

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

WI-LAN INC.	§	
v.	§	
ACER, INC., <i>et al.</i>	§	CIVIL ACTION NO. 2:07-CV-473[TJW]
	§	
	§	CONSOLIDATED WITH:
	§	
WI-LAN INC.	§	
v.	§	CIVIL ACTION NO. 2:07-CV-474[TJW]
	§	
WESTELL TECHNOLOGIES, INC., <i>et al.</i>	§	<u>JURY TRIAL REQUESTED</u>

WI-LAN INC.	§	
v.	§	
RESEARCH IN MOTION CORPORATION, <i>et al.</i>	§	CIVIL ACTION NO. 2:08-CV-247[[TJW]
	§	
	§	<u>JURY TRIAL REQUESTED</u>

**Wi-LAN INC.'S REPLY BRIEF IN RESPONSE TO
DEFENDANTS' RESPONSIVE CLAIM CONSTRUCTION BRIEF**

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- Ex. A United States Patent Number 5,282,222
- Ex. B File History excerpts for United States Patent Number 5,282,222
- Ex. C *The New IEEE Standard Dictionary of Electrical and Electronics Terms*, Fifth Edition (1993)
- Ex. D *Synchronization in Digital Communication Volume 1, Phase-, Frequency- Locked Loops, and Amplitude Control (Wiley Series in Telecommunications and Signal Processing)*, Heinrich Meyr, Gerd Ascheid, Vol. 1 (1990).
- Ex. E *Electronic Communications Systems: Fundamentals Through Advanced*, Wayne Tomasi, 1988
- Ex. F *Digital Communications*, John G. Proakis, Second Edition (1989)
- Ex. G *Data Communications Principles*, Richard D. Gitlin, Jeremiah F. Hayes, Stephen B. Weinstein
- Ex. H *Performance of an RCPC-Coded OFDM-based Digital Audio Broadcasting (DAB) System*, Hoehner, Hagenaner, Offer, Rapp
- Ex. I *OFDM for Data Communications Over Mobile Radio FM Channels - Part 1: Analysis and Experimental Results*, Casa, Leung
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- Ex. V *Declaration of Dr. Richard D. Gitlin in Support of Plaintiff's Claim Construction Brief*
- Ex. AE Selected pages from the Deposition Transcript of Dr. Richard D. Gitlin taken February 8, 2010
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- Ex. AI THE NEW IEEE STANDARD DICTIONARY OF ELECTRICAL AND ELECTRONIC TERMS (5th ed. 1993.)
- Ex. AJ *Seven Networks, Inc. v. Visto Corp.*, 2006 U.S. Dist. Lexis 93870 at *11-15 (E.D. Tex. December 29, 2006; Ward, J.)
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- Ex. AL Defendant's Invalidation Contentions Pursuant to Patent Rules 3-3 and 3-4 filed October 16, 2009
- Ex AM Patrick Amihood, Elias Masry, Laurence Milstein, & John G. Proakis, *Asymptotic Performance of Multicode MIMO Systems in Frequency Selective Fading Channels*, IEEE Military Communications Conference (2005)
- Ex. AN Defendant LG Electronics Mobilecomm U.S.A., Inc.'s Responses and Objections to Plaintiff Wi-LAN Inc.'s First Set of Common Interrogatories (Nos. 1-19) served October 19, 2009
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Ex AP Chart Comparing Gardner Paper and 'United States Patent Number 5,282,222 (1995)

Pursuant to P.R. 4-5(c), Plaintiff Wi-LAN submits the following Reply Brief to Defendants' Responsive Claim Construction Brief ("Opp. Br.").

I. PROPOSED CONSTRUCTIONS FOR THE '222 PATENT

Defendants proposed constructions attempt to rewrite the asserted claims of the '222 patent in a manner that contradicts the clear teachings of the patent and the remainder of the intrinsic record, and they do so in complete disregard for what the claimed invention is. The claimed invention of the '222 patent is wideband OFDM, which enables multiple highway lanes for carrying user data at broadband speeds. The invention, however, is not directed to any particular form of data modulation for varying the amount of data (the traffic) on those highway lanes. Such forms of modulation were well known at the time of the wideband OFDM invention. Indeed, the patent teaches that any form of data modulation can be used for modulating data on the wideband OFDM highway lanes, regardless of whether the data modulation scheme used is (i) a non-differential modulation scheme, such as (a) amplitude modulation, (b) phase modulation or (c) phase and amplitude modulation (e.g., QAM), or (ii) a differential modulation scheme.¹ Defendants' claim constructions, however, seek to unduly limit the scope of the claims to the wideband OFDM invention to use only with differential modulation schemes.

A. Wideband Frequency Division Multiplexer

The parties agree that the patentees expressly defined "wideband" and "wideband OFDM" together in the '222 patent and that this definition defines the scope of the wideband frequency division multiplexer in independent claim 1, but the parties differ in how best to present that definition. The first difference is whether the phrase "wideband frequency division multiplexer for multiplexing information onto wideband frequency channels" should be construed as "a device for placing information onto a number of frequencies ...," as Wi-LAN

¹ "To reduce the effect of amplitude distortion [for *amplitude modulation*], the modulation is *preferably phase modulation*, while the effect of phase distortion is reduced by employing *differential phase modulation*. Hence the modulation [differential phase modulation] may be referred to as Differential OFDM (DOFDM). Unlike in other proposed schemes, neither pilot tones nor diversity are required in DOFDM. Possibly, quadrature amplitude modulation [QAM, which is *phase and amplitude modulation*] might be used [QAM], but amplitude modulation makes it difficult to equalize the distorting effects of the channel on the signal."(Ex. A, 7:11-28.)

proposes, or as “a multiplexer for multiplexing information onto frequency channels ...,” as Defendants propose. As an initial matter, Defendants’ argument isolates the word “multiplexer”(i.e., they take it out context) from the larger term “wideband frequency division multiplexer” and then use that isolation to claim that Wi-LAN’s proposed construction conflicts with a well-known meaning of “multiplexer.” Defendants, however, never explain what that well-known meaning is, nor do they offer a construction that might be consistent with that well-known meaning. This defeats one of the fundamental purposes of claim construction—to take a technical term (“multiplexer”) and explain it in plain language that a lay juror can understand. Wi-LAN’s construction, however, defines what a multiplexer is to assist the trier of fact and does so in a manner consistent with the patent specification, which states that, in wideband OFDM, “information, for example encoded speech is multiplexed over a number of contiguous frequency bands [i.e., *frequencies*].” (Ex. A, 7:11-15; see also Figure 2 (illustrating how that information (in the form of individual voice channel, vc, slots) is placed onto the frequencies). Wi-LAN’s proposed construction is also consistent with the claims of the patent, including independent claim 7 (“multiplexing a first frame of information over a number of *frequencies*,” emphasis added)) and in doing so provides consistency between independent claims 1 and 7 for the trier of fact. Finally, Wi-LAN’s construction is consistent with the ordinary meaning to one of skill in the art. (*Hamvoich Decl.*, ¶¶64-65.) THE NEW IEEE STANDARD DICTIONARY OF ELECTRICAL AND ELECTRONIC TERMS (5th ed. 1993.) (“Dividing a communication channel’s bandwidth among several sub-channels with different carrier *frequencies*. Each sub-channel can separate data signals.” (Ex. AI, pp. 527-528, *emphasis added*.)

The second difference between the parties is whether the variables K and Δf in the definition should be defined for the jury. Wi-LAN believes defining these terms for independent claim 1 (as “a number of frequencies (K)” and “a frequency range between the frequencies (Δf)”) is necessary to assist the trier of fact in understanding the claims and to provide consistency in terminology between independent claim 1 and independent claim 7 (where K is referred to as a

“number of frequencies” or “points” and Δf is referred to as a “frequency range” between the frequencies or points).

B. Carrier Recovery/Clock Recovery

Defendants would have the Court believe that Wi-LAN’s constructions of carrier recovery (“synchronizing the local oscillator to the carrier frequency of the received signal”) and clock recovery (“synchronizing the sampling clock to the timing of the received signal”) are unduly restrictive and that the Court should adopt their constructions which merely reorder the claim terms (leaving actual construction open to debate). Wi-LAN’s constructions, however, are consistent with the implicit definition presented in the patent specification (see Figure 1b), which itself is consistent with the ordinary meaning to one of skill in the art. (*See* Wi-LAN’s Br. 23-26.) Figure 1b of the ’222 patent (Wi-LAN Br. at 24) depicts carrier recovery and clock recovery exactly as presented in Wi-LAN’s proposed construction, something Defendants do not dispute. Moreover, every engineering text book, patent, or other reference presented by the parties describes clock recovery and carrier recovery in a manner consistent with Wi-LAN’s proposed construction. (*Id.*) Indeed, while Defendants heavily rely on U.S. Patent 5,369,670 for the construction of “amplitude and phase differential” terms, they curiously avoid its definition of “carrier recovery”:

Estimation and tracking of phase changes of a carrier signal has been carried out by the use of phase locked loops (PLLs)... The phase of the output of *the VCO [local oscillator] is made to track [synchronized with] the phase of the received carrier* through a feedback loop. In this manner, the phase of the incoming signal may be tracked.... Other techniques for phase tracking include sending a pilot tone which allows the receiver *to synchronize its local oscillator to the carrier frequency*.

(Def. Ex. 5, 2:12-33.) As to the “other” methods for timing recovery presented by defendants, such methods were not known to one of ordinary skill in the art as clock recovery or carrier recovery. (Haimovich Tr. 179:14-180:8) For example, the Gardner paper, entitled “Interpolation in Digital Modems-Part I: Fundamentals,” (described in ¶22 of the Acampora declaration) is one example. The Gardner paper describes numerous techniques for “timing

recovery” but does not use the term “clock recovery,” although the defendants conclude, without basis, that the two terms are synonymous. As will be readily apparent with respect to the ’222 patent, the terms do not mean the same thing—“timing recovery” encompasses much more than “clock recovery.” Indeed, the Gardner paper draws an explicit distinction between clock recovery and the more general “timing recovery” methods pointed to by Defendants. For example Gardner illustrates and describes what is a clock recovery (*see, e.g.*, Figures 1(a) and 1(b)) in a manner consistent with WI-LAN’s proposed construction:

Implementation of the modem by digital techniques ... introduces sampling of the signal. In some circumstances, ***the sampling [clock] can be synchronized to the symbol rate of the incoming signal***; see Fig. 1(a) and (b). Timing in a synchronously sampled modem can be recovered in much the same ways that are familiar from analog practice.

(Def. Ex. 13, 501, emphasis added.) In contrast, the Gardner paper presents the other “timing recovery” methods as other than clock recovery: (*see, e.g.*, Fig. 1(c)):

In other circumstances, the ***sampling [clock] cannot be synchronized to the incoming signal***... For one reason or another, the sampling clock must remain independent of the symbol timing. See Fig. 1(c) for a nonsynchronized-sampling configuration.

(*Id.*) The Gardner paper describes how these “timing recovery” methods (known as digital interpolation) are accomplished in a manner other than clock recovery:

How is receiver timing to be adjusted, by digital methods, when it is not possible to alter the sampling clock? One answer is to interpolate... ***Interpolation is a timing-adjustment operation on the signal, not on a local clock or timing wave. In this respect, it is radically different from timing adjustment in the better-known analog modems.*** Of all the operations in a digitally implemented modem, ***interpolation is perhaps the one with the least resemblance to established analog methods.***

(*Id.*, emphasis added) Comparing the Gardner paper to the disclosure of the ’222 patent, it is readily apparent that the distinctions made by Gardner have also been made by the inventors. (*See* Comparison Chart, Ex. AP.) Thus, both the patent and extrinsic evidence are consistent and confirm the understanding of a clock and carrier recovery is as presented by Wi-LAN:²

² Dr. Haimovich’s expert testimony that carrier recovery is defined in the Tomasi reference as “the process of extracting a phase coherent reference carrier from a received carrier waveform” is also consistent with Wi-LAN’s construction. A reference needs to be extracted from the received signal in order to “synchronize” the local oscillator to that carrier reference, as required for “downconversion” in claim 1. As Dr. Haimovich explained, even

C. Amplitude and Phase Differential Characteristics/Channel Estimator

Defendants argue that by reciting “amplitude and phase differential characteristics,” the preamble requires the use of “differential modulation.” Not so. The preamble requires a “transmitter for transmitting electromagnetic signals and a *receiver* for receiving electromagnetic signals having amplitude and phase differential characteristics.” Accordingly, the electromagnetic signals received by the receiver, *but not those transmitted by the transmitter*, are referred to as having amplitude and phase differential characteristics. Thus, the “amplitude and phase differential characteristics” are not those imparted on the electromagnetic signal by the transmitter, as Defendants’ construction would require, but by the effects of the wireless channel on the electromagnetic signal as it passes between the transmitter and receiver. (Wi-LAN Br. 7-12, 15-17.)

Wi-LAN’s proposed construction is confirmed by the use of “phase and amplitude differential” in the context of the channel estimator in claim 1. The patent makes clear (Ex. A, 10:58 - 11:28) and Defendants’ expert admits (Acampora Tr., 122:15-20), the channel estimator produces estimates of the “amplitude and phase differential” that results from channel effects on the frequency channels, not from differential modulation. As described in the patent and illustrated in Fig. 5b, the channel estimator provides its estimated “amplitude and phase differential” to a pre-distorter, for use in preemptively counteracting channel distortion:

The predistorter 534 receives a signal corresponding to the estimated phase differential of the channel. On the (believed reasonable) assumption that the channel is reciprocal, the signal being transmitted is ***predistorted*** with the estimated ***phase differential*** so that the received signal at the portable with which the BS is communicating will be corrected for any ***phase distortion over the channel***.

(Ex. A, 9:54-61.) As set forth in Wi-LAN’s opening brief (Wi-LAN Br. at 9,10), the predistorter described in the ’222 specification (and claimed in claim 4) acts to distort the transmitted signal by the estimated phase differential so that when the signal reaches the receiver, it is undistorted.

the section of of the Gitlin textbook referenced by Defendants requires a “discrete-time PLL” to perform synchronization of the carrier frequency (compare to the ’670 patent quoted above). (Haimovich Tr. 192:21-194:4.)

(Ex. A, 9:54-61, 8:48-49.) In other words, the phase differential is the phase distortion that occurs across the wireless channel. This language belies Defendants statement that none of Wi-LAN's '222 patent citations ever equate "differential" with "distortion."

Notwithstanding the support for Wi-LAN's construction found in the claims, figures, and written description of the '222 patent, Defendants argue that the word "differential" can only have a single meaning throughout the '222 patent, even when used in different contexts ("amplitude and phase differential characteristics" and "phase differential"). This argument is legally incorrect.³

D. Transceiver

Defendants do not contest Wi-LAN's proposed construction for a transceiver as "a two-way radio unit" but instead seek to read limitations into the claims that would restrict the patent protection for wideband OFDM to only transceivers that omit carrier recovery and clock recovery, and other components found in prior art devices, for "Reducing Analog Complexity." (Ex. A, 12:51-13:64.) Defendants rely on a statement in the patent that one of the advantages of the present invention includes that these analog components can be omitted, including carrier recovery and clock recovery, among the other specified components. (*Id.*, 2:19-23.) When taken in context, Defendants cannot show that such a statement constitutes "expressions of manifest exclusion or restriction, representing a *clear disavowal* of claim scope." *Teleflex, Inc. v. Ficosa North America Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2005)(emphasis added); *see also Seven Networks, Inc. v. Visto Corp.*, 2006 U.S. Dist. Lexis 93870 at *11-15 (E.D. Tex. December 29,

³ As to whether a word can hold different meanings within a patent, the Federal Circuit has held that "where the language of the written description is sufficient to put a reader on notice of the different uses of a term, and where those uses are further apparent from publicly-available documents referenced in the patent file, it is appropriate to depart from the normal rule of construing seemingly identical terms in the same manner." *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1311 (Fed. Cir. 1999). Defendants' reliance on the '670 patent suffers from the same fate. The '670 patent does not make any express statements regarding the scope of the claims of the '222 patent and Defendants offer no reason as to the why the various citations from the '670 patent would be contextually appropriate in analyzing the claims of the '222 patent. It would be improper to use the '670 patent, based on its varied contextual use of the word "differential," to contradict the clear disclosure of the '222 patent. (Haimovich Tr., 143:14 - 144:4) and the '670 patent uses the word in a third context ("differential" as a mathematical operation) (Haimovich Tr., 144:5 -17).

2006; Ward, J.) (attached as Ex. AJ).⁴ As explained in Wi-LAN's Opening Brief, the patent specification makes clear the omission of these elements, including carrier recovery and clock recovery, is an "advantage" of the present invention not a mandatory omission. Indeed, in numerous places throughout the patent specification, including in written description and claims, the patentee repeatedly makes clear these elements are optional for wideband OFDM using expressions such as "not required" and by including certain of these elements in the described and claimed embodiments. (Wi-LAN Br. at 4-7; *see also* Ex. A, 4:55-57 (With the implementation of the present invention, several of the blocks shown in FIG.1 are *not required*." (emphasis added)).⁵

E. T is the Duration of One Time Domain Sample

As stated in the Opening Brief (Wi-LAN Br. at 23), the claim language explicitly defines the term "T" as "the duration of one time domain sample" and does not further limit "T" (as Defendants propose) to a disclosed embodiment (T is $1/K_1 \Delta f$).

F. A Number M of Levels

Defendants proffers a "differential modulation" construction ("multilevel differential phase shift keying with M levels") with respect to the term "a number M of levels." Wi-LAN addressed the construction. (Wi-LAN Br. at 21-23). Now Defendants pretend that their construction of "a number M of levels" refers to "multilevel" modulation (Opp. Br. at 21), which suffers from the same problem.⁶

⁴ Indeed, this court has recognized that the use of the words "present invention" do not constitute a disclaimer by themselves. *See Colucci v. Callaway Golf Co.*, 2010 U.S. Dist. Lexis 4725 at *17-18 (E.D. Tex. January 21, 2010; Love, Mag. J.) ("the Court will not read a specification discussing 'present invention' to be "magic words" that automatically triggers a narrowing of the claim language" (citations omitted)) (attached as Ex. AK).

⁵ Of the many passages from the patent specification and claims that Wi-LAN points to in its Opening Brief to demonstrate that the exclusion of the specified analog components is not mandatory, Defendants attempt to only address one passage in the body of their brief, that is, claim 3's inclusion of one of the proposed omitted elements, "automatic gain control," which is inconsistent with Defendants' proposed construction. Defendants are incorrect (Opp. Br. at 19) when they argue that claim 3 does not include an automatic gain control as the specification makes clear that the recited "power controller" functions as an automatic gain control. (*See* Wi-LAN Br. at 6.)

⁶ Defendants also appear to raise for the first time a construction for " $2\pi\chi/K_1$," (calling it a "phase difference between adjacent symbols") in a further attempt to read differential phase modulation into the claims, yet the parties agreed that this term does not require construction. Indeed, the variables/terms are defined in the claim.

G. Point and Tail Slots

For “points” and “tail slots,” Defendants mischaracterize the specification when they say that “the specification states that both K_1 points *and* tail slots of K_2 points are grouped into a *frame*.” This statement is contradicted by the specification and the drawings. (*See* Wi-LAN Br. at 17-21.) More specifically, Fig. 2 clearly shows the frame including only the K_1 points and excluding the two tail slots of K_2 points. This is consistent with the written description: “The K points are grouped into [1.] a frame of K_1 points and [2.] two tail slots of K_2 points each, so that $K = K_1 + 2 K_2$.” (Ex. A, 5:29-31, *emphasis added*.) Defendants’ construction for “points” and “tail slots,” as divisions within a frame *corresponding to one information symbol each*” is thus wrong not only because the points corresponding to tail slots are not information symbols but because the patent teaches otherwise.

H. Out of Band Signal

Defendants do not address Wi-LAN’s construction of the claim term “out of band signal” from claim 9, which is the term Wi-LAN sought construction of. Instead, Defendants contend that claim 9 is indefinite alleging that the claim requirement that the out of band signal be “less than a given level” is indefinite. This is the first time Defendants have provided details regarding this defense, despite Wi-LAN’s requests. Notwithstanding Defendants’ flagrant disregard for this Court’s rule, the specification does provide sufficient guidance as to the meaning of “less than a given level.” (*See* Wi-LAN’s Br. At 27; Ex. A, 5:35-42; *Haimovich Decl.* ¶¶ 112-113.)

II. CONSTRUCTION OF THE DISPUTED TERMS IN THE ’802 PATENT

Defendants go to great lengths to suggest to the Court that the MultiCode DSSS (“MC-DSSS”) invention of the ’802 patent is simply about spreading a user’s data symbols over multiple codes (or highway lanes) for transmission over a single communication channel or link using only the pseudo random noise sequences mentioned in the background to the invention, simply because they were the traditional DSSS spreading codes used in early spreading systems. (Opp. at 28-33.) To set the record straight, the invention of the ’802 patent takes the concept of spreading using DSSS spreading codes, that is, any codes of larger bandwidth than the input data

symbols to be carried by them (e.g., Walsh codes) and extends that concept to using Fourier transforms like OFDM in the '222 patent, which uses orthogonal frequencies as DSSS spreading codes (or highway lanes, a non-conventional approach not then generally thought of as spreading). (Ex. M, 4:29-34; 4:66-5:12.) However, while any spreading code (including pseudo noise sequences) can be used for “spreading” (and Wi-LAN’s construction makes that clear), it is not also true that any DSSS spreading code can be used for “invertible randomized spreading,” one of the key components of the '802 patent (and a term subject to separate claim construction). (Ex. M, 2:15-16.) In other words, the invertible randomized spreading code must perform more than the function of spreading—it must spread, it must randomize, i.e., apply complex constants chosen randomly, and both operations must be invertible. (Ex. M, 4:29-34; 5:6-7.)

Without modification, pseudo random noise sequences only spread, and are not invertible in a multicode system. (Gitlin Tr. 236:24-237:9; Proakis Tr. 106:12-107:4.) And, if modified to be invertible, they are no longer traditional pseudo random noise sequences. (Gitlin Tr. 24:1-8.) If not invertible, the multiple highway lanes they create for carrying a user’s data symbols will overlap, creating interference and errors at the receiver. (Proakis Tr. 106:12-107:4.) In traditional DSSS systems, the pseudo random noise codes could be used for spreading without this problem because a user’s data symbols were sent using a single code, not multiple codes. (Gitlin Tr. 24:23-26:12.) Non-complex pseudo random noise sequences themselves also do not apply complex constants chosen randomly to a user’s data symbols and thus do not “randomize” in the manner required by the '802 patent. (Opp. at 30; *Gitlin Decl.*, ¶ 23.) While it is correct that the word “random” happens to appear in the term “pseudo random noise sequences,” defendants mislead the Court by suggesting that such non-complex codes are performing the application of complex constants chosen randomly—they do not. (Gitlin Tr. 161:8-13.)⁷

⁷ Defendants make numerous false assertions in their brief and overzealously take advantage of the complexity of the subject matter. (*See, e.g.*, Opp. at 34 (“the parties agree that the corresponding structure includes codes having N chips”).) However, Wi-LAN is unable to address each of these false statements in this Reply given the space constraints.

A. Transceiver

In contrast to Wi-LAN's construction ("a two-way radio unit") Defendants' construction ("link") is inconsistent with their construction for the '222 patent and nonsensical. (Wi-LAN Br., at 28-29). Indeed, Defendants' expert disagrees with Defendants' construction that a transceiver is a link. (Proakis Tr. 16:21-17:2.)

B. Converter

This term is presumptively not subject to § 112(6), and a "converter" is a well known structure. Contrary to Defendants' argument, the fact that the term "converter" is used in multiple ways does not mean that a "converter" is not sufficient structure to perform the function of "converting the first stream of data symbols into plural sets of N data symbols each."⁸

C. First Computing Means

Contrary to Defendants' argument, the parties' agreed-to structures corresponding to the "first computing means" (Figures 1 and 4, as described in the patent) do not require a fixed numerical relationship between the number of data symbols to be modulated, the number of codes used/assigned, and the number of chips per code (they do not all have to be equal in number as Defendants propose). (Opp. at 34.) The patent specification repeatedly states that the patent presents "Multi-Code Direct Sequence Spread Spectrum (MC-DSSS) which is a modulation scheme that assigns up to N codes" to an individual transceiver for a user for modulating data symbols.⁹ (Ex. M, Abstract, 2:6-9.) Notably, the parties agree that this statement is corresponding structure for the "first computing means." Figures 1 and 4 of the patent, viewed in light of this statement, can only be interpreted as disclosing a corresponding structure for the "first computing means" where the number of assigned codes (or highway lanes) for a user can be less than or equal to the number of chips per code M (the number of chips per

⁸ See *Personalized Media Communs., L.L.C. v. ITC*, 161 F.3d 696, 705 (Fed. Cir. 1998) ("Even though the term 'detector' does not specifically evoke a particular structure, it does convey to one knowledgeable in the art a variety of structures known as 'detectors.'").

⁹ Defendants' experts also agree that the patent assigns up to N codes. (See *Proakis Decl.*, ¶ 20; Proakis Tr. 51:15-52:20; Acampora Tr. 174:25-175:3; 180:15-181:6.)

code M identified in the claims defines only the maximum number of codes available, e.g., using a 16-chip code allows for up to 16 invertible codes, all of which need not be assigned to a single transceiver). (Gitlin Tr. 103:9-104:20; 108:13-110:4; 117:20-118:25; 127:20-134:4.)

Defendants' reliance on the prosecution history of the reissue application is misplaced. In fact, the prosecution history further confirms that the patent discloses assigning up to N codes for modulating data symbols:

[I]n the summary of the invention (see column 2, lines 2-6), it is clear that there are up to M codes (substituting M for N as stated in the summary), wherein M is the number of chips per code. Although M equals N in the detailed description (which is a possible embodiment of the invention), this is not necessary, as indicated at column 2, lines 2-6. M does not have to equal N.... Unfortunately, the lack of clarity from using "N" in reference to both the number of data symbols and number of codes was erroneously perpetuated in a number of the claims, which this reissue application seeks to correct.

(Ex. N, at 2.) Indeed, the purpose of the reissue application was to correct the lack of clarity from using "N" in reference to both the number of data symbols, number of codes, and the number of chips per code (because one can have more codes and thus more chips per code M than the number of data symbols N to transmit for a user and choose not to use/assign all the codes to the same user). (*Id.*) Accordingly, nothing in the specification or prosecution history supports Defendants' construction that "M equals N."¹⁰¹¹

Finally, the corresponding structure for the "first computing means" (in addition to Figures 1 and 4) includes "a computing device programmed to perform the algorithms disclosed by the foregoing." Indeed, Defendant LGEMU agrees that one corresponding structure for the "first computing means" includes a computer or microprocessor programmed with an algorithm. (*See* 2:08-CV-00247, Dkt. No. 113-2 at 2.) Furthermore, Defendants' expert agrees that Figures

¹⁰ Additionally, Defendants' arguments that the dependent claims 2, 4, and 12 (i.e. the terms "source," "transformer," "modulator," and "correlator") are invalid also fail because nothing in the specification or prosecution history supports the limitation that the corresponding structure for the "first computing means" is limited to having an equal number of data symbols and chips per code. (Opp. at 36-37.)

¹¹ Defendants should be precluded from asserting invalidity under § 112 because they failed to provide any basis for their invalidity arguments with respect to the "first computing means" in their invalidity contentions.

1 and 4 disclose algorithms for implementing these structures alternatively as algorithms in a general purpose computer.¹² (Proakis Tr. 41:19-44:18.)¹³

D. Spreading

The term “spreading” refers to modulating data symbols by codes of larger bandwidth. Contrary to Defendants’ argument, Wi-LAN’s construction is not inconsistent with the ordinary meaning of spreading, but, rather, extends the ordinary meaning of spreading to include within its scope the operation of a Fourier transform as is used in the OFDM embodiment of the ’802 patent.¹⁴ (Gitlin Tr. 141:3-7; 136:21-143:13.) Consistent with Wi-LAN’s construction, Defendants now agree that “‘spreading’ refers to spreading an individual data symbol over an individual code,” as opposed to reducing the effective bandwidth of the system. (Opp. at 39; *Acampora Decl.*, ¶ 48.) And Defendants’ expert disagrees with Defendants’ construction that spreading must reduce the effective bandwidth.¹⁵ Furthermore, spreading codes are known in the art as “codes of larger bandwidth” as Wi-LAN proposes. (Gitlin Tr. 162:14-165:9.) Indeed, Defendants’ expert agrees that the spreading codes have a larger bandwidth than the input data. (Proakis Tr. 93:22-94:19.)¹⁶

¹² See *AllVoice Computing PLC v. Nuance Communs., Inc.*, 504 F.3d 1236, 1245 (Fed. Cir. 2007) (“[A]lgorithms in the specification need only disclose adequate defining structure to render the bounds of the claim understandable to one of ordinary skill in the art.”); *Intel Corp. v. VIA Techs.*, 319 F.3d 1357, 1367 (Fed. Cir. 2003) (knowledge of a person of ordinary skill in the art can be used to make clear how to implement a disclosed algorithm).

¹³ Additionally, the description of the N-point transforms at 4:66-5:12 is clearly linked corresponding structure because these transforms are used in element 12 in Figure 4 (the first computing means). (See Ex. M, Claims 4-7 (claiming the use of Fourier, Walsh, and randomizing transforms in the first computing means).)

¹⁴ Defendants improperly use an ellipsis to remove the context of Dr. Gilin’s statement in his declaration. (Opp. at 40.) Dr. Gitlin’s statement is in reference to the extension of the ordinary meaning of spreading to include within its scope the operations of a Fourier transform (for the OFDM embodiment of the ’802 patent) in which individual sinusoidal waves or harmonics (i.e., the highway lanes referred to in Wi-LAN’s Opening Claim Construction Brief) are represented in the transform by codes of larger bandwidth and used to modulate individual data symbols for transmission. (*Gitlin Decl.*, ¶ 22; Gitlin Tr. 136:21-143:13.)

¹⁵ See Proakis Tr. 76:22-77:14 (testifying that there can be spreading even when the chip rates of the input data and the spreading code are equal (i.e. where there is no reduction in the effective bandwidth)).

¹⁶ (See also Ex. AO, Roger L. Peterson, et. al., *Introduction to Spread Spectrum Communications* 52 (1995) (“Bandwidth spreading by direct modulation of a data-modulated carrier by a wide-band spreading signal or code is called *direct-sequence* (DS) *spread spectrum*.”) (underlining added)).

E. Invertible Randomized Spreading

An “invertible randomized spreading” refers to spreading (as construed above) and applying complex constants chosen randomly (“randomized”), both in a manner that is invertible. (Ex. M, 4:31-32.) Contrary to Defendants’ assertion, it is Defendants’ construction (“spreading using an invertible randomized transform”) that is inconsistent with the agreed-to structures in the specification corresponding to the “invertible randomized spreading” function. Figure 1 does not show the use of any “randomized transform” for the function of spreading. Rather, “[a] series of transforms are shown” only in the Figure 4 embodiment of the computing means 12. (Ex. M, 4:42-43.) As the specification and claims make clear, one embodiment of the patent using Figure 4 that performs “invertible randomized spreading” is where “the first transform is a Fourier transform and it is followed by a randomizing transform.” (Ex. M, Claim 6 (emphasis added); *see also* Claim 26, Original Claims 2-3, 5:6-12, Gitlin Tr. 197:24-200:12.) As mentioned above, in this embodiment, it is the Fourier transform that is used for spreading because the randomizing transform does not spread. (*Gitlin Decl.*, ¶ 23; Gitlin Tr. 154:8-157:6; 196:9-12; 209:25-210:7; Proakis Tr. 29:19-25; 40:25-41:12.) Thus, it is clear that there is no “randomized transform” used for spreading (as in Defendants’ construction) in either the computing means 12 in Figure 1 or 4. Indeed, Defendants’ expert admitted that under Defendants’ construction he could not identify any transforms disclosed in the patent that would spread by way of a randomizing transform. (Proakis Tr. 89:2-90:13.)

F. Means to Combine

As Wi-LAN’s expert has repeatedly testified, and Defendants’ experts agree, element 20 in Figure 4 is clearly linked to the recited function “to combine the modulated data symbols for transmission” because it performs the same adding or summing function to produce a composite waveform or signal for transmission as adder or summer 14 in the alternative embodiment shown

in Figure 1.¹⁷ (*Gitlin Decl.*, ¶ 24; *Gitlin Tr.* 121:8-122:9; 124:13-21; 264:2-266:17; *Proakis Tr.* 112:7-25; *Acampora Tr.* 174:14-16.)

G. Direct Sequence Spread Spectrum Codes (DSSS Codes)

“DSSS codes” are codes over which information bits are spread, and are not limited to just pseudo random noise sequences, as explained above. *See supra* at 8-9. Defendants rely on extrinsic evidence and the discussion of the prior art in the Background of the Invention section of the patent.¹⁸ (*Opp.* at 28-33.) Importantly, Defendants agree that “Fourier and Walsh Transforms may be used in connection with Figure 3,” which is a code generator for the DSSS codes. (*Opp.* at 33; *Praokis Decl.*, ¶ 22) However, Defendants argue that “these transforms are not the DSSS codes themselves.” (*Id.*) Defendants fail to appreciate that when a Fourier or Walsh transform is the only transform used in connection with the code generator embodiment of Figure 3 to generate a supply or source of codes for the “invertible randomized spreading” function of Figure 1, the DSSS codes that are generated are the columns of the Walsh or Fourier transform. (*Gitlin Tr.* 113:10-114:19; *Acampora Tr.* 170:10-24; n.14, *supra.*)

Defendants further argue that “Wi-LAN provides no explanation as to how Figure 1’s computing means could produce an ‘invertible randomized spreading’ if the DSSS codes in Figure 1 were not pseudo-random noise sequences.” (*Opp.* at 31.) As Wi-LAN’s expert testified, and as disclosed in the specification (*see supra* at 8-9), an “invertible randomized spreading” is produced in one embodiment if the codes are generated using transforms where the first transform is a Fourier transform or a Walsh transform and the second transform is a randomizer transform (it applies complex constants chosen randomly to the Fourier spreading), because these transforms spread and apply complex constants chosen randomly, and because

¹⁷ *See Atmel Corp. v. Information Storage Devices*, 198 F.3d 1374, 1380 (Fed. Cir. 1999) (holding that in identifying structure corresponding to a means-plus-function limitation “interpretation of what is disclosed must be made in light of the knowledge of one skilled in the art”).

¹⁸ Notably, publications by Defendants’ expert John G. Proakis, rebut Defendants’ argument that DSSS codes are PN sequences. (*See Ex. AM, Patrick Amihood, Elias Masry, Laurence Milstein, & John G. Proakis, Asymptotic Performance of Multicode MIMO Systems in Frequency Selective Fading Channels*, IEEE Military Communications Conference (2005) (describing a multicode system using Walsh-Hadamard codes as a direct sequence spread spectrum system).

both operations are invertible.¹⁹ (Gitlin Tr. 206:21-207:14.) Thus, the DSSS codes can perform the function of an “invertible randomized spreading” when they are randomized; however, it does not follow that the DSSS codes must be pseudo random noise sequences. Indeed, pseudo random noise sequences are not also “invertible” for multi-code use and they are not “randomized” as that term is used in the patent. (Gitlin Tr. 236:24-237:9; Proakis Tr. 106:12-107:4.) Accordingly, it is under Defendants construction that there would be nothing in Figure 1 to perform an “invertible randomized spreading” if DSSS codes in the context of Multi-Code DSSS are pseudo noise sequences.²⁰

H. Second Computing Means

Defendants agree that “Figures 2 and 5 illustrate alternate embodiments of the patented receiver.” (Opp. at 44) As such, the second computing means in Figure 5 should be included as corresponding structure.²¹ Furthermore, Wi-LAN’s identification of the second computing means in Figure 5 extending between the serial-to-parallel and parallel-to-serial converters is not “a guess.” (Opp. at 44). Rather, a simple comparison of Figures 4 and 5 clarifies that this is the only reasonable interpretation.

I. Combining the Modulated Data Symbols for Transmission

Contrary to Defendants’ argument, claim 23 does not require that the claimed combining be performed by a parallel-to-serial converter. Defendants’ construction would improperly exclude the Figure 1 embodiment, which Defendants’ expert agrees is covered by claim 23. (Proakis Tr. 34:16-17.)

¹⁹ Defendants falsely assert that Wi-LAN’s expert “conceded that the only way spreading is achieved is through the use of pseudo-random noise codes,” as even a cursory review of the cited transcript pages will reveal. (Opp. at 32.)

²⁰ Moreover, DSSS codes are not always required to perform an “invertible randomized spreading.” For example, claim 23 recites “a *spreading* of the first stream of data symbols over more than one and up to M direct sequence spread spectrum codes” in contrast with claims 1, 17, and 33 which recite “an invertible randomized spreading”.

²¹ Claims 13, 22, and 37 clearly link the second computing means to the Figure 5 embodiment which illustrates inverse transforms: “the second computing means comprises an inverse transformer for regenerating an estimate of the data symbols.” (Ex. M, claims 13, 22, 37 (*emphasis added*)).

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CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing pleading was electronically filed in compliance with Local Rule 5.1. As such, this notice was served on all counsel who are deemed to have consented to electronic service on February 25, 2010.

/s/ Sam Baxter

Sam Baxter