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United States District Court
Northern District of California

UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA

HUAWEI TECHNOLOGIES, CO, LTD, et al.,
Plaintiffs,
v.
SAMSUNG ELECTRONICS CO, LTD., et al.,
Defendants.

Case No. [3:16-cv-02787-WHO](#)

ORDER DENYING SAMSUNG'S MOTION TO DISMISS TWO OF HUAWEI'S PATENTS

Re: Dkt. No. 39

INTRODUCTION

Defendants Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Samsung Research America (collectively, “Samsung”) move to dismiss two of the 11 patent infringement claims of plaintiffs Huawei Technologies Co., Ltd., Huawei Device USA, Inc., and Huawei Technologies USA, Inc. (collectively, “Huawei”) because the two patents (U.S. Patent Nos. 8,416,892 and 8,644,239) claim mathematical algorithms, and therefore fail to claim patent-eligible subject matter under 35 U.S.C. § 101. Without the benefit of claim construction and accepting Huawei’s factual allegations in the Complaint, I find it plausible at this juncture that both patents’ claim applications of mathematical algorithms tied to specific technological improvements and a concrete structure, rather than to an abstract idea alone. Samsung’s partial motion to dismiss is therefore DENIED.

BACKGROUND

The ‘892 and ‘239 patents, which Samsung moves to dismiss, aim to reduce signal interference when a mobile device connects to a cellular network. Opp’n 1–2 (Dkt. No. 86). This process involves a series of steps, termed a “random access procedure.” *Id.* at 5.

1 contain thousands of mobile devices at a time. Compl. Ex. 7 (“’892 Patent”) at 2:66–67 (Dkt. No.
2 1-7). Before a mobile device can receive and transmit data, it must establish a connection with the
3 cell’s base station via the random access procedure. Opp’n 4.¹ This random access procedure is
4 initiated when a mobile device transmits a radio signal. *Id.* at 5. Signals from the base station to
5 a device are called downlink signals, and signals from the device to the base station are called
6 uplink signals. *Id.* Limited by the speed of light, signals take different amounts of time depending
7 on the distance between the device and the base station, but the base station cannot tell the
8 distance traveled when a signal reaches it. *Id.*

9 “When multiple mobile devices attempt to use the random access process simultaneously,
10 the uncertainty in round trip time causes interference between uplink signals transmitted by
11 different mobile terminals.” *Id.* This uncertainty prevents the base station from differentiating
12 between signals from mobile devices at different locations. *Id.* This phenomenon is called “signal
13 interference.”

14 To enable a base station to distinguish signals, a mobile device transmits a specific
15 sequence of numbers called a “random access preamble” (RAP). *Id.* All mobile devices within a
16 cell select one of 64 RAPs. *Id.* To minimize signal interference, each mobile device within a cell
17 should transmit a different RAP. In addition to the 64 original RAPs, otherwise known as “root
18 sequences,” different RAPs are generated by “cyclically shifting” its digits by different
19 increments. *Id.* Smaller shifts allow a mobile device to generate more distinct sequences from a
20 single root sequence. *Id.* When two sequences do not interfere with each other, they have “zero
21 correlation.” *Id.*

22 The ’892 patent, titled “Method and Apparatus of Transmitting a Random Access
23 Preamble,” reduces signal interference by cyclically shifting a RAP sequence with a particular
24 “Zero Correlation Zone (ZCZ) length.” ’892 Patent at 9:28–12:24. The claims incorporate a
25 cell’s size to generate ZCZ sequences that minimize interference while enabling the base station to

26 _____
27 ¹ Given the posture of this case, where discussion of the technological background is necessary for
28 its resolution, I am relying on descriptions of the technology as characterized by the plaintiffs. I
29 am not adopting these descriptions for any purpose other than ruling on the motion to dismiss.

1 distinguish signals from multiple devices. Opp'n 5. The patent discloses a method that limits the
 2 set of possible cyclic shift increments (N_{CS}) to 16, thereby reducing the signaling between the
 3 mobile device and the base station, while still maximizing the number of distinct RAPs. *Id.*

4 The patent's background information describes the problem it aims to solve: "[c]urrently
 5 there is no feasible scheme for selecting an appropriate limited set of ZCZ lengths, in order to
 6 ensure a small and limited signaling overload." '892 Patent at 3:20–23. The '892 Patent identifies
 7 a scheme in the prior art in which the random access procedure selects one of 64 preambles within
 8 a cell. *Id.* at 1:29–34. It also identifies prior art with a cyclic shift increment of N_{CS} , but with no
 9 restriction on the values of N_{CS} , thus leading to substantial signaling and inefficiency. *Id.* at 3:9–
 10 14. Another proposal limits the cyclic shift increments to 11 possible values of N_{CS} , but does not
 11 describe how to select the lengths of ZCZ. *Id.* at 3:16–19.

12 The '892 Patent, comprised of 20 claims, attempts to fill this gap. Claim 1 is
 13 representative, and recites a method for a mobile device to select a RAP with a particular ZCZ
 14 length of $N_{CS}-1$, where N_{CS} is a cyclic shift increment selected from a pre-defined set of 16
 15 possible values. *Id.*

16 The invention claimed is:

17 1. A method of facilitating communication in a mobile
 18 communication system, the method comprising:

19 selecting, by a user equipment (UE), a random access preamble
 20 from a set of random access preambles; and
 21 transmitting, by a UE, the selected random access preamble,
 22 wherein the set of random access preambles is provided with
 23 Zero Correlation Zones of length $N_{CS}-1$, where N_{CS} is a
 24 cyclic shift increment selected from a predefined set of
 25 cyclic shift increments, the pre-defined set including all of
 26 the following cyclic shift increments of 0, 13, 15, 18, 22, 26,
 27 32, 38, 46, 59, 76, 93, 119, 167, 279, 419.

28 *Id.* at 9:29–41.

29 Independent claim ten is an apparatus claim employing the method of claim one. *Id.* at
 30 10:21 – 37. Independent claims 19 and 20 include a step estimating the time of arrival of the
 31 uplink signal. *Id.* at 11:20–12:24. The remaining claims are all dependent. “As taught and
 32 claimed by the '892 Patent, the inventor identified and selected particular cyclic shifts that would

1 minimizing the number of root sequences needed to generate the 64 RAPs.” Opp’n 7.

2 The ’239 Patent, titled “Method and Apparatus for Allocating and Processing Sequences in
3 Communication System,” similarly aims to reduce cell interference. *Id.* Its claims focus on
4 interference between cells, and create sub-groups of highly correlated sequences, thereby
5 preventing these sequences from appearing in other sequence groups, resulting in low correlation
6 and low interference between subgroups. ’239 Patent.

7 The ’239 Patent comprises 23 claims. Samsung focuses its analysis on claim one.

8 What is claimed is:

9 1. A method for allocating sequences in a communication system,
10 comprising:

11 dividing, by a communication system, sequences in a sequence
12 group into multiple sub-groups, each sub-group
13 corresponding to a mode of occupying time frequency
14 resources;

15 selecting, by the communication system, a sequence from a
16 candidate sequence collection corresponding to each sub-
17 group to form the sequences in the sub-group by:

18 selecting, by the communication system, n sequences in the
19 candidate sequence collection to form sequences in a sub-
20 group i in a sequence group k , wherein n is a natural number,
21 i is a serial number of the sub-group, k is a serial number of
22 the sequence group,

23 determining by the communication system, a value of a basic
24 sequence index r , in the sub-group i in the sequence group k ,
25 the value of r_i is at least one of $\lfloor k \cdot N_i / N_1 \rfloor$, $\lceil k \cdot N_i / N_1 \rceil$,
26 $\lfloor k \cdot N_i / N_1 \rfloor + 1$ and $\lceil k \cdot N_i / N_1 \rceil - 1$, wherein N_i is a length of a
27 sequence in the candidate sequence collection, N_1 is a length
28 of a reference sub-group sequence;

29 allocating, by the communication system, the sequence group to
30 at least one of: a base station, a cell, a user equipment and a
31 channel.

32 *Id.* at 24:31–54.

33 Huawei contends claim six is representative.

34 6. A method for processing sequences in a communication system,
35 comprising:

36 obtaining, by a cell or a base station or a user equipment, a group
37 number k of a sequence group allocated by the system;

38 selecting, by the cell or the base station or the user equipment, n
39 sequences from a candidate sequence collection to form
40 sequences in a sub-group i in a sequence group k ;

41 wherein n is a natural number, i is a serial number of the sub-
42 group, a value of a basic sequence index r , in the sub-group i
43 in the sequence group k is at least one of $\lfloor k \cdot N_i / N_1 \rfloor$,

1 a length of a sequence in the candidate sequence collection,
 2 N1 is a length of a reference sub-group sequence;
 3 generating, by the cell or the base station or the user equipment,
 4 corresponding sequences according to the sequences in the
 5 formed sub-group; and
 6 communicated, by the cell or the base station or the user
 7 equipment, according to the sequences on time frequency
 8 resources corresponding to the sub-group i.

9 *Id.* at 25:1–23.

10 Zadoff-Chu (ZC) sequences are one type of sequence used in mobile communication
 11 systems. According to Huawei, “the ’239 Patent teaches how to create these ZC sequences so that
 12 they have reduced correlation (i.e., low interference) between groups, using one or more of four
 13 identified mathematical relationships... .” Opp’n. 8. The “mathematical relationships” use floor
 14 and ceiling functions (which round up and down, respectively) to group highly correlated
 15 sequences together into subgroups. *Id.* at 19 n.13.

16 Samsung argues that the ’892 and ’239 patents “claim nothing more than mathematical
 17 formulas paired with generic and high-level post-solution steps,” and therefore cover only patent
 18 ineligible subject matter.² Mot. 1.

19 LEGAL STANDARDS

20 I. MOTION TO DISMISS

21 Under Federal Rule of Civil Procedure 12(b)(6), a district court must dismiss a complaint
 22 if it fails to state a claim upon which relief can be granted. To survive a Rule 12(b)(6) motion to
 23 dismiss, the plaintiff must allege “enough facts to state a claim to relief that is plausible on its
 24 face.” *See Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 556 (2007). A claim is facially plausible
 25 when the plaintiff pleads facts that “allow the court to draw the reasonable inference that the
 26 defendant is liable for the misconduct alleged.” *See Ashcroft v. Iqbal*, 556 U.S. 662, 678 (2009)
 27 (citation omitted). There must be “more than a sheer possibility that a defendant has acted

28 _____
 29 ² Although not directly *requesting* it, Samsung states that “[t]he Court may take judicial notice of
 30 USPTO public records, such as the file history of the ’892 patent’s application.” Mot. 7 n.4. In
 31 response, Huawei asks us to take judicial notice of the ’239 patent’s prosecution history. *See*
 32 Opp’n (Dkt. No. 86) 9 n.2. Although the court may take judicial notice of patent prosecution
 33 histories, *see, e.g., Coinstar, Inc. v. Coinbank Automated Sys., Inc.*, 998 F. Supp. 1109, 1114 (N.D.
 34 Cal. 1998) (citing Fed. R. Ev. 201), the prosecution histories of the ’892 and ’239 patents are not
 35 relevant to my determination on the motion to dismiss, and the requests for judicial notice are

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