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COATS & BENNETT, PLLC 1400 Crescent Green, Suite 300 Cary, NC 27518			NOORISTANY, SULAIMAN	
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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* DAVID HAMMARWALL

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Appeal 2019-000768  
Application 15/653,975  
Technology Center 2400

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BEFORE JEAN R. HOMERE, CARL W. WHITEHEAD JR., and  
SCOTT RAEVSKY, *Administrative Patent Judges*.

RAEVSKY, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant<sup>1</sup> appeals from the Examiner's decision to reject claims 1–17. Appeal Br. 5. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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<sup>1</sup> We use the word “Appellant” to refer to “Applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as Telefonaktiebolaget LM Ericsson (publ). Appeal Br. 2.

### CLAIMED SUBJECT MATTER

The claims relate to a method for reporting Channel State Information (CSI) in a Long Term Evolution (LTE) system. Spec., Abstract, ¶ 2. Claim 1, reproduced below, is illustrative of the claimed subject matter:

1. A method, in a wireless device, for reporting Channel State Information (CSI), the wireless device being comprised in a wireless communications system, the method comprising:
  - receiving a CSI process configuration and a request for CSI from a network node;
  - determining a CSI reference resource based on a number of configured CSI processes; and
  - reporting CSI for one or more CSI processes, wherein the CSI reflects a state of a channel for the CSI reference resource.

### REJECTION

Claims 1–17 stand rejected under pre-AIA 35 U.S.C. § 102(e) as anticipated by Seo (US 2013/0301465 A1, Nov. 14, 2013) or, in the alternative, under pre-AIA 35 U.S.C. § 103(a) as obvious over Seo and Geirhofer (US 2013/0258965 A1, Oct. 3, 2013). Final Act. 2

We review the appealed rejections for error based upon the issues identified by Appellant and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential).

### ANALYSIS

#### *Rejection under § 102 over Seo*

Appellant contends claim 1 is patentable over Seo because Seo fails to disclose “determining a CSI reference resource based on a number of configured CSI processes,” as recited in claim 1. Appeal Br. 7–10; Reply Br. 2. Appellant concedes that Seo discloses “determin[ing] a CSI reference resource.” Appeal Br. 7 (“Seo determines a CSI reference resource (e.g., a

CQI reference resource).”). Accordingly, the sole question before us is whether Seo determines the CSI reference resource “based on a number of configured CSI processes.”

Appellant contends, “Seo’s approach to determining a CQI reference resource using periodic CQI reporting relies exclusively on the number of subframes until a CSI report is due and the type of those subframes, without relying at all on the number of configured CSI processes.” *Id.* Appellant contends that Seo instead describes a different kind of CQI reporting: “[Seo] determine[s] . . . a value that is a minimum value from among values greater than 4 and corresponds to a valid downlink subframe in the case of periodic CQI reporting.” *Id.* (citing Seo ¶ 130). Appellant concludes that Seo’s approach therefore “suffer[s] from one of the very problems addressed by the present application in describing a conventional LTE approach.” *Id.* at 7–8 (citing Spec. ¶¶ 86–87).

Appellant also contends, “Seo’s teachings regarding how it determines a virtual CQI reference resource also fail to read on Applicant’s claims, because Seo does not teach determining a virtual CQI reference resource based on a number of configured CSI processes.” *Id.* at 9. Specifically, Appellant contends that the CSI-RS (CSI reference signal) pattern in Seo’s Figures 8 and 9 does not “equate[] to or otherwise correspond[] to a number of ‘configured CSI processes.’” In fact, Seo never even uses the term ‘CSI process.’” *Id.* at 10.

The Examiner finds, and we agree, that Seo discloses the disputed limitation. Final Act. 6, Ans. 3–4. Specifically, the Examiner finds that Seo discloses in Fig. 8 that the received CSI-RSs are “considered as same as the number of configured CSI processes,” which are used to “determine signal

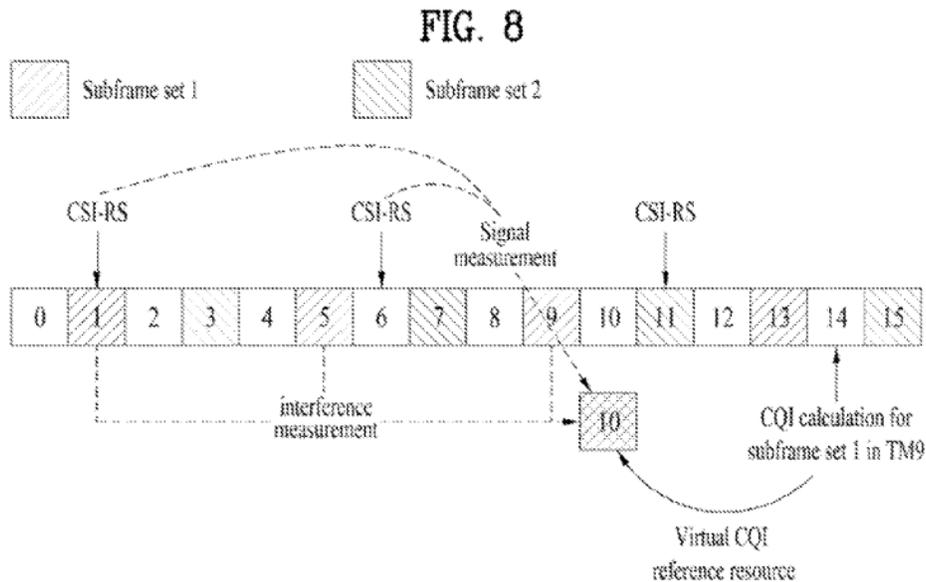
characteristics in the virtual CQI reference resource.” Final Act. 6 (also citing Seo ¶¶ 147–150). The Examiner also finds Seo’s “interference measurement resource[s]” correspond to “CSI processes”: “an interference measurement resource set may mean REs [resource elements] that represent interference characteristics . . . (herein considered same as . . . determined based on a number of configured CSI processes).” *Id.* (citing Seo, Fig. 9).

We begin by construing “CSI process.” During examination of a patent application, we give pending claims their broadest reasonable construction consistent with the specification. *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). The Specification provides a definition for CSI process: “For the purpose of this disclosure, a CSI process is defined as the reporting process of CSI (e.g., CQI and potentially associated PMI/RI) for a particular *effective channel*, and an *interference measurement resource*.” Spec. ¶ 41 (emphasis added). The Specification defines “effective channel” as “a *reference signal* resource comprising one or more multiple associated reference sequences.” *Id.* (emphasis added). In other words, a CSI process includes a reference signal resource (e.g., a CSI-RS) and an interference measurement resource.

Notably, the Specification also appears to equate CSI processes and CSI-RS: “The length of the time window may e.g. be dependent on the total number of CSI processes, *or the number of CSI-RS resources*, configured for the wireless device. For instance, a CSI reference resource may depend on the number of configured CSI-RS resources *or number of CSI processes*.” *Id.* ¶ 91 (emphasis added). Another example “accounts for the additional processing time that is required in the wireless device for the larger number of CSI-RS (*or CSI processes*).” *Id.* ¶ 101 (emphasis added). It is sufficient

for our purposes to determine that under the broadest reasonable interpretation in light of the Specification, “CSI process” includes either a CSI-RS and an interference measurement resource or a CSI-RS alone.

Seo discloses CSI processes as claimed. In Figure 8 of Seo, reproduced below, Seo calculates a virtual CQI reference resource based on two CSI-RS signals and interference measurements:



See Seo ¶¶ 146–148. Specifically, Figure 8 of Seo depicts an “example of setting a CQI reference resource.” *Id.* ¶ 34. In Figure 8, Seo discloses that a “virtual CQI reference resource has the same signal characteristics as those of a specific subframe and the same interference characteristics as those of another specific subframe.” Seo ¶ 146. Seo’s “UE can measure signal characteristics from a CSI-RS.” *Id.* ¶ 147. Seo’s UE also “determine[s] interference characteristics in the virtual CQI reference resource based on the measured interference characteristics.” *Id.* ¶ 148.

Because Seo teaches determining a virtual CQI reference resource based on CSI-RS and interference measurements, we agree with the Examiner that Seo teaches determining a virtual CQI reference resource (i.e.,

a CSI reference resource) based on configured CSI processes, under the broadest reasonable interpretation of that term.

Seo also teaches determining the CSI reference resource based on *a number* of configured CSI processes. Specifically, Seo determines its virtual CQI reference resource using (i.e., broadly “based on”) at least *two* CSI-RS measurements. *See* Seo, Fig. 8. Two CSI-RS measurements (alone or with the corresponding interference measurements) represents “a number” of configured CSI processes, under the broadest reasonable interpretation of “a number.” Accordingly, we agree with the Examiner that Seo teaches “determining a CSI references resource based on a number of configured CSI processes.”

Appellant’s argument that Seo “relies exclusively on the number of subframes until a CSI report is due and the type of those subframes, without relying at all on the number of configured CSI processes” is unpersuasive, as it relies on a narrow interpretation not reflected in the claims. *See* Appeal Br. 7. Accordingly, we sustain the Examiner’s anticipation rejection of claim 1.

Appellant also contends that Seo fails to disclose claim 2’s “wherein the determining the CSI reference resource comprises determining the CSI reference resource further based on a number of configured CSI-RS resources.” Appeal Br. 12–13. Appellant contends that Seo discloses “conventional . . . CSI reporting.” *Id.* at 12. According to Appellant, “[t]he existence of CSI-RS resources for this CSI reporting says nothing about how a particular CSI reference resource is determined.” *Id.*

In the Final Action, the Examiner cites Seo paragraphs [120] and [179] to address claim 2. Final Act. 3. In the Answer, the Examiner

expands upon this reasoning, applying Figures 8 and 9 of Seo (and corresponding paragraphs) to reject claim 2. Ans. 6–7. Appellant contends, “[t]hese new citations of Seo as with previous citations to Seo addressed by Applicant merely discuss the existence of a CSI-RS pattern and what is conventionally known that resource patterns are described for performing interference measurements for CSI reporting.” Reply Br. 4. Appellant does not persuasively distinguish Seo. For similar reasons as we discuss above for claim 1, we agree with the Examiner that Seo Figure 8 teaches claim 2’s “determining the CSI reference resource further based on a number of configured CSI-RS resources.” Specifically, Seo’s Figure 8 teaches determining a “virtual CQI reference resource” based on two CSI-RS signal measurements. *See* Seo, Fig. 8, ¶¶ 146–148. We, therefore, also sustain the Examiner’s anticipation rejection of claim 2.

Appellant’s arguments regarding the rejection of independent claims 10 and 17 rely on the same arguments as for claim 1, and Appellant does not argue separate patentability for the dependent claims apart from claim 2. *See* Appeal Br. 14. We therefore also sustain the Examiner’s anticipation rejection of claims 3–17. *See* 37 C.F.R. § 41.37(c)(1)(iv).

*Rejection under § 103 over Seo and Geirhofer*

Appellant’s arguments against the Seo-Geirhofer combination solely address the teachings of Geirhofer, contending that “Geirhofer also fails to teach determining a CSI reference resource based on a number of configured CSI processes.” Appeal Br. 10. However, the Examiner did not rely on Geirhofer in the Final Action for this limitation, but relied on Seo instead, for reasons discussed above. Final Act. 2–3. Although the Examiner newly

relied on Geirhofer for the disputed limitation in the Answer, and Appellant contests this new finding in its Reply Brief, whether Geirhofer discloses this limitation is irrelevant because Seo discloses it. Ans. 4–5; Reply Br. 2–4. We, therefore, sustain the Examiner’s obviousness rejection of claim 1.

Appellant also contends Geirhofer does not teach the limitation of claim 2. Appeal Br. 13. The Examiner cited paragraph 85 of Geirhofer to address claim 2. Final Act. 3. However, since we agree with the Examiner’s finding that Seo discloses this limitation, for reasons discussed above, Appellant’s argument attempting to distinguish Geirhofer is unpersuasive.

Appellant’s arguments regarding the rejection of independent claims 10 and 17 rely on the same arguments as for claim 1, and Appellant does not argue separate patentability for the dependent claims apart from claim 2. *See* Appeal Br. 14. We therefore also sustain the Examiner’s obviousness rejection of claims 2–17. *See* 37 C.F.R. § 41.37(c)(1)(iv).

### CONCLUSION

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1–17	102	Seo	1–17	
1–17	103	Seo, Geirhofer	1–17	

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

**AFFIRMED**