IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION

UNILOC USA, INC. and UNILOC LUXEMBOURG, S.A.,	§ § § §	Civil Action No. 1:18-cv-00163-LY
Plaintiffs,	§ §	
v.	§ §	PATENT CASE
APPLE INC.,	§ § §	
Defendant.	§ § §	

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiffs, Uniloc USA, Inc. ("Uniloc USA") and Uniloc Luxembourg, S.A. ("Uniloc Luxembourg") (together, "Uniloc"), for their first amended complaint against defendant, Apple Inc. ("Apple"), allege as follows:

THE PARTIES

1.   Uniloc USA is a Texas corporation having a principal place of business at Legacy Town Center I, Suite 380, 7160 Dallas Parkway, Plano, Texas 75024.

2.   Uniloc Luxembourg is a Luxembourg public limited liability company having a principal place of business at 15, Rue Edward Steichen, 4th Floor, L-2540, Luxembourg (R.C.S. Luxembourg B159161).

3.   Apple is a California corporation, having a principal place of business in Cupertino, California and regular and established places of business at 12535 Riata Vista Circle and 5501 West Parmer Lane, Austin, Texas. Apple offers its products and/or services, including

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those accused herein of infringement, to customers and potential customers located in Texas and in the judicial Western District of Texas.

JURISDICTION

4.   Uniloc brings this action for patent infringement under the patent laws of the United States, 35 U.S.C. § 271, *et seq.* This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331, 1332(a), and 1338(a).

COUNT I
(INFRINGEMENT OF U.S. PATENT NO. 7,020,106)

5.   Uniloc incorporates paragraphs 1-4 above by reference.

6.   Uniloc Luxembourg is the owner, by assignment, of U.S. Patent No. 7,020,106("the '106 Patent"), entitled RADIO COMMUNICATION SYSTEM, which issued on March 28, 2006. A copy of the '106 Patent is attached as Exhibit A.

7.   Uniloc USA is the exclusive licensee of the '106 Patent, with ownership of all substantial rights, including the right to grant sublicenses, to exclude others, and to enforce and recover past damages for infringement.

8.   The '106 Patent describes in detail and claims in various ways inventions in systems and devices developed by Koninklijke Philips Electronics N.V. around 2000 for improved communication of data therebetween.

9.   The '106 Patent describes problems and shortcomings in the then-existing field of communications between portable devices and describes and claims novel and inventive technological improvements and solutions to such problems and shortcomings. The technological improvements and solutions described and claimed in the '106 Patent were not conventional or generic at the time of their respective inventions but involved novel and non-obvious approaches to the problems and shortcomings prevalent in the art at the time.

10.   The inventions claimed in the '106 Patent involve and cover more than just the performance of well-understood, routine and/or conventional activities known to the industry prior to the invention of such novel and non-obvious systems and devices by the '106 Patent inventors.

11.   The inventions claimed in the '106 Patent represent technological solutions to technological problems. The written description of the '106 Patent describes in technical detail each of the limitations of the claims, allowing a person of ordinary skill in the art to understand what the limitations cover and how the non-conventional and non-generic combination of claim elements differed markedly from and improved upon what may have been considered conventional or generic.

12.   Apple imports, uses, offers for sale, and sells in the United States electronic devices that utilize Bluetooth version 3.0 + HS and above. Such devices include: (1) iPhone 4s, iPhone5, iPhone 5c, iPhone 5s, iPhone 6, iPhone 6 Plus, iPhone 6s, iPhone 6s Plus, iPhone SE, iPhone 7, iPhone 7 Plus, iPhone 8, iPhone 8 Plus, iPhone X smartphones; (2) iPad (3rd, 4th and 5th generation), iPad Mini, iPad Mini 2, iPad Mini 3, iPad Mini 4, iPad Pro, iPad Air, iPad Air 2 tablets; (3) MacBook, MacBook Air (11 inches, 13 inches), MacBook Pro (13 and 15 inches), iMac (21.5 and 27 inches), Mac Mini, Mac Pro laptops; (4) Apple Watch (1st generation), Apple watch Series 1, Apple watch series 2, Apple watch series 3, Apple watch Hermes (series 1, 2, 3), Apple watch Edition (series 2 and 3) watches; (5) iPod (generation 5), iPod touch (5th and 6th gen), iPod nano; (6) Apple TV (2nd gen, 3rd gen, 4th gen) and Apple TV 4K, and (7) Airpods (collectively, "Accused Infringing Devices").

13.   The Accused Infringing Devices are portable electronic devices capable of wirelessly sending and receiving messages between such devices using a plurality of

communication modes and links, for example in accordance with Bluetooth 3.0 + HS and above, wherein a third such link is used if the first or second such link is unavailable.

14.   Apple has infringed, and continues to infringe, claims of the '106 Patent in the United States, including claims 15-17, by making, using, offering for sale, selling and/or importing the Accused Infringing Devices in violation of 35 U.S.C. §271(a).

15.   Using claim 15 merely as an illustrative example, the Accused Infringing Devices include each and every element thereof. For instance, the Accused Infringing Devices comprise a communication station for communication with a further station. For example, the Accused Infringing Devices include Bluetooth/WiFi modules compatible with the Bluetooth Core Specification v. 3.0 + HS and above, which allows two or more devices to establish communication channels between themselves.

BLUETOOTH SPECIFICATION Version 3.0 + HS [Vol 1]	page 59 of 110
Architecture	❋ Bluetooth®

4 COMMUNICATION TOPOLOGY

4.1 PICONET TOPOLOGY

Any time a link is created using the BR/EDR Controller it is within the context of a piconet. A piconet consists of two or more devices that occupy the same BR/EDR physical channel.

Connected BR/EDR devices communicate on the same physical channel by synchronizing on a common clock and hopping sequence. The common (piconet) clock is identical to the Bluetooth clock of one of the devices in the piconet, known as the master of the piconet, and the hopping sequence is derived from the master's clock and the master's Bluetooth device address. All other synchronized devices are referred to as slaves in the piconet.

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 59.

16.   The Accused Infringing Devices comprise a first transceiver configured to at least one of transmit first information over a first communication link in a first mode, and receive second information over a second communication link in said first mode. For example, each of the Accused Infringing Devices include a Bluetooth/WiFi module capable of operating in Basic Rate/Enhanced Data Rate (BR/EDR) mode, where data is sent from the Master device to a Slave device (or vice versa) using the Master's transceiver. The receiving Slave device, using Time-Division Duplexing (TDD), is then able to send data back to its Master via a second communication link clocked to be in sync with the Master.

1.1   OVERVIEW OF BR/EDR OPERATION

The Basic Rate / Enhanced Data Rate (BR/EDR) RF (physical layer) operates in the unlicensed ISM band at 2.4 GHz. The system employs a frequency hop transceiver to combat interference and fading and provides many FHSS carriers. Basic Rate RF operation uses a shaped, binary frequency modulation to minimize transceiver complexity. The symbol rate is 1 Megasymbol per second (Ms/s) supporting the bit rate of 1 Megabit per second (Mb/s) or, with Enhanced Data Rate, a gross air bit rate of 2 or 3Mb/s. These modes are known as Basic Rate and Enhanced Data Rate respectively.

During typical operation a physical radio channel is shared by a group of devices that are synchronized to a common clock and frequency hopping pat-

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 15.

Bluetooth BR/EDR

The point-to-point topology available on *Bluetooth*® Basic Rate/Enhanced Data Rate (BR/EDR) is used for establishing one-to-one (1:1) device communications and is optimized for audio streaming, making it ideal for wireless speakers, headsets, and hands-free in-car systems.

https://www.bluetooth.com/bluetooth-technology/topology-options/point-to-point .

The physical channel is sub-divided into time units known as slots. Data is transmitted between Bluetooth devices in packets, that are positioned in these slots. When circumstances permit, a number of consecutive slots may be allocated to a single packet. Frequency hopping takes place between the transmission or reception of packets. Bluetooth technology provides the effect of full duplex transmission through the use of a Time-Division Duplex (TDD) scheme.

Above the physical channel there is a layering of links and channels and associated control protocols. The hierarchy of channels and links from the physical channel upwards is physical channel, physical link, logical transport, logical link and L2CAP channel. These are discussed in more detail in Section 3.3 on page 40 to Section 3.6 on page 58 but are introduced here to aid the understanding of the remainder of this section.

Within a physical channel, a physical link is formed between any two devices that transmit packets in either direction between them. In a piconet physical channel there are restrictions on which devices may form a physical link. There is a physical link between each slave and the master. Physical links are not formed directly between the slaves in a piconet.

The physical link is used as a transport for one or more logical links that support unicast synchronous, asynchronous and isochronous traffic, and broadcast traffic. Traffic on logical links is multiplexed onto the physical link by occupying slots assigned by a scheduling function in the resource manager.

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 15.

Piconet Physical Channel	A Channel that is divided into time slots in which each slot is related to an RF hop frequency. Consecutive hops normally correspond to different RF hop frequencies and occur at a standard hop rate of 1600 hops/s. These consecutive hops follow a pseudo-random hopping sequence, hopping through a 79 RF channel set, or optionally fewer channels when Adaptive Frequency Hopping (AFH) is in use.

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 21.

> During typical operation a physical radio channel is shared by a group of devices that are synchronized to a common clock and frequency hopping pattern. One device provides the synchronization reference and is known as the master. All other devices are known as slaves. A group of devices synchronized in this fashion form a piconet. This is the fundamental form of communication in the Bluetooth wireless technology.

Bluetooth Core Specification v. 3.0 + HS, Vol 1, pp. 15-16.

17.   The Accused Products comprise at least one of a transmitter and receiver configured to at least one of transmit and receive third information over a third communication link in a second mode. See paragraphs 16-17 above. In addition, for instance, the Accused Infringing Devices include Bluetooth modules capable of discovering whether the Master and Slave devices include 802.11 WiFi compatibility, and if so, a third communication link can be established, over which data can be transferred at a higher rate of speed, as shown below.
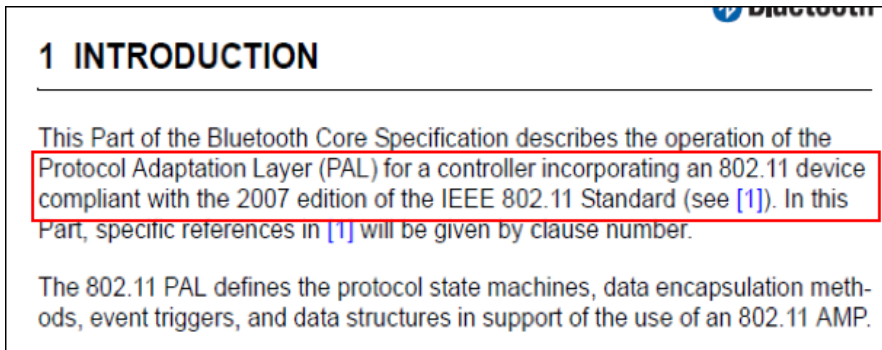
1.2 OVERVIEW OF AMP OPERATION

Alternate MAC/PHYs (AMP) are secondary Controllers in the Bluetooth core system. The BR/EDR radio, the primary radio, is used to perform discovery, association, connection establishment, and connection maintenance. Once an L2CAP connection has been established between two devices over the BR/EDR radio, the AMP Managers can discover the AMPs that are available on the other device. When an AMP is common between the two devices , the Core system provides mechanisms for moving data traffic from BR/EDR Controller to an AMP Controller.

Each AMP consists of a Protocol Adaptation Layer (PAL) on top of a MAC and PHY. The PAL is responsible for mapping the Bluetooth protocols and behavior (as specified by HCI) to the specific protocols of the underlying MAC and PHY.

L2CAP channels may be created on, or moved to, an AMP. L2CAP channels may also be moved back to the BR/EDR radio when those capabilities are not necessary or when the AMP physical link has a link supervision timeout. A link supervision timeout on the BR/EDR radio forces a disconnection of all AMP physical links between those devices.

AMPs may be enabled or disabled as needed in order to minimize power consumption in the system.

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 17.

1 INTRODUCTION

This Part of the Bluetooth Core Specification describes the operation of the Protocol Adaptation Layer (PAL) for a controller incorporating an 802.11 device compliant with the 2007 edition of the IEEE 802.11 Standard (see [1]). In this Part, specific references in [1] will be given by clause number.

The 802.11 PAL defines the protocol state machines, data encapsulation methods, event triggers, and data structures in support of the use of an 802.11 AMP.

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 15.

The Bluetooth core system consists of a Host and one or more Controllers. A Host is defined as all of the layers below the profiles and above the Host Controller Interface (HCI). A Controller is defined as all of the layers below HCI. Two types of Controllers are defined in this version of the Core Specification:

* a Basic Rate / Enhanced Data Rate Controller including the Radio, Baseband, Link Manager and optionally HCI

* an Alternate MAC/PHY (AMP) Controller including the AMP PAL (Protocol Adaptation Layer), AMP MAC, Protocol Adaptation Layer (PAL), and optionally HCI.
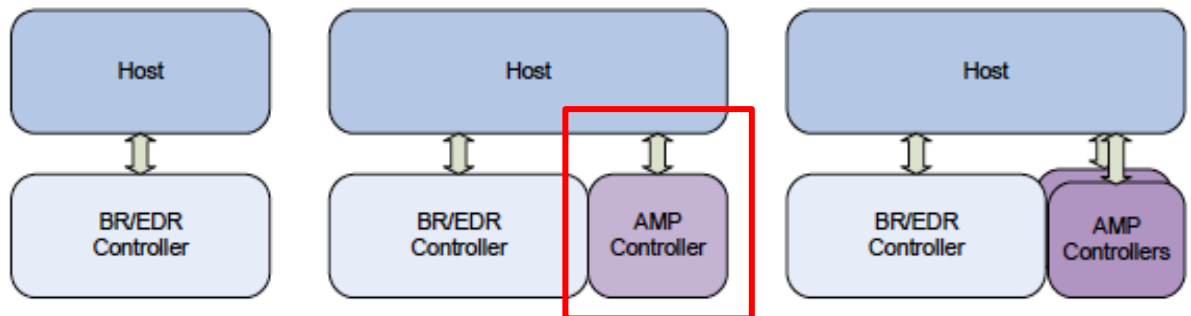
Figure 1.1: Bluetooth Host and Controller Combinations: BR/EDR only, BR/EDR with one AMP, and BR/EDR with multiple AMPs

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 15.

18.   The Accused Infringing Devices operate wherein when at least one of the first communication link and the second communication link is not available, then at least one of the first information and the second information is communicated to said communication station via the third communication link in the second mode.   See paragraph 18 above.   In addition, after the

Master and Slave devices have discovered each other and paired using the BR/EDR Controller, and it is determined that an AMP Controller can be utilized for higher speed data transmission, the alternate L2CAP channel is established/switched to, which thereafter handles the transfer of information, as illustrated below.

1.2   OVERVIEW OF AMP OPERATION

Alternate MAC/PHYs (AMP) are secondary Controllers in the Bluetooth core system. The BR/EDR radio, the primary radio, is used to perform discovery, association, connection establishment, and connection maintenance. Once an L2CAP connection has been established between two devices over the BR/EDR radio, the AMP Managers can discover the AMPs that are available on the other device. When an AMP is common between the two devices , the Core system provides mechanisms for moving data traffic from BR/EDR Controller to an AMP Controller.

Each AMP consists of a Protocol Adaptation Layer (PAL) on top of a MAC and PHY. The PAL is responsible for mapping the Bluetooth protocols and behavior (as specified by HCI) to the specific protocols of the underlying MAC and PHY.

L2CAP channels may be created on, or moved to, an AMP. L2CAP channels may also be moved back to the BR/EDR radio when those capabilities are not necessary or when the AMP physical link has a link supervision timeout. A link supervision timeout on the BR/EDR radio forces a disconnection of all AMP physical links between those devices.

AMPs may be enabled or disabled as needed in order to minimize power consumption in the system.

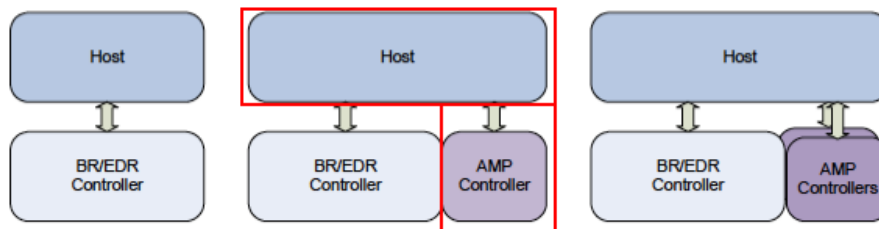Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 17.

Figure 1.1: Bluetooth Host and Controller Combinations: BR/EDR only, BR/EDR with one AMP, and BR/EDR with multiple AMPs

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 17.

1.1 L2CAP FEATURES

The functional requirements for L2CAP include protocol/channel multiplexing, segmentation and reassembly (SAR), per-channel flow control, and error control. L2CAP sits above a lower layer composed of a BR/EDR Controller and zero or more AMP Controllers. It interfaces with upper layer protocols.

Bluetooth Core Specification v. 3.0 + HS, Vol 3, p. 26.

- *Protocol/channel multiplexing*

  L2CAP supports multiplexing over individual Controllers and across multiple controllers. An L2CAP channel shall operate over one Controller at a time.

  During channel setup, protocol multiplexing capability is used to route the connection to the correct upper layer protocol.

  For data transfer, logical channel multiplexing is needed to distinguish between multiple upper layer entities. There may be more than one upper layer entity using the same protocol.

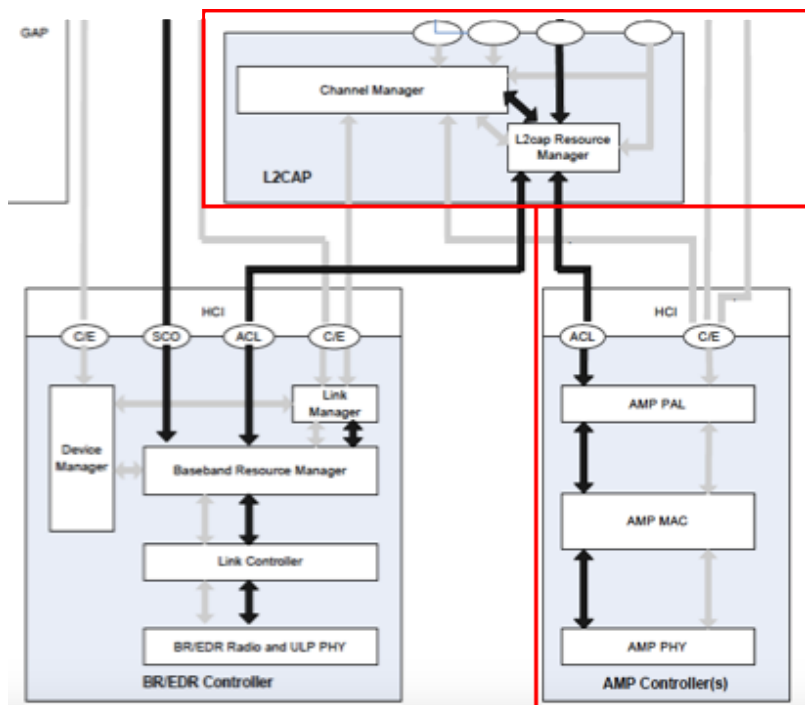Bluetooth Core Specification v. 3.0 + HS, Vol 3, p. 27.

Figure 2.1 on page 24 shows the Core layers, each with its associated communication protocol. The Link Manager, Link Controller and BR/EDR Radio layers are known as the BR/EDR controller. An AMP PAL, AMP MAC, and AMP PHY are known as an AMP Controller. This is a common implementation involving a standard physical communications interface between the Controller and remainder of the Bluetooth system including the L2CAP, service and

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 24.

19.   The Accused Infringing Devices operate wherein at least one of the first

transceiver and the transmitter is configured for transmitting specification information about a

radio interface specification defining the second mode. See paragraphs 16-19 above. In addition,

when the Accused Infringing Devices determine that an AMP Controller can be utilized to

establish an alternate L2CAP channel, the AMP Controller information necessary to form/switch

to the alternate L2CAP channel supported by the AMP Controller is transmitted/received, as

described below.

> Once an ACL connection is established over the Primary BR/EDR Controller, the local AMP Manager shall examine the L2CAP extended features bits of the remote device to determine if L2CAP fixed channels are supported (see [Part A], Logical Link Control and Adaptation Protocol Specification, Section 4.12 on page 65). If so, a query for the existence of its peer (AMP Manager) may be made by issuing an Information Request for all available fixed channels.

Bluetooth Core Specification v. 3.0 + HS, Vol 3, p. 369.

2.3.3 Creation of AMP Physical Links

Once it has been determined that a Bluetooth connection over an AMP is desired, the AMP Manager retrieves the remote AMP Controller's AMP_Assoc structure by issuing an AMP Get AMP Assoc Request packet. It then passes the AMP_Assoc structure received from the remote device to its local AMP PAL and signals it to begin the physical discovery and connection process. In devices that support HCI this is done via the HCI_Create_Physical_Link command followed by the HCI_Write_Remote_AMP_ASSOC command.

Bluetooth Core Specification v. 3.0 + HS, Vol 3, p. 370.

2.14.1 AMP_ASSOC Structure

The AMP_ASSOC is an AMP type specific structure and appears in various HCI commands and events. The AMP_ASSOC structure used by the 802.11 PAL shall be composed of Type-Length-Value (TLV) triplets.

The general format of such a TLV, shown in Table 2.1, shall be a one-octet TypeID field, a two-octet Length field, and a variable length Value field. The length of the Value field in octets shall be exactly equal to the unsigned number represented by the Length field. A TLV with zero in its Length field shall contain no Value field. If an implementation does not have support for a triplet in a received AMP_ASSOC, it shall ignore the triplet and continue processing any remaining triplets.

Bluetooth Core Specification v. 3.0 + HS, Vol 5, p. 21.

The set of defined TypeIDs is given in Table 2.2

TypeID codepoint	Description	AMP_ASSOC inclusion
0x00	Reserved	NA
0x01	MAC address	Mandatory
0x02	Preferred channel list	Mandatory
0x03	Connected channel	Optional
0x04	802.11 PAL Capabilities list	Optional
0x05	802.11 PAL version	Mandatory
0x06 - 0xFE	Reserved	NA
0xFF	Reserved for use in debugging	NA

Table 2.2: TypeIDs used for 802.11 AMP TLVs

Bluetooth Core Specification v. 3.0 + HS, Vol 5, p. 22.

20.   The Accused Products comprise said specification information being transmitted to said further station via at least one of said first communication link and said second communication link. See paragraphs 16-20 above. In addition, for example, the AMP Controller information is sent via the BR/EDR radio.

1.2 OVERVIEW OF AMP OPERATION

Alternate MAC/PHYs (AMP) are secondary Controllers in the Bluetooth core system. The BR/EDR radio, the primary radio, is used to perform discovery, association, connection establishment, and connection maintenance. Once an L2CAP connection has been established between two devices over the BR/EDR radio, the AMP Managers can discover the AMPs that are available on the other device. When an AMP is common between the two devices , the Core system provides mechanisms for moving data traffic from BR/EDR Controller to an AMP Controller.

Each AMP consists of a Protocol Adaptation Layer (PAL) on top of a MAC and PHY. The PAL is responsible for mapping the Bluetooth protocols and behavior (as specified by HCI) to the specific protocols of the underlying MAC and PHY.

L2CAP channels may be created on, or moved to, an AMP. L2CAP channels may also be moved back to the BR/EDR radio when those capabilities are not necessary or when the AMP physical link has a link supervision timeout. A link supervision timeout on the BR/EDR radio forces a disconnection of all AMP physical links between those devices.

AMPs may be enabled or disabled as needed in order to minimize power consumption in the system.

Bluetooth Core Specification v. 3.0 + HS, Vol 1, p. 17.

21.   Apple has been on notice of the '106 patent, and its and its customers' infringement therefore since at the latest the service of the original Complaint. Apple has also been on notice of Uniloc's infringement allegations and theory of infringement since that date, and thus has known that its continued actions would contribute to the infringement of claims of the '106 patent.

22.   Apple has actively induced, and continues to actively induce, infringement by others, including customers using the Accused Infringing Devices, by encouraging them to use, and instructing them how to use, those devices that Apple has intentionally designed and programmed to operate in accordance with the Bluetooth 3.0 + HS and above protocols whereby the devices infringe the asserted claims of the '106 Patent.

23.   Apple's customers who use those devices in accordance with Apple's design and intentions infringe claims of the '106 Patent. Apple intentionally instructs its customers to infringe through training videos, demonstrations, brochures, specifications and installation and user guides, such as those located at:

- www.apple.com/iphone-x/specs/

- www.apple.com/iphone-8/specs/

- www.apple.com/iphone-7/specs/

- www.apple.com/iphone-6s/specs/

- www.apple.com/iphone-se/specs/

- www.apple.com/ipad-pro/specs/

- www.apple.com/ipad-9.7/specs/

- www.apple.com/ipad-mini-4/specs/

- www.apple.com/watch/

- https://support.apple.com/kb/sp766?locale=en-US

- https://support.apple.com/kb/sp744?locale=en-US

- https://support.apple.com/kb/sp746?locale=en-US

- https://support.apple.com/en-US/specs/macnotebooks/

24.   In its marketing and instructional materials, including those identified above, Apple specifically and intentionally instructs its customers to use the Apple Wireless Devices in an infringing manner. Apple has intentionally designed and sells the Accused Infringing Devices to automatically operate in normal mode in compliance with the Bluetooth 3.0 + HS and above protocols in violation of the '106 Patent:

All models   802.11ac Wi-Fi with MIMO

www.apple.com/iphone-8/specs/

25.   Apple intends and knows that its customers use the Accused Infringing Devices to operate in compliance with the Bluetooth 3.0 + HS and above protocols. When the Accused Infringing Devices are used as intended by Apple, Apple intentionally induces such infringement.

26.   Apple has known and intended, since service of the original Complaint, that its continuing encouragement and instructions to perform those infringing acts would induce performance of the infringing acts by others, including customers. Despite that knowledge, and as evidence of its intent, Apple has refused to discontinue the inducing acts and refused to remove the infringing functionality from the Accused Infringing Devices.

27.   Apple has also infringed, and continues to infringe, claims 15-17 of the '106 patent by offering to commercially distribute, commercially distributing, or importing the

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Accused Infringing Devices which devices are used in practicing the processes, or using the

systems, of the '106 patent, and constitute a material part of the invention. For example, the

Accused Infringing Devices include software for allowing two or more devices to establish

communication channels between themselves as claimed in at least claims 15-17 ("Infringing

Software"), which is packaged with other software in the Accused Infringing Devices.   Apple

knows that the Infringing Software is especially made or especially adapted for use in

infringement of the '106 patent, not a staple article, and not a commodity of commerce suitable

for substantial non-infringing use. Apple is thereby liable for infringement of the '106 Patent

under 35 U.S.C. § 271(c).

28.   Apple has been on notice of the '106 Patent and its infringement and its

customers' infringement therefore, since at the latest the service of the original complaint upon

it. By the time of trial, Apple will have known and intended (since receiving such notice) that its

continued actions would actively induce and contribute to the infringement of claims 15-17 of

the '106 Patent.

29.   Apple may have infringed the '106 Patent through other software and devices

utilizing the same or reasonably similar functionality, including other versions of the Accused

Infringing Devices.

30.   Uniloc has been damaged by Apple's infringement of the '106 Patent.

PRAYER FOR RELIEF

 Uniloc requests that the Court enter judgment against Apple:

(A)   declaring that Apple has infringed the '106 Patent;

(B)   awarding Uniloc its damages suffered as a result of Apple's infringement of the

'106 Patent;

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(C) awarding Uniloc its costs, attorneys' fees, expenses, and interest, and

(D) granting Uniloc such further relief as the Court finds appropriate.

Date: May 30, 2018   Respectfully submitted,

           /s/ Kevin Gannon
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           Massachusetts State Bar No. 553285
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         ATTORNEYS FOR THE PLAINTIFFS

CERTIFICATE OF SERVICE

   I certify that all counsel of record who have consented to electronic service are being served with a copy of this document via the Court's CM/ECF system per Local Rule CV-5(a)(3) on May 30, 2018.

           /s/ Kevin Gannon
           Kevin Gannon