitries configured to cause the terminal to generate a first block of complex-valued modulation symbols $d(0),...,d(M_{\text{symb}}-1)$ based on the first set of bits $b(0),...,b(M_{\text{bit}}-1)$. *See, e.g.*, 3GPP TS 36.211 V10.1.0 § 5.4.2A.

61. Claim 17 of the '534 patent recites that the circuitry is configured to "determine a first sequence index." As recited in claim 17 of the '534 patent and in accordance with at least 3GPP Release 10, TS 36.211 Section 5.4.2A, each Accused LTE Product includes one or more circuitries configured to determine a first sequence index $n_{\text{oc},0}^{(\tilde{p})}$. *See, e.g.*, 3GPP TS 36.211 V10.1.0 § 5.4.2A.

62. Claim 17 of the '534 patent recites that the circuitry is configured to "cause the terminal to obtain one of a first set of orthogonal sequences based on the first sequence index." As recited in claim 17 of the '534 patent and in accordance with at least 3GPP Release 10, TS 36.211 Section 5.4.2A, each Accused LTE Product includes one or more circuitries configured to cause the terminal to obtain one of a first set of orthogonal sequences $w_{n_{oc},0}^{(\tilde{p})}(i)$ based on the first sequence index $n_{\text{oc},0}^{(\tilde{p})}$. *See, e.g.*, 3GPP TS 36.211 V10.1.0 (2011-03) § 5.4.2A.

63. Claim 17 of the '534 patent recites that the circuitry is configured to "multiply each of the first set of complex-valued symbols by the one of the first set of orthogonal sequences and a first set of complex numbers to generate a first set of symbols." As recited in claim 17 of the '534 patent and in accordance with at least 3GPP Release 10, TS 36.211 Section 5.4.2A, each

Accused LTE Product includes one or more circuitries configured to multiply each of the first block of complex-valued modulation symbols d(0),...,d(M_{symb} −1) by one of the first set of orthogonal sequences $w_{n_{oc},0}^{(\tilde{p})}(i)$ and a first set of complex numbers $e^{j\pi\lfloor n_{cs}^{cell}(n_s,l)/64\rfloor/2}$, to generate a first set of symbols. *See, e.g.*, 3GPP TS 36.211 V10.1.0 (2011-03) § 5.4.2A.

64. Claim 17 of the '534 patent recites that the circuitry is configured to "cause the terminal to generate a subframe comprising the first set of symbols." As recited in claim 17 of the '534 patent and in accordance with at least 3GPP Release 10, TS 36.211 Sections 4, 4.1 and 5.4.3, each Accused LTE Product includes one or more circuitries configured to cause the terminal to map $z^{(\tilde{P})}(i)$ to resource elements for transmission of PUCCH, which uses one resource block in each of the two slots in a subframe. *See, e.g.*, 3GPP TS 36.211 V10.1.0 (2011-03) §§ 4, 4.1, 5.4.3.

65. Claim 17 of the '534 patent recites that the circuitry is configured to "cause the terminal to transmit the subframe to a base station, wherein: the subframe comprises a first slot; the first slot comprises the first set of symbols; each of the first set of complex numbers has a same amplitude; and each of the first set of complex numbers is generated based on a cell identifier (cell ID)." As recited in claim 17 of the '534 patent and in accordance with at least 3GPP Release 10, TS 36.211 Sections 5.4.2A, 5.4.3, and 5.4, each Accused LTE Product includes one or more circuitries configured to cause the terminal to transmit the PUCCH format 3 to a base station. *See, e.g.*, 3GPP TS 36.211 V10.1.0 §§ 5.4.2A, 5.4.3, 5.4. As recited in claim 17 of the '534 patent and in accordance with at least 3GPP Release 10, TS 36.211 Sections 4, 4.1, and 5.4.2A, the subframe comprises a first slot, and the first slot comprises the first set of symbols when $n < N_{SF,0}^{PUCCH}$. *See, e.g.*, 3GPP TS 36.211 V10.1.0 §§ 4-4.1, 5.4.2A. As recited in claim 17 of the '534 patent and in accordance with at least 3GPP Release 10, TS 36.211 Section 5.4, each of the first set of complex numbers $e^{j\pi\lfloor n_{cs}^{cell}(n_s,l)/64\rfloor/2}$ has the same amplitude, and each of the first set of complex numbers

$e^{j\pi\lfloor n_{cs}^{cell}(n_s,l)/64\rfloor/2}$ uses a cell-specific cyclic shift $n_{cs}^{cell}(n_s, l)$, which is generated based on a pseudorandom sequence $c(i)$ initialized with a cell identifier (N_{ID}^{cell}). *See, e.g.*, 3GPP TS 36.211 V10.1.0 § 5.4.

66. Ford has indirectly infringed and continues to indirectly infringe at least claim 17 of the '534 patent under 35 U.S.C. § 271(b), either literally and/or under the doctrine of equivalents, by actively inducing others, including OEMs, agent-subsidiaries, affiliates, partners, software and hardware providers, manufacturers, system integrators, distributors, importers, resellers, customers, end users, and/or other third parties, in this district and elsewhere in the United States, to directly infringe the '534 patent.

67. Ford indirectly infringes by inducing third parties (e.g., end users) to infringe at least claim 17 of the '534 patent by using the LTE capabilities of the Accused LTE Products in their normal and customary way in the United States and in this district. Ford also indirectly infringes by inducing third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) to infringe at least claim 17 of the '534 patent by offering for sale and selling the Accused LTE Products. For example, Ford actively induces third parties, including without limitation end-users of the Accused LTE Products and dealerships (to the extent not agents of Ford) that sell and offer to sell the Accused LTE Products, to infringe the '534 patent by, among other things, (i) designing, manufacturing, offering for sale, selling, or otherwise providing the Accused LTE Products to third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) with the knowledge and intent that the third parties will sell the Accused LTE products to end users; (ii) designing and manufacturing the Accused LTE Products with the knowledge and intent that end-users will use the LTE capabilities of such devices in accordance with the LTE standards; (iii) enabling end-users of Accused LTE Products to use the devices in accordance with at least

the LTE standards; (iv) providing instructions to end-users for using the Accused LTE Products in their customary way, including instructions on using the cellular connectivity features of the devices; (v) providing cellular connectivity, remote diagnosis, and important firmware updates for the Accused LTE Products over cellular networks; (vi) enabling users to monitor and control their Accused LTE Product over cellular networks using Ford's Mobile App; (vii) sending notifications for events and enabling end-users to receive notifications over cellular networks; (viii) advertising compliance of the Accused LTE Products with at least the LTE standards; and (ix) providing to third parties the hardware components (e.g., antenna(s), filter(s), switch(es), transceiver(s), and/or baseband processor(s) contained in Accused LTE Products) and software components (e.g., operating systems running on Accused LTE Products and other software and/or firmware used to operate components of the Accused LTE Product) that may be required for or associated with infringement of the '534 patent.

68. Ford encourages end-users and dealerships to infringe at least claim 17 of the '534 patent with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties. On information and belief, despite having knowledge of the '534 patent at least as early as the receipt of the Notice Letter, Ford has and will continue to engage in activities constituting inducement of such direct infringement, notwithstanding its knowledge, or willful blindness thereto, that the activities it induces result in infringement of the '534 patent. Ford is aware that the Accused LTE Products are manufactured to comply with the LTE standards, and that the subsequent sale, offer for sale, and use of the LTE capabilities of such devices in the United States would result in direct infringement of at least claim 17 of the '534 patent. On information and belief, the LTE capabilities of the Accused LTE Products cannot be operated in their normal and customary way without complying with the LTE standards. Therefore, Ford is aware that at

least the end-users of its Accused LTE Products will infringe the '534 patent by using the LTE capabilities of those devices in their ordinary and customary way in accordance with the LTE standards. Ford is also aware that dealerships that offer for sale and sell the Accused LTE Products will infringe the '477 patent via such offers for sale and sales.

69. Ford has also indirectly infringed and continues to indirectly infringe at least claim 17 of the '534 patent under 35 U.S.C. § 271(c), either literally and/or under the doctrine of equivalents, by contributing to the infringement of the '534 patent by others.

70. Despite having knowledge of the '534 Patent, Ford has provided the Accused LTE Products to others (e.g., end users and dealerships), knowing that the Accused LTE Products include proprietary hardware components and software instructions that work in concert to perform specific, intended functions. Such specific intended functions, carried out by these hardware and software combinations, are a material part of the inventions of the '534 patent and are not staple articles of commerce suitable for substantial non-infringing use. Specifically, each of the Accused LTE Products contains at least a baseband processor and associated transceiver that are specifically programmed and/or configured to implement the functionality described in paragraphs 57-65.

71. Ford has been on notice of the '534 patent since at least as early as the receipt of the Notice Letter. Additionally, Ford has been on notice of the '534 patent since at least as early as the service of this Complaint. Ford's continued actions of making, using, selling, offering for sale, and/or importing into the United States any of the Accused LTE Products after receiving the Notice Letter and/or service of the Complaint, have been with Ford's knowledge of the '534 patent, knowledge of infringement of the '534 patent, intent to encourage others to infringe the '534 patent through sale, offer for sale, and use of the Accused LTE Products, knowledge that Ford's

encouraging acts actually result in direct infringement of the '534 patent by others in the United States, and knowledge that Ford's actions contribute to the direct infringement of the '534 patent by others in the United States.

72. Ford's infringement of the '534 patent has been and continues to be deliberate and with willful disregard of the '534 patent.

COUNT TWO
INFRINGEMENT OF U.S. PATENT NO. 10,231,211

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

74. On March 12, 2019, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 10,231,211 ("the '211 patent"), titled "Method for Paging Information in Cellular System." A true and correct copy of the '211 patent is attached as Exhibit D.

75. Sol IP is the exclusive licensee of the '211 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

76. The '211 patent is valid and enforceable.

77. Ford, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the '211 patent, including at least claim 29, by making, using, selling, offering for sale, and/or importing into the United States the Accused LTE Products that practice the subject matter claimed in the '211 patent without authority, either literally and/or under the doctrine of equivalents.

78. Ford makes, uses, sells, offers for sale, and/or imports the Accused LTE Products, which are configured to implement at least the features of 3GPP Release 8, thereby infringing at least claim 29 of the '211 patent.

79. The preamble of claim 29 of the '211 patent recites "[a] communication apparatus." To the extent the preamble limits the claim, each Accused LTE Product is a communication apparatus.

80. Claim 29 of the '211 patent recites "a memory." Each Accused LTE Product includes one or more memories. For example, the Accused LTE Products include a 4G embedded processor that requires a memory to operate.[26]

81. Claim 29 of the '211 patent recites "at least one processor coupled to the memory." Each Accused LTE Product includes one or more processors operably coupled to the one or more memories, wherein the one or more processors are configured to implement at least the features of 3GPP Release 8. For example, the Accused LTE Products include a 4G embedded processor that is coupled to the memory.[27] The 4G embedded processor implements the features of 3GPP Release 8, as evidenced by its ability to connect to the LTE network.

82. Claim 29 of the '211 patent recites that the processor is configured to "cause the apparatus to receive first information through a control channel in a subframe, wherein the subframe comprises the control channel and a shared channel and at least a portion of the first information indicates physical layer radio resources." As recited in claim 29 of the '211 patent and in accordance with at least 3GPP Release 8, TS 36.213 Section 7.1, each Accused LTE Product includes one or more processors configured to cause the apparatus to receive a processed downlink

[26] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022); FordPass Connect Reference Guide, https://pictures.dealer.com/billcolwellfordfd/7a1277d70a0e0ca3664f2f8f0e02ad54.pdf (last visited Mar. 31, 2022).

[27] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022); FordPass Connect Reference Guide, https://pictures.dealer.com/billcolwellfordfd/7a1277d70a0e0ca3664f2f8f0e02ad54.pdf (last visited Mar. 31, 2022).

control information (DCI) through a physical downlink control channel (PDCCH). *See, e.g.*, 3GPP TS 36.213 V8.8.0 § 7.1. As recited in claim 29 of the '211 patent and in accordance with at least 3GPP Release 8, TS 36.300 Section 5, a subframe of a physical layer downlink comprises a PDCCH and a physical downlink shared channel (PDSCH). *See, e.g.*, 3GPP TS 36.300 V8.12.0 § 5. As recited in claim 29 of the '211 patent and in accordance with at least 3GPP Release 8, TS 36.212 Sections 5.3.3, 5.3.3.1, and 5.3.3.2, and TS 36.321 Section 5.5, at least a portion of the fields within the processed DCI indicates PDSCH resources for paging messages. *See, e.g.*, 3GPP TS 36.321 V8.10.0 § 5.5, 3GPP TS 36.212 V8.8.0 §§ 5.3.3, 5.3.3.1, 5.3.3.2.

83. Claim 29 of the '211 patent recites that the processor is configured to "determine that an identifier is used in the first signal, wherein the identifier indicates that paging information is transmitted through the shared channel in the subframe." As recited in claim 29 of the '211 patent and in accordance with at least 3GPP Release 8, TS 36.321 Section 7.1, each Accused LTE Product includes one or more processors configured to determine that a paging radio network temporary identifier (P-RNTI) is used in the processed DCI, wherein the P-RNTI indicates that the paging message is transmitted through PDSCH. *See, e.g.*, 3GPP TS 36.321 V8.10.0 § 7.1.

84. Claim 29 of the '211 patent recites that the processor is configured to "cause the apparatus to obtain, without determining whether or not the paging information is intended for the apparatus, the paging information transmitted through the shared channel in the subframe in response to the identifier being used in the first information, wherein the paging information is obtained based on the physical layer radio resources indicated by the portion of the first information." As recited in claim 29 of the '211 patent and in accordance with at least 3GPP Release 8, TS 36.213 Section 7.1 and TS 36.321 Section 7.1, each Accused LTE Product includes one or more processors configured to cause the apparatus to obtain, without determining whether

or not the paging message is intended for the apparatus, a paging message on the PDSCH in response to the P-RNTI being used in the processed DCI. *See, e.g.*, 3GPP TS 36.213 V8.8.0 § 7.1; 3GPP TS 36.321 V8.10.0 § 7.1; *see also* 3GPP TS 36.331 V8.16.0 § 6.2.2 (The paging message is used for the notification of one or more UEs.). As recited in claim 29 of the '211 patent and in accordance with at least 3GPP Release 8, TS 36.213 Section 7.1 and TS 36.212 Section 5.3.3.1.3, the paging message is obtained based on the PDSCH resources for paging messages indicated within the processed DCI with cyclic redundancy check (CRC) scrambled by the P-RNTI. *See, e.g.*, 3GPP TS 36.212 V8.8.0 § 5.3.3.1.3; 3GPP TS 36.213 V8.8.0 § 7.1.

85. Ford has indirectly infringed and continues to indirectly infringe at least claim 29 of the '211 patent under 35 U.S.C. § 271(b), either literally and/or under the doctrine of equivalents, by actively inducing others, including OEMs, agent-subsidiaries, affiliates, partners, software and hardware providers, manufacturers, system integrators, distributors, importers, resellers, customers, end users, and/or other third parties, in this district and elsewhere in the United States, to directly infringe the '211 patent.

86. Ford indirectly infringes by inducing third parties (e.g., end users) to infringe at least claim 29 of the '211 patent by using the LTE capabilities of the Accused LTE Products in their normal and customary way in the United States and in this district. Ford also indirectly infringes by inducing third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) to infringe at least claim 29 of the '211 patent by offering for sale and selling the Accused LTE Products. For example, Ford actively induces third parties, including without limitation end-users of the Accused LTE Products and dealerships that sell and offer to sell the Accused LTE Products (to the extent not agents of Ford), to infringe the '211 patent by, among other things, (i) designing, manufacturing, offering for sale, selling, or otherwise providing the Accused LTE

Products to third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) with the knowledge and intent that the third parties will sell the Accused LTE products to end users; (ii) designing and manufacturing the Accused LTE Products with the knowledge and intent that end-users will use the LTE capabilities of such devices in accordance with the LTE standards; (iii) enabling end-users of Accused LTE Products to use the devices in accordance with at least the LTE standards; (iv) providing instructions to end-users for using the Accused LTE Products in their customary way, including instructions on using the cellular connectivity features of the devices; (v) providing cellular connectivity, remote diagnosis, and important firmware updates for the Accused LTE Products over cellular networks; (vi) enabling users to monitor and control their Accused LTE Products over cellular networks using Ford's Mobile App; (vii) sending notifications for events and enabling end-users to receive notifications over cellular networks; (viii) advertising compliance of the Accused LTE Products with at least the LTE standards; and (ix) providing to third parties the hardware components (e.g., antenna(s), filter(s), switch(es), transceiver(s), and/or baseband processor(s) contained in Accused LTE Products) and software components (e.g., operating systems running on Accused LTE Products and other software and/or firmware used to operate components of the Accused LTE Product) that may be required for or associated with infringement of the '211 patent.

87. Ford encourages end-users and dealerships to infringe at least claim 29 of the '211 patent with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties. On information and belief, despite having knowledge of the '211 patent at least as early as the receipt of the Notice Letter, Ford has and will continue to engage in activities constituting inducement of such direct infringement, notwithstanding its knowledge, or willful blindness thereto, that the activities it induces result in infringement of the '211 patent. Ford is

aware that the Accused LTE Products are manufactured to comply with the LTE standards, and that the subsequent sale, offer for sale, and use of the LTE capabilities of such devices in the United States would result in direct infringement of at least claim 29 of the '211 patent. On information and belief, the LTE capabilities of the Accused LTE Products cannot be operated in their normal and customary way without complying with the LTE standards. Therefore, Ford is aware that at least the end-users of its Accused LTE Products will infringe the '211 patent by using the LTE capabilities of those devices in their ordinary and customary way in accordance with the LTE standards. Ford is also aware that dealerships that offer for sale and sell the Accused LTE Products will infringe the '211 patent via such offers for sale and sales.

88. Ford has also indirectly infringed and continues to indirectly infringe at least claim 29 of the '211 patent under 35 U.S.C. § 271(c), either literally and/or under the doctrine of equivalents, by contributing to the infringement of the '211 patent by others.

89. Despite having knowledge of the '211 Patent, Ford has provided the Accused LTE Products to others (e.g., end users and dealerships), knowing that the Accused LTE Products include proprietary hardware components and software instructions that work in concert to perform specific, intended functions. Such specific intended functions, carried out by these hardware and software combinations, are a material part of the inventions of the '211 patent and are not staple articles of commerce suitable for substantial non-infringing use. Specifically, each of the Accused LTE Products contains at least a baseband processor and associated transceiver that are specifically programmed and/or configured to implement the functionality described in paragraphs 79-84.

90. Ford has been on notice of the '211 patent since at least as early as the receipt of the Notice Letter. Additionally, Ford has been on notice of the '211 patent since at least as early

as the service of this Complaint. Ford's continued actions of making, using, selling, offering for sale, and/or importing into the United States any of the Accused LTE Products after receiving the Notice Letter and/or service of the Complaint, have been with Ford's knowledge of the '211 patent, knowledge of infringement of the '211 patent, intent to encourage others to infringe the '211 patent through sale, offer for sale, and use of the Accused LTE Products, knowledge that Ford's encouraging acts actually result in direct infringement of the '211 patent by others in the United States, and knowledge that Ford's actions contribute to the direct infringement of the '534 patent by others in the United States.

91. Ford's infringement of the '211 patent has been and continues to be deliberate and with willful disregard of the '211 patent.

COUNT THREE
INFRINGEMENT OF U.S. PATENT NO. 10,932,298

92. Sol IP realleges and incorporates each of preceding paragraphs 1–91.

93. On February 23, 2021, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 10,932,298 ("the '298 patent"), titled "Method for Transmitting Up Link Control Signal in Mobile Communication System." A true and correct copy of the '298 patent is attached as Exhibit E.

94. Sol IP is the exclusive licensee of the '298 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

95. The '298 patent is valid and enforceable.

96. Ford, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the '298 patent, including at least claim 7, by making, using, selling, offering for sale, and/or importing into the United States the Accused LTE Products that practice the subject

matter claimed in the '298 patent without authority, either literally and/or under the doctrine of equivalents.

97. Ford makes, uses, sells, offers for sale, and/or imports the Accused LTE Products, which are configured to implement at least the features of 3GPP Release 8, thereby infringing at least claim 7 of the '298 patent.

98. The preamble of claim 7 of the '298 patent recites "[a] communication apparatus." To the extent the preamble limits the claim, each Accused LTE Product is a communication apparatus.

99. Claim 7 of the '298 patent recites "a circuitry." Each Accused LTE Product includes one or more circuitries that are configured to implement at least the features of 3GPP Release 8. For example, the Accused LTE Products include a 4G embedded processor comprising such circuitry.[28]

100. Claim 7 of the '298 patent recites that the circuitry is configured to "cause the communication apparatus to transmit a random access preamble." As recited in claim 7 of the '298 patent and in accordance with at least 3GPP Release 8, TS 36.300 Section 10.1.5 and TS 36.321 Section 5.1.3, each Accused LTE Product includes one or more circuitries configured to cause the communication apparatus to transmit a random access preamble. *See, e.g.*, 3GPP TS 36.300 V8.12.0 § 10.1.5; 3GPP TS 36.321 V8.12.0 § 5.1.3.

101. Claim 7 of the '298 patent recites that the circuitry is configured to "cause the communication apparatus to receive first information, wherein the first information comprises

[28] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022); FordPass Connect Reference Guide, https://pictures.dealer.com/billcolwellfordfd/7a1277d70a0e0ca3664f2f8f0e02ad54.pdf (last visited Mar. 31, 2022).

radio resource information." As recited in claim 7 of the '298 patent and in accordance with at least 3GPP Release 8, TS 36.300 Section 10.1.5, TS 36.321 Section 5.1.4, TS 36.213 Section 7.1, and TS 36.212 Section 5.3.3.1, each Accused LTE Product includes one or more circuitries configured to cause the communication apparatus to receive a downlink control information (DCI) for a random access response, wherein the DCI comprises radio resource information. *See, e.g.*, 3GPP TS 36.300 V8.12.0 § 10.1.5; 3GPP TS 36.321 V8.12.0 § 5.1.4; 3GPP TS 36.213 V8.8.0 § 7.1; 3GPP TS 36.212 V8.8.0 § 5.3.3.1.

102. Claim 7 of the '298 patent recites that the circuitry is configured to "cause the communication apparatus to obtain second information at least based on the radio resource information, wherein: the second information comprises a first random access response for the communication apparatus; and the second information comprises an indicator which indicates whether the second information comprises a second random access response for another communication apparatus." As recited in claim 7 of the '298 patent and in accordance with at least 3GPP Release 8, TS 36.321 Section 5.1.4 and TS 36.213 Sections 7.1 and 7.1.6, each Accused LTE Product includes one or more circuitries configured to cause the communication apparatus to obtain a random access response based on the radio resource information. *See, e.g.*, 3GPP TS 36.321 V8.12.0 § 5.1.4; 3GPP TS 36.213 V8.8.0 §§ 7.1, 7.1.6. As recited in claim 7 of the '298 patent and in accordance with at least 3GPP Release 8, TS 36.321 Sections 6.1.5, 6.2.2, and 6.2.3, the random access response comprises a first medium access control (MAC) random access response for the communication apparatus. *See, e.g.*, 3GPP TS 36.321 V8.12.0 §§ 6.1.5, 6.2.2, 6.2.3. As recited in claim 7 of the '298 patent and in accordance with at least 3GPP Release 8, TS 36.321 Sections 5.1.4, 6.1.5, and 6.2.2, the random access response comprises an extension field which indicates whether the random access response comprises a second MAC random access

response for another communication apparatus. *See, e.g.*, 3GPP TS 36.321 V8.12.0 §§ 5.1.4, 6.1.5, 6.2.2.

103. Ford has indirectly infringed and continues to indirectly infringe at least claim 7 of the '298 patent under 35 U.S.C. § 271(b), either literally and/or under the doctrine of equivalents, by actively inducing others, including OEMs, agent-subsidiaries, affiliates, partners, software and hardware providers, manufacturers, system integrators, distributors, importers, resellers, customers, end users, and/or other third parties, in this district and elsewhere in the United States, to directly infringe the '298 patent.

104. Ford indirectly infringes by inducing third parties (e.g., end users) to infringe at least claim 7 of the '298 patent by using the LTE capabilities of the Accused LTE Products in their normal and customary way in the United States and in this district. Ford also indirectly infringes by inducing third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) to infringe at least claim 7 of the '298 patent by offering for sale and selling the Accused LTE Products. For example, Ford actively induces third parties, including without limitation end-users of the Accused LTE Products and dealerships that sell and offer to sell the Accused LTE Products (to the extent not agents of Ford), to infringe the '298 patent by, among other things, (i) designing, manufacturing, offering for sale, selling, or otherwise providing the Accused LTE Products to third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) with the knowledge and intent that the third parties will sell the Accused LTE products to end users; (ii) designing and manufacturing the Accused LTE Products with the knowledge and intent that end-users will use the LTE capabilities of such devices in accordance with the LTE standards; (iii) enabling end-users of Accused LTE Products to use the devices in accordance with at least the LTE standards; (iv) providing instructions to end-users for using the Accused LTE Products in their customary

way, including instructions on using the cellular connectivity features of the devices; (v) providing cellular connectivity, remote diagnosis, and important firmware updates for the Accused LTE Products over cellular networks; (vi) enabling users to monitor and control their Accused LTE Products over cellular networks using Ford's Mobile App; (vii) sending notifications for events and enabling end-users to receive notifications over cellular networks; (viii) advertising compliance of the Accused LTE Products with at least the LTE standards; and (ix) providing to third parties the hardware components (e.g., antenna(s), filter(s), switch(es), transceiver(s), and/or baseband processor(s) contained in Accused LTE Products) and software components (e.g., operating systems running on Accused LTE Products and other software and/or firmware used to operate components of the Accused LTE Product) that may be required for or associated with infringement of the '298 patent.

105. Ford encourages end-users and dealerships to infringe at least claim 7 of the '298 patent with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties. On information and belief, despite having knowledge of the '298 patent at least as early as the receipt of the Notice Letter, Ford has and will continue to engage in activities constituting inducement of such direct infringement, notwithstanding its knowledge, or willful blindness thereto, that the activities it induces result in infringement of the '298 patent. Ford is aware that the Accused LTE Products are manufactured to comply with the LTE standards, and that the subsequent sale, offer for sale, and use of the LTE capabilities of such devices in the United States would result in direct infringement of at least claim 7 of the '298 patent. On information and belief, the LTE capabilities of the Accused LTE Products cannot be operated in their normal and customary way without complying with the LTE standards. Therefore, Ford is aware that at least the end-users of its Accused LTE Products will infringe the '298 patent by using the LTE

capabilities of those devices in their ordinary and customary way in accordance with the LTE standards. Ford is also aware that dealerships that offer for sale and sell the Accused LTE Products will infringe the '298 patent via such offers for sale and sales.

106. Ford has also indirectly infringed and continues to indirectly infringe at least claim 7 of the '298 patent under 35 U.S.C. § 271(c), either literally and/or under the doctrine of equivalents, by contributing to the infringement of the '298 patent by others.

107. Despite having knowledge of the '298 Patent, Ford has provided the Accused LTE Products to others (e.g., end users and dealerships), knowing that the Accused LTE Products include proprietary hardware components and software instructions that work in concert to perform specific, intended functions. Such specific intended functions, carried out by these hardware and software combinations, are a material part of the inventions of the '298 patent and are not staple articles of commerce suitable for substantial non-infringing use. Specifically, each of the Accused LTE Products contains at least a baseband processor and associated transceiver that are specifically programmed and/or configured to implement the functionality described in paragraphs 98-102.

108. Ford has been on notice of the '298 patent since at least as early as the receipt of the Notice Letter. Additionally, Ford has been on notice of the '298 patent since at least as early as the service of this Complaint. Ford's continued actions of making, using, selling, offering for sale, and/or importing into the United States any of the Accused LTE Products after receiving the Notice Letter and/or service of the Complaint, have been with Ford's knowledge of the '298 patent, knowledge of infringement of the '298 patent, intent to encourage others to infringe the '298 patent through sale, offer for sale, and use of the Accused LTE Products, knowledge that Ford's encouraging acts actually result in direct infringement of the '298 patent by others in the United

States, and knowledge that Ford's actions contribute to the direct infringement of the '298 patent by others in the United States.

109. Ford's infringement of the '298 patent has been and continues to be deliberate and with willful disregard of the '298 patent.

COUNT FOUR
INFRINGEMENT OF U.S. PATENT NO. 8,320,571

110. Sol IP realleges and incorporates each of preceding paragraphs 1–109.

111. On November 27, 2012, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,320,571 ("the '571 patent"), titled "Method for Generating Downlink Frame, and Method for Searching Cell." A true and correct copy of the '571 patent is attached as Exhibit F.

112. Sol IP is the exclusive licensee of the '571 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

113. The '571 patent is valid and enforceable.

114. Ford, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the '571 patent, including at least claim 5, by making, using, selling, offering for sale, and/or importing into the United States the Accused LTE Products that practice the subject matter claimed in the '571 patent without authority, either literally and/or under the doctrine of equivalents.

115. Ford makes, uses, sells, offers for sale, and/or imports the Accused LTE Products, which are configured to implement at least the features of 3GPP Release 8, thereby infringing at least claim 5 of the '571 patent.

116. The preamble of claim 5 of the '571 patent recites "[a]n apparatus for searching a cell by a mobile station, comprising a hardware processor." To the extent the preamble limits the

claim, each Accused LTE Product comprises a mobile station further comprising an apparatus for searching network cells (e.g., an LTE cell). The apparatus comprises a hardware processor. Each Accused LTE Product includes one or more processors, wherein the one or more processors are configured to implement at least the features of 3GPP Release 8. For example, the Accused LTE Products include a 4G embedded processor.[29]

117. Claim 5 of the '571 patent recites "a hardware processor configured to execute … receiving a downlink frame including a primary synchronization signal and two secondary synchronization signals which are different from each other; and." The hardware processor in each Accused LTE Product is configured to receive a downlink frame (e.g., an LTE type 1 downlink radio frame). As detailed in relevant LTE standards (including: 3GPP TS 36.213 V8.8.0 (2009-09) §§ 4.1, 6.11.1; 3GPP TS 36.211 V8.9.0 (2009-12) §§ 4, 4.1, 6.1.2), a downlink frame, such as an LTE type 1 downlink radio frame, will include a primary synchronization signal (PSS) and two secondary synchronization signals (the SSS in subframe 0 and the SSS in subframe 5). The SSS in subframe 0 is different from the SSS in subframe 5.

118. Claim 5 of the '571 patent recites "a hardware processor configured to execute … identifying a cell by using the primary synchronization signal and at least one of the two secondary synchronization signals, wherein." The hardware processor in each Accused LTE Product is configured to identify a cell by using the primary synchronization signal (PSS) and at least one of the two secondary synchronization signals (the SSS in subframes 0 and 5). For example, in an LTE cell search, the UE (the Accused LTE Product) uses the PSS to determine $N_{\mathrm{ID}}^{(2)}$, at least one of the

[29] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022); FordPass Connect Reference Guide, https://pictures.dealer.com/billcolwellfordfd/7a1277d70a0e0ca3664f2f8f0e02ad54.pdf (last visited Mar. 31, 2022).

SSS to determine $N_{\mathrm{ID}}^{(1)}$, and then uses $N_{\mathrm{ID}}^{(2)}$ and $N_{\mathrm{ID}}^{(1)}$, to determine the physical layer cell identity of the cell N_{ID}^{cell}. *See*, 3GPP TS 36.213 V8.8.0 (2009-09) §§ 4.1, 6.11.1; 3GPP TS 36.211 V8.9.0 (2009-12) §§ 3.1, 6.11.

119. Claim 5 of the '571 patent recites "in one secondary synchronization signal of the two secondary synchronization signal, a first short sequence scrambled with a first scrambling sequence and a second short sequence scrambled with a second scrambling sequence and a third scrambling sequence are alternately disposed on a plurality of sub-carriers; and." The Accused LTE Products are configured such that in one secondary synchronization signal of the two secondary synchronization signals (e.g., the SSS in subframe 0), a first short sequence ($s_0^{(m_0)}(n)$) scrambled with a first scrambling sequence ($c_0(n)$) and a second short sequence ($s_1^{(m_1)}(n)$) scrambled with a second scrambling sequence ($c_1(n)$) and a third scrambling sequence ($z_1^{(m_0)}(n)$) are alternatively disposed on a plurality of sub-carriers. *See* 3GPP TS 36.211 V8.9.0 (2009-12) §§ 6.2, 6.11.

120. Claim 5 of the '571 patent recites "in the other secondary synchronization signal of the two secondary synchronization signal, the second short sequence scrambled with a first scrambling sequence and the first short sequence scrambled with the second scrambling sequence and a fourth scrambling sequence are alternately disposed on a plurality of sub-carriers, and." In the other secondary synchronization signal of the two secondary synchronization signal (the SSS in subframe 5), the second short sequence scrambled with the first scrambling sequence and the first short sequence scrambled with the second scrambling sequence and a fourth scrambling sequence are alternately disposed on a plurality of sub-carriers. In subframe 5, the sequence *d(2n)* comprising the second short sequence ($s_1^{(m_1)}(n)$) is altered by applying the first scrambling

sequence ($c_0(n)$). The sequence *d(2n+1)* comprising the first short sequence ($s_0^{(m_0)}(n)$) is altered by applying the second scrambling sequence ($c_1(n)$) and a fourth scrambling sequence ($z_1^{(m_1)}(n)$). The *d(2n)* and *d(2n+1)* sequences are interleaved together for transmission on 62 sub-carriers, and are therefore alternately disposed on a plurality of sub-carriers.

121. Claim 5 of the '571 patent recites "the first short sequence and the second short sequence indicate cell group information." The first short sequence ($s_0^{(m_0)}(n)$) and the second short sequence ($s_1^{(m_1)}(n)$) indicate the cell group information ($N_{\mathrm{ID}}^{(1)}$). The first short sequence ($s_0^{(m_0)}(n)$) and the second short sequence ($s_1^{(m_1)}(n)$) are based upon indices m_0 and m_1, which are derived from the physical-layer cell-identity group. *See*, 3GPP TS 36.211 V8.9.0 (2009-12) §§ 6.2, 6.11.

122. Claim 5 of the '571 patent recites "the first scrambling sequence and the second scrambling sequence are determined based on the primary synchronization signal." As detailed in relevant LTE standards (including 3GPP TS 36.211 V8.9.0 (2009-12) §§ 6.11.1, 6.11.2), the first scrambling sequence ($c_0(n)$) and the second scrambling sequence ($c_1(n)$) are determined based on the primary synchronization signal (PSS).

123. Claim 5 of the '571 patent recites "the third scrambling sequence is determined based on the first short sequence, and the fourth scrambling sequence is determined based on the second short sequence." As detailed in relevant LTE standards (including 3GPP TS 36.211 V8.9.0 (2009-12) § 6.11.2), the third scrambling sequence ($z_1^{(m_0)}(n)$) is determined based on the first short sequence ($s_0^{(m_0)}(n)$). The fourth scrambling sequence ($z_1^{(m_1)}(n)$) is determined based on the second short sequence ($s_1^{(m_1)}(n)$). The first short sequence ($s_0^{(m_0)}(n)$) is used to determine the index m_0, which is then used to determine the third scrambling sequence ($z_1^{(m_0)}(n)$). The second

short sequence ($s_1^{(m_1)}(n)$) is used to determine the index m_1, which is then used to determine the fourth scrambling sequence ($z_1^{(m_1)}(n)$).

124. Ford has indirectly infringed and continues to indirectly infringe at least claim 5 of the '571 patent under 35 U.S.C. § 271(b), either literally and/or under the doctrine of equivalents, by actively inducing others including OEMs, agent-subsidiaries, affiliates, partners, software and hardware providers, manufacturers, system integrators, distributors, importers, resellers, customers, end users, and/or other third parties, in this district and elsewhere in the United States, to directly infringe the '571 patent.

125. Ford indirectly infringes by inducing third parties (e.g., end users) to infringe at least claim 5 of the '571 patent by using the LTE capabilities of the Accused LTE Products in their normal and customary way in the United States and in this district. Ford also indirectly infringes by inducing third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) to infringe at least claim 5 of the '571 patent by offering for sale and selling the Accused LTE Products. For example, Ford actively induces third parties, including without limitation end-users of the Accused LTE Products and dealerships that sell and offer to sell the Accused LTE Products (to the extent not agents of Ford), to infringe the '571 patent by, among other things, (i) designing, manufacturing, offering for sale, selling, or otherwise providing the Accused LTE Products to third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) with the knowledge and intent that the third parties will sell the Accused LTE products to end users; (ii) designing and manufacturing the Accused LTE Products with the knowledge and intent that end-users will use the LTE capabilities of such devices in accordance with the LTE standards; (iii) enabling end-users of Accused LTE Products to use the devices in accordance with at least the LTE standards; (iv) providing instructions to end-users for using the Accused LTE Products in their customary

way, including instructions on using the cellular connectivity features of the devices; (v) providing cellular connectivity, remote diagnosis, and important firmware updates for the Accused LTE Products over cellular networks; (vi) enabling users to monitor and control their Accused LTE Products over cellular networks using Ford's Mobile App; (vii) sending notifications for events and enabling end-users to receive notifications over cellular networks; (viii) advertising compliance of the Accused LTE Products with at least the LTE standards; and (ix) providing to third parties the hardware components (e.g., antenna(s), filter(s), switch(es), transceiver(s), and/or baseband processor(s) contained in Accused LTE Products) and software components (e.g., operating systems running on Accused LTE Products and other software and/or firmware used to operate components of the Accused LTE Product) that may be required for or associated with infringement of the '571 patent.

126. Ford encourages end-users and dealerships to infringe at least claim 5 of the '571 patent with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties. On information and belief, despite having knowledge of the '571 patent at least as early as the receipt of the Notice Letter, Ford has and will continue to engage in activities constituting inducement of such direct infringement, notwithstanding its knowledge, or willful blindness thereto, that the activities it induces result in infringement of the '571 patent. Ford is aware that the Accused LTE Products are manufactured to comply with the LTE standards, and that the subsequent sale, offer for sale, and use of the LTE capabilities of such devices in the United States would result in direct infringement of at least claim 5 of the '571 patent. On information and belief, the LTE capabilities of the Accused LTE Products cannot be operated in their normal and customary way without complying with the LTE standards. Therefore, Ford is aware that at least the end-users of its Accused LTE Products will infringe the '571 patent by using the LTE

capabilities of those devices in their ordinary and customary way in accordance with the LTE standards. Ford is also aware that dealerships that offer for sale and sell the Accused LTE Products will infringe the '571 patent via such offers for sale and sales.

127. Ford has also indirectly infringed and continues to indirectly infringe at least claim 5 of the '571 patent under 35 U.S.C. § 271(c), either literally and/or under the doctrine of equivalents, by contributing to the infringement of the '571 patent by others.

128. Despite having knowledge of the '571 Patent, Ford has provided the Accused LTE Products to others (e.g., end users and dealerships), knowing that the Accused LTE Products include proprietary hardware components and software instructions that work in concert to perform specific, intended functions. Such specific intended functions, carried out by these hardware and software combinations, are a material part of the inventions of the '571 patent and are not staple articles of commerce suitable for substantial non-infringing use. Specifically, each of the Accused LTE Products contains at least a baseband processor and associated transceiver that are specifically programmed and/or configured to implement the functionality described in paragraphs 116-123.

129. Ford has been on notice of the '571 patent since at least as early as the receipt of the Notice Letter. Additionally, Ford has been on notice of the '571 patent since at least as early as the service of this Complaint. Ford's continued actions of making, using, selling, offering for sale, and/or importing into the United States any of the Accused LTE Products after receiving the Notice Letter and/or service of the Complaint, have been with Ford's knowledge of the '571 patent, knowledge of infringement of the '571 patent, intent to encourage others to infringe the '571 patent through sale, offer for sale, and use of the Accused LTE Products, knowledge that Ford's encouraging acts actually result in direct infringement of the '571 patent by others in the United

States, and knowledge that Ford's actions contribute to the direct infringement of the '571 patent by others in the United States.

130. Ford's infringement of the '571 patent has been and continues to be deliberate and with willful disregard of the '571 patent.

COUNT FIVE
INFRINGEMENT OF U.S. PATENT NO. 10,148,477

131. Sol IP realleges and incorporates each of preceding paragraphs 1–130.

132. On December 4, 2018, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 10,148,477 ("the '477 patent"), titled "Method and Apparatus for Transmitting ACK/NACK." A true and correct copy of the '477 patent is attached as Exhibit G.

133. Sol IP is the exclusive licensee of the '477 patent and holds all substantial rights to that patent, including the sole right to sue and recover for any and all infringements.

134. The '477 patent is valid and enforceable.

135. Ford, in violation of 35 U.S.C. § 271(a), has infringed and continues to infringe one or more claims of the '477 patent, including at least claim 25, by making, using, selling, offering for sale, and/or importing into the United States the Accused LTE Products that practice the subject matter claimed in the '477 patent without authority, either literally and/or under the doctrine of equivalents.

136. Ford makes, uses, sells, offers for sale, and/or imports the Accused LTE Products, which are configured to implement at least the features of 3GPP Release 8, thereby infringing at least claim 25 of the '477 patent.

137. The preamble of claim 25 of the '477 patent recites "[a] communication apparatus." To the extent the preamble limits the claim, each Accused LTE Product is a communication apparatus.

138. Claim 25 of the '477 patent recites "a memory." Each Accused LTE Product includes one or more memories. For example, the Accused LTE Products include a 4G embedded processor that requires a memory to operate.[30]

139. Claim 25 of the '477 patent recites "a processor coupled to the memory." Each Accused LTE Product includes one or more processors operably coupled to the one or more memories, wherein the one or more processors are configured to implement at least the features of 3GPP Release 8. For example, the Accused LTE Products include a 4G embedded processor that is coupled to the memory.[31]

140. Claim 25 of the '477 patent recites that the processor is configured to "cause the apparatus to receive cyclic shift information for reference signal." As recited in claim 25 of the '477 patent and in accordance with at least 3GPP Release 8, TS 36.212 Section 5.3.3.1.1, each Accused LTE Product includes one or more processors configured to cause the apparatus to receive cyclic shift information for a demodulation reference signal (DMRS) field in a downlink control information (DCI) format 0. *See, e.g.*, 3GPP TS 36.212 V8.8.0 § 5.3.3.1.1.

141. Claim 25 of the '477 patent recites that the processor is configured to "determine a dynamic cyclic shift value based on the cyclic shift information for reference signal." As recited in claim 25 of the '477 patent and in accordance with at least 3GPP Release 8, TS 36.212 Section 5.3.3.1.1, each Accused LTE Product includes one or more processors configured to determine a

[30] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022); FordPass Connect Reference Guide, https://pictures.dealer.com/billcolwellfordfd/7a1277d70a0e0ca3664f2f8f0e02ad54.pdf (last visited Mar. 31, 2022).

[31] *Sync Technology*, FORD.COM, https://www.ford.com/technology/sync/ (last visited Mar. 31, 2022); FordPass Connect Reference Guide, https://pictures.dealer.com/billcolwellfordfd/7a1277d70a0e0ca3664f2f8f0e02ad54.pdf (last visited Mar. 31, 2022).

dynamic cyclic shift value $n_{\text{DMRS}}^{(2)}$ based on the cyclic shift for DMRS field in DCI format 0. *See, e.g.*, 3GPP TS 36.212 V8.8.0 § 5.3.3.1.1; 3GPP TS 36.211 V8.9.0 § 5.5.2.1.1.

142. Claim 25 of the '477 patent recites that the processor is configured to "generate a reference signal by cyclically shifting a sequence at least based on the dynamic cyclic shift value." As recited in claim 25 of the '477 patent and in accordance with at least 3GPP Release 8, TS 36.211 Sections 5.5, 5.5.1 and 5.5.2.1.1, each Accused LTE Product includes one or more processors configured to generate a demodulation reference signal sequence $r^{\text{PUSCH}}(\cdot)$ for physical uplink shared channel (PUSCH) by cyclically shifting a base sequence $\bar{r}_{u,v}(n)$ at least based on the dynamic cyclic shift value $n_{\text{DMRS}}^{(2)}$. *See, e.g.*, 3GPP TS 36.211 V8.9.0 §§ 5.5, 5.5.1, 5.5.2.1.1.

143. Claim 25 of the '477 patent recites that the processor is configured to "cause the apparatus to transmit data and the reference signal using one or more uplink radio resources." As recited in claim 25 of the '477 patent and in accordance with at least 3GPP Release 8, TS 36.211 Sections 5.1.1, 5.1.2, 5.3, and 5.5.2-5.5.2.1.1, each Accused LTE Product includes one or more processors configured to cause the apparatus to transmit data and the reference signal using one or more uplink radio resources, such as PUSCH. *See, e.g.*, 3GPP TS 36.211 V8.9.0 §§ 5.1.1, 5.1.2, 5.3, 5.5.2-5.5.2.1.1.

144. Claim 25 of the '477 patent recites that the processor is configured to "cause the apparatus to receive ACK/NACK (Acknowledgement/Negative Acknowledgement) for the transmitted data using a Physical Hybrid ARQ Indicator Channel (PHICH) resource, wherein the dynamic cyclic shift value is determined based on the cyclic shift information for reference signal according to Table 9 and the PHICH resource is determined at least based on the cyclic shift information for reference signal

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 25 of the '477 patent and in accordance with at least 3GPP Release 8, TS 36.211 Section 6.1.1 and TS 36.213 Section 9.1.2, each Accused LTE Product includes one or more processors configured to cause the apparatus to receive hybrid automatic repeat request (ARQ) acknowledgement/negative acknowledgement (ACK/NACK) using a physical hybrid ARQ indicator channel (PHICH) resource. *See, e.g.*, 3GPP TS 36.211 V8.9.0 § 6.1.1; 3GPP TS 36.213 V8.8.0 § 9.1.2. As recited in claim 25 of the '477 patent and in accordance with at least 3GPP Release 8, TS 36.211 Section 5.5.2.1.1, the dynamic cyclic shift value $n_{\mathrm{DMRS}}^{(2)}$ is determined based on the cyclic shift for DMRS field in DCI format 0 as given in Table 5.5.2.1.1-1:

Table 5.5.2.1.1-1: Mapping of Cyclic Shift Field in DCI format 0 to $n_{\mathrm{DMRS}}^{(2)}$ Values.

Cyclic Shift Field in DCI format 0 [3]	$n_{\mathrm{DMRS}}^{(2)}$
000	0
001	6
010	3
011	4
100	2
101	8
110	10
111	9

See, e.g., 3GPP TS 36.211 V8.9.0 § 5.5.2.1.1. As recited in claim 25 of the '477 patent and in accordance with at least 3GPP Release 8, TS 36.213 V8.8.0 Section 9.1.2, the PHICH resource is determined based on the cyclic shift for DMRS field in DCI format 0. *See, e.g.*, 3GPP TS 36.213 V8.8.0 § 9.1.2.

145. Ford has indirectly infringed and continues to indirectly infringe at least claim 25 of the '477 patent under 35 U.S.C. § 271(b), either literally and/or under the doctrine of equivalents, by actively inducing others, including OEMs, agent-subsidiaries, affiliates, partners, software and hardware providers, manufacturers, system integrators, distributors, importers, resellers, customers, end users, and/or other third parties, in this district and elsewhere in the United States, to directly infringe the '477 patent.

146. Ford indirectly infringes by inducing third parties to infringe at least claim 25 of the '477 patent by using the LTE capabilities of the Accused LTE Products in their normal and customary way in the United States and in this district. Ford also indirectly infringes by inducing third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) to infringe at least claim 25 of the '477 patent by offering for sale and selling the Accused LTE Products. For example, Ford actively induces third parties, including without limitation end-users of the Accused LTE Products and dealerships that sell and offer to sell the Accused LTE Products (to the extent not agents of Ford), to infringe the '477 patent by, among other things, (i) designing, manufacturing, offering for sale, selling, or otherwise providing the Accused LTE Products to third parties (e.g., dealerships, to the extent they are not deemed to be Ford's agents) with the knowledge and intent that the third parties will sell the Accused LTE products to end users; (ii) designing and manufacturing the Accused LTE Products with the knowledge and intent that end-users will use the LTE capabilities of such devices in accordance with the LTE standards; (iii) enabling end-

users of Accused LTE Products to use the devices in accordance with at least the LTE standards; (iv) providing instructions to end-users for using the Accused LTE Products in their customary way, including instructions on using the cellular connectivity features of the devices; (v) providing cellular connectivity, remote diagnosis, and important firmware updates for the Accused LTE Products over cellular networks; (vi) enabling users to monitor and control their Accused LTE Products over cellular networks using Ford's Mobile App; (vii) sending notifications for events and enabling end-users to receive notifications over cellular networks; (viii) advertising compliance of the Accused LTE Products with at least the LTE standards; and (ix) providing to third parties the hardware components (e.g., antenna(s), filter(s), switch(es), transceiver(s), and/or baseband processor(s) contained in Accused LTE Products) and software components (e.g., operating systems running on Accused LTE Products and other software and/or firmware used to operate components of the Accused LTE Product) that may be required for or associated with infringement of the '477 patent.

147. Ford encourages end-users to infringe at least claim 25 of the '477 patent with knowledge and the specific intent to cause the acts of direct infringement performed by these third parties. On information and belief, despite having knowledge of the '477 patent at least as early as the receipt of the Notice Letter, Ford has and will continue to engage in activities constituting inducement of such direct infringement, notwithstanding its knowledge, or willful blindness thereto, that the activities it induces result in infringement of the '477 patent. Ford is aware that the Accused LTE Products are manufactured to comply with the LTE standards, and that the subsequent sale, offer for sale, and use of the LTE capabilities of such devices in the United States would result in direct infringement of at least claim 25 of the '477 patent. On information and belief, the LTE capabilities of the Accused LTE Products cannot be operated in their normal and

customary way without complying with the LTE standards. Therefore, Ford is aware that at least the end-users of its Accused LTE Products will infringe the '477 patent by using the LTE capabilities of those devices in their ordinary and customary way in accordance with the LTE standards. Ford is also aware that dealerships that offer for sale and sell the Accused LTE Products will infringe the '477 patent via such offers for sale and sales.

148. Ford has also indirectly infringed and continues to indirectly infringe at least claim 25 of the '477 patent under 35 U.S.C. § 271(c), either literally and/or under the doctrine of equivalents, by contributing to the infringement of the '477 patent by others.

149. Despite having knowledge of the '477 Patent, Ford has provided the Accused LTE Products to others (e.g., end users and dealerships), knowing that the Accused LTE Products include proprietary hardware components and software instructions that work in concert to perform specific, intended functions. Such specific intended functions, carried out by these hardware and software combinations, are a material part of the inventions of the '477 patent and are not staple articles of commerce suitable for substantial non-infringing use. Specifically, each of the Accused LTE Products contains at least a baseband processor and associated transceiver that are specifically programmed and/or configured to implement the functionality described in paragraphs 137-144.

150. Ford has been on notice of the '477 patent since at least as early as the receipt of the Notice Letter. Additionally, Ford has been on notice of the '477 patent since at least as early as the service of this Complaint. Ford's continued actions of making, using, selling, offering for sale, and/or importing into the United States any of the Accused LTE Products after receiving the Notice Letter and/or service of the Complaint, have been with Ford's knowledge of the '477 patent, knowledge of infringement of the '477 patent, intent to encourage others to infringe the '477 patent

through sale, offer for sale, and use of the Accused LTE Products, knowledge that Ford's encouraging acts actually result in direct infringement of the '477 patent by others in the United States, and knowledge that Ford's actions contribute to the direct infringement of the '477 patent by others in the United States.

151. Ford's infringement of the '477 patent has been and continues to be deliberate and with willful disregard of the '477 patent.

DEMAND FOR TRIAL BY JURY

152. Sol IP respectfully requests a trial by jury on all issues so triable in accordance with Rule 38 of the Federal Rules of Civil Procedure.

PRAYER FOR RELIEF

153. 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 Ford has directly and/or indirectly infringed the '534, '211, '298, '571, and '477 patents, and continues to do so;

b) Entry of judgment against Ford, awarding Sol IP damages adequate to compensate Sol IP for Ford's direct and/or indirect infringement of the '534, '211, '298, '571, and '477 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 Ford for all future infringing acts occurring after the date such judgment is entered;

c) Entry of judgment that Ford's direct and/or indirect infringement of the '534, '211, '298, '571, and '477 patents has been and continues to be willful;

d) Entry of judgment as provided by 35 U.S.C. § 284 for an award of treble damages against Ford for its willful direct and/or indirect infringement of the '534, '211, '298, '571, and '477 patents;

e) Entry of judgment as provided by 35 U.S.C. § 285 that this case is exceptional and an award granting Sol IP its reasonable attorneys' fees, expenses, and costs; and

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

Dated: March 31, 2022

Respectfully submitted,

/s/ Brent N. Bumgardner

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