

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner

v.

THL HOLDING COMPANY, LLC,
Patent Owner

Case No. IPR2024-00398
Patent No. 11,265,680

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 11,265,680**

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I. INTRODUCTION

Apple Inc. (“Petitioner”) respectfully requests *inter partes* review (“IPR”) of Claims 1-12 and 15-20 (collectively, the “Challenged Claims”) of U.S. Patent No. 11,265,680 (“the ’680 Patent”).

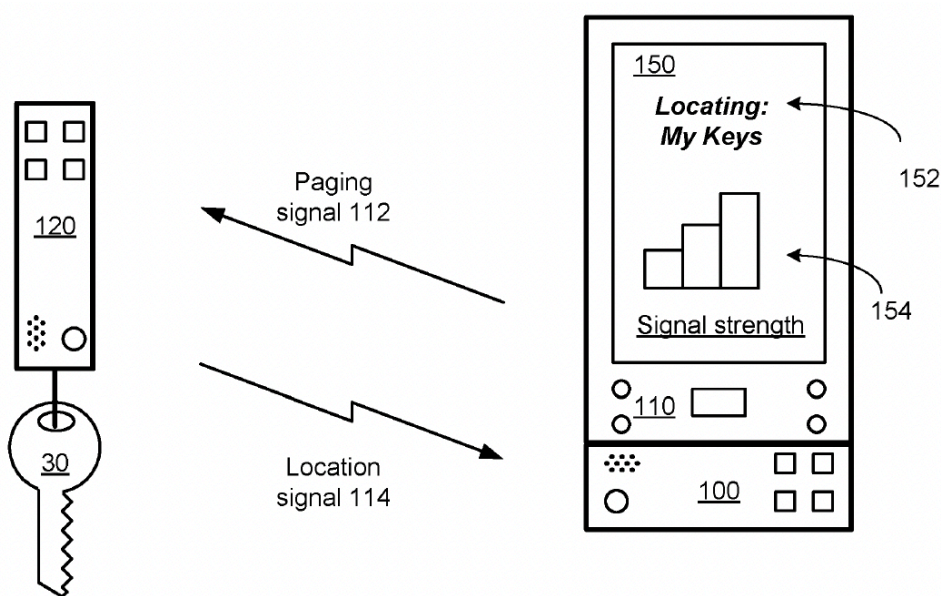
II. SUMMARY OF THE ’680 PATENT

A. Description of the ’680 Patent

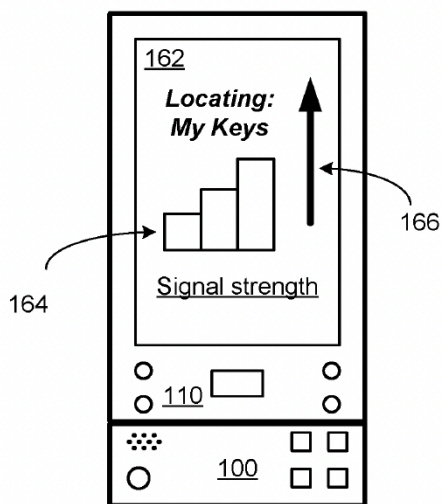
The ’680 Patent describes “a location system for use with a handheld wireless communication device 110[.]” ’680 *Patent* (Ex. 1001), 4:52-54. Device 110 includes long and short-range transceivers for wireless communication and user interfaces, such as a touchscreen. *Id.*, 4:55-64, 5:4-10. An adjunct device 100 couples with wireless communication device 110 and includes a short-range wireless receiver for communicating using various communication protocols, such as Bluetooth or UWB. *Id.*, 5:31-44.

Adjunct device 100 may be used to locate wireless device 120, which can be attached to keys, clothing, etc. *Id.*, 7:38-52. Wireless device 120 also includes a short-range wireless receiver that receives a paging signal 112 transmitted by adjunct device 110 and “emits a detectable alert signal that helps the user locate the personal object” coupled to the wireless device *Id.*, 7:47-52. The detectable alert may be a light or a sound. *Id.*

The wireless device 120 may also transmit “a location signal 114 via short-range wireless transceiver 130, such as a beacon signal or other location signal,” to adjunct device 100. *Id.*, 10:42-44.



Id., Fig. 6. Information from the location signal 114 transmitted by the wireless device and to the adjunct device, such as signal strength information of the location signal or time of flight, is used to determine a distance or direction of the wireless device 120 from the adjunct device 100. *Id.*, 10:53-56, 11:23-27, 11:4-7 (describing time of flight). The signal strength 164 and an indication of direction 166 can be shown on the screen of the wireless communication device 110:



Id., Fig. 8.

B. Field of Endeavor and Problem Solved by the Inventors

The claimed invention of the '680 Patent relates to wireless/mobile communication devices. '680 *Patent*, 2:8-9 (defining the "Technical Field of the Invention" as "relat[ing] to wireless communication devices"), 37:52, 38:53. These wireless/mobile communication devices perform functions relating to transmitting signals in response to user interactions with the device and receiving signals from other wireless devices. *Id.*, Abstract, 5:54-59, 7:52-67, 10:37-59, 15:53-67, 31:18-28, Figs. 1, 4, 6, 16. The wireless communication device performs these functions using wireless transceivers. *Id.*, 4:52-5:4, 8:2-28, Figs. 1, 5. Thus, the field of endeavor of the '680 Patent includes wireless communication devices that send and/or receive wireless signals. *Dec.*, ¶¶44-47.¹

¹ All references to "*Dec.*" are to Exhibit 1003, Declaration of Dr. R. Michael Buehrer.

The '680 Patent is reasonably pertinent to the problem of employing a first wireless device, such as a mobile communication device, to locate a second wireless device. For example, the Detailed Description begins with reference to FIG. 1 and a “location system for use with a handheld wireless communication device,” indicating to a POSITA that at least one problem faced is location determination of a wireless communication device. *'680 Patent*, 4:52-55; *Dec.*, ¶49.

C. Priority and Summary of the Prosecution History

The '680 Patent claims priority to a patent application filed on February 26, 2010. Because the '680 Patent claims the benefit of a filing date before March 16, 2013, Petitioner applies the pre-AIA versions of §§ 102, 103. Petitioner also applies February 26, 2010, as the priority date for the Challenged Claims for purposes of this proceeding.

The '680 Patent did not face any prior art rejection during prosecution. *'680 File History* (Ex. 1002). The '680 Patent only faced a double patenting rejection that applicant overcame by filing a terminal disclaimer. *Id.*, 158-164, 193.

D. Level of Skill of a POSITA

A POSITA at the time of the '680 Patent would have been a person having a bachelor's degree in computer science, computer engineering, electrical engineering, or a similar technical field and 2-4 years of experience with wireless ranging and positioning systems, wireless communication devices, and associated

computer programming. *Dec.*, ¶35. Additional industry experience or technical training may offset less formal education, while advanced degrees or additional formal education may offset lesser levels of industry experience. *Id.*

III. REQUIREMENTS UNDER 37 C.F.R. § 42.104

A. Grounds for Standing Under 37 C.F.R. § 42.104(a)

Petitioner certifies the '680 Patent is eligible for IPR.

B. Identification of Challenge Under 37 C.F.R. § 42.104(b)

The Challenged Claims are unpatentable on the following grounds.

Ground	Claim(s)	35 U.S.C. §	References
1	1, 4, 7-8	103	Kalliola (Ex. 1004) and Vauclair (Ex. 1005)
2	2-3, 6, 10-11, 15-17, 20	103	Kalliola, Vauclair, and Kalayjian (Ex. 1006)
3	5	103	Kalliola, Vauclair, and Turunen (Ex. 1007)
4	18-19	103	Kalliola, Vauclair, Kalayjian, and Turunen
5	9	103	Kalliola, Vauclair, and Trimble (Ex. 1008)
6	12	103	Kalliola, Vauclair, Kalayjian, and Trimble

C. Claim Construction Under 37 C.F.R. § 42.104(b)(3)

In this proceeding, claims are interpreted under the same standard applied by Article III courts (i.e., the *Phillips* standard). 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*). For all terms not included below, Petitioner applies the ordinary and customary meaning of the claim terms as understood by a POSITA.

For purposes of this proceeding only,² Petitioner applies THL’s construction in the parallel litigation:

“A pairing signal” – Processor signal to initiate a wireless device pairing sequence.

THL’s Proposed Constructions (Ex. 1009), 4; *Western Digital Corporation v. Spex Technologies, Inc.*, IPR2018-00084, Paper 14, at 11 (PTAB Apr. 25, 2018) (finding Petition based on claim constructions urged by Patent Owner satisfies the claim construction requirements and that Petitioner is not required to express its subjective agreement regarding correctness of the proffered claim construction or take ownership of the construction); *10X Genomics, Inc. v. Bio-Rad Laboratories, Inc.*, IPR2020-00086, Paper 8, at 19-20 (PTAB Apr. 27, 2020).

² Petitioner’s application of prior art to the Challenged Claims is not a waiver of any argument in litigation that any claim term in the ’680 Patent is indefinite or invalid.

IV. SHOWING OF ANALOGOUS, PRIOR ART

A. Kalliola

Kalliola published on August 23, 2007, qualifying as prior art under § 102(b).

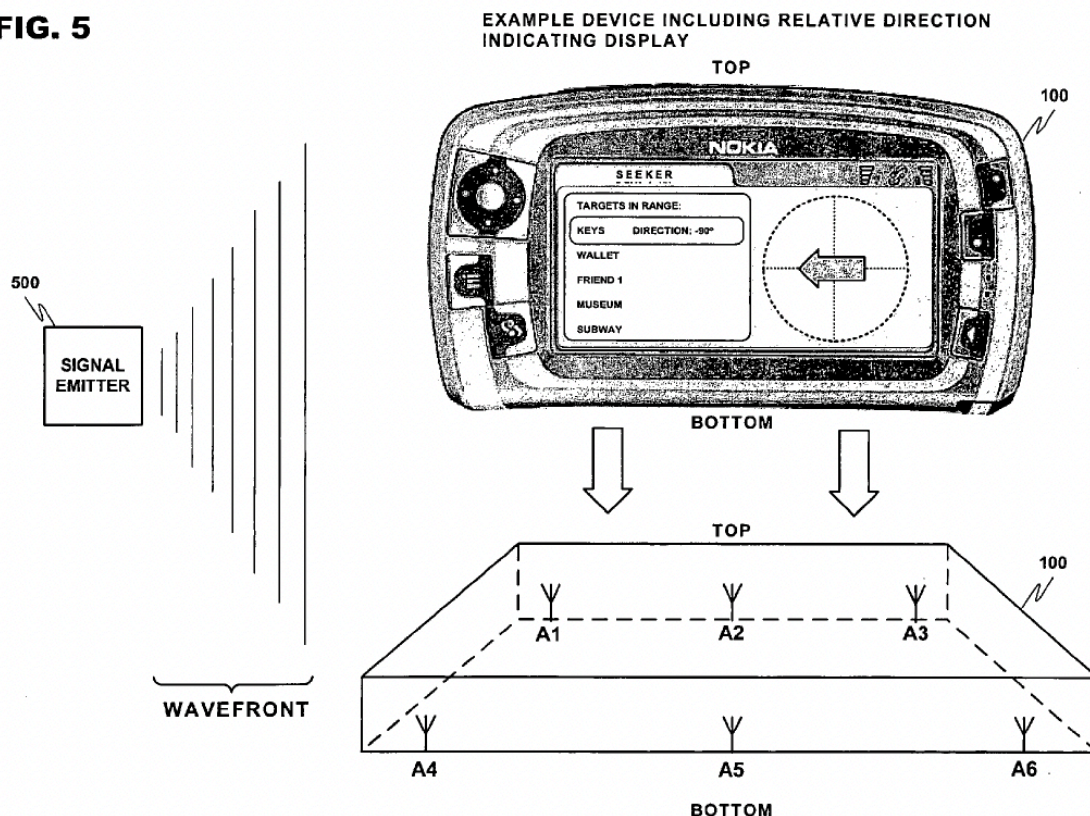
Kalliola was not cited or considered during prosecution of the '680 Patent.

Kalliola teaches that a “person might want to find the current location of a set of keys, a wallet, a jacket, the wireless communication device of another user, etc.” *Kalliola*, [0009]. To solve this problem, Kalliola proposes a “system for indicating the relative direction of a target object or location as determined from the current position of a wireless communication device.” *Id.*, Abstract. The system includes a wireless communication device (WCD) that communicates via near-field (e.g., RFID), short-range (e.g., Bluetooth, WLAN, UWB), and long-range (e.g., cellular) wireless networks and protocols. *Id.*, Fig. 1, [0034]-[0037], [0047], [0049], [0050].

The system also includes remotely-activated signal emitter devices “such as battery-operated transmitters in a keychain, in a wallet, embedded in an ID badge, mounted in a vehicle such as an automobile, motorcycle, scooter, bicycle or in a piece of clothing, may be activated remotely by a user as needed.” *Id.*, [0077]. The signal emitters “operate in a lower power or power conservation mode until a message is received instructing a device to activate the position-indicating transmission signal.” *Id.* The position-indicating signal transmitted by the signal emitter is received by an antenna array on the WCD, and the WCD determines the

direction to the signal emitter, which is displayed for the user as an arrow:

FIG. 5



Id., Fig. 5, [0069].

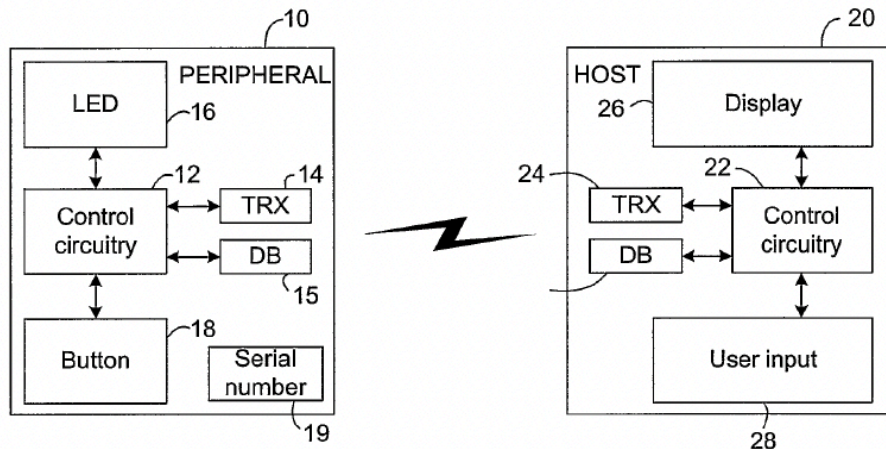
Kalliola is analogous to the claimed invention of the '680 Patent because it is from the same field of endeavor. Kalliola is directed to a mobile communication device that sends/receives wireless signals. *Dec.*, ¶92.

Kalliola is also reasonably pertinent to the particular problem with which the inventor of the '680 Patent was involved because it is directed to solving the same problem. Kalliola proposes using the WCD to help the user locate wireless devices (i.e., signal emitters). *Id.*, ¶93.

B. Vauclair

Vauclair published on December 25, 2008, qualifying as prior art under § 102(b). Vauclair was not cited or considered during the prosecution of the '680 Patent.

Vauclair discloses a pairing process between a first electronic device 10, which “is regarded as a peripheral device,” such as “a mobile telephone handsfree kit,” and a second electronic device 20, which “is regarded as a host device,” such as a “mobile telephone.” *Vauclair*, [0022]. The first and second devices “communicate according to any wireless or wired protocol” including “Bluetooth.” *Id.* Both the peripheral device 10 and the host device 20 include transceiver circuitry *Id.*, [0024], [0028].



Id., Fig. 1.

Vauclair describes a pairing process between the host device 20 and the peripheral device 10 where the host device 20 sends and receives wireless signals from the peripheral device 10. *Id.*, Fig. 2, [0034].

Vauclair is analogous to the claimed invention of the '680 Patent because it is from the same field of endeavor. Vauclair is directed to a host device 20 that sends/receives wireless signals. *Dec.*, ¶98.

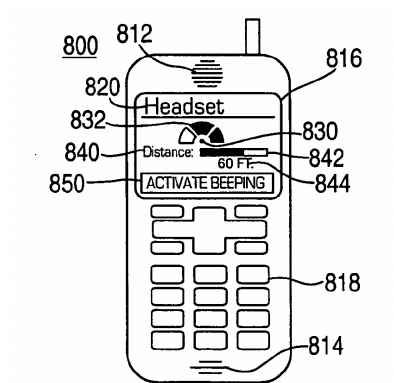
C. Kalayjian

Kalayjian published on May 29, 2008, qualifying as prior art under § 102(b). Kalayjian was not cited or considered during the prosecution of the '680 Patent.

Kalayjian discloses “[a] method and system for locating objects” using an RF (e.g., Bluetooth communications) protocol where a first device, such as a cellular phone, is paired with a second device, such as a wireless Bluetooth headset.² *Kalayjian*, Abstract, [0033]-[0034]. “Master device 310 can transmit a signal to a slave device,” and “[u]pon receiving the signal, the slave device can guide a user to its location and/or notify a user of the distance from master device 310 to the slave device.” *Id.*, [0038]. The second device “guide[s] a user to their location by emitting

² Kalayjian refers to the first device as the “master device” and the second device as the “slave device.” *Kalayjian*, Abstract. Unless quoted, Petitioner refers to the “master device” as the “first device” and the “slave device” as the “second device.”

auditory or visual signals,” which “allows a user to follow the sound or light to the misplaced object.” *Id.*, [0039].



Id., Fig. 8, [0049].

Kalayjian is analogous to the claimed invention of the '680 Patent because it is from the same field of endeavor. Kalayjian is directed to a first device 310 that sends/receives wireless signals. *Dec.*, ¶108.

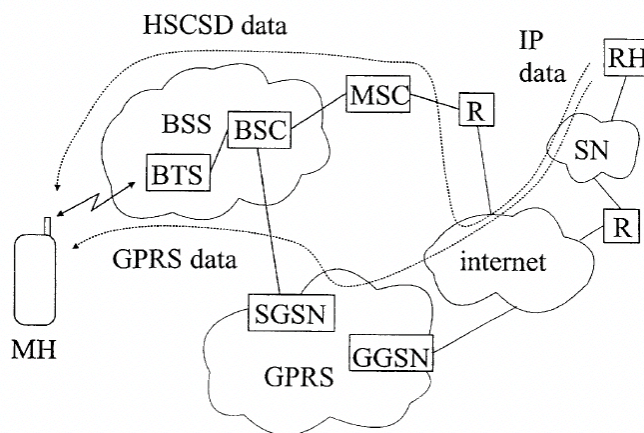
Kalayjian is also reasonably pertinent to the particular problem with which the inventor of the '680 Patent was involved because it is directed to solving the same problem of using the first device to help the user locate wireless devices, such as the user's Bluetooth headset. *Id.*, ¶109.

D. Turunen

Turunen issued on November 26, 2002, qualifying as prior art under § 102(b). Turunen was not cited or considered during the prosecution of the '680 Patent.

Turunen describes “[a] method of transmitting Internet data between a mobile host and a remote host coupled via the Internet and a GSM/GPRS cellular telephone

network.” *Turunen*, Abstract. The mobile host (MH) “communicates with a Base Transceiver Station (BTS) of a Base Station Subsystem (BSS) of the GSM network.” *Id.*, 5:39-41. The MH (a cellular telephone) sends and receives wireless signals via the GSM/GPRS cellular network:



Id., Fig. 2, 5:13-14.

Turunen is analogous to the claimed invention of the '680 Patent because it is from the same field of endeavor. Turunen is directed to a mobile host that sends/receives wireless signals. *Dec.*, ¶114.

E. Trimble

Trimble published on December 16, 2004, qualifying as prior art under § 102(b). Trimble was not cited or considered during the prosecution of the '680 Patent.

Trimble describes “[a]n object locating system includes a transmitter unit for activating a plurality of electronic tags to assist in locating keys, remote control

devices, cordless phones, eyeglasses, articles of clothing, etc. to which the tags have been attached.” *Trimble*, Abstract, [0056]. The tags can be simultaneously activated to emit an audible and/or visual indication to assist a user in locating the tag. *Id.*, [0056], [0068], [0081], [0007].

Trimble is analogous to the claimed invention of the ’680 Patent because it is from the same field of endeavor. Trimble is directed to wireless communication devices that sends wireless signals. *Dec.*, ¶120.

Trimble is also reasonably pertinent to the particular problem with which the inventor of the ’680 Patent was involved because it is directed to the problem of employing a first wireless device to locate a second wireless device. *Id.*, ¶121.

V. GROUND 1: CLAIMS 1, 4, AND 7-8 ARE OBVIOUS OVER KALLIOLA AND VAUCLAIR

A. Claim 1

1. *1[P]. A mobile communication device comprising:*

Kalliola teaches a “wireless **communication device**” (WCD) 100 that “may be anything from a basic cellular handset to a more complex device such as a wirelessly enabled palmtop or laptop computer.”³ *Kalliola*, [0035], [0002]. The WCD may be a “cellular telephone or other handheld wireless device[,]” thus

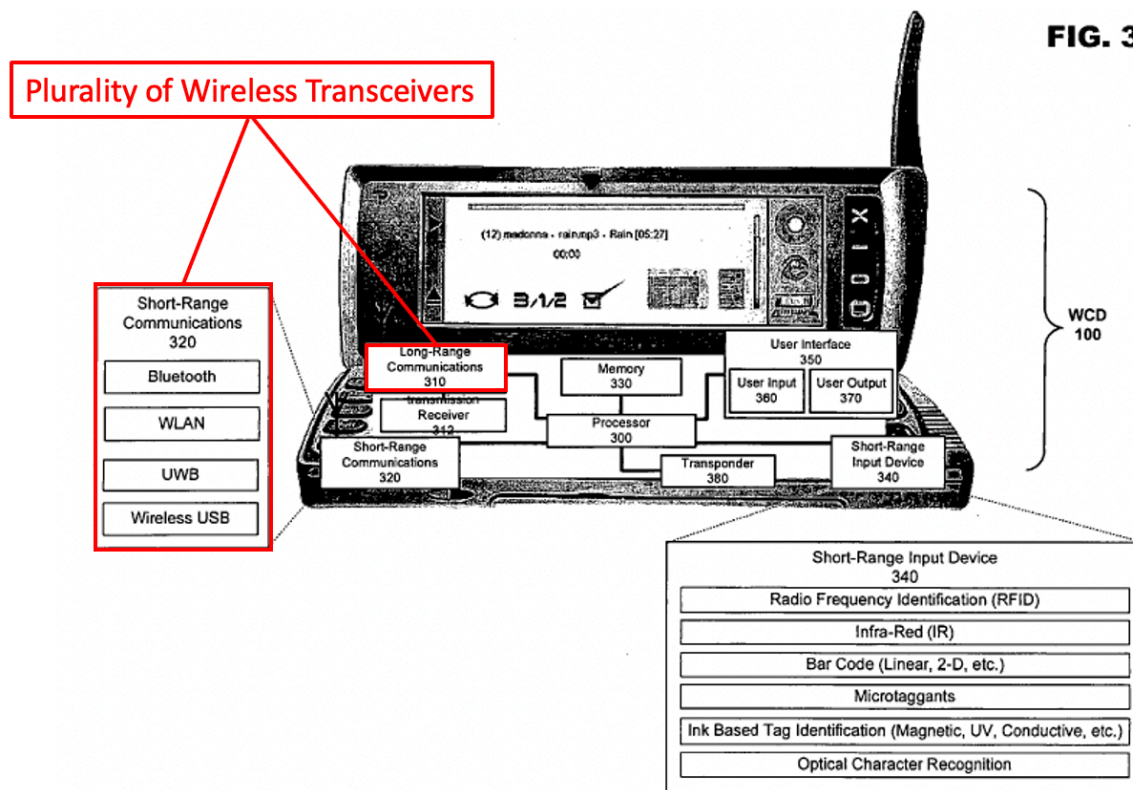
³ All emphasis and annotations added by Petitioner unless noted otherwise.

teaching a mobile communication device.⁴ *Id.*, [0038], Title, Fig. 1 (illustrating a mobile device); *Dec.*, ¶¶132-133.

2. 1(a): “a plurality of wireless transceivers”

Kalliola’s WCD includes a plurality of wireless transceivers, namely long-range communications 310 and short-range communications 320. *Kalliola*, [0044], [0046]-[0047], [0049]; *Dec.*, ¶¶134-149. Figure 3 illustrates “an exemplary structural layout of the WCD 100” depicting the WCD’s hardware components, including long-range communications 310 hardware and short-range communications 320 hardware:

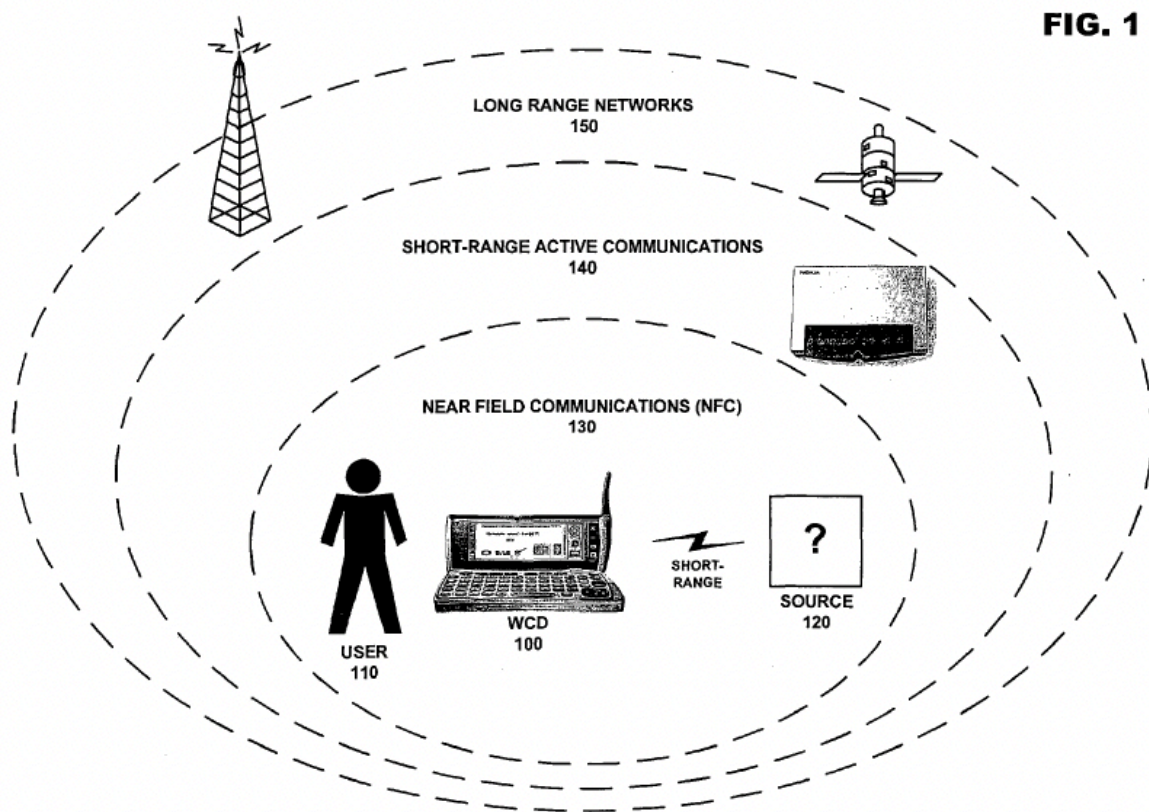
⁴ Claim language identified with *italics* and underline.



Dec., ¶149 (citing *Kalliola*, Fig. 3). *Kalliola* teaches “[h]ardware corresponding to communication sections 310, 312, 320 and 340 provide for the **transmission** and **reception** of signals.” *Kalliola*, [0053].

Kalliola’s Fig. 2 illustrates the modular functionality of the WCD. *Kalliola*, [0039], [0044]. One module is communications module 230, which “incorporates all of the communications aspects of WCD 100,” including long-range communications module 232 and short-range communications module 234. *Id.*, [0041]. “Communications module 230 utilizes at least these submodules to **receive** a multitude of different types of communication from both local and long distance sources, and to **transmit** data to recipient devices within the transmission range of

WCD 100.” *Id.* Kalliola further teaches “WCD may both **transmit and receive information** over a wide array of **wireless** communication networks.” *Id.*, [0034].



Id., Fig. 1, [0036] and [0049] (disclosing WCD’s short-range communications 140 employing Bluetooth and UWB, among other communications protocols, and a discussion of effective transmission ranges).

“Long-range communications 310 performs functions related to the exchange of information over large geographic areas (such as cellular networks) via an antenna.” *Id.*, [0047]. “Long-range communication 310 also performs both voice and data communications using, as applicable, e.g., GSM, GPRS, UMTS, SMS, or

MMS. *Id.*, [0047], [0003]-[0004] (disclosing prior art WCD communication technologies for transmitting/receiving data). “Also, long-range communications 310 may operate to **transmit** and **receive** messages[.]” *Kalliola*, [0047]. Because the long-range communications 310 transmits and receives information across wireless cellular networks, such as GSM and GPRS, the long-range communications 310 is or includes a wireless transceiver. *Dec.*, ¶136.

Kalliola thus expressly or implicitly teaches the long-range communications 310 is a wireless transceiver because Kalliola teaches transmission/reception of data performed wireless across cellular networks. *Dec.*, ¶138. Kalliola also at least inherently teaches the long-range communications 310 is a wireless transceiver because a POSITA would have known that to perform the disclosed wireless transmission/reception of data across cellular networks, such as GSM, necessarily requires a long-range wireless transceiver. *Id.*, ¶139. Finally, a POSITA would have found Kalliola renders obvious a long-range wireless transceiver, at least because (1) Kalliola expressly suggests the long-range communications 310 transmitting and receiving data; (2) “the present invention may be implemented using a variety of wireless communication equipment”; and (3) wireless long-range transceivers were ubiquitous in mobile communication devices prior to the ’680 Patent’s effective filing date. *Kalliola*, [0002]-[0004], [0006], [0038]; *Dec.*, ¶140.

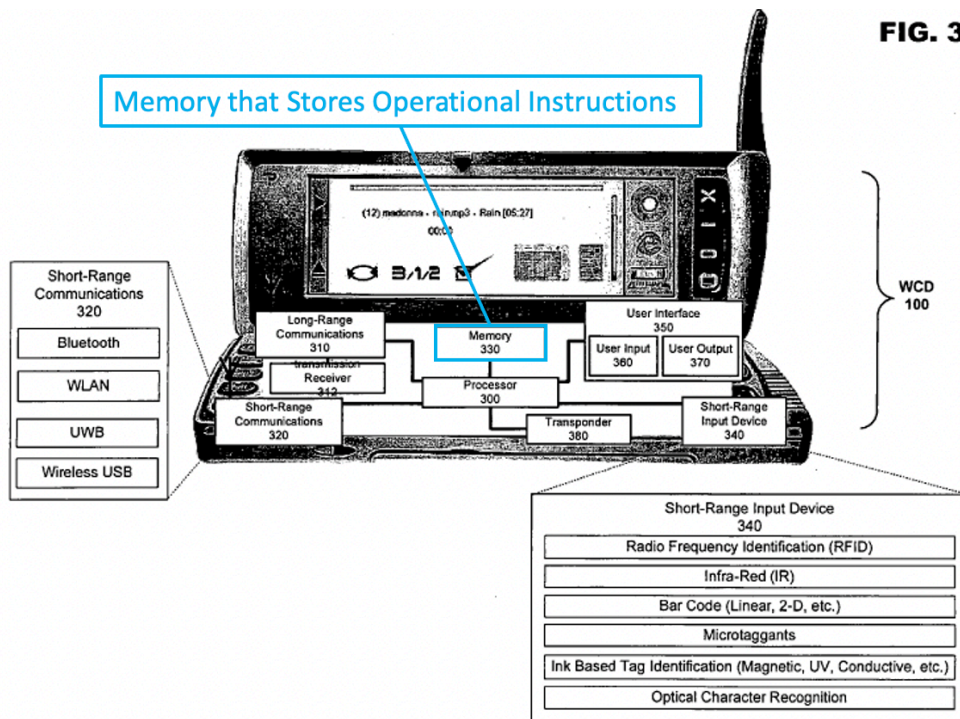
“Short-range communications 320 is responsible for functions involving the exchange of information across short-range **wireless** networks.” *Kalliola*, [0049]. “[S]hort-range communications 320 performs functions related to the establishment of short-range connections, as well as processing related to the **transmission** and **reception** of information via such connections.” *Id.* Short-range communications include Bluetooth and UWB. *Id.* For example, the WCD transmits “a Bluetooth™ message” to a signal emitter to cause it to activate its “position-indicating transmission signal.” *Id.*, [0077]. The position-indicating transmission is also a Bluetooth signal that is received by the WCD’s Bluetooth transceiver. *Id.*, [0072], [0076],[0082], *Dec.*, ¶141.

Because the short-range communications 320 performs “the exchange of information across short-range wireless networks,” including Bluetooth and UWB connections, short-range communications 310 is or includes a wireless transceiver. *Kalliola*, [0049]; *Dec.*, ¶141. *Kalliola* expressly or implicitly teaches the short-range communications 320 is a wireless transceiver because *Kalliola* teaches transmission/reception of data performed across short-range networks, such as Bluetooth and UWB. *Dec.*, ¶142. *Kalliola* also at least inherently teaches the short-range communications 320 is a wireless transceiver because a POSITA would have known that to perform the disclosed wireless transmission/reception of data using Bluetooth communications protocol necessarily requires a short-range wireless

transceiver. *Id.*, ¶143. Finally, a POSITA would have found Kalliola renders obvious a short-range wireless transceiver, at least because (1) Kalliola expressly teaches that short-range communications 320 transmits and receives wireless signals; (2) “the present invention may be implemented using a variety of wireless communication equipment”; and (3) wireless short-range transceivers were ubiquitous in mobile communication devices as of the ’680 Patent’s effective filing date. *Kalliola*, [0004], [0006], [0038]; *Dec.*, ¶144.

3. 1(b): “a memory that stores operational instructions”

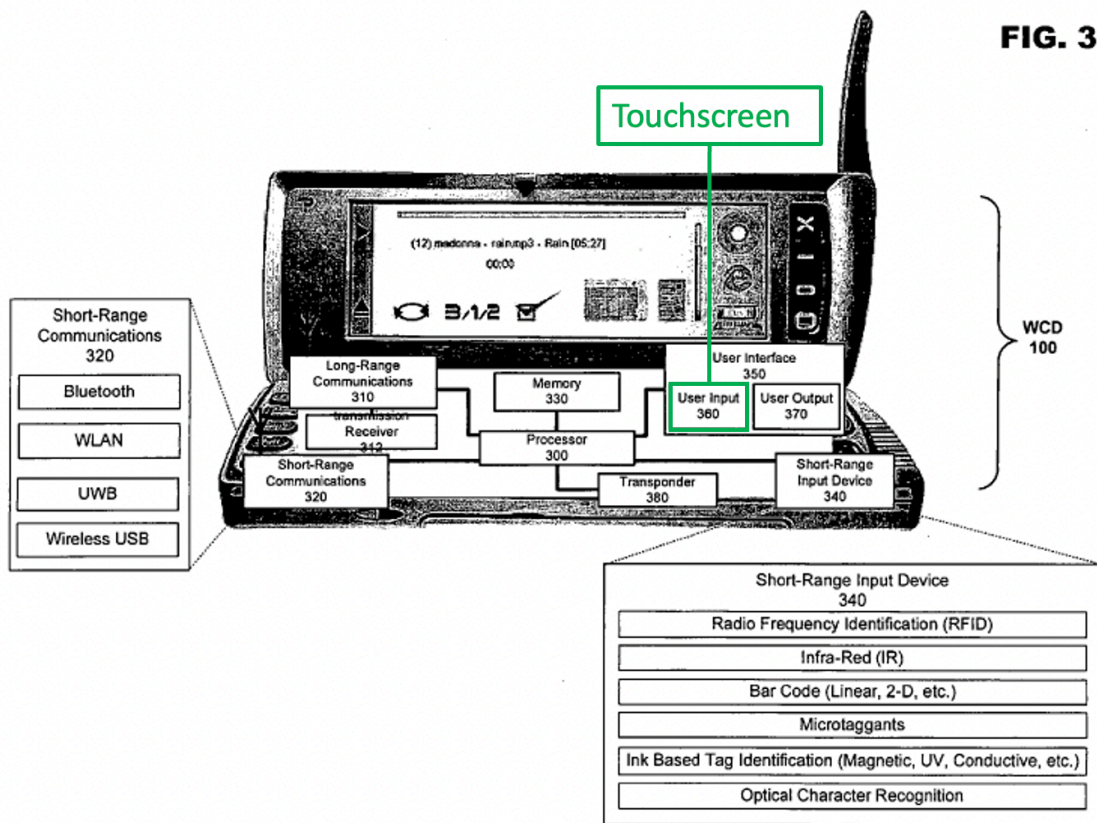
Kalliola teaches a memory 330 that stores operational instructions. *Kalliola*, [0046] (“software components stored by **memory 330** [that] include **instructions** that can be executed by processor 300”); *Dec.*, ¶150. Kalliola’s WCD includes memory 330, which “stores information in the form of data and software components (also referred to herein as modules).” *Id.*, [0045]. “[M]emory 330 may store software components that control the operation of communication sections 310, 320 and 340” and software components including “user interface manager.” *Id.* One example of a software component is “seeker application,” discussed in Section V and incorporated herein. *Kalliola*, [0080], Fig. 5; *Dec.*, ¶151 (opining the seeker application is embodied as operational instructions). Therefore memory 330 teaches the claimed memory that stores operational instructions:



Dec., ¶152 (citing *Kalliola*, Fig. 3).

4. 1(c): “a touch screen”

Kalliola’s WCD includes a user interface 350 that “includes a user input 360 and a user output 370.” *Kalliola*, [0051]. User interface is “coupled to the processor and “facilitates the exchange of information with a user.” *Id.* “User input 360 may include one or more components that allow a user to input information,” including “keypads, **touch screens**, and microphones.” *Id.* Therefore, user input 360 includes the claimed touch screen:



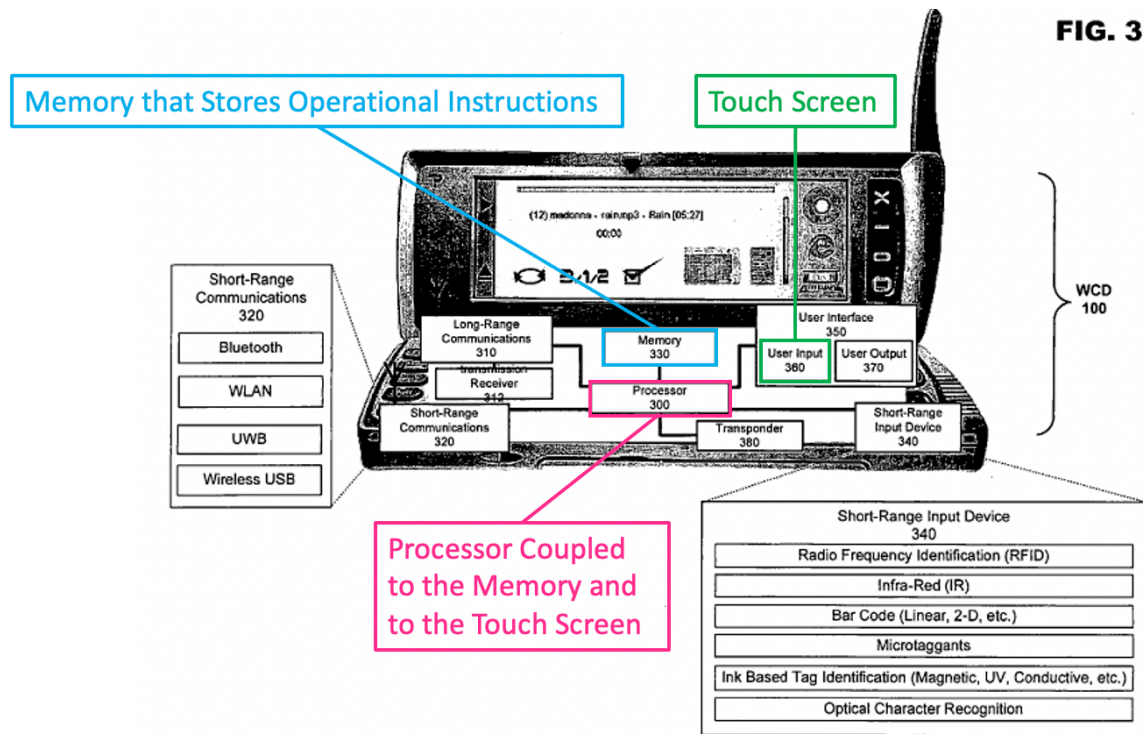
Dec., ¶153 (citing *Kalliola*, Fig. 3).

To the extent *Kalliola*’s list of three input elements qualifies as a “large list,” it would have been obvious to a POSITA to include a touchscreen as a user input 360 as expressly suggested by *Kalliola*. *Dec.*, ¶154; *In re Stepan*, 868 F.3d 1342, 1346 n.1 (Fed. Cir. 2017) (discussing “selecting from large lists of elements in a single reference” for an obviousness analysis). A POSITA would have understood that mobile devices included touchscreens for user input since at least the early 1990s and there would have been a reasonable expectation of success incorporating a touch screen into *Kalliola*’s WCD. *Dec.*, ¶154.

5. *1(d)(i): “a processor coupled to the memory and to the touch screen”*

Kalliola’s WCD includes processor 300 that “controls overall device operation” of the WCD. *Kalliola*, [0044]. “Processor 300 may be implemented with one or more microprocessors that are each capable of executing software instructions stored in memory 330.” *Id.* Kalliola expressly teaches “**coupling** separate hardware components corresponding to processor 300,...memory 300,...user interface 350...” *Kalliola*, [0054]. Kalliola’s memory stores software components “that can be executed by processor 300,” further indicating to a POSITA the processor is coupled to the memory. *Kalliola*, [0046], [0044]; *Dec.*, ¶155. Because memory stores software components that control operations, including operation of communication sections 310, 320 and user interface manager, and further because the processor executes software instructions stored in memory, Kalliola expressly teaches the processor coupled to the memory. *Id.*, [0046], [0044]; *Dec.*, ¶155.

Kalliola also expressly teaches the processor 330 is coupled...to the touch screen, namely user interface 350 implemented as a touch screen: “As further shown in FIG. 3, user interface 350 is also **coupled** to processor 300.” *Id.*, [0051]; *Dec.*, ¶156. As discussed above, user interface 350 includes user input 360, including a touch screen. Claim 1(c). Figure 3 also illustrates the processor coupled to the memory and user interface via the lines connecting the components:



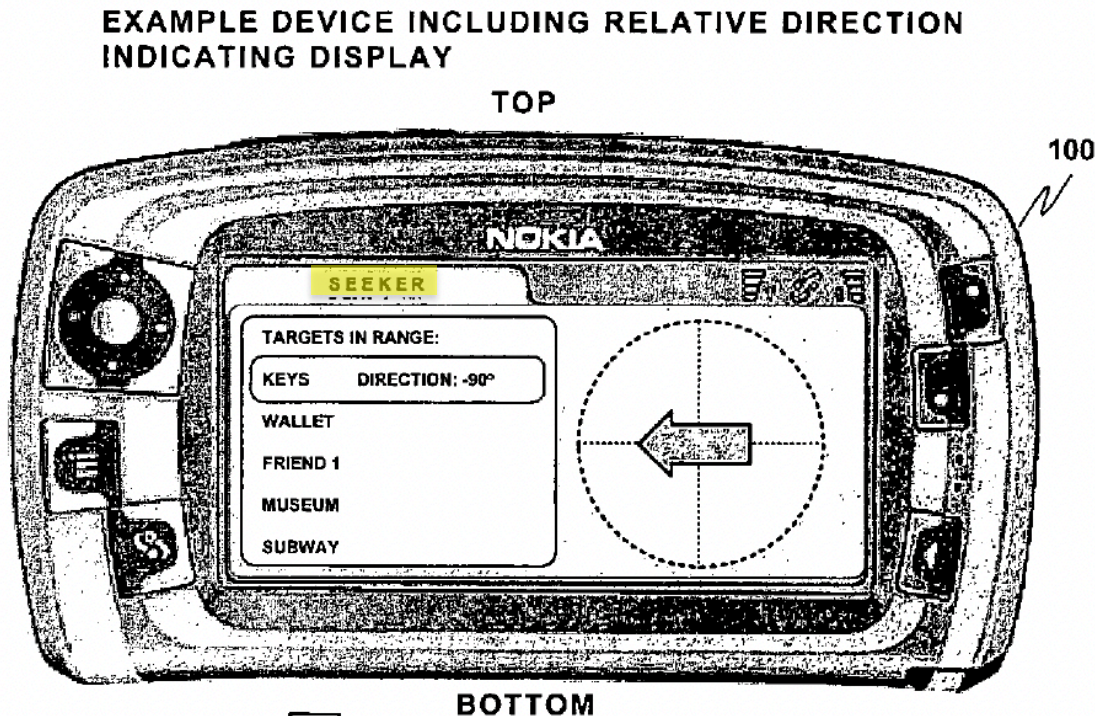
Dec., ¶157 (citing *Kalliola*, Fig. 3).

6. *1(d)(ii): “wherein the processor executes the operational instructions that cause the processor to present a graphical user interface via the touch screen and”*

Kalliola expressly teaches a processor executes the operational instructions: “Processor 300 may be implemented with one or more microprocessors that are each capable of **executing software instructions** stored in memory 330.” *Kalliola*, [0044], [0046] (“The software components stored by memory 330 include **instructions that can be executed by processor 300.**”).

Kalliola also teaches that one of the software components including software instructions (i.e., operational instructions) executed by processor 300 and that cause the processor to present a graphical user interface via the touch screen is a “seeker

application utilized to determine the relative direction towards a target.” *Id.*, [0080], [0026]; *Dec.*, ¶158. Figure 5 illustrates the “SEEKER” application’s graphical user interface:



Kalliola, Fig. 5 (excerpt); *Dec.*, ¶159.

Kalliola teaches the executed operational instructions cause the processor to present a graphical user interface via the touch screen. Kalliola teaches “user interface 350 is also coupled to processor” and “FIG. 5 also includes an example **display** shown on WCD 100 that is **viewable by user 110**.” *Kalliola*, [0051], [0071]. User interface module 240, which represents the functionality performed by the user interface 350 discloses visual and tactile elements that allow the user to enter/receive

data to WCD. *Kalliola*, [0042], [0044]. A POSITA would have understood the touchscreen to present the seeker application's GUI, such as depicted in Fig. 5. *Dec.*, ¶160.

7. ***1(d)(iii): “wherein the processor operates in association with the graphical user interface to”***

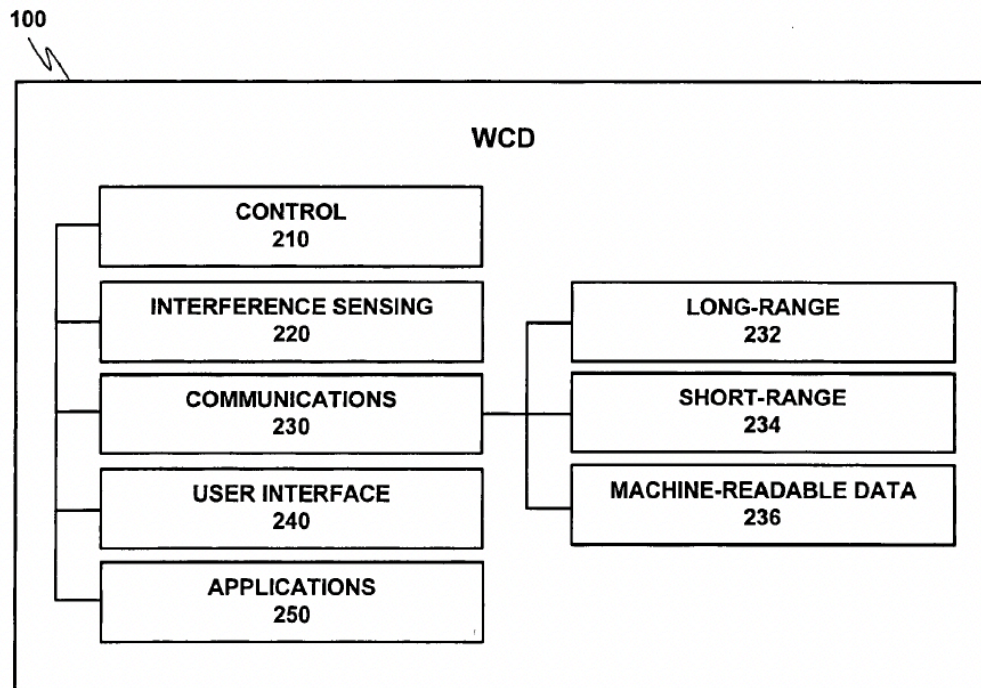
Kalliola teaches a processor executing operational instructions. *See* Claim 1(d)(ii). A POSITA would have understood or found obvious that for each claimed step, *Kalliola*'s processor alone or *Kalliola*'s processor as modified (whichever may be the case for the claimed step) *operates in association with the graphical user interface* to perform the claimed step. *Dec.*, ¶¶123-128.

Kalliola's processor 300 executes “software instructions” stored in memory. *Kalliola*, [0044], [0046]; Claim 1(d)(ii). “Processor 300 controls overall device operation,” and WCD 100 (which includes processor 300) “implements the functionality” of the disclosed system. *Id.*, [0044]. *Kalliola* discloses memory 330 stores various software instructions for WCD operation, including “software components that control the operation of communication sections 310, 320 and 340,” a “user interface manager, and any communications utilities modules required to support WCD 100.” *Id.*, [0046].

Kalliola teaches software modules shown in Fig. 2 are implemented by Fig. 3's hardware, including control module 210, user interface module 230, and

applications module 250. *Id.*, [0044], [0045] (noting the software components are also referred to as modules), [0019]-[0020] (teaching Fig. 3 is the structural description of the WCD described for Fig. 2, where Fig. 2 is the modular description of the WCD), [0039] (disclosing Fig. 2 is the modular layout for the WCD with the functions performed by software and/or hardware components).

FIG. 2



Id., Fig. 2.

“Control module 210 regulates the operation of the device. Inputs may be received from various other modules included within WCD 100....Control module

210 interprets these data inputs, and in response, may issue control commands to the other modules in WCD.” *Kalliola*, [0040].

“User interface module 240...allow[s] the user 110 to receive data from, and enter data into, the device. The data entered by user 110 may be interpreted by control module 210 to affect the behavior of WCD 100.” *Kalliola*, [0042], [0051] (discussing user interface 350). Data inputted by user may be transmitted to other devices within communication range, and data from other devices may be presented to the user via user interface module. *Id.* *Kalliola* teaches user interface 350 “is also coupled to processor 300” and “may interact with a communication utilities software component, also contained in memory,” that allows for reception of services from remote devices. *Id.*, [0051], [0055].

Applications module 250 “incorporates all other hardware and/or software applications on WCD 100,” which may include “data applications” “invoked by a control module 210” to read and supply information to other modules in WCD 100. *Id.*, [0043]. One such disclosed application is a seeker application: “[A] seeker application [is] utilized to determine the relative directions towards a target.” *Id.*, [0080]. *Kalliola* describes various steps performed by the seeker application as executed by the WCD. *Id.*, [0081]-[0083], Fig. 9. Because *Kalliola* expressly teaches the WCD’s memory stores software components for performing numerous actions “required to support WCD 100,” such actions include the seeker application, as the

seeker application includes functionality related to, at the least, communication sections and user interface manager (e.g., managing interactions with the GUI). *Id.*, [0046]; *Dec.*, ¶127.

A POSITA would have understood processor 300 operates in association with the GUI to perform overall device operation, including performing the claimed steps. *Dec.*, ¶128. Kalliola's collective teachings inform a POSITA that control module 210 receives user inputs from user interface module 240 and outputs responsive control commands to other WCD modules "to affect the behavior of the WCD," such as user interface manager controlling GUI. *Id.* Because Kalliola teaches (1) the processor executes software components ([0044]); (2) the software components include instructions controlling operation of communication sections, **user interface manager**, and any communications utilities required to support WCD ([0046]); and (3) and the control module 210 and user interface module 240 operatively work together to receive and interpret data inputs from the user at the user interface ([0040], [0042]), a POSITA would have understood Kalliola teaches, expressly or implicitly, the processor operates in association with the GUI. *Id.*

Kalliola also inherently teaches the limitation. *Dec.*, ¶130. A GUI is displayed on a display that necessarily operates in association with a processor, at least because the processor must execute software instructions instructing the GUI's display of information, as taught in Kalliola, [0044], [0046]. *Id.*

Finally, Kalliola renders obvious the limitation because a POSITA would have understood that displays presenting GUIs do so responsive to software instructions executed by a processor. *Id.*, ¶131. Therefore, a processor operating in association with a GUI is application of a known technique (processor executes software instructions, e.g., Kalliola’s seeker application, to control overall device operation ([0043]), including display information on a GUI) to a known device (Kalliola’s processor, user interface manager, and GUI) to yield predictable results (Kalliola’s information displayed on a GUI).

If a claim mapping requires modification of Kalliola to perform the claimed step, a POSITA would have understood Kalliola’s processor and stored software instructions would have been modified per the motivations to combine for the claimed step provided with the claim mapping. *Id.*, ¶123.

8. *1(d)(iv): “generate a pairing signal in response to a first indication from a user to pair the mobile communication device to at least one remote device”⁵*

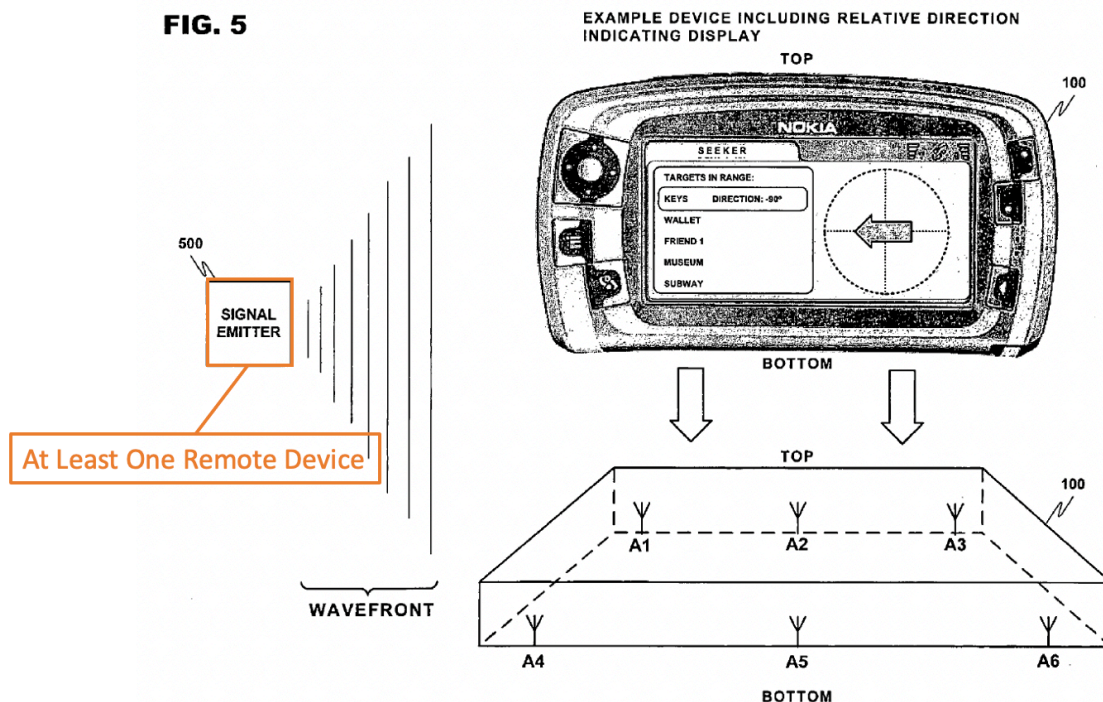
Petitioner applies PO’s construction of generate a pairing signal as a “processor signal to initiate a wireless device pairing sequence.” Section III.C.

(a) Kalliola’s Teachings

Regarding the claimed at least one remote device, Kalliola teaches signal emitters 500 attached to a plurality of “possible target objects,” such as keys.

⁵ The Certificate of Correction amended the claim language as originally printed.

Kalliola, [0071]. *Kalliola* teaches a “person might want to find the current location of a set of keys, a wallet, a jacket, the wireless communication device of another user, etc.” *Id.*, [0009]. A target object is remote from the WCD and “may be located within a short transmission range if the object includes a low power position-indicating transmission emitter” that is “activated via a wireless message[.]” *Id.*, [0107]. The signal emitters, which may include Bluetooth-enabled emitters, include “battery-operated transmitters in a keychain, in a wallet, embedded in an ID badge, mounted in a vehicle such as an automobile, motorcycle, scooter, bicycle or in a piece of clothing[.]” *Id.*, [0077], [0073] (disclosing incorporating a signal emitter 500 as a Bluetooth chipset in a keychain). In Fig. 5, a signal emitter 500 is attached to the user’s keys, thus teaching the claimed at least one remote device:

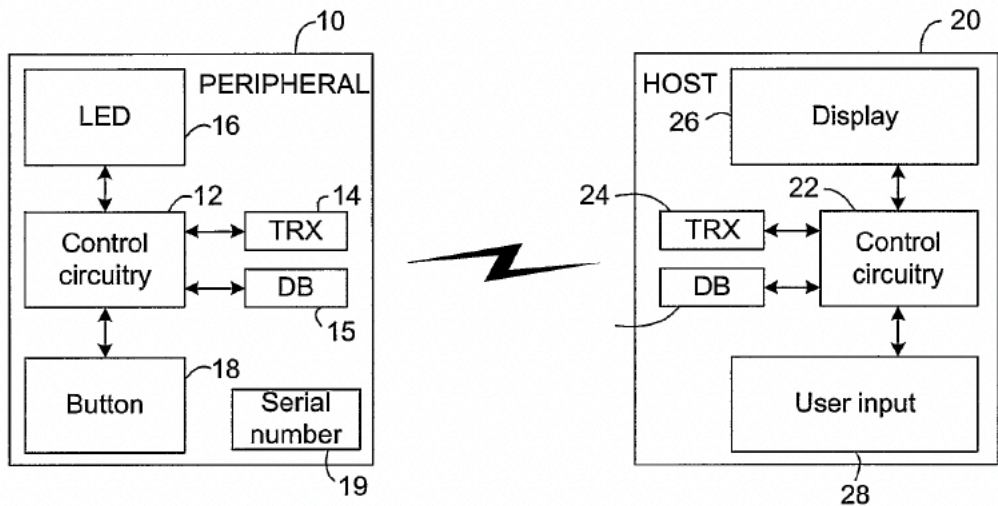


Dec., ¶163 (citing *Kalliola*, Fig. 5); *Kalliola*, Fig. 6.

Kalliola, [0073]-[0075] teaches the WCD communicates via Bluetooth with the signal emitter. In related art, *Vauclair* provides additional specificity regarding the pairing process between two devices. *Dec.*, ¶164.

(b) *Vauclair*'s Teachings

Vauclair teaches a pairing process between a first electronic device 10, which is “a peripheral device,” such as “a mobile telephone handsfree kit,” and a second electronic device 20, which is “a host device,” such as a “mobile telephone.” *Vauclair*, [0022]. The first and second devices “communicate according to any wireless or wired protocol,” including “Bluetooth.” *Id.* Both the peripheral and host devices 10, 20 include suitably programmed processors connected to transceiver (TRX) circuitry 14, 24 for handling “radio frequency communications with other electronic devices able to use the same wireless protocol.” *Id.*, [0024], [0028].



Id., Fig. 1; *Dec.*, ¶¶165-166.

Vauclair teaches a pairing process where the user “establish[es] an ad hoc wireless network between the first and second electronic devices 10, 20” by “operat[ing] the host device 20...” *Vauclair*, [0036], [0034]-[0035], [0049] (teaching “the host device 20 requests the initiation of a pairing procedure with the peripheral device 10”).

Vauclair teaches host device 20 includes a display 26 that displays “menu options” from which a user may select. *Vauclair*, [0030] (disclosing host device includes display 26 displaying menu options selectable via user input 28). “For example, **to initiate the [pairing] process, the user may select a pairing option from a menu, using the user input 28.**” *Id.*, [0036].

Vauclair thus teaches a display 26 displaying a GUI (pairing menu) and a user input 28 that allows the user to select a menu option at the GUI. *Dec.*, ¶167; *Vauclair*, [0030]. Because Vauclair expressly teaches display 26 displays menu options selectable via user input, and the user **selecting a pairing option**, Vauclair teaches a user inputting an indication via Vauclair’s graphical user interface. *Dec.*, ¶167; *Vauclair*, [0030], [0036]. The user’s selection of a pairing option satisfies the claimed first indication from a user to pair the mobile communication device to at least one remote device. *Dec.*, ¶167.

Vauclair further teaches generat[ing] a pairing signal, where the pairing signal [is] generated by the graphical user interface (as recited in Claim 1(d)(v)).

First, Vauclair teaches the user's selection of the pairing option from the menu, thus teaching a first indication...to pair. *Vauclair*, [0036]; *Dec.*, ¶168.

Second, Vauclair teaches that the selection of a menu option sends a signal to control circuitry: “user input 28...allow[s] the user **to select from available menu options, to send a signal to the control circuitry.**” *Vauclair*, [0030]. Vauclair thus teaches generate a...signal (i.e., the signal sent to the control circuitry responsive to the user selection of a menu option), where the signal [is] generated by the graphical user interface (i.e., the signal is generated at the GUI because the signal is responsive to user selection of the pairing option). *Dec.*, ¶168.

Third, Vauclair teaches the control circuitry is “in the form of a suitably programmed **processor**” and has features “required for the primary function of the device 20,” including “the establishment of device pairing.” *Vauclair*, [0028]. Therefore, the signal sent to the control circuitry is a “processor signal,” applying PO's construction. *Dec.*, ¶169.

Fourth, after receiving this signal, the control circuitry/processor initiates the wireless device pairing sequence depicted in Figs. 2-3. *Vauclair*, [0037]-[0057], pinpoint at [0049], [0051], [0028] (describing control circuitry 22 connected to transceiver circuitry 24), Figs. 2-3; *Dec.*, ¶167 (opining a POSITA would understand

that the pairing process sequence is performed responsive to the user selecting a pairing option from the menu, per Vauclair, [0036]). Thus, Vauclair teaches “to initiate a wireless device pairing sequence,” applying PO’s construction. *Dec.*, ¶169.

Thus, reading Vauclair’s teachings collectively, Vauclair teaches (1) a pairing option is presented on a menu [0036]; (2) user selects pairing option [0036]; and (3) in response to the user selection of a menu option (i.e., the pairing option), a signal is generated by the graphical user interface and sent to the control circuitry to perform the pairing process sequence [0030], [0037]-[0049]. *Dec.*, ¶170. Because a signal is sent to control circuitry to initiate the pairing process, and further because the signal is sent in response to the user selection (*a first indication from a user*) of the menu option (where the menu option is *to pair the mobile communication device to at least one remote device*), the signal sent to the control circuitry is the *pairing signal generated by the graphical user interface*.

(c) Motivation to Combine

A POSITA would have found it obvious and been motivated to configure Kalliola to execute, via processor 300, a GUI presenting a pairing menu to enable a user to initiate a Bluetooth pairing process between the WCD and the signal emitter by selecting a pairing option via the WCD’s touchscreen. *Dec.*, ¶172. A POSITA would have understood that Bluetooth pairing allows two Bluetooth devices to recognize each other on subsequent connections. *Id.* Thus, a POSITA would have

been motivated to present a pairing menu on the WCD's GUI to allow the user to pair the WCD with the signal emitters associated with the user's personal items. *Id.*

Additionally, it would have been obvious to a POSITA to configure Kalliola's WCD to generate a processor signal in response to the user selecting a pairing option from the menu, per Vauclair. *Id.*, ¶173. A POSITA would have found it obvious that the GUI presented on Kalliola WCD's touchscreen, like Vauclair's user interface, would have generated signals corresponding to the user's inputs at least to carry out designated functions of the WCD, such as the initiation of a pairing process. *Id.* Moreover, a POSITA would have found it obvious that in the modified Kalliola WCD, the signals generated by the GUI from interaction at the touchscreen would be sent to the WCD's processor so that the processor can interpret the user's inputs and take the appropriate action, as otherwise taught by Vauclair. *Id.* Here, it would have been obvious to a POSITA to configure the WCD's processor to initiate the wireless device pairing sequence upon receipt of the signal generated from the user's pairing selection, as taught by Vauclair, to carry out the pairing process initiated by the user. *Id.*

Generating processor signals in response to an indication from a user at a user interface was a well-known mechanism of wireless devices at the time of the alleged invention. *Id.*, ¶174. Additionally, Bluetooth pairing and corresponding Bluetooth pairing menus were well-known at the time as taught in Vauclair. *Id.* Vauclair simply

discloses one way in which a Bluetooth pairing menu and subsequent Bluetooth pairing process can be implemented in wireless devices. *Id.* Thus, a POSITA would have been motivated to combine the prior art elements of Kalliola's WCD communicating with a signal emitter via Bluetooth with Vauclair's pairing menu and processor signals to yield the predictable result of a pairing signal in response to a first indication from a user to pair the WCD to the signal emitter. *Id.*, ¶175. Both Vauclair and Kalliola are directed to systems employing Bluetooth-paired devices, and as Kalliola states, "Bluetooth is an example of a short-range wireless technology quickly gaining acceptance in the marketplace." *Id.*; *Kalliola*, [0004]. Thus, pairing of devices via Bluetooth was common, and there would be no change to the respective functions of either Kalliola's WCD or Vauclair's pairing menu. *Dec.*, ¶175. Because Bluetooth pairing and pairing menus were conventional well prior to the invention of the '680 Patent, there would have been a reasonable expectation of success configuring Kalliola's WCD to generate a pairing signal in response to a first indication from a user to pair the mobile communication device to at least one remote device as taught by Vauclair. *Id.*, ¶176.

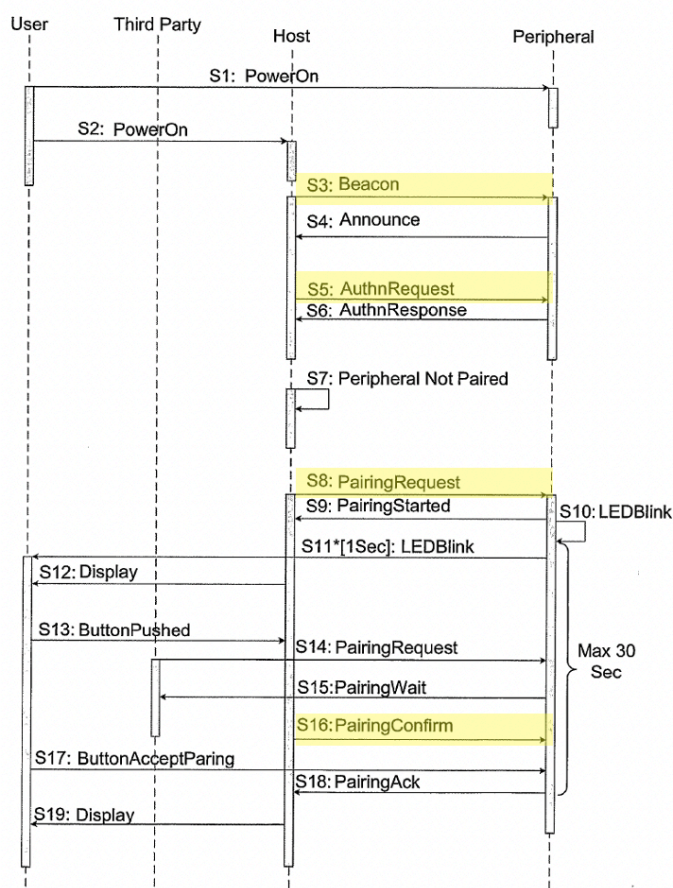
9. *1(d)(v): “wherein the at least one of the plurality of wireless transceivers, responds to the pairing signal generated by the graphical user interface by communicating RF signals to pair the mobile communication device to the at least one remote device”*

(a) Vaclair’s Teachings

Vaclair teaches the host device’s transceiver 24 responds to the pairing signal generated by the graphical user interface by communicating RF signals to pair the host device to the peripheral device. *Dec.*, ¶¶177-182.

Vaclair teaches creation of a wireless network begins with the user selecting a pairing option and, in response, the host device seeking a nearby peripheral device. *Vaclair*, [0036]-[0037]. During an identification and authentication process, the host and peripheral devices send a series of RF signals back and forth. *Id.*, [0037] (“the host device 20 then seeks a nearby peripheral device ... by sending a beacon signal (S3 in FIG. 2) containing its identification.”), [0040] (as part of the authentication process, the host device “sends an unpredictable challenge (S5 in FIG. 2) to the peripheral device 10”), [0024] and [0028] (disclosing the communications between host and peripheral device 10 (S19 in FIG. 2).” *Id.*, [0056].

The following annotated version of Fig. 2 emphasizes the series of RF signals the host device’s transceiver circuitry communicates to the peripheral device during the pairing process:



Dec., ¶179 (citing *Vauclair*, Fig. 2). Each of signals S3, S5, S8, and S16 is sent from the host device and to the peripheral device to pair the devices, per *Vauclair*’s teaching that the “pairing process is completed” after the signals are sent (and acknowledged by the peripheral device). *Dec.*, ¶178; *Vauclair*, [0056]. The signals are RF signals at least because *Vauclair* expressly teaches RF communications between host/peripheral devices ([0024], [0028]) and because a POSITA would have known or found obvious that the Bluetooth communications taught in *Vauclair* are RF signals. *Dec.*, ¶180.

(b) Motivation to Combine

It would have been obvious to configure Kalliola's Bluetooth transceiver with Vauclair's teachings regarding communicating RF signals to pair devices. *Dec.*, ¶183. Vauclair teaches the pairing process requires the host device (which, in the proposed combination, is Kalliola's WCD), to transmit a series of RF signals to the peripheral device (i.e., Kalliola's signal emitter). *Id.* A POSITA would have understood that Bluetooth pairing allows two Bluetooth devices to recognize each other on subsequent connections. *Id.*, ¶184. It would have been obvious for Kalliola's WCD to be paired with the signal emitters associated with the user's personal items to recognize the signal emitters during subsequent connections, at least because Kalliola teaches the WCD performing Bluetooth communications with various signal emitters and the user selecting a desired signal emitter to locate. *Id.*; *Kalliola*, [0071]. Applying Vauclair's known technique of pairing two devices by communicating RF signals between the devices would readily improve Kalliola's WCD and yield the predictable result of Bluetooth-paired devices. Thus, a POSITA would have been motivated to combine the prior art elements of Kalliola's WCD communicating with the signal emitter using a Bluetooth transceiver with Vauclair's pairing sequence to yield the predictable result of the WCD recognizing the signal emitter for subsequent communications. *Dec.*, ¶185.

Pairing was a well-understood and conventional feature of Bluetooth-enabled mobile communication devices for several years prior to the invention of the '680 Patent, thus ensuring a reasonable expectation of success. *Id.*, ¶186.

10. 1(d)(vi): “generate a first location request signal in response to a second indication from the user to locate the at least one remote device”

Kalliola teaches a second indication from the user to locate the at least one remote device, namely the user’s **manual indication** to send an activation message to a signal emitter. *Dec.*, ¶¶187-193, Vauclair provides details of generat[ing]...a signal responsive to user input at a user interface. *Id.*, ¶195.

(a) Kalliola’s Teachings

Figure 5 illustrates WCD 100 and determining “a relative direction” of a target object or location having signal emitter 500. *Kalliola*, Fig. 5, [0071], [0069]. The target/object includes signal emitter 500, which may be always active or “**activated remotely by a user as needed**,” such as for signal emitters limited by low power concerns. *Id.*, [0077], [0079], Fig. 8, RN 802, [0071] (discussing signal emitter included in target device, such as a set of keys).

Kalliola teaches the user “**manually activate[s]** (or request[s] the activation of) a target that is currently inactive[.]” *Id.*, [0010] (disclosing manual activation of a target and selection of an inactive target from a list of potential targets), [0081], Abstract (teaching “the ability to request that a location-indication transmission be

activated in a remote target device”). The low-power target devices that are not always activated operate in a “power conservation mode until a message is received instructing a device to activate the position-indicating transmission signal.” *Id.*, [0077]. In response to the WCD sending an “activation message” to the signal emitter of the target device, the signal emitter begins broadcasting its position-indicating signal, which allows the WCD to determine the relative direction to the signal emitter. *Id.*, [0077], [0069] (disclosing signal emitter emits a position-indicating transmission received by the WCD’s antenna array that in turn allows for displaying direction), [0012]-[0013], [0081].

Figure 9 is a flowchart “describing the process operation” and includes further details regarding the user’s manual activation of the signal emitter. *Id.*, [0080], Fig. 9. After the user “activates a seeker application,” the user “determines if the desired target is already active in step 924 by checking for its presence in the listing of target devices.” *Id.*, [0080]-[0081]. If the target device is inactive and if it allows for remote activation, “then in step 930 an activation message is sent to the target device[.]” *Id.*, [0081]. Thus, Kalliola teaches the user indicating at the WCD manual activation of a signal emitter using the seeker application, and the WCD responsively sending an activation message to the signal emitter to activate a position-indicating transmission signal to the WCD. *Dec.*, ¶188.

Kalliola's teaching of **manually activating a signal emitter** via the seeker application satisfies the claimed second indication from the user to locate the at least one remote device or otherwise renders the limitation obvious. *Dec.*, ¶191 (noting the *second* indication from the user to locate the remote device comes after the mapped *first* indication to pair the devices). Kalliola expressly teaches that a user **manually activates** or **requests the activation** of a signal emitter using the seeker application. For example, Kalliola expressly teaches the user remotely activating a signal emitter "as needed," and the WCD responsively sending a message to the signal emitter to activate the position-indicating transmission signal. *Kalliola*, [0077]. Collectively reading Kalliola's teachings that (1) the user **manually activates** the signal emitter ([0010]); (2) the signal emitter is activated on request ([0077]) using the seeker application ([0080]-[0081]); and (3) the WCD sends the signal emitter an "activation message" to activate for purposes of the emitter sending a position-indicating transmission signal ([0077], [0081]), a POSITA would have understood Kalliola expressly or implicitly teaches or otherwise renders obvious a second indication from the user to locate the at least one remote device. *Dec.*, ¶190, ¶193.

This is further supported by the fact that Kalliola's WCD includes user interface module 240 that "includes visual, audible and tactile elements which allow the user 110 to receive data from, and input data into, the device." *Kalliola*, [0042].

Kalliola also teaches user interface 350 is “coupled to the processor” and “facilitates the exchange of information with a user,” including user input 360 through various user inputs, such as a touch screen, keypad, or microphone. *Id.*, [0051]. Kalliola expressly teaches the user interfacing with the WCD by user selection of selectable options presented on the seeker application’s GUI, such as selecting the KEYS signal emitter for location. *Id.*, [0071], Fig. 5.

Because the user interface 350, which includes the GUI such as shown in Fig. 5, is coupled to the processor, the processor operates in association with the graphical user interface, as claimed in Claim 1(d)(iii). *Dec.*, ¶194; Claim 1(d)(iii).

(b) Vaclair’s Teachings

As discussed for Claim 1(d)(iv), Vaclair teaches the well-known concept of generating a...signal in response to user input, such as a selection of a menu option from a GUI. *See* Claim 1(d)(iv). Vaclair teaches user input 28 “allow[s] the user to select from available menu options, to **send a signal to the control circuitry 22[,]**” which includes “a suitably programmed processor.” *Vaclair*, [0030], [0028] (disclosing the control circuitry is connected to the transceiver circuitry). As discussed above, Kalliola teaches that the WCD receives an indication from the user to manually active the signal emitter, which causes an activation message to be sent to the signal emitter. *Kalliola*, [0077], [0081].

In the proposed combination for Claim 1(d)(vi), Kalliola’s WCD receives the

user indication to manually activate a signal emitter (per Kalliola, [0010], Abstract), and the seeker application's GUI sends a signal to the processor to indicate the manual activation instruction (per Vauclair, [0030]) to thereby generate a...signal. The generated signal is a first location request signal because the signal indicates to the WCD processor to send the activation message to instruct the position-indicating transmission signal from the signal emitter, per Kalliola, [0071]. *Dec.*, ¶196.

(c) Motivation to Combine

Petitioner incorporates the motivations for modifying Kalliola as provided in Claim 1(d)(iv). Additionally, a POSITA would have found it obvious and been motivated to modify Kalliola's WCD to generate a signal, as taught by Vauclair, in response to the user manually requesting activation of the signal emitter. *Dec.*, ¶¶196-197. A POSITA would have found obvious that the WCD's touchscreen, like Vauclair's user input, would have generated signals corresponding to the user's inputs, such as a user instruction to manually activate a remote signal emitter. *Id.*, ¶197. Moreover, a POSITA would have found obvious that the signals generated by the touchscreen would be sent to the WCD's processor so that the processor can interpret the user's inputs and take the appropriate action, as taught by Vauclair. *Id.* A POSITA would have found obvious that in the modified Kalliola, when the user inputs a request to manually activate Kalliola's inactive signal emitter, the touchscreen would generate a signal indicative of that request that would be sent to

the WCD's processor (as taught by Vauclair). *Id.* Thus, a POSITA would have been motivated to combine the prior art elements of Kalliola's WCD including a touchscreen receiving the user's indication to activate the signal emitter with Vauclair's teaching of generating a signal in response to user input to yield predictable results. *Id.*, ¶198.

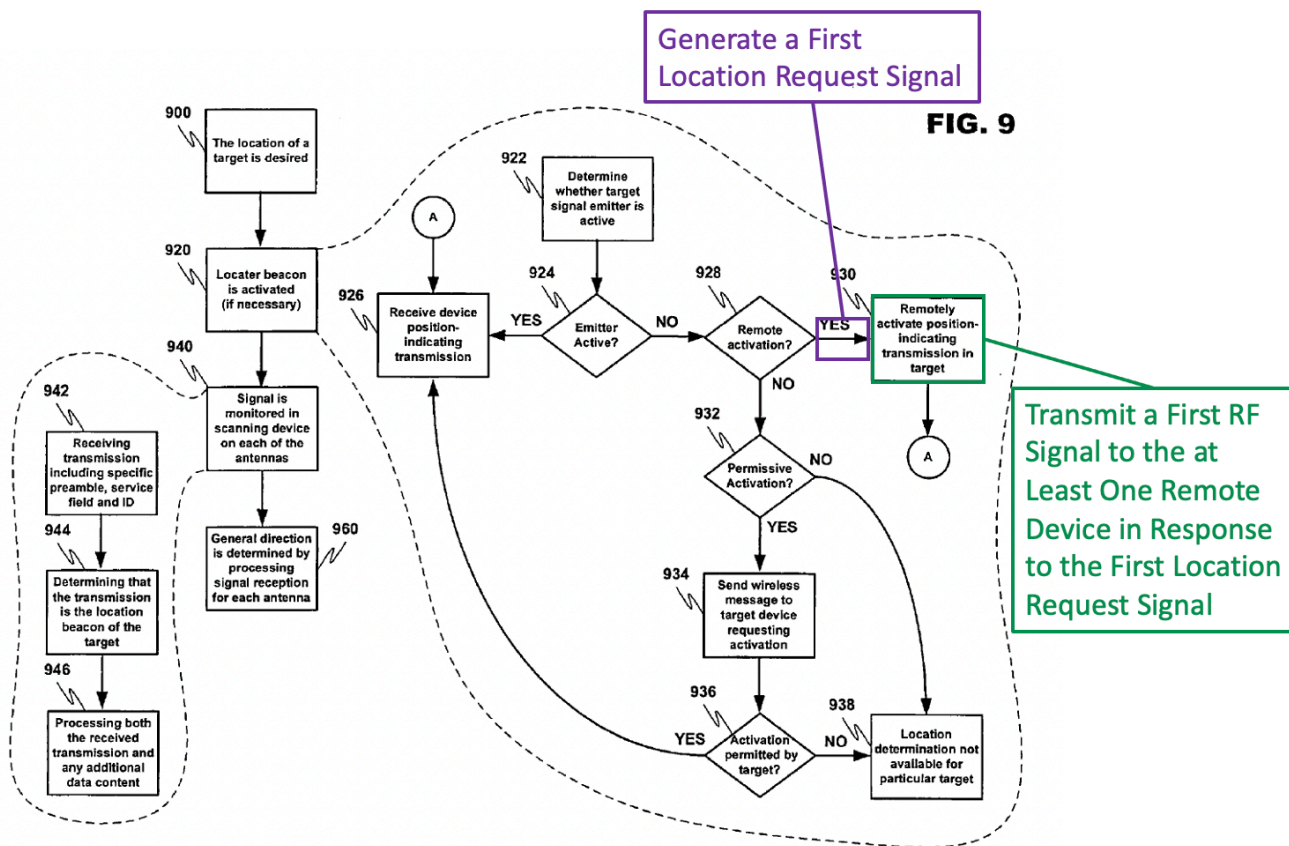
Touchscreens and other input devices that generate input signals sent to the processor were known for decades prior to the '680 Patent. *Id.*, ¶199. Indeed, a POSITA would have understood that any functional input device would generate a corresponding input signal and send that signal to the processor to properly respond to the user's inputs. *Id.* Therefore, there would have been a reasonable expectation of success in configuring Kalliola's touchscreen to generate a signal in response to the user requesting to manually activate an inactive signal emitter. *Id.*

11. 1(d)(vii): “wherein at least one of the plurality of wireless transceivers transmits a first RF signal to the at least one remote device in response to the first location request signal; and”

Kalliola's Bluetooth transceiver (at least one of the plurality of wireless transceivers) transmits an activation message to the signal emitter (transmits a first RF signal to the at least one remote device). The WCD transmits an activation message to the signal emitter, causing the signal emitter to broadcast a position-indicating transmission. *Kalliola*, [0077], [0081], [0011]-[0013].

Fig. 9 illustrates the activation and location-determining process. *Id.*, [0080]. In step 922, the WCD determines if the target signal emitter is active. *Id.*, Fig. 9, [0080]. If not, it is determined whether the target signal emitter can be remotely activated (step 928), and if so, “in step 930 an **activation message** is sent to the target device via any of the aforementioned methods of wireless communication.” *Id.*, [0081], Fig. 9. In response to the WCD sending the activation message, the signal emitter begins broadcasting its position-indicating signal, which allows the WCD to determine the relative direction to the signal emitter. *Id.*, [0077], [0069] (disclosing signal emitter emits a position-indicating transmission received by the WCD’s antenna array that in turn allows for determining direction), [0012]-[0013], [0081]; *Dec.*, ¶¶200-202.

The “activation message” is transmitted to the at least one remote device in response to the first location request signal, because Kalliola teaches (1) the user activating the signal emitter “as needed” and the signal emitter operating in low-power mode “until a message is received instructing a device [the signal emitter] to activate the position-indicating transmission signal”; and (2) if the signal emitter is not active and remote activation is enabled, then in step 930 an activation message is sent to the target device. *Kalliola*, [0077], [0081].



Dec., ¶201 (citing Kalliola, Fig. 9).

Kalliola teaches the activation message is transmitted by the Bluetooth transceiver (*at least one of the plurality of wireless transceivers*). Kalliola, [0077] (“This message may be received by any of the aforementioned wireless mediums such as via a Bluetooth™ message.”); Claim 1(a).

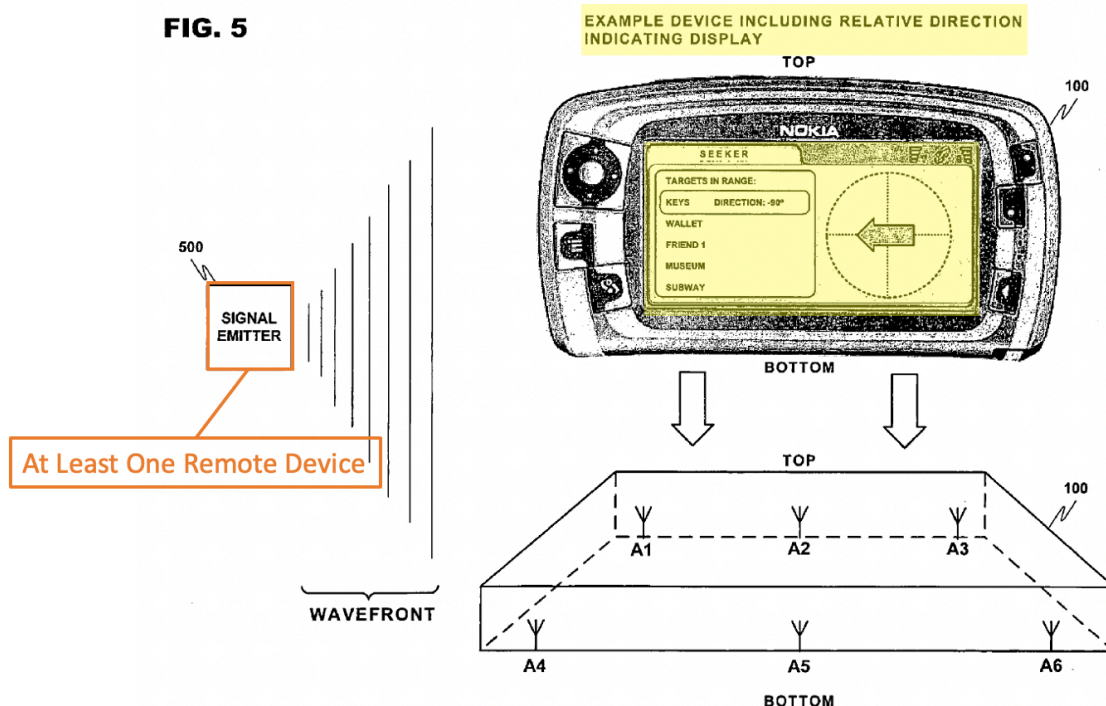
The activation message is an *RF signal* at least because the activation message is sent via Bluetooth, and Bluetooth signals are RF signals. Dec., ¶200.

Thus, a POSITA would have understood or found obvious that Kalliola’s Bluetooth transceiver (the *at least one of the plurality of wireless transceivers*)

transmits the Kalliola activation message (the first RF signal) to the signal emitter (the at least one remote device) in response to the manual user instruction to activate the signal emitter (the first location request signal). *Id.*, ¶203.

12. 1(d)(viii): “present a display that visually assists the user to determine a location of the at least one remote device”

Kalliola’s seeker application present[s] a display that visually assists the user to determine a location of the at least one remote device by displaying an arrow pointing in the direction of at least one target device. Figure 5 shows a screenshot of the seeker application where “the display shows both a list of possible target objects and an arrow pointer” pointing in the direction of the selected KEYS signal emitter. *Kalliola*, [0071].



Dec., ¶205(citing Kalliola, Fig. 5); Kalliola, Fig. 6, [0071] (“The “KEYS” target object is currently selected...Since the keys object is selected, the WCD 100 will attempt to define the relative direction towards the target designated as keys. The **display shows the directional arrow pointing in the direction of the keys**, and gives a relative direction measurement towards the keys of -90° .”), [0083].

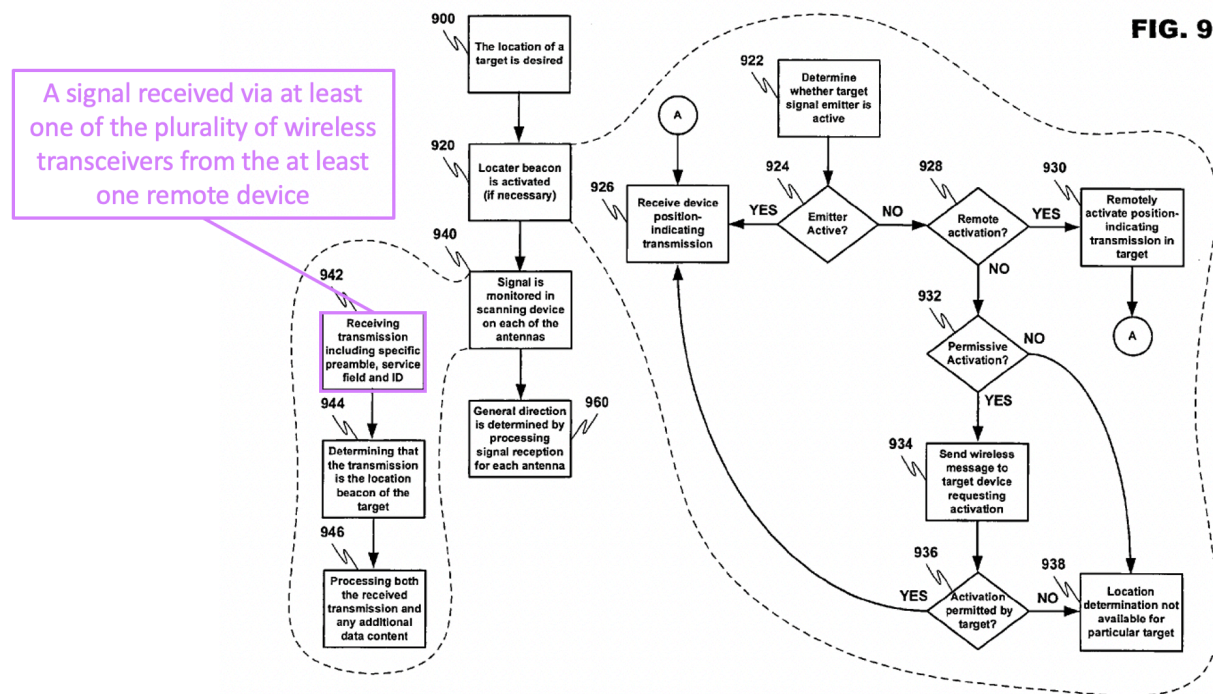
Kalliola’s displayed arrow indicating a direction to the target object to be located satisfies Claim 1(d)(viii). Claim 1(d)(x) provides further detail on what information *visually assists the user to determine the location*, expressly reciting *an arrow pointing in a direction to the at least one remote device*. Therefore, Claim 1(d)(viii) encompasses a displayed arrow as information that visually assists the user.

Kalliola teaches the *processor operates in association with the graphical user interface* to present the arrow, at least because Fig. 5 expressly illustrates the GUI displaying the arrow, and Kalliola expressly teaches the WCD’s processor “controls overall device operation” and the user interface 350 is coupled to processor. Kalliola, [0044], [0051]; Dec., ¶¶204-208.

13. *1(d)(ix): “wherein at least one of the plurality of wireless transceivers receives a second RF signal from the at least one remote device that facilitates determining the location of the at least one remote device”*

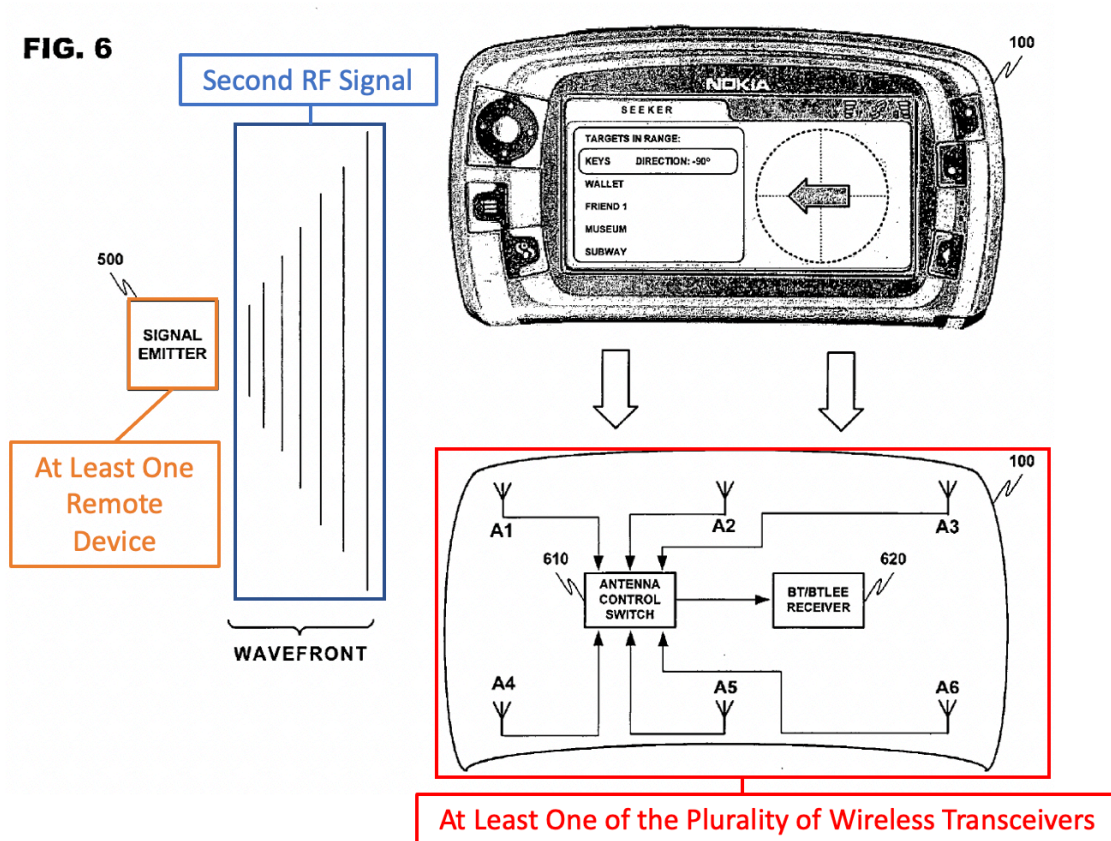
Kalliola’s WCD receives a position-indicating transmission, which is *a*

second RF signal from the at least one remote device. “In step 940 the **position-indicating transmission is received by WCD 100 on any of the antennas A1-A6.**” *Kalliola*, [0082], Fig. 9. “**Signals** received on antennas A1-A6 [of WCD] determine the relative direction to a target from WCD 100.” *Id.*, [0072]. “**BT/BTLEE receiver 620 receives signals** multiplexed from Antennas A1-A6 and **uses this information to determine relative direction using DoA signal processing[.]**” *Id.*, [0073] (explaining BT/BTLEE receiver 620 receives Bluetooth communications); *Dec.*, ¶209 (opining receiver 620 is the receiver of the Bluetooth transceiver of short-range communications 320 mapped for Claim 1(a)). “[I]n step 942 a transmission is received including a preamble that WCD 100 may recognize as a position-indicating transmission,” and the WCD decodes information from the received signal “including information identifying **the transmitting target**, information monitored to determine DoA (such as the 8 bit service field) and any other target relevant information (step 944).” *Kalliola*, [0082].



Dec., ¶210 (citing Kalliola, Fig. 9).

Because Kalliola teaches the WCD receiving a position-indicating transmission via Bluetooth ([0082], [0072]-[0073]), and because a POSITA would have understood a Bluetooth signal is an RF signal for the reasons provided for Claim 1(d)(vii), Kalliola teaches at least one of the plurality of wireless transceivers (i.e., the Bluetooth transceiver) receives a second RF signal from the at least one remote device (i.e., the position-indicating transmission/signal). Dec., ¶¶211-212 (explaining the position-indicating RF signal received by the WCD from the remote device is a *second* RF signal because this signal is received after the mapped *first* RF signal of Claim 1(d)(vii)).



Dec., ¶213 (citing *Kalliola*, Fig. 6).

The position-indicating transmission *facilitates determining the location of the at least one remote device*. *Kalliola* teaches: “The received information is the[n] processed (step 946), and both the content related information and **the directional information** may be used to provide information to user 110.” *Kalliola*, [0082]. The signals from the position-indicating transmission received by the WCD’s antennas are used to “**determine the relative direction to a target from the WCD 100.**” *Id.*, [0072], [0073] (teaching determining relative direction using DoA signal processing), [0082]-[0082] (teaching the WCD receiving the position-indicating

transmission and processing the received information to “indicate the name of the target and the relative direction towards the target from the current position of WCD 100”); *Dec.*, ¶214.

Thus, Kalliola teaches that position-indicating transmission *facilitates determining the location of the at least one remote device* because the WCD uses DoA signal processing techniques to determine the relative direction of the signal emitter from the WCD based on the position-indicating transmission. *Kalliola*, [0082], [0071], [0086], Fig. 5; *Dec.*, ¶¶214-215. A POSITA would have understood that information indicating the **relative direction** of the emitter to the WCD facilitates determining the **location** of the signal emitter because the user follows the direction information to move towards the signal emitter to thereby locate the signal emitter. *Dec.*, ¶215. Indeed, Kalliola expressly describes how the user utilizes the direction to determine the location of the signal emitter: “[a]s the user moves towards the selected target, WCD 100 will continuously measure the signal of the target device and will update the display accordingly so that the arrow and the directional measurement continue to indicate the relative direction towards the keys.” *Kalliola*, [0071]; *compare to* ’680 Patent, 14:54-62, Fig. 15 (describing displaying an “indication of direction” “to point the user in the direction of the wireless device 120”); *Dec.*, ¶¶215-217.

- 14. 1(d)(x): “wherein the display visually assists the user to determine the location of the at least one remote device via an arrow pointing in a direction to the at least one remote device”**

See Claim 1(d)(viii).

B. Claim 4

- 4. The mobile communication device of claim 1 wherein the mobile communication device is a handheld wireless communication device.**

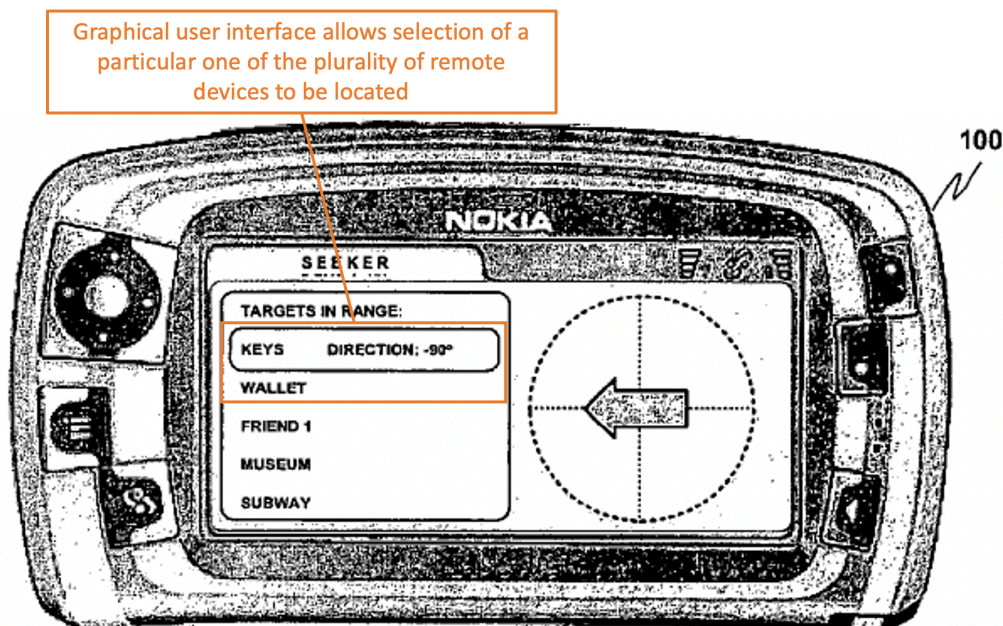
Kalliola teaches the WCD (i.e., the mobile communication device) is a handheld wireless communication device, such as “a basic cellular handset” or “a more complex device such as a wirelessly enabled palmtop” computer. *Kalliola*, [0035]; *Dec.*, ¶219; Claim 1[P].

C. Claim 7

- 7. The mobile communication device of claim 1 wherein the at least one remote device includes a plurality of remote devices and wherein the graphical user interface allows selection of a particular one of the plurality of remote devices to be located.**

Kalliola teaches a plurality of remotely-activated signal emitters associated with the user’s personal items, such as the user’s keys, wallet, ID badge, jacket, etc. *Kalliola*, [0077]; Figs. 5, 8 (RN 802); Claim 1(d)(iv); *Dec.*, ¶¶220-223.

The seeker application’s GUI allows the user to select a signal emitter from a list that includes at least two signal emitters (e.g., associated with the user’s keys and wallet):

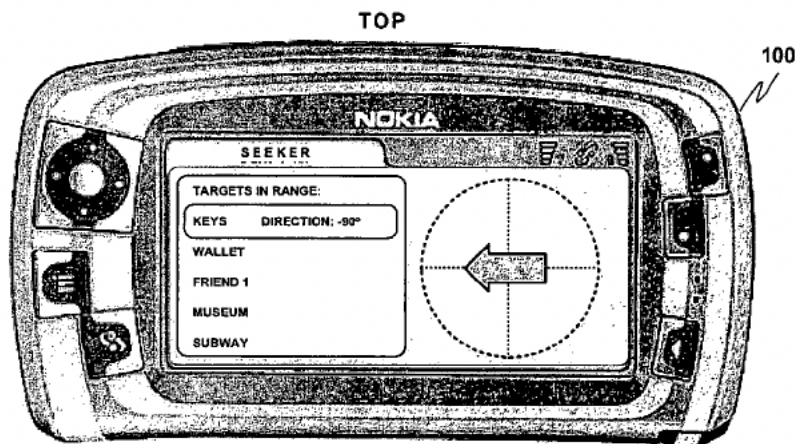


Dec., ¶222 (citing Kalliola, Fig. 5); Kalliola, Fig. 6, [0071], [0010], [0014] (disclosing user selecting target).

D. Claim 8

8. The mobile communication device of claim 7 wherein the display visually indicates the selection of the particular one of the plurality of remote devices to be located.

Kalliola's seeker application displays a border around the selected signal emitter (e.g., KEYS):



Id., Fig. 5 (excerpt). A POSITA would have understood or found obvious the border visually indicates the selection of the KEYS signal emitter, at least because the border visually distinguishes the selected KEYS from the other signal emitters in the list. *Dec.*, ¶¶224-225.

VI. GROUND 2: CLAIMS 2-3, 6, 10-11, 15-17, AND 20 ARE OBVIOUS OVER KALLIOLA, VAUCLAIR, AND KALAYJIAN

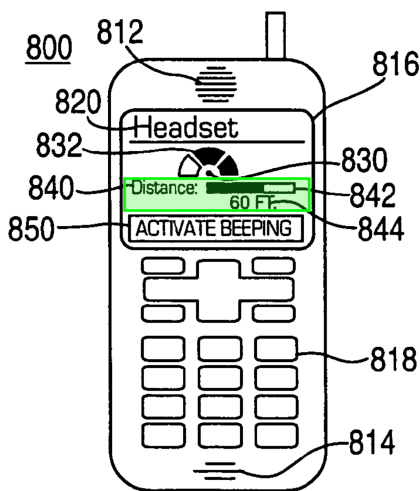
A. Claim 2

1. *Kalayjian's Teachings*

Kalayjian teaches first device 310 calculates a distance to a second device “by switching the amount of power used to transmit signals and measuring the **comparative strength of the received signals**” (i.e., a returned signal to the first device). *Kalayjian*, [0041], [0055] (discussing transmission/reception of signals between first/second devices), [0007] (same), [0040] (same), Fig. 11; *Dec.*, ¶¶226-227. Thus, Kalayjian teaches the distance is calculated based on a signal strength of the signal received from the second device. *Kalayjian*, [0041]; *Masimo Corp. v.*

Sotera Wireless, Inc., No. 2022-1415, slip op. at *2-3 (Fed. Cir. Sep. 28, 2023) (affirming the Board’s construction that the plain meaning of “based on” is “broad,” where the Board relied on a dictionary definition of “based on” to mean “to use particular...facts to make a decision [or] do a calculation”); *Dec.*, ¶227.

Screen 816 displays the calculated distance to the user via distance graphic 840, which “include[s] a symbolic representation 842 of distance, for example, a horizontal bar graphic or a numeric representation of distance 844.” *Kalayjian*, [0049].



Id., Fig. 8. Screen 816 is a GUI of the first device’s display, and distance graphic 840 visually assists the user in locating the second device. *Kalayjian*, [0049]; *Dec.*, ¶228.

A POSITA would have understood or found obvious that distance graphic 840 displayed on screen 816 satisfies Claim 2, as the distance information visually

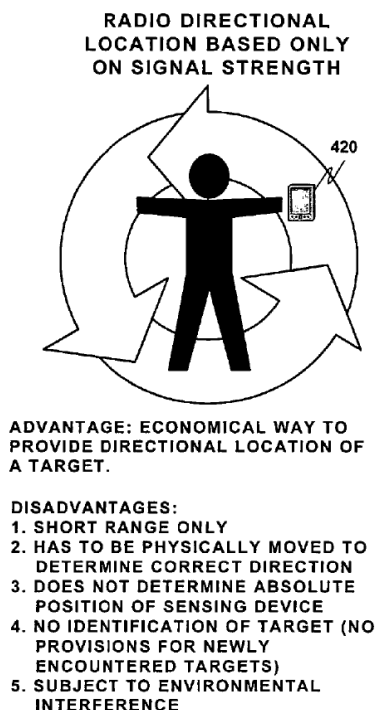
assist[s] the user. *Kalayjian*, [0041], [0049]; *Dec.*, ¶228. *Kalayjian* teaches the distance is calculated based on signal strength of the signal received from the second device. *Kalayjian*, [0041]. The '680 Patent confirms that a distance measurement is based on signal strength, stating “signal strength is...a measure of approximate **distance** to a remote device....” ’680 Patent, 11:4-7. Because *Kalayjian* teaches distance as a comparative strength of received signals and because the '680 Patent similarly describes signal strength as a measure of approximate distance, a POSITA would have understood *Kalayjian*’s displayed distance is based on signal strength and is an indication of signal strength that visually assists the user within the context of the '680 Patent. *Dec.*, ¶229.

2. *Motivation to Combine*

A POSITA would have found it obvious and been motivated to further modify *Kalliola-Vauclair* to include *Kalayjian*’s signal strength measurement to calculate distance and visually assist the user via displaying distance graphic 840. *Dec.*, ¶230.

Kalliola already teaches displaying a direction to visually assist the user in locating the remote device. *See* Claim 1(d)(viii). Visually assisting the user by also displaying information based on signal strength such as distance to the remote device, per *Kalayjian*, would have been a useful improvement to *Kalliola*’s system. *Dec.*, ¶231. *Kalliola* contemplates location-determining systems based on signal strength measurement. *Kalliola*, [0059]-[0060] (“The direction of strongest signal

reception is deemed to be the direction towards the target.”; further teaching antenna “may be used to measure the strength of each received signal”). Kalliola describes the advantage and disadvantages of prior art systems that use signal strength to determine *directional* information to a target:



Kalliola, Fig. 4, [0059]-[0060], Header III (stating “Current Systems for Providing Location-Finding or Directional Information”). Kalliola frames its disclosure as an improvement over determining *direction* based only on signal strength, such as providing Kalliola’s disclosed Direction of Arrival (DoA) location-based determination. *Dec.*, ____; *Kalliola*, [0061].

Kalliola’s disclosures at Fig. 4, [0059]-[0060] would not have been understood by a POSITA to teach away from the alleged invention of Claim 2, as

Claim 2 does not require using signal strength exclusively nor does it require determining direction based on signal strength. *Dec.*, ¶235. Petitioner’s proposed combination employs Kalliola’s DoA method to determine the *direction* from the WCD to the signal emitter *and* Kalayjian’s signal strength method to estimate the *distance* to the signal emitter. *Idemitsu Kosan Co., Ltd., v. SFC Co., Ltd.*, 870 F.3d 1376, 1381 (Fed. Cir. 2017) (“Evidence concerning whether the prior art teaches away from a given invention must relate to and be commensurate in scope with the ultimate claims at issue.”). Thus, the proposed combination encompasses Kalliola’s improvement over determining direction based exclusively on signal strength as well as Kalayjian’s distance calculation based on signal strength. Kalliola does not criticize, discredit, or discourage using signal strength to visually assist the user in locating the signal emitter. *Dec.*, ¶235.

The Federal Circuit has found that “a given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.” *Allied Erecting & Dismantling Co. v. Genesis Attachments, LLC*, 825 F.3d 1373, 1381 (Fed. Cir. 2016) (quoting *Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165, 77 USPQ2d 1865, 1870 (Fed Cir. 2006) (citation omitted)). Here, Kalliola recognizes that signal strength is an economical way to determine directional information. *Kalliola*, Fig. 4, [0060]. Likewise, a POSITA would have

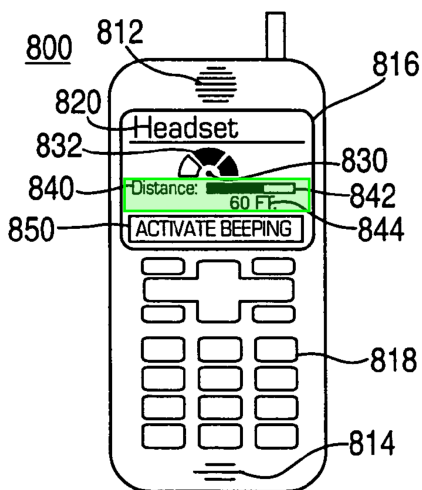
appreciated that using signal strength would also be an economical way to estimate the distance to the signal emitter. *Dec.*, ¶232.

Thus, it would have been obvious to provide *both* location-determination options to visually assist the user, namely (1) Kalliola's DoA method of determining direction to the remote device *and* (2) Kalayjian's signal strength measurement to determine distance (as otherwise also recognized as known by Kalliola). *Dec.*, ¶231. Such an improvement would have been readily implementable in Kalliola's system. *Id.* Kalliola's WCD already includes a screen that visually assists the user determine a location of the signal emitter by displaying the relative direction from the WCD to the signal emitter. *Kalliola*, Figs. 5-6. Additionally, Kalliola teaches "the seeker program may use this building schematic in the direction and position location of various selected targets" and "information received from the various potential target devices discovered in the effective transmission range of WCD 100 may be used to triangulate the approximate position of WCD 100 in...relative (**e.g., 150 meters North from target**) terms." *Id.*, [0086], [0083]. A POSITA would have understood that visually assisting the user by displaying information based on signal strength, such as a calculated distance to the signal emitter in addition to the direction, would have predictably enhanced the user's ability to quickly locate the target object, thereby enhancing user satisfaction. *Id.*, ¶232.

A POSITA would have understood that because Kalliola's WCD already includes the Bluetooth transceiver required to perform Kalayjian's distance determination based on signal strength, no hardware changes to the WCD would have been required. *Id.*, ¶236. Thus, a POSITA would have been motivated to configure Kalliola's WCD to visually assist to the signal emitter based on signal strength as taught by Kalayjian, to improve similar object-finding systems in the same way. *Id.*, ¶232. The modification would be modifying the software on the WCD to include a module for calculating the distance based on the strength of the Bluetooth signals received from the signal emitter and modifying Kalliola's seeker application to display an indication of the distance on the GUI displayed in Figures 5 and 6. *Id.*, ¶236. Location-finding using signal strength of RF signals was well understood prior to the '680 Patent, and there would have been a reasonable expectation of success. *Id.*

B. Claim 3

Kalayjian teaches Claim 3 for the same reasons provided for Claim 2. *See* Claim 2. Specifically, Kalayjian's distance graphic 840 is an indication of distance because it identifies the distance from the master device to the slave device and includes "a symbolic representation 842 of distance, for example, a horizontal bar graphic or a numeric representation of distance 844." *Kalayjian*, [0049]; *Dec.*, ¶238.



Kalayjian, Fig. 8. A POSITA would have further understood distance graphic 840 to visually assist the user for the same reasons provided for Claim 2. *See* Claim 2.

C. Claim 6

6. The mobile communication device of claim 1, wherein the at least one remote device emits a detectable alert signal in response to the first RF signal to further assist the user in determining the location of the at least one remote device.

1. *Kalayjian's Teachings*

Kalayjian teaches a wireless object location system, including a second device that emits a detectable alert signal in response to an RF signal received from a first device. *Kalayjian*, [0054]. The detectable alert signal assists the user in determining the location of the second device. *Id.* Kalayjian teaches that in response to the signal sent from the first device to the second device, “the slave device can guide a user to its location[.]” *Id.*, [0038]. Kalayjian explains that “slave devices 320, 400 and 500 can guide a user to their location by **emitting auditory** or visual **signals**.” *Id.*,

[0039]. Using the auditory or visual signals, the user can “follow the sound or light to the misplaced object.” *Id.*

Kalayjian teaches detectable alert signals are emitted in response to the signal sent from the first device to the second. After the first device transmits the RF paging signal to the second device, “the slave device takes a predetermined action to guide a user to its location. The predetermined action could be, for example, turning on a light, [or] **emitting a sound**[.]” *Id.*, [0054].

Kalayjian expressly teaches that the second device emits detectable alert signals, such as a sound, “to guide a user to its location.” *Id.*, [0039] (“slave devices 320, 400 and 500 can **guide a user to their location by emitting auditory or visual signals.**”); [0054] (“the slave device takes a predetermined action **to guide a user to its location.**”). Thus, a POSITA would have understood that Kalayjian’s audible alert is a detectable alert signal used to assist the user in locating the remote device. *Dec.*, ¶¶239-241.

2. *Motivation to Combine*

A POSITA would have found it obvious and been motivated to configure Kalliola’s signal emitter (the at least one remote device) to include a speaker and emit an audible signal when the signal emitter receives the Bluetooth activation message (the first RF signal) from the WCD. *Dec.*, ¶242. Per Kalayjian, causing the remote device to emit a sound “allows a user to follow the sound...to the misplaced

object.” *Kalayjian*, [0039]. A POSITA would have understood that a small object, such as the user’s keys, may be nearby but hidden from view by other objects. *Dec.*, ¶¶243-244, ¶246. A POSITA would have understood that causing the signal emitter to emit an audible alert, as taught by *Kalayjian*, would have allowed the user to locate the lost item using his or her auditory senses, which would have allowed the user to more easily locate objects hidden from view. *Id.*, ¶244. Thus, a POSITA would have been motivated to improve similar object-finding location systems in the same way by enabling the user of Kalliola’s WCD to quickly locate a lost personal item, such as their keys, by causing the signal emitter associated with the keys to emit a sound in response to receiving the Bluetooth message from the WCD. *Id.*, ¶¶244-245. Indeed, *Kalayjian* expressly acknowledges such benefits. *Kalayjian*, [0039]; *Dec.*, ¶243.

Object-finding systems using wireless signals to trigger auditory alerts were well-known prior to the invention of the ’680 Patent. *Id.*, ¶247. A POSITA would have understood that including a speaker in Kalliola’s signal emitter would have required only minor hardware and software changes, e.g., adding a speaker and associated software modifications to output an audible alert. *Id.* For these reasons, there would have been a reasonable expectation of success modifying Kalliola’s object-finding system to generate audible alerts as taught by *Kalayjian*. *Id.*

D. Claim 10

1. Claim 10[P]

See Claim 1[P].

2. Claim 10(a)

See Claim 1(a).

3. Claim 10(b)

See Claim 1(c).

4. Claim 10(c)

See Claim 1(b).

5. Claim 10(d)(i)

See Claims 1(d)(i)-(ii).

6. Claim 10(d)(ii)

See Claim 1(d)(iii).

7. Claim 10(d)(iii)

See Claims 1(d)(iv)-(v).

The mapping for Claim 1(d)(iv) includes a discussion of Vauclair's teachings of executing the pairing sequence to thereby complete the pairing of the host/peripheral devices. *See generally Vauclair*, [0037]-[0057], pinpoint at [0049] (disclosing the devices entering a Pairing Stated state); *Dec.*, ¶¶254-256. Therefore, Vauclair teaches the claimed *pairing*.

The mapping for Claim 1(d)(iv) also discusses the obviousness of the Kalliola WCD's touchscreen presenting a GUI that displays Vauclair's pairing option for input by the user at the touchscreen (the first user interaction with the touchscreen). See Claim 1(d)(iv).

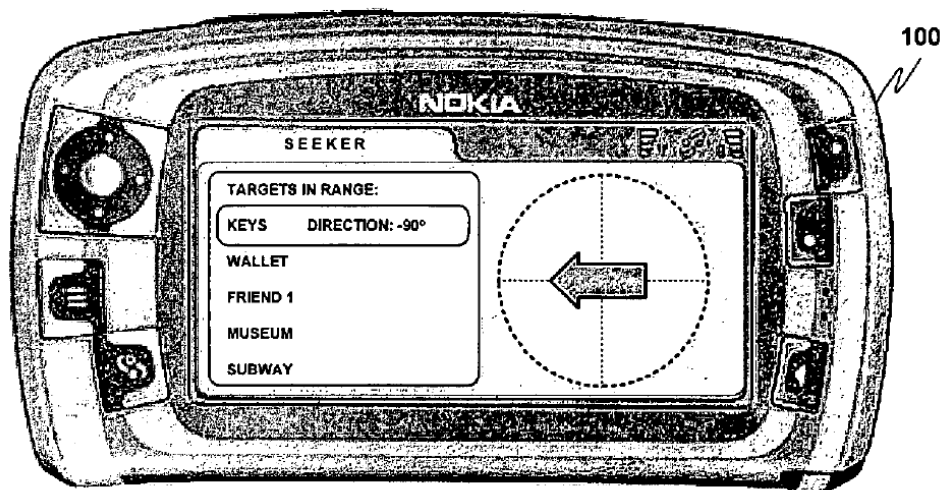
The mapping for Claim 1(d)(v) discusses the pairing process being performed via at least one of the plurality of transceivers. See Claim 1(d)(v).

8. Claim 10(d)(iv)

See Claim 6; Dec., ¶¶257-258.

9. Claim 10(d)(v)

Kalliola teaches attaching a plurality of signal emitters to target objects including the user's personal items, such as keys, wallet, ID badge, jacket, etc. Kalliola, [0077], Fig. 8 (RN 802); Claim 7. Kalliola expressly teaches "[t]he 'KEYS' target object is **currently selected**." *Id.*, [0071]. The selection, by the user, of the KEYS target object satisfies the claimed second interaction with the touchscreen. Dec., ¶260. The GUI shown in Kalliola, Fig. 5, facilitates...selection of the at least one remote device from a plurality of remote devices, as the GUI touchscreen displays a plurality of items (e.g., wallet, keys, etc.) for selection by the user. *Id.*

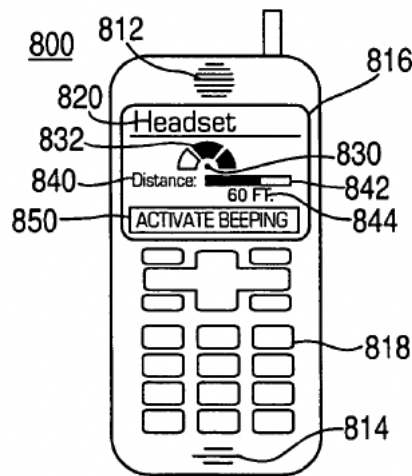


Kalliola, Fig. 5.

10. Claim 10(d)(vi)

(a) Kalayjian's Teachings

Kalayjian teaches a second device that includes a **speaker configured to emit sounds** operable to guide a user to its location. *Kalayjian*, [0034], [0054]; Claim 10(d)(iv), Claim 6. Kalayjian also teaches that the first device responds to a user interaction by transmitting a Bluetooth message to the second device, which causes the second device to generate an audio alert. *See* Claim 6; *Dec.*, ¶261. “FIG. 8 includes a screenshot of the user interface of master device 800 when the master device is attempting to locate a slave device.” *Id.*, [0049]. As shown below, “[s]creen 816 can include **graphical button 850 to enable the user to prompt the slave device to beep[.]**” *Id.*



Id., Fig. 8. Then “the master device transmits a signal to a slave device using a Bluetooth communications protocol[,]” and “the slave device takes a predetermined action to guide a user to its location[,] such as **emitting a sound**[.]” *Id.*, [0054], Fig. 10, Abstract (“When **prompted by a user**, the **master device can transmit a signal** to one of the slave devices. The slave device can then take a predetermined action to attempt to guide a user to its location. For example, the slave device can...**emit auditory** or visual **alerts** itself.”). Thus, a POSITA would have understood that Kalayjian teaches that the first device respond[s] to a user interaction by transmitting, via a Bluetooth transceiver, a signal to the second device that causes the second device to generate the audio alert. *Dec.*, ¶262.

The signal transmitted from the first device to the second device via Bluetooth communications protocol is a paging signal. The ’680 Patent states “paging signals...sent by a single device are received by all other devices and cause each of the receiving devices to generate a detectable alert signal.” ’680 Patent, 16:3-6.

“[T]he wireless device 120...receives a paging signal 112 transmitted by adjunct device 110. In response to the paging signal 112, a light or sound emitter of wireless device 120 emits a detectable alert signal that helps the user locate the personal object.” *Id.*, 7:47-53. Because Kalayjian teaches the first device transmits a signal (e.g., signal sent at step 1020) that causes the second device to generate a detectable alert signal, Kalayjian teaches a paging signal within the context of the ’680 Patent. *Dec.*, ¶¶263-264.

Kalliola-Vauclair modified with Kalayjian teaches transmitting, via at least one of the plurality of wireless transceivers. Like Kalliola, Kalayjian also teaches that the first/second devices communicate via the Bluetooth protocol, including transmitting the paging signal. *Kalayjian*, [0037], [0054]. In the proposed modification, the Kalayjian paging signal to cause an audio alert would be transmitted by Kalliola’s Bluetooth transceiver. *Dec.*, ¶265.

Kalliola-Vauclair, modified with Kalayjian, also teaches a third interaction with the touchscreen. In the proposed modification, Kalliola’s seeker application GUI displayed on the touchscreen is modified to include Kalayjian’s graphical button 850 (“ACTIVATE BEEPING”). The user’s selection of the ACTIVATE BEEPING button via the WCD’s touchscreen teaches a third interaction with the touchscreen. *Dec.*, ¶265. Additionally, it would have been obvious to configure the seeker application to respond[] to a third interaction with the touchscreen by transmitting,

via at least one of the plurality of wireless transceivers (the WCD's Bluetooth transceiver), a first paging signal to the at least one remote device (the signal emitter), wherein the first paging signal causes the at least one remote device to generate the audio alert (the modified signal emitter generates the audio alert when the signal is received). *Id.*

(b) Motivation to Combine

A POSITA would have found it obvious and been motivated to modify the Kalliola seeker application executing on processor 300 to cause the Bluetooth transceiver (the at least one of the plurality of wireless transceivers) to transmit a paging signal to Kalliola's remote signal transmitter 500 to cause it to generate an audio alert. *Dec.*, ¶265. Specifically, it would have been obvious to a POSITA to modify Kalliola's seeker application so that the user can perform a third interaction with the touchscreen to cause the signal emitter to generate an audio alert. *Id.*

Claim 6 (incorporated herein) discusses the obviousness of modifying Kalliola-Vauclair to include Kalayjian's paging signal to cause the remote device to generate an audio alert. *See* Claim 6. A POSITA would have been motivated to further modify Kalliola's seeker application such that it includes a graphical button that, when pressed, triggers the WCD's Bluetooth transceiver to transmit a Bluetooth message instructing the signal emitter to generate an audio alert to further assist the user in locating the device and improve similar object-finding systems in the same

way. *Id.*, ¶¶266-269. A POSITA would also understand that such modification would have only required minor software changes and not changed the principle of operation of Kalliola's seeker application, as Kalliola already teaches a Bluetooth transceiver for sending signals to signal emitters and a touchscreen for receiving user input. *Id.*, ¶270. For these reasons, there would have been a reasonable expectation of success modifying Kalliola's seeker application to generate audible alerts in response to a user interaction, as taught by Kalayjian. *Id.*

11. Claim 10(d)(vii)

See Claims 1(d)(viii)-(ix). Additionally, Kalliola's seeker application executing on processor 300 presents a display on the touchscreen. *Kalliola*, Fig. 5, [0071]; *Dec.*, ¶¶217-276.

E. Claim 11

See Claim 2. As discussed for Claim 2's mapping, a distance measurement is based on a signal strength and is an indication of the signal strength within the context of the '680 Patent.

F. Claim 15

See Claims 2-3; *Dec.*, ¶¶278-279.

G. Claim 16

See Claims 2-3, Claim 11; *Dec.*, ¶280.

H. Claim 17

See Claim 4.

I. Claim 20

See Claims 6, 10(d)(iv)-(v); *Dec.*, ¶282.

VII. GROUND 3: CLAIM 5 IS OBVIOUS OVER KALLIOLA, VAUCLAIR, AND TURUNEN

A. Kalliola's Teachings

Kalliola's WCD includes a plurality of wireless transceivers including a long range transceiver for exchanging "information over large geographic areas (such as cellular networks) via an antenna." *Kalliola*, [0047]; Claim 1(a). The long-range transceiver is a cellular transceiver that sends and receives voice communications via a cellular telephony network such as GSM. *Kalliola*, [0047] (disclosing voice communications via GSM), [0003]. Thus, Kalliola teaches a long range transceiver for sending and receiving telephone calls via a telephony network. *Dec.*, ¶¶283-286.

The cellular transceiver is also configured to enable data communication sessions via GPRS and/or UMTS. *Kalliola*, [0047], [0036] (disclosing wireless Internet access via long-range networks); *Dec.*, ¶287. In related art, Turunen teaches the specific type of data communicated using GPRS sessions.

B. Turunen's Teachings

Turunen teaches "transmitting **Internet data** between a mobile host and a remote host coupled via the Internet and a GSM/GPRS cellular telephone network."

Turunen, Abstract, 5:30-32 (disclosing mobile host connected to the Internet via cellular network), 5:33-39 (disclosing “**Internet data may be transmitted between the MH and the Internet** via either of these links”). Thus, Turunen teaches a mobile communication device that communicates Internet data via a GSM cellular network utilizing a GPRS link. *Dec.*, ¶288.

C. Motivation to Combine

A POSITA would have found it obvious and been motivated to configure Kalliola’s GSM cellular transceiver to communicate Internet data using a GPRS link. *Dec.*, ¶289. At the time of the ’680 Patent, cellular devices that communicated internet data via 3G networks were common in the market. *Id.* Thus, a POSITA would have been motivated to combine these prior art elements according to known methods to yield the predictable result of enabling Kalliola’s WCD to wirelessly communicate Internet data using GPRS data communication sessions on the GSM network. *Id.*

Because GRPS was specifically designed to handle Internet communications and had been in use for nearly a decade prior to the invention of the ’680 Patent, there would have been a reasonable expectation of success configuring Kalliola’s cellular transceiver to wirelessly communicate Internet data using GPRS data communication sessions. *Id.*

VIII. GROUND 4: CLAIMS 18-19 ARE OBVIOUS OVER KALLIOLA, VAUCLAIR, KALAYJIAN, AND TURUNEN

A. Claim 18

See Claim 5.

B. Claim 19

See Claim 5.

IX. GROUND 5: CLAIM 9 IS OBVIOUS OVER KALLIOLA, VAUCLAIR, AND TRIMBLE

Regarding the claimed *paging network*, the '680 Patent describes “three or more devices can be paired together in this fashion to form a paging network.” '680 *Patent*, 16:1-3, Fig. 17, 16:37-38.

A. Kalliola's Teachings

Kalliola teaches a plurality of signal emitters (*a plurality of remote devices*), each associated with a personal item, such as the user's keys and wallet. *See* Claim 7. Kalliola-Vauclair render obvious pairing Kalliola's WCD with each remote signal emitter (keys, wallet, etc.). Claim 1(d)(iv); *Kalliola*, Fig. 5, [0077] (disclosing signal emitters associated with additional items, such as clothing, bicycle, etc.). Therefore, Kalliola and Vauclair teach *the plurality of remote devices comprise a first paging network* because Kalliola-Vauclair results in the WCD being paired with the signal emitters associated with the user's keys, wallet, etc., thereby forming a paging network of three or more devices paired together. *Dec.*, ¶¶292-294.

B. Trimble's Teachings

In related art, Trimble teaches “[a]n object locating system [that] includes a transmitter unit for activating a plurality of electronic tags to assist in locating keys, remote control devices, cordless phones, eyeglasses, articles of clothing, etc. to which the tags have been attached.” *Trimble*, Abstract. “The tags are self-contained, battery powered devices that signal their presence, when activated, **by an audible and/or visual indication to get the attention of the user.**” *Id.* Each tag includes an audible alarm generating device 62 that may be “a piezo sound device or piezo-electric transducer.” *Id.*, [0092], [0093], Fig. 11.

A transmitter 10 includes an RF signal transmitter 16 for transmitting address codes to activate various number of tags. *Id.*, [0056], [0074]. A master address code identifies “**a number of electronic tags that are attached to a number of separate items, which are selected by the user to be part of a group or family of items.**” *Id.*, [0074]. Transmission of a master coded RF signal results “**in the simultaneous activation of the multiple electronic tags.**” *Id.*, [0081]. [0068]. Thus, Trimble teaches that each of a *plurality of remote devices emits corresponding detectable alert signals* (i.e., audible alarm) in response to an RF signal (i.e., the master coded RF signal) *to assist the user in determining the location of the plurality of remote devices.* *Dec.*, ¶¶295-296.

C. Motivation to Combine

A POSITA would have been motivated and found it obvious to configure Kalliola's object-finding system with Trimble's teachings. *Id.*, ¶297. The claimed first RF signal corresponds to Kalliola's activation message signal, which is transmitted in response to the user manually activating a remotely-activated signal emitter to cause the signal emitter to send the WCD a position-indicating transmission. *See* Claim 1(d)(vii). Applying Trimble, it would have been obvious to configure Kalliola's seeker application to give the user the option of activating multiple signal emitters at the same time via a master activation signal. *Id.* It also would have been obvious to configure Kalliola's remotely-activated signal emitters (each of the plurality of remote devices) to include an audible alarm-generating device, such as a piezo-electric transducer, and emit an audible alert signal when each signal emitter receives the master activation message (the first RF signal) from the WCD, per Trimble. *Id.*

A POSITA would have recognized that implementing Trimble's master activation technique in Kalliola's object-finding system would have several benefits, such as allowing users to locate lost/hidden items via audible alerts. *Id.*, ¶298. Additionally, allowing the user to activate multiple signal emitters simultaneously would have saved time and enhanced the system's usability, such as needing to quickly locate multiple items at the same time. *Id.*, ¶¶298-299.

Signal emitters capable of emitting audio alerts in response to receiving wireless signals were well-known prior to the invention of the '680 Patent. *Id.*, ¶300. A POSITA would have understood that including an audible alarm-generating device, such as a piezo-electric transducer, in Kalliola's signal emitter would have required only minor hardware and software changes, ensuring a reasonable expectation of success in the modification to Kalliola. *Id.*

X. GROUND 6: CLAIM 12 IS OBVIOUS OVER KALLIOLA, VAUCLAIR, KALAYJIAN, AND TRIMBLE

See Claim 9 (additionally discussing Trimble's teaching of audio alerts); Claim 11. Note that while Claim 9 does not rely on Kalayjian, Claim 12 does via its dependence on Claim 11.

XI. DISCRETION UNDER 35 U.S.C. § 314(a)

Petitioner stipulates that if the Petition is instituted, Petitioner will not seek resolution in the district court of any ground of invalidity raised in the Petition or that could have been raised in the Petition. *Sotera Wireless v. Masimo*, IPR2020-01019, Paper 12 at 18-19 (Dec. 1, 2020) (precedential). This stipulation "mitigates concerns of potentially conflicting decisions and duplicative efforts between the district court and the PTAB," and the Director has instructed that the Board will not discretionarily deny institution under 35 U.S.C. § 314(a). *Interim Procedure for Discretionary Denials*, pp. 7-8 (June 21, 2022).

XII. CONCLUSION

For the foregoing reasons, Petitioner respectfully requests *inter partes* review of the Challenged Claims.

Respectfully submitted,

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COUNSEL FOR PETITIONER

XIII. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Parties-in-Interest Under 37 C.F.R. § 42.8(b)(1)

Petitioner is the real party in interest.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

The '680 Patent is presently the subject of a patent infringement lawsuit filed against Petitioner in the United States District Court for the Western District of Texas Waco Division. *THL Holding Company, LLC v. Apple, Inc.*, Case No. 6:23-cv-00077.

C. Lead and Back-Up Counsel Under 37 C.F.R. § 42.8(b)(3)

Petitioner provides the following designation and service information for lead and back-up counsel. 37 C.F.R. § 42.8(b)(3) and (b)(4).

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CLAIMS LISTING APPENDIX
U.S. Patent No. 11,265,680 for Claims 1-12, 15-20

Claim Designation	Claim Language
Claim 1[P]	A mobile communication device comprising:
Claim 1(a)	a plurality of wireless transceivers;
Claim 1(b)	a memory that stores operational instructions;
Claim 1(c)	a touch screen; and
Claim 1(d)(i)	a processor coupled to the memory and to the touch screen,
Claim 1(d)(ii)	wherein the processor executes the operational instructions that cause the processor to present a graphical user interface via the touch screen and
Claim 1(d)(iii)	wherein the processor operates in association with the graphical user interface to:
Claim 1(d)(iv)	generate a pairing signal in response to a first indication from a user to pair the mobile communication device to at least one remote device,
Claim 1(d)(v)	wherein the at least one of the plurality of wireless transceivers, responds to the pairing signal generated by the graphical user interface by communicating RF signals to pair the mobile communication device to the at least one remote device;
Claim 1(d)(vi)	generate a first location request signal in response to a second indication from the user to locate the at least one remote device,
Claim 1(d)(vii)	wherein at least one of the plurality of wireless transceivers transmits a first RF signal to the at least one remote device in response to the first location request signal; and
Claim 1(d)(viii)	present a display that visually assists the user to determine a location of the at least one remote device,
Claim 1(d)(ix)	wherein at least one of the plurality of wireless transceivers receives a second RF signal from the at least one remote device that facilitates determining the location of the at least one remote device,
Claim 1(d)(x)	wherein the display visually assists the user to determine the location of the at least one remote device via an arrow pointing in a direction to the at least one remote device.

Claim Designation	Claim Language
Claim 2	The mobile communication device of claim 1 wherein the display visually assists the user further based on a signal strength of the second RF signal from the at least one remote device.
Claim 3	The mobile communication device of claim 1 wherein the display visually assists the user further by displaying an indication a distance to the at least one remote device.
Claim 4	The mobile communication device of claim 1 wherein the mobile communication device is a handheld wireless communication device.
Claim 5	The mobile communication device of claim 4 wherein the plurality of wireless transceivers includes a long range transceiver for sending and receiving telephone calls via a telephony network and further for communicating Internet data.
Claim 6	The mobile communication device of claim 1, wherein the at least one remote device emits a detectable alert signal in response to the first RF signal to further assist the user in determining the location of the at least one remote device.
Claim 7	The mobile communication device of claim 1 wherein the at least one remote device includes a plurality of remote devices and wherein the graphical user interface allows selection of a particular one of the plurality of remote devices to be located.
Claim 8	The mobile communication device of claim 7 wherein the display visually indicates the selection of the particular one of the plurality of remote devices to be located.
Claim 9	The mobile communication device of claim 7 wherein the plurality of remote devices comprise a first paging network wherein each of the plurality of remote devices emits corresponding detectable alert signals in response to the first RF signal to assist the user in determining the location of the plurality of remote devices.
Claim 10 [P]	A mobile communication device comprising:
Claim 10(a)	a plurality of wireless transceivers;
Claim 10(b)	a touchscreen;
Claim 10(c)	a memory that stores operational instructions; and

Claim Designation	Claim Language
Claim 10(d)(i)	a processor configured to execute operational instructions, wherein the operational instructions cause the processor to present a graphical user interface via the touch screen and
Claim 10(d)(ii)	wherein the processor operates in association with the graphical user interface to:
Claim 10(d)(iii)	respond to a first user interaction with the touchscreen by pairing, via at least one of the plurality of wireless transceivers, the mobile communication device with at least one remote device,
Claim 10(d)(iv)	the at least one remote device including a sound emitter configured to generate an audio alert;
Claim 10(d)(v)	facilitate, via a second interaction with the touchscreen, selection of the at least one remote device from a plurality of remote devices;
Claim 10(d)(vi)	respond to a third interaction with the touchscreen by transmitting, via at least one of the plurality of wireless transceivers, a first paging signal to the at least one remote device, wherein the first paging signal causes the at least one remote device to generate the audio alert; and
Claim 10(d)(vii)	present a display on the touchscreen, based on a signal received via at least one of the plurality of wireless transceivers from the at least one remote device, wherein the display visually assists a user to determine a location of the at least one remote device.
Claim 11	The mobile communication device of claim 10 wherein the display visually assists the user based on a signal strength of the signal received via at least one of the plurality of wireless transceivers from the at least one remote device.
Claim 12	The mobile communication device of claim 11 wherein the plurality of remote devices comprise a first paging network wherein each of the plurality of remote devices emits corresponding audio alerts in response to the first paging signal to assist the user in determining the location of the plurality of remote devices.
Claim 15	The mobile communication device of claim 10 wherein the display visually assists the user in determining a distance to the at least one remote device.

Claim Designation	Claim Language
Claim 16	The mobile communication device of claim 10 wherein the display visually assists the user by displaying an indication of a signal strength of the signal received via at least one of the plurality of wireless transceivers from the at least one remote device.
Claim 17	The mobile communication device of claim 10 wherein the mobile communication device is a handheld wireless communication device.
Claim 18	The mobile communication device of claim 17 wherein the plurality of wireless transceivers includes a long range transceiver for sending and receiving telephone calls via a telephony network and further for communicating Internet data.
Claim 19	The mobile communication device of claim 17 the plurality of wireless transceivers includes a long range transceiver for communicating Internet data.
Claim 20	The mobile communication device of claim 10 wherein the audio alert further assists the user in determining the location of the at least one remote device.

APPENDIX OF EXHIBITS

Exhibit 1001	U.S. Patent No. 11,265,680 to Howard et al.
Exhibit 1002	File History of U.S. Patent No. 11,265,680
Exhibit 1003	Declaration of R. Michael Buehrer, Ph.D.
Exhibit 1004	U.S. Patent Publication No. 2007/0197229A1 to Kalliola et al.
Exhibit 1005	U.S. Patent Publication No. 2008/0320587A1 to Vauclair et al.
Exhibit 1006	U.S. Patent Publication No. 2008/0125040A1 to Kalayjian
Exhibit 1007	U.S. Patent No. 6,487,595 to Turunen et al.
Exhibit 1008	U.S. Patent Publication No. 2004/0252030 to Trimble et al.
Exhibit 1009	THL's Opening Claim Construction Brief dated September 14, 2023
Exhibit 1010	ISO/IEC 24730-2:2006(E) <i>Information technology – Real-time locating systems (RLTS) – Part 2: 2,4 GHz air interface protocol</i> . International Organization for Standardization and the International Electrotechnical Commission (2006)
Exhibit 1011	Hui Liu, Houshang Darabi, Pat Banerjee, and Jing Liu, <i>Survey of Wireless Indoor Positioning Techniques and Systems</i> , IEEE Transactions on Systems, Man, and Cybernetics-Part C: Applications and Reviews, Vol. 37, No. 6 (November 2007)
Exhibit 1012	<i>A Comprehensive Look into the RTLS System</i> , https://www.mokosmart.com/look-into-rtls-system/ (August 2021, retrieved August 25, 2023)
Exhibit 1013	Roy Want, Andy Hopper, Veronica Falcão, and Jonathan Gibbons, <i>The Active Badge Location System</i> , ACM Transactions on Information Systems, Vol. 10, No. 1 (January 1992)
Exhibit 1014	Paramvir Bahl and Venkata N. Padmanabhan, <i>RADAR: An In-Building RF-based User Location and Tracking System</i> , Proceedings IEEE INFOCOM 2000. Conference on Computer Communications. Nineteenth Annual Joint Conference of the IEEE Computer and Communications Societies pp. 775-784 vol.2, (March 2000)
Exhibit 1015	Gwen Moritz, <i>Larry W. Fullerton: World Class Innovator</i> , Arkansas Business, https://www.arkansasbusiness.com/article/58921/larry-w-fullerton-world-class-innovator (April 2002, retrieved June 26, 2023)
Exhibit 1016	Bob Paddock, <i>A Guide to online information about: Radio Frequency Identification (RFID)</i>

	https://web.archive.org/web/20060513161655/http://archive.chipcenter.com/circuitcellar/october00/c1000rp52.htm (August 2001, retrieved September 7, 2023)
Exhibit 1017	IEEE Standard for Information technology– Local and metropolitan area networks– Specific requirements– Part 15.4: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Low-Rate Wireless Personal Area Networks (WPANs): Amendment 1: Add Alternate PHYs, IEEE Std 802.15.4a-2007 (Amendment to IEEE Std 802.15.4-2006) (2007)
Exhibit 1018	Kaveh Pahlavan, Xinrong Li, and Juha-Pekka Mäkelä, <i>Indoor Geolocation Science and Technology</i> , IEEE Communications Magazine (March 2002)
Exhibit 1019	Jeffrey Hightower and Gaetano Borriello, <i>A Survey and Taxonomy of Location Systems for Ubiquitous Computing</i> , Technical Report UW-CSE 01-08-03 (August 2001)
Exhibit 1020	<i>PARC History – A Legacy of Innovation and Inventing the Future</i> , https://www.parc.com/about-parc/parc-history/ (retrieved June 26, 2023)
Exhibit 1021	Guifx, <i>Touchscreens That Changed the World</i> , https://www.guifx.com/touchscreens-that-changed-the-world/ (retrieved June 26, 2023)
Exhibit 1022	<i>iPhone User's Guide</i> , Apple Inc. (2007)
Exhibit 1023	<i>Majority of smart phones now have touch screens</i> , https://www.canalys.com/newsroom/majority-smart-phones-now-have-touch-screens 2/7 (February 8, 2010, retrieved October 11, 2023)
Exhibit 1024	Steve Kolokowsky and Trevor Davis, <i>Touchscreens 101: Understanding Touchscreen Technology and Design</i> , Cypress Semiconductor Corp. (June 2009)
Exhibit 1025	U.S. Patent Publication No. 2006/0026521A1 to Hotelling et al.
Exhibit 1026	<i>The History of Bluetooth</i> , The History of Bluetooth - Auris, Inc (theauris.com) Auris, Inc. (retrieved June 26, 2023)
Exhibit 1027	<i>Ericsson T39 User's Guide First Edition</i> , Ericsson Mobile Communications AB (March 2001)
Exhibit 1028	<i>How does Bluetooth work?</i> , Scientific American https://www.scientificamerican.com/article/experts-how-does-bluetooth-work/#:~:text=Bluetooth%20technology%20uses%20the%20princ

	iples, devices%20that%20are%20actively%20inquiring, (November 5, 2007, retrieved September 8, 2023)
Exhibit 1029	IEEE Std. 802.15.1-2005, entitled “IEEE Standard for Information technology—Telecommunications and information exchange between systems—Local and metropolitan area networks—Specific requirements—Part 15.1: Wireless Medium Access Control (MAC) and Physical Layer (PHY) Specifications for Wireless Personal Area Networks (WPANs)”
Exhibit 1030	<i>Specification of the Bluetooth System</i> , Bluetooth Core Specification version 1.2 (05 November 2003)
Exhibit 1031	Varun Almaulu and David Cheng, <i>Bluetooth Triangulator</i> , Department of Computer Science and Engineering, University of California, San Diego, (2006)
Exhibit 1032	Josef Hallberg, Marcus Nilsson, Kåre Synnes, <i>Positioning with Bluetooth</i> , 10 th International Conference on Telecommunications (April 2003)
Exhibit 1033	Julie A. Kientz, Shwetak N. Patel, Arwa Z. Tyebkhan, Brian Gane, Jennifer Wiley, and Gregory D. Abowd, <i>Where’s My Stuff? Design and Evaluation of a Mobile System for Locating Lost Items for the Visually Impaired</i> , Proceedings of the 8 th international ACM SIGACCESS conference on Computers and accessibility (October 2006)
Exhibit 1034	Harry Newton, <u>Newton’s Telecom Dictionary</u> , CMP Books (20 th edition, 2004)
Exhibit 1035	P. Orsatti, F. Piazza & Q. Huang, <i>A 20-mA-Receive, 55-mA-Transmit, Single-Chip GSM Transceiver in 0.25-/Spl Mu/m CMOS</i> , 34 IEEE Journal of Solid-State Circuits 1869 (1999)
Exhibit 1036	Christian Gehrmann, Joakim Persson & Ben Smeets, <u>Bluetooth Security</u> , Artech House, Inc. (2004)
Exhibit 1037	Rudolf F. Graf, <u>Modern Dictionary of Electronics</u> , Newnes (7 th edition, 1999)
Exhibit 1038	WO 2009/130509A2 to Elsom-Cook
Exhibit 1039	Aaron Beach, Mike Gartrell & Richard Han, <i>Solutions to Security and Privacy Issues in Mobile Social Networking</i> , 4 in 2009 International Conference on Computational Science and Engineering 1036 (2009)
Exhibit 1040	Christian Bettstetter, Hans-Jorg Vogel & Jorg Eberspacher, <i>GSM Phase 2+ General Packet Radio Service GPRS: Architecture</i> ,

	<i>Protocols, and Air Interface, 2</i> IEEE Communications Surveys 2 (1999)
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CERTIFICATION OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. §42.24 that the foregoing Petition for *Inter Partes* Review, excluding any table of contents, mandatory notices under 37 C.F.R. §42.8, certificates of service or word count, or appendix of exhibits, contains 13,820 words according to the word-processing program used to prepare this document (Microsoft Word).

Dated: January 19, 2024

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**CERTIFICATE OF SERVICE ON PATENT OWNER
UNDER 37 C.F.R. § 42.105(a)**

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(b), the undersigned certifies that on January 19, 2024, a complete and entire copy of this Petition for *Inter Partes* Review and Exhibits were provided via Federal Express to the Patent Owner by serving the correspondence address of record for the '680 Patent:

Garlick & Markison
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Further, a courtesy copy of this Petition for *Inter Partes* Review was sent via email to Patent Owner's litigation counsel:

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