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

MOSAID TECHNOLOGIES INC.	§	
Plaintiff	§	
	§	
V.	§	**No. 2:11CV179**
	§	
DELL INC., ET AL.	§	
Defendants	§	

MEMORANDUM OPINION AND ORDER

The above-referenced case was referred to the undersigned United States Magistrate Judge for pre-trial purposes in accordance with 28 U.S.C. § 636. Before the Court are Plaintiff's Opening Claim Construction Brief (Docket Entry #459), Defendants' Responsive Claim Construction Brief (Docket Entry #486), Plaintiff's Claim Reply Claim Construction Brief (Docket Entry #491), Defendants' Surreply (Docket Entry #498, Exhibit A), and Plaintiff's Supplemental Brief (Docket Entry #510). Also before the Court is the Local Patent Rule 4-3 Joint Claim Construction and Prehearing Statement (Docket Entry #424).

A claim construction hearing, in accordance with *Markman v. Westview Instruments*, 52 F.3d 967 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996), was held in Texarkana on April 16, 2013. After hearing the arguments of counsel and reviewing the relevant pleadings, presentation materials, other papers, and case law, the Court finds the disputed terms of the patents-in-suit should be construed as set forth herein.

I. BACKGROUND

A. Introduction

On March 16, 2011, MOSAID Technologies Incorporated ("Plaintiff") filed its original

complaint for patent infringement against Dell, Inc.; Informatics Holdings, Inc. and Wasp Barcode Technologies, Ltd.; Huawei Technologies Co., Ltd., Huawei Technologies USA Inc., Huawei Device USA Inc., and Futurewei Technologies, Inc. (collectively, "Huawei"); Wistron Corporation, Wistron LLC, SMS Infocomm Corporation, Wistron Infocomm (Texas) Corporation, Wistron Infocomm Technology (America) Corporation, and Wistron NeWeb Corporation; Lexmark International, Inc.; Canon Inc. and Canon U.S.A., Inc.; Intel Corporation; Atheros Communications, Inc.; Marvell Semiconductor, Inc.; and Ralink Technology Corporation, among others (collectively, "Defendants"). Specifically, Plaintiff alleges Defendants infringe U.S. Patent Nos. 6,563,786 ("'786 patent"); 6,992,972 ("'972 patent"); 5,151,920 ("'920 patent"); 5,131,006 ("'006 patent"); 5,422,887 ("'887 patent"); and 5,706,428 ("'428 patent")(collectively "patents-in-suit").

B. The '786 and '972 patents

The '786 and '972 patents are related and share a common specification. The patents are directed to a Wireless Local Area Network ("WLAN") using an OFDM (orthogonal frequency-division multiplexing) type of spread spectrum transmission to avoid data transmission errors in a hostile and variable transmission environment. In OFDM, multiple sub-carriers are used rather than a single carrier to transmit portions of a symbol (i.e., group of data bits). The symbol period T can be varied so as to be longer or shorter in duration. The longer the duration of the symbol period T, the lower the symbol rate and the data transmission rate.[1]

In a hostile radio frequency ("RF") environment, such as where multi-path delay produces inter-symbol interference, the symbol rate can be slowed to improve system

[1] '786 patent, 2:65-3:1.

performance and data reliability. In a favorable RF transmission environment, the symbol duration can be shortened to realize a higher symbol rate.

Further, in a preferred embodiment, a normal mode uses a symbol length T. But, a second, fallback mode uses a symbol length KT, where K is an integer larger than unity. Thus, in fallback mode, the symbol length is longer than the symbol length in normal mode. Accordingly, in the fallback mode, the symbol rate is lower.

Two signaling modes are shown in Figs. 1 and 2. In the first, the symbol period length is T and in the other the symbol period length is T + T = 2T. [2]

FIG. 1

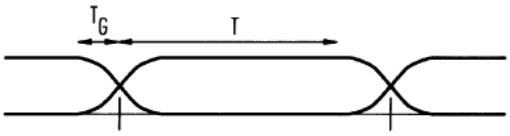
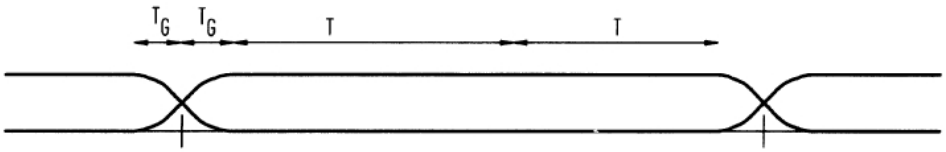


FIG. 2



Functional block diagrams of the transmitter and the receiver are shown in Figs. 3 and 4.

[2] '786 patent, 1:61-2:4; 2: 24-30 and 44-47.

FIG. 3

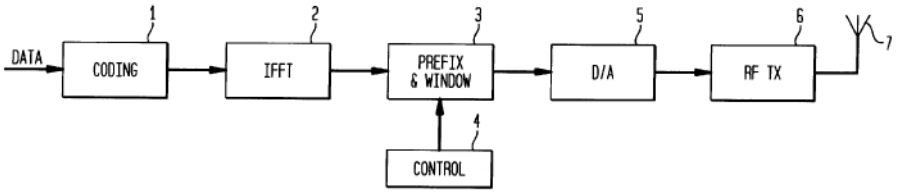
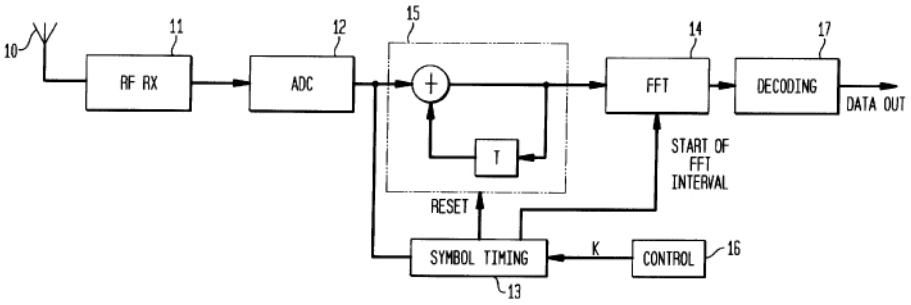


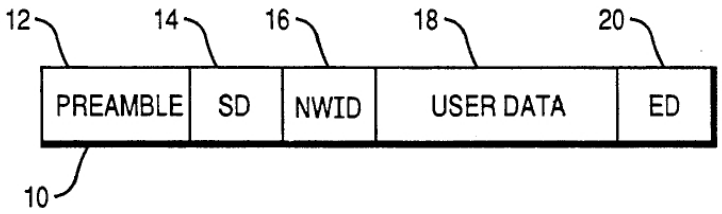
FIG. 4



C. The '920 patent

The '920 patent is directed to a spread spectrum radio receiver suitable for use in a WLAN. Information on the network is communicated in frames having start and end delimiters bracketing data in between. According to the patent, the start and end delimiters include data symbols and non-data symbols. A network frame format is shown in Fig. 2, wherein SD is the start delimiter and ED is the end delimiter. As shown, SD and ED bracket the network station identifier and user data. SD assists in symbol synchronization, and ED provides a firm point where the frame ends.

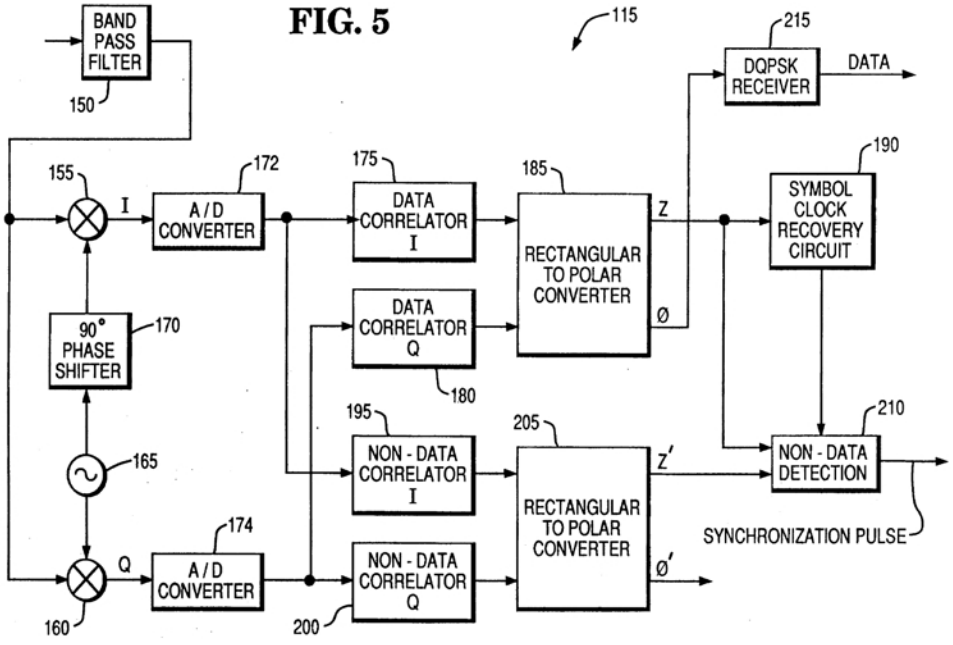
FIG. 2



The data symbols of a frame are spread by a first spreading code and the non-data symbols are spread by a second spreading code. At the receiver, the received spread spectrum signal is correlated against the first spreading code to retrieve the data symbols and against the second spreading code to retrieve the non-data symbols. The start and end segments are thereby detected.

In the disclosed embodiment, four symbols are used in the SD and in the ED. The four symbols include one or two data symbols and the remaining symbols are non-data symbols. Also, because Differential Phase Shift Keying ("DPSK") modulation in a four point constellation is used, each symbol contains two binary digits ("bits").

A block diagram of the receiver is shown in Fig. 5.

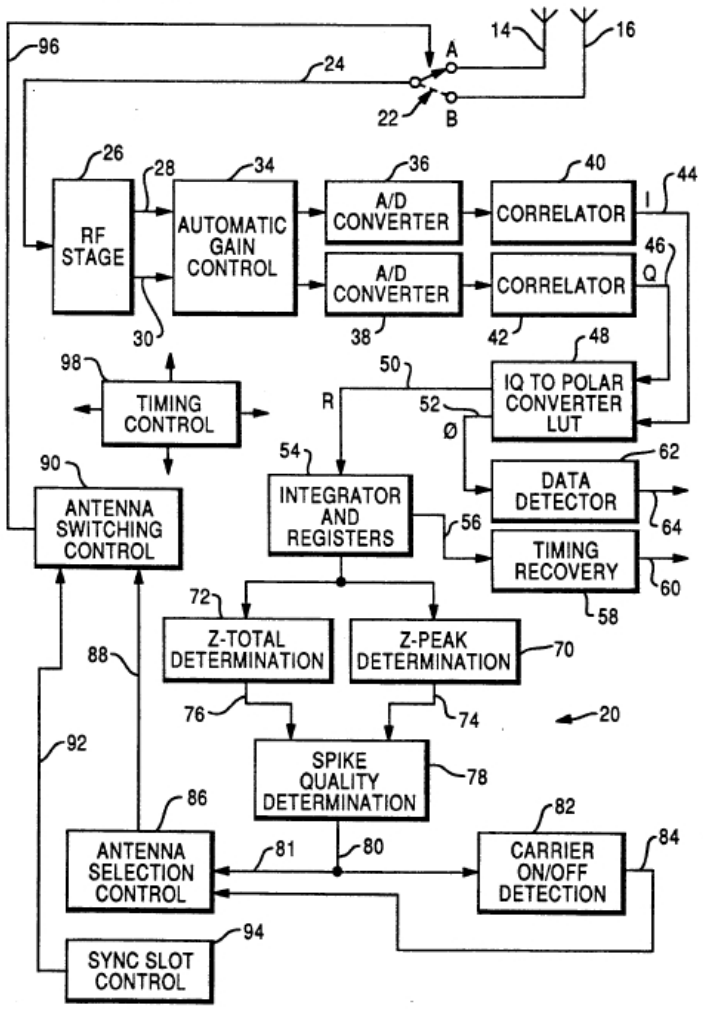


Mixers 155 and 160 produce base-band I, Q signals applied to A/D converters 172 and 174. Correlator pairs 175, 180 and 195, 200 operate on the basis of spreading codes designated for data symbols and non-data symbols, respectively. Correlators 175, 180 operate to "de-spread" a received signal and retrieve a representation of the original data information in a frame. Correlators 195, 200 operate to "de-spread" a received signal and retrieve a representation of the original non-data information in the frame.

D. The '006 patent

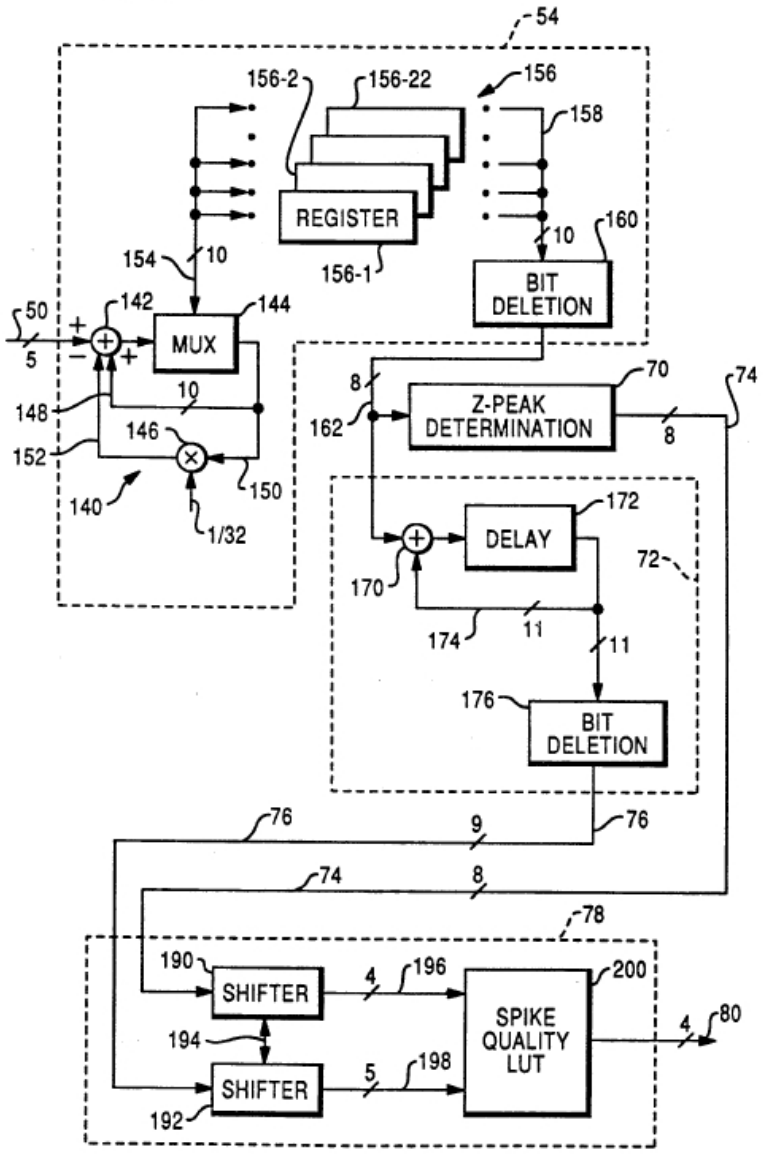
The '006 patent is directed to a WLAN using a single channel and a spread spectrum communication technique, specifically direct sequence spread spectrum ("DSSS") using a spreading code. More specifically, the '006 patent is directed to faster transmission signal carrier detection in such a system. A functional block diagram of the system is shown in Fig. 2.

FIG. 2



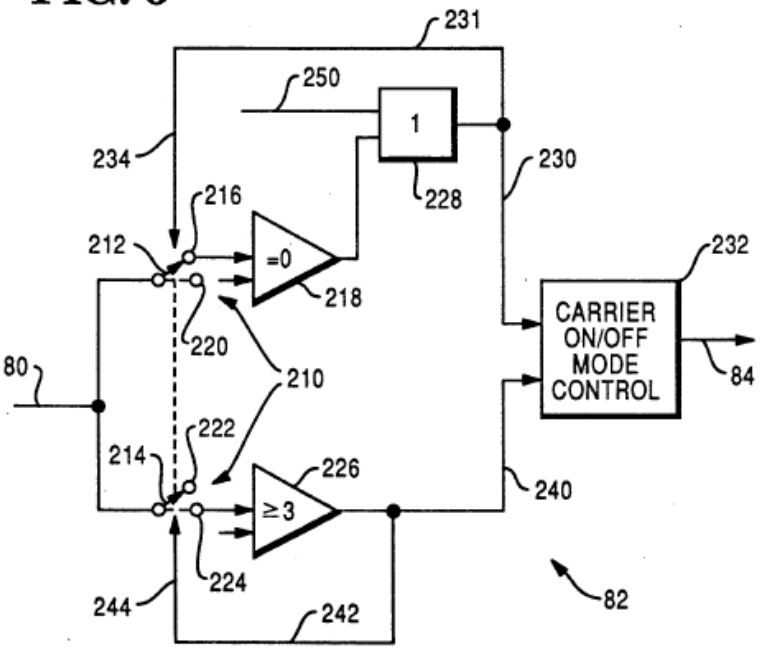
The R signal 50 (i.e., amplitude portion of polar converter output) is applied to circuitry for determining Z peak (block 70) and Z total (block 72). These values are applied to circuitry for determining spike quality (block 78). A spike quality value is applied to circuitry for carrier detection (block 82). The circuitry for determining Z peak and Z total is diagrammed in Fig. 5.

FIG. 5



The circuitry for carrier detection is shown in Fig. 6.

FIG. 6



E. The '428 patent

The '428 patent is directed to a WLAN using DSSS coding. A message transmitted over the network starts with a preamble and header. The header includes a field identifying the data rate to be used in transmitting the data field of the message and a length field identifying the number of bytes of data that are in the data field.

The IEEE 802.11 standard specified data transmission rates of either 1 or 2 Mbps. However, WLAN stations additionally operating at 5 or 8 Mbps were available, although not compliant with the 802.11 standard. Thus, a given WLAN could have stations operating at data rates above 1 or 2 Mbps. However, all stations would nevertheless operate at the same symbol rate (i.e., 1 MBaud).

A format of a typical message is shown in Fig. 4.

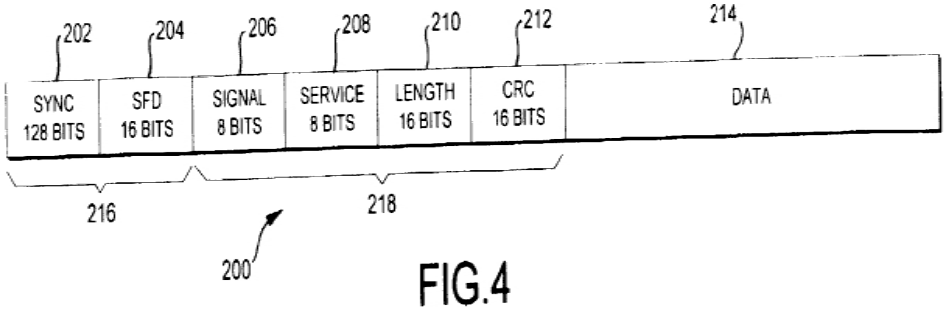


FIG.4

The length field 210 contains a value corresponding to the actual number of bytes in the data field 214 if the data transmission rate is 1 or 2 Mbps. If the data transmission rate is 5 Mbps, the value is a 2/5 fraction of the actual number of bytes, and if the data transmission rate is 8 Mbps, the value is a 2/8 fraction of the actual number of bytes. Thus, a receiving station would take the same amount of time to obtain the data transmission regardless of the data rate of the transmitting station.

F. The '887 patent

The '887 patent is directed to a WLAN access protocol. In the protocol, access to the wireless network is shared. According to the protocol, a transmitting station is required to surrender access to the network after it transmits a frame and waits for a period of time. This allows a waiting station to gain access to the network for transmission of a frame.

II. LEGAL PRINCIPLES

The claims of a patent define the invention to which the patentee is entitled the right to exclude. *Phillips v. AWH Corp.,* 415 F.3d 1303, 1312 (Fed. Cir. 2005) (*en banc*). Claim terms are given their ordinary and customary meaning to one of ordinary skill in the art at the time of

the invention, unless there is clear evidence in the patent's specification or prosecution history that the patentee intended a different meaning. *Phillips,* 415 F.3d at 1312–13. Claim construction is informed by the intrinsic evidence: the patents' specification and file histories. *Id.* at 1315–17. Courts may also consider evidence such as dictionary definitions and treatises to aid in determining the ordinary and customary meaning of claim terms. *Id*. at 1322. Further, "[o]ther claims, asserted and unasserted, can provide additional instruction because 'terms are normally used consistently throughout the patent.'" *SmartPhone Techs. LLC v. Research in Motion Corp.,* 2012 WL 489112, *2 (E.D. Tex. Feb. 13, 2012) (citing *Phillips*, 415 F.3d at 1314). "Differences among claims, such as additional limitations in dependent claims, can provide further guidance." *Id.*

A court should "avoid the danger of reading limitations from the specification into the claim." *Phillips*, 415 F.3d at 1323. For example, "although the specification often describes very specific embodiments of the invention, [the Federal Circuit has] repeatedly warned against confining the claims to those embodiments." *Id.* The Federal Circuit has "expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment." *Id*. This is not only because of the requirements of Section 112 of the Patent Act, but also because "persons of ordinary skill in the art rarely would confine their definitions of terms to the exact representations depicted in the embodiments." *Id.* Limitations from the specification should only be read into the claims if the patentee "acted as his own lexicographer and imbued the claim terms with a particular meaning or disavowed or disclaimed scope of coverage, by using words or expressions of manifest exclusion or restriction." *E-Pass Techs., Inc. v. 3 Com Corp*., 343 F.3d 1364, 1369 (Fed. Cir.

2003) (citations omitted); *Thorner v. Sony Computer Entm't Am. LLC*, 669 F.3d 1362, 1367 (Fed. Cir. 2012).

Similarly, the prosecution history may not be used to infer the intentional narrowing of a claim absent the applicant's clear disavowal of claim coverage. *Superguide Corp. v. DirecTV Enters*., 358 F.3d 870, 875 (Fed. Cir. 2004) (citations omitted). "To be given effect, such a disclaimer must be made with reasonable clarity and deliberateness." *Id.*

Finally, the Court notes that a patentee may set out the elements of a claim in a so-called means-plus-function format. 35 U.S.C. § 112, ¶ 6. The patentee may recite in the claim a "means for" achieving a certain function. In exchange for this convenience in claim drafting, the patentee must disclose corresponding structure in the specification. *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997). If the patentee fails to provide corresponding structure sufficient to enable a person of ordinary skill in the art to make and use the invention, then the claim is invalid. See 35 U.S.C. § 112, ¶ 1. If the patentee provides sufficient corresponding structure, then the claim scope encompasses that structure "and its equivalents." *Id*. at § 112, ¶ 6; *see also Default Proof Credit Card Sys. v. Home Depot U.S.A., Inc.*, 412 F.3d 1291, 1298 (Fed. Cir. 2005).

A corresponding structure need not enable the claimed invention, rather it need only "include all structure that actually performs the recited function." *Default Proof Credit Card Sys.*, 412 F.3d at 1298. A structure disclosed is only a "corresponding structure" if the "specification or prosecution history clearly links or associates that structure to the function recited in the claim." *Med. Instrumentation & Diagnostics Corp. v. Elekta*, 344 F.3d 1205, 1210 (Fed. Cir. 2003).

Guided by these principles of claim construction, this Court directs its attention to the patents-in-suit and the disputed claim terms.

III. CLAIM CONSTRUCTION

A. Agreed Claim Terms

The parties have agreed on the proposed constructions of the following terms: (1) "an analog-to-digital conversion means to provide a digital representation of a received signal;" (2) correlator means coupled to said analog-to-digital means to provide a plurality of signal samples;" (3) "peak determining means to determine the maximum value stored in said plurality of storage registers;" (4) "determining a peak value and total value for the averaged signal samples;" (5) "means (3,4) arranged to receive the superpositions of subcarriers expressing the symbols and to derive a K-fold repetition of each said superposition;" and (6) "non-data signals. . . being sequentially received with respect to said data signals." (claim 7 of '920 patent). The Court incorporates the parties' agreed constructions in attached Exhibit A.

B. Disputed Claim Term in the '786 and '972 patents

1. "plurality of signaling modes" ('786 patent, claims 1-3, 6-9); "first mode and a second mode" ('972 patent, claims 1, 11-12, 14); "first mode and at least one second mode" ('786 patent, claims 11-16, 19-35)

a. Parties Positions

The parties propose the following constructions for "plurality of signaling modes," and the two related phrases, as shown below.

Plaintiff	Defendants
Plain meaning: no construction necessary. Alternatively: One of a plurality of OFDM transmission modes	Multiple modes, including a mode at a fallback

	rate, for communication OFDM symbols in varying communication environments
A first OFDM transmission mode and a second OFDM transmission mode A first OFDM transmission mode and at least one second OFDM transmission mode	First and second modes, including a mode at a fallback rate, for communicating OFDM symbols in varying communication environments

b. Court's Construction

Plaintiff argues the terms require no construction. Alternatively, Plaintiff offers constructions, asserting it agrees with Defendants' proposal to limit the term to OFDM transmissions. The primary dispute between the parties focuses on whether the terms should be further construed to require a mode at a "fallback rate" so the claimed system can operate in "varying communication environments." Defendants assert they should, focusing on claim 1 from the '786 patent, which provides as follows:

> the apparatus is configured to selectively operate in one of a plurality of signaling modes in each of which the duration of each information-carrying symbol is KT where K is a positive integer, different ones of the plurality of signaling modes having different values of K but the same set of sub-carriers. . . .

'786 patent, 4:53-58.

Defendants assert the claims specify different symbol transmission durations, which they say means different rates of transmission. According to Defendants, one of the plurality of signaling modes includes a fallback rate. Plaintiff disagrees with Defendants' contention that the term is limited to a mode at a fallback rate. Nowhere, says Plaintiff, is fallback rate mentioned. Instead, it contends the only reference is to "fallback mode," and this is only an aspect of a preferred embodiment and not defining of the claimed invention.

Plaintiff further contests Defendants' attempt to limit the term to operations in a "varying communications environment." Plaintiff argues nothing in the claims specifies where the OFDM transmissions are to occur. Defendants point to the specification and comments made during prosecution of a European counterpart application as characterizing the present invention as providing fallback rates and thereby affording flexibility in an OFDM system to adapt to a "variety of communication environments." *See* '786 patent, Background of Invention, 1:43-45. Thus, Defendants assert the term must be limited to an OFDM "fallback rate" mode of transmission. Defendants further argue that a "fallback rate" mode is more than the preferred embodiment; it is the invention. In support, they point to the specification statement in col. 1:51-52: "The present invention is intended to provide fallback rates with a minimum change in hardware."

Defendants also contest Plaintiff's proposed construction as being so overly broad as to recapture subject matter expressly claimed during prosecution. Specifically, according to Defendants, Plaintiff's construction is so expansive as to allow "plurality of signaling modes" to cover a single OFDM transmission of a frame having a preamble used for frequency synchronization and a payload of data. That is, the preamble transmission would be one signaling mode and the payload would be a second signaling mode. Defendants contend the patentees disclaimed frequency synchronization as a signaling mode in distinguishing *Kishimoto et al.* in their response to the Office Action of October 3, 2003 (Ex. 4 to Defendants' Responsive Claim Construction Brief)(Docket Entry # 485).

Claim 1 of the '786 patent expressly requires *each* of the signaling modes to have an information-carrying symbol of a duration KT, and different signaling modes have different

values for the integer K. Thus, each of the different OFDM signaling modes has a different data transmission rate. However, nowhere does the claim specify there to be a "normal" data transmission rate and a "fallback" data transmission rate as in the preferred embodiment.

Defendants' inclusion of a mode specifically at a "fallback rate" reads a limitation from the preferred embodiment into the claim. The statement in the specification provides an indication of what the present invention can provide: "fallback rates with a minimum change in hardware." But, that is only another expression of the preferred embodiment being a flexible OFDM system and contrasts it with prior techniques used to scale data rates in an OFDM system. '786 patent, 1:43-50. Specifically, a minimum change in hardware is realized by reason of using the same set of OFDM sub-carriers. '786 patent, 2:52.

In addition, the patentee confirmed in the prosecution history that the term "fallback mode" was used to "illustratively characterize" the preferred embodiment only. *See* Plaintiff's Ex. 9, 7/29/2002 Applicant Response to Office Action at pg. 7 ("In the preferred embodiment described for the invention, the OFDM system is arranged to selectively operate in a first signaling mode and a second signaling mode (the first mode being illustratively characterized as a normal mode and the second mode being illustratively characterized as a fallback mode.)").

Further, Defendants' proposed inclusion of "for communicating OFDM symbols in varying communication environments" imposes an intended use limitation, which is subjective and thus improperly vague. Accordingly, Defendants' proposed construction must be rejected.

The terms, contrary to Plaintiff's contention, do require construction. Also, Plaintiff's proposed construction merely rewrites "signaling mode" to "OFDM transmission mode," which

broadens the term. The claims already specify that the apparatus of claim 1 and the transmitter of claim 11 provide OFDM transmission. Thus, Plaintiff's alternative construction must be rejected.

The question is what does "signaling mode" mean to one of skill in the art. As described, a stream of data bits is partitioned into successive blocks of coded data bits and applied to a quaternary phase-shift keying ("QPSK") modulator.[1] The symbol blocks are applied to an Inverse Fast Fourier Transform ("IFFT") circuit producing a set of *N* OFDM sub-carriers. Thus, the IFFT is performed on blocks of 2N coded bits. '786 patent, 3:24-44. Each block is a pattern of bits that forms an OFDM "symbol" "signaling" a particular pattern of bits in the block.

The OFDM symbol produced, and "signaling" a particular pattern of bits, will have a symbol period of duration KT. The duration KT of the symbol period can be selectively switched between "modes" having different values of K. '786 patent, 1:61-64 and 3:49-53.

The specification indicates that "signaling" refers to an OFDM symbol transmission. The specification also indicates that "mode" refers to a symbol rate. The term "signaling mode" means "an OFDM symbol transmission at a symbol rate."

Accordingly, the Court construes the term "plurality of signaling modes" ('786 patent: claims 1-3, 6-9 and '972 patent: claims 1, 11-12 and 14)) to mean "OFDM symbol transmission at one of a plurality of symbol rates."

The Court construes "first mode and a second mode"/ "first mode and at least one second mode" ('786 patent, claims 11-16, 19-35) to mean "OFDM symbol transmission at one of at least a first symbol rate and a second symbol rate."

[1] QPSK modulation has four phases and can encode two bits per symbol (i.e., 2^2 or four binary states).

Given the rejection of Plaintiff's proposed construction, Defendants' disclaimer argument is moot. However, the Court observes that application claim 38 under rejection included a limitation of "a filter operative to average an input over K intervals, each interval having a duration T." That limitation is separate from the "plurality of signaling modes" limitation. In their responsive remarks to the rejection of claim 38, the applicants merely noted that *Kishimoto* is directed to frequency synchronization in an OFDM system.[1] The primary focus of the remarks was on the SAW filter shown in *Kishimoto* and an argument that the filter limitation of claim 38 was not met.[2] As to the "signaling modes" limitation in claim 38, the applicants disputed the examiner's reliance on *Kisimoto's* characterization of an OFDM signal as being a superposition of a plurality of sub-carriers having different frequencies.[3]

Contrary to Defendants' contention, the prosecution history remarks do not speak to "signaling modes" in relation to "frequency synchronization." However, given the Court's construction of "signaling modes," an OFDM transmission of a frame's preamble and its payload do not constitute "a plurality of signaling modes." Both the frame preamble and its payload would be in an OFDM transmission at a single symbol rate (i.e., one signaling mode).

C. Disputed claim terms in the '920 patent

1. "non-data signal" (claim 7)

a. Parties' Positions

The parties propose the following constructions for "non-data signal" which occurs in

[1] Ex. 4 to Defendants' Responsive Claim Construction Brief (Docket Entry # 485-5 at pg. 11).

[2] *Id.*

[3] *Id.*

claim 7 of the '920 patent.

Plaintiff	Defendants
A signal that can be distinguished from a data signal by its physical appearance	A signal that is transmitted with a different spreading code than a data signal such that it can be distinguished from a data signal by its physical appearance as opposed to its data content

b. Court's Construction

Plaintiff contends this term is characterized in the specification, as both parties contend, as being a signal that can be distinguished from a data signal by its physical appearance. However, Plaintiff argues the term should not necessarily be limited to a different spreading code as in the preferred embodiment. Relying on among other things the Summary of the Invention, which provides that "data symbols and non-data symbols are transmitted via a spread spectrum signal and are spread via first and second spreading codes, respectively,"[4] Defendants contend the scope of the specification only provides a difference in spreading codes as the technique to distinguish a non-data signal from a data signal. Defendants characterize a difference in applied spreading codes as being in accordance with "the present invention." Defendants further contend the enabled scope of the term is limited to a different spreading code for a non-data signal from that of a data signal. Defendants also assert the recitation in the claim of "transmitted in said spread spectrum signal…" necessarily requires use of a spreading code.

Plaintiff asserts the claim language nowhere requires use of a spreading code. Further, according to Plaintiff, absent in the specification is any expression of manifest exclusion limiting a non-data signal to a particular spreading code.

[4] '920 patent, 2:19-25.

The reference in the specification to transmission by "spread spectrum" to avoid multi-path fading does not alone impose a specific requirement for the use of a spreading code. Spread spectrum transmission merely refers to spreading the transmission bandwidth in the frequency domain. Use of a spreading code is called Direct Sequence Spread Spectrum ("DSSS") transmission. Another type of spread spectrum transmission, which is also usable in a WLAN, is Frequency Hopping Spread Spectrum ("FHSS"). *See*, Saleh, et al., U.S. Pat. No. 5,048,057 issued Sept. 10, 1991 (the filing date of the '920 patent).[5]

However, the scope of the specification extends to only a DSSS form of spread spectrum signal transmission. Thus, "spread spectrum signal" in the preamble of claim 7, when read in view of the specification, is necessarily a DSSS transmission signal. Moreover, other limitations in the claim so indicate DSSS transmission.

The specification describes symbols as being used to transmit the information signals that form a frame and further says a "non-data symbol" is distinguished from a "data symbol." '920 patent, 3:50-54. The reference there is not, however, specific to "non-data signal" and "data signal" as recited in the claim. In addition, the specification refers to "data information" and "non-data information." '920 patent, 4:65-66. Yet further, the specification refers at the same time to both "data symbols" and "non-data signals." '920 patent, 3:56-57. Thus, "symbols" and "signals" appear to be used interchangeably as the parties appear to agree.

The specification describes the "present invention" as being the use of a start delimiter and an end delimiter, which requires distinguishing them from other information in a frame. '920

[5] Saleh also identifies DSSS transmission in addition to FHSS.

patent, 6:58-66. In order to do so, the delimiters are made up of a pattern consisting of both data and non-data symbols. '920 patent, 7:7:2-4. The two types of symbols are distinguished in their physical appearance by making them orthogonal to one another in a pair of complex valued signals. '920 patent, 7:13-16, 19 and 21-22. Claim 7 expressly makes this distinction by reciting "non-data signals being generally orthogonal to said data signals." Thus, a distinction based on physical appearance of being "orthogonal" is already present as a claim limitation. Plaintiff's construction is redundant of the "orthogonal" imitation already present in the claim that distinguishes a non-data signal from a data signal.

The preferred embodiment describes that a physical appearance of "orthogonality" between data signals and non-data signals in a DSSS transmission is achieved by using spreading codes that are themselves orthogonal (i.e., they do not correlate). These spreading codes are "time reversed" sequences (i.e., one sequence is the reverse order of the other) as shown in Table 1 and Table 2.

TABLE 1

DATA SYMBOL SPREADING CODE
+1 −1 +1 +1 −1 +1 +1 +1 −1 −1 −1

TABLE 2

NON-DATA SYMBOL SPREADING CODE
−1 −1 −1 +1 +1 +1 −1 +1 +1 −1 +1

A physical appearance of "orthogonality" between data signals and non-data signals is presented in the preferred embodiment by reversed spreading codes. That is, the non-data spreading code is the reverse order of the data spreading code. As a result, a non-data symbol (signal) is characterized by having been spread by a spreading code that is different from the

spreading code used for a data symbol (signal). The specification defines the data and non-data symbols (signals) in relation to the spreading codes used in their transmissions.

Defendants' construction, however, defines the term according to how it is transmitted ("with a different spreading code") rather than what constitutes a "non-data signal." Both data and non-data signals are also transmitted by DPSK modulation. But, that also describes an aspect of how they are transmitted and not what they are.[6]

The only distinction between data signals and non-data signals given in the specification is that non-data signals transmitted in the spread spectrum signal will correlate with a different spreading code than a data signal transmitted in the spread spectrum signal. '920 patent, 4:62-66. That is, a non-data signal will not correlate with the same spreading code that a data signal will correlate with.

Accordingly, the Court construes "non-data signal" to mean "a signal that does not correlate with the same spreading code to which a data signal correlates."[7]

2. "first receiving means. . . " (claim 7) / "second receiving means. . . " (claim 7)

a. Parties' Positions

The parties propose the following constructions for "first receiving means for receiving data signals transmitted in said spread spectrum signal," which occurs in claim 7 of the '920 patent.

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[6] The specification states the criteria for selection of non-data symbols will be discussed, but it never does so. '920 patent, 3:54-55.

[7] As indicated by the parties' constructions of the remaining limitations, correlation is a central aspect to the claimed subject matter.

Plaintiff	Defendants
35 U.S.C. § 112 ¶6 Function: Receiving data signals transmitted in said spread spectrum signal Structure: An analog to digital converter and correlator, or equivalents	35 U.S.C. § 112 ¶6 Function: Receiving data signals transmitted in said spread spectrum signal Structure: Band pass filter 150, a digital down converter (shown as 155, 170, 165, 160), analog-to-digital converters 172 and 174, data correlators 175 and 180, rectangular-to-polar converter 185, symbol clock recovery circuit 210, and DQPSK receiver 215.

The parties propose the following constructions for "second receiving means, coupled to said first receiving means, for receiving non-data signals transmitted in said spread spectrum signal," which occurs in claim 7 of the '920 patent.

Plaintiff	Defendants
35 U.S.C. § 112 ¶6 Function: Receiving non-data signals transmitted in a said spread spectrum signal Structure: An analog to digital converter and correlator, or equivalents	35 U.S.C. § 112 ¶6 Function: Receiving non-data signals transmitted in a said spread spectrum signal Structure: Band pass filter 150, a digital down converter (shown as 155, 170, 165, 160), analog-t0-digital converters 172 and 174, data correlators 175 and 180, rectangular-to-polar converter 185, symbol clock recovery circuit 210, and DQPSK receiver 215.

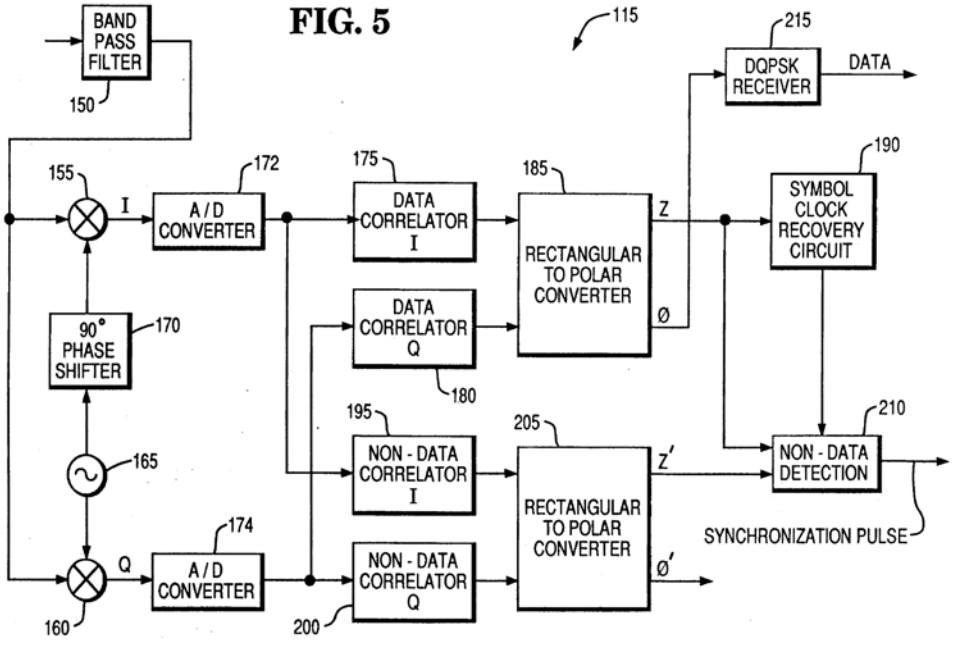
b. Court's Construction

The parties agree as to the function but disagree as to the corresponding structure. According to Plaintiff, the data signal is received at the point where the data signals in the transmitted spread spectrum signal have been converted to a digital form and "de-spread" to

retrieve a representation of the original data. Thus, Plaintiff asserts the corresponding structure for the "first receiving means" is constituted by A/D converters 172, 174 and Correlators 175, 180. On the same basis, Plaintiff identifies the corresponding structure for the "second receiving means" as A/D converters 172 and 174 together with correlators 195 and 200.

Defendants contend the specification links the receiving function to receiver 115 and is inclusive of all the functional component blocks shown in Fig. 5.

The functions are written in the claims as "receiving data/non-data signals transmitted in



said spread spectrum signal." However, the claim preamble also recites "receiving" in relation to a spread spectrum signal. Thus, the term "receiving" in the body of the claims is used in a different context from its use in the preamble.

The specification, however, makes clear that in relation to the data and non-data signals, the "receiving. . . in said spread spectrum signal" function is one of "detecting" those data and

non-data signals. '920 patent, 4:43-46 and 7:26-30. The function in the claim of "receiving data signals" is serving to designate a "detecting" function. Thus, the function is construed to mean "detecting data signals transmitted in said spread spectrum signal."

The specification links receiving of the DPSK spread spectrum signal to antenna 120, bandpass filter 150, and mixers 155, 160 that produce I and Q baseband signals. '920 patent, 4:43-55. The A/D converters 172 and 174 are not linked to either receiving the DPSK spread spectrum signal or to detecting data and non-data signals. They merely serve a converting function to take signals from an analog form to a digital form. '920 patent, 4:56-62. These components are not expressly set forth in the claim as limitations. But, the open-ended transition "comprising" admits to their inclusion as additional elements of a receiver embodiment in accordance with the disclosed embodiment covered by the claim.

The receiver 115 is described as having two paths for "complex valued input signals." '920 patent, 7:20-22. These signals are I, Q pairs produced by mixers 155 and 160. The coupling of the second receiving means to the first receiving means set forth in the claim is reflected by the connections that apply I, Q pairs to both paths.

As described, each path contains a correlator pair. The first path has correlator pair 175 and 180. The second path has correlator pair 195 and 200. '920 patent, 7:22-25.

Correlators 175, 180, 195, and 200 are clearly specified as functioning to "de-spread" the data and non-data signals. '920 patent, 4:58-66 and 5:9-17. Such "de-spreading" is part of the "detecting" function. Converters 185 and 205 function to provide a polar representation of the

data signals and the non-data signals as vectors having a length (magnitude) Z and an angle .. '920 patent, 4:67-5:8 and 5:17-24.

The output of converter 185, which represents the data signals transmitted in the spread spectrum signal are applied to DQPSK receiver 215 "to finally recover the data." '920 patent, 5:64-68.

Accordingly, the corresponding structure to the "detecting" function of the "first receiving means" includes: correlators 175 and 180, converter 185, and DQPSK receiver 215. '920 patent, 7:20-26 and 5:64-68.

Similarly, the corresponding structure to the "detecting" function of the "second receiving means" includes: correlators 195 and 200, converter 205, and non-data detection 210. '920 patent at col. 7:24-30 and col. 5:17-28. As described, non-data detection 210 is a comparator. '920 patent, 5:28-48.

3. "non-data signals being generally orthogonal to said data signals " (claim7)

a. Parties' Positions

The parties propose the following constructions for "non-data signals being generally orthogonal to said data signals" which occurs in claim 7 of the '920 patent.

Plaintiff	Defendants
Such that the correlation or crosstalk between the non-data signals and data signals is minimum, i.e., close to zero	Data and non-data signals each produce minimum cross-talk between the data and non-data correlators at each symbol timing moment

b. Court's Construction

The primary dispute between the parties is whether the "generally orthogonal" limitation requires that "crosstalk" be determined at the symbol timing moment. According to Plaintiff, the term means that crosstalk between the data and non-data signals is minimum (i.e., close to zero). Defendants agree the term refers to the amount of crosstalk present. But, they contend the crosstalk amount is determined at each symbol timing moment.

The specification states that the data and non-data signals do not have to be made completely orthogonal. '920 patent, 7:35-38. Thus, "generally orthogonal" means "not completely orthogonal."

Further, in the context of orthogonal signals, the specification describes that there should be a minimum of "crosstalk" between the two receive paths at the symbol timing period. '920 patent at col. 7:38-41. Thereafter, the specification defines "crosstalk" as referring to "the output of the non-data correlators caused by reception of data symbols and the output of the data correlators caused by reception of non-data symbols." '920 patent at col. 7:41-44. Thus, when the data and non-data signals are "generally orthogonal," there is minimal "crosstalk" between the outputs of the data and non-data correlators.

The parties' constructions express a *result* that obtains when the data and non-data signals are generally orthogonal. But, their constructions do not express how to determine if data and non-data signals *are* generally orthogonal.

As described, a data signal produces a Z vector output from converter 185. Similarly, a non-data signal produces a Z' vector output. If the dot product (aka scalar product) of vectors Z

and Z' is close to zero (i.e., $Z \cdot Z' \approx 0$), the data and non-data signals are generally orthogonal. *See* Webster's Ninth New Collegiate Dictionary (1983) at 833: orthogonal (b) of vectors: having the scalar product equal to zero.

The specification describes that the vector comparison occurs at the symbol timing moment. '920 patent, 5:28-32 and 6:13-15. The operation is further shown in Fig. 6 and illustrates the symbol timing moments. '920 patent, 6:1-31.

The Court construes "non-data signals being generally orthogonal to said data signals" to mean "a dot product of vectors representing the data signals and vectors representing the non-data signals at each symbol timing moment is near zero."

D. Disputed claim terms in the '006 patent

1. "integrator and storage means. . . " (claims 1-2)

a. Parties' Positions

The parties propose the following constructions for "integrator and storage means including a plurality of storage registers to store values of integrated representations of said plurality of signal samples," which occurs in claims 1 and 2 of the '006 patent.

Plaintiff	Defendants
35 U.S.C. § 112 ¶6 Function: Storing values of integrated representations of said plurality of signal samples Structure: More than one storage register, or equivalents Integrator construed based on plain and ordinary meaning	35 U.S.C. § 112 ¶6 Function: Storing values of integrated representations of said plurality of signal samples Structure: The leaky integrator and registers shown in Figs. 2 and 5

b. Court's Construction

The primary dispute between the parties is whether the structure includes a leaky integrator. Plaintiff asserts "integrator" is not part of the MPF clause because it does not participate in the specified "storing" function. Thus, only more than one storage register constitutes the corresponding structure. Specifically, Plaintiff points to the language of "integrated representations" as indicating that an integrating operation is not part of the specified function.

Defendants contend the term expressly combines an integrator and storage. Nowhere, according to Defendants, does the specification refer to them separately.

The function is not simply "storing" but rather "storing values of integrated representations." The function implicates an operation of integration to provide values of integrated representations. Moreover, the claim language says "including" storage registers and not "consisting of" storage registers, which is how Plaintiff reads the language.

The function, properly construed, is clearly linked to block 54 in the functional diagram of Fig. 2. The circuitry of functional block 54 is shown and described in detail as to its structure in Fig. 5. As Defendants point out, the specification refers to block 54 in the sense of a combined structure rather than a separate integrator structure and storage register structure. Defendants' Responsive Claim Construction Brief at pgs. 14-15 (Docket Entry # 485 at 19-20). Specifically, the specification identifies a structural element of "integrator and storage means (54)." '006 patent at 10:51-53 and 11:10-13.

The corresponding structure is block 54 shown in Fig. 5 and includes the circuit components shown there and described in col. 4:12-42.

2. "spike quality determining means…" (claims 1-2)

a. Parties' Positions

The parties propose the following constructions for "spike quality determining means to provide a quality value signal representative of said received signal, with said quality being dependent upon said maximum value and said total value," which occurs in claims 1 and 2 of the '006 patent.

Plaintiff	Defendants
35 U.S.C. § 112 ¶6 Function: Providing a quality value representative of said received signal Structure: A circuit that determines and provides a value representative of the quality of the received signal using circuitry (such as a lookup table) configured to use the maximum or highest value and the total value of the signal, or equivalents	35 U.S.C. § 112 ¶6 Function: Providing a quality value representative of said received signal Structure: A look up table as shown in Fig. 5, with the peak value and the total value to the table, and where the output value increases as the peak value increases and the total value decreases, as shown in Table 1. A sifter circuit that shifts the input to the LUT by 0, 1, 2, 3, or 4 bit positions, depending on the input value.

b. Court's Construction

Plaintiff contends the corresponding structure is not a look-up table ("LUT"). However, if it is the corresponding structure, Plaintiff asserts the LUT is not the exact one described in the specification because that would incorporate structural details that are not necessary to performing the function. Defendants point to circuit 78 shown in Fig. 5 as the corresponding structure, including shifters 190/192 and LUT 200 shown in Table 1.

The specification clearly links spike quality determination to circuit 78 in Fig. 5. '006

patent, 4:61-63. The LUT 200 must be addressed in order to provide a quality value signal. Also, for the quality value signal to be representative of the received signal, the addressing must be based on quantification of the received signal. The Z-peak and Z-total values provide that quantification. Thus, they are shown applied as inputs to circuit 78. '006 patent, 4:61-63. Address signals for the LUT 200 are generated by shifters 190/192 based on the Z-peak and Z-total values. '006 patent, 4:63-5:8. The shifters serve to relate Z-peak and Z-total in a manner that properly maps their relationship to the LUT values that represent spike quality values.

Defendants' identification of corresponding structure is correct and is adopted by the Court.

3. "carrier detection means…" (claims 1-2)

a. Parties' Positions

The parties propose the following constructions of "carrier detection means responsive to said quality value signal to provide a carrier detect signal," which appears in claims 1 and 2 of the '006 patent.

Plaintiff	Defendants
35 U.S.C. § 112 ¶6 Function: Providing a carrier detect signal Structure: A circuit that provides a carrier detect signal based on a predetermined threshold, or equivalents	35 U.S.C. § 112 ¶6 Function: Providing a carrier detect signal Structure: Circuits shown in Fig. 6 configured to: (i) output the presence of a carrier if the spike quality value is greater than or equal to a first threshold, and (ii) output the absence of a carrier if the spike quality value is equal to a second, lower threshold

b. Court's Construction

Plaintiff agrees with Defendants' construction as to item (i) but disagrees that item (ii) is linked to the function of carrier detection. Defendants argue the linked structure is carrier on/off detection circuit 82, and detection is both as to whether a carrier is present and whether a carrier is absent.

Defendants are correct that circuit 82 is clearly linked to the function. However, Defendants' construction seeks to characterize circuit 82 according to their own notion of circuit 82's "configuration." The diagram of Fig. 6 shows the configuration of circuit 82 and that configuration is further described in the specification. '006 patent, 7:49-8:25. Also, as described, a carrier detect signal indicates both whether a carrier is detected or is not detected. That is, a carrier detect signal has two states: carrier present and carrier absent.

The corresponding structure is circuit 82 shown in Fig. 6 and as described in the specification.

4. "determining a spike quality value…" (claims 12-14)

a. Parties' Positions

The term "determining a spike quality value based on said peak value and said total value" appears in claims 12-14 of the '006 patent.

Plaintiff	Defendants
Plain meaning: no construction necessary. Alternatively: Determining a value representing the spike quality of a sampled signal, the determination being based on the peak value and total value of the sampled signal	Comparing the peak value to the total value to determine an overall signal quality value

b. Court's Construction

Plaintiff asserts no construction is necessary, but alternatively proposes the construction noted above. Plaintiff disputes Defendants' characterization of the term as meaning a comparison operation that leads to an overall signal quality value.

Defendants assert the term "spike quality value" is coined. In giving meaning to the term, Defendants contend it must be characterized according to how it is obtained: comparing the peak value to the total value. Further, Defendants contend the term means an overall signal quality value is determined. Defendants describe peak value as being the level of actual signal present and describe total value as the level of both signal and noise present. According to Defendants, comparison of peak value to total value yields an indication of the signal-to-noise ratio, which is indicative of the quality of the received signal.

Plaintiff fails to provide a definition of "spike quality value." Plaintiff's construction rearranges the words and limits them to a sampled signal.

The Court agrees with Defendants that the term is coined; it is not a term of art. Defendants are also correct that the patentees were not seeking to be their own lexicographer. Further, Defendants' characterization of the term as meaning a measure of the signal-to-noise ratio in the channel of the received signal is correct. In addition, the signal-to-noise ratio is a measure of the overall signal channel quality.

Defendants' construction, however, misapplies "spike quality value" to signal quality. A signal-to-noise ratio is indicative of communication channel quality.[1] Consistent with such

[1] '006 patent, 5:50-55 provides as follows: "It will be appreciated that a spike quality value of 15 indicates very good *signal reception quality* whereas a spike quality value of 0 indicates that *no signal is received*. An intermediate spike quality value indicates an intermediate signal quality *reception condition.*" (emphasis added). This refers to the quality of the signal

application, claims 12-14 are specific to a wireless "communication channel" over which a received signal is transmitted. Further, during the technology tutorial presented at the hearing, Defendants' expert characterized the signal-to-noise ratio as being with regard to the quality of the channel.

The Court construes "determining a spike quality value based on said peak value and said total value" to mean "determining a signal-to-noise ratio value for the communication channel based on said peak value and said total value."

E. Disputed Claim Term in the '428 patent

1. "a length segment representing the length of time which would be required for a transmission of said data portion at one of said plurality of data rates" (claims 1, 3)/ "wherein said length segment represents the length of time which would be required for a transmission of said data portion. . . " (claim 2)

a. Parties Positions

The parties propose the following constructions for these terms.

Plaintiff	Defendants
Plain meaning: no construction necessary. Alternatively: a portion of a message that signifies the transmission time of a data portion at a data rate; wherein a portion of a message signifies the transmission time of the data portion at a second predetermined data rate that is different from the selected data rate	A segment expressed in units of length that is used to compute the time required for a transmission of said data portion at one of said plurality of data rates Said length segment represents the length of time which would be required for a transmission of said data portion means "said segment expressed in units of length that is used to compute the time required for transmission of said data portion." Plain meaning for the remaining portion of the claim term

(communication) channel, not a signal itself.

b. Court's Construction

Plaintiff contends no construction is required but offer an alternative proposed construction. The primary dispute between the parties is whether the claimed "length segment" must be "representative" of the transmission time as proposed by Defendants or can include a direct statement of time as proposed by Plaintiff.

Plaintiff faults Defendants' construction because it requires the length segment to be expressed in units of length. According to Plaintiff, the term only expresses a length of time without associated units. Defendants argue the term expresses a representation of time measurement and not a direct statement of time. According to Defendants, the length segment allows a calculation of time based on the amount of data to be transmitted and the data transmission rate. Defendants further assert bytes are units of data length as shown in the specification.

Defendants' construction is cast not in terms of what a length segment is but rather how it is used (i.e., to compute the time required for transmission of said data portion…), which is improper. Further, Defendants' construction is vague and unhelpful in requiring the segment to be "expressed in units of length."

Plaintiff's proposed construction properly captures the plain meaning of the phrase. First, it must be recognized that the phrase expresses that the length segment representation is based on both the data portion, which inherently includes an amount of data, and the data rate, which inherently includes a time dimension (e.g., bits per second).

Second, consistent with the specification, the representation of the length of time accrues from a calculation based on the amount of data and the data rate (data amount ÷ data rate =

transmission time). Thus, the length segment, by reason of containing a value corresponding to the amount of data divided by the data rate, represents the length of time required to transmit the data portion at the selected data rate.

The specification describes the length segment of a message as containing a value that is based on the amount of data (i.e., number of bytes) in the data field 214 and the bit rate (i.e., data rate). However, the discussion there is in the context of illustrating transmitting the data field between network stations on the basis of the *same* transmission time when the stations are operating at different data rates. '428 patent, 3:42-4:24 and 2:27-29. The phrase in dispute does not characterize the length segment in terms of the *same* transmission time.

The discussion in the specification based on same transmission time leads to the length segment containing a value that is an equivalent amount of data for a given transmission time and data rate. That is, the value is time x data rate = amount of data. If the data rate increases, as shown in the example of the specification, the value expressing the amount of data being transmitted must be changed accordingly to indicate a fractional amount of the actual data. '428 patent, 4:14-24.

Although the illustration in the specification is based on the length field 210 containing an amount of data, the phrase does not indicate that. Thus, Defendants' proposed construction is inconsistent with the claim language. Defendants contend that because the specification discloses a length field defining the number of bytes or octets in the payload, the claim must be construed consistent with that disclosure. Defendants support their contention with the argument that if the length segment is expressing a value in units of time, there is no need for the disclosed translation scheme. Further, say Defendants, the specification only refers to length of time in regard to how

long the receiving station will defer transmitting after it has applied the translation scheme to calculate the transmission's duration.

Essentially, what Defendants ask the Court to do is rewrite the claim language to match the specification disclosure. The Court is not permitted to do that. *Chef Am., Inc. v. Lamb-Weston, Inc*., 358 F.3d 1371, 1374 (Fed. Cir. 2004) (courts "construe the claim as written….").

The phrase means "the length segment contains a numerical value corresponding to the amount of data in the data portion divided by the selected data rate." This is what Plaintiff's construction states. Plaintiff's construction is therefore adopted.[2]

F. Disputed claim terms in the '887 patent

1. "means for broadcasting. . . " (claims 1, 7)

a. Parties' Positions

The parties propose the following constructions for this term, which occurs in claims 1 and 7 of the '887 patent.

Plaintiff	Defendants
35 U.S.C. § 112 ¶6 Function: Broadcasting [the/a] [first/second][frame/data frame] Structure: LAN controller, transceiver and equivalents	35 U.S.C. § 112 ¶6 Function: Broadcasting [the/a] [first/second][frame/data frame] Structure: A transceiver (20) disclosed in Fig. 2 and col. 3:36-37, an antenna (14) disclosed in Fig. 2 and col. 3:19-20, and a LAN controller (22) disclosed in Fig. 2 and col. 3:35-46; 4:9-11

[2] The Court notes Defendants' argument that the specification never describes a solution in which the length segment is expressed in time and only describes the length segment as being expressed as an amount of data. However, this issue appears to the Court to be one of invalidity rather than one of claim construction. That is, in view of the specification, the "length segment" phrase does not particularly point out and distinctly claim what the inventors regarded as their invention, which was that the length segment contains a value that is an amount of data.

b. Court's Construction

Plaintiff identifies LAN Controller 22 and Transceiver 20 in Fig. 2 as corresponding structure. However, Plaintiff says the LAN controller is not required to be a CSMA/CD controller. Defendants identify the CSMA/CD LAN Controller 22 and Transceiver 20 of Fig. 2 as corresponding structure. Further, Defendants contend that absent an antenna 14 the station 12 in Fig. 2 could not broadcast or transmit.

As Defendants contend, the specification clearly and specifically links LAN Controller 22 described as operating in accordance with the CSMA/CD protocol and the IEEE 802.3 standard to the broadcasting function. '887 patent, 4:8-16. Necessarily, transceiver 20 and antenna 14 are required structures to permit broadcasting in a wireless network.

The scope of the disclosure is the adaptation of a CSMA/CD LAN Controller to a wireless network. '887 patent, 4:67-5:25. Therefore, the corresponding structure is a CSMA/CD LAN Controller. Contrary to Plaintiff's assertion, a CSMA/CD LAN Controller does perform a function of broadcasting. Only an aspect of its broadcasting function is to defer broadcasting of frames.

Defendants' identification of structure is correct and is adopted by the Court.

2. "means for deferring, during a predetermined time period, broadcasting of a second frame of information . . . (second data frame)" (claims 1, 7)

a. Parties' Positions

The parties propose the following constructions for "means for deferring, during a predetermined time period, broadcasting of a second frame of information, said predetermined time period (a) beginning at a point in time immediately after completion of broadcast of the first

frame, and (b) being calculated to allow said client station to gain access to the network," which occurs in claims 1 and 7 of the '887 patent.

Plaintiff	Defendants
35 U.S.C. § 112 ¶6 Function: Deferring, during a predetermined time period, broadcasting of a second frame of information, said predetermined time period (a) beginning at a point in time immediately after completion of broadcast of the first frame, and (b) being calculated to allow said client station to gain access to the network Structure: LAN Controller and equivalents	35 U.S.C. § 112 ¶6 Function: Deferring, during a predetermined time period, broadcasting of a second frame of information, said predetermined time period (a) beginning at a point in time immediately after completion of broadcast of the first frame, and (b) being calculated to allow said client station to gain access to the network Structure: The LAN Controller (22) disclosed in Fig. 2, programmed with the algorithm disclosed in cols. 9:5-43; 4:51-61. The disclosed algorithm consists of the following steps: 1. Determine the "maximum first backoff" time of the client station by applying the formula 2k+R. 2. Execute a number of no operation instructions ("NOPs") that is predetermined to be greater than the maximum first backoff time that was calculated in step 1 for the client station.

b. Court's Construction

The parties agree on the function but dispute whether the algorithm disclosed in the specification must be part of the corresponding structure. Plaintiff identifies LAN Controller 22 as the corresponding structure. Defendants contend the LAN Controller 22 must operate in accordance with the CSMA/CD protocol. Defendants further assert the specification identifies that the CSMA/CD protocol-based controller must be adapted by specific programming to

perform the claimed function. Plaintiff asserts the function does not require implementation in accordance with a particular algorithm.

The specification describes CSMA/CD LAN Controller 22 in a Server station 12-1 as being modified to operate on the basis of an additional TxGAP delay period to allow a waiting workstation to gain access to the network before the server begins to broadcast a second frame. The specification indicates there is a delay timer in LAN Controller 22 that begins and ends as specified in the claim. '887 patent, 9:21-26. The specification further describes that the delay timer is "programmed" into the LAN controller. '887 patent, 9:40-43. Thus, the delay timer is a "software" timer that requires an algorithm. An algorithm can be set forth in prose in the specification as a step-by-step procedure. *Typhoon Touch Techs., Inc. v. Dell, Inc.*, 659 F.3d 1376, 1386 (Fed. Cir. 2011). The specification of the '887 patent does so, and Defendants' construction correctly sets forth the steps of that procedure. Defendants' Responsive Claim Construction Brief at pg. 24 (citing '887 patent, 9:37-40).

Defendants also correctly point out that LAN Controller 22 is identified as a commercially available controller requiring reprogramming with the disclosed algorithm to perform the claimed function. Defendants' proposed construction is correct and is adopted by the Court.

3. "means for deferring broadcast of a third frame of information. . . " (claims 1, 4, 7-8)

a. Parties' Positions

The parties propose the following constructions of "means for deferring broadcasting of a third frame of information by said client station (a) during broadcasting of the first frame by said server station, and (b) during a first random time period which begins at the point in time immediately after completion of broadcast of the first frame," and the related claim phrase, which

appear in claims 1, 4 and 7-8 of the '887 patent.

Plaintiff	Defendants
35 U.S.C. § 112 ¶6 Function: Deferring broadcasting of a third frame of information by said client station (a) during broadcasting of the first frame by said server station, and (b) during a first random time period which begins at the point in time immediately after completion of broadcast of the first frame Structure: LAN Controller, signal generator circuit and equivalents *[and related function/structure for related claim phrase]*	35 U.S.C. § 112 ¶6 Function: Deferring broadcasting of a third frame of information by said client station (a) during broadcasting of the first frame by said server station, and (b) during a first random time period which begins at the point in time immediately after completion of broadcast of the first frame Structure: The Signal Generator (40) and LAN Controller (22) disclosed in Figs. 2, 3A, and 3B. The LAN Controller is "suitable for the CSMA/CD (carrier sense multiple access with collision detection) protocol." *[and related function/structure for related claim phrase]*

b. Court's Construction

Plaintiff contends the corresponding structure includes LAN Controller 22 and signal generator 40. However, Plaintiff asserts that the exact details of those structures as shown and described in the specification are not necessary.

Defendants point out this term imposes a limitation on the client station to defer broadcasting for a random time period immediately after a server broadcast. Further, Defendants say, the specification clearly links the structures shown in the drawings and described in the specification as performing the specified function.

Defendants are correct. The specification identifies the corresponding structure as LAN Controller 22 and signal generator 40 as shown in the drawings and described in the written

description. Although the specification indicates the server station includes LAN Controller 22 modified to include an additional time delay that is not part of the CSMA/CD protocol, which may render it noncompliant with IEEE 802.3 protocol, the client station is not so indicated. Accordingly, the LAN Controller 22 in a client station would be suitable for and compliant with the CSMA/CD protocol.

The Court adopts Defendants' proposed construction.

4. "delaying transmission of a third data frame from the first station during a second time period" (claims 9-11)

a. Parties' Positions

This term appears in claims 9-11 of the '887 patent.

Plaintiff	Defendants
Plain meaning: no construction necessary. Alternatively: Waiting a second time period to transmit a third data frame from the first station	Forcing the first station to delay transmission of the third data frame for a second time period after every transmission

b. Court's Construction

Plaintiff contends no construction is necessary but offers an alternative meaning for the term. Plaintiff disputes Defendants' inclusion of a requirement of "after every transmission." According to Plaintiff, the requirement of forcing a TxGAP period after every transmission is an aspect of the preferred embodiment but is nowhere set forth in claim 9. Defendants point to the specification as describing imposition of a delay "after every transmission" as being a fundamental underpinning of the claimed protocol that assures surrender of the network to a waiting station.

Defendants are correct that "after every transmission" is an important and necessary aspect to realizing the objective of shared access of a WLAN. Moreover, contrary to Plaintiff's contention, the claim language supports Defendants' proposed construction. Claim 9 expressly ties the transmission delay of the first station to completion of its transmission of a data frame. Necessarily, therefore, as properly read, the claim language imposes a requirement that the delay must occur after every frame transmission by the first station.

The Court adopts a slightly modified version of Defendants' proposed construction. The Court construes "delaying transmission of a third data frame from the first station during a second time period" to mean "delaying transmission of the third data frame for a second time period after every transmission."

IV. CONCLUSION

The Court hereby orders the claim terms addressed herein construed as indicated. A chart summarizing these constructions is attached as Exhibit A.

The parties are further ordered that they may not refer, directly or indirectly, to each other's claim construction positions in the presence of the jury. Likewise, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual constructions adopted by the Court, in the presence of the jury. Any reference to claim construction proceedings is limited to informing the jury of the constructions adopted by the Court.

SIGNED this 22nd day of April, 2013.

CAROLINE M. CRAVEN
UNITED STATES MAGISTRATE JUDGE

Exhibit A

Agreed Claim Term	Court's Construction
an analog-to-digital conversion means to provide a digital representation of a received signal ('006 patent, claims 1-2)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Providing a digital representation of a received signal Structure: One or more analog to digital converters
correlator means coupled to said analog-to-digital means to provide a plurality of signal samples ('006 patent, claims 1-2)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Providing a plurality of signal samples Structure: One or more correlators
peak determining means to determine the maximum value stored in said plurality of storage registers ('006 patent, claims 1-2)	This is a means-plus-function limitation under 35 U.S.C. § 112(6) Function: Determining the maximum (i.e., highest) value stored in said plurality of registers Structure: A circuit as shown in Figure 5 configured to determine the maximum (i.e., highest) value in said plurality of storage registers
determining a peak value and total value for the averaged signal samples ('006 patent, claims 12-14)	determining the maximum (i.e., highest) value, and the sum, of the averaged signal samples
means (3,4) arranged to receive the superpositions of subcarriers expressing the symbols and to derive a K-fold repetition of each said superposition ('786 patent, claim 6)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Receiving the superpositions of subcarriers expressing the symbols and to derive a Kfold repetition of each said superposition

	Structure: Cyclic prefixing and windowing circuitry and control circuitry
non-data signals…being sequentially received with respect to said data signals (‘920 patent, claim 7)	the non-data signals are received before or after the data signals

Disputed Claim Term	**Court’s Construction**
plurality of signaling modes (‘786 patent, claims 1-3, 6-9)	OFDM symbol transmission at one of a plurality of symbol rates
first mode and a second mode (‘972 patent, claims 1, 11-12, 14); first mode and at least one second mode (‘786 patent, claims 11-16, 19-35)	OFDM symbol transmission at one of at least a first symbol rate and a second symbol rate
non-data signal (‘920 patent, claim 7)	a signal that does not correlate with the same spreading code to which a data signal correlates
first receiving means for receiving data signals transmitted in said spread spectrum signal (‘920 patent, claim 7)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Receiving data signals transmitted in said spread spectrum signal Structure: correlators 175 and 180, converter 185, and DQPSK receiver 215.
second receiving means, coupled to said first receiving means, for receiving non-data signals transmitted in said spread spectrum signal (‘920 patent, claim 7)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Receiving non-data signals transmitted in a said spread spectrum signal Structure: correlators 195 and 200, converter 205, and non-data detection 210.
non-data signals being generally orthogonal to said data signals (‘920 patent, claim 7)	a dot product of vectors representing the data signals and vectors representing the non-data signals at each symbol timing moment is near zero

integrator and storage means including a plurality of storage registers to store values of integrated representations of said plurality of signal samples (‘006 patent, claims 1-2)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Storing values of integrated representations of said plurality of signal samples Structure: Block 54 shown in Fig. 5, including the circuit components shown there and described in col. 4:12-42
spike quality determining means to provide a quality value signal representative of said received signal, with said quality being dependent upon said maximum value and said total value (‘006 patent, claims 1-2)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Providing a quality value representative of said received signal Structure: A look up table as shown in Fig. 5, with the peak value and the total value to the table, and where the output value increases as the peak value increases and the total value decreases, as shown in Table 1. A sifter circuit that shifts the input to the LUT by 0, 1, 2, 3, or 4 bit positions, depending on the input value.
carrier detection means responsive to said quality value signal to provide a carrier detect signal (‘006 patent, claims 1-2)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Providing a carrier detect signal Structure: Circuit 82 shown in Fig. 6 and as described in the specification.
determining a spike quality value based on said peak value and said total value (‘006 patent, claims 12-14)	determining a signal-to-noise ratio value for the communication channel based on said peak value and said total value
a length segment representing the length of time which would be required for a transmission of said data portion at one of said plurality of data rates (‘428 patent, claims 1, 3)	a portion of a message that signifies the transmission time of a data portion at a data rate

wherein said length segment represents the length of time which would be required for a transmission of said data portion. . . (‘428 patent, claim 2)	wherein a portion of a message signifies the transmission time of the data portion at a second predetermined data rate that is different from the selected data rate
means for broadcasting. . . (‘887 patent, claims 1, 7)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Broadcasting [the/a] [first/second][frame/data frame] Structure: A transceiver (20) disclosed in Fig. 2 and col. 3:36-37, an antenna (14) disclosed in Fig. 2 and col. 3:19-20, and a LAN controller (22) disclosed in Fig. 2 and col. 3:35-46; 4:9-11
means for deferring, during a predetermined time period, broadcasting of a second frame of information, said predetermined time period (a) beginning at a point in time immediately after completion of broadcast of the first frame, and (b) being calculated to allow said client station to gain access to the network (‘887 patent, claims 1, 7)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Deferring, during a predetermined time period, broadcasting of a second frame of information, said predetermined time period (a) beginning at a point in time immediately after completion of broadcast of the first frame, and (b) being calculated to allow said client station to gain access to the network Structure: The LAN Controller (22) disclosed in Fig. 2, programmed with the algorithm disclosed in cols. 9:5-43; 4:51-61. The disclosed algorithm consists of the following steps: 1. Determine the “maximum first backoff” time of the client station by applying the formula 2k+R. 2. Execute a number of no operation instructions (“NOPs”) that is predetermined to be greater than the maximum first backoff time that was calculated in step 1 for the client station.

means for deferring broadcasting of a third frame of information by said client station (a) during broadcasting of the first frame by said server station, and (b) during a first random time period which begins at the point in time immediately after completion of broadcast of the first frame *[and related claim phrase*] (‘887 patent, claims 1, 4 and 7-8)	This is a means-plus-function limitation under 35 U.S.C. § 112 ¶ 6. Function: Deferring broadcasting of a third frame of information by said client station (a) during broadcasting of the first frame by said server station, and (b) during a first random time period which begins at the point in time immediately after completion of broadcast of the first frame Structure: The Signal Generator (40) and LAN Controller (22) disclosed in Figs. 2, 3A, and 3B. The LAN Controller is “suitable for the CSMA/CD (carrier sense multiple access with collision detection) protocol.” *[and related function/structure for related claim phrase]*
delaying transmission of a third data frame from the first station during a second time period” (‘887 patent, claims 9-11)	delaying transmission of the third data frame for a second time period after every transmission