IN THE UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF CALIFORNIA

BELL NORTHERN RESEARCH, LLC, Plaintiff, v. COOLPAD TECHNOLOGIES, INC. AND YULONG COMPUTER COMMUNICATIONS, Defendants.	C.A. No. 3:18-cv-1783-CAB-BLM Judge: Hon. Cathy Ann Bencivengo Magistrate Judge: Hon. Barbara L. Major
BELL NORTHERN RESEARCH, LLC, Plaintiff, v. HUAWEI DEVICE (DONGGUAN) CO., LTD, HUAWEI DEVICE (SHENZHEN) CO., LTD., and HUAWEI DEVICE USA, INC., Defendants.	C.A. No. 3:18-cv-1784-CAB-BLM
BELL NORTHERN RESEARCH, LLC, Plaintiff, v. KYOCERA CORPORATION and KYOCERA INTERNATIONAL INC., Defendants.	C.A. No. 3:18-cv-1785-CAB-BLM

BELL NORTHERN RESEARCH, LLC, Plaintiff, v. ZTE CORPORATION, ZTE (USA) INC., ZTE (TX) INC., Defendants.	C.A. No. 3:18-cv-1786-CAB-BLM

PLAINTIFF'S OPENING CLAIM CONSTRUCTION BRIEF

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Cases

Statutes

TABLE OF EXHIBITS

Exhibit	Description
A	U.S. Patent No. 7,319,889 to Goris, et al., issued January 15, 2008
B	Excerpts of the Certified File History for U.S. Patent No. 7,319,889.
C	U.S. Patent No. 8,204,554 to Goris, et al., issued June 19, 2012
D	Excerpts of the Certified File History for U.S. Patent No. 8,204,554.
E	U.S. Patent No. 7,990,842 to Trachewsky, et al., issued August 2, 2011
F	U.S. Patent No. 8,416,862 to Aldana, et al., issued April 3, 2013
G	U.S. Patent No. 7,957,450 to Hansen, et al., issued June 7, 2011
H	U.S. Patent No. 6,941,156 to Mooney, issued September 6, 2005
I	Excerpts of the Certified File History for U.S. Patent No. 6,941,156
J	U.S. Patent No. 7,039,435 to McDowell, et al., issued May 2, 2006
K	Excerpts of the Certified File History for U.S. Patent No. 7,039,435
L	Amended Declaration of Dr. Vijay Madisetti In Support of Plaintiff's Claim Constructions dated May 2, 2019 ("Madisetti Op. Decl.")
M	Rebuttal Declaration of Dr. Vijay Madisetti In Support of Plaintiff's Claim Constructions dated May 8, 2019 ("Madisetti Rebuttal Decl.")
N	Sur-Rebuttal Declaration of Dr. Vijay Madisetti In Support of Plaintiff's Claim Constructions dated May 16, 2019 ("Madisetti Sur-Rebuttal Decl.")
O	Excerpts from the May 1, 2019 Declaration of Paul Min, Ph.D. Regarding Claim Construction ("Min Op. Decl.")
P	Excerpts from the May 19, 2019 Deposition of Paul Min, Ph.D. ("Min Dep.")
Q	Excerpts from Webster's Unabridged Dictionary (2001)
R	Excerpts from Rebuttal Declaration of Dr. Jonathan Wells, Ph.D. dated May 8, 2019 ("Wells Rebuttal Decl.")
S	Excerpts from William Yee, *Mobile Communications Engineering – Theory and Applications*, McGraw Hill (2d ed. 1997)

Exhibit	Description
T	U.S. 6,498,924 ("Vogel")
U	Ronald N. Bracewell, *The Fourier Transform and its Applications* (3rd ed., 2000)
V	Discrete Fourier Transform based Multimedia Colour Image Authentication for Wireless Communication (DFTMCIAWC)
W	Spatial Channel and System Characterization

I. INTRODUCTION

Pursuant to this Court's Case Management Order of October 15, 2018, Plaintiff Bell Northern Research, LLC's ("BNR") hereby submits its Opening Claim Construction Brief in the following cases, consolidated for pretrial purposes: *Bell Northern Research, LLC v. Coolpad Technologies, Inc., et al.*, No. 3:18-cv-1783; *Bell Northern Research, LLC v. Huawei Device USA, Inc., et al.*, No. 3:18-cv-1784; *Bell Northern Research, LLC v. Kyocera Corporation, et al.*, No. 3:18-cv-1785; and *Bell Northern Research, LLC v. ZTE Corporation, et al.*, No. 3:18-cv-1786.[1]

The consolidated cases involve eight patents: U.S. Patent No. 7,319,889 ("the '889 Patent"); U.S. Patent No. 8,204,554 ("the '554 Patent"); U.S. Patent No. 7,990,842 ("the '842 Patent"); U.S. Patent No. 8,416,862 ("the '862 Patent"); U.S. Patent No. 7,957,450 ("the '450 Patent"); U.S. Patent No. 6,941,156 ("the '156 Patent"); U.S. Patent No. 8,792,432 ("the '432 Patent"); and U.S. Patent No. 7,039,435 ("the '435 Patent") (collectively, the "Asserted Patents").

BNR's proposed constructions adhere to the well-known principles of claim construction and are based on the plain and ordinary meaning of the terms at issue, taking into account the specification's teachings. Defendants' proposed constructions, on the other hand, generally seek to import extraneous limitations or ignore key disclosures in an attempt to manufacture non–infringement and invalidity positions. Because BNR's constructions are consistent with the canons of patent law and properly balance granting the full scope of applicants' invention while ensuring that the public has proper notice of the scope of the invention, BNR respectfully requests that the Court adopt its proposed constructions for the disputed terms described below.

[1] BNR's expert's opinions cited herein are offered against the Huawei, Coolpad, and Kyocera Defendant Groups.

II. LEGAL STANDARD

Claim construction is the process by which "the meaning and scope of the patent claims asserted to be infringed" is determined. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). This is a task for the Court. *Id.* at 979.

A. The scope of a patent is defined by the plain import of its claims.

It is fundamental patent law that a patent's claims define the patent's scope. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc). Thus, "the claim construction inquiry . . . begins and ends . . . with the actual words of the claim." *Scanner Techs. Corp. v. ICOS Vision Sys. Corp. N.V.*, 365 F.3d 1299, 1303 (Fed. Cir. 2004) (quoting *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1248 (Fed. Cir. 1998)); *Blast Motion, Inc. v. Zepp Labs, Inc.*, No. 15-CV-700 JLS (NLS), 2017 U.S. Dist. LEXIS 16549, at *3 (S.D. Cal. Feb. 6, 2017). Given the express statutory purpose of the patent claim—"to particularly point[] out and distinctly claim[]" the invention—it is "unjust to the public, as well as an evasion of law, to construe it in a manner different from the plain import of its terms." *Phillips*, 415 F.3d at 1312 (quoting *White v. Dunbar*, 119 U.S. 47, 52 (1886)); 35 U.S.C. § 112(2). Specifically, limiting the claims by the exemplary embodiments described in the patent document is "one of the cardinal sins of patent law." *Phillips*, 415 F.3d at 1320. This is true even if the patentee described only one embodiment in the patent. *Id.* at 1323.

B. A claim term is given its full ordinary and customary meaning unless the patentee: (i) clearly otherwise defined the term, or (ii) unequivocally disclaimed the full scope of the term.

"The words of a claim are generally given their ordinary and customary meaning as understood by a person of ordinary skill in the art when read in the context of the specification and prosecution history." *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012) (citing *Phillips*, 415 F.3d at 1313); *accord CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) ("Generally speaking, we indulge a heavy presumption that a claim term carries its ordinary and

customary meaning." (internal quotation marks omitted)). "There are only two exceptions to this rule: 1) when a patentee sets out a definition and acts as his own lexicographer, or 2) when the patentee disavows the full scope of the claim term either in the specification or during prosecution." *Thorner*, 669 F.3d at 1365 (*citing Vitronics Corp. v. Conceptronic, Inc*., 90 F.3d 1576, 1580 (Fed. Cir. 1996)); *accord K-2 Corp. v. Salomon S.A*., 191 F.3d 1356, 1362–63 (Fed. Cir. 1999) ("The ordinary and accustomed meaning of a disputed claim term is presumed to be the correct one subject to . . . a different meaning clearly and deliberately set forth in the intrinsic material." (citations omitted)). Ultimately, "[t]he patentee is free to choose a broad term and expect to obtain the full scope of its plain and ordinary meaning unless the patentee explicitly redefines the term or disavows its full scope." *Thorner*, 669 F.3d at 1367.

III. CLAIM CONSTRUCTION REGARDING THE GORIS PATENTS

A. Background of the Inventions

The '889 and '554 Patents, the "Goris Patents," belong to the same patent family; the '554 Patent is a continuation of the '889 Patent. Each patent is entitled "System and Method for Conserving Battery Power in a Mobile Station" and claims priority to an earlier application filed on June 17, 2003.

The Goris Patents relate to inventions that help reduce cell phone consumption of battery power. The specification notes that "the stand-by time, as well as the talk-time, of a mobile station depend on the lifetime of a (rechargeable) battery inserted within the mobile station and hence, on the load and/or on the capacity of the battery." (Ex. A, '889 Patent at 1:27–30; Ex. C; '554 Patent at 1:28–31.) The specification further notes the problems in the prior art stemming from increasing the capacity of the battery: "batteries having increased capacities are often larger, heavier or more expensive, none of which are desirable attributes for a portable, affordable mobile station." (Ex. A, '889 Patent at 1:31–35; Ex. C, '554 Patent at 1:32–36.)

Thus, the Goris Patents describe "a way to prolong the lifetime of a mobile station without having to use a battery with an increased capacity," and they do so by

focusing on the power supply to the display of the phone. (Ex. A, '889 Patent at 1:35–37; Ex. C, '554 Patent at 1:36–38.) The claims are drawn to systems and methods that include (among other things) use of a proximity sensor and processor "adapted to cause power consumption of the display to be reduced when the display is within a predetermined range of an external object," such as a user's ear. (Ex. A, '889 Patent at 1:44–46; Ex. C, '554 Patent at 1:45–47; *see also*, *e.g.*, Claim 1.) The specification explains that "by reducing the power consumption of the display of an activated telephone set in [the] case [that] the display is not needed, i.e., in particular during a telephone call, current is saved instead of needlessly consumed from the (recharge-able) battery. Accordingly, the spared available battery power may be significant, especially for color displays, resulting in an overall increasement of the stand-by and/or talk time of the telephone set." (Ex. A,'889 Patent at 1:47–54; Ex. C, '554 Patent at 1:48–55.)

B. "a signal indicative of proximity of an external object" and "a signal indicative of the existence of a first condition, the first condition being that an external object is proximate"

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning. To the extent the Court determines that a specific construction is warranted, BNR proposes: "a signal that an external object is within a predetermined range"	"a signal that an external object is or is not within a predetermined range"

These terms appear in the following claims in the Goris Patents, and there is a difference in language between the '889 Patent term and the '554 Patent terms:

'889 Patent Claim 1	'554 Patent Claim 1	'554 Patent Claim 14
A mobile station, comprising:	A mobile station, comprising:	A mobile station, comprising:

'889 Patent Claim 1	'554 Patent Claim 1	'554 Patent Claim 14
a display; a proximity sensor adapted to generate **a signal indicative of proximity of an external object**; and a microprocessor adapted to: (a) determine whether a telephone call is active; (b) receive the signal from the proximity sensor, and (c) reduce power to the display if (i) the microprocessor determines that a telephone call is active and (ii) the signal indicates the proximity of the external object; wherein: the telephone call is a wireless telephone call; the microprocessor reduces power to the display while the signal indicates the proximity of the external object only if the microprocessor determines that the wireless telephone call is active; and the proximity sensor begins detecting whether	a display; a proximity sensor adapted to generate **a signal indicative of the existence of a first condition, the first condition being that an external object is proximate**; and a microprocessor adapted to: (a) determine, without using the proximity sensor, the existence of a second condition independent and different from the first condition, the second condition being that a user of the mobile station has performed an action to initiate an outgoing call or to answer an incoming call; (b) in response to a determination in step (a) that the second condition exists, activate the proximity sensor; (c) receive the signal from the activated proximity sensor; and (d) reduce power to the display if the signal from the activated proximity	a display; a proximity sensor adapted to generate **a signal indicative of the existence of a first condition, the first condition being that an external object is proximate**; and a microprocessor adapted to: (a) determine, independently of the determination whether the external object is proximate, the existence of a second condition different from the first condition, the second condition being that a user of the mobile station has performed an action to initiate an outgoing call or to answer an incoming call; (b) in response to a determination in step (a) that the second condition exists, activate the proximity sensor; (c) receive the signal from the activated proximity sensor; and

'889 Patent Claim 1	'554 Patent Claim 1	'554 Patent Claim 14
an external object is proximate substantially concurrently with the mobile station initiating an outgoing wireless telephone call or receiving an incoming wireless call.	sensor indicates that the first condition exists.	(d) reduce power to the display if the signal from the activated proximity sensor indicates that the first condition exists.

The only dispute regarding the definition of this claim term centers on Defendants' insertion of the three words "or is not," effectively requiring that the proximity sensor be adapted to generate a signal when an external object *is not* within a predetermined range. But Defendants cannot point to any support in the intrinsic record that requires the proximity sensor of these three claims to be adapted to generate a signal to show that something *is not* there. Nor do the Defendants cite any extrinsic evidence, including any expert testimony, that a person of ordinary skill in the art would interpret the claim term to require a signal indicating the absence of an object within a predetermined range. On the contrary, the specification invariably refers to a determination that an external object *is* within a predetermined range. For instance, in the specification:

- "The proximity sensor is coupled to the chassis and causes the power consumption to be reduced when the ***display is within*** a predetermined range of an external object." (Ex. A, '889 Patent at Abstract; Ex. C, '554 Patent at Abstract.)
- "…a proximity sensor coupled to the chassis and adapted to cause a power consumption of the display to be reduced when the ***display is within*** a predetermined range of an external object." (Ex. A, '889 Patent at 1:43–46; Ex. C, '554 Patent at 1:44–47.)

- "If the proximity sensor 140 ***detects an external object*** (such as the user's ear) ***within*** the monitored range…" (Ex. A, '889 Patent at 3:20–22; Ex. C, '554 Patent at 3:21–23.)
- "…***detecting*** an attachment of the set, in particular of the display of said set ***near to an object***, in particular to the ear…" ('889 Patent at 2:20–22; Ex. C, '554 Patent at 2:21–23.)
- "If the proximity sensor 140 ***detects an external object*** (such as the user's ear) ***within the monitored range***…" (Ex. A, '889 Patent at 3:20–22; Ex. C, '554 Patent at 3:21–23.)
- "…the proximity sensor 140 ***detects proximity*** to an external object…" (Ex. A, '889 Patent at 3:36–37; Ex. C, '554 Patent at 3:37–38.)
- "…the proximity sensor 140 again ***detects an object***. . . " (Ex. A, '889 Patent at 3:57–58; Ex. C, '554 Patent at 3:57–58.)

Similarly, the file histories for the Goris Patents evidence no requirement of a signal that an object *is not* there. (Ex. B; Ex. D.)

Even in a scenario where the external object is moved away from the display or proximity sensor, which the patent specifically contemplates, there is no requirement that the proximity sensor must generate a "negative signal" (i.e., a signal that something *is not* within a predetermined range). For example, the specification states, "the means may be further adapted to switch-on the display in response to a detection that the set, preferably the display of the set, is moved away from any object, in particular from the ear." (Ex. A, '889 Patent at 2:6–9; Ex. C, '554 Patent at 2:7–10; *see also* Ex. A, '889 Patent at 3:48–58; Ex. C, '554 Patent at 3:48–58.) Nothing in the patent forecloses an embodiment where the ***absence*** of a signal that an external object is proximate would allow the display to switch back on. In fact, the specification describes an embodiment that is wholly consistent with the absence of a signal indicating proximity to an external object:

> Moreover, ***if the proximity sensor 140 is directly activated by an incoming call*** or automatically activated, the display can be kept in a Switched-off condition as long as the mobile station 110 is, for example, ***within a pocket*** (not referenced) or the like and is only switched on when the user retrieves the mobile station 110 from the pocket to enable the user to look on the display 150 for an information about the calling party. If the user then wants to accept the call and thence places the mobile station 110 proximate an external object, such as his ear, the ***proximity sensor 140 again detects an object***, causing the display again to be switched off.

(Ex. A, '889 Patent at 3:48–68 (emphasis added); Ex. C, '554 Patent at 3:48–58.) These disclosures, coupled with the fact that there is nothing in the claim language itself to indicate that a negative signal is required, supports BNR's proposal. *See Phillips*, 415 F.3d at 1315 ("[T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.") (citation omitted).

Moreover, focusing on the disputed language in Claim 1 and 14 of the '554 Patent yields further support to BNR's interpretation that the generated signal need only indicate that an external object is within a predetermined range: "a signal indicative of the existence of a first condition, the first condition being that an external object is proximate" (emphasis added). Here, the claim language makes it clear that the subject of the signal is "that an external object is proximate." Defendants' attempt to insert an "or is not" into this very clear language describing the signal is unsupported.

In the parties' claim construction exchanges, the sole piece of evidence that Defendants have relied upon to support the "is or is not" portion of their proposed definition is Claim 2 of the '554 Patent:

> The mobile station of Claim 1, further comprising increasing power to the display if the signal from the activated proximity sensor indicates that the first condition no longer exists.

Defendants argue that because this dependent claim requires that the increasing of power to the display is conditional on "the signal from the activated proximity

sensor indicates that the first condition no longer exists," the independent Claim 1, a different independent claim in the same patent that Claim 2 does not depend from, and an independent claim from a different but related patent must also be read to require a signal that "indicates that the first condition no longer exists." But that argument is erroneous because it is black letter law that the requirements of a dependent claim cannot be imported into a construction for an independent claim. *Nazomi Communs., Inc. v. ARM Holdings, PLC*, 403 F.3d 1364, 1370 (Fed. Cir. 2005) ("[L]imitations stated in dependent claims are not to be read into the independent claim from which they depend."). Indeed, under Federal Circuit case law, "the presence of a dependent claim that adds a particular limitation gives rise to a ***presumption*** that the limitation in question ***is not present in the independent claim***." *Phillips*, 415 F.3d at 1314–1315 (emphasis added) ("Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.").

BNR has never argued that sending a signal that "indicates that the first condition no longer exists" is inconsistent with or precluded by the requirements of Claim 1. ***But Claim 1 does not require it***. And Defendants' attempt to import that requirement from a dependent claim, without any intrinsic or extrinsic support, lacks any support in the face of this strong presumption. *See, e.g.*, *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004) (reversing district court's claim construction finding where "[t]he juxtaposition of independent claims lacking any reference to a pressure jacket with dependent claims that add a pressure jacket limitation provides strong support for [the] argument that the independent claims were not intended to require the presence of a pressure jacket.").

Finally, Defendants' proposed construction, in addition to lacking any intrinsic or extrinsic support, is also inconsistent with Defendants' agreement with BNR on another term that appears further in the '889 Patent claim identified above (as well as in other claims). The parties have agreed that the term "the signal indicates the proximity of the external object" as it appears twice in the underlined portions of

Claim 1 of the '889 Patent below[2] means, "the signal is that an external object is within a predetermined range"—remarkably similar to BNR's proposal for the disputed term.

> A mobile station, comprising:
>
> a display;
>
> a proximity sensor adapted to generate a signal indicative of proximity of an external object; and
>
> a microprocessor adapted to:
>
> (a) determine whether a telephone call is active;
>
> (b) receive the signal from the proximity sensor, and
>
> (c) reduce power to the display if (i) the microprocessor determines that a telephone call is active and (ii) **the signal indicates the proximity of the external object**; wherein:
>
> the telephone call is a wireless telephone call;
>
> the microprocessor reduces power to the display while **the signal indicates the proximity of the external object** only if the microprocessor determines that the wireless telephone call is active; and
>
> the proximity sensor begins detecting whether an external object is proximate substantially concurrently with the mobile station initiating an outgoing wireless telephone call or receiving an incoming wireless call.

But the only difference between this agreed-upon term and the disputed term is that one (the agreed-upon) begins with "the signal indicates the" and the other (the disputed) begins with "a signal indicative of." The remainder of the term, "proximity of an external object," is identical. Defendants' insertion of "or is not" into the

[2] This agreed-upon term also appears in Claim 2 of the '889 Patent.

disputed term while leaving it out of the agreed-upon term cannot be explained by the difference in language, because the subject of the signal—"proximity of an external object"—is exactly the same. Defendants' proposed construction, which adds an "is not" to the proximity in one case and omits it in the other, seeks to apply different meanings to the same term, which is against basic principles of claim construction. *See, e.g., Digital Biometrics v. Identix, Inc.,* 149 F.3d 1335, 1345 (Fed. Cir. 1998) ("[T]he same word appearing in the same claim should be interpreted consistently."); *Cloud Farm Assocs. LP v. Volkswagen Grp. of Am., Inc.,* 674 Fed. Appx. 1000, 1006 (Fed. Cir. 2017) ("The same term should be construed consistently throughout the same patent and any related patents sharing a common specification.") (citing *CVI/Beta Ventures, Inc. v. Tura LP,* 112 F.3d 1146, 1159 (Fed. Cir. 1997) ("[W]e are obliged to construe the [asserted term] consistently throughout the claims.")); *Nazomi Communs*., 403 F.3d at 1370 ("The court must consider not only that different embodiments are possible, but also that the meaning of 'instruction' in the claims must be the same in all of them.").

IV. CLAIM CONSTRUCTION REGARDING U.S. PATENT NO. 7,990,842

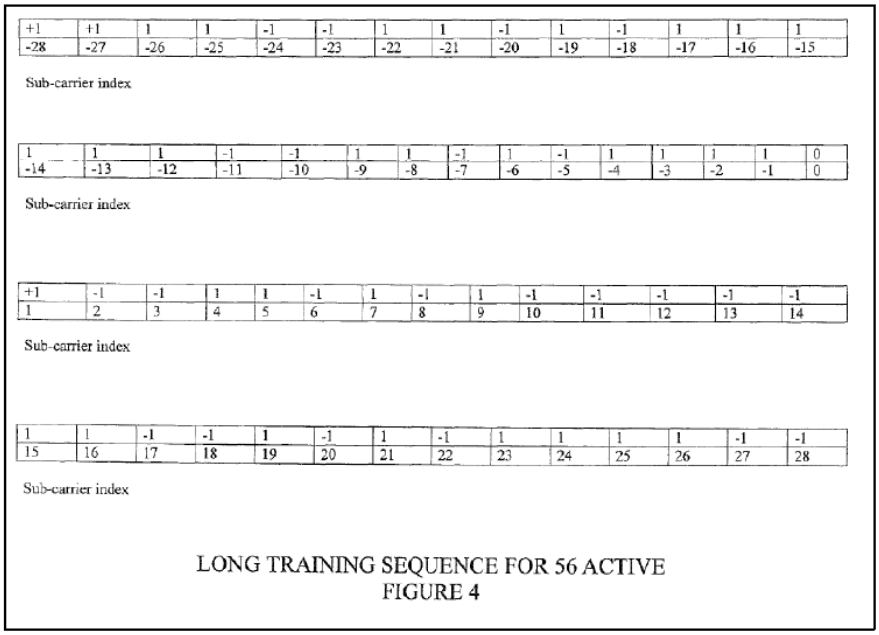
A. Background of the Invention

The '842 Patent is entitled "Backward-Compatible Long Training Sequences for Wireless Communication Networks" and claims priority to a date no later than July 2004. The '842 Patent was conceived against the backdrop of the 802.11 standard for WiFi promulgated by the Institute of Electrical and Electronics Engineers ("IEEE"). The specification explains that "different wireless devices in a wireless communication system may be compliant with different standards or different variations of the same standard," such as the versions of 802.11 that had already issued or were being developed at the time (i.e., 802.11a, 802.11b, 802.11g, and the then under development 802.11n). (Ex. E, '842 Patent at 1:50–60.) The newer versions of the 802.11 standard enabled more data to be transferred at a faster speed.

Because the 802.11 is an evolving standard, "[w]hen devices that are compliant with multiple versions of the 802.11 standard are in the same [wireless network], the devices that are compliant with older versions are considered to be legacy devices. To ensure backward compatibility with legacy devices, specific mechanisms must be employed to insure that the legacy devices know when a device that is compliant with a newer version of the standard is using a wireless channel to avoid a collision." (Ex. E, '842 Patent at 1:63–2:2.) This way, the patent specification explains, "legacy" devices can still communicate in systems using new protocols. (Ex. E, '842 Patent at 2:3–7.) The 802.11 standard uses an encoding scheme that "spread[s] a single data stream over a band of sub-carriers, each of which is transmitted in parallel." (Ex. E, '842 Patent at 2:12–14.) The standard includes "training sequences" that synchronize data transfer between a wireless sender and a receiver. (Ex. E, '842 Patent at 2:31–33.) At the time, the existing version of the 802.11 standard utilized a training sequence with 52 active subcarriers. (Ex. E, '842 Patent at 2:15–17, 24–28.)

The '842 Patent teaches longer "training sequence[s] of minimum peak-to-average ratio that uses more sub-carriers without interfering with adjacent channels." (Ex. E, '842 Patent at 2:37–39.) The patentees described specific embodiments of longer training sequences utilizing 56 and 63 subcarriers that also had minimum peak-to-average power ratios, which decreased power back-off. Power Amplifiers used in radio transmitters have nonlinear characteristics that cause significant distortion at the output when input signals are large enough to cause the power amplifier to enter a nonlinear saturation region. Therefore, amplifiers are operated with a certain safety margin, called "power back off," which can be generally defined as the ratio of maximum or peak saturation output power to average output power, the "PAPR." Increasing the back off while reducing the nonlinear distortion, can also result in overall lower amplifier efficiency and higher overall power consumption and battery drain. Therefore, a trade-off that minimizes power back-off subject to design

constraints is desired. For example, Figure 4 details "the long training sequence with a minimum peak-to-average power ratio that is used in 56 active subcarriers":



LONG TRAINING SEQUENCE FOR 56 ACTIVE
FIGURE 4

(Ex. E, '842 Patent at 5:14–19; Fig. 4.)

B. Person of Ordinary Skill in the Art

A person of ordinary skill in the art ("POSITA") for the '842 Patent would have a bachelor's degree in electrical engineering, computer engineering, computer science or similar field, and two to three years of experience in digital communications systems, such as wireless communications systems and networks, or equivalent. Moreover, someone with more technical education but less experience could have also met this standard. (Ex. L, Madisetti Op. Decl. ¶ 154.)

C. "Inverse Fourier transformer"

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning. To the extent the Court determines that a specific construction is warranted, BNR proposes:	"a circuit and/or software that performs a defined mathematical function that transforms a series of

"circuit and/or software that at least performs an inverse Fourier transform."	values from the frequency domain into the time domain"

This term appears in Claim 1 of the '842 Patent:

> A wireless communications device, comprising:
>
> a signal generator that generates an extended long training sequence; and
>
> an **Inverse Fourier Transformer** operatively coupled to the signal generator,
>
> wherein the **Inverse Fourier Transformer** processes the extended long training sequence from the signal generator and provides an optimal extended long training sequence with a minimal peak-to-average ratio, and
>
> wherein at least the optimal extended long training sequence is carried by a greater number of subcarriers than a standard wireless networking configuration for an Orthogonal Frequency Division Multiplexing scheme.

The '842 Patent teaches that a network device includes an inverse Fourier transform for processing the extended long training sequence from a signal generating circuit:

- "The network device also includes an Inverse Fourier Transform for processing the expanded long training sequence from the signal generating circuit and producing an optimal expanded long training sequence with a minimal peak-to-average ratio."
- "The network device also includes an Inverse Fourier Transform for processing the expanded long training sequence from the signal generating circuit and producing an optimal expanded long training

> sequence with a minimal peak-to-average ratio. The expanded long training sequence and the optimal expanded long training sequence are stored on more than 52 sub-carriers."

(Ex. E, '842 Patent at Abstract, 2:51–58; *see also id*. 2:63–3, 3:6–15 (similar).)

In the specification's "Detailed Description of the Invention" section, referring to Figure 2, the patentees teach:

> **The inventive long training sequence is inputted into an Inverse Fourier Transform 206**. The invention uses the same +1 or -1 BPSK encoding for each new sub-carrier**. Inverse Fourier Transform 206 may be an inverse Fast Fourier Transform (IFFT) or Inverse Discrete Fourier Transform (IFDT). Inverse Fourier Transform 206 processes the long training sequence from signal generating circuit 205** and thereafter produces an optimal expanded long training sequence with a minimal peak-to-average power ratio. The optimal expanded long training sequence may be used in either 56 active sub-carriers or 63 active subscribers.

(Ex. E, '842 Patent at 4:50–61 (emphasis added).)

Fourier transform is a well-known and understood mathematical principle encountered by math and engineering students in a college-level math course. (Ex. L, Madisetti Op. Decl. ¶ 186.) A Fourier transform operates in one-dimension or in multiple-dimensions to map functions between one domain and another domain. These domains can include, but are not limited to, space, time, frequency, or another variable. (Ex. L, Madisetti Op. Decl. ¶ 187.)

The specification provides no specific constraints or limitations on the term "inverse Fourier transformer." Likewise, the claim language does not functionally restrict the "inverse Fourier transformer" and mandate a specific type of transformation or identify specific variable or domains for transformation:

> A wireless communications device, comprising: a signal generator that generates an extended long training

> sequence; **and an Inverse Fourier Transformer operatively coupled to the signal generator, wherein the Inverse Fourier Transformer processes the extended long training sequence from the signal generator and provides an optimal extended long training sequence with a minimal peak-to-average ratio**, and wherein at least the optimal extended long training sequence is carried by a greater number of subcarriers than a standard wireless networking configuration for an Orthogonal Frequency Division Multiplexing scheme.

A person of ordinary skill in the art at the time of the invention would understand that an inverse Fourier transform is just what the name implies—the reverse of a Fourier transform operation. Below is a generic mathematical representation of two definitions of a Fourier transform, where one of them is the inverse or reverse of the other (i.e., f() is inverse of F(), and vice versa):

$$F(s) = \int_{-\infty}^{\infty} f(x)e^{-i2\pi xs}\,dx$$

$$f(x) = \int_{-\infty}^{\infty} F(s)e^{i2\pi xs}\,ds.$$

(*See* Ex. U at Appx560 ("[T]he customary formulas exhibiting the reversibility of the Fourier transformation are . . . . In this form, two successive transformations are made to yield the original function."). Of importance, the equations do not require space, time, frequency, or any other specific variable. Similarly, even contemporaneous dictionary definitions define "Fourier Transform" broadly as "a mapping function, as a signal, that is defined in one domain, as space or time, into another domain, as wavelength or frequency, where the function is represented in terms of sines and cosines." (Ex. Q at Appx230 (definition of "Fourier Transform.") *See Symantec Corp. v. Computer Assocs. Int'l, Inc.*, 522 F.3d 1279, 1291 (Fed. Cir. 2008) (quoting *Phillips*, 415 F.3d at 1318) ("Dictionaries are 'among the many tools that can assist the court in

determining the meaning of particular terminology to those of skill in the art of the invention.'"); *L.B. Plastics, Inc. v. Amerimax Home Prods.*, 499 F.3d 1303, 1308 (Fed. Cir. 2007).

Therefore, because the intrinsic record does not place any restrictions on "inverse Fourier transformer," a POSITA would simply understand the term to mean "circuit and/or software that at least performs an inverse Fourier transform," a well-known mathematical operation. (Ex. L, Madisetti Op. Decl. ¶ 190.) *See Riverwood Int'l Corp. v. RA. Jones & Co.*, 324 F.3d 1346, 1357 (Fed. Cir. 2003) ("In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves…")

Defendants' proposed construction of a "mathematical function that transforms a series of values from the frequency domain into the time domain" is wrong for several reasons. *First*, as mentioned above, the Fourier transform and inverse Fourier transform operations are agnostic—there is no requirement to transform values from a frequency domain into a time domain or vice versa. A Fourier transform could be used to transform values from a frequency domain into a time domain, likewise and a Fourier transform could also transform values into a time domain into a frequency domain. (Ex. N, Madisetti Sur-Rebuttal Decl. ¶ 9.) Even Defendants' expert admits that "the Fourier transform ***could*** map one domain to another in a broad mathematical sense." (Ex. R, Wells Rebuttal Decl. ¶ 8.) Defendants' requirement that the transformation occurs *from* the frequency domain *into* a time domain, adds both a direction limitation and variable limitations (time and frequency) not required by the specification or the claim. *See Dayco Prods. v. Total Containment, Inc.*, 258 F.3d 1317, 1327 (Fed. Cir. 2001) ("In each of the three claim constructions discussed above, the district court erroneously read a limitation into the claim language. Our cases make clear, however, that adding limitations to claims not required by the claim terms themselves, or unambiguously required by the specification or prosecution history, is impermissible."); *Aventis Pharma S.A. v. Hospira, Inc.*, 675 F.3d 1324, 1330 (Fed. Cir.

2012) ("We previously have refused to impose such limitations when not required by the language of the claims or the specification, and decline to do so here.") (internal citations omitted). Adopting Defendants' proposed construction would amount to an impermissible redrafting of the claims. *See Ecolab, Inc. v. FMC Corp.*, 569 F.3d 1335, 1344 (Fed. Cir. 2009) ("It is likewise well-settled that courts generally may not re-draft claims; we must construe the claims as written."); *Becton Dickinson & Co. v. C.R. Bard, Inc.*, 922 F.2d 792, 799 n.6 (Fed. Cir. 1990) ("Nothing in any precedent permits judicial redrafting of claims."). Therefore, Defendant's proposed construction is overly restrictive in light of the claim language, and the generally understood meaning of inverse Fourier transform. (Ex. L, Madisetti Op. Decl. ¶ 192.)

Second, Defendants' expert Dr. Wells' acknowledges that a "Fourier transform ***could*** map one domain to another in a broad mathematical sense," but argues that the construction of the term should be narrowed because the patent is within the field of wireless communications. (Ex. R, Wells Rebuttal Decl. ¶¶ 8–9.) However, the term under construction is "inverse Fourier transformer," not "inverse Fourier transformer in wireless communications."

Third, Dr. Wells is wrong to suggest that from a technical point of view, in wireless communications, the inverse Fourier transform can *only* map between the time domain and frequency domain as a matter of fact. (Ex. N, Madisetti Sur-Rebuttal Decl. ¶ 7.)

For instance, a peer-reviewed and published academic paper entitled "Discrete Fourier Transform based Multimedia Colour Image Authentication for **Wireless Communication** (DFTMCIAWC)," (emphasis added) shows the exemplary use of an inverse Fourier transform to "transform [an] embedded image from **frequency** domain to **spatial** domain" (emphasis added). Equation 1 of this reference further shows exemplary forward mapping between frequency and spatial domains in the wireless communications area between two 2-dimensional domains, (x, y) and (u, v) respectively:

$$F(u,v) = \frac{1}{\sqrt{MN}} \sum_{x=0}^{M-1} \sum_{y=0}^{N-1} f(x,y)\, e^{-j2\pi\left(\frac{ux}{M}+\frac{vy}{N}\right)}$$

(Ex. N, Madisetti Sur-Rebuttal Decl. ¶ 8; Ex. V at Appx563.)

Similarly, another peer-reviewed and published academic paper entitled "Spatial Channel and System Characterization" discussing multi-antenna (wireless) communications systems, shows that an example of an "inverse Fourier transform converts a signal from **wave vector** domain to **space** domain" (emphasis added). Equations 2 and 3 of this reference show exemplary mapping between the wave vector and spatial domains in a Fourier transform and corresponding inverse Fourier transform in the context of wireless communications.

$$G(\vec{k}) = \int g(\vec{r}) e^{j\vec{r}\cdot\vec{k}} d^3r$$
$$g(\vec{r}) = \frac{1}{(2\pi)^3} \int G(\vec{k}) e^{-j\vec{k}\cdot\vec{r}} d^3k$$

(Ex. N, Madisetti Sur-Rebuttal Decl. ¶ 9, Ex. W at Appx569.) These are "two examples of references that support[ing] []that the plain and ordinary, mathematical meaning of an inverse Fourier transform still applies in wireless communications and a definition that must use time to frequency mapping or vice versa is just an example of its use, and not a correct definition or construction even when restricted to wireless communications." (Ex. N, Madisetti Sur-Rebuttal Decl. ¶ 9.)

Thus, even in the context of wireless communications, inverse Fourier transforms are not limited to conversions between time and frequency domains. Nor are they limited it to a single variable in these or other domains (time, frequency, space, symbol, wave-vectors, …) (Ex. N, Madisetti Sur-Rebuttal Decl. ¶ 10.)

Dr. Wells also justifies his opinion incorporating Defendants' direction and variable limitations by pointing the specification's disclosure of a fast Fourier transform, which he says is "a specific algorithmic implementation of a Fourier transform (FFT)." (Ex. R, Wells Rebuttal Decl. ¶ 11.) This presents several problems because even Dr. Wells concedes the FFT is a "specific algorithmic implementation" and the specification confirms that a FFT is merely one embodiment. (*See* Ex. E, '842 Patent at 4:53–55 ("Inverse Fourier Transform 206 may be an inverse Fast Fourier Transform (IFFT) or Inverse Discrete Fourier Transform (IDFT)."). *See Phillips*, 415 F.3d at 1323 ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.").

In addition, Claim 9, which depends from Claim 1, adds the limitation "wherein the Inverse Fourier Transformer comprises at least one of the following: an Inverse Fast Fourier Transformer and an Inverse Discrete Fourier Transformer." Thus, there is a presumption that Dr. Wells's "specific algorithmic implementation" cannot be read into Claim 1. "Under the doctrine of claim differentiation, when one claim does not recite a particular limitation that is recited in another claim, 'that limitation cannot be read into the former claim.'" *Baxter Healthcare Corp. v. Fresenius Med. Care Holdings, Inc.*, No. C 07-1359, 2009 U.S. Dist. LEXIS 14842, at *13 (N.D. Cal. Feb. 10, 2009) (quoting *Amgen, Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1326 (Fed. Cir. 2003)); *TurboCare Div. of Demag Delaval Turbomachinery Corp. v. Gen. Elec. Co.*, 264 F.3d 1111, 1123 (Fed. Cir. 2001) (Claim terms should not be read to contain a limitation "where another claim restricts the invention in exactly the [same] manner.").

The Court should adopt BNR's proposed definition of this term because its construction adheres to well-established principles of claim construction and is consistent with how a POSITA would understand the term, while Defendants' construction violates black-letter patent law.

V. CLAIM CONSTRUCTION REGARDING U.S. PATENT NO. 8,416,862

A. Background of the Invention

The '862 Patent is entitled "Efficient Feedback of Channel Information in a Closed Loop Beamforming Wireless Communication System" and claims priority to a date no later than April 2005. The '862 Patent is related to wireless communications using beamforming. Beamforming is a process that allows for adapting an RF transmission (for example, WiFi) so that the intended recipient receives a stronger signal. When a transmitter is sending out an RF signal, the signal can become degraded by mixing with other signals, by passing through objects, or simply due to the distance that it must cover. Beamforming alters the properties of that RF signal to send it more directly to the recipient in a line and minimizing surrounding signal interference to increase the strength. To properly implement beamforming, the transmitter must know the properties of the channel, which is signal and noise, over which the wireless communication is conveyed. This is called feedback information. Without any modification, the feedback information required to be sent back to the wireless transmitting device may be so large that the channel may change before the entire feedback information is received by the transmitter.

The '862 Patent's claims describe improvements on transmitting feedback of transmitter beamforming information. In particular, they describe a way for the receiving device to manipulate, through mathematical techniques, the data that represents an estimate of the channel information required and further minimize and manipulate the data that must be sent back to the transmitter through mathematical techniques. One of the important technical advantages and improvements offered by the invention is a decrease in the amount of data required to send the feedback information to the transmitting wireless transmitter, which allows beamforming to occur more efficiently. (Ex. F, '862 Patent at 16:1–6.)

B. Person of Ordinary Skill in the Art

A Person of Ordinary Skill in the Art ("POSITA") for the '862 Patent would have a bachelor's degree in electrical engineering, computer engineering, computer science or similar field, and two to three years of experience in digital communications systems, such as wireless communications systems and networks, or equivalent. Moreover, someone with more technical education but less experience could have also met this standard. (Ex. L, Madisetti Op. Decl. ¶ 88.)

B. "decompose the estimated transmitter beamforming unitary matrix (V) to produce the transmitter beamforming information"

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning. In the alternative, to the extent the Court determines that a specific construction is warranted, BNR proposes: "factor the estimated transmitter beamforming unitary matrix (V) to produce a reduced number of quantized coefficients"	"factor the estimated transmitter beamforming unitary matrix (V) to produce a reduced set of angles"

The term "decompose the estimated transmitter beamforming unitary matrix (V) to produce the transmitter beamforming information" appears in Claim 9 of the '862 Patent:

> 9. A wireless communication device comprising:
>
> a plurality of Radio Frequency (RF) components operable to receive an RF signal and to convert the RF signal to a baseband signal; and
>
> a baseband processing module operable to:
>
> receive a preamble sequence carried by the baseband signal;
>
> estimate a channel response based upon the preamble sequence;

> determine an estimated transmitter beamforming unitary matrix (V) based upon the channel response and a receiver beamforming unitary matrix (U);
>
> ***decompose the estimated transmitter beamforming unitary matrix (V) to produce the transmitter beamforming information***; and
>
> form a baseband signal employed by the plurality of RF components to wirelessly send the transmitter beamforming information to the transmitting wireless device.

(Ex. F, '862 Patent Claim 9.)

A person of ordinary skill in the art at the time of the invention would have understood this term to mean: "factor the estimated transmitter beamforming unitary matrix (V) to produce a reduced number of quantized coefficients." There is no dispute regarding the first portion of the construction; specifically that "decompose the estimated transmitter beamforming unitary matrix (V) to produce" means "factor the estimated transmitter beamforming unitary matrix (V) to produce." Thus, the dispute centers on whether factoring the estimated transmitter beamforming unitary matrix (V) results in "a reduced number of quantized coefficients" as BNR contends, or "a reduced set of angles," as Defendants contend.

BNR's construction is consistent with both the claim language and specification, and is further supported by extrinsic evidence. Defendants' construction finds no anchor in the intrinsic record and selectively incorporates extrinsic references to support it. The specification identifies a clear example of what this transmitter beamforming information is:

> As the reader will appreciate, the ***coefficients*** of the Givens Rotation and the phase matrix ***coefficients*** serve as ***the transmitter beamforming information*** that is sent from the receiving wireless communication device to the transmitting wireless communication device.

(Ex. F, '862 Patent at 15:34–38 (emphasis added).[3]

The use of the term "coefficients" in BNR's proposal aligns with this portion of the specification. First, for the phase matrix, the specification specifically refers to the entries in that matrix as coefficients. *See id.* And regarding the Givens Rotation, Dr. Min acknowledged during deposition that the values of the result of the Givens Rotation are coefficients:

> Q. The result of a Givens Rotation is two matrices, right?
> A. Yes, product of the two matrices.
> Q. And you already said that the values of the matrices are called coefficients, right, commonly?
> A. Yeah, sure. That's some number.

(Ex. P, Min Dep. at 101:6–12.) Thus, BNR's use of the term coefficients in its construction to describe the result of the factoring is well supported by the intrinsic record. *See Scripps Research Inst. V. Illumina, Inc.* No. 16-cv-661 JLS (BGS), 2018 U.S. Dist. LEXIS 60928, at *5–6 (S.D. Cal. Apr. 10, 2018) ("Usually, the specification is dispositive; it is the single best guide to the meaning of a disputed term." (quoting *Vitronics*, 90 F.3d at 1582).

Further, a person of ordinary skill in the art would also understand that the reduced set of coefficients are quantized coefficients. In understanding why a person of skill in the art would understand that the coefficients are quantized, it is important to note the surrounding claim language that indicates what happens with the transmitter beamforming information: that the bandwidth processing module forms "a baseband signal employed by the plurality of RF components ***to wirelessly send*** the transmitter beamforming information to the transmitting wireless device." (Ex. F, '862 Patent

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[3] While this example refers to decomposition using Givens Rotation, it is not limiting as to the type of matrix decompositions within the scope of the claim. Dependent claim 5, for example, claims decomposing using a QR decomposition technique and dependent claim 6 comprises where the QR decomposition technique of claim 5 comprises a Givens Rotation operation. (*See* Ex. F, '862 Patent at Claims 5-6.) In both cases, the decomposition is matrix factorization and results in product matrices, and the use of the term coefficients is therefore consistent.

Claim 9 (emphasis added).) Quantization is, in effect, trading exactness or precision for finiteness and, as a result, size. As Dr. Madisetti stated, "as used in the patent and as understood by a person of skill in the art, quantization is reducing a larger set of possible values to a smaller set." (Ex. L, Madisetti Op. Decl. ¶ 94.)

This quantization occurs most often in digital signal processing as approximation by fixing the length of the bits for the value that otherwise would far exceed that length. Dr. Min offered a similar explanation for quantization: "In any formable digital communications, you would have to fix the – what we call the precision of the number. Sometimes you use 8 bits, 16 bits, 32 bits, sometimes even 64 bits, that's just to indicate a floating number of any kind." (Ex. P, Min Dep. at 97:10–14; *see also* Ex. O, Min Op. Decl. ¶ 180 ("Quantization refers to the transformation of data into integer values").) Quantization is required because the alternative is unworkable in digital communications, because "if you want to transmit a true valuable angle, then you need ***infinite bits***, it is a real number." (Ex. P, Min Dep. at 94:7–18 (emphasis added).)

The specification, too, confirms that quantization is expected for the transmitter beamforming information. For example, in each instance where the patent discusses angles that relate to the V matrix and to feedback information, the patent goes on to discuss the number of bits and bytes required for the expression of those angles during feedback. (*See, e.g.*, Ex. F, '862 Patent at 10:40–65; 11:1–20; 11:21–55; 12:64–13:14; 14:48–15:17; 15:34–58.) There is no disclosure within the patent that contemplates the transmission of real values of angles, and therefore the transmitter beamforming information that is produced by factoring the estimated transmitter beamforming matrix (V) is a reduced number of quantized coefficients. *See Scripps Research*, 2018 U.S. Dist. LEXIS 60928, at *5–6 (the specification "is the single best guide to the meaning of a disputed term") (citation omitted).

In contrast, Defendants' construction cherry-picks one portion of the specification, ignores others and disregards context provided by the entirety of the

specification and the claim language. Dr. Min cites to Col. 13:65–14:3 to support his and Defendants' construction. That excerpt states "[w]ith a decomposed matrix form for the estimated transmitter beamforming matrix (V), the set of angles fed back to the transmitting wireless device are reduced." (*See* Ex. O, Min Op. Decl. ¶¶ 176–77.) This is true; the ***goal*** of sending the transmitter beamforming information to the transmitting wireless device is to provide these angles (ψ and Φ) to the transmitting wireless device to regenerate V. But Defendants ignore the remaining portion of the specification and claims that describe ***how*** the angles are reduced and in what format the angles are fed back—as transmitter beamforming information. This ***how*** is described above and represents why the values are coefficients and not angles. The specification also supports why a person of ordinary skill in the art would understand that the coefficients are quantized for transmission. Dr. Min acknowledged this at deposition:

> **Q.** Now under your construction [for the decompose term], in what format are the angles transmitted to the transmitting wireless device?
> **A.** So what, what the patent specification says is you do unitary matrix V and you then decompose it using the Givens Rotation. Actually, you do it multiple times as necessary depending on the size of the B and then after that, ***the actually data sent back to the transmitter is, uh, quantized information***.

(Ex. P, Min Dep. at 88:12–22 (emphasis added).) Dr. Min attempts to support his opinions by stating, "Now, having said that, that is not really what the claim says. The claim language does not say anything about transmitting, what is being transmitted." (*See* Ex. P, Min Dep. at 88:23–89:2.) But the claim language ***does*** address transmitting. The claim requires that the transmitter beamforming information is wirelessly sent back to the transmitter. (*See* Ex. F, '862 Patent at Claim 9). And a person of ordinary skill in the art would understand that, in order to send the information back in a wireless system, quantization must occur. (*See* Ex. L, Madisetti Op. Decl. ¶ 95.) *See Julius Zorn, Inc. v. Medi Mfg.*, No. 3:15-CV-02734-GPC-RBB, 2017 U.S. Dist. LEXIS 35826, at *4 (S.D. Cal. Mar. 13, 2017) ("Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the

context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." (quoting *Phillips*, 415 F.3d at 1313)).

VI. CLAIM CONSTRUCTION REGARDING U.S. PATENT NO. 7,957,450

A. Background of the Invention

The '450 Patent is entitled "Method and System for Frame Formats for MIMO Channel Measurement Exchange" and claims priority to a date no later than December 2004. Like the '862 Patent, the '450 Patent is related to wireless communications using beamforming. Many wireless devices contain multiple antennas that utilize signal processing techniques to directionally focus the transmission and reception of signals in a specific direction. The process of optimizing signals in a specific direction is known as "beamforming":

> Smart antenna systems combine multiple antenna elements with a signal processing capability to optimize the pattern of transmitted signal radiation and/or reception in response to the communications medium environment. **The process of optimizing the pattern of radiation is sometimes referred to as "beamforming," which may utilize linear array mathematical operations to increase the average signal to noise ratio (SNR) by focusing energy in desired directions.**

(*See* Ex. G, '450 Patent at 1:35–42 (emphasis added).)

The specification goes on to describe that, "[i]n conventional smart antenna systems, only the transmitter or the receiver may be equipped with more than one antenna, and may typically be located in the base transceiver station (BTS) where the cost and space associated with smart antenna systems have been perceived as more easily affordable than on mobile terminals such as cellular telephones." (Ex. G, '450 Patent at 1:42–48.) But "[w]ith advances in digital signal processing (DSP) integrated circuits (ICs) in recent years, multiple antenna multiple output (MIMO) systems have emerged in which mobile terminals incorporate smart antenna systems comprising multiple transmit antenna and multiple receive antenna." (Ex. G, '450 Patent at 1:53–

57.) When used in a wireless device, such as a home router, beamforming in a MIMO system increases WiFi signal strength by focusing signals to another wireless device, such as a cellular phone or tablet.

The patent notes that beamforming is challenging because focusing the transmission of wireless signals must be adjusted as the relative positions of the transmitting and receiving wireless device positions change relative to one another. (*See*, *e.g.*, Ex. G, '450 Patent at 2:33–56.) For example, when a user walks around their home with a phone or tablet using WiFi the directionality of the WiFi signal from the home router is adjusted to compensate for the movement of the phone or tablet relative to the router. Thus, information about the RF channel used to transmit information must be adapted or else "information loss between the transmitting mobile terminal and the receiving mobile terminal may result." (*See* Ex. G, '450 Patent at 4:22–24.)

The '450 Patent teaches "feedback mechanisms by which a receiving mobile terminal may feedback information to a transmitting mobile terminal to assist the transmitting mobile terminal in adapting signals which are sent to the receiving mobile terminal." (Ex. G, '450 Patent at 1:30–34.) Specifically, the '450 Patent claims a method of transmitting data via multiple radio frequency channels with more than one transmitting antenna, receiving feedback information, and modifying a transmission mode based on the feedback information. The method reduces the network resources required for beamforming operations freeing up bandwidth for other network traffic, such as data.

Singular Value Decomposition ("SVD") is a mathematical matrix decomposition technique for reducing a matrix to its constituent parts to make certain subsequent matrix calculations easier. By using (SVD), wireless devices decrease the quantity of information transmitted to other parts of the system, such as a base station, which conserves bandwidth making the beamforming process more efficient.

B. Person of Ordinary Skill in the Art

A Person of Ordinary Skill in the Art ("POSITA") for the '450 patent would have a bachelor's degree in electrical engineering, computer engineering, computer science or similar field, and two to three years of experience in digital communications systems, such as wireless communications systems and networks, or equivalent. Moreover, someone with more technical education but less experience could have also met this standard. (Ex. L, Madisetti Op. Decl. ¶ 129.)

C. "channel estimate matrices" / "matrix based on the plurality of channel estimates"

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning. In the alternative, to the extent the Court determines that a specific construction is warranted, BNR proposes: "one or more matrices that is based on an SVD decomposition of the estimates of the values of H(t)"	"matrix H_{est} for tones of different frequencies, where H_{est} contains estimates of the true values of H(t)"

The term in question is highlighted below in Claim 1 of the '450 Patent:

> A method for communication, the method comprising:
>
> computing a plurality of **channel estimate matrices** based on signals received by a mobile terminal from a base station, via one or more downlink RF channels, wherein said plurality of **channel estimate matrices** comprise coefficients derived from performing a singular value matrix decomposition (SVD) on said received signals; and
>
> transmitting said coefficients as feedback information to said base station, via one or more uplink RF channels.

In order to properly consider the meaning of this term, some background information regarding the communication channel is necessary. The specification

explains that an RF channel between a transmitting mobile terminal and a receiving mobile terminal may be represented by a transfer system function, H. The specification further describes different variables relevant to signal transmission in the system:

> The relationship between a time varying transmitted signal, X(t), a time varying received signal, y(t), and the systems function may be represented as shown in equation [1]:
>
> $y(t)=Hxx(t)+n(t)$,
>
> where n(t) represents noise…introduced as the signal travels through the communications medium and the receiver itself.

(Ex. G, '450 Patent at 3:53–4:9.)

The specification further notes that "[i]n MIMO systems, the elements in equation 1 may be represented as vectors and matrices." (*See* Ex. G, '450 Patent at 3:65–66.) Because signal strength is subject to fading effects that might vary with time, the transfer system function H may itself become time-varying and may thus also become a function of time, H(t). Therefore, individual coefficients (or multipliers), $h_{ij}(t)$, in the transfer function H(t) may become time varying in nature. (*See* Ex. G, '450 Patent at 4:6–9.) These variables become important in MIMO systems operating according to the IEEE's 802.11 standard because in such systems "the receiving mobile terminal may compute H(t) each time a frame of information is received from a transmitting mobile terminal based upon the contents of a preamble field in each frame." (*See* Ex. G, '450 Patent at 4:10–14.) The "preamble field" is a signal to used to synchronize and facilitate data transmission.

In this context, the specification describes the meaning of the disputed term "channel estimate matrix." It notes that "[t]he computations which are performed at the receiving mobile terminal may constitute ***an estimate of the 'true' values of H(t) and may be known as 'channel estimates'…***To the extent that ***H(t), which may be***

referred to as the "channel estimate matrix", changes with time and to the extent that the transmitting mobile terminal fails to adapt to those changes, information loss between the transmitting mobile terminal and the receiving mobile terminal may result." (*See* Ex. G, '450 Patent at 4:14–24 (emphasis added).) Thus, the patentees twice link the term "channel estimate matrix" to the time-varying transfer system function "H(t)." *See Phillips*, 415 F.3d at 1315 ("[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'") (*quoting Vitronics*, 90 F.3d at 1582).

Turning to the claim language, the method requires computing one or more channel estimate matrices from signals received by a wireless communication device from a base station. The claim language requires that a plurality of channel estimate matrices comprise "coefficients derived from performing singular value decomposition (SVD)" on the RF signals received by the wireless communication device from the base station. (*See* Ex. G, '450 Patent at 19:13–19.) The coefficients of H(t) resulting from SVD are then transmitted back to the base station. By doing so, the wireless communication device can feedback channel information in a compressed format that the base station can use to adjust or attenuate signal strength as necessary to improve performance; for example, by reducing noise. *See Phillips*, 415 F.3d at 1314 ("the claims themselves provide substantial guidance as to the meaning of particular claim terms.").

After reviewing the specification and claim language, Dr. Madisetti explains:

> [T]he method requires computing one or more channel estimate matrices, H(t) from signals received by a wireless communication device from a base station. The claim language goes on to explain that a plurality of channel estimate matrices are comprised of coefficients derived from performing SVD on the RF signals received by the wireless communication device from the base station. These SVD coefficients of H(T) are then transmitted back to the base station. By doing so, the wireless communication device can feedback channel information

> in a compressed format that the base station can use to adjust or attenuate signal strength as necessary to improve performance, for example by reducing noise.

(Ex. L, Madisetti Op. Decl. ¶ 139.) Dr. Madisetti goes on to opine that a "POSITA would understand the term 'channel estimate matrices/matrices based on the plurality of channel estimates' to mean 'one or more matrices that is based on an SVD decomposition of the estimates of the values of H(t).'" (Ex. L, Madisetti Op. Decl. ¶ 140.) *See Phillips*, 415 F.3d at 1318 ("[E]xtrinsic evidence in the form of expert testimony can be useful to a court for a variety of purposes, such as to provide background on the technology at issue, to explain how an invention works, to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.").

BNR's proposed construction aligns with the claim language, the teachings of the specification, and the understanding of a POSITA and should be adopted. Even Defendants' expert, Dr. Min, acknowledges that "the '450 Patent consistently refers to "channel estimate matrix" as a matrix H….Similarly, the claim term 'matrix based on the/said plurality of channel estimates' must also refer to a matrix H." (Ex. O, Min Op. Decl. ¶ 148.)

On the other hand, Defendant's construction violates a fundamental tenet of patent law: importing limitations from an embodiment into the claims. *See Retractable Techs., Inc. v. Becton*, 653 F.3d 1296, 1313 (Fed. Cir. 2011) ("It is improper to import limitations from the specification into the claims, and this court has expressly and repeatedly warned against confining claims to specific embodiments of the invention set forth in the specification.").

The specification describes several different channel estimate embodiments:

> In one embodiment of the invention, a receiving mobile terminal may periodically transmit feedback information, comprising a **channel estimate matrix, $\mathbf{H_{up}}$**, to a

> transmitting mobile terminal. In another embodiment of the invention, a receiving mobile terminal may perform a singular value decomposition (SVD) on the channel estimate matrix, and subsequently transmit SVD-derived feedback information to the transmitting mobile terminal.

(Ex. G, '450 Patent at 7:64–8:5 (emphasis added).)

> **Yet another embodiment of the invention** may expand upon the method utilizing sounding frames to incorporate calibration. In this aspect of the invention, a receiving mobile terminal, after transmitting a sounding frame, may subsequently receive a **channel estimate matrix, $\mathbf{H_{down}}$**, from the transmitting mobile terminal. The receiving mobile terminal may then transmit feedback information which is based upon the difference H_{up}-H_{down}, to the transmitting mobile terminal.

(Ex. G, '450 Patent at 8:10–18 (emphasis added).)

> **In one embodiment of the invention**, **a full channel estimate matrix** which is computed by a receiving mobile terminal, **$\mathbf{H_{est}}$,** may be represented by its SVD: $H_{est}=USV^H$, where equation[2] H_{est} may be a complex matrix of dimensions N_{rx} x N_{tx}, where N_{rx} may be equal to the number of receive antenna at the receiving mobile terminal, and N_{tx} may be equal to the number of transmit antenna at the transmitting mobile terminal, U may be an orthonormal complex matrix of dimensions N_{rx} N_{rx}, S may be a diagonal real matrix of dimensions N_{rx} x N_{tx}, and V may be an orthonormal complex matrix of dimensions N_{tx} x N_{tx} with V^H being the Hermitian transform of the matrix V.

(Ex. G, '450 Patent at 8:52–65 (emphasis added).)

Defendants' construction is derived from the last embodiment describing H_{est}, but the specification explicitly states that this is merely "one embodiment of the invention" and there is nothing in the claim language that justifies limiting the claims to the H_{est} embodiment. *See Kara Tech. Inc. v. Stamps.com Inc.*, 582 F.3d 1341, 1348 (Fed. Cir. 2009) ([T]he patentee is generally "entitled to the full scope of his claims,

and we will not limit him to his preferred embodiment or import a limitation from the specification into the claims." (citing *Phillips*, 415 F.3d at 1323)); *Liebel-Flarsheim*, 358 F.3d at 906 ("This court has expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment."). Defendants' expert, Dr. Min, acknowledges that the use of H_{est} is disclosed as "an embodiment of the invention utilizing singular value decomposition…" (Ex. O, Min Op. Decl. ¶ 146.)

Additionally, dependent Claim 2 of the '450 Patent adds the limitation "computing each of said plurality of channel estimate matrices for a corresponding **one of a plurality of tones**, wherein each of said plurality of tones corresponds to **one or more distinct frequencies**." (Ex. G, '450 Patent at 19:23–27 (emphasis added).) Thus, the "for tones of different frequencies" limitation in Defendants' proposed construction is improper for violating the doctrine of claim differentiation. *See Curtiss-Wright Flow Control Corp. v. Velan, Inc.*, 438 F.3d 1374, 1380 (Fed. Cir. 2006) ("In the most specific sense, "claim differentiation" refers to the presumption that an independent claim should not be construed as requiring a limitation added by a dependent claim.").

The Court should adopt BNR's proposed definition because it is consistent with the plain and ordinary meaning, the claim language, descriptions in the specification, and the opinions of persons of ordinary skill in the art. Defendants' construction inappropriately imports limitations from a specific embodiment described in the specification and another embodiment claimed in a dependent claim, contrary to basic principles of claim construction.

D. "coefficients derived from performing a singular value matrix decomposition (SVD)"

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning. In the alternative, to the extent the Court determines that a specific	"values in the matrices U, S, or V^H, where $H_{est}=USV^H$"

construction is warranted, BNR proposes: "values derived from a singular value decomposition"	

The term in question is highlighted below in Claim 1 of the '450 Patent:

> 1. A method for communication, the method comprising:
>
> computing a plurality of channel estimate matrices based on signals received by a mobile terminal from a base station, via one or more downlink RF channels, wherein said plurality of channel estimate matrices comprise **coefficients derived from performing a singular value matrix decomposition (SVD)** on said received signals; and transmitting said coefficients as feedback information to said base station, via one or more uplink RF channels

Singular Value Decomposition ("SVD") is a well-known matrix decomposition method for reducing a matrix to its constituent parts to make certain subsequent matrix calculations easier. (Ex. L, Madisetti Op. Decl. ¶ 138.) The specification describes that "SVD is a method which may reduce the quantity of channel feedback information which is transmitted between a receiving mobile terminal and a transmitting mobile terminal." (Ex. G, '450 Patent at 8:45–47.)

In the context of the H_{est} embodiment, the patentees provide an example of an SVD operation:

> In one embodiment of the invention, a full channel estimate matrix which is computed by a receiving mobile terminal. H_{est} may be represented by its SVD:
>
> $H_{est}=USV^{H}$, where
>
> H_{est} may be a complex matrix of dimensions N_{rx} x N_{tx}, where N_{rx}, may be equal to the number of receive antenna at the receiving mobile terminal, and N_{tx} may be equal to the number of transmit antenna at the transmitting mobile terminal, U may be an orthonormal complex matrix of dimensions N_{rx}-N_{rx}, S may be a diagonal real matrix of

> dimensions N_{rx} x N_{tx}, and V may be an orthonormal complex matrix of dimensions N_{tx} x N N_{tx}, with V^H being the Hermitian transform of the matrix V.

(Ex. G, '450 Patent at 8:52–65.) The computed matrices U, S, and V^H, contain coefficients. (*See*, for example, Ex. G, '450 Patent at 9:37–42.) According to the claim language, these coefficients are transmitted back to the base station. (Ex. G, '450 Patent Claim 1 ("transmitting said coefficients as feedback information to said base station").) But this is just one embodiment of the invention, as explicitly stated in the excerpt above.

BNR's proposed construction accurately reflects the plain claim language and should be adopted. *See Renishaw*, 158 F.3d at 1250 ("The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction."). Furthermore, BNR's construction conforms to Dr. Madisetti's understanding of this term based on the perspective of a POSITA:

> [T]he structure of the claim dictates that SVD must be performed on the wireless signals received by a wireless device from a base station. The SVD will result in a decomposition of the estimates of the values of H(t). The coefficients derived from the SVD operation will then be transmitted back to the base station.
>
> Therefore, it is my opinion that a POSITA would understand the term "coefficients derived from performing a singular value matrix decomposition (SVD)" to mean "values derived from a singular value decomposition."

(Ex. L, Madisetti Op. Decl. ¶¶ 150–151.)

Defendants' construction is flawed because it requires that the coefficients be from the H_{est} matrix—only one embodiment of the invention. This error flows directly from Defendants' proposed construction of "channel estimate matrices," which also impermissibly limits the "channel matrices" term to H_{est}. However, as discussed above,

H_{est} is a preferred embodiment that Defendants have improperly imported into the claims, and their proposed construction for this disputed term should be rejected for the same reasons enumerated above.

VII. CLAIM CONSTRUCTION REGARDING U.S. PATENT NO. 6,941,156

A. Background of the Invention

The '156 Patent is entitled "Automatic Handoff for Wireless Piconet Multimode Cell Phone" and claims priority to a date no later than June 2001. The '156 Patent is generally related to the use of multimode cellular phones and the ability to smoothly switch between two different modes of communication operable on the cellular phone, such as a cellular connection and another RF connection (like WiFi). The claimed inventions in the '156 Patent are directed to improved methods of switching between the modes of operation. One of the important technical advantages and improvements offered by the invention is a multimode cell phone capable of automatic switching, including establishing a second communications link while the first communications link is still active. The prior art required the call to disconnect before switching modes or for a second to be initiated by an intermediary instead of the claimed multimode cell phone.

B. "simultaneous communication paths from said multimode cell phone"

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning. In the alternative, to the extent the Court determines that a specific construction is warranted, BNR proposes: "two or more active links at the same time from said multimode cellphone"	"at least two established distinct and different communication links from said multimode cell phone to a far-end communication device, at the same time"

The term "simultaneous communication paths from said multimode cell phone" appears in Claim 1 of the '156 Patent (bolded in text):

1. A multimode cell phone, comprising:

a cell phone functionality; and

> an RF communication functionality separate from said cell phone functionality;
>
> a module to establish ***simultaneous communication paths from said multimode cell phone*** using both said cell phone functionality and said RF communication functionality; and
>
> an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality, operable to switch a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on the other of said cell phone functionality and said RF communication functionality.

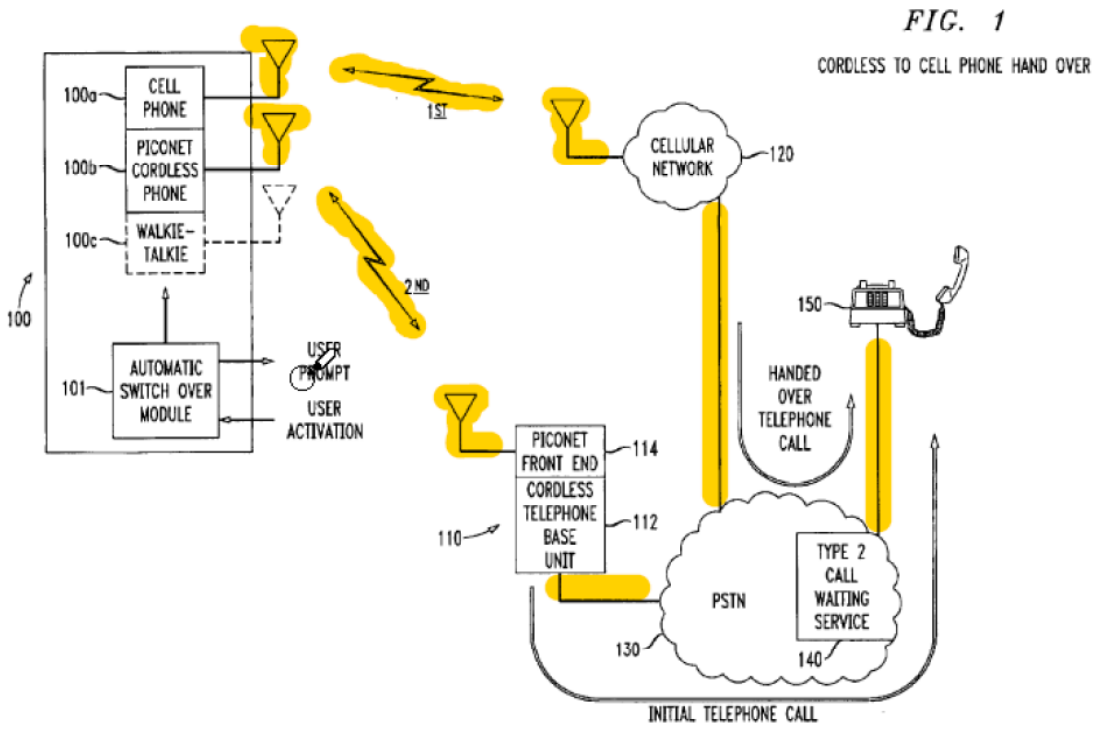
(Ex. H, '156 Patent at 8:15–31.)

BNR's proposed definition, in addition to reflecting the plain and ordinary meaning, is consistent with and supported by the intrinsic record. The meaning is confirmed by the opinions of Dr. Madisetti, viewing the claim language through the eyes of a person of ordinary skill in the art. In contrast, Defendants' construction is flawed because it violates fundamental tenets of claim construction regarding importing limitations that either exist in other elements of the claim or are unsupported by the intrinsic record.

First, the claim language focuses on the capabilities of the claimed multimode cell phone, not the telecommunications network or the far-end device—neither of which is referenced in the claim. Claim 1 describes a multimode cell phone with two communication functionalities: cellular and an RF separate from cellular. It then describes a module to establish the simultaneous communication paths using both of those communication functionalities, cellular and RF, that are resident on the claimed multimode cell phone. Finally, it claims an automatic switchover module within the multimode cell phone that switches between "a communication path established ***on***

one of said cell phone functionality and said RF communication functionality" and "another communication path later established ***on the other of said cell phone functionality and said RF communication functionality***." (*See* Ex. H, '156 Patent Claim 1 (emphasis added).) That is, the claimed modules act on the functionalities that are a part of the claimed multimode cell phone. The focus of the claim language is on the multimode cell phone, and does not address the telecommunication network or the far-end device.

The specification also confirms BNR's construction. Figure 1 is particularly instructive in that the links are identified with respect to the *multimode cell phone*, and not with respect to the far end device:

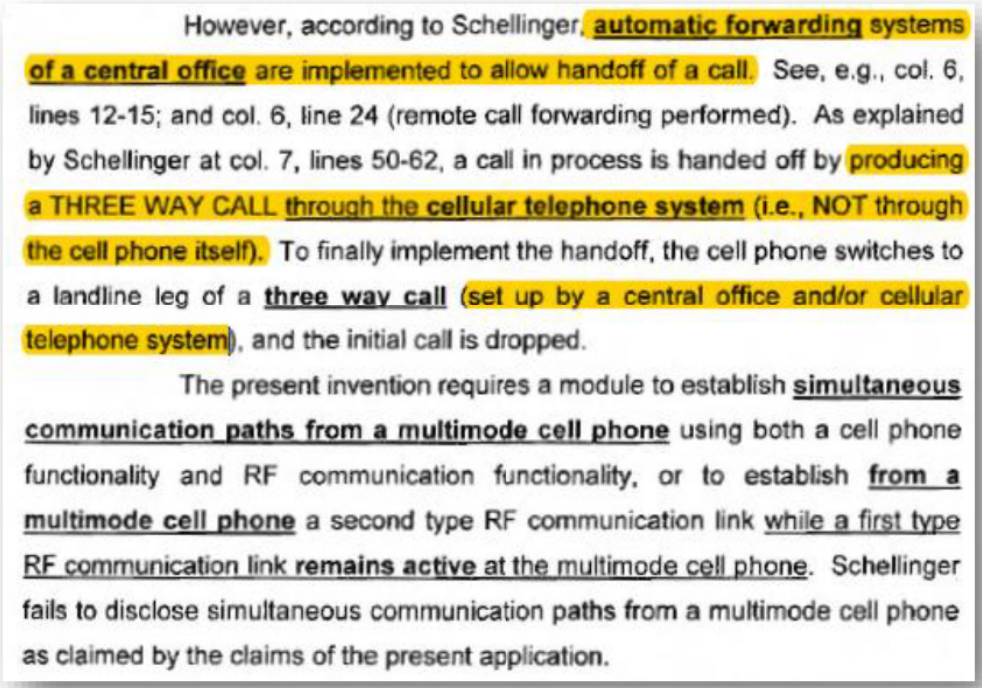


(Ex. H, '156 Patent at Fig. 1 (highlights added).) Figure 1 shows the two communication paths for (a) a cell phone functionality (as shown by 100a, the antenna diagram, following through to the path identified as "1st" to the cellular network 120)

and (b) a second RF communication functionality other than cell phone functionality (as shown by 100b, the related antenna diagram, following through to the path identified as "2nd" to the piconet front end 114 and cordless telephone base unit 112). (*See* Ex. L, Madisetti Op. Decl. ¶ 51; Ex. M, Madisetti Rebuttal Decl. ¶ 14.) But both of these paths are depicted in the claimed multimode cell phone. Figure 1 thus discloses two links from the multimode cell phone that flow to the PSTN 130. From the PSTN 130 to the far end device 150, there is only *one link*. For Defendants' construction to be correct, there would have to be two.

Further, additional portions of the specification support BNR's construction. Under Defendants' construction, there must be two concurrent paths, each of a different mode, that extend all the way to the far end device—that is, the far end device would be required to have the same mode capabilities as the multimode cell phone. But the specification unambiguously rejects that argument; the far end device "can be any telephonic device, multi-mode or ***single mode***." (Ex. H, '156 Patent at 4:12–17 (emphasis added).) Defendants' construction thus contradicts the specification. *See Phillips*, 415 F.3d at 1313 ("[C]laims must be construed so as to be consistent with the specification.").

BNR's position is also consistent with statements made during the prosecution of the application that led to the '156 Patent. To overcome a prior art rejection over U.S. Patent 5,842,122 to Schellinger et al. ("Schellinger"), the patentee amended the claims to include the limitation "a module to establish simultaneous communication paths from a multimode cell phone using both a cell phone functionality and RF communication functionality." (*See* Ex. I at Appx299, Jan. 6, 2005 Response to Office Action at p. 7; *see also id.* at Appx294–98 (pp. 2–6).) In explaining how this claim amendment traversed the Examiner's rejection, the patentee stated as follows:



However, according to Schellinger, **automatic forwarding** systems **of a central office** are implemented to allow handoff of a call. See, e.g., col. 6, lines 12-15; and col. 6, line 24 (remote call forwarding performed). As explained by Schellinger at col. 7, lines 50-62, a call in process is handed off by producing a THREE WAY CALL through the **cellular telephone system** (i.e., NOT through the cell phone itself). To finally implement the handoff, the cell phone switches to a landline leg of a **three way call** (set up by a central office and/or cellular telephone system), and the initial call is dropped.

The present invention requires a module to establish **simultaneous communication paths from a multimode cell phone** using both a cell phone functionality and RF communication functionality, or to establish **from a multimode cell phone** a second type RF communication link while a first type RF communication link **remains active** at the multimode cell phone. Schellinger fails to disclose simultaneous communication paths from a multimode cell phone as claimed by the claims of the present application.

(*See* Ex. I at Appx300, Jan. 6, 2005 Response to Office Action at p. 8 (highlights added).) According to the patentee, Schellinger disclosed a communication path "produced . . . through the cellular telephone system" or "set up by a central office and/or cellular telephone system." *See id.* By adding the limitation for a module on the multimode cell phone that establishes the communication paths, the patentee was stating that the patentable distinction is that the claimed multimode cell phone establishes the communication path, and not some external network or function. *See Phillips*, 415 F.3d at 1317 ("[T]he prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention . . . .").

Further, Defendants' expert, Dr. Paul Min, acknowledged during deposition that the Schellinger reference discloses a communication system where the multimode cell phone *does not initiate* the three-way call (i.e., the second communication path). Dr. Min was asked to refer to an excerpt cited in his declaration from Schellinger, which

stated "In Fig. 6–2 the cordless base station 115 . . . answers the landline leg of the three way call . . . to open communication between the other party and the cordless base station 115." (*See* Ex. P, Min Dep. at 57:18–23 (referencing Ex. O, Min Op. Decl. ¶ 88).) Dr. Min testified:

> **Q.** So if the cordless base station answers the landline, then it did not initiate that communication path, correct?
> **A.** That's what it says here. I mean, in this particular paragraph.
> **Q.** It says that it did not initiate the communication path?
> **A.** That's right. It answers the landline leg of the three-way call.

(*See* Ex. P, Min Dep. at 57:24–58:16.) Therefore, Schellinger discloses a second communication path initiated by the telephone system and not the multimode cell phone. This distinction was sufficient to overcome the Examiner's rejection, and the Examiner issued a Notice of Allowance. A person of skill in the art, reading the prosecution history would likewise understand that the distinction between Schellinger and the '156 Patent is that the claimed multimode cell phone, instead of an off-device system, establishes the second communication path. (*See* Ex. M, Madisetti Rebuttal Decl. ¶ 13.)

Defendants' construction is flawed for additional reasons. First, Defendants' use of the phrase "established distinct and different communication links" is confusing. In fact, during deposition, Dr. Min struggled to even define the phrase. (*See* Ex. P, Min Dep. at 35:6–42:4.) Dr. Min states that "[distinct and different] both indicate that these two communications links are not the same, but perhaps distinct has a more characterized nature of communication link versus different could be, maybe the path itself the link, the path itself is different" where "characterized" could mean that " you could use a different technology for example. So the claim, say it's a multimode cell phone. So it may describe the mode being different. And different, just using different

by itself could say, I mean, you could use a different path, physical path, but maybe use the same mode." (*See* Ex. P, Min Dep. at 37:18–38:17.)

To the extent Defendants' proposed construction "different and distinct" means a different physical path and a distinct mode, these limitations are captured by the surrounding claim language, rendering Defendants' construction improper. Claim 1, in the same limitation as the term for construction, and just after it, states "using ***both*** said cell phone functionality and said RF communication functionality." (Ex. H, '156 Patent at Claim 1.) Claim 1 also expressly states that the RF communication functionality is "separate from said cell phone functionality." *See id.* Thus, the claim already requires that each communication path utilize a different mode. For the same reason, the communication paths are necessarily different: one will start at the multimode cell phone and transit to the cell phone network and the other will start at the multimode cell phone and transit to the base station for the other RF communication. As a result, Defendants' use of the terms "distinct and different" are at best, redundant, and at worst, likely to cause even more confusion for the jury and uncertainty during the litigation. *See Digital-Vending Servs., Int'l, LLC v. Univ. of* Phoenix, Inc., 672 F.3d 1270, 1275 (Fed. Cir. 2012) (It is important to construe "claim terms in light of the surrounding claim language, such that words in a claim are not rendered superfluous.").

Defendants' construction adds an additional unsupported limitation that the "established distinct and different communication links from said multimode cell phone" extend all the way to "a far-end communication device." As explained above, not only is this limitation nonexistent in the claim or specification, the intrinsic record repudiates such a requirement. (Ex. H, '156 Patent at 4:12–17 (far-end device "can be any telephonic device, multi-mode or ***single mode***") (emphasis added).) Defendants' construction also would require "distinct and different" paths—that is, paths using different modes and along different physical paths—all the way to the far-end device. A single mode telephonic device simply cannot maintain two established

communication paths using two modes; it is a technical impossibility. (*See* Ex. L, Madisetti Op. Decl. ¶¶ 51–52.) This reading is further supported by reference to Fig. 1, as shown above, that clearly identifies only one link (the solid line from PSTN 130 to far-end device 150).

To the extent the Court deems construction of the term "simultaneous communication paths from said multimode cell phone" is necessary, the Court should adopt BNR's proposal because it is well supported by the intrinsic evidence. Defendants' construction, on the other hand, injects confusion and violates fundamental claim construction jurisprudence because it contradicts the specification.

C. "a module to establish simultaneous communication paths from said multimode cell phone using both said cell phone functionality and said RF communication functionality"

Plaintiff's Proposed Construction	Huawei & Coolpad's Proposed Construction[4]
Not a 112 ¶ 6 claim element – In the alternative, to the extent the Court determines that this claim is governed by 112 ¶ 6, BNR proposes the following Function and Structure, and disagrees that the term is indefinite for lack of corresponding structure: Function: establish simultaneous communication paths from said multimode cell phone using both said cell phone functionality and said RF communication functionality Structure: Corresponding structure for the alleged function exists in at least the following portions of the patent specification, or their equivalents:	This is a 112 ¶ 6 claim element. Function: "establish simultaneous communication paths from said multimode cell phone using both said cell phone functionality and said RF communication functionality" Structure: Fig. 1 (element 101); Fig. 2 steps 202-208; Fig. 4 steps 402-408; 4:50-67; 7:1-16.

[4] BNR understands from the parties claim construction exchanges and submissions to the Court that Kyocera and ZTE do not join in this proposal.

Figs. 1, 3, Col. 3:48–4:49; 4:54–5:62; 6:3–55; 6:60–8:5	

The term "a module to establish simultaneous communication paths from said multimode cell phone using both said cell phone functionality and said RF communication functionality" appears in Claim 1 of the '156 Patent:

> 1. A multimode cell phone, comprising:
>
> a cell phone functionality; and
>
> an RF communication functionality separate from said cell phone functionality;
>
> ***a module to establish simultaneous communication paths from said multimode cell phone using both said cell phone functionality and said RF communication functionality***; and
>
> an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality, operable to switch a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on the other of said cell phone functionality and said RF communication functionality.

(Ex. H, '156 Patent Claim 1.)

The term "a module to establish simultaneous communication paths from said multimode cellphone using both said cell phone functionality and said RF communication functionality" is not a means-plus-function term because the limitation connotes sufficiently definite structure to a person of ordinary skill in the art. However, to the extent the Court determines that § 112, ¶ 6[5] applies, Huawei and Coolpad's proposed structure is too narrow in view of the broader language in the specification.

1. The "module to establish simultaneous communications" term is not governed by § 112, ¶ 6.

[5] The '156 Patent was filed on June 26, 2001 and therefore pre-AIA.

There is no presumption that a means-plus-function reading is warranted for this term, and the intrinsic and extrinsic evidence demonstrates that the claim itself recites sufficiently definite structure. Where a limitation does not use the word "means," "there is a rebuttable presumption that § 112, ¶ 6 does not apply." *See TEK Global, S.R.L. v. Sealant Sys. Int'l*, 920 F.3d 777, 786 (Fed. Cir. Mar. 29, 2019). Only "if the challenger demonstrates that the claim term fails to recite sufficiently definite structure," can the rebuttable presumption be overcome. *See id.* (quoting *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015)). Specifically with respect to a term including the word "module," courts in this district have made clear that "*Williamson* does not . . . stand for the broad proposition that the term 'module' automatically places it among terms such as 'means' and 'step for,' thus triggering a presumption that [§ 112, ¶ 6] applies." *Blast Motion*, 2017 U.S. Dist. LEXIS 16549 at *45–46. Instead, even if the claim term uses the term module, there is still the rebuttable presumption that § 112, ¶ 6 does not apply. *See id.* at *45–46. Defendants have failed to overcome this presumption; the term recites more than sufficiently definite structure.

"Paragraph 6 does not apply when 'the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure. . . . To determine whether the claim limitation at issue connotes sufficiently definite structure to a person of ordinary skill in the art, we look first to intrinsic evidence, and then, if necessary, to the extrinsic evidence." *TEK Global,* 920 F.3d at 786; *Media Rights Techs., Inc. v. Capital One Fin. Corp.*, 800 F.3d 1366, 1372 (Fed. Cir. 2015) ("In undertaking this analysis, we ask if the claim language, read in light of the specification, recites sufficiently definite structure to avoid § 112, ¶ 6.") (quoting *Robert Bosch, LLC v. Snap-On Inc.*, 769 F.3d 1094, 1099 (Fed. Cir. 2014)); *see also Blast Motion*, 2017 U.S. Dist. LEXIS 16549, at *9, 47 ((stating same and conducting an analysis that looked to whether the claims, in light of the specification,

recites sufficiently definite structure). Here, the claim language and the specification confirm that the limitation connotes sufficient structure.

First, the claim language itself connotes sufficiently definite structure to a person of ordinary skill in the art. Claim 1 claims "A ***multimode cell phone comprising*** . . . a module to establish simultaneous communication paths from said multimode cell phone using both said cell phone functionality and said RF communication functionality." (Ex. H, '156 Patent Claim 1.) That is, this module to establish simultaneous communication paths ***is a part of the*** multimode cell phone. And a person of skill in the art understood what a multimode cell phone was at the time of the invention and the inner circuitry and specialized software for the multimode cellphone. (*See* Ex. O, Min Op. Decl. ¶ 100) ("A POSITA would understand that multimode cell phone 100 described by the '156 Patent must include radio communication equipment (e.g. antenna, amplifier, transmitter, receiver, etc.) operating in conjunction with a general purpose computer (e.g. microprocessor) that is specially programmed to perform wireless communications, typical in compliance with telecommunication industry standards (e.g. 3GPP/ETSI, etc)"); (Ex. P, Min Dep. at 46:2–4 ("So at the time 2000, let's say earlier date of the two possible priority date, 2000. People knew what the cell phone was.").) Thus, a person of skill in the art at the time of the invention would understand that the module to establish simultaneous communication paths refers to the hardware and specialized software that manages the transmission and receiving for each of the modes in accordance with the relevant standards, often the integrated system on a chip or the baseband processors. (*See* Ex. L, Madisetti Op. Decl. ¶¶ 59–60.)

Second, the specification supports this reading of the claim. As shown above in Fig. 1, the separate communication functionalities are located within the multimode cell phone. (Ex. H, '156 Patent at Fig. 1.) And the specification particularly references cell phone functionality 100a and RF communication functionality 100b, which a person of skill in the art would readily understand to mean the requisite hardware and

software, including transceivers, operating in accordance with the relevant telecommunications standards. (*See* Ex. H, '156 Patent at 3:52–55; Ex. L, Madisetti Op. Decl. ¶¶ 58–59.) *See TEK Global,* 920 F.3d at 786.

2. If the Court determines that the presumption has been rebutted, and § 112, ¶ 6 applies, Defendants' disclosed structure is improperly narrow.

Assuming that § 112, ¶ 6 applies to this limitation (which it should not), then construing the term requires two steps: determining the claimed function and identifying the corresponding structure in the written description of the patent that performs the function. *See Blast Motion*, 2017 U.S. Dist. LEXIS 16549, at *10. "When multiple embodiments in the specification correspond to the claimed function, proper application of § 112 P 6 generally reads the claim element to embrace each of those embodiments." *Micro Chem, Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1258–59 (Fed. Cir. 1999); *Serrano v. Telular Corp*., 111 F.3d 1578, 1583 (Fed. Cir. 1997). Finally, in construing a term subject to § 112, ¶ 6, the claim "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." *See Bal Seal Eng'g Co. v. Qiang Huang*, No. 10cv819-CAB, 2011 U.S. Dist. LEXIS 84516, at *4 (S.D. Cal. Aug. 1, 2011).

As an initial matter, there is no dispute with regard to the alleged function (if § 112, ¶ 6 applies). The function is to "establish simultaneous communication paths from said multimode cell phone using both said cell phone functionality and said RF communication functionality."

BNR contends that the structures that correspond with this function are disclosed in Figure 1, including 100a and 100b, as well as Col. 3:52–55, 3:64–4:1, 4:12–23, 5:27–32, 6:3–8, and 6: 33–40. As Dr. Madisetti opined, these portions of the specification show that there is circuitry, including hardware and software for the multimode cell phone 100 in Figure 1, including the transceivers and related hardware and software components of 100a and 100b of multimode cell phone 100, which describes the inputs and outputs, and where information travels next. (*See* Ex. L,

Madisetti Op. Decl. ¶¶ 58, 59, 63) For example, in Col. 3:60–4:27, the specification teaches that the module to establish simultaneous communication paths is first controlled through suitable communications with each communication path functionality 100a–100c. Where a communication path may be dropped, another mode is activated and establishes a communication link while the first remains active. (*See* Ex. H, '156 Patent at 3:60–4:27.) Further, the specification identifies steps where the user may be prompted about impending loss of the signal and or prompted to permit establishment of the alternate communication path. (*See* Ex. H, '156 Patent at 4:41–44.) Thus, it is clear that the multimode cell phone 100, and the cell phone functionality 100a and RF communication functionality 100b, which are readily understood to a person of skill in the art as RF transceivers operating in accordance with their respective telecommunications standards and using hardware and software, where the steps of setting up a first communication path, awaiting indication of the need for a second, simultaneous communication path, and then, third establishing a the second communication path are implemented within the multimode cell phone 100 and the elements 100a and 100b.

Huawei and Coolpad's proposed structure incorrectly narrows the relevant structure to just two embodiments, those disclosed in Fig. 1 (element 101) and in Fig. 2, steps 202-208; Fig. 4 steps 402-408 as well as the corresponding specification description at Col. 4:50–67 and 7:1–16. These figures represent particular embodiments, do not include the structure that captures all potential embodiments, as discussed above. In doing so, Defendants capture only an "exemplary process" (Col. 4:50; Col. 7:1). *See Micro Chem*, 194 F.3d at 1258–59; *Serrano*, 111 F.3d at 1583 (declining to require "overly limiting structure" that is "contrary to the statement of multiple structures disclosed in the specification" and noting that "[d]isclosed structure includes that which is described in a patent specification, including any alternative structures identified.").

D. "an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality, operable to switch a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on the other of said cell phone functionality and said RF communication functionality"

Plaintiff's Proposed Construction	Huawei & Coolpad's Proposed Construction
Not a 112 ¶ 6 claim element In the alternative, to the extent the Court determines that this claim is governed by 112 ¶ 6, BNR proposes the following Function and Structure, and disagrees that the term is indefinite for lack of corresponding structure: Function: in communication with both said cell phone functionality and said RF communication functionality, operable to switch a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on the other of said cell phone functionality and said RF communication functionality Structure: Corresponding structure for the alleged function exists in at least the following portions of the patent specification, or their equivalents: Figs. 1, 3, Col. 3:48–4:49; 4:54–5:62; 6:3–55; 6:60–8:5	This is a 112 ¶ 6 claim element. Function: "automatic switch over of a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on the other of said cell phone functionality and said RF communication functionality" Structure: Fig. 1 (element 101); Fig. 2 steps 210-212; Fig. 4 steps 410-412; 5:1-7; 7:17-26, Claim 1 ("an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality").

The term "an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality, operable to switch a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on

the other of said cell phone functionality and said RF communication functionality" appears in Claim 1 of the '156 Patent:

> A multimode cell phone, comprising:
>
> a cell phone functionality; and
>
> an RF communication functionality separate from said cell phone functionality;
>
> a module to establish simultaneous communication paths from said multimode cell phone using both said cell phone functionality and said RF communication functionality; and
>
> ***an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality, operable to switch a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on the other of said cell phone functionality and said RF communication functionality.***

(*See* Ex. H, '156 Patent at Claim 1.)

The term "an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality, operable to switch a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on the other of said cell phone functionality and said RF communication functionality" is not a means-plus-function term because the limitation connotes sufficiently definite structure to a person of ordinary skill in the art. However, to the extent the Court determines that § 112, ¶ 6[6] applies, Huawei and Coolpad's proposed structure is too narrow in view of the broader language in the specification.

1. <u>The "automatic switch over module" term is not governed by § 112, ¶ 6.</u>

[6] The '156 Patent was filed on June 26, 2001 and therefore pre-AIA.

There is no presumption that a means-plus-function reading is warranted for this term, and the intrinsic and extrinsic evidence demonstrate that the claim itself recites sufficiently definite structure. Where a limitation does not use the word "means," "there is a rebuttable presumption that § 112, ¶ 6 does not apply." *See TEK Global*, 920 F.3d at 786. Only "if the challenger demonstrates that the claim term fails to recite sufficiently definite structure," can the rebuttable presumption be overcome. *See id.* (quoting *Williamson*, 792 F.3d at 1349). While the term module be a well-known nonce word, this Court has made clear that "*Williamson* does not . . . stand for the broad proposition that the term 'module' automatically places it among terms such as 'means' and 'step for,' thus triggering a presumption that [§ 112, ¶ 6] applies." *See Blast Motion*, 2017 U.S. Dist. LEXIS 16549, at *45–46. Instead, even if the claim term uses the term module, there is still the rebuttable presumption that § 112, ¶ 6 does not apply. *See id.* at *45–46. Defendants have failed to meet their burden; the term recites more than sufficiently definite structure.

"Paragraph 6 does not apply when 'the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure. . . . To determine whether the claim limitation at issue connotes sufficiently definite structure to a person of ordinary skill in the art, we look first to intrinsic evidence, and then, if necessary, to the extrinsic evidence." *TEK Global,* 920 F.3d at 786; *Media Rights*, 800 F.3d at 1372 ("In undertaking this analysis, we ask if the claim language, read in light of the specification, recites sufficiently definite structure to avoid § 112, ¶ 6.") (quoting *Robert Bosch*, 769 F.3d at 1099); *see also Blast Motion*, 2017 U.S. Dist. LEXIS 16549, at *9, 47 (stating same and conducting an analysis that looked to whether the claims, in light of the specification, recites sufficiently definite structure). Further, sufficient structure "may be provided by describing the claim limitation's operation, such as its input, output, or connections." *See Apple Inc. v. Motorola, Inc.*, 757 F.3d 1286, 1299 (Fed. Cir. 2014). Here, the claim language and the specification confirm that the limitation connotes sufficient structure.

As with the prior term, the claim language itself connotes sufficiently definite structure to a person of ordinary skill in the art. Claim 1 claims "A ***multimode cell phone comprising*** . . . an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality, operable to switch a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on the other of said cell phone functionality and said RF communication functionality." The automatic switch over module is ***a part of*** the multimode cell phone, itself.

Further, this limitation is described by its operation and includes its inputs and outputs in the claim language. The automatic switch over module is in communication with both said cell phone functionality and said RF communication functionality. Further, it is operable to switch, or route, a communication path from the cell phone functionality to the RF communication functionality or in reverse. A person of ordinary skill in the art at the time of the invention would share that understanding. (*See* Ex. M, Madisetti Rebuttal Decl. ¶ 41.)

These connections to the cell phone functionality and the RF communication functionality within the multimode cell phone connote sufficient structure in the claim itself such that the presumption against § 112, ¶ 6 is not overcome. Indeed, even Huawei and Coolpad identify a portion of the claim limitation to be ***structure***:

Huawei & Coolpad's Proposed Construction
Structure: Fig. 1 (element 101); Fig. 2 steps 210-212; Fig. 4 steps 410-412; 5:1-7; 7:17-26, claim 1 ("an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality").

(*See* Doc. No. 63-2 at 53, Appendix B to Joint Hearing Statement) (identifying "an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality").

Looking to the specification also confirms that the limitation connotes sufficient structure because a person of ordinary skill in the art, reading the claims in view of the specification, would understand the term to refer to sufficiently definite structure. Figure 1 identifies inputs of user activation and outputs of user prompt, as well as connection to each of the modes 100a–100c. (*See* Ex. H, '156 Patent at Fig. 1.) The specification further includes an example of such inputs and outputs:

> In accordance with the principles of the present invention, an automated procedure may be initiated by the user of the multimode cell phone 100 at the press of a designated button. The user may be prompted about impending loss of signal or otherwise loss of the established telephone call, and may be prompted to permit establishment of and ultimately transfer to an alternative type communication path (e.g., a cellular phone call). In response, the user preferably activates a suitable button, e.g., a dedicated

> button called, e.g., "Switch to Cell Network", or simply "Switch Communication Path".

(*See* Ex. H, '156 Patent at 4:37–47.) Thus a person of ordinary skill in the art would understand that this automatic switchover module limitation connotes sufficient structure and § 112, ¶ 6 does not apply. *See TEK Global,* 920 F.3d at 786.

2. If the Court determines that the presumption has been rebutted, and § 112, ¶ 6 applies, Defendants' disclosed structure is improperly narrow.

Assuming that § 112, ¶ 6 applies to this limitation (which it should not), then construing the term requires two steps: determining the claimed function and identifying the corresponding structure in the written description of the patent that performs the function. *See Blast Motion*, 2017 U.S. Dist. LEXIS 16549, at *10. "When multiple embodiments in the specification correspond to the claimed function, proper application of § 112 P 6 generally reads the claim element to embrace each of those embodiments." *Micro Chem*, 194 F.3d at 1258–59; *Serrano*, 111 F.3d at 1583. Finally, in construing a term subject to § 112, ¶ 6, the claim "shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof." *See Bal Seal*, 2011 U.S. Dist. LEXIS 84516, at *4.

The first dispute centers on the identification of the alleged function. Huawei and Coolpad's alleged function derives from their acknowledgement that "an automatic switch over module, in communication with both said cell phone functionality and said RF communication functionality" was adequate *structure*, but attempts to alter the function to just what the automatic switch over module was "operable to" do. (*See* Doc. No. 63-2 at 53, Appendix B to Joint Hearing Statement)

BNR's proposed function, "in communication with both said cell phone functionality and said RF communication functionality, operable to switch a communication path established on one of said cell phone functionality and said RF communication functionality, with another communication path later established on the other of said cell phone functionality and said RF communication functionality,"

which fully encompasses the scope of the claimed module. In contrast, Huawei and Coolpad's alleged function does not explicitly recite the claim language and is instead artificially created; this is improper. "[A] court may not construe a means-plus-function limitation by adopting a function different from that explicitly recited in the claim." *JVW Enters. v. Interact Accessories, Inc.*, 424 F.3d 1324, 1331 (Fed. Cir. 2005) (quoting *Micro Chem.*, 194 F.3d at 1258. (internal quotations omitted)).

This function finds corresponding structure disclosed in Figure 1. "Fig. 1 shows a multimode cell phone handing over a telephone call from a cordless mode to a cellular mode, in accordance with the principles of the present invention." This also includes element 101 of Fig. 1, identified as the automatic switch over module, which is a part of the multimode cell phone 100. The specification further provides:

> A method of automatically switching between a first type RF communication link and a second type RF communication link different from the first type RF communication link, comprising participating in the first type RF communication link. An availability of the second type RF communication link is sensed, and if available, the second type RF communication link is established while the first type RF communication link remains active. The parties participating in the first type RF communication link are switched to active utilization of the second type RF communication link.

(*See* Ex. H, '156 Patent at 1:62–2:4.) This disclosure highlights the algorithm that allows a system to practice the function. First, there is participation in a first type of RF communication link. Next, the second type of RF communication link is sensed and, if available, established while the first type of RF communication link remains active. Then, the switch occurs.

Further elucidation of the structure for this algorithm exists at Col. 4:7–49:

> For explanation purposes, FIG. 1 depicts an established telephone call between the multimode cell phone 100 and a far end telephone 150 (which in the example is a landline

> telephone accessed through a cellular network). Of course, the far end telephone can be any telephonic device, multimode or single mode.
>
> Once the multimode cell phone 100 extends beyond its acceptable range, the telephone call would ordinarily be dropped, perhaps involuntarily. However, in accordance with the principles of the present invention, the telephone call between the multimode cell phone 100 and the far end telephone 150 is automatically re-established using the cellular network 120. By automatically changing the mode of the multimode cell phone 100 (preferably subsequent to a prompt to the user for permission to transfer), the conversation or other communication between the parties is transferred to the newly established cell phone call.

(*See* Ex. H, '156 Patent at 4:12–27.)

The patent then continues to describe examples of switching, including the use of a button or prompt for switching or an automated switch:

> In accordance with the principles of the present invention, an automated procedure may be initiated by the user of the multimode cell phone 100 at the press of a designated button. The user may be prompted about impending loss of signal or otherwise loss of the established telephone call, and may be prompted to permit establishment of and ultimately transfer to an alternative type communication path (e.g., a cellular phone call). In response, the user preferably activates a suitable button, e.g., a dedicated button called, e.g., "Switch to Cell Network", or simply "Switch Communication Path". Of course, the transfer may be entirely automated without requiring input from the user, within the scope of the invention.

(Ex. H, '156 Patent at 4:7–49.) Additional structure for the handover is disclosed in Col. 5:7–62 and 6:3–51, particularly for the step of switching over from one communication link to the other:

> The converse of the example of FIGS. 1 and 2 is also possible. For instance, the multimode cell phone **150** may

> move from a cell phone call to a cordless telephone call, e.g., once the multimode cell phone **100** becomes within range of its matching base unit **110**. In this case, the multimode cell phone **100** automatically establishes a wireless connection with the cordless telephone base station **110** using, e.g., a wireless piconet protocol conforming to the BLUETOOTH™ standard. Using the wireless cordless telephone communication path established between the multimode cell phone **150** and its base unit **110**, a suitable telephone number relating to the far end party may be determined and passed to the cordless telephone functionality of the multimode cell phone **100**.

(*See* Ex. H, '156 Patent at 5:7–20.)

The '156 Patent's discussion of embodiments confirms that the Defendants' formulation of the structure is too narrow. Restricting merely two examples would result in exclusion of structures handling the automatic switchover functions that are described in the following excerpts from the specification:

- "Preferably, the initial caller in the first telephone call controls the re-establishment of an alternative mode communication path. For instance, in the disclosed embodiment, the far end party's telephone number is obtained by the multimode cell phone **150** that initiated the first telephone call (i.e., who called whom)." (*See* Ex. H, '156 Patent at 5:21–26.)
- "Telephone numbers for the far end party may be recalled from a last number dialed functionality of the multimode cell phone **150**. However, call related information such as CallerID information may be used to allow a far end party to themselves initiate a communication path mode transfer." (*See* Ex. H, '156 Patent at 5:27–32.)
- "In the given example, the cordless telephone base station **110** then goes off hook and dials the telephone number of the far end party, whether or not the far end party initiated the transferred telephone call. In this example, from the far-end user's perspective, the far end user hears that there is a call coming in (e.g.,

using a Call Waiting service) and may or may not review CallerID information such as the telephone number and/or name of the calling party, before they accept the new call. Using Call Waiting type service, the far end party would accept the new communication mode by simply activating a FLASH button and abandoning the first telephone call…To this end, the cordless telephone base unit **110** may notify the handset that the new communication path has been established and accepted, allowing the base unit **110** to finally switch the audio path from the cell phone link to the BLUETOOTH™ cordless telephone link and then disconnect the cell phone call." (*See* Ex. H, '156 Patent at 5:42–62.)

- "The automatic handoff capability may be implemented using a lookup table including entries relating to alternate telephone numbers, e.g., associated cell phone numbers, land line numbers, etc. However, care should be taken to avoid the vulnerability to erroneous communication path switching." (*See* Ex. H, '156 Patent at 6:3–8.)
- "A safer, alternative approach implements a predetermined signaling tone (e g. a DTMF tone sent from the near end (switching) phone and a detector on the far end phone 150 recognizing it and preparing to flash when the new call comes in. Of course, there could be a combination of both. Let's look at this example." (*See* Ex. H, '156 Patent at 6:9–14.)
- "To accomplish [switching], the multimode cell phone 100 may send, e.g., a quick DTMF "7" followed by a DTMF "9" (i.e., representing the characters "SW") notifying the near end user and the far end phone 150 (and user) that a switch is about to happen. The far end phone 150 would remain ready for a switch over for a given length of time, e.g., for 20 seconds. The multimode cell phone 100 makes the alternate phone call as described above. After the far end phone receives the new call, it checks the call related information (e.g., CallerID data) against entries in a suitable lookup table, and if it finds a match, then automatically flashes the telephone line on the original telephone call. The near

end phone, as in the first example, is then notified that the second call has gone through, allowing the conversation to continue on a switched over communication path." (*See* Ex. H, '156 Patent at 6:25–39.)

- "In the unlikely event that the switchover does not succeed, the switchover is preferably delayed (e.g., for 10 seconds or more) to allow the users to switch back to the initial telephone call or communication path." (*See* Ex. H, '156 Patent at 6:40–44.)
- "Similar to the above examples, the multimode cell phone 100 may switch from cordless mode to cell phone mode when the user wishes to leave the proximity of the cordless telephone base unit 110. For instance, manual activation of a suitable button, or automatic detection of the quality of the RF link (e.g., the BLUETOOTH™ piconet link) below a preset level may initiate this feature." (*See* Ex. H, '156 Patent at 45–51.)

Thus, the proper structure is Fig. 1, including element 101, Col. 1:62–2:4, 4:7–49, 5:7–62, and 6:3–51 and equivalents thereof. *See* § 112, ¶ 6.

Huawei and Coolpad's proposed structure, on the other hand, is limited only to "exemplary processes" for alleged function. Specifically, Huawei and Coolpad incorrectly narrow the relevant structure to just two embodiments, those disclosed in Fig. 1 (element 101) and in Fig. 2, steps 202-208; Fig. 4 steps 402-408 as well as the corresponding specification description at Col. 4:50–67 and 7:1-16. In doing so, Huawei and Coolpad capture only two "exemplary process[es]," *see* Col. 4:50; Col. 7:1 and not the full scope of the disclosed structure for all embodiments. *See Micro Chem*, 194 F.3d at 1258–59; *Serrano*, 111 F.3d at 1583 (declining to require "overly limiting structure" that is "contrary to the statement of multiple structures disclosed in the specification" and noting that "[d]isclosed structure includes that which is described in a patent specification, including any alternative structures identified.").

VIII. CLAIM CONSTRUCTION REGARDING U.S. PATENT NO. 7,039,435

A. Background of the Invention

The '435 Patent is entitled "Proximity Regulation System for Use with a Portable Cell Phone and a Method of Operation Thereof," and it issued from an application filed on September 28, 2001.

The '435 Patent generally relates to systems or methods that regulate a mobile device's transmission power to reduce potentially harmful radiation when the device is proximate to a user. The specification describes the potential issue that the patent addresses:

> Typically, the quality of service of a cell phone is proportional to the transmit power level of the cell phone….[H]ealth concerns have arisen due to the power used to transmit the radio frequency of cell phones when operated close to the body of a cell phone user. For example, when held close to the ear, many users have health concerns about the high levels of radio frequency energy causing damage to brain cells.

(*See* Ex. J, '435 Patent at 1:33–41.)

The background section of the '435 Patent describes shortcomings of the prior art:

> … [P]ermanently reducing the power of the transmitter in cellphones…also reduces the quality of service of the cell phone. Another option for consumers is the use of cell phones with a base that typically allows a higher transmit power level of up to three watts….These type of cell phones, however, do not allow the flexibility demanded by consumers that is found in the use of a portable cell phone.

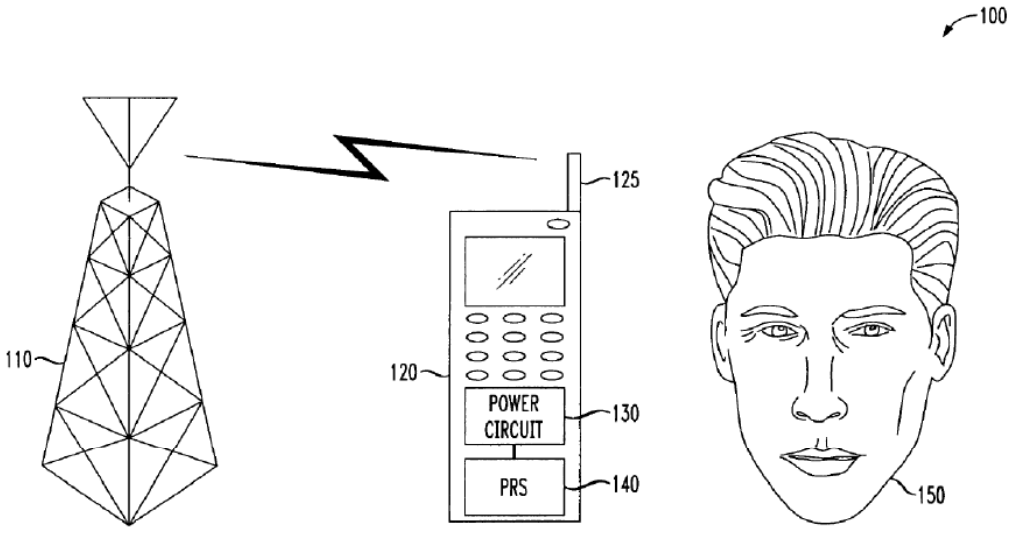
(*See* Ex. J, '435 Patent at 1:52–62.)

"Thus, [t]o address the above-discussed deficiencies of the prior art, the present invention provides a proximity regulation system for use with a portable cell phone." (Ex. J, '435 Patent at 2:3–5.) This proximity regulation system, in turn, "includes a

location sensing subsystem and a power governing subsystem, which cooperate to determine both the proximity transmit power level and when it may be employed." (Ex. J, '435 Patent at 3:47–51.) The location sensing subsystem determines the location of the cell phone relative to the user, and based on this information, the power governing subsystem, which is coupled to the location sensing subsystem, determines a "proximity transmit power level" of the phone. (Ex. J, '435 Patent at 3:47–51.)

The '435 Patent further discloses a "power circuit" that produces the cell phone's transmission power. (Ex. J, '435 Patent at 3:31–34.) The '435 Patent refers to its Figure 1 and elaborates on the power circuit's function, disclosing that "[t]hrough communications with the communications tower **110** employing the antenna **125**, the power circuit," provides a "network adjusted transmit power level…." (*Id.* at 3:34–37.) The bolded element numbers refer to Figure 1 of the '435 Patent, duplicated below:

FIG. 1



The '435 Patent teaches that the cell phone's transmit power level is ultimately determined, for example, by considering, adjusting, or reducing the network adjusted transmit power level in view of the proximity transmit power level. (*See, e.g.*, Ex. J, '435 Patent at 5:24–36; 7:9–40.)

A. "position to a communications tower"

Plaintiff's Proposed Construction	Huawei's and ZTE's Proposed Construction[7]
"transmit signal strength of a communications path between a communications tower and the portable cell phone"	Plain and ordinary meaning. In the alternative, to the extent the Court determines that a specific construction is warranted, IIuawei and ZTE propose: "position of the portable cell phone relative to a communications tower."

The term in question is bolded below in Claim 1 of the '435 Patent:

> 1. A portable cell phone, comprising:
>
> a power circuit that provides a network adjusted transmit power level as a function of a **position to a communications tower**; and
>
> a proximity regulation system, including:
>
> a location sensing subsystem that determines a location of said portable cell phone proximate a user; and
>
> a power governing subsystem, coupled to said location sensing subsystem, that determines a proximity transmit power level of said portable cell phone based on said location and determines a transmit power level for said portable cell phone based on said network adjusted transmit power level and said proximity transmit power level.

BNR's proposed construction of the disputed term is dictated by the specification of the '435 Patent, and is supported by additional intrinsic evidence,

[7] Plaintiffs have asserted the '435 Patent against Hauwei and ZTE, but not Coolpad or Kyocera.

including references identified and incorporated into the specification and the prosecution history of the '435 Patent. BNR's proposed construction also more completely resolves potentially disputed claim scope by providing meaning to the entirety of the disputed phrase, including the term "position." Defendant's proposed construction, on the other hand, leaves unresolved the meaning and scope of "position," and further introduces the additional term "relative to" that is absent from the '435 Patent claims and specification and causes confusion as to its meaning, thereby providing less, rather than more clarity regarding the scope of this claim.

As set forth by the claim language immediately above, the "network adjusted transmit power level" is defined within the claim as a function of the disputed phrase "position to a communications tower." The specification contains three instances describing what the network adjusted transmit power level is a function of.[8] Each of these instances establish that the patentee acted as its own lexicographer and specifically described the patent's usage of this term. *See Cont'l Circuits LLC v. Intel Corp.*, 915 F.3d 788, 796 (Fed. Cir. 2019) ("Our case law has recognized that the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. When the patentee acts as its own lexicographer, that definition governs. To act as its own lexicographer, a patentee must clearly set forth a definition of the disputed claim term other than its plain and ordinary meaning.") (internal quotation marks and citations omitted).

The first instance defines the term explicitly:

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[8] The '435 Patent at col. 2:18-20 states "In yet another aspect, the present invention provides a portable cell phone that includes a power circuit as a function of a position to a communications tower and a proximity regulation system." Although this sentence contains the disputed phrase, this section of the specification does not elaborate on the meaning of the terms is dispute—neither does it mention the term: "network adjusted transmit power," which immediately precedes the disputed phrase in Claim 1, and which is therefore central to the dispute. Accordingly, the above-identified sentence does not appear relevant to the present claim dispute.

> The network adjusted transmit power level is based on a transmit signal strength of a communications path between the communications tower 110 and the portable cell phone 120.

(*See* Ex. J, '435 Patent at 3:39–42.) The fact that this sentence contains no conditional language, or descriptions limiting it to a particular embodiment would inform a POSA that the above statement applies generally throughout the patent, including the claims. *See, e.g., C.R. Bard, Inc. v. United States Surgical Corp.*, 388 F.3d 858, 864 (Fed. Cir. 2004) (unconditional statements in specification not tied to a particular embodiment that characterized implants and plugs as pleated applied globally and required a pleated surface for claimed plugs). In contrast, the preceding sentences, in discussing particular embodiments of the invention, use conditional language such as "may," or "for instance," and/or address specific possible values for power levels. '435 Patent at 3:31–38. In other places, the specification of the '435 Patent makes uses of terms such as "alternatively," "in an alternative embodiment," "in one embodiment," and "in another embodiment," when a particular feature or characteristic describes a particular embodiment or instance. (*See, e.g.*, Ex. J, '435 Patent at 3:55–4:4.)

This unambiguous statement defines the disputed term in Claim 1. Both phrases reference the same term: "network adjusted transmit power level." The specification's statement that this term is "based on a transmit signal strength of a communications path between the communications tower 110 and the portable cell phone 120," would inform a person of ordinary skill in the art that Claim 1's "network adjusted transmit power level as a function of a position to a communications tower," means "network adjusted transmit power level as a function of a transmit signal strength of a communications path between the communications tower and the portable cell phone."

The second instance in the specification confirms that "network adjusted transmit power level" is determined by the communications path between the portable cell phone and the communications tower:

> After adjusting the transmit power level, the portable cell phone then transmits at a reduced level in a step 350. In one embodiment, the adjusted transmit power level may not exceed **the network adjusted transmit power level as determined by the communications path between the portable cell phone and the communications tower**. In other embodiments, the adjusted transmit power level may be reduced to the proximity transmit power level.

(*See* Ex. J, '435 Patent at 7:21–26 (emphasis added).) Although this excerpt refers to a particular embodiment, the language identifying the characteristics of the embodiment refers to the relative power of the ultimately adjusted transmit power level of the cell phone, not the statement that the network adjusted transmit power level is determined by the communications path between the portable cell phone and communications tower. A POSA would understand that this second instance's reference to "network adjusted transmit power level as determined by the communications path between the portable cell phone and the communications tower" is consistent with and analogous to the first instance's description of the same term being "based on a transmit signal strength of a communications path between the communications tower and the portable cell phone."

The third instance in the specification also confirms that "network adjusted transmit power level" is a function of the communications path between the portable cell phone and the communications tower:

> In one embodiment, the network adjusted transmit power level may equal the maximum transmit power level of a portable cell phone. In other embodiments, **the network adjusted transmit power level** may be a reduction from the maximum transmit power level **due to the communications path between the communications tower and the portable cell phone**.

(*See* Ex. J, '435 Patent at 7:34–40 (emphasis added).) Again, the language in the excerpt above referring to embodiments pertains to the particular value of a network

adjusted transmit power level relative to a cell phone's maximum transmit power level, and not the statement that the "network adjusted transmit power level" is "due to the communications path between the communications tower and the portable cell phone." For the same reasons as mentioned above with regard to the second instance, a POSA would understand that this third instance's reference to "network adjusted transmit power level," being "due to the communications path between the portable cell phone and the communications tower" is consistent with and analogous to the first instance's description of the same term.

In view of the consistent and unambiguous disclosures in the specifications as to what a network adjusted transmit power level is "based on," "determined by," and "due to," the Court should adopt BNR's construction. *See Phillips*, 415 F.3d at 1315 ("the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.") (citation omitted); *Cont'l Circuits*, 915 F.3d at 796 ("When the patentee acts as its own lexicographer, that definition governs."). These three consistent and unambiguous characterizations, which also closely track the language surrounding the disputed claim term, additionally indicate that patentee intended these definitions to apply globally. *See, e.g., C.R. Bard*, 388 F.3d at 864, 866 (two unconditional statements in specification not tied to a particular embodiment applied globally, and use of language in specification containing the additional feature that is similar to language in the claims that did not explicitly contain the feature, supported construing the claim to include the defined feature.).

BNR's claim construction is also consistent with and supported by the knowledge a POSA possessed at the time of the filing of the '435 Patent regarding cell phone networks relying on transmitted signal strength information to maintain cell phone connections and call quality, as cited in the patent. A POSA would know that the transmission signal strength necessary for a signal to travel between a tower and cell phone is determined by the communications path along which these signals must

travel (taking into account, for example, whether there are natural or man-made obstructions in the communications path). (*See, e.g.,* Ex. S at Appx537-538 (William Yee, *Mobile Communications Engineering – Theory and Applications* 21–22, McGraw Hill (2d ed. 1997).) ("Terrestrial losses are greatly affected by the general topography of the terrain….In general the texture and roughness of the terrain tend to dissipate propagated energy, reducing the received signal strength at the mobile unit and also at the base station….However, even under the most optimal siting conditions, there are often hills, trees, and various man-made structure and vehicles that can adversely affect the propagation of mobile-radio signals.").[9]

The prosecution history further supports BNR's proposed construction. In an Office Action mailed on August 13, 2004, the Patent Office Examiner rejected pending Claim 19 (which corresponds to Claim 1 of the '435 Patent), based on an obviousness combination involving U.S. 6,456,856 ("Werling") and U.S. 6,498,924 ("Vogel"). In connection with the "network adjusted transmit power level as a function of a position to a communications tower" limitation in then Claim 19, the examiner stated:

> It should be noticed that Werling fails to clearly teach the feature of providing a network adjusted transmit power level as a function of a position to a communications tower. However, Vogel teaches such limitations in column 1, lines 26-37 for the purpose of reducing the overall interference level.

(*See* Ex. K at Appx322 (August 13, 2004 Office Action at 7 from the '435 Patent's prosecution history).) The portion of the Vogel reference relied upon by the examiner related to measuring distance between a mobile station and a base station, and using this information to control transmission power of the mobile station as a function of distance between it and the base station to reduce interference levels:

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9 This book by William Yee is identified and incorporated by reference into the specification. See '435 Patent, Col. 9-13. Accordingly, this reference constitutes intrinsic evidence.

> The present invention relates more particularly to apparatus for measuring the distance, or the propagation time, between a mobile station and a base station in such a system.
>
> Such knowledge of distance or of propagation time can be used for various purposes, such as the following, given by way of example:
>
> in a mobile radiocommunications system of the Time Division Multiple Access (TDMA) type, such as in particular the Global System for Mobile communications (GSM), such knowledge can be used for the purpose of determining the timing advance to be applied to information from the mobile station so as to enable said information to be received at the base station in that one of the time channels which has been allocated to said mobile station, regardless of the propagation time between said mobile station and said base station; and
>
> in a mobile radiocommunications system of the cellular type (also such as the above-mentioned GSM), such knowledge can be used for the purpose of controlling the transmission power of the mobile station as a function of the distance between it and the base station so as to reduce the overall interference level in the system, or else so as to locate the mobile station, e.g. by combining the result of such a measurement of the distance between the mobile station and a base station with the results of measurements of the distances between said mobile station and other base stations.

(*See* Ex. T at Appx549 (U.S. 6,498,924 ("Vogel") at Col 1:10–37; Ex. K at Appx322 (August 13, 2004 Office Action at 7–8 from the '435 Patent's prosecution history).)

The applicant objected to the Vogel rejection, and in a response dated November 18, 2004 argued that the Vogel reference did not disclose "a power circuit that provides a network adjusted transmit power level as a function of a position to a communications":

> **III. Rejection of Claims 19-21, 24-25 and 27 under 35 U.S.C. §103**
>
> The Examiner has rejected Claims 19-21, 24-25 and 27 under 35 U.S.C. §103(a) as being unpatentable over Werling in view of U.S. Patent No. 6, 498,924 to Vogel, *et al.*195,562. The Applicants respectfully disagree.
>
> As recognized by the Examiner, Werling does not teach or suggest a portable cell phone including a power circuit that provides a network adjusted transmit power level as a function of a position to a communications tower as recited in independent Claim 19. Thus, the Examiner cites Vogel to cure this deficiency of Werling. (*See* Examiner's Action, page 7.)
>
> Vogel provides mobile radio communications systems and an apparatus for measuring the distance or the propagation time between a mobile station and a base station in such a system. (*See* column 2, lines 15-32.) Vogel provides no teaching or suggestion, however, of a power circuit that provides a network adjusted transmit power level as a function of a position to a communications tower. Instead, Vogel is directed to improving the accuracy of determining the distance and propagation. (*See* column 2, lines 1-14.) Vogel does teach in the background that the distance and propagation measurements may be used for various purposes. Vogel provides no teaching or suggestion, however, that the purpose may be for providing a power level for transmitting.

(*See* Ex. K at Appx336 (November 18, 2004 Response to August 13, 2004 Office Action at 9 from the '435 Patent's prosecution history).) The patent examiner agreed with the applicant, withdrew the rejection regarding Claim 19, and allowed Claims 19–27, which issued as Claims 1–9. (*See* Ex. K at Appx346, 355-358 (August 8, 2005 Office Action at 7 from the '435 Patent's prosecution history, et al).)

The prosecution history, therefore, is consistent with BNR's proposed claim construction, which emphasizes that the network adjusted transmit power level is a function of "a transmit signal strength of a communications path between the communications tower and the portable cell phone," influenced by multiple factors, including natural and man-made obstacles in the communication path—rather than simply a function of distance between a cell phone and a communication tower. *See Cont'l Circuits*, 915 F.3d at 796 (Although "it often lacks the clarity of the specification and thus is less useful for claim construction purposes," "a court should

also consider the patent's prosecution history….Like the specification the prosecution history provides evidence how the [USPTO] and the inventor understood the patent.") (citations omitted).

Finally, BNR's construction completely addresses the meaning of all terms in the disputed phrase, including the meaning and scope of "position." Defendants' proposed construction, on the other hand, does little, if anything, to clarify the meaning of the disputed phrase. Defendant's construction does not define "position" other than to associate it to the cell phone, but this says nothing as to whether "position" is meant to address only distance, communication paths, or whether natural and man-made obstacles between the cell phone and tower are taken into account. Additionally, rather than elaborate on the meaning of the disputed terms, Defendants propose additional terms, such as "relative to" that are not used or defined in the specification in connection with these disputed claim terms. Accordingly, for all of the above reasons, the Court should adopt BNR's proposed construction in view of the clear intrinsic evidence and the understanding of a person of ordinary skill in the art supporting it.

IX. CONCLUSION

For the foregoing reasons, BNR respectfully requests the Court reject Defendants' constructions and adopt BNR's constructions for the disputed claim terms.

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Respectfully Submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the above and foregoing document has been served on May 24, 2019 to all counsel of record who are deemed to have consented to electronic service via the Court's CM/ECF system. Pursuant to Local Rule 5.4(c), any other counsel of record will be served by electronic mail, facsimile, or overnight delivery.

/s/ *Sadaf R Abdullah*