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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
13/599,795	08/30/2012	Farooq Khan	2011.11.003.SR0	9469
106809	7590	12/08/2016	EXAMINER	
Docket Clerk - SAMS P.O. Drawer 800889 Dallas, TX 75380			NGUYEN, LEE	
			ART UNIT	PAPER NUMBER
			2649	
			NOTIFICATION DATE	DELIVERY MODE
			12/08/2016	ELECTRONIC

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* FAROOQ KHAN, GEORGE ZOHN HUTCHESON,  
MIKE BROBSTON, and ZHOUYUE PI

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Appeal 2015-006680  
Application 13/599,795  
Technology Center 2600

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Before BRUCE R. WINSOR, AARON W. MOORE, and  
MICHAEL J. ENGLE, *Administrative Patent Judges*.

WINSOR, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants<sup>1</sup> appeal under 35 U.S.C. § 134(a) from the final rejection of claims 1–6, 8–15, 17–24, 26, and 27. We have jurisdiction under 35 U.S.C. § 6(b). Claims 7, 16, and 25 are objected to, but indicated to be directed to allowable subject matter. Final Act. 6–7.

We affirm.

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<sup>1</sup> The real party in interest identified by Appellants is Samsung Electronics Co., Ltd. App. Br. 4.

STATEMENT OF THE CASE

Appellants’ “application relates generally to wireless communication[] . . . and, more specifically, to . . . polarization alignment of wireless signals in a wireless communications system.” Spec. ¶ 2. Claim 1, which is illustrative, reads as follows:

1. For use in a wireless communication network, a transmitter comprising:

at least one cross-polarized antenna configured to transmit a signal; and

a polarization processor configured to alter a polarization orientation of the signal to align with a polarization orientation of a receiver

Claims 1–2, 4–6, 8–11, 13–15, 17–20, 22–24, and 26 stand rejected under 35 U.S.C. § 102(b)<sup>2</sup> as being anticipated by Shapira et al. (US 7,113,748 B2; Sept. 26, 2006) (“Shapira”). *See* Final Act. 2–4.

Claims 3, 12, and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Shapira and Erell et al. (US 2011/0150052 A1; June 23, 2011) (“Erell”). *See* Final Act. 5–6.

Claim 27 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Shapira. *See* Final Act. 6.

Rather than repeat the arguments here, we refer to the Briefs (“App. Br.” filed Feb. 9, 2015; “Reply Br.” filed July 7, 2015) and the Specification (“Spec.” filed Aug. 30, 2012) for the positions of Appellants and the Final Office Action (“Final Act.” mailed Sept. 3, 2014), Advisory Action (“Adv.

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<sup>2</sup> All rejections are under the provisions of 35 U.S.C. in effect prior to the effective date of the Leahy-Smith America Invents Act of 2011. Final Act 2, 5, 6.

Act.” mailed Nov. 14, 2014), and Examiner’s Answer (“Ans.” mailed May 7, 2015) for the reasoning, findings, and conclusions of the Examiner. Only those arguments actually made by Appellants have been considered in this decision. Arguments that Appellants did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(iv) (2014).

### ISSUES

The issues presented by Appellants’ contentions are as follows:

Does the Examiner err in finding Shapira discloses “a polarization processor configured to alter a polarization orientation of the signal to align with *a polarization orientation of a receiver*” (emphasis added), as recited in claim 1?

Does the Examiner err in finding Shapira discloses “a polarization processor configured to cause a polarization orientation of the at least one cross-polarized antenna to align with *a polarization orientation of the signal*” (emphasis added), as recited in claim 8?

Does the Examiner err in finding Shapira discloses “the polarization orientation comprises at least one of: a vertical polarization, a horizontal polarization, an elliptical polarization, a circular polarization, a left hand polarization and a right hand polarization,” as recited in claim 2?

Does the Examiner err in finding Shapira discloses “the polarization processor further is configured to apply beamforming weights to the signal,” as recited in claim 6?

Does the Examiner err in finding Shapira discloses “the polarization processor is configured to alter the polarization orientation in response to

detecting a difference between the polarization orientation of the received signal and the polarization orientation of the at least one cross-polarized antenna,” as recited in claim 10?

Does the Examiner err in finding Shapira discloses “the polarization processor is configured to change the polarization orientation of the at least one cross-polarized antenna,” as recited in claim 11?

Does the Examiner err in finding Shapira discloses “a polarization of at least one of a transmitter and a receiver is determined by hardware,” as recited in claim 26?

#### PRINCIPLES OF LAW

Claim construction is an issue of law that we review *de novo*. *Cordis Corp. v. Boston Scientific Corp.*, 561 F.3d 1319, 1331 (Fed. Cir. 2009).

[The USPTO] applies to the verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definitions or otherwise that may be afforded by the written description contained in the applicant’s specification.

*In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997). Although claims are interpreted in light of the specification, “limitations are not to be read into the claims from the specification.” *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993). Accordingly, arguments must be commensurate in scope with the actual claim language. *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982).

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628,

631 (Fed. Cir. 1987). “The identical invention must be shown in as complete detail as is contained in the . . . claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989). “These elements must be arranged as in the claim under review, but this is not an ‘ipsissimis verbis’ test.” *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990) (citations omitted).

## ANALYSIS

We have reviewed Appellants’ arguments and contentions (App. Br. 11–28; Reply Br. 2–10) in light of the Examiner’s findings and explanations (Final Act. 2–6; Adv. Act. 2–6; Ans. 7–13) regarding the argued claims. We agree with the Examiner’s findings and explanations and we adopt them as our own. The following discussion, findings, and conclusions are for emphasis.

### *Claim 1*

Appellants contend that “since *Shapira* expressly matches a short-term average, which is estimated from the reverse link, *Shapira* does not, expressly or inherently teach, altering a polarization orientation of the signal to align with a polarization orientation of the receiver.” App. Br. 14 (discussing *Shapira*, col. 7, ll. 20–25, col. 10, ll. 65–67, col. 12, ll. 64–67).

Appellants explain as follows:

*Shapira* expressly teaches that the polarization is matched to the **short-term average polarization**, which is calculated and not the actual polarization of the MS. In contrast, the Claim 1 recites, without ambiguity, a polarization processor configured to alter a polarization orientation of the signal to align with a polarization orientation of a receiver, which is not an estimated, computed or otherwise guessed average of multiple different orientations of the receiver.

Reply Br. 4.

We find Appellants' argument unpersuasive of error because it is not commensurate with the broadest reasonable interpretation of claim 1. Claim 1 broadly recites a processor that "alter[s] a polarization orientation of the [transmitted] signal to align with a polarization orientation of a receiver" (emphasis added). Claim 1 does not recite any limitations as to how the polarization orientation of the receiver is determined, and does not preclude determining the polarization orientation of the receiver by an estimate. Further the claim does not recite that the polarization orientation of the receiver is an instantaneous, rather than an average value. Accordingly, we agree with the Examiner that the broadest reasonable interpretation of "alter[ing] a polarization orientation of the [transmitted] signal to align with a polarization orientation of a receiver" (claim 1) reads on Shapira's disclosure that "[i]n polarization matching, the polarization orientation in transmitting (per user) is adaptively determined based on the average orientation estimated from the reverse link" (Shapira, col. 12, ll. 64–66; *see also id.* at col. 7, ll. 9–35). *See* Ans. 9–10.

For the foregoing reasons, we sustain the rejections of (1) claim 1 and (2) claims 3–5, which depend from claim 1 and were not separately argued with particularity (*see* App. Br. 18, 27).

#### *Claim 8*

Appellants contend "*Shapira* expressly teaches that the polarization **on the forward link**, i.e., the transmitted signal, is varied. . . . *Shapira* does not expressly, or inherently teach, that a polar orientation of the receiver antenna is caused to align with the received signal." App. Br. 15–16 (discussing *Shapira*, col. 7, ll. 8–35). Appellants focus on the following sentence of *Shapira*: "As indicated in FIG. 5A, adaptive measurement and

control portion 540 is also applied to amplitude/gain and phase adjustments 512, 514 on the transmit portion of system 500 to **vary the polarization on the forward link** in an effort to **match the short term average polarization of the MS.**” Shapira, col. 7, ll. 20–25 (quoted at App. Br. 15 (emphases by Appellants)). However, in the same paragraph, Shapira also discloses the following: “The adaptive measurement and control portion 540 may be provided with a ‘fast’ mechanism for quickly adapting to fading signals on the *received* reverse link by adjusting the *receive* amplitude/gain and the phase adjustments 516, 518 at the antenna plane.” Shapira, col. 7, ll. 12–16 (emphases added). The next paragraph of Shapira further discloses the following:

[T]he signal detected from the MS on *each of the receive antenna elements* 507 is amplitude/gain adjusted and/or *phase adjusted* by amounts  $a_1$  and  $a_2$ , which may be equal to each other. The adjusted signal for each of the *receive antenna elements* is combined and adaptively controlled by the measurement and control portion 540, which drives the values of  $a_1$  and  $a_2$ .

*Id.* at col. 7, ll. 26–33 (emphases added).

Thus, contrary to Appellants’ contentions, we agree with the Examiner that Shapira discloses adjusting the polar orientation of both the receiver antenna and the transmitter antenna. *See* Ans. 10–11.

Appellants further contend “*Shapira* expressly teaches that the **polarization orientation for the receive link can be matched with the average orientation of the MS.**” *Shapira* does not teach, expressly or inherently, a processor configured to cause an actual ‘polarization orientation.’” App. Br. 16. We find this contention unpersuasive for the reasons discussed *supra* regarding claim 1.

For the foregoing reasons, we sustain the rejections of (1) claim 8; (2) claim 17, which recites a limitation substantially similar to that argued regarding claim 8 and was not separately argued with particularity (*see* Reply Br. 5–6); and (3) claims 13, 14, 22, 23, and 27, which variously depend from claims 8 and 17 and were not separately argued with particularity (*see* App. Br. 18, 28).

*Claim 2*

Appellants contend the passage of Shapira (col. 13, ll. 41–43 (cited at Final Act. 2; Ans. 12)) relied upon by the Examiner “merely states that alternatives of polarization diversity can be space-separated diversity, circular-polarization, or cross-polarization. The Examiner has merely identified a reference to circular-polarization and asserted that Shapira anticipates the claim. The Examiner has not provided an express or inherent teaching to support . . . rejection of Claim 2.” App. Br. 18–19 (discussing Shapira, col. 13, ll. 36–41). We are not persuaded of error.

The paragraph of Shapira in which the cited passage appears begins as follows: “*In implementing the embodiments for polarization matching as described above, there are many system considerations that may ultimately affect the performance. Examples of such considerations include polarization diversity, power constraints, and choices of baseband/RF/IF implementations.*” Shapira, col. 13, ll. 36–41 (quoted at App. Br. 18) (emphases added). As Appellants note, the cited passage of Shapira then expressly states that “[a]lternatives of polarization diversity can be, for example, . . . circular-polarization.” Shapira, col. 13, ll. 41–43; App. Br. 18. Thus, we find Shapira discloses polar orientation matching in which the polar orientation to be matched is a circular polarization. In other words, we

agree with the Examiner that Shapira discloses that “the polarization orientation comprises *at least one of*: a vertical polarization, a horizontal polarization, an elliptical polarization, *a circular polarization*, a left hand polarization and a right hand polarization” (emphases added), as recited in claim 2.

For the foregoing reasons we sustain the rejections of (1) claim 2; (2) claim 9, which was argued on a similar basis to claim 2 (*see* App. Br. 20–21); and (3) claim 18, which recites a limitation substantially similar to that argued regarding claim 2 and was not separately argued with particularity (*see* App. Br. 18).

#### *Claim 6*

Appellants contend the passage of Shapira (col. 7, ll. 20–25 (cited at Final Act. 3; *see also* Ans. 12 (additionally citing Shapira, col. 9, ll. 8–18, col. 22, ll. 14–15))) relied upon by the Examiner “contains no express disclosure regarding beamforming weights or that such is applied to the signal.” App. Br. 19 (discussing Shapira, col. 7, ll. 9–25).

We are not persuaded of error. Shapira discloses that “applying a set of *weights* to an [antenna] array will result in an antenna pattern, or beam, and is called *beamforming*.” Shapira, col. 22, ll. 14–15 (emphases added); Ans. 12. Accordingly, we find the Examiner does not err in finding Shapira discloses “the polarization processor further is configured to apply beamforming weights to the signal,” as recited in claim 6.

For the foregoing reason we sustain the rejection of (1) claim 6; (2) claim 15, which was argued on a similar basis to claim 6 (*see* App. Br. 24–25); and (3) claim 24, which recites a limitation substantially similar to

that argued regarding claim 6 and was not separately argued with particularity (*see* App. Br. 18).

*Claim 10*

Appellants contend that Shapira’s adjustments are based on a short term average polarization of a received signal, rather than on the actual received signal. App. Br. 22 (discussing Shapira, col. 7, ll. 9–35). This contention is unpersuasive of error for the reasons discussed *supra* regarding claim 1.

Appellants further contend

the cited portion of *Shapira* [(*see* Final Act. 4 (citing Shapira, col. 7, ll. 12–20); *see also* Ans. 12 (additionally citing Shapira, col. 13, ll. 17–35))] contains no recitation regarding detecting any difference or that such would *necessarily be present* since the cited portion focuses on computing a short-term average polarization.

*Id.* We are not persuaded of error.

Shapira does not describe “alter[ing] the polarization orientation in response to detecting a difference between the polarization orientation of the received signal and the polarization orientation of the at least one cross-polarized antenna” in *ipsissimis verbis*. *See Bond*, 910 F.2d at 832.

However, Shapira describes adaptively estimating the average orientation of an incoming signal from a mobile station (MS) (Shapira, col. 13, ll. 22–23) and adjusting the polarization of the receive link to match the average polarization of the incoming signal (*id.* at col. 13, ll. 25–30). Implicit in Shapira’s adjustment of the receive link polarization to match the average polarization of the incoming signal is a determination that such an adjustment is required, i.e., that the polarizations are different and do not already match — “detecting a difference between the polarization

orientation of the received signal and the polarization orientation of the at least one cross-polarized antenna,” as recited in claim 10.

For the foregoing reason we sustain the rejections of (1) claim 10; (2) claim 19, which was argued together with claim 10; and (3) claims 12 and 21, which depend from claims 10 and 19 respectively and were not separately argued with particularity (*see* App. Br. 27).

### *Claim 11*

Appellants contend

[t]he cited portion [of Shapira (*see* Final Act. 4 (citing Shapira, col. 7, ll. 1–16); *see also* Ans. 12 (additionally citing Shapira col. 13, ll. 25–35))] contains no express disclosure that the polarization orientation of the antenna, that is, the orientation of the electric field (E-plane) of the radio wave with respect to the Earth’s surface that is determined by the physical structure of the antenna and by its orientation, is changed.

App. Br. 23 (discussing Shapira, col. 6, l. 63–col. 7, l. 25). We are not persuaded of error.

There is no requirement that a reference recite a claim limitation *ipsissimis verbis* in order to disclose that limitation. *See Bond*, 910 F.2d at 832. Nor do we see any significance to Shapira’s alleged failure to explicitly repeat the scientific explanation of “polarization orientation.” Shapira discloses the following: “The control parameters include the parameters that are used to adjust the polarization orientation. The polarization control parameters may be fed to an *Rx polarization adjustment mechanism 1910* so that *the polarization orientation for the receive link* can be matched with the average orientation.” Shapira, col. 13, ll. 25–30 (emphases added). We find that this passage explicitly discloses “chang[ing] the polarization orientation of the . . . antenna,” as recited in

claim 11. Further, contrary to Appellants' assertion, this passage expressly discloses changing the polarization orientation of a "receive link." *See* Reply Br. 9 ("Claim[] 11 . . . require[s] adjustments to the antenna that receives the signal, not the antenna that transmits another signal.").

For the foregoing reason we sustain the rejections of (1) claim 11; and (2) claim 20, which was argued together with claim 11 (*see* App. Br. 22).

*Claim 26*

Appellants contend they are "unable to locate any portion of *Shapira* that expressly teaches that amplitude/gain and phase adjustments 512, 514, 516, 518 are hardware. Appellant[s] respectfully submit[] that amplitude/gain and phase adjustments 512, 514, 516, 518 could be implemented by software." App. Br. 26 (discussing *Shapira*, col. 6, l. 63—col. 7, l. 25, Fig 5A). We are unpersuaded of error.

Even if, as asserted by Appellants, *Shapira*'s phase adjustment could be implemented by software, one of ordinary skill in the art would recognize that such software runs on a processor, which is hardware, and therefore even a software implementation is implemented at least in part by hardware. We note that nothing in the claim precludes the use of software in addition to hardware to determine polarization. Accordingly, we agree with the Examiner that *Shapira*'s amplitude/gain and phase adjustments 512, 514, 516, 518 are encompassed by the broadest reasonable interpretation of "a polarization of at least one of a transmitter and a receiver is determined by hardware," as recited in claim 26.

For the foregoing reason we sustain the rejection of claim 26.

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DECISION

The decision of the Examiner to reject claims 1–6, 8–15, 17–24, 26, and 27 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1). *See* 37 C.F.R. §§ 41.50(f), 41.52(b) (2013).

AFFIRMED