THE UNITED STATES DISTRICT COURT
MIDDLE DISTRICT OF FLORIDA
JACKSONVILLE DIVISION

PARKERVISION, INC., *Plaintiff,* v. QUALCOMM INCORPORATED, *Defendant.*	Case No. 3:11-cv-719-J-37-TEM
QUALCOMM INCORPORATED, *Counterclaim Plaintiff,* v. PARKERVISION, INC., and STERNE, KESSLER, GOLDSTEIN & FOX PLLC *Counterclaim Defendants.*	

QUALCOMM'S OPENING BRIEF ON CLAIM CONSTRUCTION

This case presents a large number of claim construction issues for the Court's consideration. There are two reasons for this. First, despite Qualcomm's repeated requests, ParkerVision refuses to narrow the number of Asserted Claims and maintains (wrongly) that Qualcomm infringes 82 claims of the six Patents-in-Suit ("the Patents"), which collectively span over 1500 pages. Second, throughout the Patents, ParkerVision has dressed up its claims using non-standard and obtuse language to make it appear that it invented something novel when, in fact, its claims cover old technology.

While construing the many disputed terms may seem daunting given these circumstances, careful review of the Patents yields meanings for many of the non-standard terms found in the Asserted Claims. In some instances, the meaning of a term is clearly set forth in the Patents' specifications. In other instances, the meaning of a term can be gleaned from the descriptions of the alleged inventions in the pertinent specifications or prosecution histories. Some terms, however, are wholly undefined, would not be familiar to one of ordinary skill in the art, and thereby render indefinite the claims in which they appear.

I. Background of the Alleged Inventions

The subject matter of the Patents-in-Suit is the processing of high-frequency electromagnetic signals, such as those used in wireless communications. Wireless technology has evolved over its 100 year history from relatively simple AM radio broadcasting to today's highly complex "4G" digital mobile phone networks. During this time, many thousands of patents on wireless technology have been awarded and a vast amount of research published, making this a very crowded field of technology. Despite this, many fundamental aspects of modern wireless systems still rely on concepts first implemented long ago.

At the most basic level, every wireless communications system operates in essentially the same way: by (i) encoding information into an "information signal" by varying,

or "modulating," the voltage of the signal; (ii) "up-converting" the information signal to create a modulated high-frequency signal; (iii) transmitting the modulated carrier signal through space; (iv) receiving the modulated carrier signal; (v) "down-converting" the received signal to retrieve the information signal; and (vi) "demodulating" the information signal to extract the original information. (*See* Fox Aff. ¶ 19.) Most modern wireless devices use very high-frequency carrier signals (*e.g.*, 900 MHz). (*Id.*) By contrast, information signals typically have frequencies centered around zero Hz. An information signal centered around zero Hz is also known as a "baseband signal." (*Id.*)

To extract the desired information signal from the modulated carrier signal at the receiver cell phone, the carrier signal must first be "down-converted" from the high frequency of the carrier. This down-conversion can be handled in a single stage: a process known as "direct down-conversion" or "direct conversion," whereby the baseband signal is extracted directly from the modulated carrier signal. Alternatively, the down-conversion process may be performed in two stages, by first down-converting the high frequency carrier signal to an intermediate frequency ("IF") signal, and then converting the IF signal to a baseband signal. The Patents relate generally to one or both of these methods of down-conversion.

II. Legal Standards Applicable to Claim Construction

To determine the meaning of claims, courts "look first to the intrinsic evidence of record," that is, the (i) claims; (ii) specification; and (iii) prosecution history of the patent. *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) (citation omitted). Such intrinsic evidence is "the most significant source of the legally operative meaning of disputed claim language." *Id.* Claim terms should be construed according to their "ordinary and customary meaning," from the perspective of a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en

banc). However, a patentee may choose "to be his own lexicographer" by giving certain terms unique or uncommon meanings. *See Lear Siegler, Inc. v. Aeroquip Corp.*, 733 F.2d 881, 888 (Fed. Cir. 1984). Where the proper construction of a claim is not clear after consideration of intrinsic evidence, the court may refer to "extrinsic evidence," such as expert testimony, inventor testimony, learned treatises and other sources. *Phillips*, 415 F.3d at 1317-18.

III. Construction of Disputed Claim Limitations

The Patents are directed to the down-conversion of a high frequency "carrier signal"[1] to either a "lower frequency signal" (a disputed term) or a "baseband signal," *i.e.*, an information signal with a center frequency of 0 Hz. (*See*, *e.g.*, '551 Patent at 1:23-30; Dkt 110-1.) In particular, they describe methods and systems for down-converting a carrier signal according to one of the following methods: (i) down-converting the carrier signal by "under-sampling" it at an "aliasing rate,"[2] and (ii) down-converting the carrier signal by "transferring . . . energy" from the carrier signal at an "aliasing rate." The distinctions between these two methods of down-conversion— under-sampling and transferring energy— are critical to understanding the scope of the Asserted Claims and lie at the center of many of the parties' claim construction disputes.

A. "Sampling"

Term(s)	Claims	Qualcomm	ParkerVision
"sampling"	**'518**: 1, 2, 3, 12, 17, 24, 27, 82	"reducing a continuous signal to a discrete signal"	"capturing energy of a signal at discrete times"

The concept of "**sampling**" is well known in the art of signal processing, and would be understood by a person of ordinary skill in the art to mean "**reducing a continuous**

[1] The parties agree that a "carrier signal" should be construed to mean "an electromagnetic wave that is capable of carrying information via modulation." (Dkt. 110-1.)

[2] The parties agree that "aliasing rate" should be construed to mean a "sampling rate that is less than or equal to twice the frequency of the carrier signal." (Dkt. 110-1.)

signal to a discrete signal." (*See, e.g.,* Lasher Decl. Ex. 1 [IEEE Standard Dictionary of Electrical and Electronics Terms (1988)] at 2 (a "sampling circuit" is "[a] circuit whose output is a series of discrete values representative of the values of the input at a series of points in time"); Lasher Decl. Ex. 2 [Alan V. Oppenheim, *et al.*, *Signals & Systems*, 514-15 (1997)] at 2-3 ("sampling [is used] to convert a continuous-time signal to a discrete-time signal").) Indeed, Qualcomm's construction is *identical to that proposed by ParkerVision* in its March 2, 2012 Infringement Contentions, in which ParkerVision contended: "In signal processing, sampling is the reduction of a continuous signal to a discrete signal." (Lasher Decl. Ex. 3 [ParkerVision Infringement Contentions Ex. A.1 at 12].) Nothing in the Patents warrants ParkerVision's departure from the commonly accepted definition of "sampling" that it previously endorsed, or its attempt to insert into "sampling" the concept of "capturing energy."

B. "Under-Samples" and "Sub-Sampling"

Term(s)	Claims	Qualcomm	ParkerVision
"under-samples"	**'734**: 5, 13	"samples at an aliasing rate using negligible apertures"	"sampling at an aliasing rate"
"sub-sampling"	**'518**: 77, 81, 90, 91	"sampling/sample at a sub-harmonic rate"	"sampling at an aliasing rate"
"sub-sample"	**'371:** 1, 2, 22, 23, 25, 31		

1. "Under-Samples"

While the concept of under-sampling is discussed throughout all the Patents, the term "under-samples" appears in only a handful of Asserted Claims of the '734 Patent. The parties agree that under-sampling requires "sampling at an aliasing rate" (*see* Dkt. 110-2 at 7), but disagree over whether, as Qualcomm proposes, under-sampling requires the use of an aliasing signal having *negligible apertures*.

The Patents distinguish between (i) down-conversion by "under-sampling" the carrier signal and (ii) down-conversion by "transferring energy" from the carrier signal. (*See* '551 Patent 63:1-68:45, Fig. 45A (Venn diagram showing "transferring energy" and "under-

sampling" as distinct approaches to down-conversion); '734 Patent 15:29-53.) One critical distinction between these methods of down-conversion is the width (*i.e.*, time duration) of the apertures used to sample the input signal. (*See, e.g.*, '551 Patent 63:5-7, 66:36-40.) The '551 Patent, which the other patents incorporate by reference, makes clear that when the under-sampling method of down-conversion is employed, the input signal is sampled using *negligible apertures*:

> Section II above disclosed methods and system for down-converting an EM signal by under-sampling. The under-sampling systems utilize a sample and hold system controlled by an under-sampling signal. *The under-sampling signal includes a train of pulses having negligible apertures that tend towards zero time in duration.*

('551 Patent 63:1-7 (emphasis added); *see also id.* 28:2-5, 31:15-21; Fox Aff. ¶ 29.) The patent also notes that the use of "negligible aperture pulses" in an under-sampling system "minimizes the amount of energy transferred from the [received] signal." ('551 Patent 63:7-10.) By contrast, when a signal is down-converted by transferring energy, the received signal is sampled using an energy transfer signal that "includes a train of pulses having *non*-negligible apertures that tend away from zero." ('551 Patent 66:36-39 (emphasis added); *see also* '551 Patent 67:51-54, 92:12-65; Fox Aff. ¶ 29.) Use of non-negligible apertures permits transfer of "non-negligible amounts of energy" from the carrier signal. (Fox Aff. ¶ 29.) Only Qualcomm's construction gives effect to the clear distinction drawn in the patent between down-conversion via under-sampling and down-conversion by transferring energy.

2. "Sub-Sample" and "Sub-Sampling"

The terms "sub-sample" and "sub-sampling" do not appear anywhere in the Patents other than the claims of the '518 and '371 Patents. A person of ordinary skill in the art would understand from the disclosures of the Patents that "sub-sample" means "sample at a sub-harmonic rate." (Fox. Aff. ¶¶ 31-32.) This definition is apparent from the many disclosures

in the '518 Patent of sampling using an aliasing rate that is a sub-harmonic of the frequency of the carrier signal. (*See* '518 Patent 92:3-13 ("Generally, when down-converting an FM carrier signal . . . the aliasing rate is substantially equal to a harmonic or, more typically, a sub-harmonic of a frequency within the FM signal.").) Accordingly, a person of ordinary skill in the art would understand the terms "**sub-sample**" and "**sub-sampling**" to mean "**sampling/sample at a sub-harmonic rate**."

C. Transferring Energy

Term(s)	Claims	Qualcomm	ParkerVision
"transferring non-negligible amounts of energy from the carrier signal"	**'551:** 1, 2, 3, 8, 9, 12, 16, 20, 39, 41, 50, 54, 55, 57, 92, 93, 108, 113, 126	"moving sufficient energy from the carrier signal into storage to cause substantial distortion of the carrier signal"	"transferring energy (i.e., voltage and current over time) in amounts that are distinguishable from noise"
"sampling the carrier signal . . . to transfer energy"	**'518:** 1, 2, 3, 12, 17, 24, 27		
"transferring a portion of the energy . . . of the carrier signal"	**'551:** 41, 50 **'845:** 5, 6		
"receives non-negligible amounts of energy transferred from a carrier signal"	**'551:** 23, 24, 25, 26, 31, 32, 135, 149, 150, 161, 192, 193, 195, 196, 198, 202, 203	"stores sufficient energy transferred from the carrier signal to cause substantial distortion of the carrier signal"	"receives energy (i.e., voltage and current over time) from the carrier signal in amounts that are distinguishable from noise"
"sub-sampling the first signal . . . to transfer energy"	**'518:** 77, 81, 82, 90, 91	"moving sufficient energy from the carrier signal into storage to cause substantial distortion of the carrier signal"	"transferring energy (i.e., voltage and current over time) in amounts that are distinguishable from noise"

Throughout the prosecution history of the Patents, as well as in public white-papers concerning the claimed technology, ParkerVision has distinguished its alleged inventions from prior art sampling technology by emphasizing the alleged novelty of the claimed method of down-conversion by "transferring . . . energy." (*See* Lasher Decl. Ex. 5 [Prosecution of '493 Patent, February 4, 2002 Amendment] at 2; Lasher Decl. Ex. 6 [PV White Paper].) Understanding this distinction is critical for properly construing claim terms involving "transferring . . . energy."

The two down-conversion methods described in the Patents, under-sampling and transferring energy, differ at least in (i) the aperture widths used to sample the received signal, *see supra* III.B.1; and (ii) the extent to which the received carrier signal is distorted or destroyed. Specifically, the Patents make clear that, when a signal is down-converted using under-sampling, the received signal is sampled using "a train of pulses having negligible apertures," which "minimize[s] the amount of energy transferred from the [received] signal" and thus "*protects the under-sampled EM signal from distortion or destruction*." ('551 Patent 63: 5-10 (emphasis added); *see also id.* at 14-17 ("The [under-sampling] methods and systems disclosed in Section II are thus useful for . . . monitoring EM signals without distorting or destroying them.").) By contrast, the Patents teach that when a signal is down-converted by transferring energy, "the input signal is *negatively impacted*"—*i.e.*, distorted—"during each energy transferring aperture, *preventing accurate voltage reproduction* of the input signal during the apertures." (*See* Lasher Decl. Ex. 5 at 2 (emphasis added); '551 Patent 67: 55-67.)

The requirement that an "energy transfer" method of down-conversion distort the input signal is exemplified in Figures 82 and 83 and the '551 Patent and the discussion of these figures in the specification:

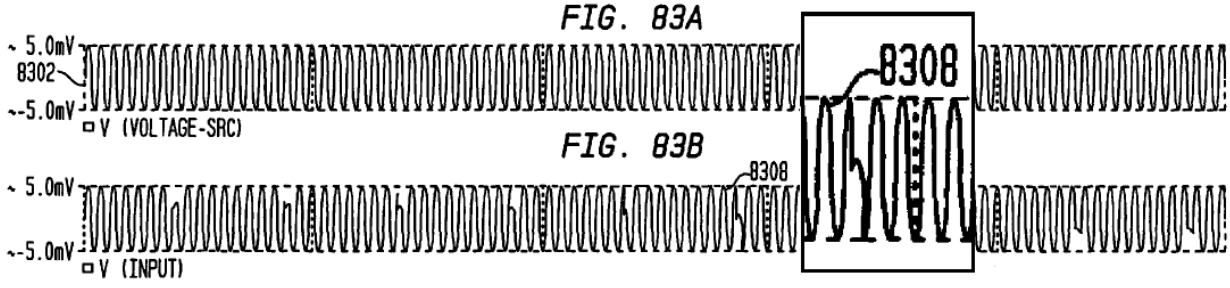

FIG. 83B illustrates the effects to the input EM signal 8302 . . . *The non-negligible distortions 8308 represent non-negligible amounts of transferred energy, in the form of charge that is transferred to the storage capacitance 8208 in FIG. 82.*

('551 Patent 67: 55-67; *see also id.* Figs. 82, 83 (shown above with detail inset); '371 Patent 5:18-29; '845 Patent 72:51-65.) A person of ordinary skill in the art would understand from this disclosure that the term "transferring non-negligible amounts of energy" involves moving energy from the carrier signal into storage sufficient to cause substantial (*i.e.,* non-negligible) distortion of the carrier signal. (*See* '551 Patent Fig. 83(B) (reproduced above with detail showing non-negligible distortions "8308"); Fox Aff. ¶ 35.) A person of ordinary skill would also understand that these "non-negligible distortions" are a result of the transfer of energy from the carrier signal to a storage module. (*See* Fox Aff. ¶ 36.)

During the prosecution of related and foreign counterparts to the Patents, ParkerVision re-affirmed that distortion of the input signal is an integral part of transferring energy. For example, during the prosecution of the '493 Patent, which is a continuation of the application for the '551 Patent, the applicants distinguished the claimed methods of down-conversion by transferring energy from conventional sampling techniques:

> One effect of transferring energy from an input signal in accordance with the claimed invention is that *the input signal is negatively impacted during each energy transferring aperture, substantially preventing accurate voltage reproduction of the input signal during the apertures*. This difference between conventional sampling of the prior art and energy transfer of the claimed invention is noted throughout the specification.

(Lasher Decl. Ex. 5 (emphasis added).) Similarly, during the prosecution of a European counterpart to the '551 Patent, the applicants stated:

> One effect of transferring energy from an input signal in accordance of the claimed invention is that *the input signal is significantly affected* during each energy-transferring aperture, substantial*ly preventing accurate voltage reproduction* of the input signal during the apertures. This difference between conventional sampling and energy transfer of the present invention is noted throughout the specification.

(Lasher Decl. Ex. 7 [EP359 File History, Mar. 4, 2002 Amendment] at 2.) One of ordinary skill in the art would understand these statements to mean that "transferring energy" results in the destruction, or at least substantial distortion, of the input signal. (Fox Aff. ¶¶ 38-40.)

ParkerVision also emphasized the importance of distortion to its alleged inventions in a published "white paper" concerning its Direct-to-Data ("D2D") technology, the same technology identified in the '551 Patent as performing down-conversion by transferring energy. (*See* '551 Patent 22:52-57.) In this white paper, ParkerVision stated:

> It has been a fundamental belief since the advent of radio communications that whatever technique is employed to extract the data from a wireless radio carrier should not distort the integrity of the radio carrier in this process . . . . D2D technology contravenes this long-standing tradition by making a clean break with this philosophical belief, and in fact, the *D2D technology not only distorts the radio carrier waveform in the process of extracting the data, it actually destroys (crushes) the carrier waveform, favoring instead to use the carrier's own energy to create the bits of data.*

(Lasher Decl. Ex. 6 at 1 (emphasis added); *see also* Fox Aff. ¶ 39.) A person of ordinary skill in the art would understand this statement to mean that a fundamental aspect of the method by which ParkerVision's D2D technology down-converts a carrier signal —*i.e.*, by transferring energy—is that it "destroys," "crushes," or, in the language of the specification, "distorts" the carrier signal. (Fox Aff. ¶ 40.)

Accordingly, in light of the foregoing intrinsic and extrinsic evidence, a person of ordinary skill in the art would understand "**transferring non-negligible amounts of energy**" to mean "**moving sufficient energy from the carrier signal into storage to cause substantial distortion of the carrier signal**." Based on this definition, the remaining terms in the table above should also be construed as Qualcomm has proposed.

D. "Lower Frequency Signal"

Term(s)	Claims	Qualcomm	ParkerVision
"lower	**'551:** 1, 2, 3, 8, 9, 12, 16, 20, 39, 41,	"a signal with frequency	"a signal with frequency

frequency signal"	50, 54, 55, 57, 92, 93, 108, 113, 126 **'371:** 1, 2, 22, 23, 25, 31	below the carrier signal frequency and above the baseband frequency"	below the carrier signal frequency"

Many of the claims of the '551 and '371 Patents are directed to down-converting an RF signal to a "lower frequency signal." The parties disagree about whether the term should be construed, as ParkerVision contends, to encompass any signal having a frequency lower than that of the carrier signal or whether it should be construed, as Qualcomm has proposed, to exclude baseband frequency.

The '551 Patent makes clear that the term "lower frequency signal" should be construed as Qualcomm has proposed. The patents distinguish between down-conversion directly to baseband and down-conversion first to an intermediate frequency:

> When the modulated carrier signal F_{MC} is received, it can be demodulated to extract the modulating baseband signal F_{MB}. Because of the typically high frequency of modulated carrier signal F_{MC}, however, it is generally impractical to demodulate the baseband signal F_{MB} directly from the modulated carrier signal F_{MC}. Instead, the modulated carrier signal F_{MC} must be down-converted to a lower frequency signal that contains the original modulating baseband signal. *When a modulated carrier signal is down-converted to a lower frequency signal, the lower frequency signal is referred to herein as an intermediate frequency (IF) signal* F_{IP}.

('551 Patent 19:7-20 (emphasis added).) Here, ParkerVision acted as its own lexicographer, defining "lower frequency signal" as "an intermediate frequency (IF) signal." *See Linear Tech. Corp. v. I.T.C.*, 566 F.3d 1049, 1054 (Fed. Cir. 2009) (patentee acted as its own lexicographer by noting in the specification that a disputed term, "as used herein," had a particular meaning).

One of ordinary skill in the art understands that the term "an intermediate frequency (IF) signal" means a signal with a frequency below that of the carrier signal but above the baseband signal. (*See* Fox Aff. ¶ 21.) To understand "intermediate frequency" signal as including signals at the lowest, baseband frequency, would run contrary to the understanding

of one of ordinary skill: it is precisely because an intermediate (*i.e.*, "lower") frequency signal is higher than a baseband signal that it is referred to as having an "intermediate frequency."

This understanding is further confirmed by the '551 Patent, which states:

> *An IF signal frequency can be any frequency above zero HZ.* Unless otherwise stated, the terms lower frequency, intermediate frequency, intermediate and IF are used interchangeably herein.

('551 Patent 14:45-48 (emphasis added).) Thus, according to the '551 Patent, which is incorporated by reference into the '371 Patent, the term "lower frequency signal" necessarily excludes signals at 0 Hz—*i.e.,* baseband frequency.[3]

Accordingly, the term "**lower frequency signal**" should be construed to mean "**a signal with frequency below the carrier signal frequency and above the baseband frequency**."

E. Terms Related to Generation of a Lower Frequency Signal or a Baseband Signal

Term(s)	Claims	Qualcomm	ParkerVision
"generating a lower frequency signal from the transferred energy"	**'551:** 1, 2, 3, 8, 9, 12, 16, 20, 39, 41, 50, 54, 55, 57, 92, 93, 108, 113, 126	"creating a lower frequency signal from the previously transferred energy"	[no construction necessary]
"lower frequency signal is generated from the transferred energy"	**'551:** 23, 24, 25, 26, 31, 32, 135, 149, 150, 161, 192, 193, 195, 196, 198, 202, 203		
"generating the lower frequency signal from the integrated energy"	**'551:** 50	Terms are indefinite.[4] If construction is necessary, they should be construed as "creating a lower frequency signal from the	
"generates a lower	**'551:** 202		

[3] Additionally, ParkerVision is estopped by the doctrine of prosecution history disclaimer from reclaiming that direct conversion to baseband is included of the scope of the meaning of the term "lower frequency signal." ParkerVision included in its March 2, 1999 Second Preliminary Amendment a claim to "[a] method for directly down-converting a modulated carrier signal to a demodulated baseband signal . . . ." (Lasher Decl. Ex. 4 [Prosecution History of the '551 Patent] at 1.) The examiner rejected that claim ("Pending Claim 8") as anticipated by prior art disclosing down-conversion of a modulated carrier signal directly to baseband. (Lasher Decl. Ex. 4 at 2-3.) In response to that rejection, ParkerVision amended the claim as follows: "[a] method for ~~directly~~ down-converting a ~~modulated~~ carrier signal to a ~~demodulated baseband~~ lower frequency signal . . . ." (Lasher Decl. Ex. 4 at 5.) Thus, in amending Pending Claim 8 to avoid the prior art, ParkerVision unequivocally disclaimed direct down-conversion. ParkerVision may not now recapture that surrendered claim scope through its construction of "lower frequency signal." *See Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452-53 (Fed. Cir. 1985) (holding patentee not entitled to assert claim interpretation disclaimed during prosecution).

[4] *See* Section III.G below (claim terms incorporating the concept of "integrated energy" are indefinite).

frequency signal from the integrated energy"		previously integrated energy"	
"generating the baseband signal from the integrated energy"	**'518:** 1, 82	Term is indefinite. If construction is necessary, it should be construed as "creating a baseband signal from the previously integrated energy"	
"generating the second signal from the integrated energy"	**'518:** 77	Term is indefinite. If construction is necessary, it should be construed as "creating a second signal from the previously integrated energy"	

Several of the Asserted Claims include terms involving the *generation* of a lower frequency signal or a baseband signal *from* transferred or integrated energy. (Fox Aff. ¶¶ 42-44.) The plain language of these claims contemplates a specific order of operations: first, energy must be transferred or integrated, and second, a signal must be generated from that energy. Thus, one of ordinary skill in the art would understand these terms to require that the lower frequency signal or baseband signal be generated from energy that has *already been transferred or integrated*. Accordingly, the "**generating [a signal] from [energy]**" terms should be construed as proposed by Qualcomm in the table above, namely that the target signal is created from "**the previously [transferred/integrated] energy.**"

F. "Harmonic or Subharmonic of the Carrier Signal" Terms

Term(s)	Claims	Qualcomm	ParkerVision
"n represents a harmonic or subharmonic of the carrier signal"	**'551:** 1, 2, 3, 8, 9, 12, 16, 20, 23, 24, 25, 26, 31, 32, 39, 41, 50, 54, 55, 57, 92, 93, 108, 113, 126, 135, 149, 150, 161, 192, 193, 195, 196, 198, 202, 203	"n is 0.5 or an integer greater than 1"	"n is 0.5 or an integer greater than or equal to 1"
"n indicates a harmonic or subharmonic of the carrier signal"	**'518:** 1, 2, 3, 12, 17, 24, 27, 82		

Certain claims of the '551 and '518 Patents are directed to down-converting a carrier signal by "transferring non-negligible amounts of energy from the carrier signal, at an aliasing rate" that is determined according to the following equation:

$$F_{AR} = \frac{F_c \pm F_{IF}}{n}$$

'551 Patent 70:47-50. In this equation, "F_{AR}" is the frequency of the aliasing rates, "F_c" is the frequency of the carrier signal, "F_{IF}" is the frequency of the signal to which the carrier is down-converted, and "n" is a variable that represents/indicates "a harmonic or subharmonic of the carrier signal."

The following passage, which appears in both the '551 and '518 Patents, provides insight in to the meaning of the terms "harmonic" and "sub-harmonic" in relation to "n":

> [I]nstead of starting from a desired aliasing rate, a list of suitable aliasing rates can be determined from the modified form of EQ. (5), by solving for various values of n. Example solutions are listed below: . . .
>
> Solving for n=0.5, 1, 2, 3, 4, 5 and 6:
> 900 MHZ/0.5=1.8 GHZ (i.e., *second harmonic*);
> 900 MHZ/l=900 MHZ (i.e., *fundamental frequency*);
> 900 MHZ/2=450 MHZ (i.e., *second sub-harmonic*);
> 900 MHZ/3=300 MHZ (i.e., *third sub-harmonic*);
> 900 MHZ/4=225 MHZ (i.e., *fourth sub-harmonic*);
> 900 MHZ/5=180 MHZ (i.e., *fifth sub-harmonic*); and
> 900 MHZ/6=150 MHZ (i.e., *sixth sub-harmonic*).

('551 Patent 71:49-65 (emphasis added); *see also* '518 Patent 70:66-71:22.) Various aliasing rate frequencies are determined for a 901 MHz carrier signal that is to be down-converted to an intermediate frequency of 1 Hz, using values for "n" of 0.5, 1, 2, 3, 4, 5, 6. (*See* '518 Patent 70:66-71:22.) When "n" equals 0.5, the corresponding aliasing rate is the "second harmonic" of the carrier signal and when "n" is an integer greater than 1, the corresponding aliasing rate is the nth sub-harmonic of the carrier signal. However, when "n" equals "1," the corresponding aliasing rate is the "fundamental frequency" rather than a harmonic or sub-harmonic. Based on this disclosure, a person of ordinary skill in the art would understand the disputed claim terms "n [represents/indicates] a harmonic or subharmonic of the carrier signal" to exclude the case where "n" equals 1.

Accordingly, the term "**n [represents/indicates] a harmonic or subharmonic of the carrier signal**" should be construed to mean "**n is 0.5 or an integer greater than 1**."

G. Energy Integration Terms

Term(s)	Claims	Qualcomm	ParkerVision
"integrating the . . . energy"	**'551:** 50, 108, 113 **'518:** 1, 2, 3, 12, 17, 24, 27, 77, 81, 82, 90, 91	Term is indefinite. If construction is necessary, it should be construed as "storing in a storage module the energy transferred during an aperture period"	"accumulating the energy"
"energy is . . . integrated"	**'371:** 1, 2, 22, 23, 25, 31	Term is indefinite. If construction is necessary, it should be construed as "the energy transferred during an aperture period is stored in a storage module"	"energy is accumulated"
"integrates the . . . energy"	**'551:** 161, 198, 202, 203	Term is indefinite. If construction is necessary, it should be construed as "stores in a storage module the energy transferred during an aperture period"	"accumulates the energy"
"integrates . . . energy"	**'551:** 198, 203	Term is indefinite. If construction is necessary, it should be construed as "stores in a storage module the energy transferred during an aperture period"	"accumulates energy"
"the integrated energy"	**'551:** 198, 202, 203	Term is indefinite. If construction is necessary, it should be construed as "the transferred energy stored in a storage module during an aperture period"	"the accumulated energy"

Several of the Asserted Claims include the limitation "integrating . . . energy," or some variation thereof. The specifications of the Patents provide very little guidance as to the meanings of those terms. (*See* Fox Aff. ¶ 45.) Indeed, the '518 Patent refers to "integrating . . . energy" only in the title of the patent and in the claims themselves; the specification contains only a brief description of an "integrator." (*See, e.g.,* '518 Patent 112:23-32.)

The concept of "integrating energy" is not well known in the art; to the contrary, a person of ordinary skill in the art would find the associated terms "nonsensical." (*See* Fox Aff. ¶ 45.) In the art of signal processing, to "integrate" something means to sum that quantity over time. (*Id.* ¶ 46.) A person of ordinary skill in the art would be familiar with integrating quantities such as voltage and current over time. (*Id.*) However, integrating energy over time has no well-understood physical meaning and a person of ordinary skill in the art would not understand what it means to "integrate" energy over time. (*Id.*) Thus, a person of ordinary skill

in the art would not understand the meaning of the "integrating energy" terms.[5] In light of the foregoing, in the absence of any meaningful explanation in the specifications of what it means to integrate energy, a person of ordinary skill in the art would find claims incorporating such language to be insolubly ambiguous, and they are, therefore, invalid as indefinite.

Although Qualcomm proposes that the "integrating energy" terms are indefinite, if the Court believes they should be construed, Qualcomm has offered alternative constructions based on the following disclosure in the '518 Patent of an "RF Switch/Integrator" and the waveform resulting from that structure at Fig. 102:

> The RF Switch/Integrator 10106 samples the RF signal 10206 shown in FIG. 102C when the Waveform Generator output 10204 is below a predetermined value. When the Waveform Generator output 10204 is above a predetermined value, the RF Switch 10106 becomes a high impedance node and *allows the Integrator to hold the last RF signal sample 10206 until the next cycle of the Waveform Generator 10108 output*. The Integrator section of 10106 is designed to charge the Integrator quickly (fast attack) and discharge the Integrator at a controlled rate (slow decay).

('518 Patent 112:23-32, Fig. 101.) According to this disclosure, when the RF switch is closed—*i.e.*, during an aperture period—a portion of the RF carrier signal energy is moved to the integrator; when the switch is open, the integrator stores "the last RF signal sample," thus acting as a storage module. (*See* Fox Aff. ¶ 48.) Thus, if the Court were to determine that the "integrating energy" terms are not invalid as indefinite, they should be construed according to the alternative constructions proposed by Qualcomm in the table above.

[5] Notably, the patent examiner considering the PCT counterpart to the '551 Patent concluded the same thing: "'Integrating' has a clear mathematical meaning, and circuits for integrating voltage or current are known. But 'energy' is already a function of time and therefore 'integrating energy' is incomprehensible because it has not been sufficiently defined, because no circuits capable of integrating an energy rather than a voltage or current are known. " (*See* Lasher Decl. Ex. 8 [PCT/US 99/24299 February 22, 2001] at 25.)

H. "Finite Time Integrating Module" Terms

Term(s)	Claims	Qualcomm	ParkerVision
"finite time integrating module"	**'845:** 1, 3, 4, 5, 6, 7, 8, 9, 12, 13, 17, 18, 19, 20, 22, 23, 24	"a module with a switch, a pulse generator, and a storage module that stores the energy transferred during an aperture period"	"circuitry that can perform a finite time integrating operation"
"finite time integrating operation"	**'845:** 1, 3, 4, 5, 6, 7, 8, 9, 12	"an operation that distorts the carrier signal and stores the energy transferred during an aperture period"	"convolving a portion of the carrier signal with an approximate representation of itself"

Claim 1 of the '845 Patent requires the use of a "finite time integrating module" to perform a "finite time integrating operation." The patents do not define these terms and they are not terms of art. However, meanings for these two terms can be extracted from Figure 151 of the '845 Patent, which is described as depicting a "finite time integrating processor" (*see* '845 Patent 10:32-34, 131:26-42) and the related teaching that "[a] finite time integrator . . . can be implemented with, for example, a switching device controlled by a train of pulses having apertures substantially equal to the time interval defined for the waveform." (*See id.* at Fig. 151; 130:41-46.) Additionally, the specification teaches that a "finite time integration system" includes an "integrator" (*see* '845 Patent at 131:26-42), which acts as a storage module. (*See* Fox Aff. ¶ 48.) In light of this intrinsic evidence, a person of ordinary skill in the art would understand a "**finite time integrating module**" to be "**a module with a switch, a pulse generator, and a storage module that stores the energy transferred during an aperture period**."

The '845 Patent teaches that the operation of a "finite time integrating module" involves the transfer of energy from a carrier signal into storage. (*See* '845 Patent 130:30-51 ("The energy transfer and SNR of a finite time integrator . . . is nearly that of a gated matched filter/correlator.").) Thus, for reasons discussed in section III.C (construing "transferring energy" terms), the operation of a "finite time integrating module" results in distortion of the

carrier signal during each aperture period. Accordingly, in light of the foregoing intrinsic evidence, a person of ordinary skill in the art would understand "**finite time integrating operation**" to mean "**an operation that distorts the carrier signal and stores the energy transferred during an aperture period**."

I. "Accumulating the Result"

Term(s)	Claims	Qualcomm	ParkerVision
"accumulating the result"	**'845:** 1, 3, 4, 5, 6, 7, 8, 9, 12	"storing in a storage module the energy transferred over multiple aperture periods"	[no construction necessary]

> Claim 1 of the '845 Patent requires:
>
> (1) performing with a finite time integrating module a finite time integrating operation on a portion of a carrier signal;
> (2) accumulating the result of the finite time integrating operation of step (1); and
> (3) repeating steps (1) and (2) for additional portions of the carrier signal, whereby the accumulation results form a down-converted signal.

From this language it is readily apparent that the term "accumulating" has a different meaning in the '845 Patent than "integrating" because both terms are used in the same claim. *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.,* 381 F. 3d 1111, 1119 (Fed. Cir. 2004) ("when an applicant uses different terms in a claim it is permissible to infer that he intended his choice of different terms to reflect a differentiation in the meaning of those terms").

Indeed, the '845 Patent explicitly discusses the difference between these terms: "The process *integrates across an acquisition aperture* then stores that value"—using a capacitor—"or a significant portion thereof, *to be accumulated with the next aperture*." ('845 Patent 152:45-48 (emphasis added), 145:44-47 ("The charge *accumulates over several apertures*") (emphasis added).) From this disclosure, and from the plain language of claim 1, it is apparent that a "finite time integrating operation" is performed during a single aperture period ("integrates across *an*

acquisition aperture"), after which the result is "accumulated," and the process is repeated, whereby another "finite time integrating operation" is performed, and the result of that integrating operation is "accumulated" with the result(s) of the preceding integrating operation(s). (Fox Aff. ¶ 52.)

In light of the foregoing, and because ParkerVision's proposed constructions improperly conflate the term "integrating" with "accumulating," the term "**accumulating the result**" should be construed to mean, as Qualcomm proposes, "**storing in a storage module the energy transferred over multiple aperture periods**."

J. Impedance Matching Terms

Term(s)	Claims	Qualcomm	ParkerVision
"impedance matching"	**'518:** 77, 81, 90, 91	"maximizing power transfer throughout a signal path"	"transferring desired power"
"output impedance match circuit"	**'551:** 25 **'371:** 25	"a circuit configured to maximize power transfer throughout the output path"	"a circuit configured to transfer desired power from the energy sampling circuitry"
"substantially impedance matched input path"	**'551:** 12 **'518:** 12	"a circuit configured to maximize power transfer throughout the input path"	"circuitry configured to transfer desired power to the input path of the energy sampling circuitry"
"input impedance match circuit"	**'551:** 24 **'371:** 23		"circuitry configured to transfer desired power to the input of the energy sampling circuitry"
"first impedance match coupled to said . . . input terminal"	**'734:** 4		"first circuitry configured to transfer desired power to said input terminal"
"second impedance match coupled to said . . . input terminal"	**'734:** 4		"second circuitry configured to transfer desired power to said input terminal"

The concept of "impedance matching" is well known to persons of ordinary skill in the art. (*See* Fox. Aff. ¶ 53.) "Impedance" is a measure of opposition to the flow of an electric current in a circuit or a component thereof. (*Id.*) Each component within a circuit has its own impedance and whenever an electronic signal passes between two components in a circuit, any impedance mismatch between adjacent components may result in degradation of the signal via

signal reflection or attenuation. (*Id.*) The most significant consequence of impedance mismatch, however, is power loss. (*Id.*) A variety of methods—generally referred to as "impedance matching"—have been developed to avoid the potentially deleterious effects of impedance mismatch, and thus to maximize power transfer. (*Id.*) For example, U.S. Patent No. 5,903,827 ("Kennan *et al.*"), which was cited by the Examiner during the prosecution of the '551 Patent, notes that "*impedance matching circuits ensure that maximum power is transferred from the output of* [one component] *to the input* [of another]." (*See* Lasher Decl. Ex. 9 [Kennan *et al.*] 5:39-42 (emphasis added); *see also* Fox Aff. ¶ 53.) Thus, one of ordinary skill in the art would understand "**impedance matching**" to mean "**maximizing power transfer throughout a signal path**."[6]

K. Differential Down Conversion Terms

Term(s)	Claims	Qualcomm	ParkerVision
"differential down-converted output signal"	**'734:** 1, 4, 5, 6, 9, 12, 13, 14, 15	"a signal that is the down-converted replica of the differential input- signal"	[no construction necessary, alternatively:] "the output signal from the differential frequency down-conversion module"
"differential frequency down-conversion module"	**'734:** 1, 4, 5, 6, 9, 12, 13, 14 15	"a circuit that down-converts a differential input signal and outputs a differential down-converted replica of the input signal"	"circuitry for frequency down-converting a carrier signal by differentially combining positive and negative transferred energy samples"
"differentially down-converting"	**'734:** 12, 13, 14, 15	"down-converting a differential input signal and outputting a differential down-converted replica of the input signal"	"converting a carrier signal by differentially combining positive and negative transferred energy samples"

Several claims within the '734 Patent refer to "differential . . . signals," which one of ordinary skill in the art would understand to refer to a pair of signals, one of which is the inverted version of the other. (*See* Fox Aff. ¶ 65.) The components of a differential signal are

[6] This definition is consistent with the teaching of the Patents-in-Suit. (*See* Fox Aff. ¶ 64.) For example, the '551 Patent notes that "[a]t higher frequencies, impedance mismatches between the various stages further reduce the strength of [electromagnetic signals] . . . . *In order to optimize power transferred through the receiver system 1102, each component should be impedance matched with adjacent components*." ('551 Patent 25:23-27; *see also* '551 Patent 66:34-48.)

commonly designated as a "positive or [(+)] signal" and a "negative or [(-)] signal." (*Id.*) Indeed, these are precisely how such signal pairs are designated in the '734 Patent:

> In a preferred embodiment, differential UFD module 9508 comprises a first UFT module 9522, a second UFT module 9524, and a storage module 9534 . . . *First and second UFT modules 9522 and 9524 downconvert differential RF input signal 9528* according to a control signal 9532, which is output by control signal generator 9510, in a manner as described elsewhere herein. *The outputs of first and second UFT modules 9522 and 9524 are stored in storage module 9534, and output as differential output signal 9530.* First UFT module 9522 outputs a 'plus' output of differential output signal 9530. Second UFT module 9524 outputs a 'minus' output of differential output signal 9530. Differential output signal 9530 is equal to the difference voltage between these 'plus' and 'minus' outputs.

('734 Patent 59:30-58 (emphasis added); *see also* '734 Patent Figs. 95, 113.) This disclosure informs one of ordinary skill in the art that a differential frequency down conversion module (9508) is comprised of two components—UFT modules 9522 and 9524—that separately down-convert the positive and negative components of the differential input signal, resulting in a differential output signal (9530) that is the down-converted version, or replica, of the differential input signal. (Fox Aff. ¶ 67.) In other words, the differential output signal contains all of the information from the differential input signal, *i.e.*, it is a replica of the input signal.

Accordingly, one of ordinary skill in the art would understand "**differential down-converted output signal**" to mean "**a signal that is the down-converted replica of the differential input signal**." (*Id.* ¶ 68.) From this basic definition, a person of ordinary skill in the art would also understand the terms "differential frequency down-conversion module" and "differentially down-converting" to have the meanings proposed by Qualcomm in the table above. (*See id.*)

L. <u>"Controlling a Charging and Discharging Cycle of the First and Second Capacitors with First and Second Switching Devices, Respectively"</u>

Term(s)	Claims	Qualcomm	ParkerVision
"controlling a charging and discharging cycle of	**'342:** 18, 19, 20, 21, 22, 23	"using the switching devices to control separately the time	[no construction necessary, alternatively:] "using a first

the first and second capacitors with first and second switching devices . . . respectively"		during which the charging of the capacitors occurs and the time during which the discharging of the capacitors occurs"	switch device to control the charging and discharging of a first capacitor and a second switch device to control the charging and discharging of a second capacitor"

Claim 18 of the '342 Patent and its dependent claims relate to a method of down-converting an electromagnetic signal that includes the following step: "controlling a charging and discharging cycle of the first and second capacitors with first and second switching devices . . . respectively." While the parties' proposed constructions appear similar, the dispute focuses on whether, as Qualcomm contends, the claimed switching devices must control *separately* both charging and discharging cycles of the respective capacitors. In other words, Qualcomm contends that switching devices must in one position (*e.g.,* open) control one cycle (charging or discharging) and in another position (*e.g.*, closed) control the other cycle.

The following passage from the '342 Patent confirms that the term should be construed as Qualcomm has proposed:

> In FIG. 160, *switching device 1608 is used to control the charging and discharging of capacitor 1604*. As described above, when switching device 1608 is closed, the RF signal coupled to capacitor 1604 causes a charge to be stored on capacitor 1604. This charging cycle is control[led] by the apertures of control signal 1646, as described herein. *During a period of time that switching device 1608 is open* (i.e., between the apertures of control signal 1646), a percentage of the total charge stored on capacitor 1604 is discharged. As described herein, capacitor 1604 is sized in accordance with embodiments of the invention to discharge between about six percent to about fifty percent of the total charge stored therein during a period of time that switching device 1608 is open . . . .

('342 Patent at 49:66-50:19.) From this disclosure, it is apparent that the claimed switching devices control *both* the charging and discharging of the capacitors: the length of time that the switch is closed controls the charging of the capacitor, and the length of time that the switch is open controls the discharging of the capacitor, such that a certain percentage of the stored charge is discharged. (*See* Fox Aff. ¶ 70.)

Accordingly, a person of ordinary skill in the art would understand "**controlling a charging and discharging cycle of the first and second capacitors with first and second switching devices . . . respectively**" to mean "**using the switching devices to control separately the time during which the charging of the capacitors occurs and the time during which the discharging of the capacitors occurs**."

M. "Interpolation Filter"

Term(s)	Claims	Qualcomm	ParkerVision
"interpolation filter"	**'845:** 9	"a component that adds additional values between sampled values and then filters both the original samples and the added values"	"circuitry that outputs a smoothed signal between the input sampled values"

There is nothing in the intrinsic evidence of the '845 Patent that provides insight into the meaning of the term "interpolation filter." However, the concept of "interpolation" is well known to those of ordinary skill in the art. Generally, "interpolation" refers to "the fitting of a continuous signal to a set of sample values," which is commonly used "for reconstructing a function, either approximately or exactly, from samples." (Lasher Decl. Ex. 2 at 4; *see also* Lasher Decl. Ex. 10 [The New IEEE Standard Dictionary of Electrical and Electronics Terms (1993)] (defining "interpolation function" as "[a] function that may be used to obtain additional values between sampled values").) Thus, one of ordinary skill in the art would understand "**interpolation filter**" to mean "**a component that adds additional values between sampled values and then filters both the original and the added values**."

N. "Asynchronous Energy Transfer Signal"

Term(s)	Claims	Qualcomm	ParkerVision
"asynchronous energy transfer signal"	**'551:** 20, 32 **'371:** 31	Term is indefinite. If construction is necessary, it should be construed as "non-synchronous energy transfer signal"	"an energy transfer signal with a phase that varies with respect to the phase of the carrier signal"

The term "asynchronous energy transfer signal" is insolubly ambiguous, and therefore indefinite, because it uses the relational term "asynchronous" without defining a

proper frame of reference—*i.e.*, the signal to which it is asynchronous.[7] If the Court believes this term should be construed, then "asynchronous" should be construed in accordance with its plain meaning of "non-synchronous," and the term "**asynchronous energy transfer signal**" therefore should be construed as "**non-synchronous energy transfer signal.**"

O. "Universal Frequency Down-Converter (UFD)"

Term	Claims	Qualcomm	ParkerVision
"universal frequency down-converter (UFD)"	**'371:** 1	"circuitry with a switch, an integrator coupled to said switch, and a pulse generator coupled to said switch"	"circuitry that can perform frequency selectivity and frequency down conversion in a unified (i.e., integrated) manner"

The term "universal frequency down-converter" is not well known in the art. Its meaning, however, can be discerned from the plain language of the claim in which it appears. (*See* '371 Patent Claim 1.) A person of ordinary skill in the art, therefore, would understand "**universal frequency down-converter**" to mean, as Qualcomm proposes, "**circuitry with a switch, an integrator coupled to said switch, and a pulse generator coupled to said switch**." (*See* Fox. Aff. ¶ 73.)

IV. Construction of Means-Plus-Function Claims

The parties agree that '518 Patent claims 82, 90, 91 and '371 Patent claim 1 should be construed according to 35 U.S.C. § 112 ¶ 6 as means-plus-function claims. Additionally, the parties are essentially in agreement as to the claimed "functions" performed by the elements in those claims. The only significant disagreements over the construction of the means-plus-function claims concern which—if any—structures disclosed in the specification are capable of performing the claimed functions. (*See* Dkt. 110.)

[7] *See, e.g.*, *Chimie v. PPG Indus., Inc.*, No. 01-389-KAJ, 2003 WL 22400215, at *5 (D. Del. Oct. 9, 2003), *aff'd,* 402 F.3d 1371 (Fed. Cir. 2005) (noting that relative language in patent claims can run afoul of the definiteness requirement of 35 U.S.C. § 112); *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, No. 03 C 7713, 2008 WL 4083145, at *9 (N.D. Ill. Aug. 27, 2008) (finding indefinite claims containing the limitations "reduced air content cleaning fabric," where the specification provide no frame of reference by which to determine when air content was "reduced").

A. Claim 1 of the '371 Patent Is a Means Plus Function Claim for Which No Corresponding Structure Is Disclosed.

One of ordinary skill in the art would understand that the term "means for operating said UFD to perform at least frequency translation operations," which appears in Claim 1 of the '371 Patent, requires a structure that operates a switch, an integrator coupled to the switch, and a pulse generator coupled to the switch. (*See supra* III.O.) Although the '371 Patent briefly discusses a general purpose microprocessor, it does not disclose an algorithm for use with such microprocessor to enable it to perform the claimed function. (*Id.*) Thus, the '371 Patent fails to disclose a structure that performs the function of Claim 1. (*See* Fox Aff. ¶ 74.) Accordingly, Claim 1 of the '371 Patent is invalid as indefinite. *See Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1367 (Fed. Cir. 2008) (means-plus-function claims are indefinite where the specification discloses only a general purpose computer).

B. Means-Plus-Function Terms Incorporating Indefinite Claim Terms

The following means-plus-function terms are indefinite because they incorporate limitations that are, for reasons discussed above, indefinite: "means for integrating the energy over the aperture periods,""means for integrating the transferred energy over the aperture periods,""means for generating the baseband signal from the integrated energy," and "means for generating the second signal from the integrated energy." These terms appear in '518 Patent claims 82, 90, and 91.

V. Indefinite Claim Terms

A. Legal Standard for Indefiniteness

To comply with the requirements of 35 U.S.C. § 112 paragraph 2, a patent claim must "particularly point[] out and distinctly claim[]" the subject matter that the patentee regards as his invention. *See Exxon Research & Eng'g Co. v. U.S.*, 265 F. 3d 1371, 1375 (Fed. Cir. 2001). A claim fails to satisfy this requirement if one of ordinary skill in the art would not

understand the bounds of the claim, when read in light of the specification. Thus, where a claim is "insolubly ambiguous," such that no narrowing construction could be adopted, it is invalid as indefinite. *Id.*

B. Imprecise Terms

In addition to the indefinite terms discussed above, the following terms render indefinite the claims of the '551 and '518 Patents in which they appear because a person of ordinary skill in the art would not be able to discern the meaning of the highlighted terms of degree: "*accurate* voltage reproduction," "controlled *substantial* amounts of energy," and "*substantial* amounts of energy." Because the patents fail to provide any guidance as to the meanings of these inherently imprecise terms, a person of ordinary skill in the art would not be able to determine the boundaries of claims containing such terms. Claims incorporating such undefined terms are invalid as indefinite. *See Seattle Box Co., Inc. v. Indus. Crating & Packing, Inc.*, 731 F.2d 818, 826 (Fed. Cir. 1984) (a claim that incorporates a "word of degree" is indefinite if the patent provides no standard for measuring that degree").

C. Undefined Mathematical Terms

The following mathematical terms render indefinite Claim 4 of the '845 Patent because they are undefined in the specification and would not be known to a person of ordinary skill in the art: "A sin(φt+N)" and "A sin(ωt+φ)." (Fox Aff. ¶ 75.) Additionally, the term "E" in '845 Patent Claim 7 is indeterminate because the equation defining it does not make mathematical sense. (*Id.*) Claims incorporating such undefined and indeterminate terms are invalid as indefinite. *See Exxon*, 265 F. 3d at 1375.

Conclusion

For the foregoing reasons, the claim language in dispute should be construed as Qualcomm proposes.

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CRAVATH, SWAINE & MOORE LLP

By: s/ Keith R. Hummel

Keith R. Hummel (admitted pro hac vice) (Trial Counsel)
khummel@cravath.com
David Greenwald (admitted pro hac vice)
dgreenwald@cravath.com
Worldwide Plaza
825 Eighth Avenue
New York, New York 10019
Telephone: (212) 474-1000
Facsimile: (212) 474-3700

-and-

BEDELL, DITTMAR, DEVAULT, PILLANS & COXE, P.A.
John A. DeVault, III
Florida Bar No. 103979
jad@bedellfirm.com
Courtney K. Grimm
cgrimm@bedellfirm.com
Florida Bar No. 953740
The Bedell Building
101 East Adams Street
Jacksonville, Florida 32202
Telephone: (904) 353-0211
Facsimile: (904) 353-9307

-and-

CADWALADER, WICKERSHAM & TAFT LLP
Christopher A. Hughes (admitted pro hac vice)
Christopher.Hughes @cwt.com
1 World Financial Center
New York, New York 10281
Telephone: (212) 504-6000
Facsimile: (212) 504-6666

-and-

GOODWIN PROCTER, LLP
Steven A. Moore (admitted pro hac vice)
samoore@goodwinprocter.com
Richard W. Thill (admitted pro hac vice)
rthill@goodwinprocter.com
4365 Executive Drive, Suite 3000
San Diego, CA 92121
Telephone: (858) 202-2700
Facsimile: (858) 457-1255

Counsel for Defendant, Counterclaim Plaintiff Qualcomm Incorporated

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on this July 13, 2012, I electronically filed the foregoing with the Clerk of the Court by using the CM/ECF system which will send a notice of electronic filing to all counsel of record.

s/ Keith R. Hummel
Keith R. Hummel (admitted pro hac vice)
khummel@cravath.com
Worldwide Plaza
825 Eighth Avenue
New York, New York 10019
Telephone: (212) 474-1000
Facsimile: (212) 474-3700
Attorney for Defendant, Counterclaim Plaintiff