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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* YOSHIHIKO OGAWA, DAICHI IMAMURA,  
SADAKI FUTAGI, and TOMOFUMI TAKATA

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Appeal 2018-002285  
Application 15/356,236  
Technology Center 2600

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Before JOHNNY A. KUMAR, CATHERINE SHIANG, and  
SCOTT E. BAIN, *Administrative Patent Judges*.

BAIN, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant<sup>1</sup> appeals under 35 U.S.C. § 134(a) from the Examiner’s decision to reject claims 1–22, which constitute all claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

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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 Panasonic Corporation. Appeal Br. 2.

## BACKGROUND

### *The Claimed Invention*

Appellant's claimed invention relates to mobile communications, and specifically, to a "sequence assignment method" for an uplink reference signal in mobile communications. Spec. 1. As the Specification describes, the maximum transmission power of a mobile station is "limited in uplink, and therefore, when the cell radius is long, [in order to] obtain the accuracy of desired channel estimation, it is necessary to transmit a reference signal and data in *narrowband*." *Id.* 3 (emphasis added). The claimed invention facilitates determining "a sequence group assigned to a cell from a large number of sequence groups," such as in cases where reference signals are transmitted in narrow bands," and "reduce[s] interference between different cells." *Id.* 4. The invention does so, according to the Specification, by grouping Zadoff-Chu sequences "into a plurality of sequence groups *according to transmission bandwidth for reference signals*, so that it is possible to increase the number of sequence groups by reducing the number of sequences included in a sequence group[]." *Id.* (emphasis added).

Claims 1 and 12 are independent. Claim 1 is illustrative of the invention and the subject matter of the appeal, and reads as follows (with disputed limitation emphasized):

1. A device, comprising:

a receiver, which, in operation, receives control information related to a sequence, the sequence being within one of a first group and a second group, *the first group being divided into first subgroups each including a first number of one or more of first sequences, the second group being divided into second subgroups each including a second number of one or more of second sequences, the first sequences and the second*

*sequences having different lengths, and the first number being different from the second number; and*

a transmitter, which, in operation, transmits a reference signal using the sequence based on the control information.

Appeal Br. 35 (Claims Appendix) (emphasis added).

### *References*

The references relied upon by the Examiner are:

<b>Name</b>	<b>Reference</b>	<b>Date</b>
3GPP TSG RAN WG1 LTE Ad Hoc R1-061676 ("NPL '676,")	<i>Multiplexing Method for Orthogonal Reference Signals for E-UTRA Uplink</i>	Pub. June 30, 2006
3GPP TSG RAN WG1 LTE Ad Hoc R1-061678 ("NPL '678")	<i>Pilot Sequence Allocation Method in E-UTRA Uplink</i>	Pub. June 30, 2006

### *The Rejections on Appeal*

Claims 4 and 15 stand rejected under pre-AIA 35 U.S.C. ¶ 112, first paragraph, as failing to comply with the written description requirement. Final Act. 2–3.

Claims 1–22 stand rejected under pre-AIA 35 U.S.C. § 103(a) as unpatentable over NPL '676 and NPL '678. Final Act. 4–9.

### DISCUSSION

We have reviewed the Examiner's rejections in light of Appellant's arguments presented in this appeal. Arguments which Appellant could have made but did not make in the Briefs are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(iv). On the record before us, Appellant has not persuaded us of error regarding the Examiner's written description rejection. As to that rejection, we adopt as our own the findings and reasons set forth in the

rejection from which the appeal is taken and in the Examiner's Answer, and we provide the following discussion for highlighting and emphasis. As to the Examiner's obviousness rejection, however, Appellant has persuaded us of error for the reasons set forth below.

*Rejection Under Pre-AIA 35 U.S.C. § 112, First Paragraph*

Appellant argues the Examiner erred in finding that the limitation "length of the first sequences is greater than or equal to a threshold value [and] length of the second sequences is less than the threshold value," as recited in dependent claims 4 and 15, fails to satisfy the written description requirement. Specifically, Appellant argues that the following passages in the Specification adequately describe the disputed limitation:

For example, in cases where transmission bandwidths for reference signals are narrower than a threshold value, 5 the table in FIG. 3 may be used, and, meanwhile, in cases where transmission bandwidths for reference signals are wider than a threshold value, the number of virtual sequences included in one virtual sequence group may increase. . . . Further, generally, the sequence length is longer when transmission bandwidths are wider, and therefore, setting the number of virtual sequences included in a virtual sequence group according to the transmission bandwidths for reference signals equals setting the number of virtual sequences included in a virtual sequence group according to the sequence length of a reference signal.

Spec. 7, 17; Appeal Br. 32.

Appellant's argument, however, is not persuasive because, as the Examiner finds, the foregoing passages in the Specification describe comparing *transmission bandwidth* to a threshold value, not comparing *sequence length* to a threshold value, as claims 4 and 15 recite. Ans. 8–9. In the Final Action, the Examiner finds that "[o]ne of ordinary skill in the art

would know that a sequence length is not the same as a transmission bandwidth.” Final Act. 9. Although the Specification implies a relationship between bandwidth and sequence length, the Examiner finds that the Specification’s use of these two separate terms means that they do not represent the same thing. *Id.* In our view, these findings are supported by the record. Spec. 4, 7, 17. Appellant has not presented any evidence or persuasive argument to rebut them.

Appellant argues that bandwidth and sequence length are interchangeable terms, because the Specification describes that “setting . . . virtual sequence group according to transmission bandwidths . . . equals setting . . . virtual sequences . . . according to the sequence length.” Spec. 17 (emphasis added); Appeal Br. 13. The statement Appellant quotes, however, is not the same as the disputed limitation, which requires comparing sequence lengths to a threshold value. Without any additional evidence presented by Appellant, we conclude the Examiner did not err in finding one of ordinary skill in the art would not understand Appellant to be in possession of the claimed subject matter of claims 4 and 15.

Accordingly, we sustain the Examiner’s rejection of claims 4 and 15 as failing to satisfy the written description requirement.

*Rejection Under Pre-AIA 35 U.S.C. § 103(a)*

Appellant argues the Examiner erred in finding the prior art teaches or suggests a sequence within a “first group” or “second group,” each being divided into “subgroups” of sequences having “different lengths,” as recited in claim 1. Appeal Br. 28–30; Reply Br. 3–6. Specifically, Appellant

argues that NPL '676, the only reference the Examiner relies on for the disputed limitation, does not teach anything about “subgroups.” *Id.* 29. Rather, according to Appellant, NPL '676 only describes the multiplexing of channels, which necessarily decreases the number of sequences. *Id.* 30. For the reasons set forth below, we agree with Appellant’s argument that, on this record, the Examiner has not sufficiently identified or explained how NPL '676 teaches or suggests the recited “subgroups” with different sequence “lengths” in claim 1.

The Examiner relies exclusively on Figure 2 of NPL '676 (and its corresponding description) as teaching the disputed limitation. Final Act. 4–5; Ans. 3–5. Figure 2 is reproduced below.

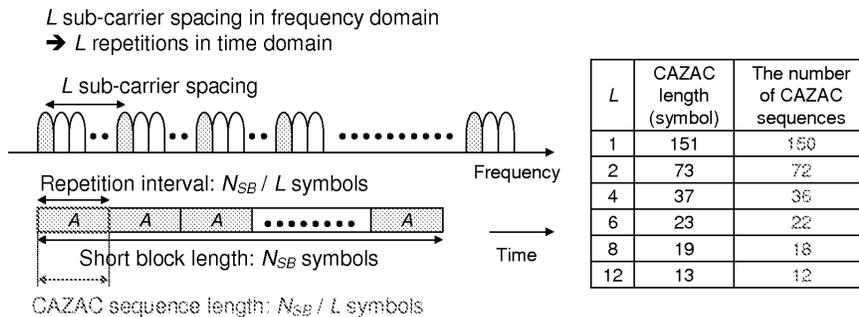


Figure 2 – The number of CAZAC sequence for distributed FDM

Figure 2 illustrates “distributed FDM [frequency division multiplexing] . . . used for uplink pilot multiplexing,” and includes an “example of the number of CAZAC [constant amplitude zero auto-correlation] sequences as a function of the number of orthogonal pilot channels,  $L$ .” NPL '676 at 2. According to the table of Figure 2, for example, one orthogonal pilot channel ( $L=1$ ) results in 150 CAZAC sequences, but when eight orthogonal pilot channels ( $L=8$ ) are multiplexed using distributed FDM, the number of CAZAC sequences decreases to 8. *Id.*

The Examiner finds:

Figure 2 shows a list of CAZAC lengths and a number of CAZAC sequences for L orthogonal pilot channels. In Page 2, R1-061676 discloses that the number of CAZAC sequences decreases according to the increase in the number of orthogonal pilots. The length of the CAZAC sequence becomes  $N_{SB} / L$  and this short sequence is repeated L times in the time domain. Therefore, when  $L=2$ , the CAZAC sequence becomes  $N_{SB} / L = 150/2 = 72$  and this short sequence is repeated L times ( $L=2$ ) in the time domain, having 2 short sequences of 72 (2 subgroups). Therefore, the list shows of 6 groups, each group containing a number of subgroups depending on L.

Ans. 3–4 (citing NPL '676 at 2). The Examiner further explains that “for the third group shown in Fig. 2, when  $L=4$ , the CAZAC sequence becomes  $N_{SB} / L = 150/4 = 36$  and this short sequence is repeated L times in the time domain, having 4 short sequences of 36 (4 subgroups).” *Id.* 4.

As Appellant argues, however, the Examiner’s mapping of “groups” and “subgroups” from Figure 2 to claim 1 appears to be redundant or circular, at least as described on this record. For instance, regarding the foregoing example when  $L = 4$  (i.e., four orthogonal pilot channels), the Examiner appears to find that these four channels correspond both to the claimed “group” and the claimed “subgroup.” *See supra*. In other words, the Examiner refers to  $L = 4$  as the “third *group*,” but also finds that it means there are “4 short sequences of 36 (4 *subgroups*).” Ans. 4 (emphases added); *see supra*.

Appellant further argues, and we agree on this record, that there “is no indication that the 36 sequences when  $L = 4$  [in Figure 2] are divided into subgroups.” Reply Br. 5. For example, Figure 2 does not indicate that the 36 sequences when  $L = 4$  are divided into subgroups of 6 sequences, or 9

sequences, or similarly that there are subgroups of sequences for any other number of orthogonal pilot channels. *Id.*

To the extent the Examiner is relying on some other manner of mapping Figure 2 to the elements of claim 1, we simply cannot discern it from the findings and explanation on the record before us.<sup>2</sup> Accordingly, on this record, we are compelled to conclude that Appellant has persuaded us of error regarding the obviousness rejection.

We, therefore, cannot sustain the obviousness rejection of claim 1. For the same reasons, we cannot sustain the obviousness rejection of independent claim 12, which recites the same disputed limitation as claim 1, nor can we sustain the rejection of the remaining claims, all of which depend (directly or indirectly) from claim 1 or claim 12.

#### SUMMARY

In summary:

<b>Claims Rejected</b>	<b>35 U.S.C. §</b>	<b>Reference(s)/Basis</b>	<b>Affirmed</b>	<b>Reversed</b>
1–22	103	NPL '676, NPL '678		1–22
4, 15	112, ¶1		4, 15	
<b>Overall Outcome</b>			4, 15	1–3, 5–14, 16–22

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<sup>2</sup> In the event of further prosecution, we also note that the record cursorily states that the reason for combining the references was “effective pilot sequence allocation.” Final Act. 5. We direct Appellant’s and the Examiner’s attention to *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”).

DECISION

We affirm the Examiner's decision rejecting claims 4 and 15.

We reverse the Examiner's decision rejecting claims 1–3, 5–14, and 16–22.

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)(iv). *See* 37 C.F.R. § 41.50(f).

AFFIRMED-IN-PART