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7 Attorneys for Plaintiff
 GOLDEN BRIDGE TECHNOLOGY, INC.

8
 9 **UNITED STATES DISTRICT COURT**
 10 **CENTRAL DISTRICT OF CALIFORNIA**

11 **CV12-04014 (AS)(FF)(Mx)**

12 GOLDEN BRIDGE TECHNOLOGY,
 INC.,)

Case No.

13)
 14) Plaintiff,

**COMPLAINT FOR PATENT
 INFRINGEMENT**

15) vs.

DEMAND FOR JURY TRIAL

16) APPLE, INC.; MOTOROLA, INC.,)
 17) AMAZON.COM, INC.; BARNES &)
 18) NOBLE, INC.;)
 19) BARNESANDNOBLE.COM LLC;)
 20) BARNESANDNOBLE.COM INC.;)
 21) DELL INC.; HEWLETT-PACKARD)
 22) COMPANY; HTC CORP. a/k/a HIGH)
 23) TECH COMPUTER CORP.; HTC)
 24) (B.V.I.) CORP.; HTC AMERICA, INC.;)
 25) EXEDEA, INC.; LG ELECTRONICS,)
 26) INC.; LG ELECTRONICS USA, INC.;)
 27) LG ELECTRONICS MOBILECOMM)
 28) U.S.A., INC.; LENOVO GROUP LTD.;)
 LENOVO HOLDING COMPANY, INC.;)
 LENOVO (UNITED STATES) INC.;)
 PALM, INC.; PANTECH CORP. f/k/a)
 PANTECH CO., LTD.; PANTECH)
 WIRELESS, INC.; RESEARCH IN)
 MOTION LIMITED; RESEARCH IN)
 MOTION CORPORATION; SAMSUNG)
 ELECTRONICS CO., LTD.; SAMSUNG)
 SEMICONDUCTOR, INC.; SAMSUNG)
 ELECTRONICS AMERICA, INC.;)
 SAMSUNG TELECOMMUNICATIONS)
 AMERICA, LLC; SIERRA WIRELESS,)
 INC.; SIERRA WIRELESS AMERICA,)

MCKOOL SMITH HENNIGAN, P.C.
 LOS ANGELES, CALIFORNIA

McKool Smith Hennigan, P.C.
LOS ANGELES, CALIFORNIA

1 INC.; SONY KABUSHIKI KAISHA)
a/k/a SONY CORPORATION; SONY)
2 ELECTRONICS, INC.; SONY)
CORPORATION OF AMERICA; SONY)
3 MOBILE COMMUNICATIONS AB;)
SONY MOBILE COMMUNICATIONS)
4 (USA) INC.; ZTE CORPORATION, ZTE)
(USA) INC., and ZTE SOLUTIONS)
5 INC.,)
6 Defendants.)

7 For its Complaint against APPLE, INC; MOTOROLA, INC., AMAZON.COM,
8 INC.; BARNES & NOBLE, INC.; BARNESANDNOBLE.COM LLC;
9 BARNESANDNOBLE.COM INC.; DELL INC.; HEWLETT-PACKARD
10 COMPANY; HTC CORP. a/k/a HIGH TECH COMPUTER CORP.; HTC (B.V.I.)
11 CORP.; HTC AMERICA, INC.; EXEDEA, INC.; LG ELECTRONICS, INC.; LG
12 ELECTRONICS USA, INC.; LG ELECTRONICS MOBILECOMM U.S.A., INC.;
13 LENOVO HOLDING COMPANY, INC.; LENOVO GROUP LTD.' LENOVO
14 (UNITED STATES) INC.; PALM, INC.; PANTECH CORP. f/k/a PANTECH CO.,
15 LTD.; PANTECH WIRELESS, INC.; RESEARCH IN MOTION LIMITED;
16 RESEARCH IN MOTION CORPORATION; SAMSUNG ELECTRONICS CO.,
17 LTD.; SAMSUNG SEMICONDUCTOR, INC.; SAMSUNG ELECTRONICS
18 AMERICA, INC.; SAMSUNG TELECOMMUNICATIONS AMERICA, LLC;
19 SIERRA WIRELESS, INC.; SIERRA WIRELESS AMERICA, INC.; SONY
20 KABUSHIKI KAISHA a/k/a SONY CORPORATION; SONY ELECTRONICS,
21 INC.; SONY CORPORATION OF AMERICA; SONY MOBILE
22 COMMUNICATIONS AB; SONY MOBILE COMMUNICATIONS (USA) INC.;
23 ZTE CORPORATION, ZTE (USA) INC., and ZTE SOLUTIONS INC. (collectively,
24 "Defendants"), Plaintiff Golden Bridge Technology, Inc. ("Plaintiff" or "GBT")
25 alleges as follows:

THE PARTIES

27 1. Plaintiff Golden Bridge Technology, Inc. is a corporation duly organized
28 and existing under the laws of the State of New Jersey, with its principal place of

1 business at 198 Brighton Avenue, Long Branch, New Jersey 07740. GBT is the
2 owner, by assignment, of all right, title and interest to U.S. Patent No. 6,075,793
3 entitled "High Efficiency Spread Spectrum System and Method" ("the '793 patent" or
4 "the Patent-in-Suit"). GBT's ownership of the '793 patent includes the rights to
5 enforce and license the patented technology.

6 2. Defendant Apple, Inc. ("Apple") is a California corporation with its
7 principal place of business located at One Infinite Loop, Cupertino, California 95014.
8 Apple's registered agent for service of process in California is CT Corporation (Agent
9 for Service of Process), 818 W. 7th Street, Suite 200, Los Angeles, California 90017.

10 3. Defendant Motorola, Inc. ("Motorola") is a Delaware corporation with its
11 principal place of business 1303 East Algonquin Road, Schaumburg, Ill. 60196.
12 Motorola's registered agent for service of process in Delaware is the Corporation
13 Trust Company, Corporation Trust Center, 1209 Orange St., Wilmington, Delaware
14 19801.

15 4. Defendant Barnes & Noble, Inc. is a Delaware corporation and its
16 registered agent for service of process is Capital Services, Inc., 615 South DuPont
17 Highway, Dover, Delaware 19901.

18 5. Defendant Barnesandnoble.com LLC is a wholly owned subsidiary of
19 Barnes & Noble, Inc. and is a Delaware limited liability company with its principal
20 place of business at 122 Fifth Avenue, New York, NY 10011. Barnesandnoble.com
21 LLC's registered agent for service of process is Capitol Services, Inc., 615 South
22 DuPont Highway, Dover, Delaware 19901.

23 6. Defendant Barnesandnoble.com Inc. is a subsidiary of Barnes & Noble,
24 Inc. Barnesandnoble.com Inc. is a Delaware corporation with business operations at
25 122 Fifth Avenue, New York, New York 10011. Barnesandnoble.com Inc.'s
26 registered agent for service of process is Capital Services, Inc., 615 South DuPont
27 Highway, Dover, Delaware 19901.

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1 7. Defendant Dell Inc. ("Dell") is a Delaware corporation with its principal
2 place of business at One Dell Way, Round Rock, Texas 78682. Dell's agent for
3 service of process is the Corporation Service Company, 2711 Centerville Road, Suite
4 400, Wilmington, Delaware 19808.

5 8. Defendant Hewlett-Packard Company ("HP") is a Delaware corporation
6 with a principal place of business at 3000 Hanover Street, Palo Alto, California
7 94304. HP's registered agent for service of process is Corporation Trust Company,
8 Corporation Trust Center, 1209 Orange St., Wilmington, Delaware, 19801.

9 9. Defendant HTC Corp. a/k/a High Tech Computer Corp. ("HTC Corp.")
10 is a Chinese corporation with its principal place of business located at No. 23,
11 Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan, Republic of China.

12 10. Defendant HTC (B.V.I.) Corp. ("HTC BVI") is a wholly-owned
13 subsidiary of Defendant HTC Corp. and is incorporated under the laws of the British
14 Virgin Islands with its principal place of business at 3F, Omar Hodge Building,
15 Wickhams Cay I, P.O. Box 362, Road Town, Tortola, British Virgin Islands.
16 Defendant HTC BVI is engaged in global investing and related activities on behalf of
17 its parent, Defendant HTC Corp., and is itself a parent company of additional named
18 defendants.

19 11. Defendant HTC America, Inc. ("HTC America") is a wholly-owned
20 subsidiary of Defendant HTC BVI and is incorporated under the laws of the State of
21 Washington, with its principal place of business at 13920 SE Eastgate Way, Suite
22 400, Bellevue, Washington 98005. HTC America's registered agent for service of
23 process is the National Registered Agents, Inc., 16055 Space Center Blvd., Suite 235,
24 Houston, Texas 77062.

25 12. Defendant Exedea, Inc. ("Exedea") is a wholly-owned subsidiary of HTC
26 BVI and is incorporated under the laws of the State of Texas with its principal place
27 of business at 5950 Corporate Drive, Houston, Texas 77036. Exedea's registered
28

1 agent for service of process is HTC USA Inc., 5950 Corporate Drive, Houston, Texas
2 77036-2306.

3 13. Defendant LG Electronics, Inc. is a Korean corporation with a principal
4 place of business at LG Twin Towers 20, Yeouido-dong, Yeongdeunspo-gu, Seoul
5 150-721, South Korea.

6 14. Defendant LG Electronics USA, Inc. is a wholly owned subsidiary of LG
7 Electronics, Inc. and is Delaware corporation with its principal place of business at
8 1000 Sylvan Avenue, Englewood Cliffs, New Jersey 07632. LG Electronics USA,
9 Inc.'s registered agent for service of process is United States Corporation Company,
10 2711 Centerville Road, Suite 400, Wilmington, Delaware 19808.

11 15. Defendant LG Electronics MobileComm U.S.A, Inc. is a wholly owned
12 subsidiary of LG Electronics, Inc. LG Electronics MobileComm U.S.A., Inc. is a
13 California corporation with its principal place of business at 920 Sylvan Avenue,
14 Englewood Cliffs, New Jersey, 07632. LG Electronics MobileComm U.S.A., Inc.'s
15 registered agent for service of process in California is Alan K. Tse, 10101 Old Grove
16 Road, San Diego, California 92131. In New Jersey, LG Electronics Mobilecomm
17 U.S.A., Inc. may be served at National Registered Agents, Inc. of New Jersey, 100
18 Canal Pointe Blvd., Suite 212, Princeton, New Jersey, 08540.

19 16. Defendant Lenovo Group Ltd. is a Chinese company, with its principal
20 place of business at No. 6 ChuangYe Road, Shangdi Information Industry Base,
21 Haidan District, Beijing, China 100085.

22 17. Defendant Lenovo Holding Company, Inc. is a wholly owned subsidiary
23 of Lenovo Group Ltd. and is a corporation organized and existing under the laws of
24 the state of Delaware with a principal place of business at 1009 Think Place,
25 Morrisville, North Carolina 27560. Lenovo Holding Company, Inc.'s registered agent
26 for service of process is Corporation Trust Company, Corporation Trust Center, 1209
27 Orange St., Wilmington, Delaware 19801.

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1 18. Defendant Lenovo (United States) Inc. is a wholly owned subsidiary of
2 Lenovo Group Ltd. Lenovo (United States) Inc. is a Delaware corporation with a
3 principal place of business at 1009 Think Pl., Morrisville, North Carolina 27560.
4 Lenovo (United States) Inc.'s registered agent for service of process is Corporation
5 Trust Company, Corporation Trust Center, 1209 Orange St., Wilmington, Delaware
6 19801.

7 19. Defendant Palm, Inc. is a Delaware corporation with its principal place
8 of business at 950 West Maude Ave., Sunnyvale, California 94085. Palm's registered
9 agent for service of process is Corporation Service Company, 2711 Centerville Rd.,
10 Wilmington, Delaware 19808.

11 20. Defendant Pantech Corp. f/k/a Pantech Co., Ltd. is a Korean corporation
12 with its principal place of business located at Pantech R&D Center, I-2 DMC
13 Sangam-dong, Mapo-gu, Seoul, 415865, South Korea.

14 21. Defendant Pantech Wireless, Inc. is a subsidiary of Pantech Co., Ltd.
15 Pantech Wireless, Inc. is a Georgia corporation with its principal place of business
16 located at 5607 Glendridge Drive, Atlanta, Georgia 30342. Pantech Wireless, Inc.'s
17 registered agent for service of process in Georgia is Kathleen Elizabeth Jones, 5607
18 Glenridge Drive, Suite 500, Atlanta GA 30342.

19 22. Defendant Research In Motion Limited ("RIM") is a Canadian
20 corporation with a principal place of business at 295 Phillip Street, Waterloo, Ontario,
21 N2L 3W8, Canada.

22 23. Defendant Research In Motion Corporation is a wholly owned subsidiary
23 of Research In Motion Limited. Research In Motion Corporation is a Delaware
24 corporation with a principal place of business at 122 W. John Carpenter Parkway,
25 Suite 430, Irving, Texas 75039. Research In Motion Corporation's agent for service
26 of process is Corporation Trust Company, Corporation Trust Center, 1209 Orange St.,
27 Wilmington, Delaware 19807.

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1 24. Defendant Samsung Electronics Co., Ltd. (“Samsung”) is a business
2 entity organized under the laws of South Korea with its principal place of business at
3 Samsung Electronics Building, 1320-10 Seocho 2-dong, Seocho-gu, Seoul, Korea.
4 Samsung Electronics Co., Ltd.’s agent for service of process is Corporate Creations
5 Network, Inc. 11380 Prosperity Farms Rd., Ste. 221 East Palm Beach Gardens, FL
6 33410-3465. On information and belief, Samsung Electronics Co. Ltd. conducts
7 business in the United States through its wholly owned subsidiaries, the relevant ones
8 which are also named defendants in this action.

9 25. Defendant Samsung Semiconductor, Inc. (“SSI”) is a wholly owned
10 subsidiary of Samsung Electronics Co., Ltd. Samsung Semiconductor, Inc. is a
11 California corporation with its principal place of business at 3655 North First Street,
12 San Jose, California 95134-1713. Samsung Semiconductor, Inc.’s agent for service of
13 process is National Registered Agents, Inc. 2875 Michelle Drive, Suite 100, Irvine,
14 California 92606.

15 26. Defendant Samsung Electronics America, Inc. (“SEA”) is a wholly
16 owned subsidiary of Samsung Electronics Co., Ltd. Samsung Electronics America,
17 Inc. is a New York corporation with its principal place of business at 105 Challenger
18 Road, Ridgefield Park, New Jersey 07660. Samsung Electronics America, Inc.’s
19 agent for service of process is CT Corporation System, 111 8th Avenue, New York,
20 New York 10011.

21 27. Defendant Samsung Telecommunications America, LLC (“STA”) is a
22 wholly owned subsidiary of Samsung Electronics Co., Ltd. Samsung
23 Telecommunications America, LLC is a Delaware limited liability company with its
24 principal place of business at 1301 E. Lookout Drive, Richardson, Texas 75082.
25 Samsung Telecommunications America, LLC’s agent for service of process is
26 Corporation Services Company, 2711 Centerville Road, Suite 400, Wilmington
27 Delaware 19808.

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1 28. Defendant Sierra Wireless, Inc. is a Canadian corporation with its
2 principal place of business at 13811 Wireless Way, Richmond, B.C. VDV 3A4,
3 Canada.

4 29. Defendant Sierra Wireless America, Inc. is a subsidiary of Sierra
5 Wireless, Inc. Sierra Wireless America, Inc. is a Delaware corporation with a
6 principal place of business is at 2200 Faraday Avenue, Suite 150, Carlsbad, California
7 92008. Sierra Wireless America, Inc.'s agent for service of process is RL&F Service
8 Corp., One Rodney Square, 10th Floor, Wilmington, Delaware 19801.

9 30. Defendant Sony Kabushiki Kaisha a/k/a Sony Corporation is a Japanese
10 corporation with its principal place of business at 7-1 Konan 1-Come, Minato-Ku,
11 Tokyo, 108-0075, Japan.

12 31. Defendant Sony Corporation of America is a subsidiary of Sony
13 Corporation. Sony Corporation of America is a New York corporation with its
14 principal place of business at 550 Madison Ave., New York, NY 10022. Sony
15 Corporation of America's agent for service of process is The Corporation Trust
16 Company, 1209 North Orange St. Wilmington, Delaware 19801.

17 32. Defendant Sony Electronics, Inc. is a subsidiary of Sony Corporation.
18 Sony Electronics, Inc. is a Delaware corporation with its principal place of business at
19 555 Madison Avenue, Fl. C, New York, NY 10022. Sony Electronics, Inc.'s agent for
20 service of process is Corporation Service Company, 2711 Centerville Road, Suite
21 400, Wilmington, DE 19808.

22 33. Defendant Sony Mobile Communications AB is a Swedish Limited
23 Liability Company with its principal place of business in Hammersmith, London,
24 United Kingdom. Defendant Sony Mobile Communications AB is a wholly owned
25 subsidiary of Sony Corporation. It was founded on October 1, 2001 as a joint venture
26 between Sony and Swedish telecommunications company Ericsson. Sony acquired
27 Ericsson's share in the venture on February 16, 2012.

28

1 40. Venue is proper under 28 U.S.C. §§ 1391(c) and 1400(b), in that the acts
2 and transactions complained of herein were conceived, carried out, made effective, or
3 had effect within the State of California and within this district, among other places.
4 On information and belief, Defendants conduct business activities in this judicial
5 district including regularly doing or soliciting business, engaging in conduct and/or
6 deriving substantial revenue from goods and services provided to consumers in the
7 State of California and in this district. Furthermore, certain of the Defendants are
8 registered to do business with the California Secretary of State.

9 41. On information and belief, this Court has personal jurisdiction over the
10 Defendants. Each of the Defendants conducts continuous and systematic business in
11 California and in this district by offering to sell and/or selling mobile devices and/or
12 3G wireless services in this State in this district.

13 42. Defendants are properly joined in this action because (1) GBT's right to
14 relief is asserted against certain Defendants jointly and severally which have a parent
15 and subsidiary relationship, (2) infringing acts of Defendants arise out of the same
16 transaction, occurrence or series of transactions or occurrences relating to the making,
17 using, offering for sale, and selling of the accused products in this action, and (3)
18 questions of fact common to all Defendants will arise in the action. More specifically,
19 on information and belief, each of the Defendants' accused products and methods use
20 one of two common baseband processors designed and manufactured by Intel
21 Corporation (formerly Infineon Corporation) and Qualcomm, Inc. to practice the
22 claimed inventions. The two baseband processors used in all the accused devices
23 operate sufficiently identically to comply with an international telecommunications
24 standard for 3G wireless communications known as the UMTS 3GPP standard. The
25 claims of the '793 patent that Plaintiff will assert all read on the UMTS 3GPP
26 standard, such that infringement in this case can be proven by establishing that (i) the
27 accused devices satisfy the UMTS 3GPP standard (which defendants all claim to
28 satisfy) and (ii) the asserted claims of the '793 patent read on the standard. For these

1 reasons, infringement issues in this case will uniformly focus for all defendants on
2 one or two common baseband processors, resulting in substantial evidentiary overlap
3 in the design and operation of the accused devices, as applied to the claims of the '793
4 patent.

5 **BACKGROUND OF THE DEVELOPMENT OF 3G WIRELESS NETWORKS**

6 43. The efficiency and quality of the wireless communication networks have
7 seen extraordinary improvements over the past few decades. Although prototypes of
8 cell phones existed as early as the 1940s, cell phones were not commercially marketed
9 in the United States until the early 1980s. The first cell phone cost almost \$4,000 per
10 unit and operated on an analog network (also known as the First Generation or "1G"
11 network). Analog networks were notoriously slow and users of the analog networks
12 often experienced distorted voices and call interferences.

13 44. In the early 1990s, a set of standards defining the Second Generation or
14 "2G" network was introduced. The 2G digital network came with many advantages
15 including increasing the capacity of the telecommunications system by allowing
16 digital voice calls to be compressed, thereby using available bandwidth more
17 efficiently. The 2G network also allowed data transmission, enabling users to
18 transmit text messages from one mobile phone to another mobile phone.

19 45. Continued improvements to the 2G network were made, including, for
20 example, the 2.5G network and the 2.75G (EDGE) network, both of which improved
21 upon the abilities to use mobile phones to receive and transmit more advanced types
22 of data including photos, email and the internet.

23 46. Today, the third generation of wireless network standards, also known as
24 "3G", has been widely deployed and is currently in use. A 3G compliant network
25 provides high speed bandwidth to handheld devices, including mobile phones, as well
26 as other types of transmission/reception devices such as electronic readers, "smart
27 phones", and laptop cards. The 3G network expands the utility of wireless phones
28 and other 3G compatible devices because it allows users to conduct tasks more

1 quickly than in the past, including viewing video, downloading books and magazines,
2 sending and receiving text and multimedia messages, as well as making and receiving
3 voice calls. The advent of the 3G network allows users to watch mobile TV on
4 demand, conduct video conferencing, and utilize location based services which allows
5 users to find businesses or contacts nearby. 3G also allows users to simultaneously
6 use voice and data services, allowing user to browse the internet and conduct a voice
7 call at the same time from the same device.

8 THE GLOBAL STANDARDIZATION OF 3G NETWORKS

9 47. 3G is a compilation of technologies, the standards for which are
10 articulated by the International Telecommunication Union ("ITU"), a global standards
11 setting organization. The ITU, through the International Mobile Telecommunications-
12 2000 (IMT-2000) initiative mandated the necessity of, and the requirements for, a
13 single global wireless standard. Many groups and committees worked together to
14 develop mobile phone systems that are compliant with IMT-2000. Those groups
15 included the Telecommunications Industry Association ("TIA") and the European
16 Telecommunications Standards Institute ("ETSI").

17 48. In or around late 1998, various regional standards organizations and
18 committees, including ETSI, formed a standards setting group with the purpose of
19 creating uniform standards for 3G wireless networks and the Wideband Code
20 Division Multiple Access/Universal Mobile Telecommunications System (known as
21 WCDMA/UMTS or sometimes just UMTS) that were compliant with the IMT-2000.
22 This standards setting organization was named the Third Generation Partnership
23 Project ("3GPP").

24 49. Currently, all 3G networks claiming to be UMTS compliant must comply
25 with the IMT-2000 global initiative as articulated by 3GPP.

26 50. UMTS improved upon previous platforms by efficiently supporting
27 increased speeds and capacity, thereby allowing even more robust uses of mobile
28 devices.

1
2
3 **GBT'S CONTRIBUTIONS TO THE TELECOMMUNICATIONS**
4 **STANDARDS REQUIRED BY THE IMT-2000 AND ARTICULATED BY**
5 **3GPP FOR 3G NETWORKS**

6 51. GBT's '793 patent, also known as the "Multicode patent," relates to 3G
7 compliant mobile devices utilizing UMTS compliant technology.

8 52. The technology claimed in the '793 patent was developed by GBT, an
9 innovator in the mobile telecommunications field.

10 53. Founded in 1995, GBT was formed for the purpose of developing
11 wireless solutions. Originally, GBT focused upon developing solutions relating to
12 making wireless connections to broadband data networks.

13 54. GBT assisted in developing wireless solutions in the wireless
14 marketplace and certain wireless technologies, including a wireless multi-media
15 service using GBT's technology known as Code Division Multiple Access technology
16 or "GB-CDMA". GBT also co-chaired a standardization committee that developed
17 3G technologies.

18 55. In 1998, after the announcement that 3G would be standardized based on
19 UMTS, GBT invested additional resources designed to make the 3G UMTS
20 environment more efficient and faster.

21 56. In 2001, many of GBT's technical innovations and contributions were
22 ultimately adopted by 3GPP as an important and necessary part of the 3G and UMTS
23 standards. 3GPP articulated these global standards in several documents, including
24 one document entitled "3GPP; Technical Specification Group Radio Access Network;
25 Physical Layer Procedures (FDD)", of which there have been several releases.

26 57. GBT's contributions to the 3G UMTS global standards greatly enhanced
27 the efficiency with which data could be transmitted and was integral in enabling rapid,
28

1 efficient connections of UMTS compliant mobile devices to a UMTS compliant 3G
2 network.

3 58. As a result of being adopted as part of the standard for 3G and UMTS,
4 certain of GBT's technology is necessarily required for any use of a 3G UMTS
5 compliant mobile device.

6 59. GBT, desiring to protect its technology, sought patents from the United
7 States Patent and Trademark Office.

8 60. On February 6, 1998, GBT filed the '793 patent application and on June
9 13, 2000, the United States Patent & Trademark Office duly and legally issued United
10 States Letters Patent No. 6,075,793 entitled "HIGH EFFICIENCY SPREAD
11 SPECTRUM SYSTEM AND METHOD". A true and correct copy of the '793 patent
12 is attached hereto as Exhibit 1 and incorporated herein by reference.

13 61. The '793 patent describes a multichannel-spread-spectrum system for
14 communicating a plurality of data -sequence signals from a plurality of data channels
15 using parallel chip-sequence signals in which fewer than all of the channels include
16 header information. A header device concatenates a header to a first data sequence
17 signal on a first channel. Data -sequence signals in parallel channels are sent without
18 a header, and are timed from the header in the first channel. By sending data through
19 parallel spread-spectrum channels, while including headers in fewer than all of the
20 channels, the invention increases data transmission efficiency.

21 62. The '793 patent claims certain of GBT's contributions to the 3G UMTS
22 standards required by the IMT-2000 and articulated by 3GPP.

23 **DEFENDANT APPLE'S UNAUTHORIZED USE**
24 **OF THE MULTICODE PATENT**

25 63. Apple is a leader in providing user-friendly mobile devices to the public.
26 Apple's most well-known products include mobile music players, personal computers
27 and laptops, and the iPhone.
28

1 64. The iPhone, first introduced in 2007, provided users easy access to an
2 interface which allowed users to not only make phone calls easily but also to play
3 games, take and send photographs, play music, among other functions.

4 65. On June 11, 2008, Apple released the iPhone 3G, which utilizes UMTS
5 compliant technology. The iPhone 3G supports faster 3G data speeds via UMTS
6 compliant technology and quickly became a favorite among wireless services
7 subscribers.

8 66. In 2009, Apple released the iPhone 3GS, which continues to operate on
9 UMTS compliant 3G networks but sported upgrades and improvements, including a
10 video camera, as compared to the iPhone 3G.

11 67. To date, Apple continues to make, offer for sale, and sell mobile devices
12 that are specifically configured to operate on UMTS compliant 3G wireless networks,
13 including the Apple iPhone 3G, the iPhone 3GS, and versions of a mobile reader with
14 a 3G 4G connectivity option marketed as the Apple iPad. Millions of the iPhones and
15 iPads are active in the U.S. alone and the iPhone and iPad continue to increase in
16 popularity.

17 68. At least as early as April 15, 2009, GBT contacted Apple by letter,
18 informing Apple that certain of GBT's patented technology was required by the
19 standard articulated by 3GPP, and offering Apple the opportunity to license GBT's
20 patents. Apple has not, to date, taken a license or otherwise obtained GBT's
21 permission to use GBT's patented technology.

22 **DEFENDANT MOTOROLA'S UNAUTHORIZED USE**
23 **OF THE MULTICODE PATENT**

24 69. Defendant Motorola is a Fortune 100 telecommunications company
25 based in Schaumburg, Illinois. It is a manufacturer of cellular phones, as well as many
26 other products.

27 70. Motorola makes, sells, offers for sale and/or imports certain mobile
28 stations which are configured to allow connection to 3G UMTS compliant wireless

1 networks. Those mobile stations manufactured by Motorola that are configured to
2 allow connection to UMTS compliant 3G wireless networks include the Motorola
3 Tundra, Backflip, Karma, and Cliq XT devices.

4 71. At least as early as April 15, 2009, GBT contacted Motorola by letter,
5 informing Motorola that certain of GBT's patented technology was required by the
6 standard articulated by 3GPP and offering Motorola the opportunity to license GBT's
7 patents.

8 72. Motorola has not, to date, taken a license or otherwise obtained GBT's
9 permission to use GBT's patented technology.

10 **DEFENDANT AMAZON'S UNAUTHORIZED USE**

11 **OF THE MULTICODE PATENT**

12 73. Amazon is an online retailer and sells books, e-readers, DVDs, CDs,
13 computer software, video games, electronics, apparel and other items through its
14 online website operating at <http://www.amazon.com>.

15 74. Amazon makes, uses, sells, offers for sale and/or imports into the United
16 States certain mobile stations which are configured to allow connection to 3G UMTS
17 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
18 for sale and/or imported by Amazon that are configured to allow connection to UMTS
19 compliant 3G wireless networks include the Amazon e-reader marketed as the Kindle
20 3G + Wifi.

21 **DEFENDANT BARNES & NOBLE'S UNAUTHORIZED USE**

22 **OF THE MULTICODE PATENT**

23 75. Barnes & Noble is a retailer selling books, magazines and e-readers,
24 among other items. Barnes & Noble makes its sales through its retail facilities as well
25 as online through its website operating at <http://www.barnesandnoble.com>.

26 76. Barnes & Noble makes, uses, sells, offers for sale and/or imports into the
27 United States certain mobile stations which are configured to allow connection to 3G
28 UMTS compliant wireless networks. Those mobile stations manufactured, used, sold,

1 offered for sale and/or imported by Barnes & Noble that are configured to allow
2 connection to 3G UMTS compliant wireless networks include the Barnes & Noble e-
3 reader marketed as the Nook 3G + Wifi device.

4 **DEFENDANT DELL'S UNAUTHORIZED USE**
5 **OF THE MULTICODE PATENT**

6 77. Dell designs and markets personal computing solutions including
7 computers, desktop personal computers, notebook computers, servers and displays.

8 78. Dell makes, uses, sells, offers for sale and/or imports into the United
9 States certain mobile stations which are configured to allow connection to 3G UMTS
10 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
11 for sale and/or imported by Dell that are configured to allow connection to 3G UMTS
12 compliant wireless networks include the Dell Inspiron Mini 10 HD, the Dell Streak 7,
13 and the Dell Inspiron Mini 10 4G devices.

14 **DEFENDANT HP'S UNAUTHORIZED USE**
15 **OF THE MULTICODE PATENT**

16 79. HP is a leading global provider of products, technologies, software,
17 solutions and services to individual consumers, small- and medium-sized businesses
18 and large enterprises. HP provides personal computers, workstations, handheld
19 computing devices, calculators and other related accessories, software and services for
20 the commercial and consumer markets. These products range from basic PDAs to
21 advanced "smartphone" devices with voice and data capability.

22 80. HP makes, uses, sells, offers for sale and/or imports into the United
23 States certain mobile stations which are configured to allow connection to 3G UMTS
24 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
25 for sale and/or imported by HP that are configured to allow connection to 3G UMTS
26 compliant wireless networks include the HP Mini 110 and the iPaq Glisten devices.

27 **DEFENDANT HTC'S UNAUTHORIZED USE**
28 **OF THE MULTICODE PATENT**

1 81. HTC is designs and manufacturers electronic products, including
2 smartphones. HTC's sales revenue totaled \$2.2 billion for 2005, a 102% increase
3 from the previous year. It has been listed as the fastest growing technology company
4 in BusinessWeek's Info Tech 100.

5 82. HTC makes, uses, sells, offers for sale and/or imports into the United
6 States certain mobile stations which are configured to allow connection to 3G UMTS
7 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
8 for sale and/or imported by HTC that are configured to allow connection to 3G UMTS
9 compliant wireless networks include the HD2 and HD7 devices.

10 83. HTC makes, uses, sells, offers for sale and/or imports into the United
11 States certain mobile stations which are configured to allow connection to 3G UMTS
12 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
13 for sale and/or imported by HTC that are configured to allow connection to 3G UMTS
14 compliant wireless networks include the Surround, Aria, Pure and Tilt2 devices.

15 84. At least as early as April 15, 2009, GBT contacted HTC by letter,
16 informing HTC that certain of GBT's patented technology was required by the
17 standard articulated by 3GPP and offering HTC the opportunity to license GBT's
18 patents.

19 85. HTC has not, to date, taken a license or otherwise obtained GBT's
20 permission to use GBT's patented technology.

21 **DEFENDANT LG'S UNAUTHORIZED USE**
22 **OF THE MULTICODE PATENT**

23 86. LG designs and manufactures electronics, home appliances and mobile
24 phones. LG is extremely successful, earning \$38.6 billion in global sales and
25 employing more than 82,000 people in over 80 subsidiaries worldwide.

26 87. LG makes, uses, sells, offers for sale and/or imports into the United
27 States certain mobile stations which are configured to allow connection to 3G UMTS
28 compliant wireless networks. Those mobile stations manufactured, used, sold, offered

1 for sale and/or imported by LG that are configured to allow connection to 3G UMTS
2 compliant wireless networks include the LG CF360, Incite, Shine II, Arena, Neon,
3 Xenon, expo, GU295, Quantum, Encore and VU Plus devices.

4 88. LG makes, uses, sells, offers for sale and/or imports into the United
5 States certain mobile stations which are configured to allow connection to 3G UMTS
6 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
7 for sale and/or imported by LG that are configured to allow connection to 3G UMTS
8 compliant wireless network include the LG Sentio, dLite and Optimus T devices.

9 89. At least as early as April 15, 2009, GBT contacted LG by letter,
10 informing LG that certain of GBT's patented technology was required by the standard
11 articulated by 3GPP and offering LG the opportunity to license GBT's patents.

12 90. LG has not, to date, taken a license or otherwise obtained GBT's
13 permission to use GBT's patented technology.

14 **DEFENDANT LENOVO'S UNAUTHORIZED USE**
15 **OF THE MULTICODE PATENT**

16 91. Lenovo designs and manufacturers electronic products including
17 desktops, notebook personal computers, workstations, servers, storage drives,
18 software and other services. Lenovo is located worldwide and in 2009 Lenovo
19 became the fourth largest vendor of personal computers in the world.

20 92. Lenovo makes, uses, sells, offers for sale and/or imports into the United
21 States certain mobile stations which are configured to allow connection to 3G UMTS
22 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
23 for sale and/or imported by Lenovo that are configured to allow connection to 3G
24 UMTS compliant wireless networks include the Lenovo S10 device.

25 **DEFENDANT PALM'S UNAUTHORIZED USE**
26 **OF THE MULTICODE PATENT**

27 93. Palm is well-known for designing and manufacturing personal digital
28 assistant products, including electronic organizers and smart phones.

1 94. Palm makes, uses, sells, offers for sale and/or imports into the United
2 States certain mobile stations which are configured to allow connection to 3G UMTS
3 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
4 for sale and/or imported by Palm that are configured to allow connection to 3G
5 UMTS compliant wireless networks include the Palm Pre Plus and the Palm Pixi Plus
6 devices.

7 95. At least as early as April 15, 2009, GBT contacted Palm by letter,
8 informing Palm that certain of GBT's patented technology was required by the
9 standard articulated by 3GPP and offering Palm the opportunity to license GBT's
10 patents.

11 96. Palm has not, to date, taken a license or otherwise obtained GBT's
12 permission to use GBT's patented technology.

13 **DEFENDANT PANTECH'S UNAUTHORIZED USE**
14 **OF THE MULTICODE PATENT**

15 97. Pantech designs and manufactures electronics, including dual-sliding,
16 double-keyboard mobile devices, as well as camera flip phones.

17 98. Pantech makes, uses, sells, offers for sale and/or imports into the United
18 States certain mobile stations which are configured to allow connection to 3G UMTS
19 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
20 for sale and/or imported by Pantech that are configured to allow connection to 3G
21 UMTS compliant wireless networks include the Pantech Impact, Breeze II, Link,
22 Pursuit, Ease, Reveal and Laser devices.

23 **DEFENDANT RESEARCH IN MOTION'S UNAUTHORIZED USE**
24 **OF THE MULTICODE PATENT**

25 99. RIM designs and manufactures electronics and is perhaps best known as
26 the developer of the BlackBerry branded mobile devices used by millions of people
27 worldwide.
28

1 100. RIM makes, uses, sells, offers for sale and/or imports into the United
2 States certain mobile stations which are configured to allow connection to 3G UMTS
3 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
4 for sale and/or imported by RIM that are configured to allow connection to 3G UMTS
5 compliant wireless networks include the Blackberry Bold 9700, Blackberry Bold
6 9000, Blackberry Curve 8310, Blackberry Pearl 8110, Blackberry Curve 8900,
7 Blackberry Curve 8320, Blackberry Pearl 3G and Blackberry Torch devices.

8 101. RIM makes, uses, sells, offers for sale and/or imports into the United
9 States certain mobile stations which are configured to allow connection to 3G UMTS
10 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
11 for sale and/or imported by RIM that are configured to allow connection to 3G UMTS
12 compliant wireless networks include the Blackberry Bold 9700, Blackberry Bold
13 9780 and Blackberry Curve 3G devices.

14 102. At least as early as April 15, 2009, GBT contacted RIM by letter,
15 informing RIM that certain of GBT's patented technology was required by the
16 standard articulated by 3GPP and offering RIM the opportunity to license GBT's
17 patents.

18 103. RIM has not, to date, taken a license or otherwise obtained GBT's
19 permission to use GBT's patented technology.

20 **DEFENDANT SAMSUNG'S UNAUTHORIZED USE**

21 **OF THE MULTICODE PATENT**

22 104. Samsung is a leading global provider of telecommunications equipment
23 and networking solutions.

24 105. Samsung makes, uses, sells, offers for sale and/or imports into the United
25 States certain mobile stations which are configured to allow connection to 3G UMTS
26 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
27 for sale and/or imported by Samsung that are configured to allow connection to 3G
28 UMTS compliant wireless networks include the Samsung a777, Captivate, Evergreen,

1 Flight II, DoubleTime, Focus Flash, Infuse, Galaxy S II, Rugby Smart, Captivate
2 Glide, Galaxy S II Skyrocket, Focus S, Galaxy Note, Galaxy Tab, Exhibit II, Gravity
3 Smart, Dart, Gravity TXT, t259, and Gravity T devices.

4 106. GBT and Samsung were parties to a May 24, 2002 license agreement
5 covering GBT's patented technologies. By its terms, the license expired on May 23,
6 2011. On or about May 10, 2011, GBT contacted Samsung by letter, informing
7 Samsung that certain of GBT's patented technology was required by the standard
8 articulated by 3GPP, informing Samsung that its license to GBT's patented
9 technologies was set to expire, and offering Samsung the opportunity to renew the
10 license. Samsung did not respond and allowed the license to expire without renewal.

11 107. Samsung has not, to date, renewed that license or otherwise obtained
12 GBT's permission to use GBT's patented technology.

13 **DEFENDANT SIERRA WIRELESS'S UNAUTHORIZED USE**
14 **OF THE MULTICODE PATENT**

15 108. Sierra Wireless offers wireless technologies, solutions and wireless
16 device applications. Its products include aircards, data cards and mobile hotspots to
17 connect people wirelessly over 3G UMTS compliant networks worldwide.

18 109. Sierra Wireless makes, uses, sells, offers for sale and/or imports into the
19 United States certain mobile stations which are configured to allow connection to 3G
20 UMTS compliant wireless networks. Those mobile stations manufactured, used, sold,
21 offered for sale and/or imported by Sierra Wireless that are configured to allow
22 connection to 3G UMTS compliant networks include the Sierra Wireless Aircard 881
23 PC Card Modem.

24 **DEFENDANT SONY'S UNAUTHORIZED USE**
25 **OF THE MULTICODE PATENT**

26 110. Sony designs and manufacturers electronic products including
27 televisions, cameras, home theater equipment and e-readers.
28

1 111. Sony makes, uses, sells, offers for sale and/or imports into the United
2 States certain mobile stations which are configured to allow connection to 3G UMTS
3 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
4 for sale and/or imported by Sony that are configured to allow connection to 3G
5 UMTS compliant wireless networks include the e-reader marketed as the Daily
6 Edition PRS-900 with 3G wireless access device.

7 **DEFENDANT SONY MOBILE COMMUNICATIONS UNAUTHORIZED USE**
8 **OF THE MULTICODE PATENT**

9 112. Sony Mobile Communications (“SMC”) manufactures and develops
10 mobile devices and is considered the fourth largest mobile phone manufacturer in the
11 world after only Nokia, Samsung and LG.

12 113. SMC makes, uses, sells, offers for sale and/or imports into the United
13 States certain mobile stations which are configured to allow connection to 3G UMTS
14 compliant wireless networks. Those mobile stations manufactured, used, sold, offered
15 for sale and/or imported by SMC that are configured to allow connection to 3G
16 UMTS compliant wireless networks include the W518a, Vivaz, and other devices.

17 114. At least as early as April 15, 2009, GBT contacted SMT by letter,
18 informing Sony Ericsson that certain of GBT’s patented technology was required by
19 the standard articulated by 3GPP and offering SMT the opportunity to license GBT’s
20 patents.

21 115. SMT has not, to date, taken a license or otherwise obtained GBT’s
22 permission to use GBT’s patented technology.

23 **DEFENDANT ZTE’S UNAUTHORIZED USE**
24 **OF THE MULTICODE PATENT**

25 116. ZTE Solutions is a leading global provider of telecommunications
26 equipment and networking solutions. It offers products applicable to voice, data,
27 multimedia and wireless broadband services and has shipped more than 200 million
28 mobile stations worldwide, including to the United States.

1 117. ZTE Solutions makes, uses, sells, offers for sale and/or imports into the
2 United States certain mobile stations which are configured to allow connection to 3G
3 UMTS compliant wireless networks. Those mobile stations manufactured, used, sold,
4 offered for sale and/or imported by ZTE Solutions that are configured to allow
5 connection to 3G UMTS compliant wireless networks include the ZTE F160 device.

6 **FIRST CLAIM FOR RELIEF AGAINST APPLE FOR**
7 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

8 118. Plaintiff incorporates herein by reference the allegations set forth in
9 paragraphs 1-117 of this Complaint as though fully set forth herein.

10 119. Plaintiff GBT is the owner by assignment of the entire right, title, and
11 interest, including the right to enforce the '793 patent.

12 120. Apple has directly infringed and continues to directly infringe the '793
13 patent by making, using, selling, or offering for sale in or importing into the United
14 States mobile station devices used in UMTS compliant 3G wireless communication
15 networks, which embodies or otherwise practices one or more of the claims of the
16 '793 patent. These mobile devices include but are not limited to the Apple iPhone 3G
17 and the Apple iPhone 3GS and the Apple iPad, which can be purchased with a 3G
18 connectivity option.

19 121. As a direct and proximate result of Apple's infringement of the '793
20 patent, Plaintiff has been and continues to be damaged in an amount yet to be
21 determined.

22 122. Apple has actual notice of the '793 patent owned by GBT.

23 123. Apple has not had, nor does it have a reasonable basis for believing that
24 it had or has the right to engage in the acts complained of herein.

25 124. Apple's infringement has been willful and deliberate, making this an
26 exceptional case and justifying the award of treble damages pursuant to 35 U.S.C. §
27 284 and attorneys' fees pursuant to 3.5 U.S.C. § 285.
28

1 **SECOND CLAIM FOR RELIEF AGAINST MOTOROLA FOR**
2 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

3 125. Plaintiff incorporates herein by reference the allegations set forth in
4 paragraphs 1-117 of this Complaint as though fully set forth herein.

5 126. Plaintiff GBT is the owner by assignment of the entire right, title, and
6 interest, including the right to enforce the '793 patent.

7 127. Motorola has directly infringed and continues to directly infringe the
8 '793 patent by making, using, selling, or offering for sale in or importing into the
9 United States mobile station devices used within UMTS compliant 3G wireless
10 communication networks, which embodies or otherwise practices one or more of the
11 claims of the '793 patent. These mobile devices include but are not limited to the
12 Tundra, Backflip, Karma and CliqXT devices.

13 128. As a direct and proximate result of Motorola's infringement of the '793
14 patent, Plaintiff has been and continues to be damaged in an amount yet to be
15 determined.

16 129. Motorola has actual notice of the '793 patent owned by GBT.

17 130. Motorola has not had, nor does it have a reasonable basis for believing
18 that it had or has the right to engage in the acts complained of herein.

19 131. Motorola's infringement has been willful and deliberate, making this an
20 exceptional case and justifying the award of treble damages pursuant to 35 U.S.C. §
21 284 and attorneys' fees pursuant to 3.5 U.S.C. § 285.

22 **THIRD CLAIM FOR RELIEF AGAINST AMAZON FOR**
23 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

24 132. Plaintiff incorporates herein by reference the allegations set forth in
25 paragraphs 1-117 of this Complaint as though fully set forth herein.

26 133. Plaintiff GBT is the owner by assignment of the entire right, title, and
27 interest, including the right to enforce the '793 patent.
28

1 134. Amazon has directly infringed and continues to directly infringe the '793
2 patent by making, using, selling, or offering for sale in or importing into the United
3 States mobile station devices used within UMTS compliant 3G wireless
4 communication networks, which embodies or otherwise practices one or more of the
5 claims of the '793 patent. These mobile devices include but are not limited to the
6 Kindle 3G + Wifi device.

7 135. As a direct and proximate result of Amazon's infringement of the '793
8 patent, Plaintiff has been and continues to be damaged in an amount yet to be
9 determined.

10 136. Amazon has actual notice of the '793 patent owned by GBT.

11 137. Amazon has not had, nor does it have a reasonable basis for believing
12 that it had or has the right to engage in the acts complained of herein.

13 **FOURTH CLAIM FOR RELIEF AGAINST BARNES & NOBLE FOR**
14 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

15 138. Plaintiff incorporates herein by reference the allegations set forth in
16 paragraphs 1-137 of this Complaint as though fully set forth herein.

17 139. Plaintiff GBT is the owner by assignment of the entire right, title, and
18 interest, including the right to enforce the '793 patent.

19 140. Barnes & Noble has directly infringed and continues to directly infringe
20 the '793 patent by making, using, selling, or offering for sale in or importing into the
21 United States mobile station devices used within UMTS compliant 3G wireless
22 communication networks, which embodies or otherwise practices one or more of the
23 claims of the '793 patent. These mobile devices include but are not limited to the
24 Nook 3G + Wifi device.

25 141. As a direct and proximate result of Barnes & Noble's infringement of the
26 '793 patent, Plaintiff has been and continues to be damaged in an amount yet to be
27 determined.

28 142. Barnes & Noble has actual notice of the '793 patent owned by GBT.

1 143. Barnes & Noble has not had, nor does it have a reasonable basis for
2 believing that it had or has the right to engage in the acts complained of herein.

3 **FIFTH CLAIM FOR RELIEF AGAINST DELL FOR**
4 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

5 144. Plaintiff incorporates herein by reference the allegations set forth in
6 paragraphs 1-117 of this Complaint as though fully set forth herein.

7 145. Plaintiff GBT is the owner by assignment of the entire right, title, and
8 interest, including the right to enforce the '793 patent.

9 146. Dell has directly infringed and continues to directly infringe the '793
10 patent by making, using, selling, or offering for sale in or importing into the United
11 States mobile station devices used within UMTS compliant 3G wireless
12 communication networks, which embodies or otherwise practices one or more of the
13 claims of the '793 patent. These mobile devices include but are not limited to the Dell
14 Inspiron Mini 10 HD, the Dell Streak 7, and the Dell Inspiron Mini 10 4G devices.

15 147. As a direct and proximate result of Dell's infringement of the '793
16 patent, Plaintiff has been and continues to be damaged in an amount yet to be
17 determined.

18 148. Dell has actual notice of the '793 patent owned by GBT.

19 149. Dell has not had, nor does it have a reasonable basis for believing that it
20 had or has the right to engage in the acts complained of herein.

21 **SIXTH CLAIM FOR RELIEF AGAINST HP FOR**
22 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

23 150. Plaintiff incorporates herein by reference the allegations set forth in
24 paragraphs 1-117 of this Complaint as though fully set forth herein.

25 151. Plaintiff GBT is the owner by assignment of the entire right, title, and
26 interest, including the right to enforce the '793 patent.

27 152. HP has directly infringed and continues to directly infringe the '793
28 patent by making, using, selling, or offering for sale in or importing into the United

1 States mobile station devices used within UMTS compliant 3G wireless
2 communication networks, which embodies or otherwise practices one or more of the
3 claims of the '793 patent. These mobile devices include but are not limited to the iPaq
4 Glisten and the HP Mini 110 devices.

5 153. As a direct and proximate result of HP's infringement of the '793 patent,
6 Plaintiff has been and continues to be damaged in an amount yet to be determined.

7 154. HP has actual notice of the '793 patent owned by GBT.

8 155. HP has not had, nor does it have a reasonable basis for believing that it
9 had or has the right to engage in the acts complained of herein.

10 **SEVENTH CLAIM FOR RELIEF AGAINST HTC FOR**
11 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

12 156. Plaintiff incorporates herein by reference the allegations set forth in
13 paragraphs 1-117 of this Complaint as though fully set forth herein.

14 157. Plaintiff GBT is the owner by assignment of the entire right, title, and
15 interest, including the right to enforce the '793 patent.

16 158. HTC has directly infringed and continues to directly infringe the '793
17 patent by making, using, selling, or offering for sale in or importing into the United
18 States mobile station devices used within UMTS compliant 3G wireless
19 communication networks, which embodies or otherwise practices one or more of the
20 claims of the '793 patent. These mobile devices include but are not limited to the
21 HTC HD2, HD7, Surround, Aria, Pure and Tilt2 devices.

22 159. As a direct and proximate result of HTC's infringement of the '793
23 patent, Plaintiff has been and continues to be damaged in an amount yet to be
24 determined.

25 160. HTC has actual notice of the '793 patent owned by GBT.

26 161. HTC has not had, nor does it have a reasonable basis for believing that it
27 had or has the right to engage in the acts complained of herein.

28

1 162. HTC's infringement has been willful and deliberate, making this an
2 exceptional case and justifying the award of treble damages pursuant to 35 U.S.C. §
3 284 and attorneys' fees pursuant to 35 U.S.C. § 285.

4 **EIGHTH CLAIM FOR RELIEF AGAINST LG FOR**
5 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

6 163. Plaintiff incorporates herein by reference the allegations set forth in
7 paragraphs 1-117 of this Complaint as though fully set forth herein.

8 164. Plaintiff GBT is the owner by assignment of the entire right, title, and
9 interest, including the right to enforce the '793 patent.

10 165. LG has directly infringed and continues to directly infringe the '793
11 patent by making, using, selling, or offering for sale in or importing into the United
12 States mobile station devices used within UMTS compliant 3G wireless
13 communication networks, which embodies or otherwise practices one or more of the
14 claims of the '793 patent. These mobile devices include but are not limited to the LG
15 CF360, Incite, Shine II, Arena, Neon, Xenon, expo, GU295, Quantum, Encore, VU
16 Plus, LG Sentio, dLite and Optimus T devices.

17 166. As a direct and proximate result of LG's infringement of the '793 patent,
18 Plaintiff has been and continues to be damaged in an amount yet to be determined.

19 167. LG has actual notice of the '793 patent owned by GBT.

20 168. LG has not had, nor does it have a reasonable basis for believing that it
21 had or has the right to engage in the acts complained of herein.

22 169. LG's infringement has been willful and deliberate, making this an
23 exceptional case and justifying the award of treble damages pursuant to 35 U.S.C. §
24 284 and attorneys' fees pursuant to 35 U.S.C. § 285.

25 **NINTH CLAIM FOR RELIEF AGAINST LENOVO FOR**
26 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

27 170. Plaintiff incorporates herein by reference the allegations set forth in
28 paragraphs 1-117 of this Complaint as though fully set forth herein.

1 171. Plaintiff GBT is the owner by assignment of the entire right, title, and
2 interest, including the right to enforce the '793 patent.

3 172. Lenovo has directly infringed and continues to directly infringe the '793
4 patent by making, using, selling, or offering for sale in or importing into the United
5 States mobile station devices used within UMTS compliant 3G wireless
6 communication networks, which embodies or otherwise practices one or more of the
7 claims of the '793 patent. These mobile devices include but are not limited to the
8 Lenovo S10 device.

9 173. As a direct and proximate result of Lenovo's infringement of the '793
10 patent, Plaintiff has been and continues to be damaged in an amount yet to be
11 determined.

12 174. Lenovo has actual notice of the '793 patent owned by GBT.

13 175. Lenovo has not had, nor does it have a reasonable basis for believing that
14 it had or has the right to engage in the acts complained of herein.

15 176. Lenovo's infringement has been willful and deliberate, making this an
16 exceptional case and justifying the award of treble damages pursuant to 35 U.S.C. §
17 284 and attorneys' fees pursuant to 3.5 U.S.C. § 285.

18 **TENTH CLAIM FOR RELIEF AGAINST PALM FOR**
19 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

20 177. Plaintiff incorporates herein by reference the allegations set forth in
21 paragraphs 1-117 of this Complaint as though fully set forth herein.

22 178. Plaintiff GBT is the owner by assignment of the entire right, title, and
23 interest, including the right to enforce the '793 patent.

24 179. Palm has directly infringed and continues to directly infringe the '793
25 patent by making, using, selling, or offering for sale in or importing into the United
26 States mobile station devices used within UMTS compliant 3G wireless
27 communication networks, which embodies or otherwise practices one or more of the
28

1 claims of the '793 patent. These mobile devices include but are not limited to the
2 Palm Pre Plus and the Palm Pixi Plus devices.

3 180. As a direct and proximate result of Palm's infringement of the '793
4 patent, Plaintiff has been and continues to be damaged in an amount yet to be
5 determined.

6 181. Palm has actual notice of the '793 patent owned by GBT.

7 182. Palm has not had, nor does it have a reasonable basis for believing that it
8 had or has the right to engage in the acts complained of herein.

9 183. Palm's infringement has been willful and deliberate, making this an
10 exceptional case and justifying the award of treble damages pursuant to 35 U.S.C. §
11 284 and attorneys' fees pursuant to 3.5 U.S.C. § 285.

12 **ELEVENTH CLAIM FOR RELIEF AGAINST PANTECH FOR**
13 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

14 184. Plaintiff incorporates herein by reference the allegations set forth in
15 paragraphs 1-117 of this Complaint as though fully set forth herein.

16 185. Plaintiff GBT is the owner by assignment of the entire right, title, and
17 interest, including the right to enforce the '793 patent.

18 186. Pantech has directly infringed and continues to directly infringe the '793
19 patent by making, using, selling, or offering for sale in or importing into the United
20 States mobile station devices used within UMTS compliant 3G wireless
21 communication networks, which embodies or otherwise practices one or more of the
22 claims of the '793 patent. These mobile devices include but are not limited to the
23 Pantech Impact, Breeze II, Link, Pursuit, Ease, Reveal and Laser devices.

24 187. As a direct and proximate result of Pantech's infringement of the '793
25 patent, Plaintiff has been and continues to be damaged in an amount yet to be
26 determined.

27 188. Pantech has actual notice of the '793 patent owned by GBT.
28

1 189. Pantech has not had, nor does it have a reasonable basis for believing that
2 it had or has the right to engage in the acts complained of herein.

3 190. As a direct and proximate result of Pantech's infringement of the '793
4 patent, Plaintiff has been and continues to be damaged in an amount yet to be
5 determined.

6 **TWELFTH CLAIM FOR RELIEF AGAINST RIM FOR**
7 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

8 191. Plaintiff incorporates herein by reference the allegations set forth in
9 paragraphs 1-117 of this Complaint as though fully set forth herein.

10 192. Plaintiff GBT is the owner by assignment of the entire right, title, and
11 interest, including the right to enforce the '793 patent.

12 193. RIM has directly infringed and continues to directly infringe the '793
13 patent by making, using, selling, or offering for sale in or importing into the United
14 States mobile station devices used within UMTS compliant 3G wireless
15 communication networks, which embodies or otherwise practices one or more of the
16 claims of the '793 patent. These mobile devices include but are not limited to the
17 Blackberry Bold 9700, Blackberry Bold 9780 and Blackberry Curve 3G, Blackberry
18 Bold 9700, Blackberry Bold 9000, Blackberry Curve 8310, Blackberry Pearl 8110,
19 Blackberry Curve 8900, Blackberry Curve 8320, Blackberry Pearl 3G and Blackberry
20 Torch devices.

21 194. As a direct and proximate result of RIM's infringement of the '793
22 patent, Plaintiff has been and continues to be damaged in an amount yet to be
23 determined.

24 195. RIM has actual notice of the '793 patent owned by GBT.

25 196. RIM has not had, nor does it have a reasonable basis for believing that it
26 had or has the right to engage in the acts complained of herein.

27
28

McKool Smith Hennigan, P.C.
LOS ANGELES, CALIFORNIA

1 197. RIM's infringement has been willful and deliberate, making this an
2 exceptional case and justifying the award of treble damages pursuant to 35 U.S.C. §
3 284 and attorneys' fees pursuant to 3.5 U.S.C. § 285.

4 **THIRTEENTH CLAIM FOR RELIEF AGAINST SAMSUNG FOR**
5 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

6 198. Plaintiff incorporates herein by reference the allegations set forth in
7 paragraphs 1-117 of this Complaint as though fully set forth herein.

8 199. Plaintiff GBT is the owner by assignment of the entire right, title, and
9 interest, including the right to enforce the '427 patent.

10 200. Samsung has directly infringed and continues to directly infringe the
11 '427 patent by making, using, selling, or offering for sale in or importing into the
12 United States mobile station devices used within UMTS compliant 3G wireless
13 communication networks, which embodies or otherwise practices one or more of the
14 claims of the '427 patent. These mobile devices include but are not limited the
15 Samsung a777, Captivate, Evergreen, Flight II, DoubleTime, Focus Flash, Infuse,
16 Galaxy S II, Rugby Smart, Captivate Glide, Galaxy S II Skyrocket, Focus S, Galaxy
17 Note, Galaxy Tab, Exhibit II, Gravity Smart, Dart, Gravity TXT, t259, and Gravity T
18 devices.

19 201. As a direct and proximate result of Samsung's infringement of the '427
20 patent, Plaintiff has been and continues to be damaged in an amount yet to be
21 determined.

22 202. Samsung has actual notice of the '427 patent owned by GBT.

23 203. Samsung has not had, nor does it have a reasonable basis for believing
24 that it had or has the right to engage in the acts complained of herein

25 204. Samsung's infringement has been willful and deliberate, making this an
26 exceptional case and justifying the award of treble damages pursuant to 35 U.S.C. §
27 284 and attorneys' fees pursuant to 3.5 U.S.C. § 285.

28

1 **FOURTEENTH CLAIM FOR RELIEF AGAINST SIERRA WIRELESS FOR**
2 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

3 205. Plaintiff incorporates herein by reference the allegations set forth in
4 paragraphs 1-117 of this Complaint as though fully set forth herein.

5 206. Plaintiff GBT is the owner by assignment of the entire right, title, and
6 interest, including the right to enforce the '793 patent.

7 207. Sierra Wireless has directly infringed and continues to directly infringe
8 the '793 patent by making, using, selling, or offering for sale in or importing into the
9 United States mobile station devices used within UMTS compliant 3G wireless
10 communication networks, which embodies or otherwise practices one or more of the
11 claims of the '793 patent. These mobile devices include but are not limited to the
12 Sierra Wireless 881 PC Card Modem.

13 208. As a direct and proximate result of Sierra Wireless' infringement of the
14 '793 patent, Plaintiff has been and continues to be damaged in an amount yet to be
15 determined.

16 209. Sierra Wireless has actual notice of the '793 patent owned by GBT.

17 210. Sierra Wireless has not had, nor does it have a reasonable basis for
18 believing that it had or has the right to engage in the acts complained of herein.

19 **FIFTEENTH CLAIM FOR RELIEF AGAINST SONY FOR**
20 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

21 211. Plaintiff incorporates herein by reference the allegations set forth in
22 paragraphs 1-117 of this Complaint as though fully set forth herein.

23 212. Plaintiff GBT is the owner by assignment of the entire right, title, and
24 interest, including the right to enforce the '793 patent.

25 213. Sony has directly infringed and continues to directly infringe the '793
26 patent by making, using, selling, or offering for sale in or importing into the United
27 States mobile station devices used within UMTS compliant 3G wireless
28 communication networks, which embodies or otherwise practices one or more of the

1 claims of the '793 patent. These mobile devices include but are not limited to the
2 Sony e-reader Daily Edition PRS-900 with 3G wireless access device.

3 214. As a direct and proximate result of Sony 's infringement of the '793
4 patent, Plaintiff has been and continues to be damaged in an amount yet to be
5 determined.

6 215. Sony has actual notice of the '793 patent owned by GBT.

7 216. Sony has not had, nor does it have a reasonable basis for believing that it
8 had or has the right to engage in the acts complained of herein.

9 **SIXTEENTH CLAIM FOR RELIEF AGAINST SONY MOBILE FOR**
10 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

11 217. Plaintiff incorporates herein by reference the allegations set forth in
12 paragraphs 1-117 of this Complaint as though fully set forth herein.

13 218. Plaintiff GBT is the owner by assignment of the entire right, title, and
14 interest, including the right to enforce the '793 patent.

15 219. Sony Mobile Communications has directly infringed and continues to
16 directly infringe the '793 patent by making, using, selling, or offering for sale in or
17 importing into the United States mobile station devices used within UMTS compliant
18 3G wireless communication networks, which embodies or otherwise practices one or
19 more of the claims of the '793 patent. These mobile devices include but are not
20 limited to the Sony Equinox, W518a and Vivaz devices.

21 220. At the time of Sony Mobile's conduct, Sony Mobile had knowledge of
22 the '793 patent, knew or should have known that its actions would induce direct
23 infringement by others, and intended that its actions would induce direct infringement
24 by others.

25 221. As a direct and proximate result of Sony Ericsson 's infringement of the
26 '793 patent, Plaintiff has been and continues to be damaged in an amount yet to be
27 determined.

28 222. Sony Mobile has actual notice of the '793 patent owned by GBT.

1 223. Sony Mobile has not had, nor does it have a reasonable basis for
2 believing that it had or has the right to engage in the acts complained of herein.

3 224. Sony Mobile's infringement has been willful and deliberate, making this
4 an exceptional case and justifying the award of treble damages pursuant to 35 U.S.C.
5 § 284 and attorneys' fees pursuant to 3.5 U.S.C. § 285.

6 **SEVENTEENTH CLAIM FOR RELIEF AGAINST ZTE FOR**
7 **INFRINGEMENT OF U.S. PATENT NO. 6,075,793**

8 225. Plaintiff incorporates herein by reference the allegations set forth in
9 paragraphs 1-117 of this Complaint as though fully set forth herein.

10 226. Plaintiff GBT is the owner by assignment of the entire right, title, and
11 interest, including the right to enforce the '793 patent.

12 227. ZTE Solutions has directly infringed and continues to directly infringe
13 the '793 patent by making, using, selling, or offering for sale in or importing into the
14 United States mobile station devices used within UMTS compliant 3G wireless
15 communication networks, which embodies or otherwise practices one or more of the
16 claims of the '793 patent. These mobile devices include but are not limited to the
17 ZTE F160 device.

18 228. As a direct and proximate result of ZTE Solutions' infringement of the
19 '793 patent, Plaintiff has been and continues to be damaged in an amount yet to be
20 determined.

21 229. ZTE Solutions has actual notice of the '793 patent owned by GBT.

22 230. ZTE Solutions has not had, nor does it have a reasonable basis for
23 believing that it had or has the right to engage in the acts complained of herein.

24 **PRAYER FOR RELIEF**

25 WHEREFORE, Plaintiffs pray for judgment against each Defendant as follows:

26 1. For a judicial determination and declaration that each of the Defendants
27 has infringed and continues to infringe the Patents-in-Suit by making, using,
28

1 importing, offering for sale, and/or selling mobile devices that are used to connect to
2 UMTS compliant 3G networks in the United States;

3 2. For a judicial determination and decree that each of the Defendants'
4 infringement of the Patents-in-Suit is willful;

5 3. For damages resulting from each of the Defendants' past and present
6 infringement of the Patents-in-Suit and the trebling of such damages because of the
7 willful and deliberate nature of its infringement;

8 4. For a declaration that this is an exceptional case under 35 U.S.C. § 285
9 and for an award of attorneys' fees and costs in this action;

10 5. For an assessment of prejudgment interest; and

11 6. For such other and further relief as the Court may deem just and proper
12 under the circumstances.

13 DATED: May 8, 2012

McKool Smith Hennigan, P.C.

14
15
16 By Lawrence M. Hadley / MSH
17 Lawrence M. Hadley

18 Attorneys for Plaintiff, GOLDEN BRIDGE
19 TECHNOLOGY, INC.
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DEMAND FOR JURY TRIAL

1
2 Plaintiffs hereby demand a jury trial pursuant to Rule 38 of the Federal Rules of
3 Civil Procedure as to all issues in this lawsuit.
4

5 DATED: May 8, 2012

McKool Smith Hennigan, P.C.

6
7 By Lawrence M. Hadley
8 Lawrence M. Hadley

9 Attorneys for Plaintiff GOLDEN BRIDGE
10 TECHNOLOGY, INC.
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McKool Smith Hennigan, P.C.
LOS ANGELES, CALIFORNIA

EXHIBIT 1



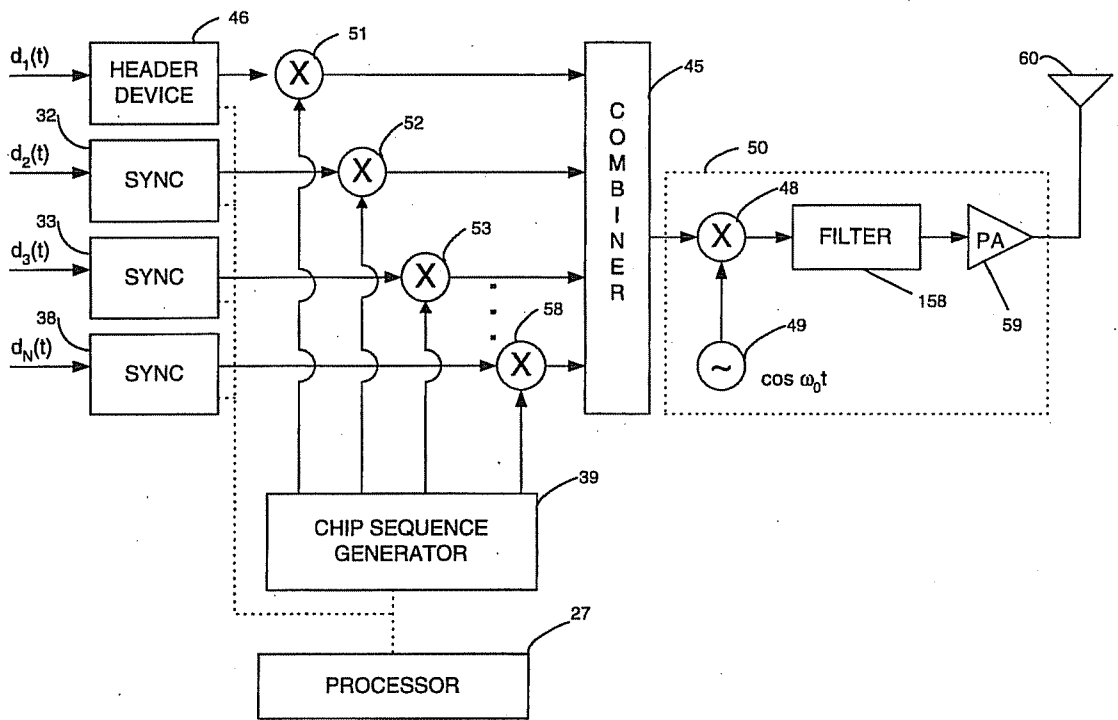
- [54] **HIGH EFFICIENCY SPREAD SPECTRUM SYSTEM AND METHOD**
- [75] Inventors: **Donald L. Schilling**, Sands Point, N.Y.;
Joseph Garodnick, Centerville, Mass.
- [73] Assignee: **Golden Bridge Technology, Inc.**, West Long Branch, N.J.
- [21] Appl. No.: **09/020,105**
- [22] Filed: **Feb. 6, 1998**
- [51] Int. Cl.⁷ **H04B 7/216**
- [52] U.S. Cl. **370/441; 370/335; 370/342; 375/200**
- [58] Field of Search **370/320, 335, 370/342, 349, 350, 441, 464, 477, 479; 375/200, 355, 356**

- [56] **References Cited**
U.S. PATENT DOCUMENTS
- 5,081,643 1/1992 Schilling 375/1
- 5,109,390 4/1992 Gilhousen et al. 375/1
- 5,166,951 11/1992 Schilling 375/1

Primary Examiner—Dang Ton
Assistant Examiner—David R Vincent
Attorney, Agent, or Firm—David Newman; Chartered

[57] **ABSTRACT**
 A multichannel-spread-spectrum system for communicating a plurality of data-sequence signals from a plurality of data channels using parallel chip-sequence signals in which fewer than all of the channels include header information. A header device concatenates a header to a first data-sequence signal on a first channel. Data-sequence signals in parallel channels are sent without a header, and are timed from the header in the first channel.

7 Claims, 4 Drawing Sheets



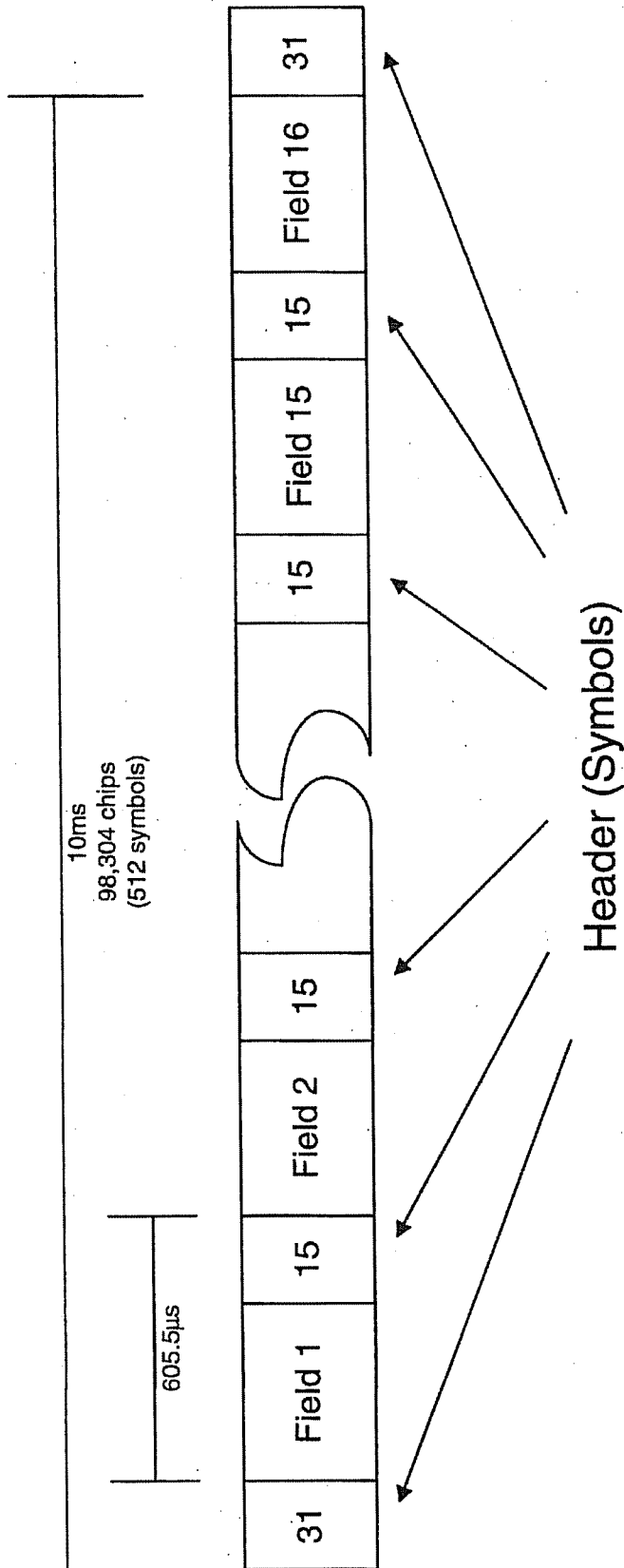


FIG. 1
PRIOR ART

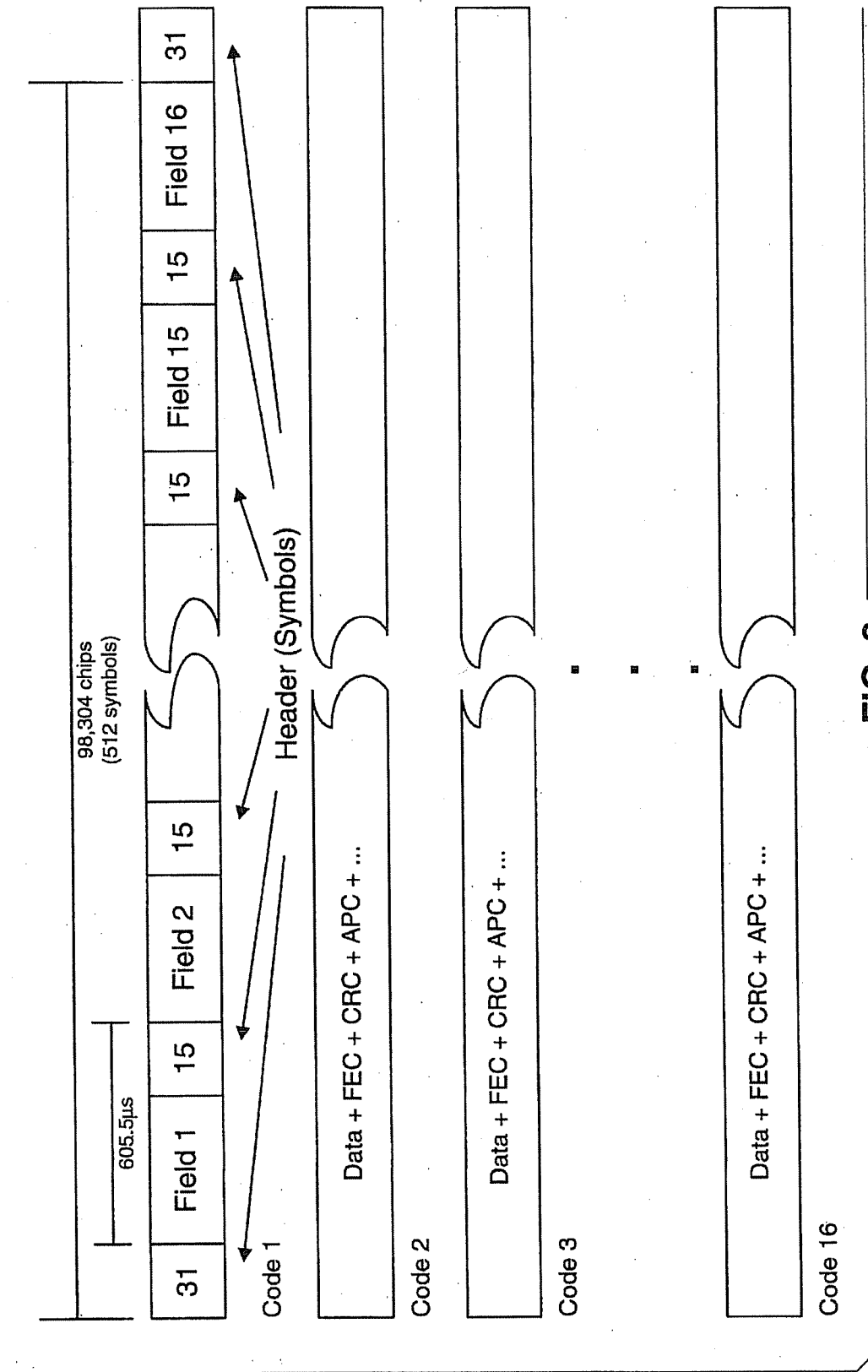


FIG. 2

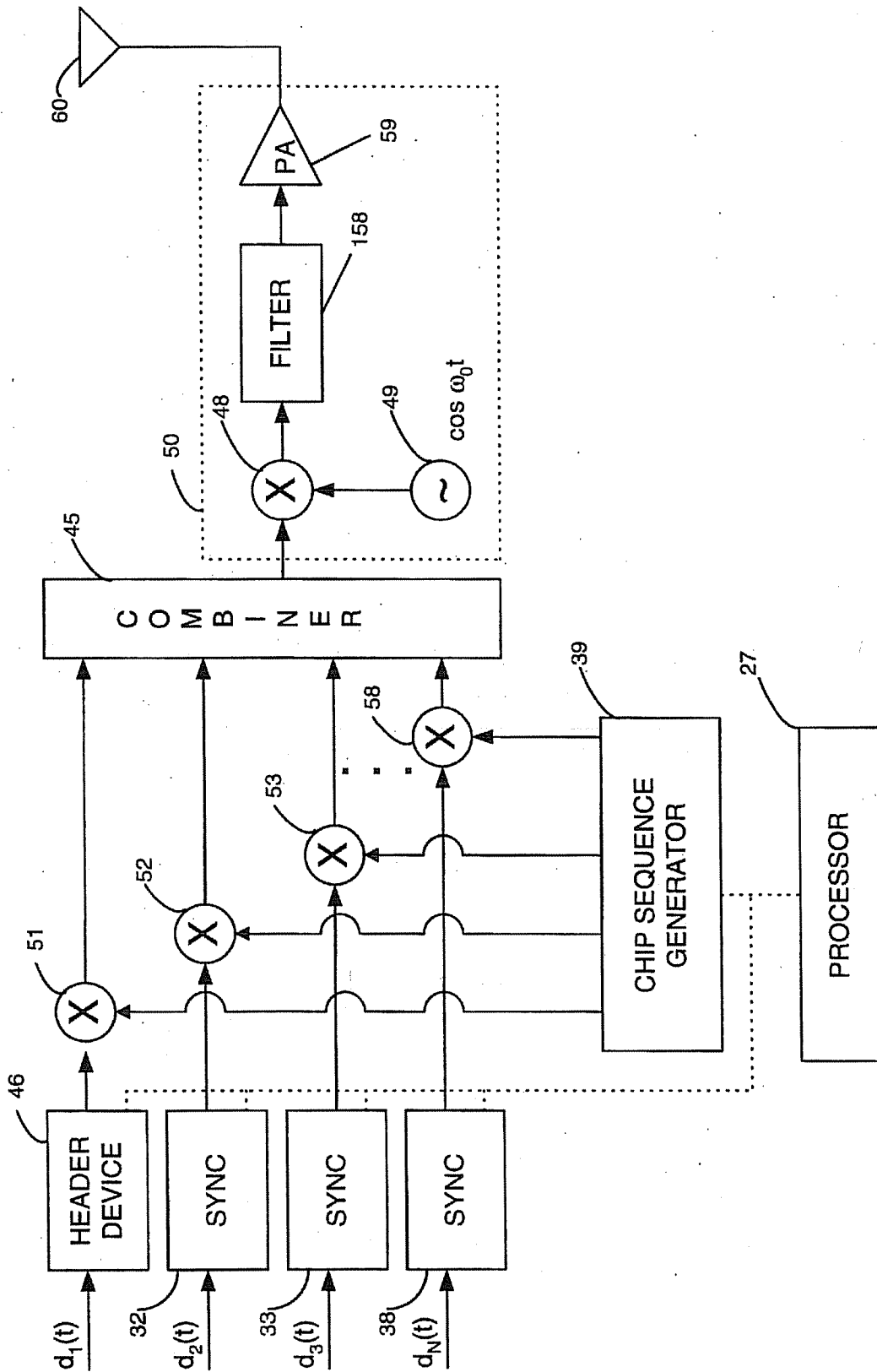


FIG. 3

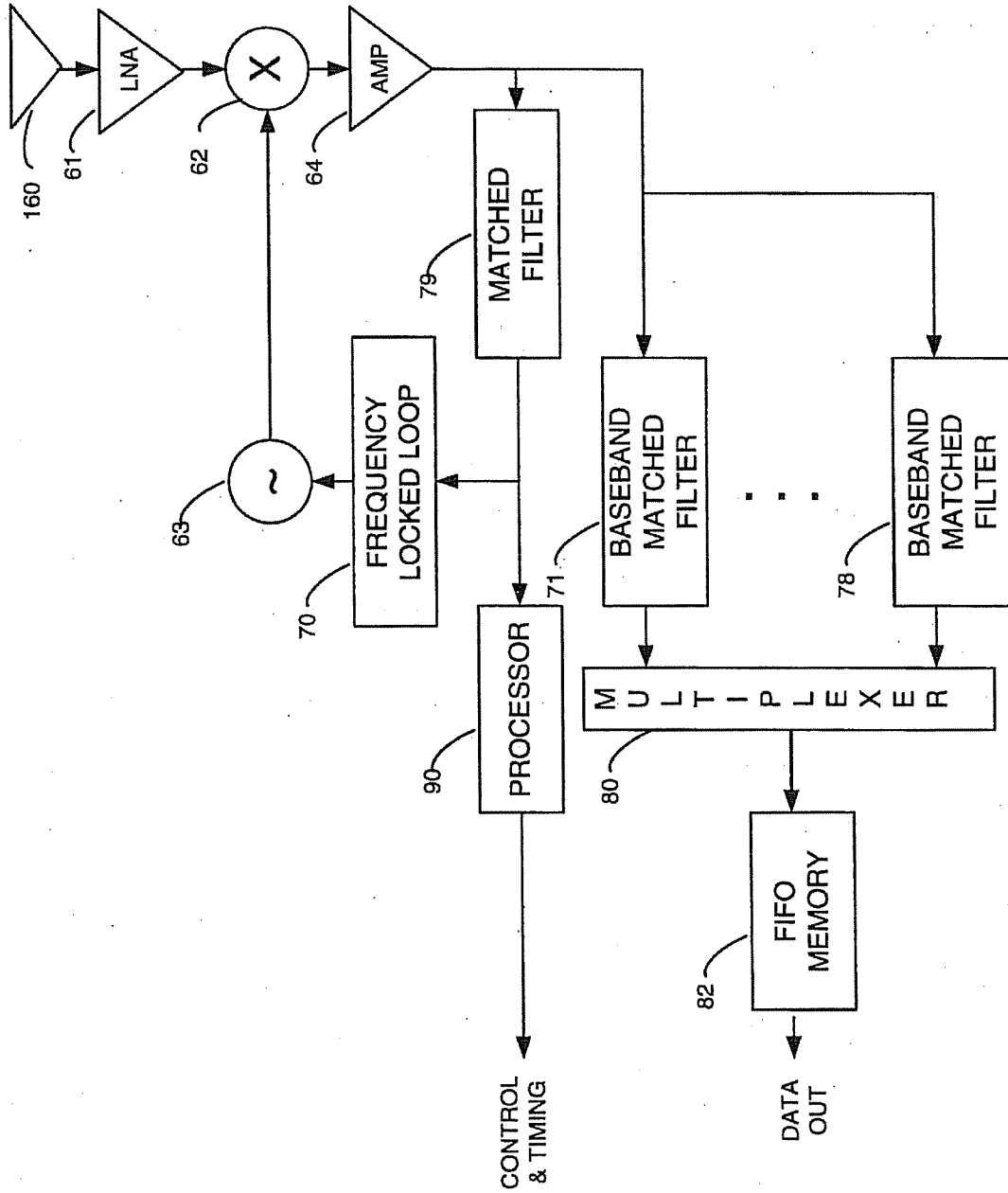


FIG. 4

HIGH EFFICIENCY SPREAD SPECTRUM SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

This invention relates to spread-spectrum communications, and more particularly to a highly efficient spread-spectrum system employing packets having multiple parallel spread-spectrum channels.

DESCRIPTION OF THE RELEVANT ART

In a spread-spectrum system, one method for constructing a spread-spectrum signal transmitted as a packet is to use a header to determine the sampling point of a matched filter, to time the fields of the received data, to determine the relative amplitudes of the in-phase component and quadrature-phase component of the received spread-spectrum signal for coherent detection, to detect multipath, and to provide the coefficients for maximal ratio combining. A typical frame of the spread-spectrum signal, transmitted as a packet or a frame of a continuous signal, is shown in FIG. 1 for the case where the processing gain (PG) is 192; that is, for the example where there are 192 chips/symbol. The term "packet" is used throughout this disclosure to indicate a packet signal, and also includes frames of continuous signals which define packets.

With reference to FIG. 1, the time difference of 605.5 μ sec between fields is needed when one or both of the terminals, transmitter and receiver, is in motion at vehicular speeds. Other times are also good. Less time between headers may be better in a particular application, but typically requires more headers, and hence more overhead. For the example of FIG. 1, the Doppler shift of the received signal requires more frequent updates the faster one of the terminal moves. The example shown in FIG. 1 is for a system operating at 2 GHz, a vehicle at 60 miles per hour, and binary-phase-shift-keying (BPSK) modulation. The length of the headers, 31 and 15 symbols, is determined by the required signal-to-noise ratio of the headers to provide accurate enough references for coherent demodulation.

For the example of FIG. 1, 256 symbols are used for headers, leaving 256 symbols for data. Thus, this channel is only 50% efficient. In addition, the maximum data rate, including bearer data, signaling, power control, etc., is 25.6 kbps uncoded.

One solution offered in the prior art is to use a lower processing gain, for example, 96. Then, there would be 1024 symbols per frame and the maximum data rate would increase to 51.2 kbps. The channel, however, would still be only 50% efficient. The headers would have to increase symbol length to make up for the loss in processing gain. Also, if orthogonal codes were used, then the number of users would be limited to 96.

Another method offered by prior art is to use parallel spread-spectrum channels, with each channel defined by a different chip-sequence signal. In this method, by using multiple correlators or matched filters, orthogonal codes are sent simultaneously, thereby increasing the data rate while still enjoying the advantage of a high processing gain. The multiple spread-spectrum channels merely behave as multiple users to a single location. However, the efficiency remains at 50%.

SUMMARY OF THE INVENTION

A general object of the invention is to increase data transmission efficiency by sending data through parallel

spread-spectrum channels while including headers in fewer than all of the channels.

The present invention broadly includes a multichannel-spread-spectrum system for communicating a plurality of data-sequence signals from a plurality of data channels, over a communications channel. The multichannel-spread-spectrum system includes, at a transmitter, a header device, a processor, a chip-sequence generator, a plurality of product devices, a combiner, and a transmitter subsystem. At a receiver, the system may further include a translating device, a header-matched filter, a receiver processor, and a plurality of data-matched filters.

At the transmitter, the header device concatenates a header to a first data-sequence signal on the first data-sequence channel to generate a header frame. As used herein, a "header frame" is defined to be a header followed by data and may include multiple headers interspersed with fields of data. Timing is keyed from the header. The processor generates control and timing signals for synchronization of the second, third through the nth data-sequence channels to the header. The chip-sequence generator generates a plurality of chip-sequence signals, with each chip-sequence signal orthogonal to the other chip-sequence signals of the plurality of chip-sequence signals. A plurality of product devices multiplies the output from the header device, and each of the remaining data-sequence signals, by a respective chip-sequence signal, thereby generating a plurality of spread-spectrum channels. The plurality of spread-spectrum channels includes a spread-spectrum-header channel and a plurality of spread-spectrum-data channels. The spread-spectrum-header channel is generated by processing the header frame with a first chip-sequence signal. Each of the plurality of spread-spectrum-data channels is generated by processing a respective data-sequence signal by a respective chip-sequence signal. The combiner algebraically combines the plurality of spread-spectrum channels as a multichannel-spread-spectrum signal. The transmitter subsystem transmits the multichannel-spread-spectrum signal on a carrier frequency using radio waves over the communications channel.

At the receiver, the translating device translates the received multichannel-spread-spectrum signal from the carrier frequency to a processing frequency. The header-matched filter has an impulse response matched to the header. The header-matched filter detects, at the processing frequency, the header in the multichannel-spread-spectrum signal and outputs, in response to detecting the header, a header-detection signal. The receiver processor, in response to the header-detection signal, generates control and timing signals. Each data-matched filter of the plurality of data-matched filters has an impulse response matched to a respective chip-sequence signal of the plurality of chip-sequence signals. The plurality of data-matched filters despreads the received multichannel-spread-spectrum signal as a plurality of received spread-spectrum channels.

Additional objects and advantages of the invention are set forth in part in the description which follows, and in part are obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention also may be realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate preferred

embodiments of the invention, and together with the description serve to explain the principles of the invention.

FIG. 1 illustrates a prior art packet or frame of a spread-spectrum signal;

FIG. 2 shows a spread-spectrum signal employing multiple parallel spread-spectrum channels, having a header for timing on only the first spread-spectrum channel;

FIG. 3 is a block diagram of a multichannel spread-spectrum transmitter; and

FIG. 4 is a block diagram of a multichannel spread-spectrum receiver.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference now is made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals indicate like elements throughout the several views.

The present invention provides a novel multichannel spread-spectrum system and method for communicating on a plurality of data channels using parallel spread-spectrum channels. With the present invention, increased efficiency is obtained by including header information in fewer than all the channels. Effectively, instead of replicating the frame format shown in FIG. 1 for each spread-spectrum channel, only one frame contains headers while the other spread-spectrum channels sent in parallel with different chip-sequence signals devote the entire time for data, as shown in FIG. 2. The remaining spread-spectrum channels are synchronized to the first channel by a processor. Therefore, the efficiency is increased. One or more spread-spectrum channels, but less than the total number of spread-spectrum channels, could have a header for synchronization. The use of one spread-spectrum channel with a header, however, would be more efficient. For example, a system constructed for 384 kbps data rate, FEC rate $\frac{1}{2}$ convolutional coding, 25.6 kbps maintenance channel for power control, CRC, etc., and processing gain of 192, utilizes 16 parallel chip-sequence signals and yields a 96.9% efficiency.

The multichannel spread-spectrum system might be used as part of a radio-based Ethernet system, or an ATM system, or any other networked system. The multichannel spread-spectrum system could be used for connection as well as connectionless applications. The multichannel spread-spectrum system includes a multichannel spread-spectrum transmitter, and may also include a multichannel spread-spectrum receiver.

The present invention is for a multichannel spread-spectrum link which, in a preferred embodiment, is from a user to the base station. The present invention is illustrated, by way of example, with a multichannel spread-spectrum transmitter transmitting the multichannel spread-spectrum signal to a multichannel spread-spectrum receiver.

The multichannel spread-spectrum signal, in a preferred embodiment, includes a header, in a first data-sequence channel, followed in time by the first data-sequence signal. The header is concatenated with the first data-sequence signal to generate a header frame. As used herein, a "header frame" is defined to be a header followed by data and may include multiple headers interspersed with fields of data.

The header is generated from spread-spectrum processing, by using techniques well known in the art, a header-symbol-sequence signal with a chip-sequence signal. The header-symbol-sequence signal is a predefined

sequence of symbols. The header-symbol-sequence signal may be a constant value, i.e., just a series of 1-bits or symbols, or a series of 0-bits or symbols, or alternating 1-bits and 0-bits or alternating symbols, a pseudorandom symbol sequence, or other predefined sequence as desired. The chip-sequence signal is user-defined and, in a usual practice, is used with a header-symbol-sequence signal. The header, in a preferred embodiment, includes a chip-sequence signal used for the purpose of synchronization.

Each spread-spectrum channel of the multichannel spread-spectrum signal is generated similarly, from techniques well known in the art as used for the header, by spread-spectrum processing a data-sequence signal with a respective chip-sequence signal. The first chip-sequence signal is generated from a first code (code 1). A second spread-spectrum channel is defined by a second chip-sequence signal, which is generated from a second code (code 2). Similarly, a third spread-spectrum channel is defined by a third chip-sequence signal, which is generated from a third code (code 3).

The data-sequence signal may be derived from data, or an analog signal converted to data, signaling information, or other source of data symbols or bits. The chip-sequence signal can be user defined, and preferably is orthogonal to other chip-sequence signals used for generating the plurality of spread-spectrum channels. Demultiplexing data, spread-spectrum modulating each demultiplexed channel as a spread-spectrum signal and forming a multichannel spread-spectrum signal, keeps processing gain (PG) constant, independent of data rate. For a high data rate, for example, the multichannel spread-spectrum signal may include 128 channels. Sixty-four channels may be on an in-phase component and sixty-four channels may be on a quadrature-phase component.

The present invention broadly comprises a multichannel spread-spectrum system for communicating data between a plurality of multichannel spread-spectrum transmitters and a plurality of multichannel spread-spectrum receivers, preferably using radio waves. The terms "multichannel spread-spectrum transmitter" and "multichannel spread-spectrum receiver", as used herein, denote the overall system components for transmitting and receiving, respectively, data.

Each multichannel spread-spectrum transmitter includes header means, processor means, transmitter-spread-spectrum means, combiner means, and transmitter-carrier means. The header means is coupled to the processor means. The transmitter-spread-spectrum means is coupled to the header means and to a plurality of data channels. The combiner means is coupled between the transmitter-spread-spectrum means and the transmitter-carrier means.

The header means is coupled to a first channel of the plurality of data channels. The header means concatenates a header for chip-sequence synchronization to the first data-sequence signal of the plurality of data sequence signals to generate a header frame. The header is for chip-sequence synchronization.

The processor means is coupled to the header means and to each of remaining channels of the plurality of data channels. Responsive to the header, the processor means generates control and timing signals to synchronize the plurality of data channels to the header.

The transmitter-spread-spectrum means spread-spectrum processes each of the data-sequence signals, as well as the header frame, with a respective chip-sequence signal. The output of the transmitter-spread-spectrum means is a plurality of spread-spectrum channels, with each spread-spectrum

channel corresponding to one of the data inputs. The plurality of spread-spectrum channels includes a spread-spectrum-header channel and a plurality of spread-spectrum-data channels. The spread-spectrum channel is generated by processing the header frame with a first chip-sequence signal. Each of the plurality of spread-spectrum-data channels is generated by processing a respective data-sequence signal by a respective chip-sequence signal.

The combiner means algebraically combines the plurality of spread-spectrum channels as a multichannel-spread-spectrum signal. At the output of the combiner means is the multichannel spread-spectrum signal. The transmitter-carrier means transmits, at a carrier frequency, the multichannel spread-spectrum signal, using radio waves, over a communications channel.

Each of the multichannel spread-spectrum receivers includes translating means, header-detection means, processor means, and receiver-spread-spectrum means. The translating means is coupled to the communications channel. The header-detection means is coupled between the translating means and the processor means. The receiver-spread-spectrum means is coupled to the translating means. At the output of the receiver-spread-spectrum means are the received data.

The translating means translates the received multichannel spread-spectrum signal from the carrier frequency to a processing frequency. The processing frequency may be a radio frequency (RF), an intermediate frequency (IF), a baseband frequency, or other desirable frequency for processing data.

The header-detection means detects, at the processing frequency, the header embedded in the spread-spectrum-header channel of the multichannel spread-spectrum signal. The header-detection means outputs, in response to detecting the header, a header-detection signal.

The receiver-processor means generates control and timing signals from the detected header. These signals are used for controlling sequences and timing of the invention.

The receiver-spread-spectrum means despreads the multichannel spread-spectrum signal of the multichannel spread-spectrum signal, as a plurality of data signals.

The transmitter-spread-spectrum means, as illustratively shown in FIG. 3, is embodied as a chip-sequence means and a plurality of product devices 51-58. The chip-sequence means may be embodied as a chip-sequence generator 39 for generating a plurality of chip-sequence signals. Alternatively, the transmitter-spread-spectrum means may be embodied as a plurality of EXCLUSIVE-OR gates, or equivalent logic devices or circuitry, coupled between the plurality of data inputs and a memory device for storing the plurality of chip-sequence signals. In this embodiment, the memory device outputs a respective chip-sequence signal to the respective data-sequence signal. A third alternative may include having the transmitter-spread-spectrum means embodied as a memory device, with appropriate detection circuitry so that, in response to a particular data symbol or data bit at the output of a particular output the demultiplexer, a chip-sequence signal is substituted for that data symbol or data bit. The transmitter-spread-spectrum means may also be embodied as any other technology known in the art capable of outputting a plurality of chip-sequence signals.

The combining means is embodied as a combiner 45. The header means is embodied as a header device 46 for concatenating a header with data in the first data channel. The processor means is embodied as a processor 27. The transmitter-carrier means is embodied as a transmitter-

carrier subsystem 50. The transmitter-carrier subsystem 50 may include an oscillator 49 and multiplier device 48 for shifting a signal to a carrier frequency, a filter 58 for filtering the shifted signal, and a power amplifier 59 and/or other circuitry as is well known in the art for transmitting a signal over a communications channel. The signal is transmitted using an antenna 60.

As shown in FIG. 3, the header device 46 is coupled between the first data channel and the first product device 51. The chip-sequence generator 39 is coupled to the plurality of product devices 51-58 and to the processor 27. The combiner 45 is coupled between the plurality of product devices 51-58 and the transmitter-carrier subsystem 50.

The header device 46 concatenates the header with data using a first data channel of a plurality of data channels. The header device 46 is necessary for timing of data from different data channels. From timing the data from the header in a single channel, data in all channels are timed. A plurality of synchronization devices, which may be embodied as buffer memories 32-38, receive timing and control signals from the processor 27 to synchronize the plurality of data channels to the header on the first data channel.

The chip-sequence generator 39 generates a plurality of chip-sequence signals. Each of the chip-sequence signals of the plurality of chip-sequence signals has low correlation with the other chip-sequence signals in the plurality of chip-sequence signals, and is preferably orthogonal to the other chip-sequence signals in the plurality of chip-sequence signals. The chip-sequence generator 39 equivalently may be embodied as a plurality of chip-sequence generators.

The plurality of product devices 51-58, for example, may be embodied as a plurality of EXCLUSIVE-OR gates coupled between the incoming data channels and the chip-sequence generator 39. Each EXCLUSIVE-OR gate multiplies a respective data-sequence signal by a respective chip-sequence signal from the chip-sequence generator 39.

The plurality of product devices 51-58 multiplies each of the data-sequence signals by a respective chip-sequence signal. At the output of the plurality of product devices 51-58 is a plurality of spread-spectrum channels, respectively. A particular spread-spectrum channel is identified by the chip-sequence signal that was used to spread-spectrum process the particular data sequence signal. The plurality of spread-spectrum channels includes a spread-spectrum-header channel and a plurality of spread-spectrum-data channels. The spread-spectrum-header channel is generated by processing the header frame with a first chip-sequence signal. Each of the plurality of spread-spectrum-data channels is generated by processing a respective data-sequence signal with a respective chip-sequence signal. The plurality of spread-spectrum-data channels is synchronized to the spread-spectrum-header channel.

The combiner 45 algebraically combines the plurality of spread-spectrum channels, and outputs the combined signal as a multichannel-spread-spectrum signal. Preferably, the combiner 45 combines the plurality of spread-spectrum channels linearly, although some nonlinear process may be involved without significant degradation in system performance.

The transmitter-carrier subsystem 50 transmits, at a carrier frequency, the multichannel spread-spectrum signal using radio waves over a communications channel. The transmitter-carrier subsystem 50 of the multichannel spread-spectrum transmitter includes appropriate filters, power amplifiers and matching circuits coupled to an antenna 60. The transmitter-carrier subsystem 50 also may include a

hard limiter, for hard limiting the multichannel spread-spectrum signal before transmitting.

At the receiver, as shown in FIG. 4, the translating means is shown as receiver RF section, which may include a translating device 62 with oscillator 63 and frequency-locked loop 70. The translating device 62 is coupled through a low noise amplifier 61 to an antenna 160 to the communications channel and through an amplifier 64 to the header-matched filter 79. The translating device 62 is coupled to the oscillator 63, and the oscillator 63 is coupled to the frequency-locked loop 70. The header-matched filter 79 is coupled to the frequency-locked loop 70 and to a processor 90. The plurality of data-matched filters 71-78 is coupled between the translating device 62 and a multiplexer 80. The multiplexer 80 is coupled to a receiver-FIFO memory 82.

The translating device 62 translates the received multichannel spread-spectrum-spread-spectrum signal from the carrier frequency to a processing frequency. The translating device 62 may be a mixer, which is well known in the art, for shifting an information signal, which in this disclosure is the received multichannel spread-spectrum signal modulated at a carrier frequency, to IF or baseband. The processing frequency may be RF, IF, baseband frequency or other desired frequency for a digital signal processor. The signal for shifting the received multichannel spread-spectrum-spread-spectrum signal is produced by oscillator 63.

The header-detection means is embodied as a header-matched filter 79. The header-matched filter 79 detects, at the processing frequency, the header embedded in the spread-spectrum-header channel of the multichannel spread-spectrum signal. The term "header-matched filter" as used herein, is a matched filter for detecting the header, by having an impulse response matched to the chip-sequence signal and bits of the header of the spread-spectrum-header channel of the multichannel spread-spectrum signal. The header-matched filter may be a digital-matched filter, a surface-acoustic-wave (SAW) device, software operating in a processor or embodied within an application specific integrated circuit (ASIC). In response to detecting the header, the header-matched filter 79 outputs a header-detection signal. The header-matched filter at a base station can detect the header embedded in the multichannel spread-spectrum signal from all users, since the chip-sequence signal for the header and data is common to all users.

The header-detection means alternatively may be embodied as a header-matched filter, coupled to an output of a data-matched filter or to the output of the multiplexer 80. This alternative is taught in U.S. Pat. No. 5,627,855, entitled PROGRAMMABLE TWO-PART MATCHED FILTER FOR SPREAD SPECTRUM by Davidovici, which is incorporated herein by reference.

The frequency-locked loop 70 is frequency locked in response to the header-detection signal. The frequency-locked loop 70 locks the frequency of the oscillator 63 to the carrier frequency of the received multichannel spread-spectrum signal. Circuits for frequency locked loops, and their operation, are well known in the art.

The processor means is embodied as a processor 90. The processor 90, in response to the header-detection signal, generates control and timing signals. The control and timing signals are used for controlling sequences and timing of the invention.

The receiver-spread-spectrum means is embodied as a plurality of data-matched filters 71-78. Each of the plurality of data-matched filters 71-78 has an impulse response matched to a chip-sequence signal of a respective one of the

plurality of chip-sequence signals. The data-matched filters may be embodied as a digital-matched filter, SAW device, software operating in a processor, or an ASIC. The plurality of data-matched filters 71-78 despreads the multichannel-spread-spectrum signal as a plurality of received spread-spectrum channels.

Alternatively, the receiver-spread-spectrum means and the transmitter-spread-spectrum means may be embodied as the plurality of data-matched filters 71-78, thereby using the same hardware. The plurality of data-matched filters 71-78 in this embodiment are time multiplexed with different coefficients, between transmit and receive.

Each chip-sequence signal in the plurality of chip-sequence signals is different, preferably orthogonal to the others, to avoid or reduce interference. The plurality of chip-sequence signals, however, preferably is common to all users. Thus, the plurality of data-matched filters 71-78 can detect the plurality of chip-sequence signals from any of the users.

The present invention also comprises a method. The method includes the steps of concatenating a header to a first data-sequence signal of a plurality of data sequence signals to generate a header frame. A used herein, a "header frame" is defined to be a header followed by data and may include multiple headers interspersed with fields of data.

The input data are in a plurality of data-sequence signals. The plurality of data-sequence signals are synchronized to the header responsive to control and timing signals generated by a processor. The method includes generating a plurality of chip-sequence signals, and multiplying each of the data-sequence signals by a respective chip-sequence signal, thereby generating a plurality of spread-spectrum channels. The plurality of spread-spectrum channels includes a spread-spectrum-header channel and a plurality of spread-spectrum-data channels. The spread-spectrum-header channel is generated by processing the header frame with a first chip-sequence signal. Each of the plurality of spread-spectrum-data channels is generated by processing a respective data-sequence signal with a respective chip-sequence signal. Each of the plurality of spread-spectrum-data channels is synchronized to the spread-spectrum-header channel.

The steps include algebraically combining the plurality of spread-spectrum channels as a multichannel-spread-spectrum signal, and transmitting on a carrier frequency the multichannel spread-spectrum signal over a communications channel using radio waves.

The steps may further include, at a multichannel spread-spectrum receiver, translating the multichannel spread-spectrum signal from the carrier frequency to a processing frequency, and detecting, at the processing frequency, the header embedded in the multichannel spread-spectrum signal. The chip-sequence signals used for the header and the data may be common to all users. In response to detecting the header, the method includes outputting a header-detection signal and generating control and timing signals.

The steps also include despreads the multichannel-spread-spectrum signal as a plurality of received spread-spectrum channels.

In the present invention, assume 800 kb/s is first demultiplexed into K channels, where $K=32$ in a preferred system, although any K will suffice. As a result, if $K=32$, then the transmitted rate is $f_T=25$ kb/s. Each of these K channels is spread using a different orthogonal spread-spectrum code of length L. Thus,

$$\int_0^{T_L} C_i(t)C_j(t)dt = \begin{cases} 1 & i = j \\ 0 & i \neq j \end{cases}$$

over the time, T_L , corresponding to the code length L . For example, if the chip rate were 5 megachips/s, and there were eight users, then the send rate is 6.4 Mb/s $32=200$ kb/s so that processing gain is 25.

Note that the processing gain has increased by a factor of 32. Further, the length L of each of the K orthogonal codes is such that $L \geq K$, since there are only L orthogonal codes of length L .

One-half of the chip-sequence signals may be sent on an in-phase (I) channel and one-half on a quadrature-phase (Q) channel, forming quadrature-phase-shift-keying modulation (QPSK) or OQPAK. Binary-phase-shift-keying modulation (BPSK) can also be used. These are standard modulation procedures well known in the prior art.

Different sectors and different cells should use different orthogonal chip sequences to minimize interference between sectors and cells. This is done by multiplying each chip sequence signal, C_i , by a chip sequence, $g_s(t)$. Within a sector, every user uses the same codeset, C_i and g_s . Within each sector of each cell, each user uses the same codeset, C_i , but each sector in each cell gets a different g_s .

Users transmitting at different rates use a subset of the 32 codes so that the processing gain remains a constant.

If 2 Mb/s were the basic data rate, then with FEC and overhead the data rate might be $f_d=4.4$ Mb/s. In this case to achieve a processing gain of twenty-five ($PG=25$) at say $f=10$ Mchips/s requires:

$$25 = Kf_d/f_c \times 8$$

or

$$K = 200f_d/f_c = 200 \times 4.4/10 = 88$$

The use of 88 orthogonal codes each of length 88 is certainly within the state-of-the art.

It will be apparent to those skilled in the art that various modifications can be made to the high efficiency spread spectrum packet system of the instant invention without departing from the scope or spirit of the invention, and it is intended that the present invention cover modifications and variations of the high efficiency spread spectrum packet system provided they come within the scope of the appended claims and their equivalents.

We claim:

1. A multichannel-spread-spectrum system for communicating a plurality of data-sequence signals from a plurality of data channels using parallel chip-sequence signals, comprising:

- a header device, coupled to a first data channel of said plurality of data channels, for concatenating a header to a first data-sequence signal;
- a processor for synchronizing a remaining plurality of data channels to the header in the first data channel;
- chip-sequence means for outputting a plurality of chip-sequence signals, with each chip-sequence signal orthogonal to the other chip-sequence signals in said plurality of chip-sequence signals;
- a plurality of product devices, coupled to said chip-sequence means, for multiplying each of said plurality of data-sequence signals by a respective chip-sequence signal, thereby generating a plurality of spread-spectrum channels, respectively;

a combiner, coupled to the plurality of product devices, for algebraically combining the plurality of spread-spectrum channels as a multichannel-spread-spectrum signal;

a transmitter subsystem, coupled to said combiner, for transmitting the multichannel-spread-spectrum signal on a carrier frequency over a communications channel;

a translating device, coupled to the communications channel, for translating the received multichannel-spread-spectrum signal from the carrier frequency to a processing frequency;

a header-matched filter, coupled to said translating device and having an impulse response matched to the header, for detecting, at the processing frequency, the header in the multichannel-spread-spectrum signal, and for outputting, responsive to detecting the header, a header-detection signal;

a receiver processor, coupled to said header-matched filter, responsive to the header-detection signal, for generating control and timing signals; and

a plurality of data-matched filters, coupled to said translating device, with each data-matched filter having an impulse response matched to a respective chip-sequence signal of the plurality of chip-sequence signals, for despreading the received multichannel-spread-spectrum signal as a plurality of received spread-spectrum channels, respectively.

2. The multichannel-spread-spectrum system as set forth in claim 1, with said chip-sequence means including a chip-sequence generator for generating the plurality of chip-sequence signals.

3. The multichannel-spread-spectrum system as set forth in claim 1, with said chip-sequence means including a memory for storing the plurality of chip-sequence signals.

4. The multichannel-spread-spectrum system as set forth in claim 1, said plurality of product devices, including:

a first EXCLUSIVE-OR gate, coupled to said chip-sequence means and to said header device, for multiplying the header and a first data-sequence signal with a first chip-sequence signal to generate a spread-spectrum-header channel;

a second EXCLUSIVE-OR gate, coupled to said chip-sequence means and to a second data channel, for multiplying a second data-sequence signal by a second chip-sequence signal, the second chip-sequence signal being different from the first chip-sequence signal, to generate a first spread-spectrum-data channel;

a third EXCLUSIVE-OR gate, coupled to said chip-sequence means and to a third data channel, for multiplying a third data-sequence signal by a third chip-sequence signal, the third chip-sequence signal being different from the second chip-sequence signal and from the first chip-sequence signal, to generate a second spread-spectrum-data channel;

an nth EXCLUSIVE-OR gate, coupled to said chip-sequence means and to an nth data channel, for multiplying an nth data-sequence signal by an nth chip-sequence signal, the nth chip-sequence signal being different from the third chip-sequence signal and from the second chip-sequence signal and from the first chip-sequence signal, to generate an nth-1 spread-spectrum-data channel; and

the first spread-spectrum-data channel, the second spread-spectrum-data channel, and the nth-1 spread-spectrum-data channel synchronized, responsive to timing and

control signals generated by the processor, to the spread-spectrum-header channel.

5 5. A multichannel-spread-spectrum transmitter for communicating a plurality of data-sequence signals from a plurality of data channels using parallel chip-sequence signals, comprising:

- a header device, coupled to a first data channel of said plurality of data channels, for concatenating a header to a first data-sequence signal to generate a header frame;
- 10 a processor, coupled to the header device and to the plurality of data channels, for synchronizing the plurality of data channels;

spread-spectrum means, coupled to the plurality of data channels, for spread-spectrum processing the plurality of data-sequence signals by a plurality of chip-sequence signals, respectively, thereby generating a plurality of spread-spectrum channels, the plurality of spread-spectrum channels including a spread-spectrum-header channel generated by processing the header frame with a first chip-sequence signal, and a plurality of spread-spectrum-data channels;

combiner means, coupled to said spread-spectrum means, for algebraically combining the plurality of spread-spectrum channels as a multichannel-spread-spectrum signal; and

carrier means, coupled to said combiner means, for transmitting the multichannel-spread-spectrum signal over a communications channel at a carrier frequency.

6. The transmitter as set forth in claim 5, said spread-spectrum means including:

means for generating the plurality of chip-sequence signals;

- a first EXCLUSIVE-OR gate, coupled to said generating means and to said header device, for multiplying the header frame with the first chip-sequence signal to generate the spread-spectrum-header channel;

- a second EXCLUSIVE-OR gate, coupled to said generating means and to a second data channel, for multiplying a second data-sequence signal by a second chip-sequence signal, the second chip-sequence signal being different from the first chip-sequence signal, to generate a first spread-spectrum-data channel;

- a third EXCLUSIVE-OR gate, coupled to said generating means and to a third data channel, for multiplying a third data-sequence signal by a third chip-sequence signal, the third chip-sequence signal being different from the second chip-sequence signal and from the first chip-sequence signal, to generate a second spread-spectrum-data channel;

- an nth EXCLUSIVE-OR gate, coupled to said generating means and to an nth data channel, for multiplying an nth data-sequence signal by an nth chip-sequence signal, the nth chip-sequence signal being different from the third chip-sequence signal and from the second chip-sequence signal and from the first chip-sequence signal, to generate an nth-1 spread-spectrum-data channel; and

the first spread-spectrum-data channel, the second spread-spectrum-data channel, and the nth-1 spread-spectrum-data channel synchronized, responsive to timing and control signals generated by the processor, to the spread-spectrum-header channel.

7. A multichannel-spread-spectrum transmitter for communicating a plurality of data-sequence signals from a plurality of data channels using parallel chip-sequence signals, comprising:

- a header device, coupled to a first data channel of said plurality of data channels, for concatenating a header to a first data-sequence signal to generate a header frame;

- a processor, coupled to the header device and to the plurality of data channels, for synchronizing the plurality of data channels;

- a chip-sequence generator for generating a plurality of chip-sequence signals, each of said plurality of chip-sequence signals being orthogonal to other chip-sequence signals within the plurality of chip-sequence signals;

- a plurality of product devices, coupled to the plurality of data channels and to said chip-sequence generator, for multiplying the plurality of data-sequence signals by a plurality of chip-sequence signals, respectively, thereby generating a plurality of spread-spectrum channels, the plurality of spread-spectrum channels including a spread-spectrum-header channel and a plurality of spread-spectrum-data channels, the spread-spectrum-header channel generated by multiplying the header frame with a first chip-sequence signal, each of the plurality of spread-spectrum-data channels generated by multiplying a respective data-sequence signal by a respective chip-sequence signal;

- a combiner, coupled to said plurality of product devices, for algebraically combining the plurality of spread-spectrum channels as a multichannel-spread-spectrum signal; and

- a transmitter subsystem, coupled to said combiner, for transmitting the multichannel-spread-spectrum signal over a communications channel at a carrier frequency.

* * * * *

**UNITED STATES DISTRICT COURT
CENTRAL DISTRICT OF CALIFORNIA**

NOTICE OF ASSIGNMENT TO UNITED STATES MAGISTRATE JUDGE FOR DISCOVERY

This case has been assigned to District Judge Christina A. Snyder and the assigned discovery Magistrate Judge is Frederick F. Mumm.

The case number on all documents filed with the Court should read as follows:

CV12- 4014 CAS (FFM~~x~~)

Pursuant to General Order 05-07 of the United States District Court for the Central District of California, the Magistrate Judge has been designated to hear discovery related motions.

All discovery related motions should be noticed on the calendar of the Magistrate Judge

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NOTICE TO COUNSEL

A copy of this notice must be served with the summons and complaint on all defendants (if a removal action is filed, a copy of this notice must be served on all plaintiffs).

Subsequent documents must be filed at the following location:

Western Division
312 N. Spring St., Rm. G-8
Los Angeles, CA 90012

Southern Division
411 West Fourth St., Rm. 1-053
Santa Ana, CA 92701-4516

Eastern Division
3470 Twelfth St., Rm. 134
Riverside, CA 92501

Failure to file at the proper location will result in your documents being returned to you.

UNITED STATES DISTRICT COURT
for the
CENTRAL DISTRICT

COPY

GOLDEN BRIDGE TECHNOLOGY, INC.

Plaintiff

v.

APPLE, INC.; MOTOROLA, INC.' AMAZON.COM,
INC.; BARNESANDNOBLE.COM LLC;

Defendant

ATTACHMENT A

CV12-04014 CAS (FFMx)
Civil Action No.

SUMMONS IN A CIVIL ACTION

To: *(Defendant's name and address)*
SEE ATTACHMENT B

A lawsuit has been filed against you.

Within 21 days after service of this summons on you (not counting the day you received it) — or 60 days if you are the United States or a United States agency, or an officer or employee of the United States described in Fed. R. Civ. P. 12 (a)(2) or (3) — you must serve on the plaintiff an answer to the attached complaint or a motion under Rule 12 of the Federal Rules of Civil Procedure. The answer or motion must be served on the plaintiff or plaintiff's attorney, whose name and address are:

Lawrence M. Hadley, Esq. (lhadley@mckoolsmithhennigan.com)
MCKOOL SMITH HENNIGAN, P.C.
865 South Figueroa Street, Suite 2900,
Los Angeles, CA 90017
Telephone: (213) 694-1200
Facsimile: (213) 694-1234

If you fail to respond, judgment by default will be entered against you for the relief demanded in the complaint. You also must file your answer or motion with the court.

MAY - 8 2012

Date: _____

CLERK OF COURT

JULIE PRADO SEAL

Signature of Clerk or Deputy Clerk

ATTACHMENT A

MCKOOL SMITH HENNIGAN, P.C.
LOS ANGELES, CALIFORNIA

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4 MCKOOL SMITH HENNIGAN, P.C.
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5 Los Angeles, California 90017
Telephone: (213) 694-1200
6 Facsimile: (213) 694-1234

7 Attorneys for Plaintiff
GOLDEN BRIDGE TECHNOLOGY, INC.

9 UNITED STATES DISTRICT COURT
10 CENTRAL DISTRICT OF CALIFORNIA

12 GOLDEN BRIDGE TECHNOLOGY,
INC.,)

14 Plaintiff,)

15 vs.)

16 APPLE, INC.; MOTOROLA, INC.,)
AMAZON.COM, INC.; BARNES &)
17 NOBLE, INC.;)
BARNESANDNOBLE.COM LLC;)
BARNESANDNOBLE.COM INC.;)
18 DELL INC.; HEWLETT-PACKARD)
COMPANY; HTC CORP. a/k/a HIGH)
19 TECH COMPUTER CORP.; HTC)
(B.V.I.) CORP.; HTC AMERICA, INC.;)
20 EXEDEA, INC.; LG ELECTRONICS,)
INC.; LG ELECTRONICS USA, INC.;)
21 LG ELECTRONICS MOBILECOMM)
U.S.A., INC.; LENOVO GROUP LTD.;)
22 LENOVO HOLDING COMPANY, INC.;)
LENOVO (UNITED STATES) INC.;)
23 PALM, INC.; PANTECH CORP. f/k/a)
PANTECH CO., LTD.; PANTECH)
24 WIRELESS, INC.; RESEARCH IN)
MOTION LIMITED; RESEARCH IN)
25 MOTION CORPORATION; SAMSUNG)
ELECTRONICS CO., LTD.; SAMSUNG)
26 SEMICONDUCTOR, INC.; SAMSUNG)
ELECTRONICS AMERICA, INC.;)
27 SAMSUNG TELECOMMUNICATIONS)
AMERICA, LLC; SIERRA WIRELESS,)
28 INC.; SIERRA WIRELESS AMERICA,)

Case No.

**COMPLAINT FOR PATENT
INFRINGEMENT**

DEMAND FOR JURY TRIAL

1 INC.; SONY KABUSHIKI KAISHA)
a/k/a SONY CORPORATION; SONY)
2 ELECTRONICS, INC.; SONY)
CORPORATION OF AMERICA; SONY)
3 MOBILE COMMUNICATIONS AB;)
SONY MOBILE COMMUNICATIONS)
4 (USA) INC.; ZTE CORPORATION, ZTE)
(USA) INC., and ZTE SOLUTIONS)
5 INC.,)
6 Defendants.)

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ATTACHMENT B

ATTACHMENT A TO SUMMONS

1. Apple, Inc.
CT Corporation (Agent for Service of Process)
818 W. 7th Street, Suite 200
Los Angeles, California 90017
2. Motorola, Inc.
Corporation Trust Company
Corporation Trust Center
1209 Orange St.
Wilmington, Delaware 19801
3. Barnes & Noble, Inc.
Capital Services, Inc.
615 South DuPont Highway
Dover, Delaware 19901
4. Barnesandnoble.com LLC
Capitol Services, Inc.
615 South DuPont Highway
Dover, Delaware 19901
5. Barnesandnoble.com Inc.
Capital Services, Inc.
615 South DuPont Highway
Dover, Delaware 19901
6. Dell Inc.
Corporation Service Company
2711 Centerville Road, Suite 400
Wilmington, Delaware 19808
7. Hewlett-Packard Company
Corporation Trust Company
Corporation Trust Center
1209 Orange St.
Wilmington, Delaware 19801
8. HTC Corp. a/k/a High Tech Computer Corp.
No. 23, Xinghua Rd.
Taoyuan City
Taoyuan County 330
Taiwan, Republic of China
9. HTC (B.V.I.) Corp.
3F, Omar Hodge Building
Wickhams Cay I, P.O. Box 362, Road Town
Tortola, British Virgin Islands
10. HTC America, Inc.
National Registered Agents, Inc.
16055 Space Center Blvd., Suite 235
Houston, Texas 77062

ATTACHMENT A TO SUMMONS

(Cont'd)

11. Exedea, Inc.
HTC USA Inc.
5950 Corporate Drive
Houston, Texas 77036-2306
12. LG Electronics, Inc
LG Twin Towers 20
Yeouido-dong, Yeongdeunspo-gu
Seoul 150-721
South Korea
13. LG Electronics USA, Inc.
United States Corporation Company
2711 Centerville Road, Suite 400
Wilmington, Delaware 19808
14. **In California:**

LG Electronics MobileComm U.S.A., Inc.
Alan K. Tse
10101 Old Grove Road
San Diego, California 92131

In New Jersey:

LG Electronics Mobilecomm U.S.A., Inc.
National Registered Agents, Inc. of New Jersey
100 Canal Pointe Blvd., Suite 212
Princeton, New Jersey 08540
15. Lenovo Group Ltd.
No. 6 ChuangYe Road
Shangdi Information Industry Base
Haidan District
Beijing, China 100085
16. Lenovo Holding Company, Inc.
Corporation Trust Company
Corporation Trust Center
1209 Orange St.
Wilmington, Delaware 19801
17. Lenovo (United States) Inc.
Corporation Trust Company
Corporation Trust Center
1209 Orange St.
Wilmington, Delaware 19801
18. Palm, Inc.
Corporation Service Company
2711 Centerville Rd.
Wilmington, Delaware 19808

ATTACHMENT A TO SUMMONS

(Cont'd)

19. Pantech Corp. f/k/a Pantech Co., Ltd.
Pantech R&D Center, I-2 DMC Sangam-dong
Mapo-gu, Seoul, 415865, South Korea
20. Pantech Wireless, Inc.
Kathleen Elizabeth Jones
5607 Glenridge Drive, Suite 500
Atlanta GA 30342
21. Research In Motion Limited
295 Phillip Street
Waterloo, Ontario, N2L 3W8, Canada
22. Research In Motion Corporation
Corporation Trust Company
Corporation Trust Center
1209 Orange St.,
Wilmington, Delaware 19807
23. Samsung Electronics Co., Ltd.
Corporate Creations Network, Inc.
11380 Prosperity Farms Rd., Ste. 221
East Palm Beach Gardens, FL 33410-3465
24. Samsung Semiconductor, Inc.
National Registered Agents, Inc.
2875 Michelle Drive, Suite 100
Irvine, California 92606
25. Samsung Electronics America, Inc.
CT Corporation System
111 8th Avenue
New York, New York 10011
26. Samsung Telecommunications America, LLC
Corporation Services Company
2711 Centerville Road, Suite 400
Wilmington Delaware 19808
27. Sierra Wireless, Inc.
13811 Wireless Way
Richmond, B.C. VDV 3A4
Canada
28. Sierra Wireless America, Inc.
RL&F Service Corp.
One Rodney Square, 10th Floor
Wilmington, Delaware 19801

ATTACHMENT A TO SUMMONS

(Cont'd)

29. Sony Kabushiki Kaisha a/k/a Sony Corporation
7-1 Konan 1-Come
Minato-Ku, Tokyo, 108-0075
Japan.
30. Sony Corporation of America
The Corporation Trust Company
1209 North Orange St.
Wilmington, Delaware 19801
31. Sony Electronics, Inc.
Corporation Service Company
2711 Centerville Road, Suite 400
Wilmington, DE 19808
32. Sony Mobile Communications AB
Hammersmith, London
United Kingdom
33. Sony Mobile Communications (USA) Inc.
Capitol Corporate Services Inc.
615 South Dupont Highway
Dover, Delaware 19901
34. ZTE Corporation
2425 N. Central Expressway, Suite 600
Richardson, Texas 75080

35. ZTE (USA) Inc.
Lixin Cheng
33 Wood Avenue South, Floor 2
Iselin, New Jersey 08830
36. ZTE Solutions Inc.
Corporation Service Company
2711 Centerville Road Suite 400
Wilmington, Delaware 19808

**UNITED STATES DISTRICT COURT, CENTRAL DISTRICT OF CALIFORNIA
CIVIL COVER SHEET**

I (a) PLAINTIFFS (Check box if you are representing yourself)
GOLDEN BRIDGE TECHNOLOGY, INC.

DEFENDANTS
SEE ATTACHMENT A

CONFORMED COPY

(b) Attorneys (Firm Name, Address and Telephone Number. If you are representing yourself, provide same.)

Attorneys (If Known)

MCKOOL SMITH HENNIGAN, P.C.
Lawrence M. Hadley (lhadley@mckoolsmithhennigan.com)
865 South Figueroa Street, Ste. 2900, Los Angeles, CA 90017
Telephone: (213) 694-1200
Facsimile: (213) 694-1234

II. BASIS OF JURISDICTION (Place an X in one box only.)

III. CITIZENSHIP OF PRINCIPAL PARTIES - For Diversity Cases Only
(Place an X in one box for plaintiff and one for defendant.)

- 1 U.S. Government Plaintiff
 2 U.S. Government Defendant
 3 Federal Question (U.S. Government Not a Party)
 4 Diversity (Indicate Citizenship of Parties in Item III)

- | | PTF | DEF | | PTF | DEF |
|---|----------------------------|----------------------------|---|----------------------------|----------------------------|
| Citizen of This State | <input type="checkbox"/> 1 | <input type="checkbox"/> 1 | Incorporated or Principal Place of Business in this State | <input type="checkbox"/> 4 | <input type="checkbox"/> 4 |
| Citizen of Another State | <input type="checkbox"/> 2 | <input type="checkbox"/> 2 | Incorporated and Principal Place of Business in Another State | <input type="checkbox"/> 5 | <input type="checkbox"/> 5 |
| Citizen or Subject of a Foreign Country | <input type="checkbox"/> 3 | <input type="checkbox"/> 3 | Foreign Nation | <input type="checkbox"/> 6 | <input type="checkbox"/> 6 |

IV. ORIGIN (Place an X in one box only.)

- 1 Original Proceeding
 2 Removed from State Court
 3 Remanded from Appellate Court
 4 Reinstated or Reopened
 5 Transferred from another district (specify):
 6 Multi-District Litigation
 7 Appeal to District Judge from Magistrate Judge

V. REQUESTED IN COMPLAINT: JURY DEMAND: Yes No (Check 'Yes' only if demanded in complaint.)

CLASS ACTION under F.R.C.P. 23: Yes No

MONEY DEMANDED IN COMPLAINT: \$ _____

VI. CAUSE OF ACTION (Cite the U. S. Civil Statute under which you are filing and write a brief statement of cause. Do not cite jurisdictional statutes unless diversity.)
Patent Infringement - 35 U.S. C. Section 1, et seq.

VII. NATURE OF SUIT (Place an X in one box only.)

OTHER STATUTES	CONTRACT	TORTS PERSONAL INJURY	TORTS PERSONAL PROPERTY	PRISONER PETITIONS	LABOR
<input type="checkbox"/> 400 State Reapportionment	<input type="checkbox"/> 110 Insurance	<input type="checkbox"/> 310 Airplane	<input type="checkbox"/> 370 Other Fraud	<input type="checkbox"/> 510 Motions to Vacate Sentence Habeas Corpus	<input type="checkbox"/> 710 Fair Labor Standards Act
<input type="checkbox"/> 410 Antitrust	<input type="checkbox"/> 120 Marine	<input type="checkbox"/> 315 Airplane Product Liability	<input type="checkbox"/> 371 Truth in Lending	<input type="checkbox"/> 530 General	<input type="checkbox"/> 720 Labor/Mgmt. Relations
<input type="checkbox"/> 430 Banks and Banking	<input type="checkbox"/> 130 Miller Act	<input type="checkbox"/> 320 Assault, Libel & Slander	<input type="checkbox"/> 380 Other Personal Property Damage	<input type="checkbox"/> 535 Death Penalty	<input type="checkbox"/> 730 Labor/Mgmt. Reporting & Disclosure Act
<input type="checkbox"/> 450 Commerce/ICC Rates/etc.	<input type="checkbox"/> 140 Negotiable Instrument	<input type="checkbox"/> 330 Fed. Employers' Liability	<input type="checkbox"/> 385 Property Damage Product Liability	<input type="checkbox"/> 540 Mandamus/Other	<input type="checkbox"/> 740 Railway Labor Act
<input type="checkbox"/> 460 Deportation	<input type="checkbox"/> 150 Recovery of Overpayment & Enforcement of Judgment	<input type="checkbox"/> 340 Marine	BANKRUPTCY	<input type="checkbox"/> 550 Civil Rights	<input type="checkbox"/> 790 Other Labor Litigation
<input type="checkbox"/> 470 Racketeer Influenced and Corrupt Organizations	<input type="checkbox"/> 151 Medicare Act	<input type="checkbox"/> 345 Marine Product Liability	<input type="checkbox"/> 22 Appeal 28 USC 158	<input type="checkbox"/> 555 Prison Condition	<input type="checkbox"/> 791 Empl. Ret. Inc. Security Act
<input type="checkbox"/> 480 Consumer Credit	<input type="checkbox"/> 152 Recovery of Defaulted Student Loan (Excl. Veterans)	<input type="checkbox"/> 350 Motor Vehicle	<input type="checkbox"/> 423 Withdrawal 28 USC 157	FORFEITURE/PENALTY	PROPERTY RIGHTS
<input type="checkbox"/> 490 Cable/Sat TV	<input type="checkbox"/> 153 Recovery of Overpayment of Veteran's Benefits	<input type="checkbox"/> 355 Motor Vehicle Product Liability	CIVIL RIGHTS	<input type="checkbox"/> 610 Agriculture	<input type="checkbox"/> 820 Copyrights
<input type="checkbox"/> 810 Selective Service	<input type="checkbox"/> 160 Stockholders' Suits	<input type="checkbox"/> 360 Other Personal Injury	<input type="checkbox"/> 441 Voting	<input type="checkbox"/> 620 Other Food & Drug	<input checked="" type="checkbox"/> 830 Patent
<input type="checkbox"/> 850 Securities/Commodities/Exchange	<input type="checkbox"/> 190 Other Contract	<input type="checkbox"/> 362 Personal Injury-Med Malpractice	<input type="checkbox"/> 442 Employment	<input type="checkbox"/> 625 Drug Related Seizure of Property 21 USC 881	<input type="checkbox"/> 840 Trademark
<input type="checkbox"/> 875 Customer Challenge 12 USC 3410	<input type="checkbox"/> 195 Contract Product Liability	<input type="checkbox"/> 365 Personal Injury-Product Liability	<input type="checkbox"/> 443 Housing/Accommodations	<input type="checkbox"/> 630 Liquor Laws	SOCIAL SECURITY
<input type="checkbox"/> 890 Other Statutory Actions	<input type="checkbox"/> 196 Franchise	<input type="checkbox"/> 368 Asbestos Personal Injury Product Liability	<input type="checkbox"/> 444 Welfare	<input type="checkbox"/> 640 R.R. & Truck	<input type="checkbox"/> 61 HIA(1395ff)
<input type="checkbox"/> 891 Agricultural Act	REAL PROPERTY	IMMIGRATION	<input type="checkbox"/> 445 American with Disabilities - Employment	<input type="checkbox"/> 650 Airline Regs	<input type="checkbox"/> 862 Black Lung (923)
<input type="checkbox"/> 892 Economic Stabilization Act	<input type="checkbox"/> 210 Land Condemnation	<input type="checkbox"/> 462 Naturalization Application	<input type="checkbox"/> 446 American with Disabilities - Other	<input type="checkbox"/> 660 Occupational Safety /Health	<input type="checkbox"/> 863 DIWC/DIWW 405(g)
<input type="checkbox"/> 893 Environmental Matters	<input type="checkbox"/> 220 Foreclosure	<input type="checkbox"/> 463 Habeas Corpus-Alien Detainee	<input type="checkbox"/> 440 Other Civil Rights	<input type="checkbox"/> 690 Other	<input type="checkbox"/> 864 SSID Title XVI
<input type="checkbox"/> 894 Energy Allocation Act	<input type="checkbox"/> 230 Rent Lease & Ejectment	<input type="checkbox"/> 465 Other Immigration Actions			<input type="checkbox"/> 865 RSI (405(g))
<input type="checkbox"/> 895 Freedom of Info. Act	<input type="checkbox"/> 240 Torts to Land				FEDERAL TAX SUITS
<input type="checkbox"/> 900 Appeal of Fee Determination Under Equal Access to Justice	<input type="checkbox"/> 245 Tort Product Liability				<input type="checkbox"/> 870 Taxes (U.S. Plaintiff or Defendant)
<input type="checkbox"/> 950 Constitutionality of State Statutes	<input type="checkbox"/> 290 All Other Real Property				<input type="checkbox"/> 871 IRS-Third Party 26 USC 7609

FOR OFFICE USE ONLY: Case Number: _____

CV12-04014

AFTER COMPLETING THE FRONT SIDE OF FORM CV-71, COMPLETE THE INFORMATION REQUESTED BELOW.

**UNITED STATES DISTRICT COURT, CENTRAL DISTRICT OF CALIFORNIA
CIVIL COVER SHEET**

VIII(a). IDENTICAL CASES: Has this action been previously filed in this court and dismissed, remanded or closed? No Yes

If yes, list case number(s):

VIII(b). RELATED CASES: Have any cases been previously filed in this court that are related to the present case? No Yes

If yes, list case number(s):

Civil cases are deemed related if a previously filed case and the present case:

- (Check all boxes that apply) A. Arise from the same or closely related transactions, happenings, or events; or
 B. Call for determination of the same or substantially related or similar questions of law and fact; or
 C. For other reasons would entail substantial duplication of labor if heard by different judges; or
 D. Involve the same patent, trademark or copyright, and one of the factors identified above in a, b or c also is present.

IX. VENUE: (When completing the following information, use an additional sheet if necessary.)

(a) List the County in this District; California County outside of this District; State if other than California; or Foreign Country, in which **EACH** named plaintiff resides.
 Check here if the government, its agencies or employees is a named plaintiff. If this box is checked, go to item (b).

County in this District:*

California County outside of this District; State, if other than California; or Foreign Country

NEW JERSEY

(b) List the County in this District; California County outside of this District; State if other than California; or Foreign Country, in which **EACH** named defendant resides.
 Check here if the government, its agencies or employees is a named defendant. If this box is checked, go to item (c).

County in this District:*

California County outside of this District; State, if other than California; or Foreign Country

SEE ATTACHMENT B

(c) List the County in this District; California County outside of this District; State if other than California; or Foreign Country, in which **EACH** claim arose.
Note: In land condemnation cases, use the location of the tract of land involved.

County in this District:*

California County outside of this District; State, if other than California; or Foreign Country

LOS ANGELES

* Los Angeles, Orange, San Bernardino, Riverside, Ventura, Santa Barbara, or San Luis Obispo Counties

Note: In land condemnation cases, use the location of the tract of land involved

X. SIGNATURE OF ATTORNEY (OR PRO PER):

Lawrence M. Hadley
Lawrence M. Hadley

Date

5/8/2012

Notice to Counsel/Parties: The CV-71 (JS-44) Civil Cover Sheet and the information contained herein neither replace nor supplement the filing and service of pleadings or other papers as required by law. This form, approved by the Judicial Conference of the United States in September 1974, is required pursuant to Local Rule 3 -1 is not filed but is used by the Clerk of the Court for the purpose of statistics, venue and initiating the civil docket sheet. (For more detailed instructions, see separate instructions sheet.)

ATTACHMENT A

ATTACHMENT A TO CIVIL COVER SHEET

DEFENDANTS:

APPLE, INC.

MOTOROLA, INC.

AMAZON.COM, INC.

BARNES & NOBLE, INC.

BARNESANDNOBLE.COM LLC

BARNESANDNOBLE.COM INC.

DELL INC.

HEWLETT-PACKARD COMPANY

HTC CORP. a/k/a HIGH TECH COMPUTER CORP.

HTC (B.V.I.) CORP.

HTC AMERICA, INC.

EXEDEA, INC.

LG ELECTRONICS, INC.

LG ELECTRONICS USA, INC.

LG ELECTRONICS MOBILECOMM U.S.A., INC.

LENOVO GROUP, LTD.

LENOVO HOLDING COMPANY, INC.

LENOVO (UNITED STATES) INC.

PALM, INC.

PANTECH CORP. f/k/a PANTECH CO., LTD.

PANTECH WIRELESS, INC.

RESEARCH IN MOTION LIMITED

RESEARCH IN MOTION CORPORATION

SAMSUNG ELECTRONICS CO., LTD.

SAMSUNG SEMICONDUCTOR, INC.

SAMSUNG ELECTRONICS AMERICA, INC.

SAMSUNG TELECOMMUNICATIONS AMERICA, LLC

SIERRA WIRELESS, INC.

**ATTACHMENT A TO CIVIL COVER SHEET
(Cont'd)**

SIERRA WIRELESS AMERICA, INC.

SONY KABUSHIKI KAISHA a/k/a SONY CORPORATION

SONY ELECTRONICS, INC.

SONY CORPORATION OF AMERICA

SONY MOBILE COMMUNICATIONS AB

SONY MOBILE COMMUNICATIONS (USA) INC.

ZTE CORPORATION

ZTE (USA) INC.

ZTE SOLUTIONS INC.

ATTACHMENT B

ATTACHMENT B TO CIVIL COVER SHEET

1. Defendant Apple, Inc. is a California corporation with its principal place of business located at One Infinite Loop, Cupertino, California 95014.
2. Defendant Motorola, Inc. is a Delaware corporation with its principal place of business 1303 East Algonquin Road, Schaumburg, Ill. 60196.
3. Defendant Barnes & Noble, Inc. is a Delaware corporation and its registered agent for service of process is Capital Services, Inc., 615 South DuPont Highway, Dover, Delaware 19901.
4. Defendant Barnesandnoble.com LLC is a wholly owned subsidiary of Barnes & Noble, Inc. and is a Delaware limited liability company with its principal place of business at 122 Fifth Avenue, New York, NY 10011.
5. Defendant Barnesandnoble.com Inc. is a subsidiary of Barnes & Noble, Inc. Barnesandnoble.com Inc. is a Delaware corporation with business operations at 122 Fifth Avenue, New York, New York 10011.
6. Defendant Dell Inc. is a Delaware corporation with its principal place of business at One Dell Way, Round Rock, Texas 78682.
7. Defendant Hewlett-Packard Company is a Delaware corporation with a principal palace of business at 3000 Hanover Street, Palo Alto, California 94304.
8. Defendant HTC Corp. a/k/a High Tech Computer Corp. is a Chinese corporation with its principal place of business located at No. 23, Xinghua Rd., Taoyuan City, Taoyuan County 330, Taiwan, Republic of China.
9. Defendant HTC (B.V.I.) Corp. is a wholly-owned subsidiary of Defendant HTC Corp. and is incorporated under the laws of the British Virgin Islands with its principal place of business at 3F, Omar Hodge Building, Wickhams Cay I, P.O. Box 362, Road Town, Tortola, British Virgin Islands.

ATTACHMENT B TO CIVIL COVER SHEET

(Cont'd)

10. Defendant HTC America, Inc. is a wholly-owned subsidiary of Defendant HTC BVI and is incorporated under the laws of the State of Washington, with its principal place of business at 13920 SE Eastgate Way, Suite 400, Bellevue, Washington 98005.
11. Defendant Exedea, Inc. is a wholly-owned subsidiary of HTC BVI and is incorporated under the laws of the State of Texas with its principal place of business at 5950 Corporate Drive, Houston, Texas 77036.
12. Defendant LG Electronics, Inc. is a Korean corporation with a principal place of business at LG Twin Towers 20, Yeouido-dong, Yeongdeunspo-gu, Seoul 150-721, South Korea.
13. Defendant LG Electronics USA, Inc. is a wholly owned subsidiary of LG Electronics, Inc. and is Delaware corporation with its principal place of business at 1000 Sylvan Avenue, Englewood Cliffs, New Jersey 07632.
14. Defendant LG Electronics MobileComm U.S.A, Inc. is a wholly owned subsidiary of LG Electronics, Inc. LG Electronics MobileComm U.S.A., Inc. is a California corporation with its principal place of business at 920 Sylvan Avenue, Englewood Cliffs, New Jersey 07632.
15. Defendant Lenovo Group Ltd. is a Chinese company, with its principal place of business at No. 6 ChuangYe Road, Shangdi Information Industry Base, Haidan District, Beijing, China 100085.
16. Defendant Lenovo Holding Company, Inc. is a wholly owned subsidiary of Lenovo Group Ltd. and is a corporation organized and existing under the laws of the State of Delaware with a principal place of business at 1009 Think Place, Morrisville, North Carolina 27560.
17. Defendant Lenovo (United States) Inc. is a wholly owned subsidiary of Lenovo Group Ltd. Lenovo (United States) Inc. is a Delaware corporation with a principal place of business at 1009 Think Pl., Morrisville, North Carolina 27560.

ATTACHMENT B TO CIVIL COVER SHEET

(Cont'd)

18. Defendant Palm, Inc. is a Delaware corporation with its principal place of business at 950 West Maude Ave., Sunnyvale, California 94085.
19. Defendant Pantech Corp. f/k/a Pantech Co., Ltd. is a Korean corporation with its principal place of business located at Pantech R&D Center, I-2 DMC Sangam-dong, Mapo-gu, Seoul, 415865, South Korea.
20. Defendant Pantech Wireless, Inc. is a subsidiary of Pantech Co., Ltd. Pantech Wireless, Inc. is a Georgia corporation with its principal place of business located at 5607 Glendridge Drive, Atlanta, Georgia 30342.
21. Defendant Research In Motion Limited ("RIM") is a Canadian corporation with a principal place of business at 295 Phillip Street, Waterloo, Ontario, N2L 3W8, Canada.
22. Defendant Research In Motion Corporation is a wholly owned subsidiary of Research In Motion Limited. Research In Motion Corporation is a Delaware corporation with a principal place of business at 122 W. John Carpenter Parkway, Suite 430, Irving, Texas 75039.
23. Defendant Samsung Electronics Co., Ltd. is a business entity organized under the laws of South Korea with its principal place of business at Samsung Electronics Building, 1320-10 Seocho 2-dong, Seocho-gu, Seoul, Korea.
24. Defendant Samsung Semiconductor, Inc. is a wholly owned subsidiary of Samsung Electronics Co., Ltd. Samsung Semiconductor, Inc. is a California corporation with its principal place of business at 3655 North First Street, San Jose, California 95134-1713.
25. Defendant Samsung Electronics America, Inc. is a wholly owned subsidiary of Samsung Electronics Co., Ltd. Samsung Electronics America, Inc. is a New York corporation with its principal place of business at 105 Challenger Road, Ridgefield Park, New Jersey 07660.

ATTACHMENT B TO CIVIL COVER SHEET

(Cont'd)

26. Defendant Samsung Telecommunications America, LLC is a wholly owned subsidiary of Samsung Electronics Co., Ltd. Samsung Telecommunications America, LLC is a Delaware limited liability company with its principal place of business at 1301 E. Lookout Drive, Richardson, Texas 75082.
27. Defendant Sierra Wireless, Inc. is a Canadian corporation with its principal place of business at 13811 Wireless Way, Richmond, B.C. VDV 3A4, Canada.
28. Defendant Sierra Wireless America, Inc. is a subsidiary of Sierra Wireless, Inc. Sierra Wireless America, Inc. is a Delaware corporation with a principal place of business is at 2200 Faraday Avenue, Suite 150, Carlsbad, California 92008.
29. Defendant Sony Kabushiki Kaisha a/k/a Sony Corporation is a Japanese corporation with its principal place of business at 7-1 Konan 1-Come, Minato-Ku, Tokyo, 108-0075, Japan.
30. Defendant Sony Corporation of America is a subsidiary of Sony Corporation. Sony Corporation of America is a New York corporation with its principal place of business at 550 Madison Ave., New York, NY 10022.
31. Defendant Sony Electronics, Inc. is a subsidiary of Sony Corporation. Sony Electronics, Inc. is a Delaware corporation with its principal place of business at 555 Madison Avenue, Fl. C, New York, NY 10022.
32. Defendant Sony Mobile Communications AB is a Swedish Limited Liability Company with its principal place of business in Hammersmith, London, United Kingdom.
33. Defendant Sony Mobile Communications (USA) Inc. is a Delaware corporation with its principal place of business located at 7001 Development Drive, Research Triangle, North Carolina 27709.
34. Defendant ZTE Corporation is a Chinese corporation with its principal place of business at No. 55, Hi-tech Road South, Shenzhen, P.R. China 518057.

ATTACHMENT B TO CIVIL COVER SHEET

(Cont'd)

35. Defendant ZTE (USA) Inc. is a subsidiary of ZTE Corporation. ZTE (USA) Inc. is a New Jersey corporation with business operations at 33 Wood Ave. South, Floor 2, Iselin, New Jersey 08830.
36. Defendant ZTE Solutions Inc. is a subsidiary of ZTE Corporation. ZTE Solutions Inc. is a Delaware corporation with business operations at 2425 N. Central Expressway, Suite 600, Richardson, Texas 75080.