

**IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF TEXAS  
DALLAS DIVISION**

CARUCEL INVESTMENTS, L.P.,

*Plaintiff,*

vs.

VOLKSWAGEN GROUP OF AMERICA,  
INC., d/b/a AUDI OF AMERICA, INC.,

*Defendant.*

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CIVIL ACTION NO. \_\_\_\_\_

**JURY TRIAL DEMANDED**

**PLAINTIFF'S ORIGINAL COMPLAINT  
FOR PATENT INFRINGEMENT**

Plaintiff, Carucel Investments, L.P. (“Carucel Investments” or “Plaintiff”) files this Original Complaint against Volkswagen Group of America, Inc. d/b/a Audi of America, Inc. (“Defendant” or “Audi”) for infringement of U.S. Patent No. 7,221,904 (the “’904 Patent”), U.S. Patent No. 7,848,701 (the “’701 Patent”), U.S. Patent No. 7,979,023 (the “’023 Patent”), U.S. Patent No. 8,463,177 (the “’177 Patent”) and U.S. Patent No. 8,718,543 (the “’543 Patent”).

**THE PARTIES**

1. Plaintiff Carucel Investments, L.P. is a Delaware limited partnership with its principal place of business at 507 Maggie Trail, Lucas, TX 75002.
2. Carucel Investments is the exclusive owner of the ’904 Patent, the ’701 Patent, the ’023 Patent, the ’177 Patent, and the ’543 Patent.
3. The ’904 Patent entitled “MOBILE COMMUNICATION SYSTEM WITH MOVING BASE STATION” is generally directed to a moving base station which is interposed between a moving mobile telephone unit and a fixed base station. A true and correct copy of the ’904 Patent is attached as Exhibit A.

4. The '701 Patent entitled "MOBILE COMMUNICATION SYSTEM WITH MOVING BASE STATION" is generally directed to a moving base station which is interposed between a moving mobile telephone unit and a fixed base station. A true and correct copy of the '701 Patent is attached as Exhibit B.

5. The '023 Patent entitled "MOBILE COMMUNICATION SYSTEM WITH MOVING BASE STATION" is generally directed to a moving base station which is interposed between a moving mobile telephone unit and a fixed base station. A true and correct copy of the '023 Patent is attached as Exhibit C.

6. The '177 Patent entitled "MOBILE COMMUNICATION SYSTEM WITH MOVING BASE STATION" is generally directed to a moving base station which is interposed between a moving mobile telephone unit and a fixed base station. A true and correct copy of the '177 Patent is attached as Exhibit D.

7. The '543 Patent entitled "MOBILE COMMUNICATION SYSTEM WITH MOVING BASE STATION" is generally directed to a moving base station which is interposed between a moving mobile telephone unit and a fixed base station. A true and correct copy of the '543 Patent is attached as Exhibit E.

8. On information and belief, Defendant Volkswagen Group of America, Inc. d/b/a Audi of America, Inc. is a corporation organized under the laws of the State of New Jersey with a principal place of business at 2200 Ferdinand Porsche Drive, Herndon, Virginia 20171. Audi has a registered agent for service, Corporation Service Company, located at 251 Little Falls Drive, Wilmington, Delaware 19808.

#### **JURISDICTION AND VENUE**

9. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. §§ 1, et seq.

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

11. This Court has personal jurisdiction over the Defendant. On information and belief, Defendant conducts business and has committed acts of patent infringement. On information and belief, Defendant conducts business within the State of Texas, directly or through intermediaries, which activities give rise to at least a portion of the infringements alleged herein and include: (i) manufacturing, distributing, offering for sale, selling, and advertising its vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot that infringe the Asserted Patents in the State of Texas and the Northern District of Texas; and (ii) purposefully and voluntarily placing its infringing vehicles in the stream of commerce with knowledge that, through Defendant's established distribution channels, its accused vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot will be sold and purchased by consumers in the State of Texas and the Northern District of Texas.

12. Venue is proper in the Northern District of Texas pursuant to 28 U.S.C. § 1400(b) because, among other things, (i) Defendant is subject to personal jurisdiction in this District; (ii) Defendant has a regular and established place of business in Texas and in this District— including a corporate office (South Central Region Office located in Irving, Texas) and a regional parts distribution center (Fort Worth Parts Distribution Center located in Fort Worth, Texas); (iii) on information and belief, Defendant provides new vehicle warranty services on Volkswagen/Audi products, including the accused vehicles/products, to new Volkswagen/Audi customers through its independent dealerships located in this District; (iv) Defendant has purposely transacted business involving the accused vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot in this District, including the manufacture, distribution, marketing and sale of its vehicles

with a mobile wireless router that acts as a mobile Wi-Fi hotspot that infringe the Asserted Patents to one or more customers in Texas; and (v) certain of the infringing acts complained of herein occurred in this District.

13. On information and belief, Defendant is the owner of the webpage: <https://www.vw.com/warranty/>, where new and/or potential customers can access and review an abbreviated version of the Defendant's Warranty Booklet.

14. By way of illustration only, the Defendant's Warranty Booklet attached hereto as Exhibit F states that "[t]his New Vehicle Limited Warranty is issued by Volkswagen Group of America, Inc." (Exhibit F, p. 6). On information and belief, Defendant provides this warranty booklet or a similar warranty booklet to new and/or potential Volkswagen Group of America, Inc. customers, including customers that purchase Volkswagen/Audi vehicles in the Northern District of Texas. The Defendant's Warranty Booklet directs new and/or potential customers to see an authorized dealer for full warranty and maintenance details. (Exhibit F, cover page). The Defendant's Warranty Booklet further provides that "[t]his limited warranty will be honored by any authorized Volkswagen dealer in the United States, including its territories." (Exhibit F, p. 7). On information and belief, Defendant warrants to the original and each subsequent owner of new Volkswagen/Audi vehicle that any authorized dealer will make any repairs or replacement necessary to correct defects in material or workmanship arising during the warranty period. Upon information and belief, all such warranty work is paid for and supervised by Defendant.

15. On information and belief, the authorized Volkswagen Group of America, Inc. dealerships located within this District (e.g., Clay Cooley Audi of Park Cities located in Dallas, Texas; Audi Dallas located in Dallas, Texas; Rusty Wallis Volkswagen located in Garland, Texas; Metro Volkswagen located in Irving, Texas; Audi Grapevine located in Grapevine, Texas; Randy

Hiley Volkswagen of Arlington located in Arlington, Texas; Autobahn Motorcar Group located in Fort Worth, Texas; Audi Fort Worth located in Fort Worth, Texas; and Southwest Volkswagen of Weatherford located in Weatherford, Texas) are Defendant's exclusive agents, instrumentalities, and representatives within this District for the provision of all new warranty service within this District for Volkswagen/Audi vehicles sold both within the District and outside the District. Upon information and belief, if a Volkswagen Group of America, Inc. customer located within this District needs to have new car warranty repairs performed within the District, Defendant requires the Volkswagen Group of America, Inc. customer to have the work performed at one of their authorized Volkswagen Group of America, Inc. dealers in the District.

16. On information and belief, Defendant is subject to this Court's jurisdiction pursuant to due process and/or the Texas Long Arm Statute, due at least to their substantial business in this State and District, including: (i) at least part of their infringing activities alleged herein; and (ii) regularly doing or soliciting business, engaging in other persistent conduct, and/or deriving substantial revenue from goods sold and services provided to Texas residents.

**AUDI VEHICLES INCLUDING A MOBILE WI-FI HOTSPOT**

17. Wi-Fi is a technology for radio wireless local area networking of devices based on the Institute of Electrical and Electronics Engineers ("IEEE") 802.11 standards.

18. On information and belief, at least some of the accused Audi vehicles include a modular infotainment platform - MIB (the "Audi Wi-Fi") which is a mobile wireless router that acts as a mobile Wi-Fi hotspot in the Audi vehicle.<sup>1</sup> The Audi vehicles are constructed to move with traffic at a rate of speed which is comparable to the speed of the traffic because vehicles operate on roadways in traffic and typically move with a rate of speed comparable to traffic. As

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<sup>1</sup> See Exhibit G, Audi Modular Infotainment System Manual, p. 30.

the Audi Wi-Fi is installed in and connected to the Audi vehicle, the Audi Wi-Fi and the mobile devices connected to the Audi Wi-Fi also move with traffic. The Audi vehicle, the Audi Wi-Fi located within the Audi vehicle, and the mobile devices connected to the Audi Wi-Fi all move relative to a plurality of fixed radio ports (e.g., cellular radio ports included in cellular base stations operated by cellular carriers).

19. On information and belief, the Audi Wi-Fi of the accused Audi vehicles include a Harman PPIS LTE module, which is GSM/GPRS/EDGE/UMTS/HSPA+/LTE cellular communication module. “The purpose of the PPIS LTE module is to extend the Audi MIB Main-Unit with GSM/UMTS/LTE functionality for providing network access.”<sup>2</sup> On information and belief, the Harman PPIS LTE module includes a receiver adapted to receive a plurality of signals, each of the plurality of signals transmitted from each of the plurality of fixed radio ports (e.g. cellular radio ports included in cellular base stations) within a frequency band having a lower limit greater than 300 megahertz. On information and belief, each of the foregoing cellular standards – GSM/GPRS/EDGE/UMTS/HSPA+/LTE EDGE – transmits within a frequency band having a lower limit greater than 300 megahertz. The 4G LTE signals are transmitted from a cellular radio port (fixed port) included in a cellular base station.

20. On information and belief, the Harman PPIS LTE module operates in accordance with the 4G LTE communication standard, and, therefore receives cellular signals through multiple antennas. 4G LTE requires multiple cellular receive antennas.<sup>3</sup> The Audi Wi-Fi, therefore, includes at least two spatially separated cellular antennas. Additionally, The PPIS module includes a

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<sup>2</sup> See Exhibit H, available at [https://fccid.io/ANATEL/00770-15-07978/Manual-para-referencia\\_PPIS-LTE/F315AA92-B78C-4B1B-8695-E59EA1BD028D/PDF](https://fccid.io/ANATEL/00770-15-07978/Manual-para-referencia_PPIS-LTE/F315AA92-B78C-4B1B-8695-E59EA1BD028D/PDF).

<sup>3</sup> See Exhibit I, available at <https://www.anandtech.com/show/6541/the-state-of-qualcomms-modems-wtr1605-and-mdm9x25>.

receiver configured to receive cellular RF signals, e.g., 4G LTE signals (fixed port signals) through at least two of the separated antennas. The 4G LTE signals are transmitted from a cellular radio port (fixed port) included in a cellular base station.

21. On information and belief, the Harman PPIS LTE module includes a processor (controller) programmed to align and combine the 4G LTE signals received through the multiple antennas.

22. On information and belief, the Audi Wi-Fi operates in accordance with at least the 4G LTE communication standard, and therefore, receives cellular signals through multiple antennas including at least two spatially separated cellular antennas. Since diversity is mandatory in LTE, the PPIS LTE Module receiver receives cellular signals through multiple antennas.<sup>4</sup>

23. On information and belief, the Audi Wi-Fi, including the PPIS LTE Module, includes a receiver configured to receive cellular RF signals, e.g., 4G LTE and CDMA signals (cellular signals) through the separated antennas. The cellular signals are received from base station radio interface circuits included in carrier cellular base stations.

24. On information and belief, the Audi Wi-Fi, including the MIB System, includes an MIB Main-Unit which includes a Marvell 88w8787-BRD2 Wi-Fi chip and supporting circuitry forming a Wi-Fi transceiver including a Wi-Fi transmitter.<sup>5</sup> The Wi-Fi transceiver is adapted to transmit within the frequency band (a Wi-Fi transmitter operating at 2.4 GHz), a resultant signal to the mobile unit (e.g., a Wi-Fi enabled smartphone, tablet or laptop computer) in accordance with at least one of the plurality of signals. Additionally, the Wi-Fi transceiver is configured to transmit RF signals, to a mobile device (e.g., a Wi-Fi enabled smartphone, tablet or laptop computer). The

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<sup>4</sup> 4G LTE requires receive diversity. See Exhibit I, available at <https://www.anandtech.com/show/6541/the-state-of-qualcomms-modems-wtr1605-and-mdm9x25>.

<sup>5</sup> See Exhibit J, available at <https://fccid.io/T8GA270/Internal-Photos/Int-Photos-C2-3047618>.

MIB System is a mobile hotspot that provides Internet services to Wi-Fi enabled mobile devices via cellular networks. Thus, the Wi-Fi signals (radio frequency signals) correspond to the received 4G LTE cellular signals (received fixed port signals). On information and belief, the Audi Wi-Fi, including the MIB System, is a mobile hotspot that provides Internet services to Wi-Fi enabled mobile devices via cellular networks, thus, the mobile device RF signal includes data extracted from the cellular signals (4G LTE and CDMA signals).

25. On information and belief, the Harman PPIS LTE module in the Audi Wi-Fi includes a processor. Upon information and belief, the processor is programmed to maximize an amount of transferred information to the mobile unit by evaluating a quality of each of the plurality of signals transmitted from the plurality of fixed radio ports.

### **COUNT I**

(INFRINGEMENT OF U.S. PATENT NO. 7,221,904)

26. Carucel Investments incorporates paragraphs 1 through 25 herein by reference.

27. The '904 Patent is valid, enforceable, and was duly and legally issued by the United States Patent and Trademark Office on May 22, 2007 after full and fair examination.

28. Carucel Investments is the owner of all rights, title, and interest in and to the '904 Patent and has standing to bring this lawsuit for infringement of the '904 Patent.

29. Defendant has and continues to directly infringe one or more claims of the '904 Patent in this judicial district and elsewhere in Texas and the United States, including at least claims 22, 23, 28, 29, 30, 31, 32, 33, 34, 35, 40, 50 and 51 by, among other things, making, using, offering for sale, selling and/or importing accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot.



30. Defendant directly infringes the '904 Patent by making, using, offering for sale, selling and/or importing the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot. Defendant is thereby liable for direct infringement.

31. Defendant has had knowledge of the '904 Patent, at least as early as service of this Complaint.

32. By way of illustration only, the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot include each and every element of claim 22 of the '904 Patent. For example, at least some of the accused Audi vehicles include a modular infotainment platform - MIB (the "Audi Wi-Fi") which is a mobile wireless router that acts as a mobile Wi-Fi hotspot in the Audi vehicle.<sup>6</sup>

33. The accused Audi vehicles include "[a]n apparatus adapted to move in accordance with a movement of a mobile unit moving relative to a plurality of fixed radio ports." For example, Audi Modular Infotainment System manual provides that the vehicle has a "WiFi hotspot"<sup>7</sup> and that the Audi Wi-Fi is installed in and connected to the Audi vehicle, and that the Audi Wi-Fi and the mobile devices connected to the Audi Wi-Fi also move with traffic. The Audi vehicles are constructed to move with traffic at a rate of speed which is comparable to the speed of the traffic because vehicles operate on roadways in traffic and typically move with a rate of speed comparable to traffic. The Audi vehicle, the Audi Wi-Fi located within the Audi vehicle, and the mobile devices connected to the Audi Wi-Fi all move relative to a plurality of fixed radio ports (e.g., cellular radio ports included in cellular base stations operated by cellular carriers).

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<sup>6</sup> See Exhibit G, Audi Modular Infotainment System Manual, p. 30.

<sup>7</sup> See *id.*

34. The accused Audi vehicles include “a receiver adapted to receive a plurality of signals, each of the plurality of signals transmitted from each of the plurality of fixed radio ports within a frequency band having a lower limit greater than 300 megahertz.” For example, the Audi Wi-Fi of many of the accused Audi vehicles include a Harman PPIS LTE module, which is GSM/GPRS/EDGE/UMTS/HSPA+/LTE cellular communication module. “The purpose of the PPIS LTE module is to extend the Audi MIB Main-Unit with GSM/UMTS/LTE functionality for providing network access.”<sup>8</sup> On information and belief, the Harman PPIS LTE module includes a receiver adapted to receive a plurality of signals, each of the plurality of signals transmitted from each of the plurality of fixed radio ports (e.g. cellular radio ports included in cellular base stations) within a frequency band having a lower limit greater than 300 megahertz. On information and belief, each of the foregoing cellular standards – GSM/GPRS/EDGE/UMTS/HSPA+/LTE EDGE – transmits within a frequency band having a lower limit greater than 300 megahertz. The 4G LTE signals are transmitted from a cellular radio port (fixed port) included in a cellular base station.

35. The accused Audi vehicles include “a transmitter adapted to transmit, within the frequency band, a resultant signal to the mobile unit in accordance with at least one of the plurality of signals.” For example, the MIB Main-Unit which includes a Marvell 88w8787-BRD2 Wi-Fi chip and supporting circuitry forming a Wi-Fi transceiver including a Wi-Fi transmitter.<sup>9</sup> The Wi-Fi transceiver is adapted to transmit within the frequency band (a Wi-Fi transmitter operating at 2.4 GHz), a resultant signal to the mobile unit (e.g., a Wi-Fi enabled smartphone, tablet or laptop computer) in accordance with at least one of the plurality of signals. Additionally, the Wi-Fi transceiver is configured to transmit RF signals, to a mobile device (e.g., a Wi-Fi enabled

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<sup>8</sup> See Exhibit H, available at [https://fccid.io/ANATEL/00770-15-07978/Manual-para-referencia\\_PPIS-LTE/F315AA92-B78C-4B1B-8695-E59EA1BD028D/PDF](https://fccid.io/ANATEL/00770-15-07978/Manual-para-referencia_PPIS-LTE/F315AA92-B78C-4B1B-8695-E59EA1BD028D/PDF).

<sup>9</sup> See Exhibit J, available at <https://fccid.io/T8GA270/Internal-Photos/Int-Photos-C2-3047618>.

smartphone, tablet or laptop computer). The Audi Wi-Fi is a mobile hotspot that provides Internet services to Wi-Fi enabled mobile devices via cellular networks. Thus, the Wi-Fi signals (RF signals) correspond to the received 4G LTE cellular signals (received fixed port signals). On information and belief, the Audi Wi-Fi, including the MIB System, provides Internet services to Wi-Fi enabled mobile devices via cellular networks, thus, the mobile device RF signal includes data extracted from the cellular signals (4G LTE and CDMA signals).

36. The accused Audi vehicles also include “a processor adapted to maximize an amount of transferred information to the mobile unit by evaluating a quality of each of the plurality of signals transmitted from the plurality of fixed radio ports.” For example, the Harman PPIS LTE module in the Audi Wi-Fi includes a processor that, on information and belief, is programmed to maximize an amount of transferred information to the mobile unit by evaluating a quality of each of the plurality of signals transmitted from the plurality of fixed radio ports.

37. Carucel Investments has been damaged as a result of Defendant’s infringing conduct described in this Count. Defendant is, thus, liable to Carucel Investments in an amount that adequately compensate it for Defendant’s infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284 and attorney fees under 35 U.S.C. § 285

## **COUNT II**

(INFRINGEMENT OF U.S. PATENT NO. 7,848,701)

38. Carucel Investments incorporates paragraphs 1 through 37 herein by reference.

39. The ‘701 Patent is valid, enforceable, and was duly and legally issued by the United States Patent and Trademark Office on December 7, 2010 after full and fair examination.

40. Carucel Investments is the owner of all rights, title, and interest in and to the '701 Patent and has standing to bring this lawsuit for infringement of the '701 Patent.

41. Defendant has and continues to directly infringe one or more claims of the '701 Patent in this judicial district and elsewhere in Texas and the United States, including at least claims 10, 15, 16, 17, 18, 31, 33, 34 and 35 by, among other things, making, using, offering for sale, selling and/or importing accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot.

42. Defendant directly infringes the '701 Patent by making, using, offering for sale, selling and/or importing the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot. Defendant is thereby liable for direct infringement.

43. Defendant has had knowledge of the '701 Patent, at least as early as service of this Complaint.

44. By way of illustration only, the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot include each and every element of claim 10 of the '701 Patent. For example, at least some of the accused Audi vehicles include a modular infotainment platform - MIB (the "Audi Wi-Fi") which is a mobile wireless router that acts as a mobile Wi-Fi hotspot in the Audi vehicle.<sup>10</sup>

45. The accused Audi vehicles include "[a] movable base station configured to move relative to Earth." For example, the Audi Modular Infotainment System manual provides that the vehicle has a "WiFi hotspot"<sup>11</sup> and that the Audi Wi-Fi is installed in and connected to the Audi vehicle, and that the Audi Wi-Fi and the mobile devices connected to the Audi Wi-Fi also move

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<sup>10</sup> See Exhibit G, Audi Modular Infotainment System Manual, p. 30.

<sup>11</sup> See *id.*

with traffic. The Audi vehicles are constructed to move with traffic at a rate of speed which is comparable to the speed of the traffic because vehicles operate on roadways in traffic and typically move with a rate of speed comparable to traffic.

46. The accused Audi vehicles include “a plurality of spatially separated antennas.” For example, the Audi Wi-Fi and the Harman PPIS LTE module operate in accordance with the 4G LTE communication standard, and, therefore receive cellular signals through multiple antennas. 4G LTE requires multiple cellular receive antennas.<sup>12</sup> The Audi Wi-Fi, therefore, includes at least two spatially separated cellular antennas.

47. The accused Audi vehicles include “a receiver configured to receive fixed port signals from a fixed port through the plurality of spatially separated antennas.” For example, the Harman PPIS LTE module operates in accordance with the 4G LTE communication standard, and, therefore receives cellular signals through multiple antennas. 4G LTE requires multiple cellular receive antennas.<sup>13</sup> The Audi Wi-Fi, therefore, includes at least two spatially separated cellular antennas. Additionally, The PPIS module includes a receiver configured to receive cellular RF signals, e.g., 4G LTE signals (fixed port signals) through at least two of the separated antennas. The 4G LTE signals are transmitted from a cellular radio port (fixed port) included in a cellular base station. The Audi vehicle, the Audi Wi-Fi located within the Audi vehicle, and the mobile devices connected to the Audi Wi-Fi all move relative to a plurality of fixed ports (e.g., cellular radio ports included in cellular base stations operated by cellular carriers).

48. The accused Audi vehicles include “a controller configured to align and combine the received fixed port signals.” For example, the Harman PPIS LTE module includes a processor

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<sup>12</sup> See Exhibit I, available at <https://www.anandtech.com/show/6541/the-state-of-qualcomms-modems-wtr1605-and-mdm9x25>.

<sup>13</sup> See *id.*

(controller), that on information and belief is programmed to align and combine the 4G LTE signals received through the multiple antennas.

49. The accused Audi vehicles also include “a transmitter configured to transmit radio frequency signals to a mobile device corresponding to the received fixed port signals.” For example, an MIB Main-Unit which includes a Marvell 88w8787-BRD2 Wi-Fi chip and supporting circuitry forming a Wi-Fi transceiver including a Wi-Fi transmitter.<sup>14</sup> The Wi-Fi transceiver is adapted to transmit radio frequency signals to the mobile unit (e.g., a Wi-Fi enabled smartphone, tablet or laptop computer) that correspond to received cellular signals. The MIB System is a mobile hotspot that provides Internet services to Wi-Fi enabled mobile devices via cellular networks. Thus, the Wi-Fi signals (radio frequency signals) correspond to the received 4G LTE cellular signals (received fixed port signals).

50. Carucel Investments has been damaged as a result of Defendant’s infringing conduct described in this Count. Defendant is, thus, liable to Carucel Investments in an amount that adequately compensate it for Defendant’s infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284 and attorney fees under 35 U.S.C. § 285.

### **COUNT III**

(INFRINGEMENT OF U.S. PATENT NO. 7,979,023)

51. Carucel Investments incorporates paragraphs 1 through 50 herein by reference.

52. The ‘023 Patent is valid, enforceable, and was duly and legally issued by the United States Patent and Trademark Office on July 12, 2011 after full and fair examination.

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<sup>14</sup> See Exhibit J, available at <https://fccid.io/T8GA270/Internal-Photos/Int-Photos-C2-3047618>.

53. Carucel Investments is the owner of all rights, title, and interest in and to the '023 Patent and has standing to bring this lawsuit for infringement of the '023 Patent.

54. Defendant has and continues to directly infringe one or more claims of the '023 Patent in this judicial district and elsewhere in Texas and the United States, including at least claims 11, 16, 17, 18, 19, 20, 21, 22 and 23 by, among other things, making, using, offering for sale, selling and/or importing accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot.

55. Defendant directly infringes the '023 Patent by making, using, offering for sale, selling and/or importing the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot. Defendant is thereby liable for direct infringement.

56. Defendant has had knowledge of the '023 Patent, at least as early as service of this Complaint.

57. By way of illustration only, the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot include each and every element of claim 11 of the '023 Patent. For example, at least some of the accused Audi vehicles include a modular infotainment platform - MIB (the "Audi Wi-Fi") which is a mobile wireless router that acts as a mobile Wi-Fi hotspot in the Audi vehicle.<sup>15</sup>

58. The accused Audi vehicles include "[a]n apparatus configured to move relative to Earth." For example, Audi Modular Infotainment System manual provides that the vehicle has a "WiFi hotspot"<sup>16</sup> and that the Audi Wi-Fi is installed in and connected to the Audi vehicle, and that the Audi Wi-Fi and the mobile devices connected to the Audi Wi-Fi also move with traffic.

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<sup>15</sup> See Exhibit G, Audi Modular Infotainment System Manual, p. 30.

<sup>16</sup> See *id.*

The Audi vehicles are constructed to move with traffic at a rate of speed which is comparable to the speed of the traffic because vehicles operate on roadways in traffic and typically move with a rate of speed comparable to traffic. The Audi vehicle, the Audi Wi-Fi located within the Audi vehicle, and the mobile devices connected to the Audi Wi-Fi all move relative to Earth.

59. The accused Audi vehicles include “a plurality of spatially separated antennas.” For example, the Audi Wi-Fi and the Harman PPIS LTE module operate in accordance with the 4G LTE communication standard, and, therefore receive cellular signals through multiple antennas. 4G LTE requires multiple cellular receive antennas.<sup>17</sup> The Audi Wi-Fi, therefore, includes at least two spatially separated cellular antennas.

60. The accused Audi vehicles include “a receiver configured to receive fixed port signals from a fixed port through the plurality of spatially separated antennas.” For example, the Harman PPIS LTE module operates in accordance with the 4G LTE communication standard, and, therefore receives cellular signals through multiple antennas. 4G LTE requires multiple cellular receive antennas.<sup>18</sup> The Audi Wi-Fi, therefore, includes at least two spatially separated cellular antennas. Additionally, The PPIS module includes a receiver configured to receive cellular RF signals, e.g., 4G LTE signals (fixed port signals) through at least two of the separated antennas. The 4G LTE signals are transmitted from a cellular radio port (fixed port) included in a cellular base station.

61. The accused Audi vehicles also include “a transmitter configured to transmit radio frequency signals to a mobile device corresponding to the received fixed port signals.” For example, an MIB Main-Unit which includes a Marvell 88w8787-BRD2 Wi-Fi chip and supporting

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<sup>17</sup> See Exhibit I, available at <https://www.anandtech.com/show/6541/the-state-of-qualcomms-modems-wtr1605-and-mdm9x25>.

<sup>18</sup> See *id.*



circuitry forming a Wi-Fi transceiver including a Wi-Fi transmitter.<sup>19</sup> The Wi-Fi transceiver is adapted to transmit radio frequency signals to the mobile unit (e.g., a Wi-Fi enabled smartphone, tablet or laptop computer) that correspond to received cellular signals. The MIB System is a mobile hotspot that provides Internet services to Wi-Fi enabled mobile devices via cellular networks. Thus, the Wi-Fi signals (radio frequency signals) correspond to the received 4G LTE cellular signals (received fixed port signals).

62. Carucel Investments has been damaged as a result of Defendant's infringing conduct described in this Count. Defendant is, thus, liable to Carucel Investments in an amount that adequately compensate it for Defendant's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284 and attorney fees under 35 U.S.C. § 285.

#### **COUNT IV**

(INFRINGEMENT OF U.S. PATENT NO. 8,463,177)

63. Carucel Investments incorporates paragraphs 1 through 62 herein by reference.

64. The '177 Patent is valid, enforceable, and was duly and legally issued by the United States Patent and Trademark Office on June 11, 2013 after full and fair examination.

65. Carucel Investments is the owner of all rights, title, and interest in and to the '177 Patent and has standing to bring this lawsuit for infringement of the '177 Patent.

66. Defendant has and continues to directly infringe one or more claims of the '177 Patent in this judicial district and elsewhere in Texas and the United States, including at least claims 16, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31, 47, 48, 49, 51, 52, and 53 by, among other things,

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<sup>19</sup> See Exhibit J, available at <https://fccid.io/T8GA270/Internal-Photos/Int-Photos-C2-3047618>.

making, using, offering for sale, selling and/or importing accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot.

67. Defendant directly infringes the '177 Patent by making, using, offering for sale, selling and/or importing the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot. Defendant is thereby liable for direct infringement.

68. Defendant has had knowledge of the '177 Patent, at least as early as service of this Complaint.

69. By way of illustration only, the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot practices every step in the method described in claim 16 of the '177 Patent. For example, at least some of the accused Audi vehicles include a modular infotainment platform - MIB (the "Audi Wi-Fi") which is a mobile wireless router that acts as a mobile Wi-Fi hotspot in the Audi vehicle.<sup>20</sup>

70. The accused Audi vehicles receive "fixed port signals from a fixed port through a plurality of spatially separated antennas moving relative to Earth." For example, the Harman PPIS LTE module operates in accordance with the 4G LTE communication standard, and, therefore receives cellular signals through multiple antennas. 4G LTE requires multiple cellular receive antennas.<sup>21</sup> The Audi Wi-Fi, therefore, includes at least two spatially separated cellular antennas. Additionally, The PPIS module includes a receiver configured to receive cellular RF signals, e.g., 4G LTE signals (fixed port signals) through at least two of the separated antennas. The 4G LTE signals are transmitted from a cellular radio port (fixed port) included in a cellular base station.

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<sup>20</sup> See Exhibit G, Audi Modular Infotainment System Manual, p. 30.

<sup>21</sup> See Exhibit I, available at <https://www.anandtech.com/show/6541/the-state-of-qualcomms-modems-wtr1605-and-mdm9x25>.

71. The accused Audi vehicles also transmit, “to a mobile device, radio frequency signals corresponding to the received fixed port signals.” For example, an MIB Main-Unit which includes a Marvell 88w8787-BRD2 Wi-Fi chip and supporting circuitry forming a Wi-Fi transceiver including a Wi-Fi transmitter.<sup>22</sup> The Wi-Fi transceiver transmits radio frequency signals signal to the mobile unit. The MIB System is a mobile hotspot that provides Internet services to Wi-Fi enabled mobile devices via cellular networks. Thus, the Wi-Fi signals (radio frequency signals) correspond to the received 4G LTE cellular signals (received fixed port signals).

72. Carucel Investments has been damaged as a result of Defendant’s infringing conduct described in this Count. Defendant is, thus, liable to Carucel Investments in an amount that adequately compensate it for Defendant’s infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284 and attorney fees under 35 U.S.C. § 285.

## **COUNT V**

(INFRINGEMENT OF U.S. PATENT NO. 8,718,543)

73. Carucel Investments incorporates paragraphs 1 through 72 herein by reference.

74. The ‘543 Patent is valid, enforceable, and was duly and legally issued by the United States Patent and Trademark Office on May 6, 2014 after full and fair examination.

75. Carucel Investments is the owner of all rights, title, and interest in and to the ‘543 Patent and has standing to bring this lawsuit for infringement of the ‘543 Patent.

76. Defendant has and continues to directly infringe one or more claims of the ‘543 Patent in this judicial district and elsewhere in Texas and the United States, including at least claims 10, 12, 13, 18, 19, 20, 21, 23, 25, 26, 44, 45, 49, 50, 51, 52, 53, 54, and 55 by, among other

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<sup>22</sup> See Exhibit J, available at <https://fccid.io/T8GA270/Internal-Photos/Int-Photos-C2-3047618>.

things, making, using, offering for sale, selling and/or importing accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot.

77. Defendant directly infringes the '543 Patent by making, using, offering for sale, selling and/or importing the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot. Defendant is thereby liable for direct infringement.

78. Defendant has had knowledge of the '543 Patent, at least as early as service of this Complaint.

79. By way of illustration only, the accused Audi vehicles with a mobile wireless router that acts as a mobile Wi-Fi hotspot that includes each and every element of claim 10 of the '543 Patent. For example, at least some of the accused Audi vehicles include a modular infotainment platform - MIB (the "Audi Wi-Fi") which is a mobile wireless router that acts as a mobile Wi-Fi hotspot in the Audi vehicle.<sup>23</sup>

80. The accused Audi vehicles include "a plurality of spatially separated antennas." For example, the Audi Wi-Fi and the Harman PPIS LTE module operate in accordance with the 4G LTE communication standard, and, therefore receive cellular signals through multiple antennas. 4G LTE requires multiple cellular receive antennas.<sup>24</sup> The Audi Wi-Fi, therefore, includes at least two spatially separated cellular antennas.

81. The accused Audi vehicles include "a receiver configured to receive, through the plurality of spatially separated antennas, a plurality of cellular signals from a plurality of base station interface circuits." For example, the Harman PPIS LTE module operates in accordance with the 4G LTE communication standard, and, therefore receives cellular signals through multiple

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<sup>23</sup> See Exhibit G, Audi Modular Infotainment System Manual, p. 30.

<sup>24</sup> See Exhibit I, available at <https://www.anandtech.com/show/6541/the-state-of-qualcomms-modems-wtr1605-and-mdm9x25>.

antennas. 4G LTE requires multiple cellular receive antennas. The Audi Wi-Fi, therefore, includes at least two spatially separated cellular antennas. Additionally, The PPIS module includes a receiver configured to receive cellular RF signals, e.g., 4G LTE signals (cellular signals) through at least two of the separated antennas. The 4G LTE signals (cellular signals) are received from base station radio interface circuits included in carrier cellular base stations.

82. The accused Audi vehicles also include “a transmitter configured to transmit a mobile device radio frequency signal to a mobile device moving relative to Earth while the apparatus is moving relative to the plurality of base station radio interface circuits and relative to Earth, the mobile device radio frequency signal including data extracted from the cellular signals.” For example, an MIB Main-Unit which includes a Marvell 88w8787-BRD2 Wi-Fi chip and supporting circuitry forming a Wi-Fi transceiver including a Wi-Fi transmitter.<sup>25</sup> The Wi-Fi transceiver is adapted to transmit a mobile device radio frequency signal to the mobile unit (e.g., a Wi-Fi enabled smartphone, tablet or laptop computer). The MIB System is a mobile hotspot that provides Internet services to Wi-Fi enabled mobile devices via cellular networks. Thus, the Wi-Fi signals (mobile device radio frequency signal) includes data extracted from the received 4G LTE cellular signals (received cellular signals). On information and belief, the Audi Wi-Fi, including the MIB System, is a mobile hotspot that provides Internet services to Wi-Fi enabled mobile devices via cellular networks, thus, the mobile device RF signal includes data extracted from the cellular signals (4G LTE and CDMA signals). Additionally, the Audi Modular Infotainment System manual provides that the Audi Wi-Fi is installed in and connected to the Audi vehicle, and that the Audi Wi-Fi and the mobile devices connected to the Audi Wi-Fi also move with traffic. The Audi vehicles are constructed to move with traffic at a rate of speed which is

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<sup>25</sup> See Exhibit J, available at <https://fccid.io/T8GA270/Internal-Photos/Int-Photos-C2-3047618>.

comparable to the speed of the traffic because vehicles operate on roadways in traffic and typically move with a rate of speed comparable to traffic. The MIB System provides WiFi service to devices in the vehicle while the MIB system (apparatus) is moving relative to the plurality of base station radio interface circuits within the cellular base stations and while moving relative to Earth.

83. Carucel Investments has been damaged as a result of Defendant's infringing conduct described in this Count. Defendant is, thus, liable to Carucel Investments in an amount that adequately compensate it for Defendant's infringements, which, by law, cannot be less than a reasonable royalty, together with interest and costs as fixed by this Court under 35 U.S.C. § 284 and attorney fees under 35 U.S.C. § 285.

#### **JURY DEMAND**

84. Carucel Investments hereby requests a trial by jury pursuant to Rule 38 of the Federal Rules of Civil Procedure.

#### **PRAAYER FOR RELIEF**

85. Carucel Investments requests that the Court find in its favor and against Defendant, and that the Court grant Carucel Investments the following relief:

- a. Judgment that one or more claims of the '904, '701, '023, '177, and '543 Patents have been infringed, either literally and/or under the doctrine of equivalents, by Defendant;
- b. Judgment that Defendant account for and pay to Carucel Investments all damages to and costs incurred by Carucel Investments because of Defendant's infringing activities and other conduct complained of herein;
- c. That Carucel Investments be granted pre-judgment and post-judgment interest on the damages caused by Defendant's infringing activities and other conduct complained of herein; and
- d. That Carucel Investments be granted such other and further relief as the Court may deem just and proper under the circumstances

Dated: December 18, 2018

Respectfully submitted,

*/s/ Sanford E. Warren, Jr.* \_\_\_\_\_  
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