

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

BELL NORTHERN RESEARCH, LLC

Plaintiff,

v.

COMMSCOPE HOLDING COMPANY,
INC., COMMSCOPE INC., RUCKUS
WIRELESS, INC., ARRIS
INTERNATIONAL LIMITED, ARRIS
GLOBAL LTD., ARRIS US HOLDINGS,
INC., ARRIS SOLUTIONS, INC., ARRIS
TECHNOLOGY, INC., and ARRIS
ENTERPRISES, LLC,

Defendants.

Civil Action No. 6:21-cv-941

JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Bell Northern Research, LLC (“BNR” or “Plaintiff”), for its Complaint against Defendants CommScope Holding Company, Inc., CommScope Inc., Ruckus Wireless Inc., ARRIS International Limited, ARRIS Global Ltd., ARRIS US Holdings, Inc., ARRIS Solutions, Inc., ARRIS Technology, Inc., and ARRIS Enterprises, LLC (collectively “CommScope” or “Defendant”), alleges the following:

NATURE OF THE ACTION

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

THE PARTIES

2. Plaintiff BNR is a limited liability company organized under the laws of the State of Delaware with a place of business at 401 North Michigan Avenue, Chicago, Illinois 60611.

3. Upon information and belief, Defendant CommScope Holding Company, Inc. is a corporation organized and existing under the laws of the State of Delaware, and can be served through its registered agent, United Agent Group Inc., 3411 Silverside Road Tatnall Building #104, Wilmington, DE 19810.

4. Upon information and belief, Defendant CommScope Inc. is a corporation organized and existing under the laws of the State of Delaware, and can be served through its registered agent, United Agent Group Inc., 3411 Silverside Road Tatnall Building #104, Wilmington, DE 19810. Upon information and belief, CommScope Inc. is a wholly owned subsidiary of CommScope Holding Company.

5. Defendants ARRIS International Limited, ARRIS Global Ltd, ARRIS US Holdings, Inc., ARRIS Solutions, Inc., ARRIS Technology, Inc., and ARRIS Enterprises, LLC are collectively referred to as “ARRIS.”

6. CommScope Holding Company, Inc. acquired ARRIS in 2019. Upon information and belief, CommScope Holding Company, Inc. is the parent corporation of ARRIS.

7. Defendant ARRIS International Limited f/k/a Arris International plc is a corporation duly organized and existing under the laws of England and Wales.

8. Defendant ARRIS Global Ltd. is a corporation duly organized and existing under the laws of England and Wales. Upon information and belief, ARRIS Global Ltd is a subsidiary of ARRIS International Limited.

9. Defendant ARRIS US Holdings, Inc. is a corporation organized and existing under the laws of the State of Delaware, and can be served through its registered agent, United Agent Group Inc., 3411 Silverside Road, Tatnall Building, #104, Wilmington, DE 19810. Upon information and belief, ARRIS US Holdings, Inc. is a subsidiary of ARRIS International

Limited. CommScope has admitted that “Arris US Holdings, Inc.’s business includes selling products and services throughout the United States, including in this judicial district.”

10. Defendant ARRIS Solutions, Inc. is a corporation organized and existing under the laws of the State of Delaware, and can be served through its registered agent, United Agent Group Inc., 3411 Silverside Road, Tatnall Building, #104, Wilmington, DE 19810. CommScope has admitted that “ARRIS Solutions, Inc.’s business includes selling products and services throughout the United States, including in this judicial district.”³ Upon information and belief, ARRIS Solutions, Inc. is a subsidiary of ARRIS U.S. Holdings, Inc.

11. Defendant ARRIS Technology, Inc. is a corporation duly organized and existing under the laws of the State of Delaware and can be served through its registered agent, United Agent Group Inc., 3411 Silverside Road, Tatnall Building, #104, Wilmington, DE 19810. Upon information and belief, ARRIS Technology, Inc. is a subsidiary of ARRIS Solutions, Inc.

12. Defendant ARRIS Enterprises LLC is a corporation organized and existing under the laws of the State of Delaware, and can be served through its registered agent, United Agent Group Inc., 3411 Silverside Road, Tatnall Building, #104, Wilmington, DE 19810. CommScope has admitted that “ARRIS Enterprises LLC’s business includes selling products and services throughout the United States, including in this judicial district.” Upon information and belief, ARRIS Enterprises LLC is a subsidiary of ARRIS Technology, Inc.

13. Upon information and belief, ARRIS maintains regular and established places of business and does business in Texas at its offices at 4516 Seton Center Pkwy, Austin, Texas 78759- 5370 and/or 5300 Hollister St., Houston, Texas 77040. Upon information and belief, ARRIS maintained a regular and established place of business in Plano, Texas prior to its acquisition by CommScope in 2019.⁵ As detailed below, CommScope (including ARRIS)

maintains a regular and established place of business at 2601 Telecom Parkway, Richardson, Texas 70852, located within this District.

14. Defendant Ruckus Wireless, Inc. is a corporation organized and existing under the laws of the State of Delaware, and can be served through its registered agent, United Agent Group Inc., 3411 Silverside Road, Tatnall Building, #104, Wilmington, DE 19810. Upon information and belief, Commscope acquired Ruckus when it completed its acquisition of Arris in April 2019.

15. Upon information and belief, all Defendants are a single combined “CommScope” company. The online websites for Defendants are combined into a single “CommScope” presence. For example, the ARRIS web domain (www.arris.com) re-directs the public to the CommScope web domain (www.commscope.com).

16. The CommScope web domain further explains that the companies operate as “combined companies” that provide their technologies, solutions, and products, such as by importation, manufacture, sale, and/or offers for sale of their products and services throughout the United States. For example, the CommScope website lists for sale ARRIS-branded DSL product lines that, prior to acquisition of ARRIS, were available from Arris’s website.

17. The CommScope jobs websites (<https://jobs.commscope.com/> and <https://careers.commscope.com/>) appear to handle the job recruitment features for all of CommScope, including ARRIS.

JURISDICTION AND VENUE

18. This is an action for patent infringement arising under the Patent Laws of the United States, Title 35 of the United States Code.

19. This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

20. The Court has personal jurisdiction over CommScope because, under the laws of the State of Texas, due at least to its substantial business in Texas and in this judicial district, directly or through intermediaries, including: (i) at least a portion of the infringements alleged herein; and (ii) regularly doing or soliciting business, engaging in other persistent courses of conduct and/or deriving substantial revenue from goods and services provided to individuals in the State of Texas.

21. Venue is proper in this District pursuant to 28 U.S.C. §§ 1391 and 1400(b). CommScope maintains a regular and established place of business in 4516 Seton Center Pkwy, Austin, Texas 78759-5370; located within this District that contains CommScope's employees and/or other individuals CommScope directs or controls. Venue is also proper in this District pursuant to 28 U.S.C. § 1391(c)(3) on the basis that ARRIS International Limited and ARRIS Global Ltd are not residents of the United States.

22. CommScope's commission of acts of infringement in this District, and the presence of an office at which CommScope does business in the Western District of Texas, establishes venue over CommScope under 28 U.S.C. § 1400(b).

23. Venue is also convenient in this District. This is at least true because of this District's close ties to this case— including the technology, relevant witnesses, and sources of proof—and its ability to move this case quickly and efficiently to resolution. Further, this District has familiarity with at least some of the BNR Patents. First, several of the patents (*i.e.*, U.S. Patent Nos. 6,963,129 and 6,858,930) were involved in a recent lawsuit filed in this District. (*See Bell Northern Research, LLC v. Samsung Elecs. Co., Ltd.*, No. 6:20-cv-326-ADA, ECF No. 1 (W.D. Tex. Apr. 24, 2020.)) Second, several of the patents (*i.e.*, U.S. Patent Nos. RE 48,629, 8,416,862, 6,963,129 and 6,858,930) are involved in other pending lawsuit, also filed in this

District. *See Bell Northern Research, LLC v. Apple Inc.*, No. 6:21-cv-833, ECF No. 1 (W.D. Tex. Aug. 11, 2021); *Bell Northern Research, LLC v. Lenovo Group Ltd., et al.*, No. 6:21-cv-847, ECF No. 1 (W.D. Tex. Aug. 13, 2021); *Bell Northern Research, LLC v. Dell Technologies Inc., et al.*, No. 6:21-cv-909, ECF No. 1 (W.D. Tex. Sept. 1, 2021).

BACKGROUND

24. The Asserted Patents come from a rich pedigree dating back to the late 19th century. This is when Bell Labs sprang to life from the combined efforts of AT&T and Western Electric. Bell Labs is one of America's greatest technology incubators, and paved the way for many technological advances we know and use today, including the transistor, several kinds of lasers, the UNIX operating system, and computer languages such as C++. In total, Bell Labs received nine Nobel Prizes for its work over the years.

25. Eventually the Bell system broke up and spawned several new companies. They included telecommunications powerhouses Lucent and Agere Systems. Lucent was absorbed by Nokia, while Agere Systems was acquired by LSI, then Avago, and ultimately renamed Broadcom. The Bell system also spun off Northern Electric which led to the creation of a research lab known as BNR. This lab grew to host thousands of engineers in offices around the globe. One of those was an 800,000-square-foot campus in Richardson, Texas.

26. Collectively, these companies spurred a digital revolution in telecommunications, starting with the first digital telephone switch in 1975. They continued to push the industry to new heights in the late-80's, when BNR announced the desire to create a global fiber optic network (called "FiberWorld"). Its goal was to give users easy, reliable, and fast access to a variety of multimedia services. To realize this vision, Bell Labs and subsequent innovators made

numerous breakthroughs in laser, integrated circuit, photodetector, amplifier, and waveguide designs. These advancements led to the modern fiber optic systems we use today.

27. This work naturally evolved to include cellular telecommunications as well. On May 6, 1992, BNR VP George Brody—along with executives from Bell Cellular and Northern Electric—made the first Canada-US digital cellular call. It stretched from Toronto, Ontario to Fort Worth, Texas.

28. Eventually, Nortel Networks absorbed BNR. Although Nortel was ultimately unsuccessful in its bid to supply digital telecommunications and networking solutions to the market, some Bell Labs and Nortel alumni decided to reenergize BNR in 2017. Today it is the successor in interest to many of the key telecommunications technologies.

29. The BNR Patent portfolio comprises hundreds of patents that reflect important developments in telecommunications that were invented and refined by leading technology research companies, including Agere, LSI, and Broadcom. These include U.S. Patent Nos. RE 48,629, 8,416,862, 7,564,914, 6,963,129 and 6,858,930 (collectively, these patents comprise the “Asserted Patents”).

30. Portions of the BNR portfolio are presently licensed and/or were previously licensed to leading technology companies.

31. BNR brings this action to put a stop to CommScope’s unauthorized and unlicensed use of the Asserted Patents.

U.S. Patent No. RE 48,629

32. Jason Alexander Trachewsky and Rajendra T. Moorti are the inventors of U.S. Patent No. RE 48,629 (the ’629 patent). A true and correct copy of the ’629 patent is attached as Exhibit A.

33. The '629 patent resulted from the pioneering efforts of Messrs. Trachewsky and Moorti (hereinafter "the Inventors") in the general area of wireless communication systems and more particularly to long training sequences of minimum peak-to-average power ratio which may be used in legacy systems. At the time of these pioneering efforts, conventionally implemented technology did not sufficiently address the problem of different wireless devices compliant with different standards or different versions of the same standard while enabling backward compatibility with legacy devices that avoids collisions. For example, in the 802.11a and 802.11g standards, each data packet starts with a preamble which includes a short training sequence followed by a long training sequence. The short and long training sequences are used for synchronization between the sender and the receiver. The long training sequence of 802.11a and 802.11g is defined such that each of sub-carriers -26 to +26, except for the subcarrier 0 which is set to 0, has one binary phase shift keying constellation point, either +1 or -1.

34. There existed a need to create a long training sequence of minimum peak-to-average ratio that uses more sub-carriers without interfering with adjacent channels.

35. For example, the Inventors developed a wireless communications device, comprising: a signal generator that generates an extended long training sequence; and an Inverse Fourier Transformer operatively coupled to the signal generator, wherein the Inverse Fourier Transformer processes the extended long training sequence from the signal generator and provides an optimal extended long training sequence with a minimal peak-to-average ratio, and wherein at least the optimal extended long training sequence is carried by a greater number of subcarriers than a standard wireless networking configuration for an Orthogonal Frequency Division Multiplexing scheme, wherein the optimal extended long training sequence is carried by exactly 56 active sub-carriers, and wherein the optimal extended long training sequence is

represented by encodings for indexed sub-carriers -28 to +28, excluding indexed sub-carrier 0 which is set to zero, as follows:

<i>Sub-carrier</i>	-28	-27	-26	-25	-24	-23	-22
<i>Encoding</i>	+1	+1	+1	+1	-1	-1	+1
<i>Sub-carrier</i>	-14	-13	-12	-11	-10	-9	-8
<i>Encoding</i>	+1	+1	+1	-1	-1	+1	+1
<i>Sub-carrier</i>	1	2	3	4	5	6	7
<i>Encoding</i>	+1	-1	-1	+1	+1	-1	+1
<i>Sub-carrier</i>	15	16	17	18	19	20	21
<i>Encoding</i>	+1	+1	-1	-1	+1	-1	+1
<i>Sub-carrier</i>	-21	-20	-19	-18	-17	-16	-15
<i>Encoding</i>	+1	-1	+1	-1	+1	+1	+1
<i>Sub-carrier</i>	-7	-6	-5	-4	-3	-2	-1
<i>Encoding</i>	-1	+1	-1	+1	+1	+1	+1
<i>Sub-carrier</i>	8	9	10	11	12	13	14
<i>Encoding</i>	-1	+1	-1	-1	-1	-1	-1
<i>Sub-carrier</i>	22	23	24	25	26	27	28
<i>Encoding</i>	-1	+1	+1	+1	+1	-1	-1

36. One advantage of the patented invention is that it provides an expanded long training sequence of minimum peak-to-average power ratio thereby decreasing power back-off. (See '629 patent at 4:15-17.)

37. Another advantage of the invention is that expanded long training sequence may be used by 802.11a and 802.11g devices for estimating the channel impulse response and by a receiver for estimating the carrier frequency offset between the transmitter clock and receiver clock. (See '629 patent at 4:17-21.)

U.S. Patent No. 8,416,862

38. Carlos Aldana and Joonsuk Kim are the inventors of U.S. Patent No 8,416,862 ("the '862 patent"). A true and correct copy of the '862 patent is attached as Exhibit B.

39. The '862 patent resulted from the pioneering efforts of Messrs. Aldana and Kim (hereinafter "the Inventors") in the area of wireless communications systems using beamforming. These efforts resulted in the development of a method and system for the efficient feedback of channel information in a closed loop beamforming wireless communication system.

40. At the time of these pioneering efforts, the most widely implemented technology used to address reduced beam forming feedback information for wireless communications was to reduce the size of the feedback. For instance, in a 2x2 MIMO wireless communication, the feedback needs four elements that are all complex Cartesian coordinate values V_{11} V_{12} ; V_{21} V_{22} . In general, $V_{ik} = a_{ik} + j*b_{ik}$, where a_{ik} and b_{ik} are values between -1, 1. Thus, with 1 bit expressions per each element for each of the real and imaginary components, a_{ik} and b_{ik} can be either -1/2 or +1/2, which requires $4 \times 2 \times 1 = 8$ bits per tone. With 4 bit expressions per each element of $V(f)$ in an orthogonal frequency division multiplexing (OFDM) 2x2 MIMO wireless communication, the number of bits required is 1728 per tone (e.g., $42 \times 54 \times 4 = 1728$, 4 elements per tone, 2 bits for real and imaginary components per tone, 54 data tones per frame, and 4 bits per element), which requires overhead for a packet exchange that is too large for practical applications.

41. The Inventors conceived of the invention claimed in the '862 patent as a way to reduce beamforming feedback information for wireless communications.

42. For example, the Inventors developed a method for feeding back transmitter beamforming information from a receiving wireless communication device to a transmitting wireless communication device, the method comprising: the receiving wireless communication device receiving a preamble sequence from the transmitting wireless device; the receiving wireless device estimating a channel response based upon the preamble sequence; the receiving wireless device determining an estimated transmitter beamforming unitary matrix (V) based upon the channel response and a receiver beamforming unitary matrix (U); the receiving wireless device decomposing the estimated transmitter beamforming unitary matrix (V) to produce the

transmitter beamforming information; and the receiving wireless device wirelessly sending the transmitter beamforming information to the transmitting wireless device.

43. One advantage of the patented invention is a reduction of beam forming feedback information for wireless communications. (*See* '862 patent at 3:49-51.)

U.S. Patent No. 7,564,914

44. Christopher J. Hansen, Carlos H. Aldana, and Joonsuk Kim are the inventors of U.S. Patent No. 7,564,914 (“the '914 patent”). A true and correct copy of the '914 patent is attached as Exhibit C.

45. The '914 patent resulted from the pioneering efforts of Messrs. Hansen, Aldana, and Kim (hereinafter “the Inventors”) in the general area of wireless networking.

46. For example, the Inventors developed a method for communicating information in a communication system, the method comprising: transmitting data via a plurality of radio frequency (RF) channels utilizing a plurality of transmitting antennas; receiving feedback information via at least one of said plurality of RF channels; modifying a transmission mode based on said feedback information; receiving said feedback information comprising channel estimates based on transmission characteristics of said transmitted data via at least one of said plurality of transmitting antennas; and deriving said feedback information from mathematical matrix decomposition of said channel estimates.

47. One advantage of the '914 patent is the more precise estimation of channel characteristics. (*See* '914 patent at 18:12-15.)

48. Another advantage of the patented invention is that it minimizes the quantity of feedback information and in turn reduces overhead. (*See* '914 patent at 18:35-39.)

49. Further advantages include higher information transfer rates, and more effective beamforming on transmitted signals. (*See* '914 patent at 18:40-45.)

U.S. Patent No. 6,963,129

50. Thomas Evans, Stan Mihelcic, Leah M. Miller, Kumar Nagarajan, and Edwin M. Fulcher are the inventors of U.S. Patent No. 6,963,129 (“the ’129 patent”). A true and correct copy of the ’129 patent is attached as Exhibit D.

51. The ’129 patent resulted from the pioneering efforts of Messrs. Evans, Mihelcic, Nagarajan, and Fulcher and Ms. Miller (hereinafter “the Inventors”) in the area of heat spreader and package design. The Inventors conceived of the invention claimed in the ’129 patent as a way to implement better heat transfer mechanisms in relation to semiconductor packages.

52. For example, the Inventors developed a heat spreader assembly, comprising: a single, unibody heat spreader configured to extend across substantially the entire first surface of at least two spaced integrated circuits opposite a second surface of the integrated circuits having a bonding pad; adhesive placed between the heat spreader and the first surface for securing the heat spreader to the first surface of the integrated circuits at a spaced distance above at least one passive device arranged in the area between the spaced integrated circuits; and a second heat spreader interposed between the heat spreader and only of the at least two spaced integrated circuits.

53. Among the advantages of the ’129 patented invention is that it provides for heat spreader assemblies having improved thermal characteristics. (*See* ’129 patent at 2:23-26.)

U.S. Patent No. 6,858,930

54. Leah M. Miller and Kishor Desal are the inventors of U.S. Patent No. 6,858,930 (“the ’930 patent”). A true and correct copy of the ’930 patent is attached as Exhibit E.

55. The ’930 patent resulted from the pioneering efforts of Ms. Miller and Mr. Kishor (hereinafter “the Inventors”) in the area of heat spreader and package design.

56. The Inventors conceived of the invention claimed in the '930 patent as a way to address the problems of heat production and package flexibility that constrain certain aspects of package design.

57. For example, the Inventors developed a multi chip package, comprising: a package substrate having a first side and an opposing second side, the first side for receiving package electrical connections, integrated circuits each having a first side and an opposing second side, the first side of each of the integrated circuits electrically connected and structurally connected to the second side of the package substrate, heat spreaders each having a first side and an opposing second side, the first side of each of the heat spreaders disposed adjacent the second side of the integrated circuits, where one each of the heat spreaders is associated with one each of the integrated circuits, a single stiffener having a first side and an opposing second side, the stiffener covering all of the integrated circuits and heat spreaders, the first side of the stiffener disposed adjacent the second side of the heat spreaders, and discrete components electrically connected to the second side of the package substrate and coplanar with the integrated circuits.

58. One advantage of the '930 patented invention is that it provides adequate heat dissipation for a multi chip module. (*See* '930 patent at 2:15-20.)

59. Another advantage of the '930 patented invention is that it provides structural support for a multi chip module. (*See* '930 patent at 2:10-15.)

DEFENDANT'S ACTIVITIES

60. Defendant is a network infrastructure provider company.

61. Defendant designs, develops, manufactures, and sells wireless networking equipment, including access points, data gateways, telephony gateways, cable modems, wireless routers, cable gateways and WiFi Extenders, such as R320 indoor access points, R510 indoor access points, R550 indoor access points, R610 indoor access points, R650 indoor access points,

R750 indoor access points, R850 indoor access points, C110 indoor access points, H320 indoor access points, H510 indoor access points, M510 indoor access points, R310 indoor access points, R710 indoor access points, R720 indoor access points, R730 indoor access points, T310 outdoor access points, T750 outdoor access points, Q410 indoor access points, Q710 indoor access points, Q910 indoor access points, E510 outdoor access points, P300 outdoor access points, T610 outdoor access points, T710 outdoor access points, T811 outdoor access points, H550 indoor access points, T350 outdoor access points, TG3442 data gateways. TG3451 telephony gateways, T1682-3 telephony gateways. TG 3482 telephony gateways, RAC2VIA 802.11ac Wave 2 routers, DG3450 data gateways, TG3452 telephony gateways , TG1682 wireless telephone gateways, SBR1750 wireless routers, DG2470 cable gateways, TG2472 telephony gateways, DG2470 cable gateways, TG2472 cable voice gateways, TG2492 cable voice gateways, DG3450 cable gateways, TG3442A cable voice gateways, TG3452 cable voice gateways, NVG558 fixed wireless broadband gateways, VAP3400 Wi-Fi extenders for IPTV, and VAP4402 Wi-Fi extenders (collectively “Accused Instrumentalities”).

COUNT I– INFRINGEMENT OF U.S. PATENT NO. RE 48,629

62. The allegations set forth in the foregoing paragraphs 1 through 61 are incorporated into this First Claim for Relief.

63. On July 6, 2021, the ’629 patent was duly and legally reissued by the United States Patent and Trademark Office under the title “Backward-compatible Long Training Sequences for Wireless Communication Networks.”

64. BNR is the assignee and owner of the right, title and interest in and to the ’629 patent, including the right to assert all causes of action arising under the Patent and the right to any remedies for infringement of it.

65. Upon information and belief, CommScope has and continues to directly or indirectly infringe one or more claims of the '629 patent, including at least claim 1, by selling, offering to sell, making, using, and/or providing and causing to be used instrumentalities that operate according to the 802.11n standard, including access points, data gateways, telephony gateways, cable modems, wireless routers, cable gateways and WiFi Extenders, such as R320 indoor access points, R510 indoor access points, R550 indoor access points, R610 indoor access points, R650 indoor access points, R750 indoor access points, R850 indoor access points, C110 indoor access points, H320 indoor access points, H510 indoor access points, M510 indoor access points, R310 indoor access points, R710 indoor access points, R720 indoor access points, R730 indoor access points, T310 outdoor access points, T750 outdoor access points, E510 outdoor access points, P300 outdoor access points, T610 outdoor access points, T710 outdoor access points, T811 outdoor access points, H550 indoor access points, T350 outdoor access points, TG3442 data gateways, TG3451 telephony gateways, T1682-3 telephony gateways, TG 3482 telephony gateways, RAC2VIA 802.11ac Wave 2 routers, DG3450 data gateways, TG3452 telephony gateways, TG1682 wireless telephone gateways, SBR1750 wireless routers, DG2470 cable gateways, TG2472 telephony gateways, DG2470 cable gateways, TG2472 cable voice gateways, TG2492 cable voice gateways, DG3450 cable gateways, TG3442A cable voice gateways, TG3452 cable voice gateways, NVG558 fixed wireless broadband gateways, VAP3400 Wi-Fi extenders for IPTV, and VAP4402 Wi-Fi extenders (the "'629 Accused Instrumentalities").

66. The 802.11n standard was introduced on or about October 2009, and provides a definition for a High Throughput Long Training Field ("HT-LTF"). The first part of the HT-LTF "consists of one, two, or four HT-LTFs that are necessary for demodulation of the HT-Data

portion of the PPDU” (*i.e.*, Protocol Data Unit). The 802.11n standard provides a specific HT-LTF sequence that is transmitted in the case of 20 MHz operation. (*See* 802.11-2016 at 19.3.9.4.6 or 802.11-2009 at 20.3.9.4.6.)

67. Upon information and belief after a reasonable investigation, at least the ’629 Accused Instrumentalities infringe the ’629 patent. The ’629 Accused Instrumentalities are wireless communication devices that include a signal generator that generates an extended long training sequence. For instance, the R650 is 802.11n compliant and, therefore, uses a specific HT-LTF sequence that is transmitted in the case of 20 MHz operation. (*See* 802.11-2016 at 19.3.9.4.6 or 802.11-2009 at 20.3.9.4.6; *see, e.g.*, <https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/>.) This corresponds to the long training sequence with minimum peak-to-average power ratio described in the ’629 patent. (*See id.*) Devices operating in accordance with the 802.11n standard (known as “wireless stations” or “STAs”) must be able to generate the HT-LTF described.

68. The ’629 Accused Instrumentalities include an Inverse Fourier Transformer operatively coupled to the signal generator. For instance, R650 is 802.11n compliant and, therefore, uses an encoding process that requires a reverse Fourier transformer. (*See* 802.11-2016 and 19.3.4(b) or 802.11-2009 at 20.3.4(b); *see, e.g.*, <https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/>.)

69. The ’629 Accused Instrumentalities include an Inverse Fourier Transformer (as explained above) that processes the extended long training sequence from the signal generator and provides an optimal extended long training sequence with a minimal peak-to-average ratio. For instance, the R650 is 802.11n compliant and, therefore, processes the HT-LTF training sequence from the signal generator. (*See* 802.11-2016 at Figure 19-9 and 19.3.9.4.6; *see, e.g.*,

[https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/)) The R650 also provides an optimal HT-LTF training sequence with a minimal peak-to-average ratio. *See* 802.11-2016 at 19.3.9.4.6 at Equation 19-23; *see, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

70. The '629 Accused Instrumentalities also include an optimal extended long training sequence that is carried by a greater number of subcarriers than a standard wireless networking configuration for an OFDM scheme. For instance, the R650 is 802.11n compliant, and therefore includes an optimal HT-LTF training sequence that is carried by a greater number of subcarriers than is standard for an OFDM scheme. (*See* 802.11-2016 at 19.3.9.4.6 at Equation 19-23 and additional subcarriers noted therein as compared to L-LT; *see, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

71. The '629 Accused Instrumentalities also include an optimal extended long training sequence that is carried by exactly 56 active subcarriers. For instance, the R650 is 802.11n compliant and, therefore, includes an optimal HT-LTF training sequence that is carried by 56 active subcarriers. (*See* 802.11-2016 at 19.3.9.4.6; *see, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

72. The '629 Accused Instrumentalities also include an optimal extended long training sequence (as explained above) that is represented by encodings for indexed subcarriers - 28 to +28, excluding indexed subcarrier 0 which is set to zero, as follows:

<i>Sub-carrier</i>	-28	-27	-26	-25	-24	-23	-22
<i>Encoding</i>	+1	+1	+1	+1	-1	-1	+1
<i>Sub-carrier</i>	-14	-13	-12	-11	-10	-9	-8
<i>Encoding</i>	+1	+1	+1	-1	-1	+1	+1
<i>Sub-carrier</i>	1	2	3	4	5	6	7
<i>Encoding</i>	+1	-1	-1	+1	+1	-1	+1
<i>Sub-carrier</i>	15	16	17	18	19	20	21
<i>Encoding</i>	+1	+1	-1	-1	+1	-1	+1
<i>Sub-carrier</i>	-21	-20	-19	-18	-17	-16	-15
<i>Encoding</i>	+1	-1	+1	-1	+1	+1	+1
<i>Sub-carrier</i>	-7	-6	-5	-4	-3	-2	-1
<i>Encoding</i>	-1	+1	-1	+1	+1	+1	+1
<i>Sub-carrier</i>	8	9	10	11	12	13	14
<i>Encoding</i>	-1	+1	-1	-1	-1	-1	-1
<i>Sub-carrier</i>	22	23	24	25	26	27	28
<i>Encoding</i>	-1	+1	+1	+1	+1	-1	-1

73. For instance, the R650 is 802.11n compliant, and therefore includes an optimal HT-LTF training sequence that is represented by encodings for indexed subcarriers -28 to +28, excluding indexed subcarrier 0 according to the chart above. (See 19.3.9.4.6 at Equation 19-23; see, e.g., <https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/>.)

74. CommScope has infringed and is infringing, individually and/or jointly, either literally or under the doctrine of equivalents, at least claim 1 of the '629 patent in violation of 35 U.S.C. §§ 271, *et seq.*, directly or indirectly, by making, using, offering for sale, selling, offering for lease, leasing in the United States, and/or importing into the United States without authority or license, the '629 Accused Instrumentalities.

75. Upon information and belief, CommScope has had knowledge of the '629 patent, at least since receiving a notice letter from BNR dated July 22, 2021.

76. Upon information and belief, since CommScope had knowledge of the '629 patent, CommScope has induced and continues to induce others to infringe at least claim 1 of the '629 patent under 35 U.S.C. § 271(b) by, among other things, and with specific intent or willful blindness, actively aiding and abetting others to infringe, including but not limited to

CommScope's partners and customers, whose use of the '629 Accused Instrumentalities constitutes direct infringement of at least claim 1 of the '629 patent.

77. In particular, CommScope's actions that aid and abet others such as their partners and customers to infringe include marketing the '629 Accused Instrumentalities to its customers, distributing the '629 Accused Instrumentalities and providing materials and/or services to users of the '629 Accused Instrumentalities, including providing instructions to users on how to use the functionality of the '629 patent on its website and elsewhere. (*See, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

78. Upon information and belief, CommScope has engaged in such actions with specific intent to cause infringement or with willful blindness to the resulting infringement because CommScope has had actual knowledge of the '629 patent and that its acts were inducing infringement of the '629 patent since CommScope has had knowledge of the '629 patent.

79. CommScope's infringement of the '629 patent is exceptional and entitles BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

80. BNR has been damaged by CommScope's infringement of the '629 patent and will continue to be damaged unless CommScope is enjoined by this Court. BNR has suffered and continues to suffer irreparable injury for which there is no adequate remedy at law. The balance of hardships favors BNR, and public interest is not disserved by an injunction.

81. BNR is entitled to recover from CommScope all damages that BNR has sustained as a result of CommScope's infringement of the '629 patent, including without limitation and/or not less than a reasonable royalty.

COUNT II– INFRINGEMENT OF U.S. PATENT NO. 8,416,862

82. The allegations set forth in the foregoing paragraphs 1 through 81 are incorporated into this Second Claim for Relief.

83. On April 9, 2013, the '862 patent was duly and legally issued by the United States Patent and Trademark Office under the title “Efficient Feedback of Channel Information in a Closed Loop Beamforming Wireless Communications System.”

84. BNR is the assignee and owner of the right, title and interest in and to the '862 patent, including the right to assert all causes of action arising under the patent and the right to any remedies for infringement of it.

85. Upon information and belief, CommScope has and continues to directly or indirectly infringe one or more claims of the '862 patent, including at least claims 1 and 9, by selling, offering to sell, making, using, and/or providing and causing to be used instrumentalities that operate according to the 802.11ac standard, including access points, data gateways, telephony gateways, cable modems, wireless routers, cable gateways and WiFi Extenders, such as R320 indoor access points, R510 indoor access points, R550 indoor access points, R610 indoor access points, R650 indoor access points, R750 indoor access points, R850 indoor access points, C110 indoor access points, H320 indoor access points, H510 indoor access points, M510 indoor access points, R310 indoor access points, R710 indoor access points, R720 indoor access points, R730 indoor access points, T310 outdoor access points, T750 outdoor access points, E510 outdoor access points, P300 outdoor access points, T610 outdoor access points, T710 outdoor access points, T811 outdoor access points, H550 indoor access points, T350 outdoor access points, TG3442 data gateways, TG3451 telephony gateways, T1682-3 telephony gateways, TG 3482 telephony gateways, RAC2VIA 802.11ac Wave 2 routers, DG3450 data gateways, TG3452 telephony gateways , TG1682 wireless telephone gateways, SBR1750

wireless routers, DG2470 cable gateways, TG2472 telephony gateways, DG2470 cable gateways, TG2472 cable voice gateways, TG2492 cable voice gateways, DG3450 cable gateways, TG3442A cable voice gateways, TG3452 cable voice gateways, NVG558 fixed wireless broadband gateways, VAP3400 Wi-Fi extenders for IPTV, and VAP4402 Wi-Fi extenders (the “’862 Accused Instrumentalities”).

86. The 802.11ac standard was introduced on or about December 2013, and provides a definition and standardization for channel sounding for beamforming for Multiple Input Multiple Output (“MIMO”) RF radio links, including how a receiving wireless device communicates channel sounding to a base station. Beamforming requires the use of a steering matrix that improves the reception to the beamformee. The 802.11ac standard provides a specific way to compress the beamforming feedback matrix by the beamformee, and how to determine and decompose the estimated transmitter beamforming unitary matrix and compressed into angles for efficient transmission to the beamformer, which generates a next steering matrix. (*See* 802.11-2016 at 19.3.12.1.)

87. Upon information and belief after a reasonable investigation, at least the ’862 Accused Instrumentalities infringe the ’862 patent. The ’862 Accused Instrumentalities provide a method for feeding back transmitter beamforming information from a receiving wireless communication device to a transmitting wireless communication device. For instance, the R650 is 802.11ac compliant and therefore provides a compressed beamforming feedback matrix to a beamformer. (*See, e.g.*, 802.11-2016 at 19.3.12.1; <https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/>.)

88. The ’862 Accused Instrumentalities, for example, receive a preamble sequence from a transmitting wireless device. For instance, the R650 is an 802.11ac compliant receiver

and, therefore, receives a PHY preamble with HT-LTFs from a beamformer. (*See, e.g.*, 802.11-2016 at 19.3.13.1; [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

89. The '862 Accused Instrumentalities include estimating a channel response based upon the preamble sequence. For instance, the R650 is an 802.11ac compliant wireless device and, therefore, estimates a channel response as a result of receiving the HT-LTF's which are part of the PHY preamble. (*See, e.g.*, 802.11-2016 at 19.3.13.1; [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

90. The '862 Accused Instrumentalities include determining an estimated transmitter beamforming unitary matrix (V) based upon the channel response and a receiver beamforming unitary matrix (U). For instance, the R650 is an 802.11ac compliant wireless device, and therefore calculates a beamforming unitary matrix V based on a singular value decomposition of the channel response $H=UDV^*$, where D is a diagonal matrix and U is a receiver unitary matrix. (*See, e.g.*, 802.11-2016 at 19.3.12.3.6; [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

91. The '862 Accused Instrumentalities include decomposing the estimated transmitter beamforming unitary matrix (V) to produce the transmitter beamforming information. For instance, the R650 is an 802.11ac compliant wireless device and, therefore, determines beamforming feedback matrices and compresses those into the form of angles. (*See, e.g.*, 802.11-2016 at 19.3.12.3.6; [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

92. The '862 Accused Instrumentalities include wirelessly sending the transmitter beamforming information to the transmitting wireless device. For instance, the R650 is an

802.11ac compliant wireless device and, therefore, wirelessly sends the compressed beamformed matrices to the beamformer. (*See, e.g.*, 802.11-2016 at 19.3.12.3.6; <https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/>.)

93. CommScope has infringed and is infringing, individually and/or jointly, either literally or under the doctrine of equivalents, at least claims 1 and 9, of the '862 patent in violation of 35 U.S.C. §§ 271, *et seq.*, directly and/or indirectly, by making, using, offering for sale, selling, offering for lease, leasing in the United States, and/or importing into the United States without authority or license, the '862 Accused Instrumentalities.

94. Upon information and belief, CommScope has had knowledge of the '862 patent, at least since receiving a notice letter from BNR dated January 4, 2021.

95. Upon information and belief, since CommScope had knowledge of the '862 patent, CommScope has induced and continues to induce others to infringe at least claims 1 and 9 of the '862 patent under 35 U.S.C. § 271(b) by, among other things, and with specific intent or willful blindness, actively aiding and abetting others to infringe, including but not limited to CommScope's partners and customers, whose use of the '862 Accused Instrumentalities constitutes direct infringement of at least claims 1 and 9 of the '862 patent.

96. In particular, CommScope's actions that aid and abet others such as their partners and customers to infringe include marketing the '862 Accused Instrumentalities to its customers, distributing the '862 Accused Instrumentalities to its customers and providing materials and/or services to users of the '862 Accused Instrumentalities including providing instructions to users on how to use the functionality of the '862 patent on its website and elsewhere. (*See, e.g.*,

[https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

97. Upon information and belief, CommScope has engaged in such actions with specific intent to cause infringement or with willful blindness to the resulting infringement because CommScope has had actual knowledge of the '862 patent and that its acts were inducing infringement of the '862 patent since CommScope has had knowledge of the '862 patent.

98. CommScope's infringement of the '862 patent is exceptional and entitles BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

99. BNR has been damaged by CommScope's infringement of the '862 patent and will continue to be damaged unless CommScope is enjoined by this Court. BNR has suffered and continues to suffer irreparable injury for which there is no adequate remedy at law. The balance of hardships favors BNR, and public interest is not disserved by an injunction.

100. BNR is entitled to recover from CommScope all damages that BNR has sustained as a result of CommScope's infringement of the '862 patent, including without limitation and/or not less than a reasonable royalty.

COUNT III – INFRINGEMENT OF U.S. PATENT NO. 7,564,914

101. The allegations set forth in the foregoing paragraphs 1 through 100 are incorporated into this Third Claim for Relief.

102. On July 21, 2009, the '914 patent was duly and legally issued by the United States Patent and Trademark Office under the title "Method and System for Frame Formats for MIMO Channel Measurement Exchange."

103. BNR is the assignee and owner of the right, title and interest in and to the '914 patent, including the right to assert all causes of action arising under the patent and the right to any remedies for infringement of it.

104. Upon information and belief, CommScope has and continues to directly or indirectly infringe one or more claims of the '914 patent, including at least claims 1 and 25, by selling, offering to sell, making, using, and/or providing and causing to be used instrumentalities that operate according to the 802.11ac standard, including access points, data gateways, telephony gateways, cable modems, wireless routers, cable gateways and WiFi Extenders, such as R320 indoor access points, R510 indoor access points, R550 indoor access points, R610 indoor access points, R650 indoor access points, R750 indoor access points, R850 indoor access points, C110 indoor access points, H320 indoor access points, H510 indoor access points, M510 indoor access points, R310 indoor access points, R710 indoor access points, R720 indoor access points, R730 indoor access points, T310 outdoor access points, T750 outdoor access points, E510 outdoor access points, P300 outdoor access points, T610 outdoor access points, T710 outdoor access points, T811 outdoor access points, H550 indoor access points, T350 outdoor access points, TG3442 data gateways, TG3451 telephony gateways, T1682-3 telephony gateways, TG 3482 telephony gateways, RAC2VIA 802.11ac Wave 2 routers, DG3450 data gateways, TG3452 telephony gateways, TG1682 wireless telephone gateways, SBR1750 wireless routers, DG2470 cable gateways, TG2472 telephony gateways, DG2470 cable gateways, TG2472 cable voice gateways, TG2492 cable voice gateways, DG3450 cable gateways, TG3442A cable voice gateways, TG3452 cable voice gateways, NVG558 fixed wireless broadband gateways, VAP3400 Wi-Fi extenders for IPTV, and VAP4402 Wi-Fi extenders (the "'914 Accused Instrumentalities").

105. The 802.11ac standard provides for a "compressed beamforming feedback matrix" and specifies that "[i]n compressed beamforming feedback matrix, the beamformee shall remove the space-time stream CSD in Table 19-10 from the measured channel before computing

a set of matrices for feedback to the beamformer.” (*See* 802.11-2016 at 19.3.12.3.6.) Furthermore, “[t]he beamforming feedback matrices, $V(k)$, found by the beamformee are compressed in the form of angles, which are sent to the beamformer.” (*Id.*) Devices implementing the beamforming standardization according to 802.11ac standard must be capable of providing compressed beamforming feedback matrices as set forth above.

106. On information and belief after a reasonable investigation, the '914 Accused Instrumentalities infringe the '914 patent. The '914 Accused Instrumentalities provide a method for transmitting data via a plurality of radio frequency (RF) channels utilizing a plurality of transmitting antennas. For instance, the R650 is an 802.11ac compliant wireless device that transmits data via a plurality of radio frequency (RF) channels utilizing a plurality of transmitting antennas. (*See, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

107. The '914 Accused Instrumentalities receive feedback information via at least one of the plurality of RF channels. For instance, the R650 is an 802.11ac compliant wireless device that receives feedback information via at least one of the plurality of RF channels. (*See, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

108. The '914 Accused Instrumentalities modify a transmission mode based on the feedback information. For instance, the R650 is an 802.11ac compliant wireless device that modifies a transmission mode based on the feedback information. (*See, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

109. The '914 Accused Instrumentalities receives the feedback information comprising channel estimates based on transmission characteristics of the transmitted data via at least one of the plurality of transmitting antennas. For instance, the R650 is an 802.11ac compliant wireless device that receives the feedback information comprising channel estimates based on transmission characteristics of the transmitted data via at least one of the plurality of transmitting antennas; and deriving the feedback information from mathematical matrix decomposition of channel estimates. (*See, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

110. The '914 Accused Instrumentalities derive the feedback information from mathematical matrix decomposition of channel estimates. For instance, the R650 is an 802.11ac compliant wireless device that derives the feedback information from mathematical matrix decomposition of channel estimates. (*See, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

111. CommScope has infringed and is infringing, individually and/or jointly, either literally or under the doctrine of equivalents, at least claims 1 and 25 of the '914 patent in violation of 35 U.S.C. §§ 271, *et seq.*, directly or indirectly, by making, using, offering for sale, selling, offering for lease, leasing in the United States, and/or importing into the United States without authority or license, the '914 Accused Instrumentalities.

112. Upon information and belief, CommScope has had knowledge of the '914 patent, at least since receiving a notice letter from BNR dated January 13, 2021.

113. Upon information and belief, since CommScope had knowledge of the '914 patent, CommScope has induced and continues to induce others to infringe at least claims 1 and 25 of the '914 patent under 35 U.S.C. § 271(b) by, among other things, and with specific intent

or willful blindness, actively aiding and abetting others to infringe, including but not limited to CommScope's partners and customers, whose use of the '914 Accused Instrumentalities constitutes direct infringement of at least claims 1 and 25 of the '914 patent.

114. In particular, CommScope's actions that aid and abet others such as their partners and customers to infringe include marketing the '914 Accused Instrumentalities to its customers, distributing the '914 Accused Instrumentalities and providing materials and/or services to users of the '914 Accused Instrumentalities, including providing instructions to users on how to use the functionality of the '914 patent on its website and elsewhere. (*See, e.g.*, [https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/))

115. Upon information and belief, CommScope has engaged in such actions with specific intent to cause infringement or with willful blindness to the resulting infringement because CommScope has had actual knowledge of the '914 patent and that its acts were inducing infringement of the '914 patent since CommScope has had knowledge of the '914 patent.

116. CommScope's infringement of the '914 patent is exceptional and entitles BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

117. BNR has been damaged by CommScope's infringement of the '914 patent and will continue to be damaged unless CommScope is enjoined by this Court. BNR has suffered and continues to suffer irreparable injury for which there is no adequate remedy at law. The balance of hardships favors BNR, and public interest is not disserved by an injunction.

118. BNR is entitled to recover from CommScope all damages that BNR has sustained as a result of CommScope's infringement of the '914 patent, including without limitation and/or not less than a reasonable royalty.

COUNT IV – INFRINGEMENT OF U.S. PATENT NO. 6,963,129

119. The allegations set forth in the foregoing paragraphs 1 through 118 are incorporated into this Fourth Claim for Relief.

120. On November 8, 2005, the '129 patent was duly and legally issued by the United States Patent and Trademark Office under the title “Multi-chip Package Having a Contiguous Heat Spreader Assembly.”

121. BNR is the assignee and owner of the right, title and interest in and to the '129 patent, including the right to assert all causes of action arising under the patent and the right to any remedies for infringement of it.

122. Upon information and belief, CommScope has and continues to directly or indirectly infringe one or more claims of the '129 patent, including at least claims 1 and 2, by selling, offering to sell, making, using, and/or providing and causing to be used instrumentalities that include a heat spreader. The heat spreader in CommScope's instrumentalities, including R550 indoor access points, R610 indoor access points, R650 indoor access points, C110 indoor access points, Q410 indoor access points, Q710 indoor access points, Q910 indoor access points, H320 indoor access points, M510 indoor access points, T750 outdoor access points, T350 outdoor access points, and TG 3482 telephony gateways (the “'129 Accused Instrumentalities”) have heat spreader assembly that includes a single, unibody heat spreader. The single, unibody heat spreader is configured to extend across substantially the entire first surface of at least two spaced integrated circuits opposite a second surface of the integrated circuits having (1) a single, unibody heat spreader configured to extend across substantially the entire first surface of at least two spaced integrated circuits opposite a second surface of the integrated circuits that have a bonding pad; (2) adhesive placed between the heat spreader and the first surface for securing the heat spreader to the first surface of the integrated circuits at a spaced distance above at least one

passive device arranged in the area between the spaced integrated circuits; and (3) a second heat spreader interposed between the heat spreader and only one of the at least two spaced integrated circuits.

123. Upon information and belief after a reasonable investigation, at least the '129 Accused Instrumentalities infringe the '129 patent. The '129 Accused Instrumentalities include a heat spreader assembly. For instance, the R650 contains a heat spreader assembly that includes a single, unibody heat spreader configured to extend across substantially the entire first surface of at least two spaced integrated circuits opposite a second surface of the integrated circuits having a bonding pad. (*See, e.g.*, <https://webresources.ruckuswireless.com/datasheets/r650/ds-commscope-r650.html#d48e1571>.)

124. The '129 Accused Instrumentalities' heat spreader assembly also includes adhesive placed between the heat spreader and the first surface for securing the heat spreader to the first surface of the integrated circuits at a spaced distance above at least one passive device arranged in the area between the spaced integrated circuits. For instance, the R650's heat spreader assembly includes adhesive placed between the heat spreader and the first surface for securing the heat spreader to the first surface of the integrated circuits. (*See, e.g.*, <https://webresources.ruckuswireless.com/datasheets/r650/ds-commscope-r650.html#d48e1571>.)

125. More specifically, a transparent adhesive is placed between the heat spreader and the first surface in order to secure the heat spreader to the first surface of the integrated circuits. When assembled, the heat spreader is spaced at a distance above at least one passive device and arranged in the area between the spaced integrated circuits. (*See, e.g.*, <https://webresources.ruckuswireless.com/datasheets/r650/ds-commscope-r650.html#d48e1571>.)

126. The '129 Accused Instrumentalities' heat spreader assembly also includes a second heat spreader interposed between the heat spreader and only one of the at least two spaced integrated circuits. For instance, the R650's heat spreader assembly includes a second heat spreader, which is interposed between the heat spreader and only one of the at least two spaced integrated circuits. (*See, e.g.*, <https://webresources.ruckuswireless.com/datasheets/r650/ds-commscope-r650.html#d48e1571>.)

127. CommScope has infringed and is infringing, individually and/or jointly, either literally or under the doctrine of equivalents, at least claims 1 and 2 of the '129 patent in violation of 35 U.S.C. §§ 271, *et seq.*, directly or indirectly, by making, using, offering for sale, selling, offering for lease, leasing in the United States, and/or importing into the United States without authority or license, the '129 Accused Instrumentalities.

128. Upon information and belief, CommScope has had knowledge of the '129 patent, at least since receiving a notice letter from BNR dated March 10, 2021.

129. Upon information and belief, since CommScope had knowledge of the '129 patent, CommScope has induced and continues to induce others to infringe at least claims 1 and 2 of the '129 patent under 35 U.S.C. § 271(b) by, among other things, and with specific intent or willful blindness, actively aiding and abetting others to infringe, including but not limited to CommScope's partners and customers, whose use of the '129 Accused Instrumentalities constitutes direct infringement of at least claims 1 and 2 of the '129 patent.

130. In particular, CommScope's actions that aid and abet others such as their partners and customers to infringe include marketing the '129 Accused Instrumentalities to its customers, distributing the '129 Accused Instrumentalities and providing materials and/or services to users of the '129 Accused Instrumentalities, including providing instructions to users on how to use

the functionality of the '129 patent on its website and elsewhere. (*See, e.g.*, [https://www.commscope.com/product--type/enterprise-networking/wireless-access-points/indoor/r650/.](https://www.commscope.com/product--type/enterprise-networking/wireless-access-points/indoor/r650/))

131. On information and belief, CommScope has engaged in such actions with specific intent to cause infringement or with willful blindness to the resulting infringement because CommScope has had actual knowledge of the '129 patent and that its acts were inducing infringement of the '129 patent since CommScope has had knowledge of the '129 patent.

132. CommScope's infringement of the '129 patent is exceptional and entitles BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

133. BNR has been damaged by CommScope's infringement of the '129 patent and will continue to be damaged unless CommScope is enjoined by this Court. BNR has suffered and continues to suffer irreparable injury for which there is no adequate remedy at law. The balance of hardships favors BNR, and public interest is not disserved by an injunction.

134. BNR is entitled to recover from CommScope all damages that BNR has sustained as a result of CommScope's infringement of the '129 patent, including without limitation and/or not less than a reasonable royalty.

COUNT V – INFRINGEMENT OF U.S. PATENT NO. 6,858,930

135. The allegations set forth in the foregoing paragraphs 1 through 134 are incorporated into this Fifth Claim for Relief.

136. On February 22, 2005, the '930 patent was duly and legally issued by the United States Patent and Trademark Office under the title "Multi Chip Module."

137. BNR is the assignee and owner of the right, title and interest in and to the '930 patent, including the right to assert all causes of action arising under the patent and the right to any remedies for infringement of it.

138. Upon information and belief, CommScope has and continue to directly infringe one or more claims of the '930 patent, including at least claims 1, 2, 5 and 6 by selling, offering to sell, making, using, and/or providing and causing to be used instrumentalities having a multi chip package, including R550 indoor access points, R610 indoor access points, R650 indoor access points, C110 indoor access points, H320 indoor access points, M510 indoor access points, Q410 indoor access points, Q710 indoor access points, Q910 indoor access points, T750 outdoor access points, T350 outdoor access points, and TG 3482 telephony gateways (the "'930 Accused Instrumentalities") having, in part, heat spreaders each having a first side and an opposing second side, the first side of each of the heat spreaders disposed adjacent the second side of the integrated circuits, where one each of the heat spreaders is associated with one each of the integrated circuits, a single stiffener having a first side and an opposing second side, the stiffener covering all of the integrated circuits and heat spreaders, the first side of the stiffener disposed adjacent the second side of the heat spreaders.

139. Upon information and belief and after a reasonable investigation, at least the '930 Accused Instrumentalities infringe the '930 patent. The '930 Accused Instrumentalities include a package substrate having a first side and an opposing second side, the first side for receiving package electrical connections. For instance, the R650 includes a package substrate having a first side and an opposing second side, the first side for receiving package electrical connections. (*See, e.g.*, <https://webresources.ruckuswireless.com/datasheets/r650/ds-commscope-r650.html#d48e1571>.)

140. The '930 Accused Instrumentalities also include integrated circuits each having a first side and an opposing second side, the first side of each of the integrated circuits electrically connected and structurally connected to the second side of the package substrate. For instance,

the R650 includes integrated circuits each having a first side and an opposing second side, the first side of each of the integrated circuits electrically connected and structurally connected to the second side of the package substrate. (*See, e.g.*, <https://webresources.ruckuswireless.com/datasheets/r650/ds-commscope-r650.html#d48e1571>.)

141. The '930 Accused Instrumentalities also include heat spreaders each having a first side and an opposing second side, the first side of each of the heat spreaders disposed adjacent the second side of the integrated circuits, where one each of the heat spreaders is associated with one each of the integrated circuits. For instance, the R650 includes heat spreaders each having a first side and an opposing second side, the first side of each of the heat spreaders disposed adjacent the second side of the integrated circuits, where one each of the heat spreaders is associated with one each of the integrated circuits. (*See, e.g.*, <https://webresources.ruckuswireless.com/datasheets/r650/ds-commscope-r650.html#d48e1571>.)

142. The '930 Accused Instrumentalities also include a single stiffener having a first side and an opposing second side, the stiffener covering all of the integrated circuits and heat spreaders, the first side of the stiffener disposed adjacent the second side of the heat spreaders. For instance, the R650 includes a single stiffener having a first side and an opposing second side, the stiffener covering all of the integrated circuits and heat spreaders, the first side of the stiffener disposed adjacent the second side of the heat spreaders. (*See, e.g.*, <https://webresources.ruckuswireless.com/datasheets/r650/ds-commscope-r650.html#d48e1571>.)

143. The '930 Accused Instrumentalities also include discrete components electrically connected to the second side of the package substrate and coplanar with the integrated circuits. For instance, the R650 includes discrete components electrically connected to the second side of

the package substrate and coplanar with the integrated circuits. (*See, e.g.*, <https://webresources.ruckuswireless.com/datasheets/r650/ds-commscope-r650.html#d48e1571>.)

144. CommScope has infringed and is infringing, individually and/or jointly, either literally or under the doctrine of equivalents, at least claims 1, 2, 5 and 6 of the '930 patent in violation of 35 U.S.C. §§ 271, *et seq.*, directly and/or indirectly, by making, using, offering for sale, selling, offering for lease, leasing in the United States, and/or importing into the United States without authority or license, the '930 Accused Instrumentalities.

145. Upon information and belief, CommScope has had knowledge of the '930 patent, at least since receiving a notice letter from BNR dated March 10, 2021.

146. Upon information and belief, since CommScope had knowledge of the '930 patent, CommScope has induced and continues to induce others to infringe the '930 patent under 35 U.S.C. § 271(b) by, among other things, and with specific intent or willful blindness, actively aiding and abetting others to infringe, including but not limited to CommScope's partners and customers, whose use of the '930 Accused Instrumentalities constitutes direct infringement.

147. In particular, CommScope's actions that aid and abet others such as their partners and customers to infringe include marketing the '930 Accused Instrumentalities to its customers, distributing the '930 Accused Instrumentalities and providing materials and/or services to users of the '930 Accused Instrumentalities, including providing instructions to users on how to use the functionality of the '930 patent on its website and elsewhere. (*See, e.g.*, <https://www.commscope.com/product-type/enterprise-networking/wireless-access-points/indoor/r650/>.)

148. Upon information and belief, CommScope has engaged in such actions with specific intent to cause infringement or with willful blindness to the resulting infringement

because CommScope has had actual knowledge of the '930 patent and that its acts were inducing infringement of the '930 patent since CommScope has had knowledge of the '930 patent.

149. CommScope's infringement of the '930 patent is exceptional and entitles BNR to attorneys' fees and costs incurred in prosecuting this action under 35 U.S.C. § 285.

150. BNR has been damaged by CommScope's infringement of the '930 patent and will continue to be damaged unless CommScope is enjoined by this Court. BNR has suffered and continues to suffer irreparable injury for which there is no adequate remedy at law. The balance of hardships favors BNR, and public interest is not disserved by an injunction.

151. BNR is entitled to recover from CommScope all damages that BNR has sustained as a result of CommScope's infringement of the '930 patent, including without limitation and/or not less than a reasonable royalty.

JURY DEMAND

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, BNR demands a trial by jury on all issues triable as such.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff BNR demands judgment for itself and against CommScope as follows:

A. An adjudication that the CommScope has infringed U.S. Patent Nos. RE 48,629, 8,416,862, 7,564,914, 6,963,129, and 6,858,930;

B. An award of damages to be paid by CommScope adequate to compensate BNR for CommScope's past infringement of U.S. Patent Nos. RE 48,629, 8,416,862, 6,963,129 and 6,858,930, and any continuing or future infringement through the date such judgment is entered, including interest, costs, expenses, and an accounting of all infringing acts including, but not limited to, those acts not presented at trial;

- C. Enhanced damages for willful infringement;
- D. A declaration that this case is exceptional under 35 U.S.C. § 285, and an award of BNR's reasonable attorneys' fees; and
- E. An award to BNR of such further relief at law or in equity as the Court deems just and proper.

Dated: September 10, 2021

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