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UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF CALIFORNIA

CARUCEL INVESTMENTS, L.P., a
Delaware limited partnership,

Plaintiff,

v.

NOVATEL WIRELESS, INC., a
Delaware corporation; AT&T
MOBILITY LLC, a Delaware limited
liability company; VERIZON
COMMUNICATIONS INC., a
Delaware corporation; and CELCO
PARTNERSHIP d/b/a VERIZON
WIRELESS,

Defendants.

CASE NO. 16-cv-0118-H-KSC

**PLAINTIFF CARUCEL
INVESTMENTS, L.P.'S
MEMORANDUM OF
CONTENTIONS OF FACT AND
LAW**

Trial Date: April 4, 2017

Time: 9 A.M.

Courtroom: 15A

Judge: Hon. Marilyn L. Huff

Carucel Investments—Exhibit 2102

IPR2019-01102: VW GoA, Inc. v. Carucel Investments L.P.

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Pursuant to Local Rule 16.1(f)(2) and this Court's scheduling orders, Plaintiff Carucel Investments, L.P. ("Carucel") hereby submits the following Memorandum of Contentions of Fact and Law. Carucel notes that it has prepared this Memorandum without the benefit of any pretrial disclosures from Defendants Novatel Wireless, Inc. ("Novatel"), Verizon Communications, Inc. ("Verizon"), and Cellco Partnership d/b/a Verizon Wireless ("Cellco," collectively "Defendants"). Accordingly, Carucel reserves the right to amend or supplement this Memorandum in response to Defendants' disclosures.

Additionally, the statements below regarding infringement and validity of Carucel's patents-in-suit are based upon the Court's construction of the terms in those patents. By making these statements, Carucel does not waive any claim construction issues with respect to those constructions, including but not limited to the right to appeal from the Court's Claim Construction order.

MATERIAL FACTS AND POINTS OF LAW

I. BACKGROUND

This case concerns Novatel's and Verizon/Cellco's infringement of Carucel's patents—U.S. patent 7,221,904 (the "'904 patent"); 7,848,701 (the "'701 patent"); 7,979,023 (the "'023 patent"); and 8,718,543 (the "'543 patent") (collectively the "Carucel patents"). Novatel designed, made, imported, marketed, used and sold a line of hotspot devices named MiFi (for "mobile Wi-Fi" or "My WI-Fi") that infringe the Carucel patents, and Verizon/Cellco sold, distributed, and used the infringing MiFi devices within the United States.¹ MiFi devices have

¹ Carucel's patents expired in June, 2015, after this case was originally filed in the Southern District of Florida. This case was transferred to this Court from the Southern District of Florida in January, 2016. Accordingly, Carucel is seeking a reasonable royalty from the Defendants for past unauthorized use of its inventions.

1 one and only one purpose—to act as an intermediary between cell towers and Wi-
2 Fi enabled user devices.

3 Carucel’s experts reviewed the discovery and evidence in this case and
4 provided their expert opinions regarding Defendants’ infringements and the
5 damage it has caused Carucel. For example, the reports and testimony of Dr.
6 Kamran Kiasaleh, who has over 30 years of experience in the wireless
7 communications industry and is a professor of Electrical Engineering at the
8 University of Texas, conclude that Defendants’ MiFi devices undoubtedly infringe
9 certain claims of each of Carucel’s patents. Dr. Kiasaleh also explains why,
10 contrary to Defendants’ assertions, Carucel’s patents are valid. Finally, economist
11 Dr. Patrick Kennedy has opined that Defendants’ infringements have harmed
12 Carucel and calculates reasonable royalties for such harm to be approximately
13 \$32.8 million for Verizon and \$17.2 million for Novatel.

14 Carucel looks forward to trial to vindicate its rights, and notes the following
15 issues the jury and Court will help resolve.

16 **A. Carucel’s History**

17 Carucel is a small, family-owned, limited partnership, whose sole assets are
18 the patents-in-suit. Carucel owns a total of eight patents related to the technology in
19 this suit, but is only asserting four of its eight patents against Defendants. The
20 Carucel patents concern inventions by the family patriarch, Charles D. Gavrilovich,
21 Sr., who passed away in July, 2015. Charles Gavrilovich, Jr. and his sister, Vera I.
22 Gavrilovich, are now the sole owners and managers of Carucel.

23 Inventor Charles Gavrilovich, Sr. founded Carucel in 1999 and invented the
24 patented technology at issue in this suit. He earned a M.S. in electrical engineering
25 and had 39 years of experience in the field of telecommunications, working for
26 leading companies, including Bell Labs, Lucent Technology, and Motorola.

1 Mr. Gavrilovich, Sr. was a prolific inventor during his lifetime. In addition to
 2 the Carucel patents, Mr. Gavrilovich was a named inventor on more than twenty
 3 other patents. Some of those patents, which were owned by Mr. Gavrilovich's
 4 former employers, were extremely valuable—with one former employer valuing
 5 certain patents by Mr. Gavrilovich, Sr. at over \$1 billion.

6 **B. The Carucel Patents**

7 The Carucel patents were the culmination of Mr. Gavrilovich's life's work.
 8 The Carucel patents claim several distinct inventions. Most importantly to the
 9 issues presented here, Mr. Gavrilovich invented a "mobile base station" that
 10 significantly improved wireless communications by acting as an intermediary
 11 between cell towers and user devices.

12 The asserted claims of the Carucel patents cover a movable base station or
 13 apparatus configured to provide important benefits to mobile user devices, such as
 14 smartphone, tablet and laptop users. In 1995, movable base stations like those
 15 patented by Mr. Gavrilovich did not exist. Fig. 4 of the '904 patent, reproduced
 16 below, shows a conceptual diagram of the mobile base station/apparatus that was
 17 invented by Mr. Gavrilovich, where no. 100 shows antennas to communicate with
 18 mobile units and no. 101 shows antennas to communicate with fixed base stations,
 19 i.e., cell towers. ('904 pat., 6:28-29, 5:25-29.)

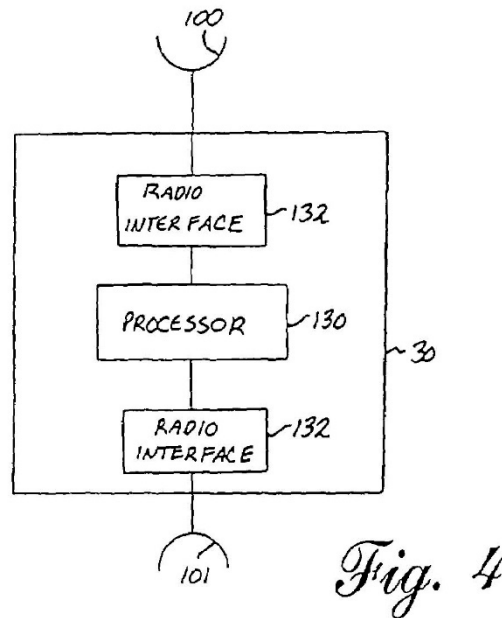


Figure 4 of the '904 Patent

Thus, Mr. Gavrilovich's inventive movable base station is a mobile wireless device that acts as an intermediary and provides connectivity between a cellular network and one or more mobile user devices. It provides a communication path between the mobile devices and cellular network that increases the available data bandwidth and quality of wireless service, which in turn provides important, tangible benefits to consumers by enabling fewer dropped calls and higher data throughput. For example, the inventive technology can be put in automobiles so that passengers of a car can listen to music or news, follow driving directions, watch streaming movies or play networked games (high bandwidth applications) on their tablets or other portable devices while travelling.

Increased bandwidth and service quality are hallmarks of modern cellular communications, allowing for many applications that did not exist at the time of the invention back in 1995—such as video chat, mobile multimedia, texting of high-resolution photos, etc. Mr. Gavrilovich's inventions enable higher bandwidths and service quality by addressing the handoff problems and data bandwidth constraints

1 that would otherwise exist, thereby allowing greater access to these modern day
2 applications.

3 At the time of the invention in 1995, conventional consumer cellular networks
4 generally did not provide high bandwidth to mobile users. A significant technical
5 challenge impeding high bandwidth was the “handoff” processing of connected
6 mobile devices. “Handoff” is a term of art that describes the situation that occurs
7 when a mobile device moves geographically from one cell to another within a
8 cellular network. As the mobile device moves between cells, its communication link
9 with the network may be dropped or disconnected unless it can be seamlessly
10 “handed-off” from one cell tower base station to another so as to ostensibly provide a
11 continuous, uninterrupted call or data link connection. Under the conventional
12 scheme, the network and mobile devices are burdened with processing handoffs as
13 the mobile devices move through cells of a cellular network. This burden increases
14 and reliability declines with increases in the travel speed of the mobile devices as
15 they move across cells, potentially becoming unmanageable, resulting in dropped
16 connections, interruptions and poor service.

17 Mr. Gavrilovich recognized this significant problem, among others, as
18 described in the specification. (’904 pat., 1:51-2:11.) His vision led to the patented
19 invention of a movable base station or apparatus interposed between mobile devices
20 and a cellular network.

21 The inventive mobile base station essentially provides a portable cell that
22 moves together with the mobile user devices. The user devices need only remain
23 wirelessly connected to a single mobile base station and do not need to repeatedly
24 handoff with multiple cellular network cell tower base stations. This reduces the
25 handoff processing burden on the mobile devices and the network and substantially
26 increases reliability, quality of service and available bandwidth. (’904 pat., 5:17-19.)

Although the Carucel patents all generally share the same specification, the asserted patents all claim different inventive aspects of a movable apparatus or movable base station, and thus differ in the scope of their claims. One inventive aspect has the mobile apparatus configured to communicate with multiple fixed radio ports of a cellular network (e.g., asserted claims of the '904 patent). Another aspect of the invention emphasizes multiple antennas of the mobile base station (e.g., asserted claims of the '701, '023, and '543 patents). Both of these inventive aspects further improve bandwidth and service quality of the mobile base station.

Starting in about 2000, Carucel made efforts to license or sell its patented technology. In October, 2014 Carucel successfully licensed its patented technology to [REDACTED]

[REDACTED].

C. The Accused MiFi Hotspot Devices

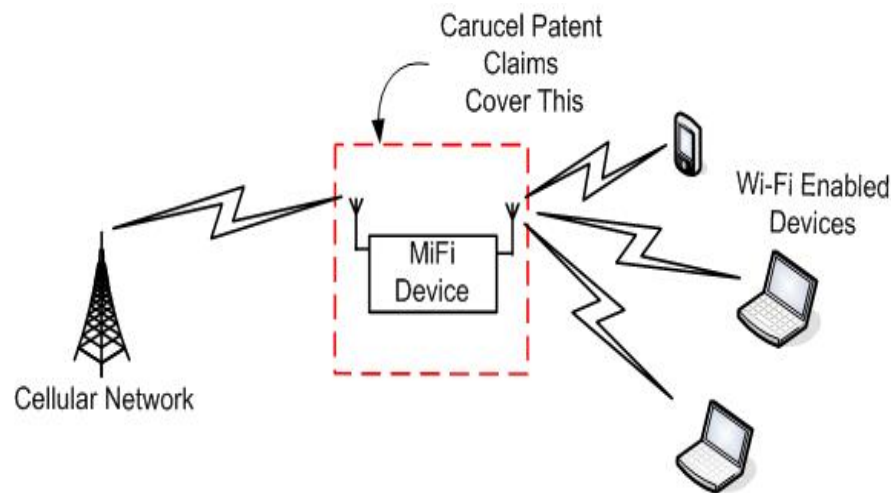
The accused products in this case are small, portable, electronic “MiFi” (Mobile Wi-Fi or My Wi-Fi) devices designed, manufactured, imported and sold by Novatel, and sold at retail to consumers together with cell network access by Verizon/Cellco. Carucel accuses five different MiFi product models of infringing each Carucel patent. The accused MiFi models are the: MiFi2200, MiFi4510, MiFi4620, MiFi5510, and MiFi6620. A representative photo of the MiFi2200 is shown below.



Photo of MiFi2200

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The sole purpose of MiFi devices is to wirelessly connect mobile user devices like laptop computers and tablets to cellular phone networks so that people can access the Internet or other data services on their Wi-Fi enabled computers wherever they have cell data access, which is particularly useful when users are not at traditional Wi-Fi locations such as home and work. A perfect example of this situation is when users are in moving cars. In operation, a MiFi device creates what is known as a “mobile Wi-Fi hotspot,” meaning a local Wi-Fi wireless local area network, a moving base station for the user devices to manage communication with the cellular network. The figure below shows a conceptual diagram of an infringing MiFi device in its operating environment (not to scale).



MiFi Operational Environment

Novatel designed, manufactured, sold, and imported and distributed the infringing MiFi devices from approximately 2009 to the present. Verizon, through its wholly owned subsidiary Cellco, retailed the accused MiFi models together with Verizon MiFi data service connection plans in the U.S. MiFi devices cannot be used without an accompanying data service, so the service fees are part of the cost of ownership to anyone who is going to use a MiFi device.

Carucel Investments—Exhibit 2102

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1 There is undisputed evidence that Novatel specifically designed the accused
2 MiFi devices for in-car use so that users could turn their cars into mobile Wi-Fi
3 hotspots as they traveled in traffic.

4 **II. THE PARTIES**

5 **A. Carucel**

6 Carucel is a Delaware limited partnership with its principal place of business
7 in Fort Lauderdale, FL. Carucel is the owner of all patents at issue in this case,
8 identified and discussed below.

9 **B. Novatel Wireless, Inc.**

10 Headquartered in San Diego, CA, Novatel Wireless described itself in its
11 2009 SEC filings as a provider of wireless broadband access solutions for the
12 worldwide mobile communications market. (*See* 2009 Novatel SEC filings.)
13 Currently, Novatel describes itself as a global provider of solutions for the Internet
14 of Things (“IoT”), including software-as-a-service (“SaaS”) solutions for the fleet
15 telematics market. (*See* 2015 Novatel SEC filings.) Novatel’s range of products in
16 2009 included MiFi intelligent mobile hotspots, embedded PCI express mini card
17 modems for OEMs, USB modems, the Merlin wireless PC card and ExpressCard
18 modems, and the MobiLink mobile communications suite. (*See* 2009 Novatel SEC
19 filing.) Novatel described the MiFi mobile intelligent hotspots as providing “both
20 WLAN and WWAN wireless connectivity to up to five users simultaneously from a
21 wide assortment of devices including notebook computers, music players and digital
22 cameras.” (*Id.*) Novatel registered the trademark “MiFi” and marketed its mobile
23 intelligent hotspots under that name. Novatel produced a series of MiFi devices for
24 various carriers and to operate with various wireless telephone technology standards
25 (e.g., 3G, GSM, LTE, etc.). (*Id.*) These Novatel MiFi devices are the subject of this
26 litigation. On September 22, 2016, Novatel announced the sale of its MiFi business
27 to T.C.L. Industries Holdings for \$50 million. (*See* 9/22/16 Novatel Press Release.)
28

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1 Novatel is now a wholly-owned subsidiary, indirectly, of T.C.L. Industry Holdings
2 of Hong Kong. (*Id.*)

3 C. Verizon Communications, Inc.

4 Founded in 1983, Verizon is a Delaware corporation with its principal place
5 of business in New York, New York. In 2009, Verizon described itself in its SEC
6 filings as “one of the world’s leading providers of communications services.” (*See*
7 2009 Verizon SEC filings.) In a recent 10-K, Verizon describes itself as “one of the
8 world’s leading providers of communications, information and entertainment
9 products and services to consumers, businesses and governmental agencies.” (*See*
10 Verizon 2016 10-K.) Until February 2014, Verizon’s Domestic Wireless
11 communication segment was run by a joint venture, Cellco Partnership doing
12 business as Verizon Wireless (Verizon Wireless). Cellco Partnership was formed in
13 April 2000 by the combination of the U.S. wireless operations and interests of
14 Verizon and Vodafone Group Plc (Vodafone). (*Id.*) Up until February 2014, Verizon
15 owned a controlling 55% interest in Verizon Wireless, and Vodafone owned the
16 remaining 45%. On February 21, 2014, Verizon completed the acquisition of
17 Vodafone’s 45% interest in Cellco Partnership for aggregate consideration of
18 approximately \$130 billion. (*Id.*)

19 According to Verizon’s 10-K, Verizon Wireless provides wireless
20 communications services across one of the most extensive wireless networks in the
21 United States. Measured by retail connections and revenue, Verizon Wireless is the
22 largest wireless service provider in the country. (*Id.*) As of December 31, 2015,
23 Verizon Wireless had 112.1 million retail connections and \$91.7 billion in revenues.
24 In 2009, Verizon’s Domestic Wireless segment accounted for 58% of the company’s
25 aggregate revenues. (*Id.*) By 2015, the Domestic Wireless segment represented
26 approximately 71% of Verizon’s aggregate revenues. (*Id.*)

As of 2009, Verizon’s primary network technology platform was CDMA. As of December 31, 2009, CDMA-1-XRTT technology was deployed in virtually all of its cell sites within its CDMA network and EV-DO, a third-generation packet-based technology intended primarily for high-speed data transmission, was deployed in approximately 94% of the cell sites within its CDMA network. (*See* Verizon SEC filings.) In December 2010, Verizon launched its 4G LTE network, adding to its CDMA technology platform. (*Id.*) By 2013, Verizon had “substantially completed the deployment of [its] fourth-generation (4G) Long-Term Evolution (LTE) network.” (*Id.*)

D. Cellco Partnership d/b/a Verizon Wireless

Cellco is a Delaware general partnership with its principal place of business in Basking Ridge, New Jersey. Verizon currently owns 100% of Cellco. The Verizon Wireless network is operated by Cellco, and the accused MiFi devices were sold through Cellco doing business under the brand Verizon Wireless.

III. Defendants Each Infringe the Asserted Claims of the Carucel Patents—Either Literally or Under the Doctrine of Equivalents

A. Infringement—Contentions of Law

“A determination of patent infringement under 35 U.S.C. § 271(a)² requires a two-step analysis — first, the language of the claim at issue must be interpreted to define its proper scope and, second, the evidence before the court must be examined to ascertain whether the claim has been infringed, whether the claim ‘reads on’ the accused product or process. The first inquiry is a question of law for the court while

² 35 U.S.C. § 271(a) states: “Except as otherwise provided in this title, whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent.”

1 the second is a question of fact.” *Minnesota Mining & Mfg. Co. v. Johnson &*
 2 *Johnson Orthopaedics, Inc.*, 976 F.2d at 1559, 1570 (Fed. Cir. 1992). Here, the first
 3 step has already been accomplished through the Court’s claim-construction Order
 4 for the Patents-in-Suit.³ (*See* Dkt. 131.)

5 “After claim construction, the next step in an infringement analysis is
 6 comparing the properly construed claims with the allegedly infringing devices or
 7 methods. This comparison is a question of fact.” *Ecolab, Inc. v. Envirochem, Inc.*,
 8 264 F.3d 1358, 1369 (Fed. Cir. 2001) (citing *Kemco Sales, Inc. v. Control Papers*
 9 *Co.*, 208 F.3d 1352, 1360 (Fed. Cir. 2000)); *see also Karlin Tech. Inc. v. Surgical*
 10 *Dynamics, Inc.*, 177 F.3d 968, 974 (Fed. Cir. 1999) (“The second step of the
 11 infringement analysis, i.e., comparing the properly construed claims to the device
 12 accused of infringing, is a question of fact.”).

13 Infringement occurs when each limitation of a properly interpreted claim is
 14 found in the accused product. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967
 15 (Fed. Cir. 1995). “It is axiomatic that the parameters of a patent right are defined by
 16 the claims of the patent, and that if the accused matter falls within the claims, literal
 17 infringement is made out.” *Drexelbrook Controls, Inc. v. Magnetrol Int’l, Inc.*, 720
 18 F. Supp. 397, 405 (D. Del. 1989), *aff’d*, 904 F.2d 45 (Fed. Cir. 1990). A patent
 19 holder may establish that an accused product meets every limitation of the asserted

21
 22 ³ Defendants have improperly asserted an impermissible claim construction that they
 23 had previously abandoned during the claim construction phase of the case, regarding
 24 the claim term “frequency band” as it appears in claim 22 of the ’904 patent. *See*
 25 Expert Rebuttal Report of J. Stevenson Kenney dated 12/23/2016 at 25-27. This is
 26 entirely untimely and highly prejudicial to Carucel because Defendants have waived
 27 their proposed construction. The parties identified “frequency band” as a Most
 28 Significant Term in the Claim Construction Hearing Statement (Dkt. 119 at 5, and
 offered competing proposed constructions (Dkt. 119-2 at B1-8). But Defendants
 failed to argue their proposed construction of this term in their Claim Construction
 Brief (Dkt. 120), thus adopting Carucel’s construction.

1 claims literally or equivalently. *TechSearch, L.L.C. v. Intel Corp.*, 286 F.3d 1360,
 2 1372 (Fed. Cir. 2002), *cert. denied*, 537 US 995 (2002).

3 Even though a claim may not be literally infringed, infringement can still be
 4 found under the doctrine of equivalents if the patentee establishes that differences
 5 between the claimed and accused products are insubstantial. *Warner-Jenkins Co. v.*
 6 *Hilton Davis Chemical Co.*, 520 U.S. 17 (1997). One way to establish equivalence
 7 is by the “function-way-result” test for equivalence established by the Supreme
 8 Court. Infringement may be found if the accused product and the claimed invention:
 9 (1) perform substantially the same function, (2) in substantially the same way, (3) to
 10 obtain substantially the same results. *Graver Tank & Manufacturing Co. v. Linde*
 11 *Air Products Co.*, 85 USPQ 328 (1966). The doctrine of equivalents must be
 12 applied on an element-by-element basis. *Warner-Jenkins Co.*, 520 U.S. at 40. The
 13 proper time frame for evaluating equivalency, and thus knowledge of
 14 interchangeability between elements, is at the time of infringement and not the time
 15 that the patent was issued. *Id.*

16 “An accused product that ‘imperfectly’ or ‘sometimes, but not always’
 17 embodies a claimed element or method nonetheless infringes.” *Stryker Corp. v.*
 18 *Davol, Inc.*, 75 F. Supp. 2d 741, 743 (W.D. Mich. 1999) (quoting *Bell*
 19 *Communications Research Inc. v. Vitalink Communications Corp.*, 55 F.3d 615,
 20 622-23 (Fed. Cir. 1995)), *aff’d*, 234 F.3d 1252 (Fed. Cir. 2000); *Paper Converting*
 21 *Mach. Co. v. Magna-Graphics Corp.*, 745 F.2d 11, 20 (Fed. Cir. 1984) (“That the
 22 machine was not operated in its optimum mode is inconsequential: imperfect
 23 practice of an invention does not avoid willful infringement.”). Moreover, if an
 24 apparatus or claimed element is “configure to” do something, then such a claim is
 25 always infringed by an accused device have the same configuration, whether or not
 26 the accused device is in operation or not. *See In re Giannelli*, 739 F.3d 1375 (Fed.
 27 Cir. 2014).

1 “The [patent owner] has the burden of proving infringement by a
 2 preponderance of the evidence,” i.e., that it is more likely than not that all of the
 3 elements of infringement have been proven. *Id*; see *Seal-Flex, Inc. v. Athletic Track*
 4 *& Court Construction*, 172 F.3d 836, 842 (Fed. Cir. 1999).

5 In light of the above principles, and against the factual record in this case,
 6 Carucel has clearly meet its burden of showing that the asserted claims of the
 7 Patents-in-Suit are literally infringed by the accused MiFi products, or alternatively,
 8 in certain instances, infringed under the doctrine of equivalents.

9 **B. Material Facts Regarding Infringement of Carucel’s Patents**

10 Defendants engaged in the design, manufacture, importation, distribution, use,
 11 offer for sale, and sale of the infringing MiFi mobile devices. These activities
 12 occurred within the United States. This is supported by, among other things,
 13 technical, marketing and financial documentation produced by each of the
 14 Defendants and the testimony of the Novatel and Verizon/Cellco corporate
 15 representatives regarding the infringing MiFi products, as well as the testimony of
 16 Dr. Slim Souissi, Mr. Charles Gavrilovich, Jr., and the report and testimony of
 17 technical expert Dr. Kiasaleh, as discussed below.

18 All of the asserted patents share a common specification, and all claim their
 19 priority date to June 2, 1995. The asserted Carucel patents claim different
 20 inventions and differ in the scope of their claims.

21 **1. The ’904 Patent**

22 The ’904 patent, entitled “Mobile Communications System with Moving Base
 23 Station” was filed on September 22, 1999 and issued on May 22, 2007. It has a
 24 priority date of June 2, 1995. Carucel accuses the Novatel MiFi 5510, MiFi 6620,
 25 MiFi 4510, MiFi 4620, and MiFi 2200 mobile hotspot devices (collectively the
 26 “accused MiFi products”) of infringing claims 22, 28, 29, 30, and 31, either literally
 27

1 or alternatively under the doctrine of equivalents. Claim 22 is an independent claim.
 2 Claims 28-31 depend from claim 22.

3 **2. Teachings of the '904 Patent Claims**

4 The asserted claims of the '904 patent describe a movable apparatus
 5 connecting with multiple fixed radio ports, e.g., cellular base stations. This enables
 6 consistent, continuous connections while the apparatus is moving. As Dr. Kiasaleh
 7 explained, this feature of the claimed invention supports “soft hand-offs,” which are
 8 a necessary, critical component to Novatel’s accused MiFi products in order to
 9 deliver key features including high data throughput, low error rates, and continuous
 10 connections to CDMA cellular networks.

11 Claim 22 teaches an “apparatus adapted to move [e.g., a moving base
 12 station] ... with a mobile unit [e.g., user cell phone]. The Court has construed
 13 “adapted to” in the quoted phrase to mean “constructed to move with the traffic at a
 14 rate of speed which is comparable to the speed of the traffic.” (*See* Claim
 15 Construction Order, Dkt. 131 and 131-1 at p. A1-1.)

16 The claimed apparatus is essentially an intermediary mobile wireless device
 17 that provides communications between a cellular network and a user mobile unit,
 18 e.g., a cell phone or laptop computer. The apparatus includes “a receiver” to receive
 19 signals from “fixed radio ports” (e.g., base stations within a cellular network), “a
 20 transmitter” to transmit a “resultant signal” to the user mobile unit based on one or
 21 more of the received fixed port signals, and “a processor” to maximize the amount
 22 of information transferred to the mobile unit by evaluating the quality of signals
 23 transmitted from the fixed radio ports.

24 Claim 22 specifically includes “a receiver adapted to receive a plurality of
 25 signals, each of the plurality of signals transmitted from each of the plurality of
 26 fixed radio ports within a frequency band having a lower limit greater than 300
 27

1 megahertz.” The patents do not restrict what frequency band must be used beyond
2 the lower limit greater than 300MHz.

3 Claim 28 includes all of the limitations of claim 22 and adds that the claimed
4 processor is adapted to determine a “best fixed radio port,” where the best fixed
5 radio port enables maximization of the amount of information transferred to the
6 mobile unit.

7 Claim 29 includes all of the limitations of claim 28 and adds that the claimed
8 transmitter is adapted to transmit the resultant signal according to the signal from
9 the “best fixed radio port.”

10 Claim 30 includes all of the limitations of claim 29 and adds that the claimed
11 processor is also adapted to determine multiple “best fixed radio ports” and combine
12 signals from the best fixed radio ports to produce the resultant signal that is then
13 transmitted to the mobile unit.

14 Claim 31 includes all of the limitations of claim 30 and adds that the claimed
15 processor is also adapted to combine the signals from the “best fixed radio ports” by
16 synchronizing the signals and then combining the synchronized signals according to
17 their quality in order to produce the resultant signal.

18 **3. Infringement of the '904 Patent**

19 Carucel asserts direct infringement of claims 22, 28, 29, 30, and 31 of the '904
20 patent by each of the Defendants. The accused products that infringe the
21 asserted '904 patent claims are: the Novatel MiFi 5510, MiFi 6620, MiFi 4510,
22 MiFi 4620, and MiFi 2200 mobile hotspot devices (collectively the “accused MiFi
23 products”). Each of these Novatel products includes all of the limitations of claims
24 22, 28, 29, 30, and 31. Novatel engaged in the design, manufacture, importation,
25 distribution, marketing, use, offer for sell, and sale of the infringing MiFi mobile
26 devices, and Verizon/Cellco marketed, used, and retailed the accused MiFi products
27 along with associated wireless data plans.

28 Carucel Investments—Exhibit 2102

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1 Literal infringement of claims 22, 28, 29, 30, and 31 of the '904 patent is
2 supported by, among other things, technical documentation produced by Defendants
3 regarding the accused Novatel MiFi products (cited in the attached exhibit list and
4 each incorporated herein by reference) and the testimony of Defendants' corporate
5 representatives, Messrs. Tidke, Linke, Schooler, and Benz, regarding the MiFi
6 products' designs and operation, as well as the testimony of Novatel's former CTO,
7 Dr. Slim Souissi, who was deeply involved in the development of the infringing
8 MiFi's; and the testimony of Charles Gavrilovich, Jr. Additionally, materials which
9 also provide support for Carucel's infringement contentions may be found in Dr.
10 Kiasaleh's Expert Report on Infringement dated 12/2/2016, also incorporated by
11 reference as if fully set forth herein (attached as Exhibit 3).

Carucel's technical expert, Dr. Kiasaleh, rendered his expert opinion that the accused MiFi products each literally infringe claims 22, 28, 29, 30, and 31 of the '904 patent. Dr. Kiasaleh's opinion is based on his decades of experience, knowledge and study of wireless communications technology, including that used by the accused MiFi products, and also on his extensive analysis and review of Novatel's technical documents and the testimony of Dr. Souissi and Mr. Tidke regarding the accused MiFi products. Dr. Kiasaleh's opinion describes in great detail why every limitation is present in each of the accused MiFi devices. (*See* Expert Report of Dr. Kamran Kiasaleh Ph.D. Regarding Infringement dated 12/2/2016, at 15-68.)

Dr. Kiasaleh's opinion concludes that the additional limitation "constructed to move with the traffic at a rate of speed which is comparable to the speed of the traffic" is met because each of the accused MiFi products is specifically "designed to be portable and to move alongside the PD [personal device] in a vehicle or other means of transportation." (*Id.*) This opinion is based on his knowledge, experience, and review of the Novatel technical documents and the testimony of Mr. Tidke and

1 Dr. Souissi in this case. Moreover, Dr. Souissi testified explicitly and at length that

2 [REDACTED]
 3 [REDACTED]
 4 [REDACTED]
 5 [REDACTED]. Mr. Linke further testified on behalf of Novatel that [REDACTED]
 6 [REDACTED]
 7 [REDACTED]

8 [REDACTED]. Also, Novatel, in conjunction with Sprint, advertised on television the
 9 MiFi's construction to be carried in a car moving with traffic. *See* Carucel
 10 0015000-0015001. Furthermore, Novatel's internal documents corroborate Dr.
 11 Souissi's testimony, and also describe Novatel's engineering efforts to build the
 12 MiFi4620 [REDACTED]

13 Indeed, the '904 specification expressly discloses that one way the claimed
 14 apparatus is "constructed to move with traffic at a speed comparable to the speed of
 15 the traffic" is that it "may be moved by means of a rail 35, or other suitable
 16 conveying device which may include an automotive vehicle travelling on the
 17 roadway." '904 patent at col 4, ll. 6-9.

18 Alternatively, were the phrase "constructed to move with traffic" not to be
 19 found literally in the accused MiFi products, they would nonetheless infringe under
 20 the doctrine of equivalents because there would be only insubstantial differences
 21 between the MiFi products and the claimed apparatus so constructed. The small
 22 form factor and portability of the accused MiFi devices meets the function-way-
 23 result test under the doctrine of equivalents for the "constructed to" limitation. The
 24 accused MiFi devices perform the same function—they can move with traffic at a
 25 comparable rate of speed by being placing in a moving vehicle driven on a highway,
 26 as disclosed in the Carucel patent specification. The accused devices also perform
 27 that function in the same way as the claimed movable base station—being moved by

28 Carucel Investments—Exhibit 2102

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1 vehicle at a speed comparable to the speed of traffic; and they also produce the exact
2 same results—a mobile wireless intermediary device that moves with traffic because
3 the MiFi devices are in cars.

4 Regarding the frequency band requirement, the requirement simply states that
5 the lower limit must be greater than 300Mhz. There is no other limitation. It is
6 undisputed that all of the MiFi devices transmit within the frequency band of
7 400MHz-70GHz. Thus, Defendants literally meet this limitation. Additionally,
8 were the frequency band is limited to a smaller bandwidth, the patent claims refer to
9 the concept of a frequency band but do not require each frequency band to be the
10 same; the reference to “the” frequency band in the claims is to the requirements of a
11 frequency band, which is simply that it have a lower limit of greater than 300 Mhz.

12 Alternatively, if “frequency band” appearing in claim 22 referred to one
13 specific, limited band assigned by the F.C.C. for a given transmission type (although
14 nothing in the patents provide such limitation), then Carucel may establish
15 infringement under the doctrine equivalents by proving that there are insubstantial
16 differences between the cellular and WiFi frequency bands in the context of claim
17 22. For example, using two arbitrarily assigned F.C.C. frequency band is no
18 different than using one wider frequency band. The communications still serve the
19 same functions of communicating with user devices and fixed base stations, they do
20 that the same way using the same type of transmitters, receivers, and antennas, and
21 they achieve the same result of acting as an intermediary between user devices and
22 fixed base stations. Under this contingency, all of the other elements of the claims
23 are literally present in the accused MiFi products.

24 Infringement of claims 22, 28, 29, 30, and 31 of the '904 patent literally or
25 under the doctrine of equivalents is supported by, among other things, technical
26 documentation produced by Defendant regarding the accused Novatel MiFi products
27 (cited in the attached exhibit list and each incorporated herein by reference) and the

28 Carucel Investments—Exhibit 2102

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1 testimony of Defendant's corporate representatives, Messrs. Tidke, Linke, Schooler,
 2 and Benz, regarding the MiFi products' designs and operation, as well as the
 3 testimony of Novatel's former CTO, Dr. Slim Souissi, who was deeply involved in
 4 the development of the infringing MiFi's; and the testimony of Charles Gavrilovich,
 5 Jr. Additionally, materials which also provide support for Carucel's infringement
 6 contentions may be found in Dr. Kiasaleh's Expert Report on Infringement,
 7 12/2/2016, and his additional testimony and any supplemental report describing the
 8 insubstantial differences between the frequency bands of the accused MiFi products
 9 and the claimed invention.

10 **4. The '701 Patent**

11 The '701 patent, entitled "Mobile Communications System with Moving Base
 12 Station" was filed on April 9, 2007, and issued on December 7, 2010. It has a
 13 priority date of June 2, 1995. Carucel accuses the Novatel MiFi 5510, MiFi 6620,
 14 MiFi 4510, MiFi 4620, and MiFi 2200 mobile hotspot devices (the accused MiFi
 15 products) of literally infringing claims 10 and 15. Carucel accuses MiFi 6620 of
 16 literally infringing claim 13. Claim 10 is an independent claim. Claims 13 and 15
 17 depend from claim 10.

18 **5. Teachings of the '701 Patent Claims**

19 Three of the patents-in-suit (the '701 Patent, '023 Patent, and the '543 Patent,
 20 collectively referred to as the "diversity patents") require multiple antennas for the
 21 reception of cellular network signals and for communicating with mobile user
 22 devices. The diversity patents are critical enabling patents; without practicing the
 23 patents, the performance of a MiFi device would not be sufficient to meet key
 24 performance requirements of Novatel's carrier customers or end users. These
 25 performance requirements include data throughput/bandwidth, low error rates, and
 26 connection continuity.
 27

1 The asserted claims of the '701 patent describe "a movable base station" that
 2 has "spatially separated antennas." These features enable significantly improved
 3 data throughput/bandwidth, low error rates, and connection continuity. As Dr.
 4 Kiasaleh explained, these features of the claimed invention are necessary, critical
 5 features of Novatel's accused MiFi products to support higher bandwidth considered
 6 crucial to deliver commercially viable products.

7 Claim 10 teaches a "movable base station configured to move relative to
 8 Earth." The Court has construed the term "configured to" to mean "constructed to
 9 move with the traffic at a rate of speed which is comparable to the speed of the
 10 traffic." (*See* Claim Construction Order, Dkt. 131 and 131-2 at p. A2-1.)

11 The claimed movable base station is essentially an intermediary mobile
 12 wireless device that provides communications between a cellular network and a
 13 mobile user device, e.g., a cell phone or laptop computer. The movable base station
 14 includes multiple "spatially separated antennas;" "a receiver" to receive signals from
 15 a fixed port e.g., cellular network, through the antennas; "a controller" to align and
 16 combine the received signals; and "a transmitter" to transmit radio frequency signals
 17 to a mobile user device that correspond to the received fixed port signals.

18 Claim 13 includes all of the limitations of claim 10 and adds "another plurality
 19 of spatially separated antennas." The transmitter of claim 13 is configured to
 20 transmit the radio frequency signals through the second set of antennas.

21 Claim 15 includes all of the limitations of claim 10 and adds that the controller
 22 is configured to compare the received fixed port signals to select a best signal.

23 **6. Infringement of the '701 Patent**

24 Carucel asserts direct infringement of claims 10, 13 and 15 of the '701 patent
 25 by each of the Defendants. The accused products that infringe the asserted '701
 26 patent claims are: the Novatel MiFi 5510, MiFi 6620, MiFi 4510, MiFi 4620, and
 27 MiFi 2200 mobile hotspot devices (collectively the "accused MiFi products"). Each

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1 of these Novatel products includes all of the limitations of claims 10 and 15. The
2 MiFi 6620 includes all of the limitations of claim 13.

3 Novatel engaged in the design, manufacture, importation, distribution,
4 marketing, use, offer for sell, and sale of the infringing MiFi mobile devices, and
5 Verizon/Cellco marketed, used, and retailed the accused MiFi products along with
6 associated wireless data plans.

7 Literal infringement of claims 10, 13 and 15 of the '701 patent is supported by,
8 among other things, technical documentation produced by Defendants regarding the
9 accused Novatel MiFi products (cited in the attached exhibit list and each
10 incorporated herein by reference) and the testimony of Defendants' corporate
11 representatives, Messrs. Tidke, Linke, Schooler, and Benz, regarding the MiFi
12 products' designs and operation, as well as the testimony of Novatel's former CTO,
13 Dr. Slim Souissi, who was deeply involved in the development of the infringing
14 MiFi's; and the testimony of Charles Gavrilovich, Jr. Additionally, materials which
15 also provide support for Carucel's infringement contentions may be found in Dr.
16 Kiasaleh's Expert Report on Infringement dated 12/2/2016, also incorporated by
17 reference as if fully set forth herein.

18 Carucel's technical expert, Dr. Kiasaleh, rendered his expert opinion that the
19 accused MiFi products each literally infringe claims 10 and 15 of the '701 patent;
20 and that the MiFi 6620 literally infringes claim 13. Dr. Kiasaleh's opinion is based
21 on his decades of experience, knowledge and study of wireless communications
22 technology, including that used by the accused MiFi products, and also on his
23 extensive analysis and review of Novatel's technical documents and the testimony
24 of Dr. Souissi and Mr. Tidke regarding the accused MiFi products. Dr. Kiasaleh's
25 opinion describes in great detail why every limitation is present in each of the
26 accused MiFi devices. (*See* Expert Report of Dr. Kamran Kiasaleh Ph.D. Regarding
27 Infringement dated 12/2/2016, at 68-119.)

1 Dr. Kiasaleh's opinion concludes that the additional limitation "constructed to
 2 move with the traffic at a rate of speed which is comparable to the speed of the
 3 traffic" is met because each of the accused MiFi products is specifically "designed
 4 to be portable and to move alongside the PD [personal device] in a vehicle or other
 5 means of transportation." (*Id.*) This opinion is based on his knowledge, experience,
 6 and review of the Novatel technical documents and the testimony of Mr. Tidke and
 7 Dr. Souissi in this case. Moreover, Dr. Souissi testified explicitly and at length that

8 [REDACTED]

9 [REDACTED]

10 [REDACTED]

11 [REDACTED]. Mr. Linke further testified on behalf of Novatel that [REDACTED]

12 [REDACTED]

13 [REDACTED]

14 [REDACTED]. Also, Novatel, in conjunction with Sprint, advertised on television the
 15 MiFi's construction in promoting it to be carried in a car moving with traffic. *See*
 16 Carucel 0015000-0015001.

17 Indeed, the '701 specification, which is essentially the same as the '904
 18 specification, expressly discloses that one way the claimed apparatus is "constructed
 19 to move with traffic" is that it "may be moved by means of a rail 35, or other
 20 suitable conveying device which may include an automotive vehicle travelling on
 21 the roadway." '904 patent at col 4, ll. 6-9.

22 Alternatively, if the "constructed to move with traffic" limitation is not met
 23 literally by the accused MiFi products, then Carucel can also assert and prove
 24 infringement under the doctrine equivalents by proving that there are insubstantial
 25 differences between the MiFi products and the claimed movable base station so
 26 constructed. Any differences between the accused MiFi devices and a movable base
 27 station constructed to move with traffic at the speed of traffic are insubstantial.

28 Carucel Investments—Exhibit 2102
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1 Indeed, the small form factor and portability of the accused MiFi devices meets the
 2 function-way-result test under the doctrine of equivalents for the “constructed to”
 3 limitation. The accused MiFi devices perform the same function—they can move
 4 with traffic at a comparable rate of speed by being placed in a moving vehicle
 5 driven on a highway, as disclosed in the Carucel patent specification. The accused
 6 devices also perform that function in the same way as the claimed movable base
 7 station/apparatus/transmitter—being moved by vehicle at a speed comparable to the
 8 speed of traffic; and they also produce the exact same results—a mobile wireless
 9 intermediary device that moves with traffic at a comparable rate of speed.

10 Infringement of claims 10 and 15 of the ’701 patent literally or under the
 11 doctrine of equivalents is supported by, among other things, technical
 12 documentation produced by Defendant regarding the accused Novatel MiFi products
 13 (cited in the attached exhibit list and each incorporated herein by reference) and the
 14 testimony of Defendant’s corporate representatives, Messrs. Tidke, Linke, Schooler,
 15 and Benz, regarding the MiFi products’ designs and operation, as well as the
 16 testimony of Novatel’s former CTO, Dr. Slim Souissi, who was deeply involved in
 17 the development of the infringing MiFi’s; and the testimony of Charles Gavrilovich,
 18 Jr. Additionally, materials which also provide support for Carucel’s infringement
 19 contentions may be found in Dr. Kiasaleh’s Expert Report on Infringement,
 20 12/2/2016, and any additional testimony and any supplemental report describing the
 21 insubstantial differences between the accused MiFi products and the claimed
 22 invention.

23 **7. The ’023 Patent**

24 The ’023 patent, entitled “Mobile Communications System with Moving Base
 25 Station” was filed on October 10, 2010, and issued on July 10, 2011. It has a
 26 priority date of June 2, 1995. Carucel accuses the Novatel MiFi 5510, MiFi 6620,
 27 MiFi 4510, MiFi 4620, and MiFi 2200 mobile hotspot devices (the accused MiFi

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1 products) of literally infringing claims 11, 21, 22, and 23. Carucel accuses MiFi
 2 6620 of literally infringing claim 14. Claim 11 is an independent claim. Claims 14,
 3 21, 22, and 23 depend from claim 11.

4 **8. Teachings of the '023 Patent Claims**

5 The '023 patent is one of Carucel's diversity patents, requiring multiple
 6 antennas for the reception of cellular network signals and for communicating with
 7 mobile user devices. The diversity patents are critical enabling patents; without
 8 practicing the patents, the performance of a MiFi device would not be sufficient to
 9 meet key performance requirements of Novatel's carrier customers or end users.
 10 These performance requirements include data throughput/bandwidth, low error
 11 rates, and connection continuity.

12 The asserted claims of the '023 patent describe "an apparatus configured to
 13 move relative to Earth" that has "spatially separated antennas." These features
 14 enable significantly improved data throughput/bandwidth, low error rates, and
 15 connection continuity. As Dr. Kiasaleh explained, these features of the claimed
 16 invention support a higher data bandwidth which is a necessary, critical feature of
 17 Novatel's accused MiFi products in order to deliver commercial viability of the
 18 products.

19 Claim 11 teaches an "apparatus configured to move relative to Earth." The
 20 Court has construed the term "configured to" to mean "constructed to move with the
 21 traffic at a rate of speed which is comparable to the speed of the traffic." (*See* Claim
 22 Construction Order, Dkt. 131 and 131-2 at p. A2-1.)

23 The claimed movable apparatus is essentially an intermediary mobile wireless
 24 device that provides communications between a cellular network and a mobile user
 25 device, e.g., a cell phone or laptop computer. The claimed apparatus includes
 26 multiple "spatially separated antennas;" "a receiver" to receive signals from a fixed
 27 port e.g., cellular network, through the antennas; and "a transmitter" to transmit

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1 radio frequency signals to a mobile user device that correspond to the received fixed
2 port signals.

3 Claim 14 includes all of the limitations of claim 11 and adds “another plurality
4 of spatially separated antennas.” The transmitter of claim 14 is configured to
5 transmit the radio frequency signals through the second set of antennas.

6 Claim 21 includes all of the limitations of claim 11 and adds that the receiver
7 is further configured to receive fixed port signals from multiple fixed ports through
8 the spatially separated antennas.

9 Claim 22 includes all of the limitations of claim 21 and adds that each signal
10 transmitted from fixed ports includes common data.

11 Claim 23 includes all of the limitations of claim 22 and adds that transmission
12 of each fixed port signal is delayed by a different time and that the receiver is
13 configured to receive and separate the different fixed port signals.

14 **9. Infringement of the '023 Patent**

15 Carucel asserts direct infringement of claims 11, 21, 22 and 23 of the '023
16 patent by each of the Defendants. The accused products that infringe the
17 asserted '023 patent claims are: the Novatel MiFi 5510, MiFi 6620, MiFi 4510,
18 MiFi 4620, and MiFi 2200 mobile hotspot devices (collectively the “accused MiFi
19 products”). Each of these Novatel products includes all of the limitations of claims
20 11, 21, 22 and 23. The MiFi 6620 includes all of the limitations of claim 14.

21 Novatel engaged in the design, manufacture, importation, distribution,
22 marketing, use, offer for sell, and sale of the infringing MiFi mobile devices, and
23 Verizon/Cellco marketed, used, and retailed the accused MiFi products along with
24 associated wireless data plans.

25 Literal infringement of claims 11, 14, 21, 22 and 23 of the '023 patent is
26 supported by, among other things, technical documentation produced by Defendants
27 regarding the accused Novatel MiFi products (cited in the attached exhibit list and

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each incorporated herein by reference) and the testimony of Defendants' corporate representatives, Messrs. Tidke, Linke, Schooler, and Benz, regarding the MiFi products' designs and operation, as well as the testimony of Novatel's former CTO, Dr. Slim Souissi, who was deeply involved in the development of the infringing MiFi's. Additionally, materials which also provide support for Carucel's infringement contentions may be found in Dr. Kiasaleh's Expert Report on Infringement dated 12/2/2016, also incorporated by reference as if fully set forth herein.

Carucel's technical expert, Dr. Kiasaleh, rendered his expert opinion that the accused MiFi products each literally infringe claims 11, 21, 22 and 23 of the '023 patent; and that the MiFi 6620 literally infringes claim 14. Dr. Kiasaleh's opinion is based on his decades of experience, knowledge and study of wireless communications technology, including that used by the accused MiFi products, and also on his extensive analysis and review of Novatel's technical documents and the testimony of Dr. Souissi and Mr. Tidke regarding the accused MiFi products. Dr. Kiasaleh's opinion describes in great detail why every limitation is present in each of the accused MiFi devices. (*See* Expert Report of Dr. Kamran Kiasaleh Ph.D. Regarding Infringement dated 12/2/2016, at 119-175.)

Dr. Kiasaleh's opinion concludes that the additional limitation "constructed to move with the traffic at a rate of speed which is comparable to the speed of the traffic" is met because each of the accused MiFi products is specifically "designed to be portable and to move alongside the PD [personal device] in a vehicle or other means of transportation." (*Id.*) This opinion is based on his knowledge, experience, and review of the Novatel technical documents and the testimony of Mr. Tidke and Dr. Souissi in this case. Moreover, Dr. Souissi testified explicitly and at length that

[REDACTED]

[REDACTED]

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[REDACTED]

[REDACTED] Mr. Linke further testified on behalf of Novatel that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] Also, Novatel, in conjunction with Sprint, advertised on television the MiFi's construction in promoting it to be carried in a car moving with traffic. *See* Carucel 0015000-0015001.

Indeed, the '023 specification, which is essentially the same as the '904 specification, expressly discloses that one way the claimed apparatus is “constructed to move with traffic” is that it “may be moved by means of a rail 35, or other suitable conveying device which may include an automotive vehicle travelling on the roadway.” '904 patent at col 4, ll. 6-9.

Alternatively, if the “constructed to move with traffic” limitation is not met literally by the accused MiFi products, then Carucel can also assert and prove infringement under the doctrine equivalents by proving that there are insubstantial differences between the MiFi products and the claimed movable base station/apparatus/transmitter so constructed. Any differences between the accused MiFi devices and an apparatus constructed to move with traffic at the speed of traffic are insubstantial. Indeed, the small form factor and portability of the accused MiFi devices meets the function-way-result test under the doctrine of equivalents for the “constructed to” limitation. The accused MiFi devices perform the same function—they can move with traffic at a comparable rate of speed by being placed in a moving vehicle driven on a highway, as disclosed in the Carucel patent specification. The accused devices also perform that function in the same way as the claimed movable base station/apparatus/transmitter—being moved by vehicle at a speed comparable to the speed of traffic; and they also produce the exact same

1 results—a mobile wireless intermediary device that moves with traffic at a
2 comparable rate of speed.

3 Infringement of claims 11, 14, 21, 22 and 23 of the '023 patent literally or
4 under the doctrine of equivalents is supported by, among other things, technical
5 documentation produced by Defendant regarding the accused Novatel MiFi products
6 (cited in the attached exhibit list and each incorporated herein by reference) and the
7 testimony of Defendant's corporate representatives, Messrs. Tidke, Linke, Schooler,
8 and Benz, regarding the MiFi products' designs and operation, as well as the
9 testimony of Novatel's former CTO, Dr. Slim Souissi, who was deeply involved in
10 the development of the infringing MiFi's; and the testimony of Charles Gavrilovich,
11 Jr. Additionally, materials which also provide support for Carucel's infringement
12 contentions may be found in Dr. Kiasaleh's Expert Report on Infringement,
13 12/2/2016, and any additional testimony and any supplemental report describing the
14 insubstantial differences between the accused MiFi products and the claimed
15 invention.

16 **10. The '543 Patent**

17 The '543 patent, entitled "Mobile Communications System with Moving Base
18 Station" was filed on May 16, 2013, and issued on May 6, 2014. It has a priority
19 date of June 2, 1995. Carucel accuses the Novatel MiFi 5510, MiFi 6620, MiFi
20 4510, MiFi 4620, and MiFi 2200 mobile hotspot devices (the accused MiFi
21 products) of literally infringing claim 10. Claim 10 is an independent claim.

22 **11. Teachings of the '543 Patent Claims**

23 The '543 patent is one of Carucel's diversity patents, requiring multiple
24 antennas for the reception of cellular network signals and for communicating with
25 mobile user devices. The diversity patents are critical enabling patents; without
26 practicing the patents, the performance of a MiFi device would not be sufficient to
27 meet key performance requirements of Novatel's carrier customers or end users.
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1 These performance requirements include data throughput/bandwidth, low error
2 rates, and connection continuity.

3 In addition to multiple antennas, claim 10 also describes a movable apparatus
4 connecting with multiple base stations interface circuits. This enables consistent,
5 continuous connections while the apparatus is moving. As Dr. Kiasaleh explained,
6 this feature of the claimed invention supports “soft hand-offs,” which are a
7 necessary, critical component to Novatel’s accused MiFi products in order to deliver
8 key features including high data throughput, low error rates, and continuous
9 connections to CDMA cellular networks. Thus, claim 10 covers multiple antenna
10 arrangements as well as multiple base station connections.

11 Claim 10 of the ’543 patent describe “an apparatus” that has multiple
12 “spatially separated antennas” and “a transmitter configured to transmit ... while the
13 apparatus is moving.” These features enable significantly improved data
14 throughput/bandwidth, low error rates, and connection continuity. As Dr. Kiasaleh
15 explained, these features of the claimed invention support a higher data bandwidth
16 which is a necessary, critical feature of Novatel’s accused MiFi products in order to
17 deliver commercial viability of the products.

18 Claim 10 teaches “a transmitter configured to transmit...” The Court has
19 construed the term “configured to” in this phrase to mean “constructed to move with
20 the traffic at a rate of speed which is comparable to the speed of the traffic.” (*See*
21 Claim Construction Order, Dkt. 131 and 131-4 at p. A4-3.)

22 Like the other asserted claims in this case, the apparatus of claim 10 is
23 essentially an intermediary mobile wireless device that provides communications
24 between a cellular network and a mobile user device, e.g., a cell phone or laptop
25 computer. The claimed apparatus includes multiple “spatially separated antennas;”
26 “a receiver” to receive cellular signals from multiple base station interface circuits,
27 through the antennas; and “a transmitter” configured to transmit radio frequency

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1 signals to a moving mobile device that include data extracted from the received
2 cellular signals.

3 **12. Infringement of the '543 Patent**

4 Carucel asserts direct infringement of claim 10 of the '543 patent by each of
5 the Defendants. The accused products that infringe claim 10 are: the Novatel MiFi
6 5510, MiFi 6620, MiFi 4510, MiFi 4620, and MiFi 2200 mobile hotspot devices
7 (collectively the "accused MiFi products"). Each of these Novatel products includes
8 all of the limitations of claim 10.

9 Novatel engaged in the design, manufacture, importation, distribution,
10 marketing, use, offer for sell, and sale of the infringing MiFi mobile devices, and
11 Verizon/Cellco marketed, used, and retailed the accused MiFi products along with
12 associated wireless data plans.

13 Literal infringement of claim 10 of the '543 patent is supported by, among
14 other things, technical documentation produced by Defendants regarding the
15 accused Novatel MiFi products (cited in the attached exhibit list and each
16 incorporated herein by reference) and the testimony of Defendants' corporate
17 representatives, Messrs. Tidke, Linke, Schooler, and Benz, regarding the MiFi
18 products' designs and operation, as well as the testimony of Novatel's former CTO,
19 Dr. Slim Souissi, who was deeply involved in the development of the infringing
20 MiFi's. Additionally, materials which also provide support for Carucel's
21 infringement contentions may be found in Dr. Kiasaleh's Expert Report on
22 Infringement dated 12/2/2016, also incorporated by reference as if fully set forth
23 herein.

24 Carucel's technical expert, Dr. Kiasaleh, rendered his expert opinion that the
25 accused MiFi products each literally infringe claim 10 of the '543 patent. Dr.
26 Kiasaleh's opinion is based on his decades of experience, knowledge and study of
27 wireless communications technology, including that used by the accused MiFi

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1 products, and also on his extensive analysis and review of Novatel’s technical
 2 documents and the testimony of Dr. Souissi and Mr. Tidke regarding the accused
 3 MiFi products. Dr. Kiasaleh’s opinion describes in great detail why every limitation
 4 is present in each of the accused MiFi devices. (*See* Expert Report of Dr. Kamran
 5 Kiasaleh Ph.D. Regarding Infringement dated 12/2/2016, at 175-200.)

6 Dr. Kiasaleh’s opinion concludes that the additional limitation “constructed to
 7 move with the traffic at a rate of speed which is comparable to the speed of the
 8 traffic” is met because each of the accused MiFi products is specifically “designed
 9 to be portable and to move alongside the PD [personal device] in a vehicle or other
 10 means of transportation.” (*Id.*) This opinion is based on his knowledge, experience,
 11 and review of the Novatel technical documents and the testimony of Mr. Tidke and
 12 Dr. Souissi in this case. Moreover, Dr. Souissi testified explicitly and at length that

13 [REDACTED]

14 [REDACTED]

15 [REDACTED]

16 [REDACTED] Mr. Linke further testified on behalf of Novatel that [REDACTED]

17 [REDACTED]

18 [REDACTED]

19 [REDACTED]. Also, Novatel, in conjunction with Sprint, advertised on television the
 20 MiFi’s construction in promoting it to be carried in a car moving with traffic. *See*
 21 Carucel 0015000-0015001.

22 Indeed, the ’543 specification, which is essentially the same as the ’904
 23 specification, expressly discloses that one way the claimed apparatus is “constructed
 24 to move with traffic” is that it “may be moved by means of a rail 35, or other
 25 suitable conveying device which may include an automotive vehicle travelling on
 26 the roadway.” ’904 patent at col 4, ll. 6-9.

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1 Alternatively, if the “constructed to move with traffic” limitation is not met
2 literally by the accused MiFi products, then Carucel can also assert and prove
3 infringement under the doctrine equivalents by proving that there are insubstantial
4 differences between the MiFi products and the claimed transmitter so constructed.
5 Any differences between the accused MiFi devices and a transmitter constructed to
6 move with traffic at the speed of traffic are insubstantial. Indeed, the small form
7 factor and portability of the accused MiFi devices meets the function-way-result test
8 under the doctrine of equivalents for the “constructed to” limitation. The accused
9 MiFi devices perform the same function—they can move with traffic at a
10 comparable rate of speed by being placed in a moving vehicle driven on a highway,
11 as disclosed in the Carucel patent specification. The accused devices also perform
12 that function in the same way as the claimed movable base
13 station/apparatus/transmitter—being moved by vehicle at a speed comparable to the
14 speed of traffic; and they also produce the exact same results—a mobile wireless
15 intermediary device that moves with traffic at a comparable rate of speed.

16 Infringement of claim 10 of the ’543 patent literally or under the doctrine of
17 equivalents is supported by, among other things, technical documentation produced
18 by Defendant regarding the accused Novatel MiFi products (cited in the attached
19 exhibit list and each incorporated herein by reference) and the testimony of
20 Defendant’s corporate representatives, Messrs. Tidke, Linke, Schooler, and Benz,
21 regarding the MiFi products’ designs and operation, as well as the testimony of
22 Novatel’s former CTO, Dr. Slim Souissi, who was deeply involved in the
23 development of the infringing MiFi’s; and the testimony of Charles Gavrilovich, Jr.
24 Additionally, materials which also provide support for Carucel’s infringement
25 contentions may be found in Dr. Kiasaleh’s Expert Report on Infringement,
26 12/2/2016, and any additional testimony and any supplemental report describing the

1 insubstantial differences between the accused MiFi products and the claimed
2 invention.

3 **IV. CARUCEL'S ASSERTED PATENT CLAIMS ARE VALID**

4 **A. Validity—Contentions of Law**

5 35 U.S.C. § 282 states in pertinent part:

6 A patent shall be presumed valid. Each claim of a patent (whether
7 in independent, dependent, or multiple dependent form) shall be
8 presumed valid independently of the validity of other claims;
9 dependent or multiple dependent claims shall be presumed valid
10 even though dependent upon an invalid claim. . . . The burden of
11 establishing invalidity of a patent or any claim thereof shall rest on
12 the party asserting such invalidity.

13 “A patent is presumed valid.” *Oney v. Ratliff*, 182 F.3d 893, 895 (Fed. Cir.
14 1999). The granting of a patent by the Patent Office carries with it the presumption
15 that the patent’s subject matter is new, useful and constitutes an advance that was
16 not, at the time the invention was made, obvious to one of ordinary skill in the art.
17 *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988). The law presumes
18 that the Patent Office acted correctly in issuing the patent. *See id.* “One who
19 challenges a patent’s validity must prove invalidity by clear and convincing
20 evidence.” *Id.* (citing *Finnigan Corp. v. Int’l Trade Comm’n*, 180 F.3d 1354, 1365
21 (Fed. Cir. 1999)); *see also Budde v. Harley-Davidson, Inc.*, 250 F.3d 1369, 1376
22 (Fed. Cir. 2001) (“Because the claims of a patent are afforded a statutory
23 presumption of validity, overcoming the presumption of validity requires that any
24 facts supporting a holding of invalidity must be proved by clear and convincing
25 evidence.”). “Clear and convincing evidence has been described as evidence which
26 proves in the mind of the trier of fact ‘an abiding conviction that the truth of [the]
27 factual contentions are highly probable.’” *Intel Corp. v. U.S. Int’l Trade Comm’n*,
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1 946 F.2d 821, 830 (Fed. Cir. 1991) (quoting *Colorado v. New Mexico*, 467 U.S. 310,
2 316 (1984)) (other citation omitted).

3 **1. Date of Invention**

4 To conduct an invalidity analysis, under law applicable to this case one begins
5 with the date of invention.⁴ The date when a patent application is filed is presumed
6 to be the date of invention. *Wang Labs., Inc. v. Mitsubishi Elec. Am. Inc.*, 30
7 U.S.P.Q.2d 1241, 1246 (C.D. Cal. 1993). However, when an infringer cites a
8 reference with an effective date prior to the patentee's application date in order to
9 show invalidity of the patent, and the patentee claims a pre-filing date of invention
10 in order to avoid the cited reference, the infringer must prove by clear and
11 convincing evidence that the patentee is not entitled to the pre-filing date of
12 invention. *Mahurkar v. C.R. Bard Inc.*, 79 F.3d 1572, 1578 (Fed. Cir. 1996);
13 *Innovative Scuba Concepts, Inc. v. Fed. Ind., Inc.*, 26 F.3d, 1112 1115 (Fed. Cir.
14 1994). A patentee is entitled to a date of conception as a date of the invention if it is
15 established that the inventor acted with due diligence in reducing the invention to
16 practice. *Price v. Symsek*, 988 F.2d 1187, 1190 (Fed. Cir. 1993).

17 Conception is the "formation in the mind of the inventor, of a definite and
18 permanent idea of the complete and operative invention, as it is hereafter to be
19 applied in practice." *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367,
20 1376 (Fed. Cir. 1986). Conception is complete when the inventor has formed the
21 idea of how to make and use every aspect of the claimed invention, and all that is
22 required is that it be made without the need for any further inventive effort. *See*,
23 *e.g., New Railhead Mfg., LLC v. Vermeer Mfg. Co.*, 298 F.3d 1290, 1294 (Fed. Cir.

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27 ⁴ The law regarding priority date was changed under the America Invents Act
28 ("AIA"), but the patents-in-suit all have priority dates prior to the passage of that
law, so the pre-AIA law applies.

2002); *Eli Lilly & Co. v. Barr Labs.*, 251 F.3d 955, 974 (Fed. Cir. 2001); *Sewall v. Walters*, 21 F.3d 411, 415 (Fed Cir. 1994).

The Federal Circuit adheres to the “rule of reason” and “totality of the circumstances” standard for corroborating evidence. *E.g.*, *Price v. Symsek*, 988 F.2d 1187, 1195 (Fed. Cir. 1993). “The rule suggests a reasoned examination, analysis and evaluation of all pertinent evidence so that a sound determination of the credibility of the inventor’s story may be reached. . . . The rule of reason, however, does not dispense with the requirement for some evidence of independent corroboration.” *Coleman v. Dines*, 754 F.2d 353, 360 (Fed. Cir. 1985). When assessing corroborating evidence, “[a]n evaluation of all pertinent evidence must be made so that a sound determination of the credibility of the inventor’s story may be reached.” *Price*, 988 F.2d at 1195.

The date of invention also requires determining the date when there was a “reduction to practice.” “In order to establish an actual reduction to practice, the inventor must prove that: (1) he constructed an embodiment or performed a process that met all the limitations . . . and (2) he determined that the invention would work for its intended purpose.” *Z4 Techs., Inc. v. Microsoft Corp.*, 507 F.3d 1340, 1352 (Fed. Cir. 2007) (quoting *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998)). “Constructive reduction to practice occurs when a patent application on the claimed invention is filed.” *Hybritech*, 802 F.2d at 1376.

2. Prior Art Under 35 U.S.C. § 102(a), (b)

“[I]n order to invalidate a patent based on prior knowledge or use, that knowledge or use must have been available to the public.” *Woodland Trust v. Flowertree Nursery, Inc.*, 148 F.3d 1368, 1370 (Fed. Cir. 1998). “[P]rior knowledge or use by others may invalidate a patent under § 102(a) if the prior knowledge or use was accessible to the public.” *Id.*

1 “[U]nder Section 102(a), a document is prior art only when published before
 2 the invention date.” *Mahurkar*, 79 F.3d at 1576. To constitute a publication, a
 3 document must be publicly accessible. A document is publicly accessible if it is
 4 “disseminated or otherwise made available to the extent that persons interested and
 5 ordinarily skilled in the subject matter or art exercising reasonable diligence, can
 6 locate it and recognize and comprehend therefrom the essentials of the claimed
 7 invention without need of further research or experimentation.” *Brucklemeyer v.*
 8 *Ground Heaters, Inc.*, 445 F.3d 1374, 1378 (Fed. Cir. 2006) (citations omitted).

9 In determining whether a reference qualifies as a “printed publication” under
 10 § 102(b), “the key inquiry is whether or not a reference has been made ‘publicly
 11 accessible.’” *In re Klopfenstein*, 380 F.3d 1345, 1348 (Fed. Cir. 2004).
 12 “[A]ccessibility goes to the issue of whether interested members of the relevant
 13 public could obtain the information if they wanted to.” *In re Elsner*, 381 F.3d 1125,
 14 1131 (Fed. Cir. 2004), quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d
 15 1560, 1569 (Fed. Cir. 1988). Where the public accessibility of a student thesis is at
 16 issue, courts look not only to whether the thesis was shelved in a public library, but
 17 also whether the thesis was “cataloged or indexed in a meaningful way.” *In re*
 18 *Cronyn*, 890 F.2d 1158, 1161 (Fed. Cir. 1989); *Ajinomoto Co.*, 1998 WL 151411
 19 (“The key to determining whether the [alleged prior art] thesis was publicly
 20 available is whether the thesis was indexed, cataloged, and shelved on the critical
 21 date.”).

22 Under Section 102(b), any description of the claimed invention in a printed
 23 publication prior to the critical date, i.e., one year before the effective filing date of
 24 the patent, is a statutory bar. *See* 35 U.S.C. § 102(b). Courts apply the same
 25 standards for determining whether a document is a printed publication and whether
 26 an invention is described in a printed publication under both 35 U.S.C. § 102(a) and
 27 § 102(b). *See, e.g.*, 2-6 Chisum on Patents § 6.02[4] (2006).

3. Anticipation

Anticipation is a question of fact that must be proved by clear and convincing evidence. *Glaxo Inc. v. Novopharm Ltd.*, 52 F.3d 1043, 1047 (Fed. Cir. 1995). The burden of proving anticipation by clear and convincing evidence rests with the party asserting invalidity. *See Koito Mfg. Co., Ltd. v. Turn-Key-Tech, LLC*, 381 F.3d 1142, 1151 (Fed. Cir. 2004).

“Invalidity for anticipation requires that all of the elements and limitations of the claim are found within a single prior art reference. . . . There must be no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention. *Scripps Clinic & Research Found. v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991) (citations omitted). “Every element of the claimed invention must be literally present [in the single prior art reference], arranged as in the claim. . . . The identical invention must be shown in as complete detail as is contained in the patent claim.” *Richardson v. Suzuki Motor Co., Ltd.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989) (citation omitted). “[A]nticipation does not permit an additional reference to supply a missing claim limitation.” *Teleflex, Inc. v. Ficos N. Am. Corp.*, 299 F.3d 1313, 1335 (Fed. Cir. 2002). Absence from the reference of any claimed element negates anticipation. *Atlas Powder Co. v. E.I. DuPont De Nemours*, 750 F.2d 1569, 1573-74 (Fed. Cir. 1984).

“In addition to identity of invention, anticipation [under § 102] requires that the prior art reference must be enabling, thus ‘placing the allegedly disclosed matter in the possession of the public.’” *Am. Standard Inc. v. Pfizer Inc.*, 722 F. Supp. 86, 109 (D. Del. 1989) (citation omitted). “A claimed invention cannot be anticipated by a prior art reference if the allegedly anticipatory disclosures cited as prior art are not enabled.” *Amgen Inc. v. Hoescht Marion Roussel, Inc.*, 314 F.3d 1313, 1354 (Fed. Cir. 2003). “To anticipate a claim, a reference must disclose every element of

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1 the challenged claim and enable one skilled in the art to make the anticipating
 2 subject matter.” *PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1566
 3 (Fed. Cir. 1996).

4 “For a prior art reference to anticipate a claim, the reference must disclose
 5 each and every element of the claim with sufficient clarity to prove its existence in
 6 the prior art.” *Motorola, Inc. v. Interdigital Tech. Corp.*, 121 F.3d 1461, 1473 (Fed.
 7 Cir. 1997). “Although this disclosure requirement presupposes the knowledge of
 8 one skilled in the art of the claimed invention, that presumed knowledge does not
 9 grant a license to read into the prior art reference teachings that are not there. An
 10 expert’s conclusory testimony, unsupported by the documentary evidence, cannot
 11 supplant the requirement of anticipatory disclosure in the prior art reference itself.”
 12 *Id.* “Every element of the claimed invention must be literally present [in a single
 13 prior art reference], arranged as in the claim. The identical invention must be shown
 14 in as complete detail as is contained in the patent claim.” *Richardson v. Suzuki*
 15 *Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989) (citations omitted). “An
 16 anticipating reference must describe the patented subject matter with sufficient
 17 clarity and detail to establish that the subject matter existed in the prior art and that
 18 such existence would be recognized by persons of ordinary skill in the field of the
 19 invention.” *Crown Operations Int’l Ltd. v. Solutia, Inc.*, 289 F.3d 1367, 1375 (Fed.
 20 Cir. 2002).

21 4. Obviousness

22 35 U.S.C. § 103 states in pertinent part:

23 A patent may not be obtained though the invention is not
 24 identically disclosed or described as set forth in section 102 of this
 25 title, if the differences between the subject matter sought to be
 26 patented and the prior art are such that the subject matter as a
 27 whole would have been obvious at the time the invention was

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1 made to a person having ordinary skill in the art to which said
 2 subject matter pertains. Patentability shall not be negated by the
 3 manner in which the invention was made.

4 Obviousness is a question of law based upon underlying questions of facts.
 5 *Okajima v. Bourdeau*, 261 F.3d 1350, 1354 (Fed. Cir. 2001); *Continental Can Co. v.*
 6 *Monsanto Co.*, 948 F.2d 1264, 1270 (Fed. Cir. 1991).

7 The underlying factual issues to be considered in an obviousness analysis
 8 include “four general types, all of which must be considered by the trier of fact: (1)
 9 the scope and content of the prior art; (2) the level of ordinary skill in the art; (3) the
 10 differences between the claimed invention and the prior art; and (4) any objective
 11 indicia of nonobviousness.” *Crown Operations Int’l, Ltd. v. Solutia Inc.*, 289 F.3d
 12 1367, 1376 (Fed. Cir. 2002). The United States Supreme Court reaffirmed the
 13 primacy of those factors in determining whether a patent is invalid for obviousness.
 14 *See KSR Int’l. Co. v. Teleflex Inc.*, 550 U.S. 398, 127 S. Ct. 1727, 1734 (2007)
 15 (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)). “Under § 103, the
 16 scope and content of the prior art are to be determined; differences between the prior
 17 art and the claims at issue are to be ascertained; and the level of ordinary skill in the
 18 pertinent art resolved. Against this background the obviousness or nonobviousness
 19 of the subject matter is determined.” *Id.* (quoting *Graham*, 383 U.S. at 17-18).

20 Obviousness requires disclosure or suggestion of all limitations in a claim.
 21 *See CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003)

22 “[W]hen the prior art teaches away from combining certain known elements,
 23 discovery of a successful means of combining them is more likely to be
 24 nonobvious.” *KSR*, 127 S.Ct. at 1740 (citing *United States v. Adam*, 383 U.S. 39
 25 (1966)).

26 If the proposed modification would render the prior art invention being
 27 modified unsatisfactory for its intended purpose, then there is no suggestion or

1 motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221
 2 USPQ 1125 (Fed. Cir. 1984) (emphasis added). If the proposed modification or
 3 combination of the prior art would change the principle of operation of the prior art
 4 invention being modified, then the teachings of the references are not sufficient to
 5 render the claims obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

6 “[R]ejections on obviousness grounds cannot be sustained by mere
 7 conclusory statements; instead, there must be some articulated reasoning with some
 8 rational underpinning to support the legal conclusion of obviousness.” *KSR*, 127 S.
 9 Ct. at 1741 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)). The Supreme
 10 Court in *KSR* “acknowledged the importance of identifying ‘a reason that would
 11 have prompted a person of ordinary skill in the relevant field to combine the
 12 elements in the way the claimed new invention does’ in an obviousness
 13 determination.” *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d
 14 1350, 1356-57 (Fed. Cir. 2007) (quoting *KSR*, 127 S. Ct. at 1731). “This is so
 15 because inventions in most, if not all, instances rely upon building blocks long since
 16 uncovered, and claimed discoveries almost of necessity will be combinations of
 17 what, in some sense, is already known.” *KSR*, 127 S.Ct. at 1741; *see also In re*
 18 *Kotzab*, 217 F.3d 1365, 1369-70 (Fed. Cir. 2000) (“[I]dentification in the prior art of
 19 each individual part claimed is insufficient to defeat patentability of the whole
 20 claimed invention.”). Indeed, “a patent is not proved obvious merely by
 21 demonstrating that each of its elements was, independently, known in the prior art.”
 22 *KSR*, 127 S. Ct. at 1731. That is, decomposing an invention into its constituent
 23 elements, finding each element in the prior art, and then claiming that it is easy to
 24 reassemble these elements into the invention, is a forbidden *ex post* analysis. *E.g.*,
 25 *In re Fritch*, 972 F.2d 1260, 1265-66 (Fed. Cir. 1992).

26 “Such secondary considerations as commercial success, long felt but unsolved
 27 needs, failure of others, etc., might be utilized to give light to the circumstances

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1 surrounding the origin of the subject matter sought to be patented.” *KSR*, 127 S. Ct.
 2 at 1734 (quoting *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)); *Ruiz v. A.B.*
 3 *Chance Co.*, 234 F.3d 654, 663 (Fed. Cir. 2000); *Ashland Oil, Inc. v. Delta Resins &*
 4 *Refractories, Inc.*, 776 F.2d 281, 306 (Fed. Cir. 1985); *Pentec Inc. v. Graphic*
 5 *Controls Corp.*, 776 F.2d 309, 315 (Fed. Cir. 1985). “[E]vidence of secondary
 6 considerations may often be the most probative and cogent evidence in the record.
 7 It may often establish that an invention appearing to have been obvious in light of
 8 the prior art was not. It is to be considered as part of all the evidence, not just when
 9 the decisionmaker remains in doubt after reviewing the art.” *Stratoflex, Inc. v.*
 10 *Aeroquip Corp.*, 713 F.2d 1530, 1538-39 (Fed. Cir. 1983). “The commercial
 11 response to an invention is significant to determinations of obviousness, and is
 12 entitled to fair weight.” *Demaco Corp. v. F. Von Langsdorff Licensing Ltd.*, 851
 13 F.2d 1387, 1391 (Fed. Cir. 1988). “The rationale for giving weight to the so-called
 14 ‘secondary considerations’ is that they provide objective evidence of how the
 15 patented device is viewed in the marketplace, by those directly interested in the
 16 product.” *Id.*

17 Commercial success of an infringer’s accused product is evidence of
 18 commercial success of the invention when there is sufficient nexus between the
 19 invention and the success of the infringing product. “When a patentee asserts that
 20 commercial success supports its contention of nonobviousness, there must of course
 21 be a sufficient relationship between the commercial success and the patented
 22 invention. The term ‘nexus’ is often used, in this context, to designate a legally and
 23 factually sufficient connection between the proven success and the patented
 24 invention, such that the objective evidence should be considered in the
 25 determination of nonobviousness. The burden of proof as to this connection or
 26 nexus resides with the patentee.” *Id.* at 1392.

1 “In meeting its burden of proof, the patentee in the first instance bears the
 2 burden of coming forward with evidence sufficient to constitute a prima facie case
 3 of the requisite nexus. . . . A prima facie case of nexus is generally made out when
 4 the patentee shows both that there is commercial success, and that the thing (product
 5 or method) that is commercially successful is the invention disclosed and claimed in
 6 the patent.” *Id.* “When the patentee has presented a prima facie case of nexus, the
 7 burden of coming forward with evidence in rebuttal shifts to the challenger. . . . It is
 8 thus the task of the challenger to adduce evidence to show that the commercial
 9 success was due to extraneous factors other than the patented invention, such as
 10 advertising, superior workmanship, etc.” *Id.* at 1393.

11 “[W]hen differences that may appear technologically minor nonetheless have
 12 a practical impact, particularly in a crowded field, the decision maker must consider
 13 the obviousness of the new structure in this light. Such objective indicia as
 14 commercial success, or filling an existing need, illuminate the technological and
 15 commercial environment of the inventor, and aid in understanding the state of the art
 16 at the time the invention was made.” *Continental Can Co. v. Monsanto Co.*, 948
 17 F.2d 1264, 1273 (Fed. Cir. 1991).

18 “[L]ong-felt need is analyzed as of the date of an articulated identified
 19 problem and evidence of efforts to solve that problem.” *Texas Instruments, Inc. v.*
 20 *United States Int’l Trade Comm’n.*, 988 F.2d 1165, 1178 (Fed. Cir. 1993).

21 In light of the above principles, and against the factual record in this case,
 22 defendants cannot meet their burden of showing that the asserted claims of any of
 23 the Patents-in-Suit are obvious.

24 **B. Material Facts—Validity of Carucel’s Asserted Claims**

25 Carucel incorporates by reference as if fully set forth herein the Rebuttal
 26 Expert Report of Dr. Kamran Kiasaleh, Ph.D. regarding validity, dated 12/23/2016,
 27

1 which sets forth in greater detail Carucel's contentions with respect to the validity of
2 the Carucel patents (attached as Exhibit 4).

3 **1. The Uhlirz Doctoral Thesis is Not Prior Art**

4 In his Expert Report on Invalidity, Defendants' technical expert Dr. J.
5 Stevenson Kenney references the doctoral thesis of Dr. Markus Uhlirz from the
6 Vienna University of Technology ("Uhlirz Thesis"). See Expert Report of J.
7 Stevenson Kenney, PhD on Invalidity dated 12/2/2016 at p. 38 ¶ 96 (hereinafter
8 "Defendants' Invalidity Report"). The Uhlirz Thesis was first published on or after
9 August 4, 1995, after the priority date of the asserted Carucel patents, June 2, 1995.
10 See CARUCEL015002-003, incorporated herein by reference. Thus, the Uhlirz
11 Thesis is not prior art against the Carucel patents under 35 U.S.C. § 102, and
12 therefore cannot be relied upon to find any of the asserted Carucel claims invalid as
13 allegedly being anticipated or obvious. Even if it were prior art, the Uhlirz Thesis
14 suffers all of the same infirmities as prior art as does the Uhlirz paper (discussed
15 below), which infirmities are explained at length in Dr. Kiasaleh's Rebuttal Expert
16 Report dated 12/23/2016.

17 **2. The Uhlirz Paper Does Not Anticipate Any of the Asserted Claims** 18 **Because It Is Not Enabling Prior Art**

19 "To anticipate a claim, a reference must disclose every element of the
20 challenged claim and *enable one skilled in the art to make the anticipating subject*
21 *matter.*" *PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1566 (Fed. Cir.
22 1996) (emphasis added).

23 Defendants' Invalidity Report relies heavily on a VTC 1994 paper entitled
24 "Concept of a GSM-base Communication System" by Markus Uhlirz (hereinafter
25 the "Uhlirz paper"). The Report asserts that the Uhlirz paper alone anticipates
26 claims 22, 28-29 and 32 of the '904 patent; claims 10, 13 and 15 of the '701 patent;
27 claims 11, 14, and 21-22 of the '023 patent; and claim 10 of the '543 patent.

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1 However, the Uhlirz paper is a five page conceptual paper generally
 2 describing a railroad GSM communication system at a high level, but lacking
 3 sufficient details to enable one of skill in the art to make the system disclosed in the
 4 paper. Thus, it cannot be used as prior art to anticipate the asserted claims of the
 5 Carucel patents. This is supported by the testimony of Dr. Uhlirz in this case, who
 6 authored the paper and repeatedly testified that it was merely a conceptual paper
 7 lacking details of how the described system was built. The conclusion that the
 8 Uhlirz paper is non-enabling is also supported by the Rebuttal Expert Report of Dr.
 9 Kamran Kiasaleh, Ph.D. Regarding U.S Patent Nos. 7,221,904; 7,848,701;
 10 7,979,023; and 8,718,543, dated 12/23/2016 (“Validity Rebuttal Report”),
 11 incorporated herein by reference. *See, e.g.*, Validity Rebuttal Report at ¶¶ 86-87.

12 **3. Validity of the Asserted Claims of the ’904 Patent**

13 Claims 22 and 28-31 of the ’904 patent are not anticipated by or obvious in
 14 view of the references relied upon by Defendants. Carucel’s validity positions are
 15 set forth in detail in the Validity Rebuttal Report, incorporated herein by reference.
 16 None of the alleged prior art references relied upon by Defendants—alone or in
 17 combination—disclose each and every limitation of the asserted claims. Nor would
 18 such limitations have been obvious to one of ordinary skill in the art.

19 Based on Dr. Kiasaleh’s experience in the wireless communications industry,
 20 the types of problems encountered in wireless communications systems, and the
 21 prior art solutions to those problems, a person of ordinary skill in the art pertinent to
 22 the patents-in-suit from the approximate time of the invention of the ’904 patent
 23 would be someone with: (1) a bachelor’s degree in Electrical Engineering and at
 24 least 5 years of experience in hardware and/or software design and implementation;
 25 or (2) a Master’s degree in Electrical Engineering with at least 2 years of experience
 26 in hardware and/or software design and implementation.

27 **a. Invention Date of the Claims of the ’904 Patent**

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1 The claims of the '904 patent are entitled to a priority date of June 2, 1995,
 2 because the patent properly claims priority to a PCT application, PCT/US95/07037,
 3 which was filed on June 2, 1995. Conception and diligent constructive reduction to
 4 practice of the claimed invention (filing of the PCT application) prior to June 2,
 5 1995 establishes that the invention date of the asserted claims in the '904 patent
 6 occurred before June 2, 1995. Conception and diligent reduction to practice for this
 7 earlier invention date, prior to June 2, 1995, is supported by the engineering logbook
 8 of Mr. Gavrilovich, Sr. (Carucel00001-00058) and the testimony of Mr.
 9 Gavrilovich, Jr., incorporated herein by reference. Further support for the
 10 conception date is fully described in the Validity Rebuttal Report at ¶ 221.

11 **b. Prior Art Identified by Defendants' Expert Does Not**
 12 **Invalidate any Asserted Claim of the '904 Patent**

13 The prior art references identified by Defendants' expert Dr. J. Stevenson
 14 Kenney do not anticipate or render obvious any of the asserted claims of the '904
 15 Patent. The bases and explanation for why each of the identified prior art references
 16 and combinations cited below do not invalidate any of the asserted claims is set
 17 forth and described in the Validity Rebuttal Report, incorporated herein by
 18 reference. The references which do not invalidate any asserted claim include:

- 19 1. The VTC 1994 paper entitled "Concept of a GSM-base Communication
 20 System" by Markus Uhlirz (hereinafter the "Uhlirz paper").
- 21 2. U.S. Patent 5,276,686 ("Ito" or the "Ito patent").
- 22 3. U.S. Patent 5,519,761 ("Gilhousen '761" or "Gilhousen '761 patent").
- 23 4. U.S. Patent 5,101,501 ("Gilhousen '501" or "Gilhousen '501 patent").
- 24 5. U.S. Patent 5,203,018 ("Hirose" or the "Hirose patent").
- 25 6. U.S. Patent 5,614,914 ("Bolgiano" or the "Bolgiano patent").
- 26 7. U.S. Patent 5,446,727 ("Bruckert" or "Bruckert patent").

1 The prior art references and combinations do not expressly or inherently
 2 disclose, teach, or render obvious the specific combination of limitations set forth in
 3 the asserted claims of the '904 patent as those limitations are construed by the
 4 Court. Nor is there evidence that anyone conceived of the invention set forth in the
 5 asserted claims of the '904 patent prior to the inventors named on the patent.

6 As set forth in the Validity Rebuttal Report, the cited references, either alone
 7 or in combination, fail to teach or suggest all of the limitations of the asserted
 8 claims. Moreover, certain combination of references would destroy the intended
 9 purpose or change the principle operation of the prior art, or plainly teach away
 10 from what is claimed. Finally, a person of ordinary skill in the art would not have
 11 been motivated to combine the teachings in the asserted references in the
 12 combinations identified by Defendants or their expert. The detailed description of
 13 the bases for lack of such motivation for each identified combination is set forth and
 14 described in the Validity Rebuttal Report.

15 **c. Secondary Considerations Support the Nonobviousness of**
 16 **the Asserted Claims of the Patents-in-Suit**

17 Secondary considerations confirm that the invention of the '904 Patent was
 18 nonobvious at the relevant time. As described in the Validity Rebuttal Report and
 19 Carucel's Supplemental Responses to Defendants' Interrogatories, secondary
 20 considerations confirming non-obviousness existed, including: the commercial
 21 success of products embodying the invention, including the accused MiFi products.
 22 Novatel sold about 7.9 million units of accused MiFi products worth about \$1
 23 billion dollars. And Verizon/Cellco sold about 4.5 million accused MiFi products
 24 along with data service plans worth about \$4.5 billion. These sales figures are
 25 supported by Defendants' produced financial documents, the testimony of their
 26 corporate representatives, and the Opening and Supplemental Expert Reports of
 27 Carucel's damages expert, Dr. Patrick Kennedy, dated December 2, 2016 and

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February 3, 2017, respectively, which are incorporated by reference as though fully set forth herein.

4. Validity of the Asserted Claims of the '701 Patent

Claims 11, 13 and 15 of the '701 patent are not anticipated by or obvious in view of the references relied upon by Defendants. Carucel's validity positions are set forth in detail in the Validity Rebuttal Report, incorporated herein by reference. None of the alleged prior art references relied upon by Defendants—alone or in combination—disclose each and every limitation of the asserted claims. Nor would such limitations have been obvious to one of ordinary skill in the art.

Based on Dr. Kiasaleh's experience in the wireless communications industry, the types of problems encountered in wireless communications systems, and the prior art solutions to those problems, a person of ordinary skill in the art pertinent to the patents-in-suit from the approximate time of the invention of the '701 patent would be would be someone with: (1) a bachelor's degree in Electrical Engineering and at least 5 years of experience in hardware and/or software design and implementation; or (2) a Master's degree in Electrical Engineering with at least 2 years of experience in hardware and/or software design and implementation.

a. Invention Date of the Claims of the '701 Patent

The claims of the '701 patent are entitled to a priority date of June 2, 1995 because the patent properly claims priority to a PCT application, PCT/US95/07037, which was filed on June 2, 1995. The invention date of the asserted claims in the '701 patent occurred before June 2, 1995, as corroborated by the engineering logbook of Mr. Gavrilovich, Sr. (Carucel00001-00058) and the testimony of Mr. Gavrilovich, Jr. This is fully described in the Validity Rebuttal Report at ¶ 221.

b. Prior Art Identified by Defendants' Expert Does Not Invalidate any Asserted Claim of the '701 Patent

1 The prior art references identified by Defendants' expert Dr. J. Stevenson
 2 Kenney do not anticipate or render obvious any of the asserted claims of the '701
 3 Patent. The bases and explanation for why each of the identified prior art references
 4 and combinations cited below do not invalidate any of the asserted claims is set
 5 forth and described in the Validity Rebuttal Report, incorporated herein by
 6 reference. The references which do not invalidate any asserted claim include:

- 7 1. The VTC 1994 paper entitled "Concept of a GSM-base Communication
 8 System" by Markus Uhlirz (hereinafter the "Uhlirz paper").
- 9 2. U.S. Patent 5,276,686 ("Ito" or the "Ito patent").
- 10 3. U.S. Patent 5,519,761 ("Gilhousen '761" or "Gilhousen '761 patent").
- 11 4. U.S. Patent 5,101,501 ("Gilhousen '501" or "Gilhousen '501 patent").
- 12 5. U.S. Patent 5,203,018 ("Hirose" or the "Hirose patent").
- 13 6. U.S. Patent 5,614,914 ("Bolgiano" or the "Bolgiano patent").
- 14 7. U.S. Patent 5,446,727 ("Bruckert" or "Bruckert patent").

15 The prior art references and combinations do not expressly or inherently
 16 disclose, teach, or render obvious the specific combination of limitations set forth in
 17 the asserted claims of the '701 patent as those limitations are construed by the
 18 Court. Nor is there evidence that anyone conceived of the invention set forth in the
 19 asserted claims of the '701 patent prior to the inventors named on the patent.

20 As set forth in the Validity Rebuttal Report, the cited references, either alone
 21 or in combination, fail to teach or suggest all of the limitations of the asserted
 22 claims. Moreover, certain combination of references would destroy the intended
 23 purpose or change the principle operation of the prior art, or plainly teach away
 24 from what is claimed. Finally, a person of ordinary skill in the art would not have
 25 been motivated to combine the teachings in the asserted references in the
 26 combinations identified by Defendants or their expert. The detailed description of
 27

1 the bases for lack of such motivation for each identified combination is set forth and
2 described in the Validity Rebuttal Report.

3 **c. Secondary Considerations Support the Nonobviousness of**
4 **the Asserted Claims of the Patents-in-Suit**

5 Secondary considerations confirm that the invention of the '701 Patent was
6 nonobvious at the relevant time. As described in the Validity Rebuttal Report and
7 Carucel's Supplemental Responses to Defendants' Interrogatories, secondary
8 considerations confirming non-obviousness existed, including: the commercial
9 success of products embodying the invention, including the accused MiFi products.
10 Novatel sold about [REDACTED] units of accused MiFi products worth about [REDACTED]
11 [REDACTED] dollars. And Verizon/Cellco sold about [REDACTED] accused MiFi products
12 along with data service plans worth about [REDACTED]. These sales figures are
13 supported by Defendants' produced financial documents, the testimony of their
14 corporate representatives, and the Opening and Supplemental Expert Reports of
15 Carucel's damages expert, Dr. Patrick Kennedy, dated December 2, 2016 and
16 February 3, 2017, respectively, which are incorporated by reference as though fully
17 set forth herein.

18 **5. Validity of the Asserted Claims of the '023 Patent**

19 Claims 10, 14, and 21-23 of the '023 patent are not anticipated by or obvious
20 in view of the references relied upon by Defendants. Carucel's validity positions are
21 set forth in detail in the Validity Rebuttal Report, incorporated herein by reference.
22 None of the alleged prior art references relied upon by Defendants—alone or in
23 combination—disclose each and every limitation of the asserted claims. Nor would
24 such limitations have been obvious to one of ordinary skill in the art.

25 Based on Dr. Kiasaleh's experience in the wireless communications industry,
26 the types of problems encountered in wireless communications systems, and the
27 prior art solutions to those problems, a person of ordinary skill in the art pertinent to

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1 the patents-in-suit from the approximate time of the invention of the '023 patent
 2 would be someone with: (1) a bachelor's degree in Electrical Engineering and at
 3 least 5 years of experience in hardware and/or software design and implementation;
 4 or (2) a Master's degree in Electrical Engineering with at least 2 years of experience
 5 in hardware and/or software design and implementation.

6 **a. Invention Date of the Claims of the '023 Patent**

7 The claims of the '023 patent are entitled to a priority date of June 2, 1995
 8 because the patent properly claims priority to a PCT application, PCT/US95/07037,
 9 which was filed on June 2, 1995. The invention date of the asserted claims in the
 10 '023 patent occurred before June 2, 1995, as corroborated by the engineering
 11 logbook of Mr. Gavrilovich, Sr. (Carucel00001-00058) and the testimony of Mr.
 12 Gavrilovich, Jr. This is fully described in the Validity Rebuttal Report at ¶ 221.

13 **b. Prior Art Identified by Defendants' Expert Does Not**
 14 **Invalidate any Asserted Claim of the '023 Patent**

15 The prior art references identified by Defendants' expert Dr. J. Stevenson
 16 Kenney do not anticipate or render obvious any of the asserted claims of the '023
 17 Patent. The bases and explanation for why each of the identified prior art references
 18 and combinations cited below do not invalidate any of the asserted claims is set
 19 forth and described in the Validity Rebuttal Report, incorporated herein by
 20 reference. The references which do not invalidate any asserted claim include:

- 21 1. The VTC 1994 paper entitled "Concept of a GSM-base Communication
 22 System" by Markus Uhlirz (hereinafter the "Uhlirz paper").
- 23 2. U.S. Patent 5,276,686 ("Ito" or the "Ito patent").
- 24 3. U.S. Patent 5,519,761 ("Gilhousen '761" or "Gilhousen '761 patent").
- 25 4. U.S. Patent 5,101,501 ("Gilhousen '501" or "Gilhousen '501 patent").
- 26 5. U.S. Patent 5,203,018 ("Hirose" or the "Hirose patent").
- 27 6. U.S. Patent 5,614,914 ("Bolgiano" or the "Bolgiano patent").

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1 7. U.S. Patent 5,446,727 (“Bruckert” or “Bruckert patent”).

2 The prior art references and combinations do not expressly or inherently
3 disclose, teach, or render obvious the specific combination of limitations set forth in
4 the asserted claims of the ’023 patent as those limitations are construed by the
5 Court. Nor is there evidence that anyone conceived of the invention set forth in the
6 asserted claims of the ’023 patent prior to the inventors named on the patent.

7 As set forth in the Validity Rebuttal Report, the cited references, either alone
8 or in combination, fail to teach or suggest all of the limitations of the asserted
9 claims. Moreover, certain combination of references would destroy the intended
10 purpose or change the principle operation of the prior art, or plainly teach away
11 from what is claimed. Finally, a person of ordinary skill in the art would not have
12 been motivated to combine the teachings in the asserted references in the
13 combinations identified by Defendants or their expert. The detailed description of
14 the bases for lack of such motivation for each identified combination is set forth and
15 described in the Validity Rebuttal Report.

16 **c. Secondary Considerations Support the Nonobviousness of**
17 **the Asserted Claims of the Patents-in-Suit**

18 Secondary considerations confirm that the invention of the ’023 Patent was
19 nonobvious at the relevant time. As described in the Validity Rebuttal Report and
20 Carucel’s Supplemental Responses to Defendants’ Interrogatories, secondary
21 considerations confirming non-obviousness existed, including: the commercial
22 success of products embodying the invention, including the accused MiFi products.
23 Novatel sold about [REDACTED] units of accused MiFi products worth about [REDACTED]
24 [REDACTED] dollars. And Verizon/Cellco sold about [REDACTED] accused MiFi products
25 along with data service plans worth about [REDACTED]. These sales figures are
26 supported by Defendants’ produced financial documents, the testimony of their
27 corporate representatives, and the Opening and Supplemental Expert Reports of

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1 Carucel's damages expert, Dr. Patrick Kennedy, dated December 2, 2016 and
 2 February 3, 2017, respectively, which are incorporated by reference as though fully
 3 set forth herein.

4 **6. Validity of the Asserted Claims of the '543 Patent**

5 Claim 10 of the '543 patent is not anticipated by or obvious in view of the
 6 references relied upon by Defendants. Carucel's validity positions are set forth in
 7 detail in the Validity Rebuttal Report, incorporated herein by reference. None of the
 8 alleged prior art references relied upon by Defendants—alone or in combination—
 9 disclose each and every limitation of the asserted claims. Nor would such
 10 limitations have been obvious to one of ordinary skill in the art.

11 Based on Dr. Kiasaleh's experience in the wireless communications industry,
 12 the types of problems encountered in wireless communications systems, the prior art
 13 solutions to those problems, a person of ordinary skill in the art pertinent to the
 14 patents-in-suit from the approximate time of the invention of the '904 patent would
 15 be someone with: (1) a bachelor's degree in Electrical Engineering and at least 5
 16 years of experience in hardware and/or software design and implementation; or (2) a
 17 Master's degree in Electrical Engineering with at least 2 years of experience in
 18 hardware and/or software design and implementation.

19 **a. Invention Date of the Claims of the '543 Patent**

20 The claims of the '543 patent are entitled to a priority date of June 2, 1995,
 21 because the patent properly claims priority to a PCT application, PCT/US95/07037,
 22 which was filed on June 2, 1995. The invention date of the asserted claims in the
 23 '543 patent occurred before June 2, 1995, as corroborated by the engineering
 24 logbook of Mr. Gavrilovich, Sr. (Carucel00001-00058) and the testimony of Mr.
 25 Gavrilovich, Jr. This is fully described in the Validity Rebuttal Report at ¶ 221.

26 **b. Prior Art Identified by Defendants' Expert Does Not** 27 **Invalidate any Asserted Claim of the '543 Patent**

28 Carucel Investments—Exhibit 2102
 IPR2019-01102: VW GoA, Inc. v. Carucel Investments L.P.

1 The prior art references identified by Defendants' expert Dr. J. Stevenson
 2 Kenney do not anticipate or render obvious any of the asserted claims of the '543
 3 Patent. The bases and explanation for why each of the identified prior art references
 4 and combinations cited below do not invalidate any of the asserted claims is set
 5 forth and described in the Validity Rebuttal Report, incorporated herein by
 6 reference. The references which do not invalidate any asserted claim include:

- 7 1. The VTC 1994 paper entitled "Concept of a GSM-base Communication
 8 System" by Markus Uhlirz (hereinafter the "Uhlirz paper").
- 9 2. U.S. Patent 5,276,686 ("Ito" or the "Ito patent").
- 10 3. U.S. Patent 5,519,761 ("Gilhousen '761" or "Gilhousen '761 patent").
- 11 4. U.S. Patent 5,101,501 ("Gilhousen '501" or "Gilhousen '501 patent").
- 12 5. U.S. Patent 5,203,018 ("Hirose" or the "Hirose patent").
- 13 6. U.S. Patent 5,614,914 ("Bolgiano" or the "Bolgiano patent").
- 14 7. U.S. Patent 5,446,727 ("Bruckert" or "Bruckert patent").

15 The prior art references and combinations do not expressly or inherently
 16 disclose, teach, or render obvious the specific combination of limitations set forth in
 17 the asserted claims of the '543 patent as those limitations are construed by the
 18 Court. Nor is there evidence that anyone conceived of the invention set forth in the
 19 asserted claims of the '543 patent prior to the inventors named on the patent.

20 As set forth in the Validity Rebuttal Report, the cited references, either alone
 21 or in combination, fail to teach or suggest all of the limitations of the asserted
 22 claims. Moreover, certain combination of references would destroy the intended
 23 purpose or change the principle operation of the prior art, or plainly teach away
 24 from what is claimed. Finally, a person of ordinary skill in the art would not have
 25 been motivated to combine the teachings in the asserted references in the
 26 combinations identified by Defendants or their expert. The detailed description of
 27

1 the bases for lack of such motivation for each identified combination is set forth and
2 described in the Validity Rebuttal Report.

3 **c. Secondary Considerations Support the Nonobviousness of**
4 **the Asserted Claims of the Patents-in-Suit**

5 Secondary considerations confirm that the invention of the '543 Patent was
6 nonobvious at the relevant time. As described in the Validity Rebuttal Report and
7 Carucel's Supplemental Responses to Defendants' Interrogatories, secondary
8 considerations confirming non-obviousness existed, including: the commercial
9 success of products embodying the invention, including the accused MiFi products.
10 Novatel sold about [REDACTED] units of accused MiFi products, bringing in revenue
11 of more than [REDACTED] dollars. And Verizon/Cellco sold about [REDACTED] million accused
12 MiFi products along with data service plans and brought in revenue in excess of
13 [REDACTED]. These sales figures are supported by Defendants' produced financial
14 documents, the testimony of their corporate representatives, and the Opening and
15 Supplemental Expert Reports of Carucel's damages expert, Dr. Patrick Kennedy,
16 dated December 2, 2016 and February 3, 2017, respectively, which are incorporated
17 by reference as though fully set forth herein.

18 **V. CARUCEL'S CONTENTIONS OF FACT AND LAW ON DAMAGES**

19 Defendants' infringement of the asserted patents entitles Carucel to an award
20 of damages. Carucel seeks a reasonable royalty for infringement by Defendants.
21 Carucel is not seeking lost profits. The patents expired on June 2015, so injunctive
22 relief is not requested.

23 **A. Damages Contentions of Law**

24 When a defendant is found to infringe a patent, the plaintiff is entitled to
25 damages as a matter of law:

26 Upon finding for the claimant the court shall award the claimant
27 damages adequate to compensate for the infringement, but in no event
28 less than a reasonable royalty for the use made of the invention by the
infringer, together with interest and costs as fixed by the court.

Carucel Investments—Exhibit 2102
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1 When the damages are not found by a jury, the court shall assess
 2 them. In either event the court may increase the damages up to three
 3 times the amount found or assessed. Increased damages under this
 4 paragraph shall not apply to provisional rights under section 154(d).

5 The court may receive expert testimony as an aid to the determination
 6 of damages or of what royalty would be reasonable under the
 7 circumstances.

8 35 U.S.C. § 284.

9 “In patent law, the fact of infringement establishes the fact of damage because
 10 the patentee's right to exclude has been violated.” *Lindemann Maschinenfabrik*
 11 *GmbH v. Am. Hoist & Derrick Co.*, 895 F.2d 1403, 1406 (Fed. Cir. 1990). Because
 12 a damages award is predicated on infringement of a valid patent, a proper damages
 13 analysis must assume that the patent in question is valid and infringed. *Apple Inc. v.*
 14 *Motorola, Inc.*, 757 F.3d 1286, 1315 (Fed. Cir. 2014). Evidence of damages may
 15 come from different sources, including fact witnesses and expert witnesses, and in
 16 any event under the relevant statute the district court is obligated to award damages
 17 once infringement is found. *Id.*; *See Dow Chem. Co. v. Mee Indus., Inc.*, 341 F.3d
 18 1370, 1382, n.4 (Fed. Cir. 2003); *Riles v. Shell Exploration & Prod. Co.*, 298 F.3d
 19 1302, 1312 (Fed. Cir. 2002); *SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*,
 20 926 F.2d 1161, 1167-68 (Fed. Cir. 1991).

21 A reasonable royalty, “the floor below which damages shall not fall,” may be
 22 calculated through a hypothetical negotiation, which “attempts to ascertain the
 23 royalty upon which the parties would have agreed had they successfully negotiated
 24 an agreement just before infringement began.” *Lucent Techs. Inc. v. Gateway Inc.*,
 25 580 F.3d 1301, 1324 (Fed. Cir. 2009). The hypothetical negotiation assumes that
 26 the asserted patent claims are valid and infringed. *Id.* at 1325.

Courts regularly apply the *Georgia-Pacific* factors⁵ to help determine the royalty that would result from such a hypothetical negotiation. *Uniloc USA, Inc. v.*

⁵ “1. The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty. 2. The rates paid by the licensee for the use of other patents comparable to the patent in suit. 3. The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold. 4. The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly. 5. The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promotor. 6. The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or convoyed sales. 7. The duration of the patent and the term of the license. 8. The established profitability of the product made under the patent; its commercial success; and its current popularity. 9. The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results. 10. The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention. 11. The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use. 12. The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions. 13. The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer. 14. The opinion testimony of qualified experts. 15. The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee -- who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention -- would have been willing to pay as a royalty and yet be able to make a reasonable profit and which amount would have been acceptable by a prudent patentee who was willing to grant a license.” *Georgia-Pacific Corp. v. U.S. Plywood Corp.*, 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970). Carucel Investments—Exhibit 2102

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1 *Microsoft Corp.*, 632 F.3d 1292, 1317 (Fed. Cir. 2011) (“This court has sanctioned
 2 the use of the Georgia-Pacific factors to frame the reasonable royalty inquiry. Those
 3 factors properly tie the reasonable royalty calculation to the facts of the hypothetical
 4 negotiation at issue.”); *see also LaserDynamics, Inc. v. Quanta Computer, Inc.*, 694
 5 F.3d 51, 76 (Fed. Cir. 2012); *and Lucent*, 580 F.3d 1301, 1324-1334.

6 Consistent with many of the *Georgia-Pacific* factors, the hypothetical
 7 negotiation analysis depends on the specific parties and acts of infringement. *See*
 8 *ResQNet.com, Inc. v. Lansa, Inc.*, 594 F.3d 860, 868 (Fed. Cir. 2010) (“A
 9 ‘reasonable royalty’ derives from a hypothetical negotiation between *the patentee*
 10 and *the infringer* when the infringement began.”) (emphasis added); *Applied Med.*
 11 *Res. Corp v. U.S. Surgical Corp.*, 435 F.3d 1356, 1361 (Fed. Cir. 2006). (“When an
 12 established royalty does not exist, a court may determine a reasonable royalty based
 13 on “hypothetical negotiations between willing licensor and willing licensee.”). As a
 14 result, different acts of infringement can necessitate different hypothetical
 15 negotiations even if the same parties are involved. *Applied Med*, 435 F.3d 1356,
 16 1361-1362. While the hypothetical negotiation occurs at the time that infringement
 17 began, an expert is permitted to utilize “the book of wisdom,” meaning information
 18 outside the hypothetical negotiation timeframe, in calculating a reasonable royalty.
 19 *Sinclair Refining Co. v. Jenkins Petroleum Process Co.*, 289 U.S. 689, 698 (1933).

20 The Federal Circuit “has also recognized that estimating a ‘reasonable
 21 royalty’ is not an exact science. As such, the record may support a range of
 22 ‘reasonable’ royalties, rather than a single value. Likewise, there may be more than
 23 one reliable method for estimating a reasonable royalty. *See, e.g., In re Innovatio IP*
 24 *Ventures, LLC Patent Litig., MDL 2303, 2013 U.S. Dist. LEXIS 144061, 2013 WL*
 25 *5593609, at *30-*40 (N.D. Ill. Oct. 3, 2013)* (undertaking a detailed evaluation of
 26 the different methods proposed by the parties of valuing the patents at issue).” *Apple*
 27 *v. Motorola*, 757 F.3d at 1315.

1 In evaluating comparable licensing agreements under the *Georgia-Pacific*
 2 factors, agreements resulting from litigation should be treated with caution. *Laser*
 3 *Dynamics v. Quanta Computer, Inc.*, 694 F.3d 51, 77 (Fed. Cir. 2012). Regardless,
 4 such agreements can be considered, particularly when they are the most reliable
 5 licenses for comparison. *ResQNet.com, Inc.*, 594 F.3d 860, 872. “For example, a
 6 party may use the royalty rate from sufficiently comparable licenses, value the
 7 infringed features based upon comparable features in the marketplace, or estimate
 8 the value of the benefit provided by the infringed features by comparing the accused
 9 product to non-infringing alternatives.” *Id.* “As we have held many times, using
 10 sufficiently comparable licenses is a generally reliable method of estimating the
 11 value of a patent.” *Id.*, at 1326 (Fed. Cir. 2014); *see also ActiveVideo Networks, Inc.*
 12 *v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1333 (Fed. Cir. 2012); *Maxwell v. J.*
 13 *Baker, Inc.*, 86 F.3d 1098, 1110 (Fed. Cir. 1996).

14 “A party may also use what this court has referred to as ‘the analytical
 15 method,’ focusing on the infringer's projections of profit for the infringing product.”
 16 *Summit 6, LLC v. Samsung Elecs. Co.*, 802 F.3d 1283, 1296 (Fed. Cir. 2015) (*citing*
 17 *Lucent Techs., Inc. v. Gateway, Inc.*, 580 F.3d 1301, 1324 (Fed. Cir. 2009)).

18 “Consistent with [Federal Rule of Evidence] Rule 703, patent damages
 19 experts often rely on technical expertise outside of their field when evaluating
 20 design around options or valuing the importance of the specific, infringing features
 21 in a complex device.” *Apple v. Motorola*, at 1321 (citing *Monsanto Co. v. David*,
 22 516 F.3d 1009, 1015 (Fed. Cir. 2008).) It is proper for damages experts to opine as
 23 to the value of the invention, not simply the value of the accused device as a whole
 24 (unless the entire market value of the device is derived from the invention). *Id.*, at
 25 1318; *see also Gen. Motors Corp. v. Devex Corp.*, 461 U.S. 648, 655 (1983).
 26 Apportionment of the value of the invention should properly rely on expert
 27 testimony and not simply an unsupported assertion by a damages expert. *Apple v.*

28 Carucel Investments—Exhibit 2102

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1 *Motorola*, at 1321. The Federal Circuit has also confirmed that apportionment
 2 based on component costs in the bill of materials for components that are used for
 3 an invention are an appropriate method to establish the value. *See, e.g., Summit 6*, at
 4 1645.

5 **B. Damages Contentions of Fact**

6 The patents at issue are the work of inventor Charles Gavrilovich, Sr. who
 7 presciently identified real issues with cellular network communications and tackled
 8 those problems in the patents-in-suit. Mr. Gavrilovich's experience at Bell Labs,
 9 Lucent and Motorola over almost three decades gave him knowledge and insight to
 10 take on big issues. In so doing, he invented key technology at the core of the
 11 accused MiFi device. His invention enables the entire category of MiFi devices by
 12 solving technological issues with mobile devices that serve as intermediary
 13 communications points between user devices and cellular networks. As a result,
 14 Carucel as a company properly understood that this patent portfolio is worth at least
 15 tens to hundreds of millions of dollars based on the company's own market
 16 investigation and experience. Company witnesses who understand the value of these
 17 patents, including Charles Gavrilovich, Jr., are prepared to testify as to damages to
 18 Carucel by Defendants and a reasonable royalty for infringement of the asserted
 19 patents.

20 Additionally, Carucel retained an economist who specializes in assessing
 21 damages in lawsuits including patent lawsuits, Patrick Kennedy, Ph.D. Dr. Kennedy
 22 used his decades of experience in this area to conduct damages analysis for the
 23 patents-in-suit with respect to Defendants Novatel and Verizon (a.k.a. Cellco). Dr.
 24 Kennedy analyzed the *Georgia-Pacific* factors regarding a hypothetical negotiation
 25 between each defendant and the plaintiff to arrive at a proper reasonable royalty.
 26 Dr. Kennedy's reasoning and opinions are incorporated fully herein by reference.

27 **Importance of the Patented Invention**

28 Carucel Investments—Exhibit 2102
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1 Dr. Kennedy based his valuation of a reasonable royalty on the work of Dr.
2 Kiasaleh. Per Dr. Kiasaleh, the Patents-in-Suit are necessary for the realization of a
3 mobile base station that has the capability of communication with terrestrial cellular
4 networks and that can be a bridge between cellular networks and personal devices
5 that do not possess cellular communications capability. Dr. Kiasaleh's technical
6 opinions noted that the Diversity Patents are critical enabling patents; without
7 practicing the patents the performance of a mobile base station platform would not
8 be sufficient to meet key performance requirements of Novatel's or Verizon's
9 carrier customers or end users, including throughput/bandwidth, low error rates, and
10 connection continuity. Additionally, according to Dr. Kiasaleh, the patents promote
11 efficient power usage. (*See* Ex. 5, Kennedy Revised Report re Novatel, at 6.)

12 Novatel itself recognized the value of better connectivity, touting in 2009 that
13 its MiFi2200 devices include "[e]nhanced performance and less connectivity
14 interruptions." (*Id.*, at 8.) Mobility was also a primary advertising point for Novatel.
15 Novatel product literature also highlighted [REDACTED]
16 [REDACTED], all of which Dr. Kiasaleh confirmed were enabled or
17 enhanced by the patents-in-suit. (*Id.*, at 9.) Higher bandwidth (resulting in higher
18 speeds) was of primary importance to buyers of the Wi-Fi enabled devices. (*Id.*)

19 Using the patented inventions, Novatel was able to obtain the Best Notebook
20 Accessory award at the Consumer Electronics Show in 2011. In its news release
21 about the award, Novatel credited the award to the exact features of the patented
22 invention: "Unlike any other device, the MiFi Intelligent Mobile Hotspot is
23 optimized for mobile data and ease-of-use, with dedicated and uninterrupted data
24 sessions, optimized power management for data users, and advanced integrated
25 antenna technology for maximum performance." (*Id.*, at 10.) Novatel deponents
26 including Steven Linke, Director of Channel Sales and Operations, testified that [REDACTED]
27 [REDACTED].

1 Additionally, Sangram Tidke, Director of Software Engineering at Novatel, testified
2 specifically [REDACTED]

3 [REDACTED].
4 Public reception to the infringing devices was enthusiastic, especially for
5 people who found the ability to use the MiFi devices on the road critical. “Since the
6 devices work anywhere there's coverage, they also work while in a car, on a train, or
7 in Wi-Fi-free locations.” (*Id.*, at 19.)

8 **Novatel**

9 Based on his analysis, Dr. Kennedy opined for Novatel that in a hypothetical
10 negotiation between Carucel and Novatel, a reasonable royalty would be \$2.00 per
11 device, with \$0.50 per device for infringement of the '904 patent and \$1.50 for
12 infringement of the other patents. Dr. Kennedy applied the *Georgia-Pacific* factors
13 to reach this conclusion. He reviewed several other licenses and discussed them
14 with technical expert Dr. Kiasaleh to determine which if any was sufficiently
15 comparable to use in forming an opinion. Of those licenses, one was comparable,
16 which was the SPH-Novatel license. That license [REDACTED]

17 [REDACTED]
18 [REDACTED].
19 Dr. Kennedy did not simply use the SPH agreement and apply the royalty
20 rate, because the agreement involved a different party, different technology and
21 other considerations. So he conducted additional analysis to make appropriate
22 adjustments to the royalty rate.

23 Dr. Kennedy also performed a value apportionment based on the revenues
24 and profitability of Novatel regarding the devices. For example, the first year
25 Novatel introduced the infringing devices, the devices accounted for [REDACTED] of
26 Novatel's total revenue, and within three years, they accounted for nearly [REDACTED] of
27 Novatel's total revenue. (*Id.*, at 19.) At the time of the hypothetical negotiation,

1 Novatel anticipated a [REDACTED] margin on the devices, and it actually obtained
 2 between [REDACTED] profit margin during the first two years the MiFi2200 units
 3 were sold. (*Id.*, 29.) The average price of the infringing devices for Novatel was
 4 [REDACTED], and Novatel sold more than [REDACTED] units during the infringement
 5 period. Thus, Novatel brought in more than [REDACTED] in revenue from the
 6 infringing devices.

7 Despite the patents' critical enabling features, Dr. Kennedy did not attribute
 8 all of the profit from the device sales to the patented features. Instead, he performed
 9 a very conservative apportionment analysis. Using a bill-of-materials
 10 apportionment, Dr. Kiasaleh indicated that [REDACTED] of the component costs were
 11 necessary for the patented inventions. Dr. Kennedy then obtained further
 12 apportionment from Dr. Kiasaleh to determine the minimum value attributable to the
 13 patented features based on the costs of antennas used in the devices. Dr. Kiasaleh
 14 indicated that the actual value of the invention would be considerably more than the
 15 apportionment based on the antennas alone.

16 Dr. Kennedy also obtained the comparative value of the specific claims of
 17 the '904 patent, which were directed more toward soft hand-off functionality, versus
 18 the other patents-in-suit, which were more directed to antenna diversity. Based on
 19 input from the technical expert and a review of comparable technologies, he
 20 determined that the relative value of the '904 patent would be \$0.50 per unit
 21 whereas the other patents-in-suit would be \$1.50 per unit.

22 Applying the correct royalty rate, Dr. Kennedy opined that the following
 23 damages would apply depending on if the companies agreed to a running royalty or
 24 a lump sum royalty, and he included an appropriate 7% for prejudgment interest:

	<u>Running Royalty</u>	<u>Lump Sum</u>
Royalties for '904 patent	[REDACTED]	[REDACTED]
Royalties for other patents	[REDACTED]	[REDACTED]
Total Royalties	[REDACTED]	[REDACTED]

28 Carucel Investments—Exhibit 2102

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1 Prejudgment interest for '904 patent
 2 Prejudgment interest for other patents
 3 Total prejudgment interest at 7%

4
 5 Total Damages

6 **Verizon/Cellco**

7 Based on his analysis, Dr. Kennedy opined that in a hypothetical negotiation
 8 between Carucel and Verizon/Cellco, a reasonable royalty would be \$6.00 per
 9 device, with \$1.50 per device for infringement of the '904 patent and \$4.50 for
 10 infringement of the other patents. Dr. Kennedy applied the *Georgia-Pacific* factors
 11 to reach this conclusion. He reviewed several other licenses and discussed them
 12 with technical expert Dr. Kiasaleh to determine which if any was sufficiently
 13 comparable to use in forming an opinion. Of those licenses, one was comparable,
 14 which was the Broadcom-Verizon license. That license applied a payment of \$6.00
 15 per unit for all products on the Verizon network. (*See* Ex. 6, Kennedy Supplemental
 16 Report, at 22-26.) He also took into account the SPH-Novatel license as a license of
 17 secondary comparability. (*Id.*, at 26-31.)

18 Dr. Kennedy did not simply use the Broadcom agreement and apply the
 19 royalty rate, because the agreement involved a different party, different technology
 20 and other considerations. So he conducted additional analysis to make appropriate
 21 adjustments to the royalty rate. The result of that analysis led him to conclude that
 22 the additional adjustments offset each other so that the royalty rate would not
 23 change from the comparable Broadcom license. Not only did he apply a *Georgia-*
 24 *Pacific* analysis to the Broadcom license, he did a similar analysis to the SPH
 25 license, making it economically comparable to the conditions of the hypothetical
 26 negotiation.

27 Verizon made much more money from the infringing devices than Novatel
 28 did. Verizon generally did not [REDACTED]

Verizon sold [REDACTED]

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1 [REDACTED]
2 [REDACTED]. On the whole, Verizon [REDACTED]
3 [REDACTED] (*See id.*, at 7-
4 13.) Whereas Novatel made approximately [REDACTED] in revenue from selling more
5 than [REDACTED] Verizon made over [REDACTED] from selling [REDACTED] units.
6 (*Id.*, at 14.) Verizon failed to provide profitability data, stating that it did not track
7 such information. However, it is apparent that the profitability was [REDACTED]
8 because Verizon already had a cellular network and its company representative
9 witness conceded that [REDACTED]
10 [REDACTED]
11 [REDACTED].

12 In total, Verizon earned approximately [REDACTED] in revenue per MiFi device,
13 \$[REDACTED] of which is attributed to equipment fees based on the stand-alone price of
14 the MiFi devices, and the remainder to data solely allocated to the infringing devices
15 by Verizon itself. (*Id.*, at 21.) Dr. Kennedy also looked at the profit margin Verizon
16 made just from equipment revenues, which, at [REDACTED]
17 [REDACTED]. (*Id.*, at 31.) In dollar terms, Verizon's gross profit per device sold
18 averaged [REDACTED] versus Novatel's [REDACTED] per device. In addition to the [REDACTED] per
19 device in equipment profit, Verizon also earned more than [REDACTED] in data revenues
20 per device.

21 Again, despite the patents' critical enabling features, Dr. Kennedy did not
22 attribute all of this profit to the patented features. As with his Novatel analysis, he
23 performed a conservative value apportionment based on the revenues and
24 profitability of Verizon's device sales. Using a bill-of-materials apportionment, Dr.
25 Kiasaleh indicated that [REDACTED] of the component costs were necessary for the patented
26 inventions. Dr. Kennedy then obtained further apportionment from Dr. Kiasaleh to
27 determine the minimum value attributable to the patented features based on the costs

1 of antennas used in the devices. Dr. Kiasaleh indicated that the actual value of the
 2 invention would be considerably more than the apportionment based on the antennas
 3 alone.

4 Dr. Kennedy also obtained the comparative value of the specific claims of
 5 the '904 patent, which were more directed toward soft hand-off functionality, versus
 6 the other patents-in-suit, which were more directed to antenna diversity. Based on
 7 input from the technical expert and a review of comparable technologies, he
 8 determined that the value of the '904 patent would be \$1.50 per unit whereas the
 9 other patents-in-suit would be \$4.50 per unit.

10 Applying these royalties, Dr. Kennedy concluded that the assessment of
 11 damages based on a reasonable royalty stemming from a hypothetical negotiation
 12 between Carucel and Verizon would be as follows:

	<u>Running Royalty</u>	<u>Lump Sum</u>
Royalties for '904 patent		
Royalties for other patents		
Total Royalties		
Prejudgment interest for '904 patent		
Prejudgment interest for other patents		
Total prejudgment interest at 7%		
Total Damages		

20 VI. ABANDONED ISSUES

21 Carucel has not abandoned any issues raised by the pleadings. Carucel has,
 22 however, voluntarily declined, without prejudice, to assert at trial its claims for
 23 infringement of U.S. Patent Nos. 8,463,177 and 8,849,191. Carucel reserves the
 24 right to supplement and amend this section as warranted.

1 **VII. EXHIBITS**

2 A copy of Carucel's current exhibit list is attached as hereto Exhibit 1.
3 Carucel reserves the right to supplement and amend its exhibit list as warranted.
4 Carucel reserves the right to use and designate any exhibits from Defendants' trial
5 exhibit list, even if Defendants should subsequently remove them from their list.

6 **VIII. WITNESSES**

7 A copy of Carucel's current witness list is attached hereto as Exhibit 2.
8 Carucel reserves the right to supplement and amend its witness list as warranted.
9

10 **IX. RESERVATIONS**

11 Carucel reserves the right to supplement and amend this Memorandum as
12 warranted.
13

14 DATED: February 10, 2017

GAVRILOVICH, DODD & LINDSEY, LLP

15
16 By /s/Michael K. Lindsey

17 Michael K. Lindsey,

18 Admitted *Pro Hac Vice*

19 James M. Sarnecky, SBN 202465

20 Attorneys for Plaintiff,

21 Carucel Investments, L.P.
22
23
24
25
26
27

CERTIFICATE OF SERVICE

The undersigned hereby certifies that all counsel of record who are deemed to have consented to electronic service are being served this 10th day of February, 2017, with a copy of this document via the Court's EM/ECF system. Any other counsel of record will be served by electronic mail, facsimile and/or first class mail on the same date.

/s/Mike Lindsey
Michael K. Lindsey