

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 SURREPLY TO PETITION

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I. INTRODUCTION

Patent Owner (“THL”) submits the following Surreply to the Petition (“Pet.,” Paper 1) for Inter Partes Review of claims 11-19 (“Challenged Claims”) of U.S. Patent No. 11,350,246 (“the ’246 Patent”) filed by Apple Inc., (“Apple”).

Apple bases its Petition and Reply on a claim construction lacking any support in the intrinsic record. THL’s proposed construction, in contrast, is entirely supported by the intrinsic record. When that proper construction is applied, Apple cannot establish obviousness of the Challenged Claims. For this reason, the Board should deny the Petition and confirm the patentability of claims 11-19.

II. ARGUMENT

A. **THL’s construction of “rotation of the mobile communication device” is consistent with the intrinsic record—Apple’s construction has no support in the intrinsic record.**

The intrinsic record of the ’246 Patent canvassed in Patent Owner’s Response confirms that “rotation of *the* mobile communication device” recited in claim 11 refers to the mobile device “as a whole.” (POR, 15-18 (emphasis added).) Apple’s construction, in contrast, finds no support whatsoever in the intrinsic record. In its Reply, Apple asserts several reasons THL’s construction is improper, but each reason is unfounded.

First, Apple asserts claim construction is unnecessary because THL did not act as its own lexicographer. (Reply, 3.) While Apple is correct that the '246 Patent does not provide an express definition for the disputed claim language, a genuine claim construction dispute plainly exists, *i.e.*, whether “the” mobile communication device” for which rotation is detected refers to the mobile device “as a whole” (THL’s construction), or merely a component of the device relative to another component of the device (Apple’s construction: “any rotation of the mobile communication device relative to any object, including itself”). (Reply, 4.)

Despite asserting claim construction is unnecessary, Apple devotes more than half its Reply to this genuine dispute. (Reply, 2-17.) The Federal Circuit and the Board have long held that genuine and material claim construction disputes must be resolved. *See Xerox Corp. v. Bytemark, Inc.*, No. IPR2022-00621, 2023 WL 5319767, *8 (P.T.A.B. Aug. 16, 2023) (“[W]e determine that there is a genuine dispute between the parties that requires a specific claim construction”) (quoting *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy[.]’”)). Here, the claim construction dispute is material to patentability, *i.e.*, to determine whether Kalliola discloses “rotation of the mobile communication device” as recited in claim limitations 11(d)

and 11(e)(vii). Under controlling law, the Board must resolve this claim construction dispute.

Next, Apple asserts that THL’s “as a whole” construction includes an “implicit” “negative limitation.” (Reply, 5.) THL’s construction is plainly *not* “negative;” it merely clarifies the meaning of “the mobile communication device” recited in claim 11 consistent with the intrinsic record as outlined in the Patent Owner’s Response. Like all claim constructions, THL’s “as a whole” construction excludes only structures that fail to satisfy it. For example, a claim construction construing “elongated” as “having a length greater than its width” necessarily excludes square structures. That does not mean, however, that the construction of “elongated” includes a “negative” limitation.

Apple cites *Seabed Geosolutions (US) Inc. v. Magseis FF LLC*, 8 F.4th 1285, 1288 (Fed. Cir. 2021). (Reply, 6.) But in that case, the Board construed the claim limitation “geophone internally fixed within [the] housing” based “entirely on extrinsic evidence” to require a “non-gimbaled” geophone. *Id.* at 1287. The Federal Circuit held the Board’s negative claim construction was not supported by the intrinsic record, which “says nothing about the geophone being gimbaled or non-gimbaled.” *Id.* at 1288. In the present case, in contrast, THL has not proposed a “negative” claim construction, and THL relies exclusively on the intrinsic record to support its claim construction. *Seabed* is thus inapposite.

Apple cites *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) for the proposition that, “[i]n the absence of an express exclusion of claim scope, a broad claim term will not be narrowed.” (Reply, 6.) Here, THL’s construction does not seek to “narrow” an otherwise “broad” claim term. THL merely seeks to resolve, based on the intrinsic record, a genuine claim construction dispute as to whether “the mobile communication device” recited in claim 11 refers to the device as a whole, or one component of that device relative to another component of the device. As explained above, the intrinsic record supports THL’s interpretation and lacks *any* support for Apple’s interpretation.

Finally, Apple cites *Uniloc 2017 LLC v. Sling TV, L.L.C.*, No. 2023-1156, 2024 WL 4038034, *Slip Op.*, at *4-*5 (Fed. Cir. Sept. 4, 2024) for the assertion that negative limitations are improper if unsupported by the original claim language. (Reply, 6-7.) Again, THL does not construe the disputed language of claim 11 for what it does not cover. THL construes the disputed claim language for what it does cover, *i.e.*, the mobile communication device *as a whole*.

Under the guise of claim construction, Apple pivots next to an improper written description argument. Apple asserts “[t]he ’246 Patent [d]oes [n]ot [d]escribe the [c]laimed [e]mbodiment” and “[n]othing in the specification describes an embodiment encompassing Claim 11(e)(vii).” (Reply, 7.) Apple asserts “[t]he ’246 Patent does not describe using signal delay to determine direction at all” and

“[t]he only mentions of signal delay in the ’246 Patent relate to determining distance—not direction[.]” (*Id.* at 7-8.)

Apple’s argument is procedurally improper, factually incorrect, and has nothing to do with the claim construction dispute. Procedurally, the Board in an IPR proceeding does not reach arguments concerning compliance with the written description requirement. 35 U.S.C. § 311(b). Factually, as quoted in THL’s Patent Owner Response, the ’246 Patent *expressly* discloses the use of “round trip signal delay” for “direction finding.” (POR, 9-10; ’246 Patent 15:40-52.) Apple asserts, incorrectly, this passage is “relate[d] to determining distance.” (Reply, 7-8.) The passage makes no express reference to determining “distance” but expressly refers to “determining directionality” (15:37-40) and “direction finding” (15:46). Apple’s misread of the ’246 Patent is inexplicable.

Apple also asserts the ’246 Patent fails to disclose, in the same embodiment, using “both” signal delay *and* the detected rotation of the mobile communication device. (Reply, 7.) But the ’246 Patent expressly describes using the rotation of the mobile communication device detected by the orientation sensor to determine direction (*e.g.*, 11:43-53; 14:47-62) and also using “round trip signal delay” for “direction finding” (*e.g.*, 15:40-52). Claim 11(e)(vii) recites using both approaches for determining direction.

Tellingly, Apple cites no intrinsic evidence to support its claim construction. Lacking such evidence, Apple resorts to irrelevant extrinsic evidence to assert that the “netbook” mentioned in the ’246 Patent is a small laptop “typically having two halves connected via a hinge that rotate into open/closed positions.” (Reply, 12.) From this unremarkable conclusion, Apple asserts, without explanation, that THL’s proposed “as a whole” construction excludes a netbook. (*Id.*) Of course, THL’s construction does not “exclude” a netbook. THL’s construction merely requires, for purposes of direction finding, that the rotation of the mobile communication device detected by the orientation sensor be the rotation of the device “as a whole.” If a netbook includes such an orientation sensor for determining direction based on the rotation of the netbook as a whole, the netbook would fall within the scope of claim limitations 11(d) and 11(e)(vii) as properly construed. A netbook would not be excluded under THL’s proposed construction merely because it has two halves connected via a hinge as Apple asserts.

Apple attacks THL’s construction asserting, by hypothesis, that it “creates ambiguity.” (Reply, 12-16.) On the contrary, THL’s construction resolves the parties’ genuine dispute and adds clarity to the claim language. To the extent Apple’s purported ambiguities arise (they do not), they apply equally to the *unconstrued* claim language. Nothing in the claim language, as presently written, addresses the hypothetical and unlikely confusion Apple concocts. No authority

requires a claim construction to resolve hypothetical confusion by an unidentified third-party. THL’s proposed construction resolves the parties’ genuine dispute in *this proceeding* with respect to the challenged claims and the prior art *Apple* identified.

For these reasons, and those addressed in Patent Owner’s Response (POR, 15-19, 21-25), the Board should adopt THL’s “as a whole” claim construction based on the intrinsic record.

B. Kalliola’s “first embodiment” does not teach nor suggest limitations 11(d) or 11(e)(vii):

With respect to limitation 11(d), Apple does not dispute the express statement in Kalliola that the orientation sensor 932 “provide[s] information on the relative orientation of two sections of WCD 100.” (Reply, 18.) Apple asserts “[b]ecause both sections (i.e., the *entirety*) of Kalliola’s device are rotating, i.e., spinning, about the axis of rotation, Kalliola teaches rotation of the mobile device ‘as a whole’ applying THL’s construction.” (Reply, 19 (emphasis in original).) But even where “both sections” of the Kalliola device are rotating, the described orientation sensor 932 is merely determining the rotation of one section relative to the other. As Kalliola explains, orientation sensor 932 “provide[s] information on the *relative orientation of two sections* of WCD 100.” (Ex. 1004, ¶[0078] (emphasis added).) Kalliola does not disclose a sensor for determining whether the WCD, as a whole, is

rotating. For this reason, Kalliola's first embodiment does not teach nor suggest limitation 11(d).

Kalliola's first embodiment also fails to disclose limitation 11(e)(vii), which recites "determine[ing] ... a direction" to the remote device "based on rotation of the mobile communication device detected by the orientation sensor" (Reply, 26 (emphasis removed)), and Apple admits its orientation sensor is used to determine which "mode[]" the "DoA estimation may operate in" (Reply, 21 (citing Ex. 1004, ¶[0013]).) Kalliola paragraph [0013] says nothing about determining a direction to the remote device "based on" device rotation as recited in limitation 11(e)(vii). Instead, as described in greater detail in Kalliola paragraphs [0078]-[0079] and Figure 9A, a display screen, display format and camera function are selected "based on" the detected orientation of the screen relative to the WCD to which it is connected. That is plainly not the function recited in limitation 11(e)(vii).

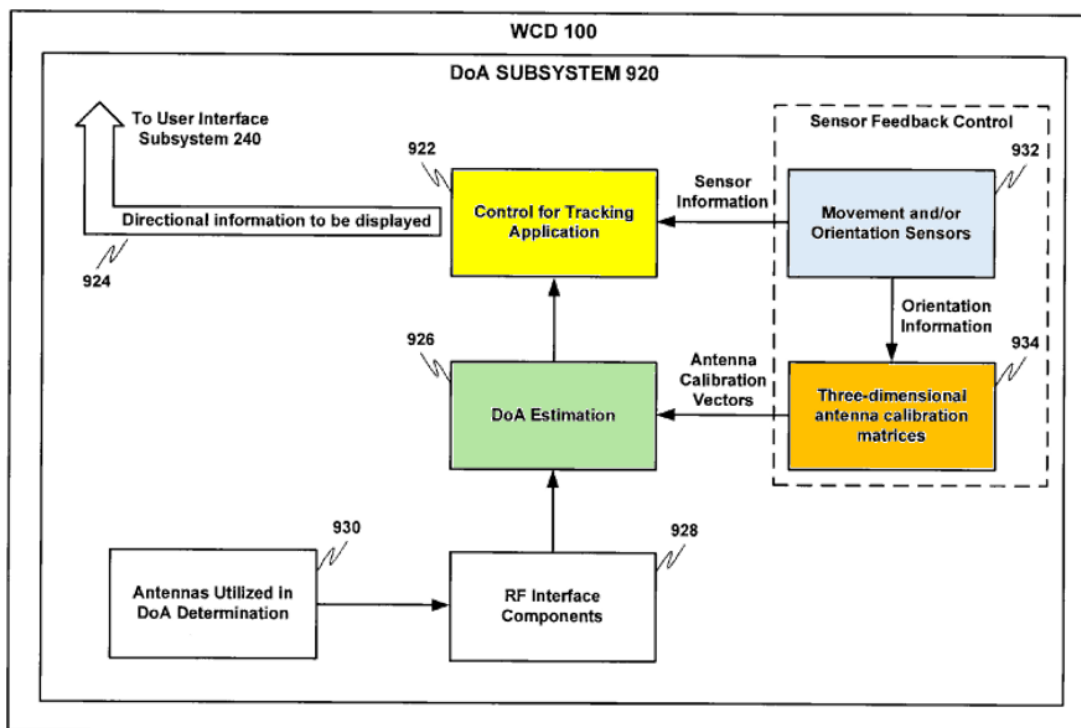
Citing Kalliola at paragraph [0081], Apple asserts the detected orientation may be used "to determine the appropriate antenna calibration vectors[.]" (Reply, 21.) That is correct, but the "determination" described in Kalliola (antenna calibration selection) is not the "determination" recited in limitation 11(e)(vii), *i.e.*, "determining a direction to the remote device." Kalliola's antenna calibration is described in more detail in paragraph [0082], and *exclusively* concerns the relative

position of the WCD components—not determining a direction to a remote object based on the orientation of the mobile device itself as recited in limitation 11(e)(vii).

Apple states “the claim does not require using the orientation sensor to determine a particular orientation and then using that orientation to determine direction.” (Reply, 22.) But limitation 11(d) recites “an orientation sensor to detect rotation of the mobile communication device[,]” and limitation 11(e)(vii) recites determining a direction to the remote device “based on . . . rotation of the mobile communication device detected by the orientation sensor[.]”

Apple essentially argues that the mode and antenna calibration selections described in Kalliola resulting from the relative component orientation determination are *prerequisites* to the described DoA estimation, and therefore, the DoA estimation described in Kalliola is “based on” the relative component orientation. That is incorrect, as Kalliola expressly describes how the DoA determination is made, and it is not “based on” input from the orientation sensor, let alone a detected orientation of the WCD as a whole. First, as figure 9B makes clear, the “orientation sensors” 932 (light blue) are output to the “control” 922 (yellow) and the “antenna calibration matrices” 934 (orange), but *not* the “DoA Estimation” 926 (green) where the direction determination takes place.

FIG. 9B



Ex. 1001, Fig. 9B

Second, Kalliola provides extensive detail on *how* the direction to the remote device is determined, and that is not based on a detected rotation of Kalliola's WCD. Kalliola describes its approach to direction determination in paragraphs [0060]-[0077] with reference to Figures 5-8. Kalliola "employs signals received on multiple antennas in a Direction of Arrival ('DoA') signal processing scheme in order to determine a relative direction to a target from WCD 100." (Ex. 1004, ¶[0060].)

In this example, "the direction of arrival of the incident signal (e.g., the position-indicating transmission) is resolved based on the phase and possibly amplitude differences of signals received by the elements of an antenna array." (*Id.*) Because Kalliola does not disclose determining direction to the remote device based

on a determined orientation of anything, let alone the orientation of the WCD as a whole, Kalliola does not teach nor suggest claim limitation 11(e)(vii).

C. Kalliola’s “Second Embodiment” Does Not Teach nor Suggest Limitations 11(d) or 11(e)(vii).

In its Patent Owner Response, THL explained that the gyroscope disclosed in Kalliola is not implemented to detect rotation of the WCD, nor to determine a direction to a remote device based on that rotation as recited in limitations 11(d) and 11(e)(vii). (POR, 25.) In Kalliola, the gyroscope merely detects whether the WCD is moving or not moving. (Ex. 1004, ¶¶[0014], [0084].) Kalliola uses that binary information, *i.e.*, moving or not moving, to suspend or reactivate its direction-finding algorithm to conserve power—not to determine a direction to a remote device as claimed. (*Id.*)

In its Reply, Apple quotes the deposition testimony of THL’s expert stating that, in the abstract, a gyroscope “can be used to detect angular velocity.” (Reply, 23.) That is irrelevant because Kalliola does not disclose that its gyroscope is used to determine a direction to a remote device based on the rotation of the WCD as recited in limitation 11(e)(vii). As explained above, Kalliola uses the gyroscope to detect when the WCD is not moving so the direction-finding procedure described above may be suspended to conserve power (Ex. 1004, ¶¶[0014], [0084])—a

purpose different from the claimed purpose. Thus, the second embodiment of Kalliola does not teach nor suggest limitation 11(e)(vii).

Apple states, incorrectly, that Figure 9B discloses that “sensor information” provided by the gyroscope “is provided to the tracking application 922, which controls the DoA determination process.” (Reply, 24.) But Kalliola’s Figure 9B discloses that the sensor information is provided to the “***Control for*** tracking application 922”—not the tracking application itself. (Ex. 1004, ¶[0080].) Kalliola explains that the tracking algorithm is implemented by the “DoA Estimation module 926”—a *separate* module from the control module 922 Apple points to in Figure 9B. (*Id.*) Figure 9B shows that the “DoA Estimation module” 926 does not receive the gyroscope output. As explained above, the gyroscope output is merely used in Kalliola as a “control” function to suspend or reactivate the DoA estimation altogether, to preserve battery life. (Ex. 1004, ¶¶[0014], [0084].)

Apple conflates the distinct functions of the components described in Figure 9B when it states “[t]he orientation sensor information is used to select the antenna configuration, which determines ‘how the measurements from the active antennas will be interpreted in order to determine direction.’” (Reply, 21 (citing [Ex. 1004] Kalliola ¶[0081]).) Taken in its proper context, the cited passage of Kalliola explains that the orientation sensor module 932 provides information to “the tracking application 922 and/or a three-dimensional (3-D) antenna calibration matrices

module 934[,]" and that the "3-D antenna module 934 may use the collected sensor information to determine the appropriate antenna calibration vectors to provide to DoA Estimation module 926." (Ex. 1004, ¶[0081].) Contrary to the implication of Apple's statement, it is the "antenna configuration" output from the 3-D antenna module 934—not the output of the orientation sensor 932—that determines "how the measurements from the active antennas will be interpreted in order to determine direction." (*Id.*)

Next, Apple cites its expert's supplemental declaration asserting, based on new references not raised in the Petition, that "a gyroscope detects rotational motion." (Reply, 23, citing Exs. 1047, ¶47 (Supp. Buehrer Decl.); 1051, 170 (Pons, *Wearable Robots*, 2008); 1053, 9 (Unknown Author, *The History of Gyroscopes – From Humble Beginnings to Hyper Technology*, "last visited Jan. 22, 2025").¹ While a gyroscope can be used to detect rotational motion, Kalliola does not disclose using its gyroscope to detect rotation of the WCD for the purpose of determining a

¹ Apple's Exhibit 1053 is a webpage from www.advancednavigation.com. The webpage states it was first "Published on: 21 May 2023," and Apple did not access it until January 22, 2025. (Reply, 32.) This reference is clearly not prior art to the '246 Patent, which claims priority by continuation to February 26, 2010.

direction to a remote device as recited in limitation 11(e)(vii). (Ex. 1004, ¶¶[0014], [0084].)

Finally, Apple cites Kalliola's disclosure that "[i]ncreased activity detected by motion sensors in WCD 100 may trigger a configuration that increases the speed of the DoA estimation[.]" (Reply, 26 (citing Kalliola, [0086]).) Like Apple's prior citation to the "control" module 922 for suspending the (separate) DoA Estimation in module 926 to preserve power, Apple's citation to the same control module 922 to "increase the speed of" the (separate) DoA Estimation in module 926 does not teach nor suggest "detecting rotation" of the device as recited in limitation 11(d), nor determining direction to a remote device based on that rotation as recited in limitation 11(e)(vii).

III. CONCLUSION

For the above reasons, the Board should confirm the patentability of claims 11-19 of the '246 Patent.

Dated: March 6, 2025

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Certificate of Service

The undersigned hereby certifies that on March 6, 2025, a complete and entire copy of PATENT OWNER'S SURREPLY TO PETITION, was served via electronic mail to the attorneys listed below:

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