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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.

Cellular networks consist of cells ranging in size from 1 km to 100 km, and each cell may

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

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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
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
communication system, the method comprising:

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

23 *Id.* at 9:29–41.

24 Independent claim ten is an apparatus claim employing the method of claim one. *Id.* at
25 10:21 – 37. Independent claims 19 and 20 include a step estimating the time of arrival of the
26 uplink signal. *Id.* at 11:20–12:24. The remaining claims are all dependent. “As taught and
27 claimed by the ’892 Patent, the inventor identified and selected particular cyclic shifts that would
28 provide the greatest number of RAPs from a root sequence for a given cell size, thereby

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;

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

Id. at 24:31–54.

Huawei contends claim six is representative.

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

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

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

wherein n is a natural number, i is a serial number of the sub-
group, a value of a basic sequence index r , in the sub-group i
in the sequence group k is at least one of $\lfloor k \cdot N_i / N_1 \rfloor$,
 $\lceil k \cdot N_i / N_1 \rceil$, $\lfloor k \cdot N_i / N_1 \rfloor + 1$ and $\lceil k \cdot N_i / N_1 \rceil - 1$, wherein N_i is

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

1 unlawfully.” *Id.* While courts do not require “heightened fact pleading of specifics,” a plaintiff
2 must allege facts sufficient to “raise a right to relief above the speculative level.” *See Twombly*,
3 550 U.S. at 555, 570.

4 In deciding whether the plaintiff has stated a claim upon which relief can be granted, the
5 Court accepts the plaintiff’s allegations as true and draws all reasonable inferences in favor of the
6 plaintiff. *See Usher v. City of Los Angeles*, 828 F.2d 556, 561 (9th Cir. 1987). However, the court
7 is not required to accept as true “allegations that are merely conclusory, unwarranted deductions of
8 fact, or unreasonable inferences.” *See In re Gilead Scis. Sec. Litig.*, 536 F.3d 1049, 1055 (9th Cir.
9 2008).

10 To state a claim for patent infringement, “a patentee need only plead facts sufficient to
11 place the alleged infringer on notice. This requirement ensures that the accused infringer has
12 sufficient knowledge of the facts alleged to enable it to answer the complaint and defend itself.”
13 *Phonometrics, Inc. v. Hospitality Franchise Sys., Inc.*, 203 F.3d 790, 794 (Fed. Cir. 2000). The
14 Federal Circuit has “repeatedly recognized that in many cases it is possible and proper to
15 determine patent eligibility under 35 U.S.C. § 101 on a Rule 12(b)(6) motion.” *Genetic Techs.*
16 *Ltd. v. Merial L.L.C.*, 818 F.3d 1369, 1373 (Fed. Cir. 2016). In such circumstances where it is
17 possible and proper, “claim construction is not an inviolable prerequisite to a validity
18 determination under § 101.” *Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Can.*, 687 F.3d
19 1266, 1273 (Fed. Cir. 2012).

20 **II. PATENT ELIGIBILITY UNDER 35 U.S.C. § 101**

21 Under Section 101 of the Patent Act, “Whoever invents or discovers any new and useful
22 process, machine, manufacture, or composition of matter, or any new and useful improvement
23 thereof, may obtain a patent therefor... .” 35 U.S.C. § 101. The Supreme Court “has long held
24 that this provision contains an important implicit exception: Laws of nature, natural phenomena,
25 and abstract ideas are not patentable.” *Alice Corp. Pty. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2354
26 (2014) (citing another source). The reason for the exception is clear enough—“such discoveries
27 are manifestations of ... nature, free to all men and reserved exclusively to none.” *Mayo*
28 *Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1293 (2012) (citations and

1 internal quotation marks omitted). The boundaries of the exception, however, are not so clear.

2 The *Alice* court highlighted “the concern that drives this exclusionary principle as one of
3 preemption.” *Alice Corp.*, 134 S. Ct. at 2354 (noting the delicate balance inherent in promoting
4 progress, the primary object of patent law, and granting a monopoly, the means for accomplishing
5 that goal). In other words, patents that seek to wholly preempt others from using a law of nature
6 or an abstract idea—“the basic tools of scientific and technological work”—are invalid. *Id.*
7 “Accordingly, in applying the § 101 exception, we must distinguish between patents that claim the
8 buildin[g] block[s] of human ingenuity and those that integrate the building blocks into something
9 more, thereby transform[ing] them into a patent-eligible invention.” *Id.* (internal citations and
10 quotation marks omitted).

11 The *Alice* court then applied *Mayo*’s two-step framework for analyzing whether claims are
12 patent eligible. *Id.* at 2355. First, “determine whether the claims at issue are directed to one of
13 those patent-ineligible concepts.” *Id.* Subsequent federal circuit court opinions have clarified the
14 importance of the first step. *See, e.g., Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1334 (Fed.
15 Cir. 2016) (finding patent eligible subject matter in claims directed to improvements in computer
16 software, under *Alice* step one). “[T]he first step of the inquiry is a meaningful one ... and cannot
17 simply ask whether the claims *involve* a patent-ineligible concept... .” *Id.* at 1335 (alteration in
18 original). “Rather, the ‘directed to’ inquiry applies a stage-one filter to claims, considered in light
19 of the specification, based on whether their character as a whole is directed to excluded subject
20 matter.” *Id.* (internal quotation marks omitted).

21 “If this threshold determination is met, we move to the second step of the inquiry and
22 consider the elements of each claim both individually and as an ordered combination to determine
23 whether the additional elements transform the nature of the claim into a patent-eligible
24 application.” *Id.* at 1334 (internal citations and quotations omitted). This step entails the “search
25 for an inventive concept – i.e., an element or combination of elements that is sufficient to ensure
26 that the patent in practice amounts to significantly more than a patent upon the [ineligible concept]
27 itself.” *Alice Corp.*, 134 S. Ct. at 2355 (internal quotation marks and citations omitted).

28 Although not dispositive of the “inventive concept” inquiry, many courts use the

1 “machine-or-transformation” test as “a useful and important clue” to assess whether a claim is
2 patent-eligible. *Bilski v. Kappos*, 561 U.S. 593, 604 (2010). Under this test, a “claimed process is
3 surely patent-eligible under § 101 if: (1) tied to a particular machine or apparatus; or (2) it
4 transforms a particular article into a different state or thing.” *Id.* at 600. “Beyond the machine-or-
5 transformation test, a court is obligated to hew closely to established precedents in this area to
6 determine whether an invention falls within one of the exceptions to § 101’s broad eligibility.”
7 *OIP Technologies, Inc. v. Amazon.com, Inc.*, No. C-12-1233-EMC, 2012 WL 3985118, at *5
8 (N.D.Cal. Sept. 11, 2012) (citation omitted).

9 **III. BURDEN OF PROOF**

10 No Supreme Court or Federal Circuit post-*Alice* decision has definitively ruled on whether
11 the clear and convincing evidence standard applies when evaluating patent-eligible subject matter
12 at the motion to dismiss stage. District courts are split as to the appropriate standard. “Several
13 courts have concluded that a heightened burden of proof makes little sense in the context of a
14 motion to dismiss or motion for judgment on the pleadings, and therefore declined to apply the
15 clear and convincing evidence standard.” *Papst Licensing GmbH & Co. KG v. Xilinx Inc.*, No. 16-
16 CV-00925-LHK, 2016 WL 3196657, at *7 (N.D. Cal. June 9, 2016) (collecting cases). Other
17 courts apply the clear and convincing standard since the Federal Circuit has endorsed that standard
18 to determine validity at other stages of a proceeding.³ *Id.*; see also *OpenTV, Inc. v. Apple Inc.*, No.
19 5:15-CV-02008-EJD, 2016 WL 344845, at *3 (N.D. Cal. Jan. 28, 2016) (collecting cases).
20 It is not necessary to decide whether the heightened burden of proof applies here because
21 defendants fail to establish the invalidity of the patents at issue, even by a preponderance of the
22 evidence.

23 **DISCUSSION**

24 Samsung moves to dismiss both the ’892 and ’239 patents because (1) they are directed to
25 mathematical equations; and (2) they do not contain any inventive concepts. Samsung focuses its

26 _____
27 ³ The heightened standard derives from the presumption of validity that attaches to patents in other
28 contexts, however “no equivalent presumption of eligibility applies in the section 101 calculus.”
Ultramercial, Inc. v. Hulu, LLC, 772 F.3d 709, 721 (Fed. Cir. 2014).

1 analysis on claim one of each patent, while briefly addressing the remaining claims. *See* Mot.
2 3:14–20; 5:11–21; 9:18–10:18; 11:23–24, 13. For purposes of this motion, I will focus on claim
3 one as representative of each patent, because no side identifies significant differences between
4 claim one and the other claims that would or should impact the analysis.

5 “The courts have recognized that it is not always easy to determine the boundary between
6 abstraction and patent-eligible subject matter.” *Internet Patents Corp. v. Active Network, Inc.*, 790
7 F.3d 1343, 1347 (Fed. Cir. 2015) (collecting cases and highlighting the court’s attention to patents
8 that attempt to preempt use of the laws of nature or abstract ideas when determining the
9 boundary). *See also Parker v. Flook*, 437 U.S. 584, 589 (1978) (“The line between a patentable
10 ‘process’ and an unpatentable ‘principle’ is not always clear.”)

11 In attempting to find that boundary, “the [Federal Circuit] and the Supreme Court have
12 found it sufficient to compare claims at issue to those claims already found to be directed to an
13 abstract idea in previous cases.” *Enfish*, 822 F.3d at 1334. Here, however, the parties have
14 presented few cases with claims pertaining to mobile communication systems. *See, e.g., France*
15 *Telecom S.A. v. Marvell Semiconductor Inc.*, 12-cv-04967-WHO, 39 F. Supp. 3d 1080 (N.D. Cal.
16 2014) (finding method claims for correcting errors in telecommunication patent eligible); *TQP*
17 *Dev., LLC v. Intuit Inc.*, No. 2:12-CV-180-WCB, 2014 WL 651935 (E.D. Tex. Feb. 19, 2014)
18 (denying defendant’s motion for summary judgment of invalidity of method claim for transmitting
19 encrypted data over a communication link).

20 A recent decision from the district of Delaware, however, analyzes nearly identical claims
21 under a Rule 12(c) motion for judgment on the pleadings. *See Evolved Wireless, LLC v. Apple*
22 *Inc.*, No. CV 15-542-SLR, 2016 WL 6440137 (D. Del. Oct. 31, 2016). In *Evolved Wireless*, both
23 patents dealt with “specific solutions to improve mobile device functionality over the prior art
24 with faster, more reliable, and more efficient voice and data transmissions.” *Id.* at *1 (internal
25 quotation marks omitted). The patents accomplished this end by means of cyclic shifts, defined
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1 differently than those at play here.⁴ *Id.* at *2-3. The *Evolved Wireless* court concluded, “[b]ecause
2 the ’916 and ’481 patents are directed to technological improvements resolving specific problems
3 in a wireless communications system, the court finds that they claim patent-eligible subject matter
4 under § 101. *Id.* at *7. Although not binding, the *Evolved Wireless* decision is directly on point
5 and highly persuasive.

6 **I. THE ’892 PATENT**

7 Samsung argues that the ’892 Patent is directed to a mathematical equation because its
8 claimed advance over the prior art is the inclusion of a specific set of 16 cyclic shift intervals,
9 which Samsung deems “math.” Mot. 7. Huawei counters that the claims “do not preempt all uses
10 of the mathematical concepts they implement, but rather apply them to very specific problems and
11 technological contexts,” Opp’n 11, and “are specifically directed to a specific technological
12 improvement with the technological goal of facilitating communication between a user equipment
13 and cell of a mobile communication network.” Opp’n 13. As in *Evolved Wireless*, I find that the
14 ’892 Patent claims are directed to a specific improvement in cellular communications, and not an
15 abstract idea or mathematical formula. Thus, the claims are not directed to a patent-ineligible
16 concept under *Alice* step one, and the analysis ends there.

17 Samsung contends that the ’892 Patent is invalid under *Alice* because it is directed to a
18 mathematical formula, the claimed advance is a mathematical equation, and the generic post-
19 solution steps were thoroughly conventional in the art. Mot. 7-9. But “a process is not
20 unpatentable simply because it contains a law of nature or a mathematical algorithm.” *Flook*, 437
21 U.S. at 590. Rather, “[i]t is now commonplace that an *application* of a law of nature or
22 mathematical formula to a known structure or process may well be deserving of patent
23 protection.” *Diamond v. Diehr*, 450 U.S. 175, 187 (1981) (alteration in original). But, “[w]ithout
24 additional limitations, a process that employs mathematical algorithms to manipulate existing
25 information to generate additional information is not patent eligible.” *Digitech Image Techs., LLC*

26
27 ⁴ It matters that the patents accomplish the precise improvement at issue here, but use different
28 equations. It seems clear that the ’892 and ’239 patents are not claiming the abstract idea of
improving the technological functioning and they are not claiming the mathematical formulas they
employ because the formulas have no significance removed from the technological environment.

1 *v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1351 (Fed. Cir. 2014).

2 **A. The Claimed Advance is Not a Mathematical Equation**

3 Claim one of the '892 Patent is a method claim comprised of two steps: selecting and
4 transmitting a number (the RAP) ascertained by applying mathematical equations to a predefined
5 set of values. '892 Patent, 9:29-41. This process is meant to be performed via "user equipment."⁵
6 *Id.* at 9:32. Samsung and Huawei agree that claim one's final element, limiting the cyclic shift
7 increments to a predefined set of 16, is the claimed advance over the prior art. *See* Mot. 7; Opp'n
8 6. Samsung's reasoning, however, flounders at its next step. Samsung insists that "the specific
9 technological improvement" is "just math." Reply 4. But that contention is belied by the claims
10 "considered in light of the specification." *Enfish*, 822 F.3d at 1335. The improvement appears to
11 also encompass the decreased interference resulting from low signal overload. *See* '892 Patent,
12 3:4-8. While the improvement necessarily *relies* on math because the low signal overload depends
13 on the limited set of cyclic shift intervals, itself derived from mathematical equations and variables
14 dictated by a cell's size, that reliance does not render it ineligible for a patent. *See Digitech Image*
15 *Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1350 (Fed. Cir. 2014) ("In determining
16 whether a process claim recites an abstract idea, we must examine the claim as a whole, keeping in
17 mind that an invention is not ineligible just because it relies upon a law of nature or mathematical
18 algorithm.").

19 "The abstract idea exception has been applied to prevent patenting of claims that abstractly
20 cover results *where it matters not by what process or machinery* the result is accomplished."
21 *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 2016 WL 4896481, at *8 (Fed. Cir. Sept. 13, 2016)
22 (emphasis added) (citation and internal quotation marks omitted). The '892 Patent does not

23 _____
24 ⁵ The particular apparatus "user equipment," is not defined, but I preliminarily construe it as
25 referring to a mobile terminal (i.e., device). *See* '892 Background. Huawei does not argue that I
26 must conduct claim construction prior to deciding this motion, and Samsung underscores this
27 silence. *See* Reply 3 n.2. In my preliminary view, the claims here do not appear to be so
28 "straightforward" that claim construction would not be helpful. *See Boar's Head Corp. v.*
DirectApps, Inc., No. 2:14-CV-01927-KJM, 2015 WL 4530596, at *4 (E.D. Cal. July 28, 2015).
Nonetheless, I will proceed to "adopt the meaning most favorable to the plaintiff when considering
eligibility," *id.* (citing another source), preliminarily construe "user equipment" as referring to a
mobile terminal, and decide this motion to dismiss prior to claim construction.

1 attempt to claim a mathematical formula. It discloses a method that uses a predefined set of
 2 numbers—itsself derived from an equation, but not occurring in the natural environment—to
 3 enable a mobile device to more efficiently synchronize with a base station. This advance entails
 4 more than an abstract idea or “just math.”

5 In addition to arguing that the claimed advance is directed to a mathematical equation,
 6 Samsung contends that the “conventional post-solution activity” here, selecting and transmitting
 7 RAPs, “does not render a mathematical formula patent-eligible.” Mot. 8. It relies on *Flook* and
 8 *Thales Visionix, Inc. v. United States*, 122 Fed. Cl. 245 (2015) to support its position. But the
 9 *Thales* court found that the claims at issue were directed to “mathematical equations for
 10 determining the relative position of a moving object to a moving reference frame,” and, therefore,
 11 “incorporate[d] laws of nature governing motion... .” *Thales*, 122 Fed. Cl. at 252. And *Flook*’s
 12 algorithm enlisted a “scientific principle ... that has always existed.” *Flook*, 437 U.S. at 593 n.15.
 13 Unlike in *Flook* and *Thales*, the equation of the ’892 Patent has no significance outside of
 14 decreasing interference between mobile devices—not “a building block of human ingenuity.”
 15 *Thales*, 122 Fed. Cl. at 252.

16 **B. The Patent is Apparently Limited To a Specific Technological Improvement and a**
 17 **Concrete Structure**

18 The improvement is more than merely a mathematical formula. The advance is the result
 19 of applying a mathematical formula to the specific context of a mobile communication system. It
 20 does not “simply provide a new and presumably better method of calculating” a number, such as
 21 an alarm limit, that exists as a law of nature. *Flook*, 437 U.S. at 594–95.⁶ See also *Genetic Techs.*
 22 *Ltd.*, 818 F.3d at 1376 (“The claim is directed to a natural law—the principle that certain non-
 23 coding and coding sequences are in linkage disequilibrium with one another.”); *Ariosa*
 24 *Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1376 (Fed. Cir. 2015) (“[T]he claims are

25
 26 ⁶ The *Diehr* Court noted that “the claims in *Flook* did more than present a mathematical formula.”
 27 *Diehr*, 450 U.S. at 193 n.14. But, “[a]ll the application provided was a ‘formula for computing an
 28 updated alarm limit.’” *Id.*; see also *Flook*, 437 U.S. at 594 (finding the “process is unpatentable
 under § 101, not because it contains a mathematical algorithm as one component, but because
 once that algorithm is assumed to be within the prior art, the application, considered as a whole,
 contains no patentable invention.”)

1 directed to matter that is naturally occurring”). Rather, the result of the method in claim one is a
 2 number, but one far removed from a law of nature, and “firmly rooted in technology used for
 3 wireless communications.” *Evolved Wireless*, 2016 WL 6440137, at *6.

4 Further, the ’892 Patent is not an attempt to limit the use of an *idea* to a particular
 5 technological environment. *See generally Alice*, 134 S. Ct. at 2358 (“*Flook* stands for the
 6 proposition that the prohibition against patenting abstract ideas cannot be circumvented by
 7 attempting to limit the use of [the idea] to a particular technological environment.”). The only
 8 “abstract idea” identified by Samsung is the mathematical equation used to derive the limited set
 9 of cyclic shift intervals. But Samsung itself admits that the equation has no significance when
 10 removed from the context of mobile devices connecting to a base station within a cell. *See*
 11 *Samsung Reply 2* (Dkt. No. 89) (“Huawei does not even try to argue that the claimed
 12 mathematical formulas—whether used to create the claimed RAPs of the ’892 claims or the
 13 sequences in the ’239 claims—have any utility except to be used for cellular transmissions.”). If
 14 the equation has no independent significance outside the technological environment of mobile
 15 communication systems, then the claims tying the equation to a mobile device cannot be an
 16 attempt to limit something that could be broader, and thus, there is no attempt to “circumvent”
 17 patent law. *See Research Corp. Techs. v. Microsoft Corp.*, 627 F.3d 859, 869 (Fed. Cir. 2010)
 18 (“Indeed, this court notes that inventions with specific applications or improvements to
 19 technologies in the marketplace are not likely to be so abstract that they override the statutory
 20 language and framework of the Patent Act.”)

21 Applying the mathematical equations of the ’892 Patent to mobile communication systems
 22 is not a “wholly generic computer implementation.” *Alice*, 134 S. Ct. at 2358. Rather, the claims
 23 “purport to improve the functioning” of the mobile communication system. *Cf. id.* at 2359
 24 (finding that the claims in *Alice* did not improve the functioning of the computer). Improvements
 25 to mobile communications technology are similar to patents aimed to improve computer-related
 26 technology because both employ software. *See California Inst. of Tech. v. Hughes Commc'ns Inc.*,
 27 59 F. Supp. 3d 974, 987 (C.D. Cal. 2014) (“The essence of software is manipulating existing data
 28 and generating additional data through algorithms.”) I will therefore look to cases analyzing

1 patents dealing with computer-related technology.

2 The *Enfish* court explained that it “do[es] not read *Alice* to broadly hold that all
3 improvements in computer-related technology are inherently abstract and, therefore, must be
4 considered at step two.” *Enfish, LLC*, 822 F.3d at 1335. It then proceeded to analyze the
5 improvements under *Alice* step one, and found the claims of the database software at issue were
6 “not directed to an abstract idea,” but rather, they [were] directed to a specific improvement to the
7 way computers operate....” *Enfish*, 822 F.3d at 1336. Analogizing to *Enfish*, here the “plain
8 focus of the claims is on an improvement to [cellular] functionality itself, not on economic or
9 other tasks for which a computer is used in its ordinary capacity.” *Id.* at 1336.

10 Samsung simultaneously argues that the ’892 Patent is not connected to a concrete
11 structure but, even if it is, it is still not patent-eligible (because it is directed to a mathematical
12 formula, the only improvement is the use of particular cyclic shift numbers, and it is “just math”).
13 *See* Reply 3–5 (“The lesson of these cases is that mathematical formulas and other abstract ideas
14 are not patent-eligible just because they are used for technological ends, or just because they are
15 paired with conventional and generic devices.”) As an initial matter, the ’892 Patent’s “user
16 equipment” (i.e., mobile device) is “integral to the claimed invention.” *Compression Tech. Sols.*
17 *LLC v. EMC Corp.*, No. C-12-01746 RMW, 2013 WL 2368039, at *9 (N.D. Cal. May 29, 2013)
18 (“To be integral, the computer must facilitate the process in a way a person could not.”) (internal
19 citation omitted). *Compare* ’892 Patent at 9:29–41 (“A method of facilitating communication in a
20 mobile communication system, the method comprising: selecting, *by a user equipment*, a random
21 access preamble...”), *with Digitech Image Techs., LLC v. Elecs. for Imaging, Inc.*, 758 F.3d
22 1344, 1350–51 (Fed. Cir. 2014) (only the preamble mentions a “digital image reproduction
23 system” and “nothing in the claim language expressly ties the method to an image processor” ...
24 “we therefore need not decide whether tying the method to an image processor would lead us to
25 conclude that the claims are directed to patent eligible subject matter.”)

26 But a tie to a concrete structure, even where it is integral to the claimed invention, is not
27 enough to conclude the claim covers patentable subject matter. Rather, it is the method as a
28 whole, including the step of limiting available cyclic shift increments to a predefined set, that

1 removes the '892 claims from the realm of abstract ideas. *Compare Gottschalk v. Benson*, 409
 2 U.S. 63 (1972) (holding unpatentable claims for an algorithm used to convert binary code decimal
 3 numbers to equivalent pure binary numbers because finding that a digital computer was a
 4 sufficient limitation would wholly preempt the mathematical formula and in practical effect would
 5 be a patent on the algorithm itself), *with Diehr*, 450 U.S. at 178 (holding claims patent eligible
 6 because they improved an existing technological process, not because they were implemented on a
 7 computer). The '892 Patent provides an improvement to an existing technological process tied to
 8 a concrete structure.

9 The parties disagree whether Samsung's cases involve technological applications and/or
 10 physical devices on one hand, or concern "abstract ideas untethered to applications of physical
 11 devices" on the other. *See* Opp'n 15; Reply 4. This disagreement in interpretation highlights the
 12 reasons for incorporating preemption into the analysis. *See* Opp. 11 (noting "the absence of any
 13 discussion of preemption in Samsung's motion"). "The concern underlying the exceptions to §
 14 101 is not *tangibility*, but preemption." *See Mayo*, 132 S.Ct. at 1301 (emphasis added). "[A]t the
 15 same time...the absence of complete preemption does not demonstrate patent eligibility." *Ariosa*
 16 *Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015) (internal quotation
 17 marks and citation omitted).

18 Turning to the cases, the *Flook* claims were found ineligible absent complete preemption,
 19 even though they were specifically applied to the petrochemical and oil-refining industry. *Flook*,
 20 437 U.S. at 589-90. The *Flook* court reasoned that the "claim [was] directed essentially to a
 21 method of calculating." *Id.* at 595. As discussed above, that is not the case here where the claim
 22 is focused on an *improvement*, not an equation.

23 Samsung's cases are distinguishable. The *TLI* court found that the claims were "not
 24 directed to a solution to a technological problem," but rather were "simply directed to the abstract
 25 idea of classifying and storing digital images in an organized manner." *In re TLI Commc'ns LLC*
 26 *Patent Litig.*, 823 F.3d 607, 614 (Fed. Cir. 2016). The court found that the "steps [fell] squarely
 27 within [Federal Circuit] precedent finding generic computer components insufficient to add an
 28 inventive concept to an otherwise abstract idea." *Id.* (collecting cases with claims involving

1 generic computer components, storing, receiving and sending information); *see also Synopsys, Inc.*
 2 *v. Mentor Graphics Corp.*, No. C 12-6467-MMC, 78 F. Supp. 3d 958, 963 (N.D. Cal. 2015) (“The
 3 claimed methods [] at issue [did] not entail anything physical.”); *Digitech Image Techs., LLC v.*
 4 *Elecs. for Imaging, Inc.*, 758 F.3d 1344, 1350 (Fed. Cir. 2014) (finding “[t]he method in the ’415
 5 patent claims an abstract idea because it describes a process of organizing information through
 6 mathematical correlations and is not tied to a specific structure or machine.”); *Compression Tech.*
 7 *Sols. LLC v. EMC Corp.*, No. C-12-01746 RMW, 2013 WL 2368039, at *5 (N.D. Cal. May 29,
 8 2013) (finding the patent was “no more than an abstract idea: all of the claimed limitations can be
 9 performed as mental processes ... and it is so broad that it would inappropriately limit future
 10 innovation.”) While Samsung insists that “all of Samsung’s cases involved technological
 11 applications and/or physical devices,” Reply 4, none of them involved technological
 12 improvements *and* physical devices, and so they are not directly on point.

13 Samsung argues that Huawei’s cases do not involve mathematical equations, and therefore,
 14 do not support the patent eligibility of the ’892 claims. Opp’n 5. *McRO* involved patents with
 15 methods for “automatically animating lip synchronization and facial expression of animated
 16 characters.” *McRO*, 2016 WL 4896481, at *1. The method did not include *numbers*, but it did
 17 involve “limited mathematical rules.” *Id.* at *8 (noting defendant’s concession that the prior art
 18 “was driven by subjective determinations rather than specific, limited mathematical rules.”) Even
 19 though the result of the method was not “tangible,” the court found the claim patent-eligible
 20 because it was “directed to a patentable, technological improvement,” not “an abstract idea.” *Id.*
 21 at *10. As in *McRO*, the ’892 claims “use[] the limited rules in a process specifically designed to
 22 achieve an improved technological result in conventional industry process.” *Id.*

23 I have already discussed *Enfish*. Although it is true that the claims “were not directed to a
 24 mathematical formula,” Mot. 9 n.5; *see also* Reply 6, the *Enfish* court focused on the claims’
 25 alleged “improvement of an existing technology.” *Enfish*, 822 F.3d at 1337. The same focus is
 26 warranted here. *See id.* (noting that its conclusion “is bolstered by the specification’s teachings
 27 that the claimed invention achieves other benefits over conventional databases, such as increased
 28 flexibility, faster search times, and smaller memory requirements.”) As in *McRO* and *Enfish*, the

1 '892 patent is directed to an improvement in existing technology, not an abstract idea. This
2 analysis need not proceed to *Alice* Step two. *See Evolved Wireless* at *7 (“Because the ’916 and
3 ’481 patents are directed to technological improvements resolving specific problems in a wireless
4 communications system, the court finds that they claim patent-eligible subject matter under §
5 101.”) At the pleading stage, I will not dismiss the ’892 Patent.

6 **II. THE ’239 PATENT**

7 The ’239 Patent claims are directed to “[a] method and apparatus for allocating and
8 processing sequences in a communication system.” ’239 Patent, Abstract. Samsung proclaims
9 that it accomplishes this by dividing, selecting, and determining values—“pure mathematics.”
10 Mot. 11:3. At least here, Samsung identifies the abstract idea it purports the ’239 Patent attempts
11 to preempt—“a formula for dividing numerical sequences into non-highly correlated groups.” *Id.*
12 at 11:9. Huawei concedes that the claims include a mathematical formula, and proffers the same
13 arguments regarding the ’892 Patent, concluding that alone does not render it patent ineligible.

14 **A. *Alice* Step One – The “Directed To” Inquiry**

15 Since the ’239 claims essentially present a method of allocating (i.e., sorting), I think they
16 present a closer case. The parties, however, fail to advance arguments worthy of additional
17 discussion. Samsung has at least presented an abstract idea with respect to the ’239 claims, and
18 Huawei offers no argument in rebuttal, other than contending that including math does not render
19 claims patent ineligible. I will accept the argument that the ’239 claims are directed to an abstract
20 idea, and proceed to analyze them under *Alice* step two.

21 **B. *Alice* Step Two – The Search for an “Inventive Concept”**

22 Samsung argues that “allocating data within a cellular communication system is not an
23 inventive concept” and claiming “base station,” “cell,” “user equipment,” and “channel” are
24 conventional elements insufficient to render the claims patent eligible. Mot. 12 (citing *TLI*, 823
25 F.3d at 615 (“generating computer components [are] insufficient to add an inventive concept to an
26 otherwise abstract idea”). As with the ’892 claims, the ’239 claims are limited to the technological
27 environment of cellular communications, and they are tied to the concrete structure of a mobile
28 device. For these reasons, and because they do not present a risk of preemption, the claims

1 contain enough of an inventive concept to be patent eligible, at least based on the allegations in the
2 Complaint.

3 **III. MOTIONS TO SEAL**

4 Both Huawei and Samsung submit administrative motions to seal information relevant to
5 this motion. Huawei filed a motion to seal portions of its Complaint (Dkt. No. 3), stating that it
6 has no issue with unsealing, but sought to seal to avoid breaching its non-disclosure agreement
7 with Samsung. Dkt. No. 3-1 (Bettinger Decl.) ¶¶ 8-9. Since Samsung “do[es] not maintain a
8 claim of confidentiality over any information disclosed in Huawei’s Complaint (Dkt. No. 3-4), or
9 any of its supporting exhibits filed under seal (Dkt. Nos. 3-5 through 3-26),” Huawei’s motion is
10 DENIED.

11 Samsung’s motion to seal portions of its Answer (Dkt. No. 41) is superseded by its motion
12 to seal portions of its Amended Answer (Dkt. No. 90) and is therefore TERMINATED. Samsung
13 supports its administrative motion to file these documents under seal through the Declarations of
14 Hojin Chang (Dkt. No. 41-1), and Marissa Ducca (Dkt. No. 41-2 and Dkt. No. 90-1). Samsung
15 asserts that portions of its Answer and Amended Answer disclose confidential financial
16 information that it only discloses this information under the protections of a non-disclosure
17 agreement. Chang Decl. ¶¶ 4-6. Huawei supports the sealing of its confidential information
18 referenced in Samsung’s Answer and Amended Answer through the Declaration of Xiaowu Zhang
19 (Dkt. No. 53),⁷ asserting the information Huawei seeks to seal disclosed confidential licensing and
20 patent acquisition strategies. Huawei’s declaration submitted in support of sealing does not
21 address Exhibit 58 (Dkt. No. 41-4) to Samsung Answer and Counterclaims, which Samsung
22 identifies as Huawei asserting a claim of confidentiality.

23 Huawei also seeks to seal portions of its answer to Samsung’s counterclaims. Dkt. Nos.
24 97, 100, 102. Huawei inadvertently filed the motion with incomplete redactions (Dkt. No. 97),
25 and seeks to seal the not fully redacted answer (Dkt. No. 97-2) and unredacted answer and exhibits
26 (Dkt. No. 98) at Dkt. No. 100. Huawei’s motion (Dkt. No. 100) to permanently seal these

27 _____
28 ⁷ Only Exhibit A of Dkt. No. 53 should be sealed, the rest of Dkt. No. 53, including the declaration
and proof of service, should be UNSEALED/UNLOCKED.

1 documents (Dkt. Nos. 97-2 and 98) is GRANTED. Huawei corrected its error in a motion to seal
2 at Dkt. No. 102.

3 Samsung and Huawei have shown compelling justification for sealing this information.
4 For this reason, I GRANT the parties' narrowly tailored requests to seal the confidential
5 information in the documents as indicated in the table below. All other documents that I have
6 declined to seal will be unsealed by the court on or after November 29, 2016, unless either side
7 asks that I reconsider any decision to deny sealing as referenced below.

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Dkt. No. 3 Huawei Motion to Seal its Complaint				
Document Sought to be Sealed	Dkt. No.	Portions Sought to Be Sealed	Party Claiming Confidentiality	Court's Ruling
Huawei's Complaint	3-4	1:21-22, 2:6-25, 5:19-20, 5:23, 6:1-11, 10:25-26, 11:4-14:15, 15:13-16:23, 16:25-17:27, 19:23-20:6, 22:5-16, 24:21-25:6, 27:7-18, 29:27-30:10, 32:13-24, 35:2-8, 37:12-23, 40:7-18, 42:23-26, 43:1-8, 45:18-46:3, 46:11-23, footer (all pages)	NONE	DENIED
Exhibits 2.1-2.43 and 3.1-3.53	3-5, 3-6, 3-7, 3-8, 3-9, 3-10, 3-11, 3-12, 3-13, 3-14, 3-15, 3-16, 3-17, 3-18, 3-19, 3-20, 3-21,3-22, 3-23, 3-24, 3-25, 3-26	Entire Documents	NONE	
Bettinger Decl. and Ex. A	3-1	Entire Documents	NONE	DENIED
Dkt. No. 90				

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Samsung's Motion to Seal Answer and Amended Counterclaims				
Samsung Answer and Counterclaims	41-3	35:9, 107:7, 108:24, 108:27, 109:2, 109:4-6, 109:10, 109:16, 109:19	Samsung (Dkt. Nos. 41-1, 41-2, and 90-1)	GRANTED
Samsung Answer and Counterclaims	41-3	2:8, 35:6-7, 35:10, 88:9-10, 107:9, 107:11, 107:12, 107:14, 107:15, 107:16, 107:17, 107:21, 107:22-23, 107:24-25, 107:26-27, 108:23-25, 108:27-109:2, 109:4, 109:10-11, 109:16-20, 110:6, 110:10, 110:13, 110:14, 110:16, 110:18, 110:19, 110:27-28, 111:1, 119:24	Huawei (Dkt. No. 53)	GRANTED
Exhibit 58	41-4			
Samsung Answer and Amended Counterclaims	90-2	35:7, 99:16, 101:6, 101:9, 101:12, 101:14-16, 101:20, 101:26, 102:2	Samsung (Dkt. Nos. 41-1, 41-2, and 90-1)	GRANTED
Samsung Answer and Amended Counterclaims	90-2	2:8, 35:6-7, 35:10, 80:14-15, 99:18, 99:20, 99:21, 99:23, 99:24, 99:25, 99:26, 100:3, 100:4-5, 100:6-7, 100:8-9, 101:5-7, 101:9-12, 101:14, 101:20-21, 101:26-102:3, 102:16, 102:20, 102:23, 102:24, 102:26, 103:2, 103:3, 103:11-12, 103:13, 112:13	Huawei (Dkt. No. 53)	GRANTED
Dkt. No. 97				

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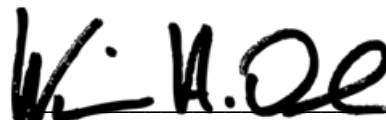
Huawei's Motion to Seal Portions of Answer to Amended Counterclaims				
Huawei Answer to Amended Counterclaims		70:19-20; 111:18; 111:21; 111:25; 111:26; 112:2; 112:7; 112:11; 112:12; 112:17; 112:19-20; 112:23-24; 112:26-27; 113:1; 113:3-4; 113:6-7; 113:10; 115:13-14; 115:17-18; 115:23-24; 116:1-2; 116:5; 116:17-18; 117:2-3; 117:5; 117:7; 117:10-12; 118:13; 118:25; 119:2; 119:3; 119:6; 119:8; 119:13; 119:14; 119:15; 119:17; 120:6-7; 120:10-11; 120:14; 135:12	Huawei (Dkt. Nos. 41-1 and 53)	GRANTED
Huawei Answer to Amended Counterclaims		111:15; 115:14; 115:17; 115:23; 116:2; 116:5-7; 116:17; 117:2; 117:5; 117:11	Samsung (Dkt. Nos. 41-1, 41-2, and 91)	GRANTED

CONCLUSION

For the aforementioned reasons, defendants' motion to dismiss is DENIED.

IT IS SO ORDERED.

Dated: November 21, 2016



WILLIAM H. ORRICK
United States District Judge