

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.
Petitioner,

v.

THL HOLDING COMPANY, LLC,
Patent Owner.

U.S. Patent No. 11,350,246 to Howard, et al.

Case No.: IPR2024-00399

PATENT OWNER'S RESPONSE TO PETITION

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Exhibit No.	Description
2001	Patent Owner's Disclaimer of Claims 1-10 and 20-27
2002	Declaration of Dr. Martin J. Feuerstein
2003	Curriculum Vitae of Dr. Martin J. Feuerstein

Patent Owner submits the following Response (“Response”) to the Petition (“Pet.”, Paper 1) for Inter Partes Review of claims 1-19 (“Challenged Claims”) of U.S. Patent No. 11,350,246 (“the ’246 Patent”) filed by Apple Inc., (“Apple” or “Petitioner”), and the Board’s Decision on Institution (“DI,” Paper 8).

I. INTRODUCTION

The Petition challenged Claims 1-19 of the ’246 Patent on three grounds. In its Decision on Institution, the Board determined there was a reasonable likelihood that Petitioner will prevail in demonstrating that claim 1 is unpatentable as obvious in view of Kalliola, Turunen, Oswald, Vauclair, and Kalayjian. (DI, 14-23.) With respect to independent claim 11, however, the Board determined that it was “not sufficiently persuaded by Petitioner’s argument and evidence that the combination of Kalliola and Oswald teaches or suggests limitation 11(e)(vii),” which recites determining a direction to the at least one remote device based on “rotation of the mobile communication device detected by the orientation sensor.” (DI, 23.)

Following the Decision on Institution, THL disclaimed claims 1-10 (and 20-27) pursuant to 35 U.S.C. § 253(a) and 37 C.F.R. § 1.321(a). (Ex. 2001.) Because THL disclaimed challenged claims 1-10, this Response focuses on the patentability of challenged claims 11-19. As explained in detail below, the Board correctly

determined that Kalliola – the only prior art reference the Petition relies upon for limitation 11(e)(vii) – fails to teach or suggest that limitation.

While Patent Owner disputes the Petitioner’s stated reasons to combine and modify Kalayjian, Kalliola and Oswald for the reasons stated in the POPR (Paper No. 7, 15-19), Patent Owner need not address that issue here because the proposed combination, even if made, does not render claim 11 obvious.

Claims 12-19 depend from independent claim 11. Thus, for the same reason the Petition fails to establish obviousness of independent claim 11, it fails to establish obviousness of dependent claim 12-19.

II. OVERVIEW OF THE '246 PATENT

The '246 Patent is titled “Wireless Device and Methods for Use Therewith.” (Ex. 1001.) The '246 Patent describes “a location system for use with a handheld wireless communication device[.]” (*Id.* at 4:52–54.) The wireless communication device (110) can be “a smart phone, digital book, netbook, personal computer with wireless data communication or other wireless communication device that includes a wireless transceiver for communicating over a long wireless network ... and/or a short-range wireless network[.]” (*Id.* at 4:56–62.) In one example, an adjunct device (100) can be coupled to a wireless communication device (110). (*Id.* at 5:30–33.) The adjunct device (100) together with the wireless communication device (110)

cooperate to assist a user in wirelessly locating a remotely-located wireless device (120).

Figure 1 below illustrates an example adjunct device 100 coupled to a wireless communication device 110, and locating remotely-located wireless device 120.

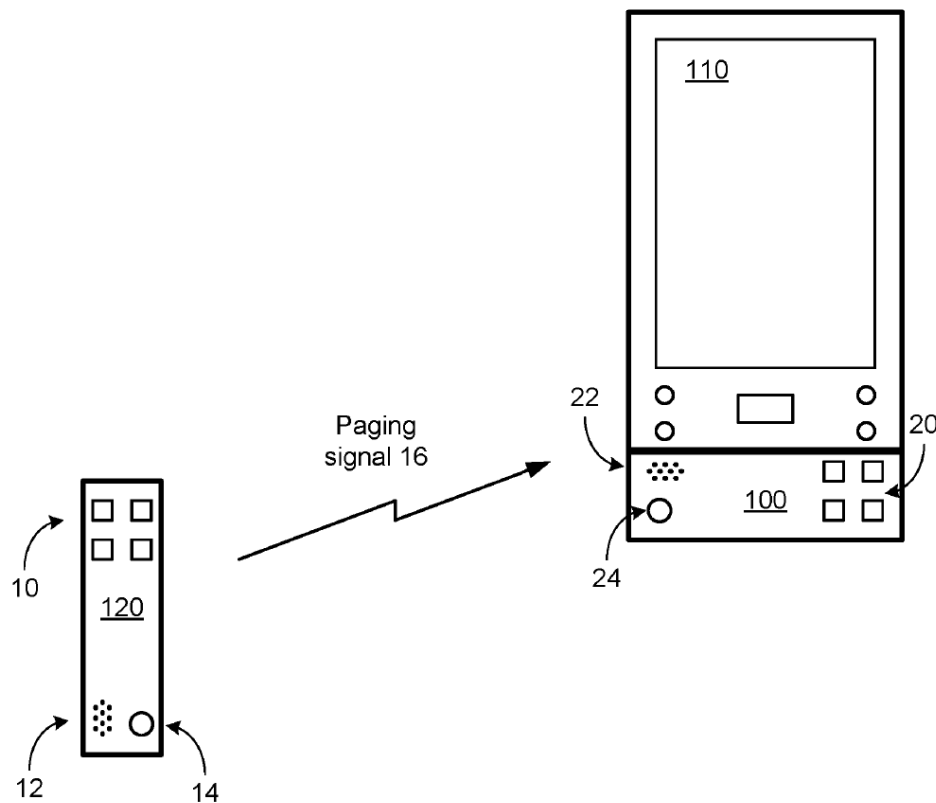


FIG. 1

The '246 Patent describes the adjunct device 100 and the remote wireless device 120 as follows.

Wireless device 120 is shown that includes a user interface that includes push buttons 10, a light emitter 14 such as a light emitting diode (LED) or other emitter, and sound emitter 12 such as a beeper, buzzer, speaker

or other audio device. While particular user interface devices are shown, the wireless device can similarly include other devices such as a touch screen or other display screen, a thumb wheel, trackball, and/or other input or output devices. The user interface of the wireless device 120 generates a location request signal in response to an indication from a user by for instance, pushing one of the push buttons 10.

Wireless device 120 further includes a short-range wireless transmitter that transmits an RF paging signal, such as paging signal 16 in response to the location request signal. The short-range wireless transmitter can be part of a transceiver that operates in conjunction with a communication standard such as 802.11, Bluetooth, ZigBee, ultra-wideband, Wimax or other standard short or medium range communication protocol, or other protocol.

Adjunct device 100 includes a housing that is couplable to the handheld wireless communication device 110 via a communication port of the handheld wireless communication device 110. The adjunct device 100 includes a short-range wireless receiver that receives the RF paging signal, such as paging signal 16. The short-range wireless receiver of adjunct 100 can also be part of a transceiver that operates in conjunction with a communication standard such as 802.11, Bluetooth, ZigBee, ultra-wideband, Wimax or other standard short or medium range communication protocol, or other protocol. In particular, the short-range wireless receiver of adjunct device 100 is configured to receive the paging signal 16 generated by wireless device 120.

Adjunct device includes its own user interface having push buttons 20, sound emitter 22 and light emitter 24 that emit audio and/or visual alert signals in response to the paging signal 16 to assist the user in locating the handheld wireless communication device. As with the user interface of wireless device 120, the user interface of adjunct device 100 can similarly include other devices such as a touch screen or other display screen, a thumb wheel, trackball, and/or other input or output devices.

(*Id.*, 5:11-53.)

The '246 Patent explains that the features and functions of the wireless communication device 110 and the adjunct device 100 may be integrated into an “enhanced handheld wireless communication device” that adds the components necessary to provide the additional functions and features of the adjunct device.

While many of the descriptions of the present invention contained herein focus on functions and features ascribed to an adjunct device operating in conjunction with a handheld wireless communication device, the functions and features of the adjunct device handheld wireless communication device combination can be implemented in an enhanced handheld wireless communication device that includes structure and functionality drawn from an adjunct device, such as adjunct devices 100, 100', 101 and 103. Handheld wireless communication device 300 presents such a device that includes a handheld wireless communication device portion having the standard components of a handheld wireless communication device and an

adjunct portion that adds the components necessary to provide the additional functions and features of the adjunct device 100, 100', 101 and 103. In summary, handheld wireless communication device 300 includes the structure and functionality of any of the embodiments of handheld wireless communication device 110 and adjunct device 100, 100', 101 and 103, within a single housing, and without the external connections required to couple adjunct device 100, 100', 101 or 103 to handheld wireless communication device 110.

(*Id.*, 29:59-30:14.)

The '246 Patent explains that the adjunct device 100 and/or the wireless communication device 110 may be paired with one or more remote wireless devices 120. (*Id.*, 15:53-16:3.)

The '246 Patent teaches that the adjunct device may send a “paging signal” to the short-range wireless receiver on the remote wireless device 120, causing the remote device to flash a light or emit a sound to help a user locate the remote device:

[T]he wireless device 120 includes its own short-range wireless receiver that 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. In an embodiment of the present invention, the adjunct device 100 operates in a similar fashion to wireless device 120 to initiate the paging signal 112. In particular, the transmission of paging signal 112 can be initiated by pressing a button or otherwise

interacting with the user interface of adjunct 100. In a further embodiment, handheld wireless communication device 100 includes an interactive application that generates application data that is passed to adjunct device 100 via the communication port of the handheld wireless communication device 100. Adjunct device 100 responds to such application data by initiating the transmission of the paging signal 112. In either case, a user of handheld wireless communication device 110 that wishes to locate his or her key 30, or other object coupled to wireless device 120, initiates the paging signal 112. The user can then locate the wireless device 120 and corresponding object by homing in on the visual and/or audio emissions of the wireless device 120.

(*Id.*, 7:47-8:2.)

The '246 Patent describes multiple approaches for estimating or calculating the distance or direction to the remote wireless device 120. In one embodiment, illustrated in Figures 6-8, a directional antenna and signal strength are used to determine the direction from the handheld wireless device 110 to the remote device 120.

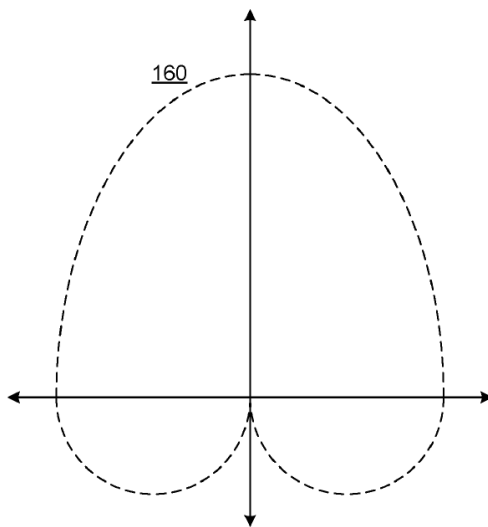


FIG. 7

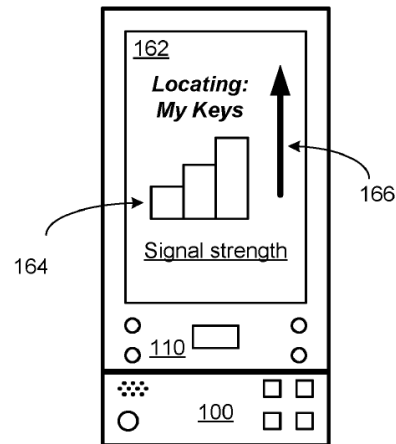


FIG. 8

The '246 Patent explains that, separate from or in addition to signal strength, “time of flight” calculations may be implemented to determine the distance to the remote device.

In an embodiment of the present invention, a time of flight can be used instead of or in addition to signal strength to determine the distance to a remote device. In particular, the time can be measured from the transmission of the paging signal to the reception of the location signal. This time delay (round trip flight time) can indicate the distance to the remote device. The time delay, T_d , can be represented as follows:

$$T_d = T_{f1} + T_{f2} + T_p$$

where, T_p represents the processing time to generate the location signal in response to the paging signal and to recognize the location signal, T_{f1} represents the flight time for the paging signal to travel to the remote device and T_{f2} represents the flight time for the location signal to travel from the remote device to the adjunct device. Considering the processing time T_p to be fixed, the distance to a remote device, D_{ft} , can be approximated based on the following:

$$D_{ft} = C(T_f) = c(T_d - T_p)$$

where c is a proportionality constant that is based on the speed of light in air and $T_f = (T_{f1} + T_{f2})$.

(*Id.*, 34:34-55.)

The '246 Patent also discloses locating the remote wireless device 120 in two and three-dimensional space using signal strength and/or round trip signal delay.

While the foregoing description has focused on location in a two dimensional sense, three-dimensional location can be accomplished in a similar fashion. In particular, directional antennas can be employed in both the x-y and x-z or y-z planes to distinguish z-axis, as well as x and y axis, coordinates. It should be noted that multiple directional antennas can be employed that are arranged orthogonally or non-orthogonally as long as the null directions span either all or substantially all of three dimensional space or a portion of three

dimensional space that is of interest. Further more complex antenna designs with three-dimensional antenna patterns can likewise be employed in a similar fashion to determine directionality in three-dimensions. Three dimensional location can be useful, for example, in locating objects on different floors of a building or other structure such as a mine or a ship, determining of a person with a remote device has fallen overboard, as well as other three-dimensional applications. In addition or alternative to providing three dimensional direction finding, multiple antennas can be employed in a diversity receiver that, for example includes two or more receivers. Such configurations can be employed to mitigate the effects of fading, multipath interference and other path losses to provide more stable reception of signals, and more stable measurement of signal strength, round trip signal delay, etc.

(*Id.*, 15:28-52.)

In some embodiments in the '246 Patent, an orientation sensor is implemented to determine the rotation direction of the handheld wireless device (110) relative to the remote wireless device (120). With respect to Figure 7, for example, the specification explains:

In an alternative embodiment, the user is instructed to “turn around” to gather 360 degrees of directional data. The signal strength data can be analyzed in conjunction with one or more orientation sensors of the handheld wireless communication device 110, to determine a direction to the wireless device 120. In particular, the location application can determine the particular orientation of the device corresponding to the

point where the null of antenna pattern 160 is aligned with the direction to the wireless device 120, and feedback that direction to the user via a directional indicator.

(*Id.*, 11:43-53.)

Figure 15 illustrates a display screen indicating a direction 166' to the remote wireless device. As the user rotates the orientation of the handheld wireless communication device 110, indication of direction 166' varies based on the updated direction. (*Id.*, 14:47-62.)

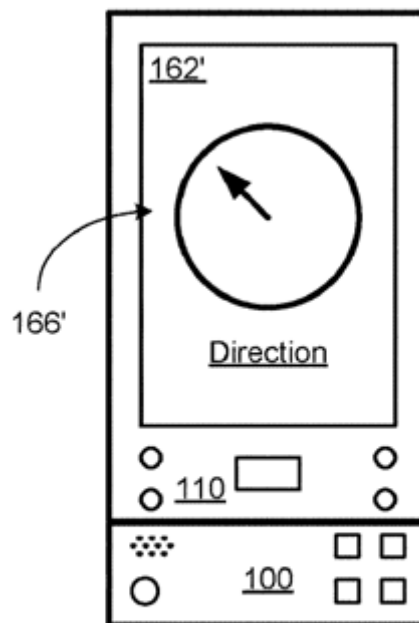


FIG. 15

Claim 11 of the '246 Patent recites the following limitations, each numbered in the manner presented in the Petition:

[11 P] A mobile communication device comprising:

[11(a)] a plurality of wireless transceivers including a Bluetooth transceiver, a long-range transceiver configured to send and receive telephone calls via a telephony network and to communicate Internet data, and one or more ultra-wideband transceivers coupled to two or more antennas;

[11(b)] a memory that stores operational instructions;

[11(c)] a touch screen;

[11(d)] an orientation sensor to detect rotation of the mobile communication device; and

[11(e)(i)] a processor coupled to the plurality of wireless transceivers, the memory, the touch screen and the orientation sensor,

[11(e)(ii)] wherein the processor is configured to execute the operational instructions, which upon execution, cause the processor to:

[11(e)(iii)] present a graphical user interface via the touch screen;

[11(e)(iv)] in response to a pair request from a user received at the graphical user interface, pair the mobile communication device with at least one remote device;

[11(e)(v)] in response to an audio alert request from the user received at the graphical user interface, transmit an audio alert request signal to the at least one remote device via the Bluetooth transceiver;

[11(e)(vi)] estimate a distance between the mobile communication device and the at least one remote device based on ultra-wideband communication between the one or more ultra-wideband transceivers and the at least one remote device and time of flight calculations;

[11(e)(vii)] determine a direction to the at least one remote device based on signal delay of ultra-wideband communications between the two or more antennas and the at least one remote device and on rotation of the mobile communication device detected by the orientation sensor; and

[11(e)(viii)] output to the graphical user interface the estimated distance to the at least one remote device and an arrow pointing in the direction of the at least one remote device.

III. LEVEL OF ORDINARY SKILL

The level of ordinary skill in the art (“POSITA”) for evaluating the ’246 Patent and the prior art must be assessed as of the priority date, which is February 26, 2010. A POSITA is understood as a hypothetical person who applies conventional wisdom prevalent in the field at the time. This concept is central to

interpreting how the patent and prior art would have been understood by someone skilled in the technical field of wireless communications during that period.

In determining the appropriate level of ordinary skill, several factors are considered, including the types of problems encountered in the art, the prior art solutions to those problems, the speed of technological advancements, the complexity of the technology, and the educational and professional background of workers in the field. The level of skill reflects the abilities of someone who would have been able to work with wireless technology, particularly in areas such as communication devices, signal processing, and wireless ranging systems.

Petitioner has proposed that a POSITA would have had “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” (Pet., 4; Ex. 1003, ¶ 35). Patent Owner agrees that this description reasonably represents the level of ordinary skill required to understand and implement the teachings of the ’246 Patent, as well as the prior art cited in the Petition. Accordingly, this level of skill is appropriate for assessing the patentability of the claims at issue in this proceeding. (Ex. 2002, ¶ 22).

IV. CLAIM CONSTRUCTION

Claim terms are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art (POSITA), considering the claims themselves, the specification, and the prosecution history of the patent. In the underlying district court litigation, Patent Owner proposed specific constructions for the terms “time of flight calculations” and “signal delay,” and these constructions were applied by both Petitioner and the Board in the Petition and the Decision on Institution (Pet., 6; DI, 9).

A claim term at issue in this IPR is “rotation of the mobile communication device,” as recited in limitations [11(d)] and [11(e)(vii)]. As the Board noted, the Petition did not propose a construction for this term. (DI, 24.) Based on the language of claim 11 and the examples provided in the specification of the ’246 Patent, a POSITA would have interpreted “rotation of the mobile communication device” to mean the rotation of the mobile communication device as a whole, rather than the rotation of a specific component of the device relative to another component. (Ex. 2002, ¶¶ 49-50).

Claim 11 recites “an orientation sensor to detect rotation of the mobile communication device” and “rotation of the mobile communication device detected by the orientation sensor.” The plain language of these limitations, when read in context with the rest of claim 11, makes clear that the orientation sensor detects the

rotation of “the” mobile communication device, *i.e.*, as a whole. There is no indication that the claim language refers to detecting the rotation of only a part or component of the mobile communication device, as that would be something other than “the” mobile communication device for which rotation is detected. (Ex. 2002, ¶ 51.)

This interpretation is supported by the '246 Patent specification, which in different passages consistently describes determining the rotation of the mobile communication device as a whole in relation to external objects, not the movement of device components relative to one another. For example, the specification uses this rotation data to “determine a direction to the wireless device 120[]” and to provide feedback to the user via a directional indicator (Ex. 1001, 11:43-52; Ex. 2002, ¶ 52.)

With respect to Figure 7, for example, the specification explains:

In an alternative embodiment, the user is instructed to “turn around” to gather 360 degrees of directional data. The signal strength data can be analyzed in conjunction with *one or more orientation sensors of the handheld wireless communication device 110, to determine a direction to the wireless device 120*. In particular, the location application can *determine the particular orientation of the device corresponding to the point where the null of antenna pattern 160 is aligned with the direction to the wireless device 120*, and feedback that direction to the user via a directional indicator.

(Ex. 1001, 11:43-52) (emphasis added.)

In this example, the orientation sensor is implemented to help locate the remote wireless device 120 relative to the handheld wireless communication device 110 *as a whole*. (Ex. 2002, ¶ 54.)

In another example, the '246 specification explains, with reference to Figure 30, that “changes of orientation, *such as the rotation of the handheld device 256* about roll, pitch or yaw axes can be detected and used to adjust the orientation of the screen pointer.” (Ex. 1001, 25:34-37) (emphasis added.) In this example, the orientation sensor is implemented to help locate the orientation of handheld device 256 *as a whole* relative to the remote display screen 252. (Ex. 2002, ¶ 55.)

In another example, the '246 specification explains that an “internal compass” of the wireless communication device 110 assists to provide “absolute directional information.”

It should be noted that the handheld wireless communication device 110 can include an internal compass that generates an indication of its own orientation. This orientation information can also be used in conjunction with the received directions θ_1 , to triangulate the location of the mobile paging device 278 or provide absolute directional information.

(Ex. 1001, 28:32-38; Ex. 2002, ¶ 56.)

Further, no example of the mobile communication device shown in the figures of the '246 Patent illustrate a device having a multi-section body with hinges, folds, slides, and/or twist joints that rotate relative to one another. These specification examples from the '246 Patent confirm that a person of ordinary skill in the art at the time of the invention would have interpreted the claimed “orientation sensor to detect rotation of the mobile communication device” as referring to detecting the rotation of the mobile communication device *as a whole*, and not to detecting the orientation of a *component* of the mobile communication device relative to another component of the device. (Ex. 2002, ¶ 57).

Taken together, these examples confirm that a POSITA would have interpreted “rotation of the mobile communication device” as detecting the rotation of the mobile communication device as a whole, not the movement of individual components. This interpretation is consistent with the claim construction applied by the Board in the Decision on Institution. (DI, 24.)

V. THE CHALLENGED CLAIMS ARE PATENTABLE

A. Ground #1: The proposed combination fails to teach limitations [11(d)] and [11(e)(vii)].

In Ground #1, the Petition asserts that claims 11-14 are obvious over the combination of Kalliola, Turunen, Oswald, Vauclair and Kalayjian. (Pet., 17-70.)

This combination fails to teach or suggest limitation [11(d)], which recites “an orientation sensor to detect rotation of the mobile communication device,” and related limitation [11(e)(vii)], which recites “determine a direction to the at least one remote device based ... on rotation of the mobile communication device detected by the orientation sensor.” (Ex. 2002, ¶ 59.)

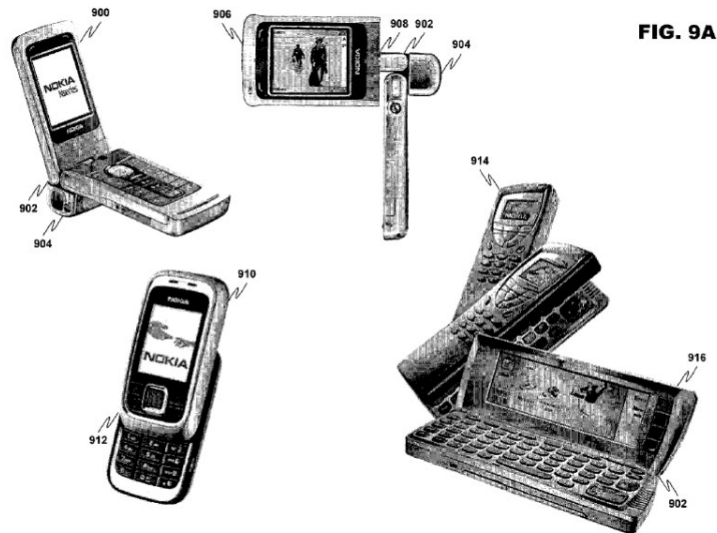
As explained in the claim construction section above, a person of ordinary skill in the art at the time of the invention would have interpreted the claimed “orientation sensor to detect rotation of the mobile communication device” as referring to detecting the rotation of the mobile communication device *as a whole*, as distinct from detecting the orientation of a *component* of the mobile communication device relative to another component of the same device. (Ex. 2002, ¶ 60.)

Petitioner asserts that Kalliola (alone) discloses claim limitations [11(d)] and [11(e)(vii)]. With respect to limitation [11(d)], the Petition cites Kalliola paragraphs [0078], [0079], [0081] and [0084], and Figs. 9A and 9B. (Pet., 54-57.)

None of the cited paragraphs or figures of Kalliola disclose an orientation sensor to determine the rotation of the mobile communication device, *i.e.*, the device as a whole. (Ex. 2002, ¶ 62.)

Fig. 9A of Kalliola below shows a number of Wireless Communications Devices (WCD), each having multi-section bodies with hinges, folds, slides, and/or

twist joints in which one portion of the WCD moves relative to another portion of the WCD. (Ex. 2002, ¶ 63.)



Kalliola explains at paragraph [0078] (emphasis added):

In each of these examples, mechanical sensors may provide information on the *relative orientation of two sections* of WCD 100. In at least one case, an exemplary WCD 100 is pictured at 900, wherein a sensor may be integrated into *hinge 902*. This sensor may provide information to a controller in WCD 100 regarding the orientation of the device, such as shown at 900, *as to whether a flip cover of the device is open or closed*.

Kalliola provides further examples at paragraph [0079] (emphasis added):

The WCD 100 shown at 910 is divided into at least two sections that slide laterally with respect to one another. ... However, *a sensor in the sliding mechanism 912 may detect when the device is opened* (e.g., when the two sections are moved so that they are no longer aligned).

Continuing, Kalliola explains at paragraph [0079] (emphasis added), “[i]n the example of 916, a cellular telephone mode may be implemented at 914 when a *hinge sensor 901 ... provides that the device is in a closed orientation.*” (Ex. 2002, ¶ 64.)

Clearly, repeatedly and consistently, in Kalliola orientation refers to determining whether sections of the WCD are open or closed. Kalliola fails to disclose any sensors detecting “rotation” of the WCD as a whole. Indeed, Kalliola does not use the word “rotation,” let alone describe rotation of the device as a whole. Instead Kalliola describes detecting movement or orientation of one device component relative to another device component. Kalliola thus fails to disclose limitation [11(d)], which recites an orientation sensor to detect rotation of “the” mobile communication device, *i.e.*, as a whole. (Ex. 2002, ¶ 65.)

The Petition also refers to the description of a “gyroscope” at Kalliola paragraph [0084]. (Pet., 56-57.) But that disclosure pertains to managing or conserving “battery life” by *suspending* tracking calculations if a sensor indicates the WCD (and the target) are not moving, and *resuming* tracking calculations if the sensor indicates the WCD/target have moved. (Ex. 1004, ¶ [0084].) This paragraph discloses nothing about “an orientation sensor to detect rotation of the mobile communication device” as recited in limitation [11(d).] (Ex. 2002, ¶ 66.)

In its Decision on Institution, the Board correctly observed, based on the same disclosures THL addresses above, that Kalliola fails to disclose a sensor that measures the rotation of the mobile communication device as a whole:

Even to the extent that some of these sensors, such as those located in hinges or twist joints, measure rotation, it is the rotation of one part of the device relative to another part of the device that they measure, not the rotation of the device as a whole.

(DI, 24.)

Dr. Buehrer's declaration with respect to limitation [11(d)] generally repeats the assertions provided in the Petition, which THL addresses above. He acknowledges the technical operation of Kalliola's orientation sensor, explaining (emphasis added) that "when the orientation sensor is **determining** whether the flip cover of a flip phone is **open/closed**, the orientation sensor is detect[ing] ... **specifically, rotation of the cover relative to the body.**" (Ex. 1003, ¶ 261) (citing Ex. 1004, ¶ [0078]); Ex. 2002 ¶ 67.) This operation of Kalliola does not meet limitation [11(d)] for the reasons described above.

If a single element of the claim is absent from the prior art, the claim is not obvious. *See CFMT, Inc. v. YieldUp Int'l Corp.*, 349 F.3d 1333, 1342, 68 USPQ2d 1940 (Fed. Cir. 2003) ("[O]bviousness requires a suggestion of all limitations in a claim[.]" (citing *In re Royka*, 490 F.2d 981, 985, 180 USPQ 580 (CCPA 1974)); *In*

re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955 (Fed. Cir. 1993) (reversing obviousness rejection where prior art did not teach or suggest all claim limitations). Since the Supreme Court’s decision in *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007), the Federal Circuit has reiterated that all claim elements of an invention at issue must be found to exist in the prior art references before proceeding with an obviousness analysis. *See Abbott Laboratories v. Sandoz, Inc.*, 544 F.3d 1341, 1351, 89 USPQ2d 1161 (Fed. Cir. 2008). Kalliola’s disclosure of a sensor for detecting whether a flip cover is open or closed does not disclose nor suggest an orientation sensor capable of detecting the rotation of the entire mobile communication device as claimed. A POSITA, therefore, would lack the necessary information to make and use the invention as claimed, as it requires detecting the orientation of the device as a whole rather than the movement or orientation of one component relative to another.

THL disputes Dr. Buehrer’s conclusory assertion that Kalliola’s “orientation sensor is detect[ing] rotation of the mobile communication device” (Ex. 1003, ¶ 261) (citing Ex. 1004, ¶ [0078].) While the orientation sensor described in Kalliola paragraph [0078] is monitoring the movement “of the cover relative to the body” as Dr. Buehrer acknowledges, that is not the claimed orientation sensor to detect rotation of the mobile communication device *as a whole*. (Ex. 2002, ¶ 68.)

THL also disputes Dr. Buehrer's conclusory assertion that Kalliola's disclosure of a "gyroscope" in paragraph [0084] discloses "an orientation sensor to detect rotation of the mobile communication device." (Ex. 1003, ¶ 262.) As explained, that disclosure pertains to managing or conserving "battery life" by *suspending* tracking calculations if a sensor indicates the WCD (and the target) are not moving, and *resuming* tracking calculations if the sensor indicates the WCD/target have moved. (Ex. 1004, ¶ [0084]; Ex. 2002, ¶ 69.) Paragraph [0084] discloses nothing about "an orientation sensor to detect rotation of the mobile communication device" as recited in limitation [11(d).]

With respect to related claim limitation [11(e)(vii)], the Petition incorrectly asserts "Kalliola teaches at least two embodiments using the rotation of the WCD as detected by the orientation sensor to determine a direction of the WCD to the at least one remote device (target)." (Pet., p. 59.)

In what the Petition calls "Kalliola's First Embodiment," the Petition asserts (emphasis added) "Kalliola teaches one use of the orientation information disclosed in Fig. 10, RN 1000, is *to determine [if] the phone is in a flip-phone open mode*, which triggers the 3-D antenna module to set an antenna configuration for use in 'direction finding.'" (Pet., p. 60) (citing Ex. 1004, Fig. 10, ¶¶ [0082], [0085], Fig. 12.) In this context, the Petition acknowledges that the alleged orientation sensor merely senses whether the "flip-phone" is "open" or closed (Pet., 60); it does *not*

sense the “rotation” of the WCD as a whole, and is *not* used to “determine” the “direction from the mobile communication device to the remote device” as claimed. Thus, for these reasons, as well those expressed above with respect to limitation [11(d)], this “First Embodiment” of Kalliola fails to teach or suggest limitation [11(e)(vii)]. (Ex. 2002, ¶ 71.)

In what the Petition calls “Kalliola’s Second Embodiment,” the Petition cites the paragraph [0084] disclosure addressed above, in which “motion” of the WCD is monitored for “pausing a DoA estimation until the motion of the WCD is detected by the motion sensors[,]” and “resum[ing] the DoA estimation” when motion is detected again. (Pet., p. 63) (citing Ex. 1004, ¶¶ [0014], [0084].) Petitioner repeatedly asserts, incorrectly, that the cited paragraphs relate to Kalliola’s “orientation sensor.” (Pet., 63.) Yet the cited paragraphs address “motion sensors” that are “used to detect when WCD 100 is being moved” or when it “is stationary” (*i.e.*, sensing moving versus stationary status) for purposes of “power management” to “conserve battery life.” (Ex. 1004, ¶¶ [0014], [0084].) Therefore, the “motion” in the context of Kalliola is in no way equivalent to, nor even related to the uses of, the “rotation” in the ’246 patent. (Ex. 2002, ¶ 72.) In this “Second Embodiment,” the described “motion” is not implemented to sense the “rotation” of the WCD as a whole, or to “determine the direction” from the mobile communication device to the remote device, as recited in limitation [11(e)(vii)].

Next, also in the context of Kalliola's "Second Embodiment," the Petition addresses Kalliola paragraph [0086], which describes a "correction or compensation mode" that may be employed when user moves the WCD "too quickly for an accurate DoA estimation." (Pet., 64.) This occurrence, according to Kalliola, "may trigger a configuration that increases the speed of the DoA estimation[.]" [Ex. 1004, ¶ 0086.] The sensor described in this embodiment, like the others the Petition cites, does not determine "rotation" of the mobile communication device for the claimed purpose of "determine[ing] a direction to the at least one remote device" as recited in limitation [11(e)(vii)]. (Ex. 2002, ¶ 73.)

Dr. Buehrer also addresses Kalliola's Figure 12 flow chart, which the Petition does not address. (Ex. 1003, ¶¶ 278-279.) But Dr. Buehrer acknowledges that the "sensor information" received in connection with step 1208 is, as stated in the flow chart, "for use in operational mode determination." (*Id.*, ¶ 278.) He acknowledges that the sensor data is used to set "the antenna calibration vectors" and the "user interface" for the detected "mode" as reflected in steps 1210 and 1212 of the flowchart. (*Id.*) Furthermore, Dr. Buehrer admits that the "DoA estimation [process] *begins*" "[t]hereafter," *i.e.*, after the sensor data is collected and used for its intended purpose. (*Id.*) This concession confirms that the orientation sensor data described in Kalliola is *not* used to determine the "rotation" of the mobile communication device, nor to "determine the direction" from the mobile

communication device to the remote device, as recited in limitation [11(e)(vii)]. (Ex. 2002, ¶ 75.)

In paragraph 279 of his declaration, Dr. Buehrer acknowledges that the two described determinations made based on information collected from the orientation sensor disclosed in Kalliola are (1) “to determine whether a flip phone cover is opened or closed[],” and (2) “to set ‘antenna calibration vectors’” Neither is the claimed functions of “detect[ing] rotation of the mobile communication device” [11(d)], nor “determin[ing] a direction to the at least one remote device based ... on rotation of the mobile communication device” [11(e)(vii).] (Ex. 2002, ¶ 76.)

For the reasons expressed above, THL specifically disagrees with Dr. Buehrer’s unsupported conclusion in paragraph 283, based on the above-addressed embodiments, that Kalliola teaches “orientation sensors module 932 detects rotation (i.e., a rotational motion) *of the WCD*,” and “determin[ing] a direction to the at least one remote device based...on *rotation of the mobile communication device detected by the orientation sensor*.” (Emphasis added.) (Ex. 2002, ¶ 77.)

THL disputes the assertion of Ground 1 that a POSITA would consider claim 11 obvious in view of the proposed combination of Kalliola, Turunen, Oswald, Vauclair and Kalayjian because that combination fails to teach or suggest limitations [11(d)] and [11(e)(vii)]. See *CFMT*, 349 F.3d at 1342; *In re Rijckaert*, 9 F.3d at 1534. The Petition did not look to any prior art reference other than Kalliola to

render those limitations obvious, and the Petitioner is not permitted to introduce a new obviousness rationale in its reply. *See* 37 C.F.R. § 42.23(b); *Yita LLC v. MacNeil IP LLC*, 69 F.4th 1356, 1365-66 (Fed. Cir. 2023), cert. denied, 144 S. Ct. 499, 217 L. Ed. 2d 261 (2023).

Dependent claims 12-14 recite limitations unrelated to limitations [11(d)] and [11(e)(vii)]. Because Ground #1 fails to establish obviousness of claim 11 from which claims 12-14 depend, that Ground fails to demonstrate the obviousness of dependent claims 12-14 by virtue of at least their dependence from claim 11 for the reasons explained above. (Ex. 2002, ¶ 79.)

B. Grounds #2 and #3 fail to demonstrate that the challenged claims are obvious.

In Ground #2 and Ground #3, the Petition does not further address independent claim 11, and addresses only claims 15–19, which are dependent from claim 11 and include limitations [11(d)] and [11(e)(vii)].

Thus, for the same reasons that THL has shown claim 11 is not obvious over the proposed combination of Ground #1, dependent claims 15-19 are nonobvious for at least their dependence from claim 11. (Ex. 2002, ¶ 81.)

VI. CONCLUSION

For the reasons stated above, the Petition and its supporting materials fail to demonstrate that the challenged claims 11-19 of the '246 Patent are obvious to a person of ordinary skill in the art at the time of the invention because the prior art cited by Petitioner does not teach or suggest all limitations of those claims. Accordingly, Patent Owner respectfully requests that the Board find claims 11-19 patentable.

Dated: October 31, 2024

Respectfully submitted,

/ John S. LeRoy /
John S. LeRoy (Reg. No. 48,158)
Frank A. Angileri (Reg. No. 36,733)
Marc Lorelli (Reg. No. 43,759)
BROOKS KUSHMAN P.C.
150 W. Second St., Suite 400N
Royal Oak, MI 48067-3846
(248) 358-4400/ F: (248) 358-3351
jleroy@brookskushman.com
fangileri@brookskushman.com
mlorelli@brookskushman.com

Attorneys for THL Holding Company, LLC

Certificate of Service

The undersigned hereby certifies that on October 31, 2024, a complete and entire copy of PATENT OWNER'S RESPONSE TO PETITION, was served via electronic mail to the attorneys listed below:

LEAD COUNSEL	BACK-UP COUNSEL
Jennifer C. Bailey (Reg. No. 52,583) ERISE IP, P.A. 7015 College Blvd., Suite 700 Overland Park, Kansas 66211 Jennifer.Bailey@EriseIP.com PTAB@eriseip.com	Callie A. Pendergrass (Reg. No. 63,949) Christina Canino (<i>Pro Hac Vice</i>) ERISE IP, P.A. 7015 College Blvd., Suite 700 Overland Park, Kansas 66211 Callie.Pendergrass@eriseip.com Christina.Canino@eriseip.com

Respectfully submitted,

/ John S. LeRoy /

John S. LeRoy (Reg. No. 48,158)
Frank A. Angileri (Reg. No. 36,733)
Marc Lorelli (Reg. No. 43,759)
BROOKS KUSHMAN P.C.
150 W. Second St., Suite 400N
Royal Oak, MI 48067-3846
(248) 358-4400/ F: (248) 358-3351
jleroy@brookskushman.com
fangileri@brookskushman.com
mlorelli@brookskushman.com

Attorneys for THL Holding Company, LLC

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Respectfully submitted,

Dated: October 31, 2024

/ John S. LeRoy /
John S. LeRoy (Reg. No. 48,158)
Frank A. Angileri (Reg. No. 36,733)
Marc Lorelli (Reg. No. 43,759)
BROOKS KUSHMAN P.C.
150 W. Second St., Suite 400N
Royal Oak, MI 48067-3846
(248) 358-4400/ F: (248) 358-3351
jleroy@brookskushman.com
fangileri@brookskushman.com
mlorelli@brookskushman.com

Attorneys for THL Holding Company, LLC