

**UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF MINNESOTA**

REGENTS OF THE  
UNIVERSITY OF MINNESOTA,

Plaintiff,

v.

CELLCO PARTNERSHIP  
D/B/A VERIZON WIRELESS,

Defendant.

Civil Action No. 14-cv-4672

**JURY TRIAL DEMANDED**

**FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT**

Plaintiff Regents of the University of Minnesota (“the University” or “Plaintiff”) makes and files this First Amended Complaint for Patent Infringement against Defendant Cellco Partnership d/b/a Verizon Wireless (“Verizon Wireless” or “Defendant”). In support of this First Amended Complaint, the University alleges as follows:

**THE PARTIES**

1. The University is a leading public institution of higher education and advanced research created by charter and perpetuated by the Constitution of the State of Minnesota, Article XIII, Section 3. The University’s main offices are located in Minneapolis, Minnesota.

2. On information and belief, Defendant is a general partnership organized and existing under the laws of the State of Delaware doing business under an assumed

name in the State of Minnesota, and having a principal place of business in Basking Ridge, New Jersey.

### **NATURE AND BASIS OF ACTION**

3. The University has a long history of discovery, innovation, teaching, outreach, and public service. The University supports and facilitates fundamental and applied research in numerous fields. The fruits of this research directly benefit the people of the State of Minnesota, as well as people around the world.

4. Much University research, like the scientific and technical research that led to the patents at issue in this case, requires significant funding, and thus much of the research performed at the University is financed by various public and private sources. For example, in 2013 (the year for which the most recent data is available), faculty and staff from across the University successfully competed for nearly \$700 million in sponsored research awards. Researchers working in the College of Science and Engineering accounted for nearly \$120 million worth of those awards.

5. The knowledge obtained through the University's research benefits many people and organizations around the world, including educators, researchers, employers, employees, and consumers. To maximize those benefits, the University sometimes patents and/or commercializes inventions made by researchers at the University, and then returns a portion of the proceeds of those activities to fund further education and research at the University. In 2013, royalty revenues from licensing and commercializing the University's various innovations reached nearly \$40 million. The University reinvests its royalty revenues in its mission of serving the people of the State of Minnesota.

6. Over the past 15 years, the United States Patent and Trademark Office (“USPTO”) has awarded hundreds of patents to the University, thereby recognizing the many discoveries made by its faculty and staff. These patents span many fields and disciplines. Many of them are based on groundbreaking research done by Professor Georgios Giannakis, along with his colleagues, in the field of wireless communications.

7. Professor Giannakis joined the University in 1999 and is a recognized expert in signal processing, communications, and networking. He is the Director of the Digital Technology Center at the University and also holds an ADC Endowed Chair in Wireless Communications. Professor Giannakis, both individually and collectively with his colleagues, has received many best paper and technical achievement awards over the years, and has written or co-written hundreds of journal and conference papers. According to the Thomson ISI Web of Knowledge List of Highly Cited Researchers, Professor Giannakis is among the top ten most cited researchers in the field of computer science, and the most cited researcher in the fields of signal processing, communications, and networking. He has advised dozens of students who have gone on to hold prestigious and influential positions in both academia and industry. He has been awarded millions of dollars in sponsored research funding that has enabled him and his collaborators to conduct research in wireless communications and related fields. His funding includes grants awarded by the National Science Foundation and the U.S. Army, such as the grants that helped support the research leading to the patents at issue.

8. Defendant has adopted important and valuable technical innovations made by Professor Giannakis and his colleagues. Specifically, Defendant has built and used

wireless communications networks and provided wireless communications services that incorporate these patented technical contributions. As a result, Defendant has reaped substantial benefits from the University's patented technologies. Defendant, however, has used these patented technologies without the University's authorization, and also without compensating the University.

### **JURISDICTION AND VENUE**

9. The University asserts claims for patent infringement against Defendant arising under the patent laws of the United States, Title 35 of the United States Code. Accordingly, this Court has jurisdiction over the subject matter of this action under at least 28 U.S.C. §§ 1331 and 1338.

10. Venue in this Court is proper under at least 28 U.S.C. §§ 1391 and 1400.

11. This Court has personal jurisdiction over the Defendant under the United States Constitution, the State Laws of Minnesota, and/or the Federal Rules of Civil Procedure. Defendant has substantial and continuous contacts with this judicial district. For example, Defendant has conducted business continuously and systematically in the State of Minnesota for many years and continues to conduct that business actively today. Defendant has also committed acts of patent infringement within this judicial district. Defendant has a wireless communication network and provides wireless communication services in the State of Minnesota, including 4G LTE services and a network that enables such services, which infringe or are used to infringe the Asserted Patents (defined below). Moreover, Defendant has sales representatives located in the State of Minnesota that market, promote, and sell Defendant's wireless communications services. The activities

referenced throughout this paragraph include, but are not limited to, those activities accused in this Complaint of patent infringement, as explained further below.

**THE UNIVERSITY'S PATENTS**

12. The University asserts five patents in this Complaint for patent infringement: U.S. Patent No. 7,251,768; U.S. Patent No. RE45,230; U.S. Patent No. 8,588,317; U.S. Patent No. 8,718,185; and U.S. Patent No. 8,774,309. These five patents are collectively referred to as the "Asserted Patents" in this Complaint.

**U.S. Patent No. 7,251,768**

13. On July 31, 2007, the USPTO duly and lawfully issued United States Patent No. 7,251,768 ("the '768 Patent"), entitled "Wireless Communication System Having Error-Control Coder and Linear Precoder," to inventors Drs. Georgios B. Giannakis, Zhengdao Wang, and Shengli Zhou. A true and correct copy of the '768 Patent is attached hereto as Exhibit A.

14. The '768 Patent is currently in full force and effect.

15. All right, title, and interest in and to the '768 Patent have been assigned to the University, which is the sole owner of the '768 Patent.

**U.S. Patent No. RE45,230**

16. On November 4, 2014, the USPTO duly and lawfully issued United States Reissue Patent No. RE45,230 (“the ‘230 Patent”), entitled “Wireless Communication System Having Linear Encoder,” to inventors Drs. Georgios B. Giannakis, Yan Xin, and Zhengdao Wang. A true and correct copy of the ‘230 Patent is attached hereto as Exhibit B.

17. The ‘230 Patent is currently in full force and effect.

18. All right, title, and interest in and to the ‘230 Patent have been assigned to the University, which is the sole owner of the ‘230 Patent.

**U.S. Patent No. 8,588,317**

19. On November 19, 2013, the USPTO duly and lawfully issued United States Patent No. 8,588,317 (“the ‘317 Patent”), entitled “Estimating Frequency-Offsets and Multi-Antenna Channels in MIMO OFDM Systems,” to inventors Drs. Georgios B. Giannakis and Xiaoli Ma. A true and correct copy of the ‘317 Patent is attached hereto as Exhibit C.

20. The ‘317 Patent is currently in full force and effect.

21. All right, title, and interest in and to the ‘317 Patent have been assigned to the University, which is the sole owner of the ‘317 Patent.

**U.S. Patent No. 8,718,185**

22. On May 6, 2014, the USPTO duly and lawfully issued United States Patent No. 8,718,185 (“the ‘185 Patent”), entitled “Estimating Frequency-Offsets and Multi-Antenna Channels in MIMO OFDM Systems,” to inventors Drs. Georgios B. Giannakis

and Xiaoli Ma. A true and correct copy of the ‘185 Patent is attached hereto as Exhibit D.

23. The ‘185 Patent is currently in full force and effect.

24. All right, title, and interest in and to the ‘185 Patent have been assigned to the University, which is the sole owner of the ‘185 Patent.

**U.S. Patent No. 8,774,309**

25. On July 8, 2014, the USPTO duly and lawfully issued United States Patent No. 8,774,309 (“the ‘309 Patent”), entitled “Estimating Frequency-Offsets and Multi-Antenna Channels in MIMO OFDM Systems,” to inventors Drs. Georgios B. Giannakis and Xiaoli Ma. A true and correct copy of the ‘309 Patent is attached hereto as Exhibit E.

26. The ‘309 Patent is currently in full force and effect.

27. All right, title, and interest in and to the ‘309 Patent have been assigned to the University, which is the sole owner of the ‘309 Patent.

**DEFENDANT’S INFRINGING ACTIVITIES**

28. Defendant owns and/or operates a wireless communications system that it publicly refers to as its “4G LTE network.” Defendant uses its 4G LTE network to provide 4G LTE communication services to its customers. These customers have mobile devices that operate on Defendant’s 4G LTE network.

29. Defendant imports, makes, and/or uses within the United States LTE wireless communications systems and performs methods with those LTE communication systems that embody the inventions claimed in the Asserted Patents. These inventions, for example, relate to the operation of the radio access portion of Defendant’s LTE

wireless communication systems. Defendant offers to sell and/or sells services to customers related to the building of these LTE wireless communication systems and/or use of these LTE communication methods. These LTE wireless communication systems include, but are not limited to, the network that Defendant refers to as its 4G LTE network.

30. On information and belief, Defendant knew of the Asserted Patents no later than November 6, 2014. Defendant has knowingly induced and contributed to acts performed by others that infringe the Asserted Patents, which include the continued assembly and maintenance of Defendant's LTE wireless communications network, the use of Defendant's network to provide LTE wireless communications services, as well as acts that infringe the Asserted Patents performed by customers who use that LTE network and those LTE services. On information and belief, Defendant encourages these acts by others with the specific intent to infringe the Asserted Patents. On information and belief, Defendant imports, offers to sell, and/or sells within the United States components, such as mobile devices that operate on Defendant's 4G LTE network or components used in providing Defendant's 4G LTE services, knowing such components to be especially made or especially adapted for use in the infringement of the Asserted Patents, and not staple articles or commodities of commerce suitable for substantial non-infringing use.



**COUNT ONE**  
**DEFENDANT'S INFRINGEMENT OF THE '768 PATENT**

31. The University repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs. The University specifically references and realleges the allegations set forth in the section called "Defendant's Infringing Activities."

32. On or after the issue date of the '768 Patent, Defendant has imported, made, and/or used within the United States LTE wireless communications systems and performed methods using those LTE wireless communication systems that directly infringe one or more claims of the '768 Patent. Defendant has also sold and offered to sell services that involve the use of these LTE wireless communications systems and involve the use of methods that directly infringe one or more claims of the '768 Patent.

33. Defendant knew of the '768 Patent no later than November 6, 2014. Defendant has actively and knowingly induced infringement, and/or actively and knowingly contributed to acts of infringement, of one or more claims of the '768 Patent by selling communication services to customers that require the use of Defendant's infringing LTE wireless communications systems and require that infringing methods be performed using those LTE wireless communication systems. On information and belief, Defendant knows that the use of its LTE wireless communication systems is an act of direct infringement of the '768 Patent, and encourages those acts, by requiring devices using its LTE network to operate in a specific way, as well as through the marketing, promoting, and advertising the use of its LTE network, with the specific intent to infringe

the '768 Patent. Alternatively, on information and belief, Defendant knows there is a high probability that the use of its LTE wireless communication systems constitutes direct infringement of the '768 Patent, but has taken deliberate actions to avoid learning of these facts. In addition, on information and belief, Defendant knows that its LTE wireless communication systems are adapted for use in a manner that infringes the '768 Patent. Defendant also knows there is a high probability, that its LTE wireless communication systems are not staple articles or commodities of commerce suitable for substantial non-infringing use.

34. As a result of Defendant's infringing acts, the University has suffered and continues to suffer damage. Thus, the University is entitled to recover damages for Defendant's infringing acts, which in no event can be less than a reasonable royalty.

35. As a result of Defendant's infringing acts, the University has been and continues to be irreparably injured and the remedies available to the University at law are inadequate to compensate for that injury. The University's irreparable injury will continue unless and until Defendant's continuing acts are restrained and enjoined by this Court.

36. The University is entitled to injunctive relief enjoining and restraining Defendant, its officers, agents, servants, and employees, acting jointly or severally, and all persons acting in concert with it, and each of them, from further infringement and from inducing infringement, and/or contributing to the infringement of the '768 Patent.

**COUNT TWO**  
**DEFENDANT'S INFRINGEMENT OF THE '230 PATENT**

37. The University repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs. The University specifically references and realleges the allegations set forth in the section called "Defendant's Infringing Activities."

38. On or after the issue date of the '230 Patent, Defendant has imported, made, and/or used within the United States LTE wireless communications systems and performed methods using those LTE wireless communication systems that directly infringe one or more claims of the '230 Patent. Defendant has also sold and offered to sell services that involve the use of these LTE wireless communications systems and involve the use of methods that directly infringe one or more claims of the '230 Patent.

39. Defendant knew of the '230 Patent no later than November 6, 2014. Defendant has actively and knowingly induced infringement, and/or actively and knowingly contributed to acts of infringement, of one or more claims of the '230 Patent by selling communication services to customers that require the use of Defendant's infringing LTE wireless communications systems and require that infringing methods be performed using those LTE wireless communication systems. On information and belief, Defendant knows that the use of its LTE wireless communication systems is an act of direct infringement of the '230 Patent, and encourage those acts, by requiring devices using its LTE network to operate in a specific way, as well as through the marketing, promoting, and advertising the use of its LTE network, with the specific intent to infringe

the '230 Patent. Alternatively, on information and belief, Defendant knows there is a high probability that the use of its LTE wireless communication systems constitutes direct infringement of the '230 Patent, but has taken deliberate actions to avoid learning of these facts. In addition, on information and belief, Defendant knows that its LTE wireless communication systems are adapted for use in a manner that infringes the '230 Patent. Defendant also knows there is a high probability that its LTE wireless communication systems are not staple articles or commodities of commerce suitable for substantial non-infringing use.

40. As a result of Defendant's infringing acts, the University has suffered and continues to suffer damage. Thus, the University is entitled to recover damages for Defendant's infringing acts, which in no event can be less than a reasonable royalty.

41. As a result of Defendant's infringing acts, the University has been and continues to be irreparably injured and the remedies available to the University at law are inadequate to compensate for that injury. The University's irreparable injury will continue unless and until Defendant's continuing acts are restrained and enjoined by this Court.

42. The University is entitled to injunctive relief enjoining and restraining Defendant, its officers, agents, servants, and employees, acting jointly or severally, and all persons acting in concert with it, and each of them, from further infringement and from inducing infringement, and/or contributing to the infringement of the '230 Patent.

**COUNT THREE**  
**DEFENDANT'S INFRINGEMENT OF THE '317, '185 AND '309 PATENTS**

43. The University repeats, realleges, and incorporates by reference, as if fully set forth herein, the allegations of the preceding paragraphs. The University specifically references and realleges the allegations set forth in the section called "Defendant's Infringing Activities."

44. On or after the issue dates of the '317, '185 and '309 Patents, Defendant has imported, made, and/or used within the United States LTE wireless communications systems and performed methods using those LTE wireless communication systems that directly infringe one or more claims of the '317, '185 and '309 Patents, respectively. Defendant has also sold and offered to sell services that involve the use of these LTE wireless communications systems and involve the use of methods that directly infringe one or more claims of the '317, '185 and '309 Patents.

45. Defendant knew of the '317, '185 and '309 Patents no later than November 6, 2014. Defendant has actively and knowingly induced infringement, and/or actively and knowingly contributed to acts of infringement, of one or more claims of the '317, '185 and '309 Patents by selling communication services to customers that require the use of Defendant's infringing LTE wireless communications systems and require that infringing methods be performed using those LTE wireless communication systems. On information and belief, Defendant knows that the use of its LTE wireless communication systems is an act of direct infringement of the '317, '185 and '309 Patents, and encourages those acts, by requiring devices using its LTE network to operate in a specific

way, as well as through the marketing, promoting, and advertising the use of its LTE network, with the specific intent to infringe the '317, '185 and '309 Patents. Alternatively, on information and belief, Defendant knows there is a high probability that the use of its LTE wireless communication systems constitutes direct infringement of the '317, '185 and '309 Patents, but has taken deliberate actions to avoid learning of these facts. In addition, on information and belief, Defendant knows that its LTE wireless communication systems are adapted for use in a manner that infringes the '317, '185 and '309 Patents. Defendant also knows there is a high probability that its LTE wireless communication systems are not staple articles or commodities of commerce suitable for substantial non-infringing use.

46. As a result of Defendant's infringing acts, the University has suffered and continues to suffer damage. Thus, the University is entitled to recover damages for Defendant's infringing acts, which in no event can be less than a reasonable royalty.

47. As a result of Defendant's infringing acts, the University has been and continues to be irreparably injured and the remedies available to the University at law are inadequate to compensate for that injury. The University's irreparable injury will continue unless and until Defendant's continuing acts are restrained and enjoined by this Court.

48. The University is entitled to injunctive relief enjoining and restraining Defendant, its officers, agents, servants, and employees, acting jointly or severally, and all persons acting in concert with it, and each of them, from further infringement and

from inducing infringement, and/or contributing to the infringement of the '317, '185 and '309 Patents.

**PRAYER FOR RELIEF**

WHEREFORE, the University respectfully requests that this Court:

A. Enter judgment that Defendant has infringed one or more claims of the '768 Patent, the '230 Patent, the '317 Patent, the '185 Patent, and the '309 Patent, in violation of at least 35 U.S.C. § 271;

B. Enter an order enjoining Defendant, its officers, agents, servants, representatives, and employees, and all persons acting in concert with them, and each of them, from infringing, inducing the infringement of, and contributing to the infringement of the '768 Patent, the '230 Patent, the '317 Patent, the '185 Patent, and the '309 Patent;

C. Award the University damages and/or a reasonable royalty for Defendant's infringement, inducement of infringement, and/or contributory infringement of the '768 Patent, the '230 Patent, the '317 Patent, the '185 Patent, and the '309 Patent, together with pre-judgment and post-judgment interest and costs, pursuant to 35 U.S.C. § 284;

D. Increase damages awarded to the University in this case to three times the damages amount found by the jury or assessed by the Court pursuant to 35 U.S.C. § 284;

E. Perform an accounting of Defendant's infringing activities through trial and judgment;

F. Declare this case to be an exceptional case under 35 U.S.C. § 285 and awarding the University its attorneys' fees and costs; and

G. Award the University such other and further relief as this Court deems just and proper.

**DEMAND FOR JURY TRIAL**

Pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, the University respectfully requests a trial by jury of any and all issues on which a trial by jury is available under applicable law.



Date: January 30, 2015

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