UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

BARNES & NOBLE, INC., *et al.*,

Plaintiffs,

v.

LSI CORPORATION, *et al.*,

Defendants.

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No. C-11-2709 EMC

ORDER RE CLAIM CONSTRUCTION

I. INTRODUCTION

Plaintiff Barnes & Noble Inc. ("Barnes & Noble") initiated this action against Defendants LSI Corporation and Agere Systems LLC ("LSI") seeking a declaratory judgment that the Barnes & Noble "Nook" line of products do not infringe a number of patents. LSI, the assignee of the patents at issue in this case, answered the complaint and asserted counterclaims (and eventually, amended counterclaims) against Barnes & Noble alleging patent infringement. LSI asserts that the Nook product line infringes nine patents – i.e., the '730 patent,'087 patent,'663 patent,'006 patent, '867 patent, '958 patent, '394 patent, '420 patent, and the '552 patent. The parties have presented the Court with 34 terms to be construed. This order construes thirteen of those terms – the terms identified as the most significant by the parties.

II. LEGAL STANDARD

Claim construction is a question of law to be determined by the Court. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) ("We therefore settle inconsistencies in our precedent and hold that in a case tried to a jury, the court has the power and obligation to construe as a matter of law the meaning of language used in the patent claim."). "The purpose of

claim construction is to 'determin[e] the meaning and scope of the patent claims asserted to be infringed.'" *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351 (Fed. Cir. 2008) (quoting *Markman*, 52 F.3d at 976).

Claim construction "begins with the language of the claims themselves" and "claim language 'generally carries the ordinary meaning of the words in their normal usage in the field of invention.'" *Apio, Inc. v. Mann Packing Co., Inc.*, No. C07-5628 JF, 2008 WL 4571558 (N.D. Cal. Oct. 14, 2008) (quoting *Invitrogen Corp. v. Bicrest Mfg., L.P.*, 327 F.3d 1364, 1367 (Fed. Cir. 2003)). Thus, "[i]n some cases, the ordinary meaning of claim language . . . may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc). However,

> [b]ecause the meaning of a claim term as understood by persons of skill in the art is often not immediately apparent, and because patentees frequently use terms idiosyncratically, the court looks to "those sources available to the public that show what a person of skill in the art would have understood disputed claim language to mean." Those sources include "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art."

Id. (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004)).

"[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Id.* at 1315 (quoting *Vitrionics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). "It is therefore entirely appropriate for a court, when conducting claim construction, to rely heavily on the written description for guidance as to the meaning of the claims." *Id.* at 1317. On the other hand, courts must avoid "importing limitations from the specification into the claim." *Id.* at 1323. In particular, "although the specification often describes very specific embodiments of the invention," courts must not "confin[e] the claims to those embodiments." *Id.*

As a general matter, extrinsic evidence such as dictionaries and expert testimony is considered less reliable than intrinsic evidence (*i.e.*, the patent and its prosecution history). *See id.*

at 1317-19 (noting that "extrinsic evidence may be useful to the court, but it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence").

III. '730 PATENT

A. Background and General Description of Patent

The '730 Patent is entitled "Data Protocol and Method for Segmenting Memory for a Music Chip." It explains a protocol "for labeling various types of data contained in a music chip" which "includes a hierarchical arrangement of headers for storing information about selections on the chip and the method in which they were coded in the memory of the chip." '730 Patent, Col. 1, 47-51. The "hierarchical arrangement of headers" includes global headers, "located at the very start of memory" which provide information that is necessary to decode the content of the music chip. Examples of that information include "the necessary bit rate, as well as information pertaining to the specific encoding algorithm employed in recording audio on the chip." *Id.*, Col. 1, 54-56. In addition to the global header, each chip will have a "table of contents" that will "include information on play times, song titles, music category and artist" through "individual headers." *Id.*, Col. 1, 57-62. The benefit of the header arrangement over prior art is that it permits the user to easily find and select the pre-recorded music located on the music chip. *Id.*, Col. 1, 38-44.

B. Representative Claims

Claims 1 and 18 are representative claims for the '730 patent and contain the terms the parties have indicated are most significant as to this patent. Claim 1 provides (with terms to be construed in bold):

> 1. A data format for use in an audio system wherein pre-recorded music is digitally encoded in memory of an integrated circuit music chip, and said music is decoded and reproduced by means of an associated audio player, said data format for storing information pertaining to the contents of said music chip, wherein individual tracks of audio are stored in designated locations in said music chip, said data format including:
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> **first header having parameters stored therein for use by said audio player in decoding said digitally encoded music stored in said memory**; and

> at least one second header, said second header including selectable categorical information relating to said individual tracks of audio stored in said memory.

730 Patent, Col. 6:14-27. Claim 18 provides (with claims to be construed in bold):

> 18. A data protocol for use in storing pre-recorded audio in memory of an integrated circuit chip, said integrated circuit chip being adapted for use with an audio player, said data protocol comprising:
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> **global header having parameters stored therein corresponding to an encoding technique used for storing said pre-recorded audio in memory and used by said audio player in decoding said audio**; and
>
> at least one individual header having multiple data fields, said data fields including general description information about individual tracks of said pre-recorded audio.

Id., Col. 7:19-29.

C. "First Header" / "Global Header"

As to the term beginning "first header having parameters . . ." the parties have provided the following competing constructions:

Barnes & Noble	LSI	Court
"a single data structure that includes information used by the audio player to decode the collection of individual tracks of audio stored in memory."	Plain and ordinary meaning, or "a data structure on a music chip which includes information relating to the way the music tracks were encoded in the memory of the music chip for use by the audio player in decoding the stored music."	"a single data structure that includes information used by the audio player to decode the collection of individual tracks of audio stored in memory."

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Similarly, for the term beginning "global header having parameters . . ." the parties have provided the following competing constructions:

Barnes & Noble	LSI	Court
"a single data structure that includes information used by the audio player to decode the collection of individual tracks of audio stored in memory."	Plain and ordinary meaning, or "a data structure that includes information about how the prerecorded audio was encoded and is used during decoding."	"a single data structure that includes information used by the audio player to decode the collection of individual tracks of audio stored in memory."

The central dispute is whether the "first" and "global" headers are limited to a "single data structure," and whether this limitation applies to both terms. Barnes & Noble argues that both terms are limited to a "single data structure," while LSI contends neither term is so limited.

These terms have been construed previously on two separate occasions. First, in *Agere Systems, Inc. v. Sony Corp.*, No. 2:06-CV-079, 2008 WL 2078308 (E.D. Tex. May 15, 2008), Sony – like Barnes & Noble does here – argued that the term should be construed as referring to a "*single* data structure" in which "*all* pre-recorded audio tracks are encoded for storage in memory, which is used by the audio player to decode *all* tracks for playback." *Id.* at *15. By contrast, LSI asserted the same construction it advances in this case. *Id.*. Despite the parties treating "global" and "first" headers identically, the court construed them separately. As to the "global header" term, the court concluded that it "includes information common to all of the music on the chip." *Id.* at *16. As to the "first header" term, however, the court found the term had a "broader scope." *Id.* Accordingly, the court construed "global header" as "a single data structure that contains information corresponding to the way in which all pre-recorded audio tracks are encoded for storage in memory, which is used by the audio player to decode all tracks for playback." *Id.* It construed "first header" to mean "a data structure on a music chip which includes information relating to the way the music tracks were encoded in the memory of the music tracks were encoded in the memory of the music chip for use by the audio player in decoding the stored music." *Id.*

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Second, another court in this district provided a tentative claim construction[1] in the case *Sandisk Corp. v. LSI Corp.*, No. C 09-02737 WHA, 2010 WL 986992 (N.D. Cal. Mar. 17, 2010). As Sony did in *Agere* and Barnes & Noble does here, Sandisk argued that the term "first header" should be construed as a "*single* data structure" while LSI again advanced the same construction it does in this case. *Id.* at *3. The court found this dispute – among others – all "stem from the fact that the term 'first header' *never* appeared in the specification! Rather, the term 'first header' appeared solely in claims 1 through 17. In other words, after five columns of discussion and disclosure by the patentee, the claims introduced – for the first time – a term never previously seen in the patent." *Id.* As in *Agere*, the court found that the term "first header" is "broader in scope than the disclosed 'global header.'" *Id.* at *4. However, as to the question the parties have raised in *this* case – whether the first header can only be a "single data structure" – the *Sandisk* court found that there "can only be a *single* 'first header.'" *Id.* Accordingly, after resolving additional disputes, the *Sandisk* court adopted the following construction for the term "first header": "a single data structure that includes information used by the audio player to decode digitally encoded music stored in memory." *Id.* at *6.

The Court agrees with Barnes & Noble that the term "first header" and "global header" both refer to a single data structure. Beginning with the language of the patent, claim 1 and claim 18 speak of a "first header . . . [and] *at least one* second header" and a "global header . . . [and] *at least one* individual header," respectively. '730 Patent, claim 1, 18 (emphases added). *See also Interactive Gift Exp., Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) ("In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves . . . ."). Accordingly, whereas the patent expressly accounts for the existence of more than one individual or second header, the claims – and, in fact, everywhere in the patent – speak of a global or first header *in the singular*. Thus, the plain text of the claim strongly supports Barnes & Noble's construction. *Sandisk*, 2010 WL 986992, at *4.

[1] Subsequent to the court's tentative construction, the parties settled the case. Accordingly, no final construction occurred in the *Sandisk* case.

Similarly, as the *Sandisk* court recognized, the purpose of the "first header" and "global header" supports the limitation of both terms to a "single data structure." The specification explains that "[t]he present invention is a protocol . . . includ[ing] a *hierarchical* arrangement of headers about selections on the chip and the method in which they were coded." '730 patent, col. 1:48-50 (emphasis added). The hierarchy consists of two tiers: the "global header" (or "first header"), which contains information to "decode the digitally encoded music stored in the memory (*e.g.*, encoding algorithm, bitrate, etc.)," and the "individual header" (or "second header") which contains "information about individual music tracks (e.g., artist, album, genre, etc.)." *Sandisk*, 2010 WL 986992, at *4. The invention summary provides that a "global header located at the very start of memory will specify information needed to successfully decode the content of the music chip" while the individual headers are described as having the "music category to which a track belongs . . . the artist, and information for addressing each track selection." *Id.*, col. 1:51-65; *see also C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 864 (Fed. Cir. 2004) ("Statements that describe the invention as a whole, rather than statements that describe only preferred embodiments, are more likely to support a limiting definition of a claim term."). Accordingly, the Court agrees with the *Sandisk* court that the "weight of intrinsic evidence" demonstrate a "clear intent by the patentee to limit the invention to a *hierarchy* of headers, where multiple 'music-track-specific' headers corresponded to a single 'decoding' header." *Sandisk*, 2010 WL 986992,at *5.

LSI argues, however, that the patent discloses the possibility of multiple "first" or "global" headers. LSI relies on the declaration of Dr. Jayant who states, in part: "By storing information about the encoding algorithm in the header of a music file (as opposed to having a single file corresponding to an entire memory chip), the patent aimed to make it 'possible to encode more on a single chip using different algorithms . . . [and] at different bit rates.'" Decl. of Dr. Nikil Jayant ("Jayant Decl.") ¶ 13 (Dkt. No. 268-37) (quoting '730 Patent, Col. 2:58-59). However, the specification language upon which Dr. Jayant relies states, in its full context, that:

> The parameter information of the global header **22** is advantageously included because as compression technology evolves, it may be possible to encode more on a single chip using different algorithms, and almost certainly at different bit rates. Thus, rather than 'freeze' the compression algorithm to its current quality using a specific bit

> rate, it will be more cost effective to generate a specific algorithm release for each chip. This would allow an album from a specific artist introduced today to use 128Kbps while an album released at some future date from the same artist could utilize a different algorithm that would play at perhaps 32 Kbps with the same quality that the 128 Kbps piece has at present.

'730 Patent, col. 2:55-67.

While this language is far from a model of clarity, the Court disagrees that this language describes a music chip containing music encoded with differing algorithms or bit rates. Rather, this language recognizes that as compression technology evolves, it "may be possible" to fit more music onto a single chip. This is demonstrated by the "album" example at the end of this passage – the specification speaks of an album released "today" using a 128Kbps bit rate while "at some future date" a more advanced algorithm would allow encoding at a 32Kbps bit rate but at the same quality as a present 128Kbps encoding, but taking up less space in the music chip. *See* Declaration of Dr. Paris Smaragdis ("Smaragdis Decl.") ¶ 8 (Dkt. No. 270-44) ("In other words, while an earlier music chip may encode its music using a particular algorithm, a later music chip may store its music encoded using a different, better algorithm that provides the same quality as the algorithm used in the earlier music chip using a much lower bit rate . . . ."). This passage read in context makes clear that the "different," more advanced, algorithm alluded to in the subject passage pertains to a new algorithm on a new chip, not multiple algorithms on a single existing chip. *See id.* ("Thus, rather than 'freeze' the compression algorithm to its current quality using a specific bit rate, it will be more cost effective to *generate a specific algorithm release for each chip*." (emphasis added)). Accordingly, the Court finds that nothing in the patent discloses having multiple bit rates or algorithms (and thereby requiring a multiplicity of first or global headers) on a single chip.

Finally, although the *Agere* court's holding that "global header" and "first header" should be construed differently – it may be argued that the term "global" more strongly connotes a singular entity with universal application – both parties agree they should be treated similarly, at least on the question of whether they are limited to a "single data structure." The Court notes that the term "first header" only appears in claim 1 and associated dependent claims. It does not appear in the specification, where only "global header" is used to describe the invention as a whole. Significantly,

the inventors used the terms interchangeably during the prosecution of the patent. For example, an October 1996 letter sent to a patent examiner states, in part, "[t]he data protocol [described in the patent] contains a global header which will specify information needed to successfully decode the content of the music and at least a second header which is a table of contents that contains various fields of information." Dkt. No. 270-32, at 11. In support of this statement, the inventor cited to claims 1, 18, and 31 – despite the fact that the term "global header" appears nowhere within claim 1.

The Court is cognizant of the general presumption that different terms were intended to have different meanings. *See Applied Medical Resources Corp. v. U.S. Surgical Corp.*, 448 F.3d 1324 (Fed. Cir. 2006). However, this presumption only exists in the absence of evidence to the contrary. *Id.* Additionally, the Federal Circuit has recognized claim drafters can, and do, use different terms to define the same subject matter – particularly where independent claims are involved. *See Curtiss-Wright Flow Control Corp. v. Velan, Inc.*, 438 F.3d 1374, 1380 (Fed. Cir. 2006) ("Different claims with different words can . . . define different subject matter within the ambit of the invention. On the other hand, claim drafters can also use different terms to define the exact same subject matter."); *Mycogen Plant Science v. Monsanto Co.*, 243 F.3d 1316, 1329 (Fed. Cir. 2001) (citation omitted) ("It is not unusual that separate claims may define the invention using different terminology, especially where . . . independent claims are involved.").

Accordingly, the Court finds that both the "first header" and "global header" identified in the '730 patent are limited to a "single data structure." The Court thus provides the following construction for both terms: "a single data structure that contains information corresponding to the way in which pre-recorded audio tracks are encoded for storage in memory, which is used by the audio player to decode tracks for playback."

IV. '958 PATENT

A. Background and General Patent Description

The '958 Patent is entitled "Digital Modulation System Using Extended Code Set." The invention is targeted at minimizing the effect of multipath interference on wireless signals. As the specification describes:

> A wireless communications channel can rarely be modeled as purely line-of-site. Therefore, one must consider the many independent paths that are the result of scattering the reflection of a signal between the many objects that lie between and around the transmitting stations and the receiving station. The scattering and reflection of the signal creates many different "copies" of the transmitted signal ("multipath signals" arriving at the receiving station with various amounts of delay, phase shift and attenuation.

'958 Patent, Col. 1:20-28. The resulting delay between the various signals can create "intersymbol interference" ("ISI") as well as other problems. The invention seeks to reduce these negative effects on the wireless signal by using a modulation system using a larger code set of M codes of N length, where M > N. *Id.*, Col. 3: 48-50. The resulting signal consists of longer codes less susceptible to interference while balancing the need to maintain data rate. The codes employed by the modulation system are such that they provide low auto-correlation sidelobes (i.e. reduce the chance that a given code will interfere with a copy of itself that has time-shifted) and reduced cross-correlation values (i.e. reduce the chance the chosen codes will interfere with each other) between the codes.

B. Representative Claims

Claim 1 is a representative claim for the term the parties have identified as being most significant as to this patent. Claim 1 provides (with terms to be construed in bold):

> 1. A method for modulating information bits over a radio frequency communication channel, comprising:
>
> grouping a number of information bits,
>
> based on the grouping, selecting a **code** having N chips from a code set that includes M **codes**, wherein M > N, and wherein the code set is derived from a complementary **code** that provides autocorrelation sidelobes suitable for multipath environments, and
>
> modulating the phase of at least one carrier signal in accordance with the selected **code**.

'958 Patent, Col. 10:62-11:4.

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C. "Code"

As to the term"code," the parties have provided the following constructions:

Barnes & Noble	LSI	Court
"a sequence of chips representing a real value"	Plain and ordinary meaning, or "a sequence of chips"	"A sequence of chips consisting of real values"

Accordingly, the parties only dispute whether the term "code" in the '958 Patent is limited to real values or if the term also includes complex values (i.e. values with both a real and imaginary component).

Both the *Agere* court and the International Trade Commission ("ITC") have construed the term "Code" as requiring real values. In *Agere*, the court noted that the '958 patent describes two modes of operation, "a full data rate mode of transmitting codes, and a fallback, or half data rate mode. In the full data rate mode, two separate codes are transmitted at the same time, one code on each of two channels (so-called 'I' and 'Q' channels). In the fallback mode, a single code is transmitted on both the I and Q channels." *Agere*, 2008 WL 2078308, at *3. The court found that Agere had failed to explain how Figure 4 of the patent – a depiction of the invention operating in "fallback mode" – could operate using complex codes. *Id.* at *4. Accordingly, the court concluded that "[b]ecause the fallback mode requires the transmittal of the same code over both the I and Q channels, it is clear that Mr. van Nee intended for his invention to include the use of only real-valued code." *Id.*

Similarly, in *In Re Certain Audiovisual Components and Products Containing the Same*, Inv. No. 337-TA-837, 2013 WL 4406820 (USITC July 18, 2013) (initial determination), the ITC found the '958 patent required codes with real values. It held:

> The intrinsic evidence requires restricting the claims to real codes because that is all the '958 specification discloses and allows. The stated purpose of the '958 patent, which is to overcome the limitation of "conventional M-ary keying systems" where "the number of possible codes M is not more than the code N in chips," makes clear that the claim limitation "code" encompasses only real codes.

Id. at *82. The ALJ quoted an expert who noted that if the "code length N in chips" were construed to include "complex chips," a "greater number than N orthogonal sequences of 'complex' length N would exist; accordingly, the patent's description of both its purported problem and its purported solution would be inaccurate." *Id.* Finally, the ITC noted that

> the embodiments depicted in the '958 specification are designed for real codes, and not complex codes. Specifically, the system shown in Figure 3 of the '958 patent cannot accommodate complex codes, because it cannot place the imaginary part on one channel and the real part on the other channel. Similarly, the "fallback mode" illustrated in Figures 4 and 7 requires the simultaneous transmission of the same code on the I and Q channels, which can be achieved only with real codes and not complex codes.

Id. at *83 (citation omitted).

The Court agrees with the *Agere* court and the ITC and concludes that the codes disclosed in the '958 patent are "real" codes insofar as they are comprised of real chips. The patent states, "[c]hips are actually code bits, but they are called chips to distinguish them from data bits." '958 Col. 7:18-20. The Court begins by noting the difference between a "real" chip and a "complex" chip. A real chip takes a binary value – either 1 or 0 (or, as described in the invention 1 or -1). Because complex numbers take the form "a + bj," a complex chip takes one of four values – 0 + 0j, 0+1j, 1+0j, or 1+1j. *See* Negus Decl. ¶ 16, Bambos Decl. ¶ 7.

There is no dispute that *signals* are commonly expressed as complex numbers. For example, the patent itself refers to quadrature phase shift keying (QPSK). '958 Patent, Col. 8: 14. Nor do the parties dispute that a QPSK signal can be represented by a point in the complex plane. In other words, the four possible QPSK signals can be written as four complex numbers. As noted above, every complex number can be written as a + bj, where a and b are both real numbers, and j is the square root of -1. The numbers "a" and "b" are called the real and imaginary parts of the complex number, respectively. Again, the four values of a complex chip would be 0 + 0j, 0 + 1j, 1 + 0j or 1 + 1j.

Here, the invention does not disclose complex chips as part of its teaching. Instead, it employs real chips in the processing of complex signals. The specification makes this clear.

Figure 3 represents a digital modulation system which employs the principles of the instant invention. It describes a system in which 10 bits of data are received from a multiplexer. "Then ten bit data symbol is encoded into a I/Q code pair of 11 chip codes or codewords." '958 Patent, Col. 7:9-10. The first four bits are placed through a first modulator, which, in the Figure 3 embodiment "corresponds to the I phase modulation branch of the system **30** which produces the I component of the . . . signal to be transmitted." '958 Patent, Col. 7:10-23. The first modulator takes the four data bits and produces the length 11 code described by the invention. *Id.* The second set of four bits are then placed through a second modulator which then produces "a corresponding one of 16 length 11 codes from the extended code set according to the principles of the present invention." *Id.*, Col. 7:24-28. "The second modulator **34** corresponds to the Q phase modulation branch of the system **30** which produces the Q component of the . . . signal to be transmitted." *Id.*, Col. 7:28-32. The I & Q phases process complex signals. That complex signal is expressed as a + bj, wherein "a" is called the "I component" of the signal and "b" is called the "Q component" of the signal. There is no dispute that the real part of the signal is sent through the "I branch" and the imaginary part of the signal is sent through the "Q branch" of a modulation system described above. *See* '958 patent, Figures 1 and 3. Thus, each code in this invention encodes either the real part "a" or the imaginary part "b," but not both. In either instance, a single codeword contains information about only "a" or "b," but not both. *In Re Certain Audiovisual Components*, 2013 WL 4406820, at 83 ("Moreover, the embodiments depicted in the '958 specification are designed for real codes, and not complex codes. Specifically, the system shown in Figure 3 of the '958 patent cannot accommodate complex codes, because it cannot place the imaginary part on one channel and the real part on the other channel.").

Central to the question at bar, the code chips take a binary value (for example, either 0 or 1; or -1 or 1). Thus, the codes themselves contain only real numbers even though collectively the codes in the I & Q branches process complex values. At the hearing, Barnes & Noble clarified that the construction it seeks does not mean that the codes could only "represent" real values, but rather they contain only real values. This construction would be consistent with the notion that the signals being encoded by the modulator in the I & Q branches could represent real and imaginary values, a point that LSI emphasizes.

The Court notes that all the illustrative codes in the specification employ binary values – *i.e.*, real numbers. *See* '958 Patent, col. 5 tbl 1, 2; col. 6, tbl. 3. While the specification does not necessarily dictate claim limitations, it does enlighten claim construction. *See Phillips.*, 415 F.3d at 1315 ("[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" (quoting *Vitrionics*., 90 F.3d at 1582)).

Further, to the extent that the intrinsic evidence is ambiguous as to the meaning of "code," extrinsic evidence in the form of inventor testimony actually supports limiting the term "codes" to "real codes." *See In re Omeprazole Patent Litig.*, 490 F. Supp. 2d 381, 418 (S.D.N.Y. 2007) ("When the meaning cannot be determined by intrinsic evidence, a court may turn to extrinsic evidence to construe the claims in a patent. Extrinsic evidence consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises, and may be useful to show the state of the art at the time of the invention." (citations omitted)). For example, during his deposition, Mr. Richard Van Nee had the following exchange regarding the Invention Disclosure Report he produced regarding the '958 patent:

> Q. That, I guess, on page – in the IDR, page 2256, I guess in that first paragraph there it is talking about: "As an example, for 11 chip codes a system with 16 different codes can be used"?
>
> A. Yes.
>
> Q. And the codes you were contemplating here, those were real codes?
>
> A. Yes. Those were real codes.
>
> Q. You would transmit independent codes on the I and Q channels?
>
> A. Yes. That's correct.

Van Nee Deposition at 33-34 (Dkt. No. 270-21). Later in the deposition, he was asked:

> Mr. Qualey: How is a complex code different from a real code?
>
> . . . .
>
> A. That it has complex values. Not just a sign, but also a [phase], a [phase] other than zero and [1]80 degrees.

Mr. Qualey: To transmit a complex code you have to encode it on both the I and Q channels simultaneously?

A. Exactly.

Id. at 38. Accordingly, the inventor's testimony supports limiting the term code to "real" codes insofar as the patent does not disclose a same code being simultaneously encoded on both the I and Q branches simultaneously.

As a result, the Court construes the term "code" as "a sequence of chips consisting of real values" as proposed by Barnes & Noble. This is consistent with the ultimate construction rendered by the *Agere* court and the ITC.

V. '867 PATENT

A. Background and General Patent Description

The '867 Patent is entitled "Wireless Local Area Network Apparatus." The patent discloses a wireless network apparatus that provides for a transmitter that periodically sends transmission signals to receivers on the network. '867 Patent, Col. 1, 39-45. These periodic signals contain data which permits a timer in the transmitter and a timer in the receiver to be synchronized. *Id.*, Col. 1, 47-50. The patent discloses that this arrangement has a power-management benefit. By synchronizing the timers in both the transmitter and receiver, the receivers are able to "periodically switch between a low power consumption state, in which their transceivers are de-energized, and a high power consumption state, in which their transceivers are energized, and can thereby receive periodic signals transmitted from some other station." *Id.*, Col. 1, 54-69. If the periodic signal informs the receiver that there are data packets to be sent to it, it can remain energized and receive those data packets. If not, the receiver can return to its low-power consumption state. *See id.*, Col. 2:7-25.

B. Representative Claims

Claims 1, 18, and 20 are representative claims for the '867patent and contain the terms the parties have indicated are most significant as to this patent. Claim 1 provides (with terms to be construed in bold):

> 1. A method of synchronizing a receiver with a transmitter in a wireless local area network, comprising:
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> periodically receiving a transmission signal from a transmitter, the transmission signal including a timestamp field, the timestamp field including **a timestamp having a value m for synchronizing a receiver timer with the transmitter timer, wherein the timestamp represents a value within a count sequence of a timer in the transmitter** and **wherein the timestamp accounts for delays due to a busy signal on a medium access protocol**, and
>
> synchronizing the receiver with the transmitter based on the timestamp.

'867 Patent, Col. 8:19-31. Claim 18 provides:

> 18. The method of claim **16**, wherein the timestamp **accounts for a delay** between a start of a process to transmit the transmission signal and an actual time of transmitting the transmission signal.

Claim 20 provides:

> 20. A receiver, comprising:
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> **a receiver counter that counts up to n counts**, and
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> a radio modem capable of periodically receiving a transmission signal from a transmitter, the transmission signal including a timestamp field, the timestamp field **including a timestamp having a value m for synchronizing the receiver counter with a transmitter timer**, **wherein the timestamp represents a value m within a count sequence of the transmitter timer**, and **wherein the timestamp accounts for delays due to a busy signal on a medium access protocol.**

Id., Col. 9:57-67.

C. <u>"wherein the timestamp accounts for delays due to a busy signal on a medium access protocol" / "accounts for delays"</u>

The parties have provided the following constructions for the "wherein the timestamp accounts for delays due to a busy signal on a medium access protocol" term that appear in the '867 Patent:

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Barnes & Noble	LSI	Court
"wherein the timestamp represents the amount of delays due to a busy signal on a medium access protocol"	Plain and ordinary meaning, or "wherein the timestamp accounts for the time deferred for transmission of the transmission signal due to a sensed energy level above a threshold value on the wireless medium"	"wherein the timestamp indicates the amount of delays due to a busy signal on the wireless medium"

Similarly, the parties have provided the following constructions for the more general "accounts for delays" language that appears in the '867 patent:

Barnes & Noble	LSI	Court
"represents the amount of delay"	Plain and ordinary meaning, or "accounts for the delay in transmission of a signal"	"indicates the amount of delay"

LSI argues that no construction is necessary for these terms or, in the alternative, that it should be made explicit that the "amount of delay" refers to the delay in transmission of a signal from an access point to a receiver. Barnes & Noble, by contrast seeks to replace "accounts" with the word "represents." LSI argues that Barnes & Noble's construction implies that the timestamp would have to be *equal* to the amount of delay due to a busy signal while excluding other delays (such as the time it takes the transmitter to prepare and actually transmit the message in question). LSI contends that the specification clearly demonstrates that the timestamp is taken from a counter only after busy-signal delay *and* message processing- and transmission-related delays are taken into account. Barnes & Noble disagrees, noting that such "message processing" and "transmission related" delays "are present whether or not there has been a delay due to a busy signal and B&N's proposed construction does not exclude any such delay." Dkt. No. 270-4, at 13 n.8.

The "accounts for delay" term has been construed by the Eastern District of Texas in the *Agere* case. In *Agere*, Agere Systems offered the same construction as LSI does in this case, while Sony proposed a construction of "the timestamp contains a value representing the amount of delay resulting from the medium access protocol being busy." *Agere*, 2008 WL 2078308, at *10. The court ultimately concluded that:

> Based on the claim language, the specification, and the prosecution history, the court is persuaded that the inventors used the phrase "wherein the timestamp accounts for" to mean "wherein the timestamp indicates the amount of." As such, the court construes the phrase as a whole to mean "wherein the timestamp indicates the amount of time deferred for transmission of the transmission signal due to a sensed energy level above a threshold value on the wireless medium."

Id. Thus, the court in *Agere* largely adopted the construction advanced by LSI in this case, but with the substitution of "indicates" for "accounts for." Similarly, the International Trade Commission ("ITC") has construed the more general "accounts for delay" terms as "indicates the amount of delay." *In Re Certain Audiovisual Components and Products Containing the Same*, Inv. No. 337-TA-837, 2013 WL 4406820, at *116 (USITC July 18, 2013) (initial determination).

The Court begins by noting that while the term "wherein the timestamp accounts for delays due to a busy signal on a medium access protocol" does not expressly account for other delays that are inherent in the transmission of a signal from a transmitter to a receiver, the specification acknowledges there are other delays inherent in the process. Specifically, as Figure 4 demonstrates, even after the transmitter has determined that the network is not busy, there is still an inherent delay as a request to sent (RTS) signal and then a clear-to-send signal (CTS) are issued. '867 Patent, Fig. 4; *see also id.*, Col. 5:25-31 ("If no medium busy is issued, so the medium is sensed 'free', the WMAC control turns on the transmitter of the modem by issuing a request to send (RTS) signal. The modem will then start to send a training sequence and will issue a clear-to-send signal (CTS) once the training sequence is complete."). It is not until this process is complete that the time stamp is taken and the TIM packet sent. *Id.* Fig. 4; *see also id.*, Col. 5:37-43.

The claim language here is elastic enough to account for these delays. In contrast, Barnes & Noble's proposed construction which would replace "accounts for" with "represents" is not supported by the claims language or the specification. The ordinary meaning of represent, the construction advanced by Barnes & Noble, is to "correspond to." Webster's Third New International Dictionary 1926 (2002). By contrast, the ordinary meaning of the phrasal verb "to account" as used in the subject claims is more open ended – to "supply" or "make up a specified amount or proportion of." *Id.*; *cf. Tex. Digital Systems, Inc. v. Telegenix*, 308 F.3d 1193 (Fed. Cir. 2002) ("Dictionaries are always available to the court to aid in the task of determining meanings that

would have been attributed by those of skill in the relevant art to any disputed terms used by the inventor in the claims.").

Adopting Barnes & Noble's construction of the term would mean that as to those claims which provide "wherein the timestamp accounts for delays due to a busy signal on a medium access protocol," the term would be construed such that the timestamp *corresponds to* any delay due to a business signal. This would be inaccurate and inconsistent with the invention's specification insofar as the time stamp would also have the inherent RTS and CTS delays. Figure 4 and the invention's specification makes clear that the time stamp "represent[s] the state of the access point counter **22** at the exact time of transmission of the TIM packet." *Id.*, Col. 7:44-45; *see also id.* Col. 5:2-4 ("A TIME STAMP FIELD in which is loaded a so-called time stamp of the value of the modulo n counter in the transmitter **20** at the time of transmission of the TIM . . ."). *See Phillips*, 415 F.3d at 1315 ("[T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." (citation omitted)). While Barnes & Noble argues that its proposed construction does not "exclude any such delay," dkt. No. 270-4, at 13 n.8, its choice of the term "represents" so implies.

In light of the specification and claims language, the Court agrees with the ITC and *Agere* court to the extent they construed the "accounts for delay" terms by replacing "accounts for" with "indicates." Further, the Court construes the portion of the phrase providing "due to a busy signal on a medium access protocol" as "due to a busy signal on the wireless medium." Use of the phrase "indicates the amount" in place of "accounts for" makes express that the timestamp must not only indicate that there has been a delay, but informs the receiver as to the amount of that delay.

D. <u>"a timestamp having a value m for synchronizing a receiver timer with the transmitter timer, wherein the timestamp represents a value within a count sequence of a timer in the transmitter" / "a receiver counter that counts up to n counts"</u>

As to the various terms in the '867 patent which relate to a timestamp having a value m, the parties have provided the following construction:

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Barnes & Noble	LSI	Court
"a timestamp representing a value m within the range 0 to n in the counter of the transmitter, where n represents the interval between transmission signals"	Plain and ordinary meaning, or "a timestamp representing a value of a counter in the transmitter"	"a timestamp representing a value m within the range 0 to n in the counter of the transmitter, where n represents the interval between attempted transmission signals"
"receiver counter that counts from 0 to n, where n represents the interval between transmission signals"	Plain and ordinary meaning, or "a counter in the receiver configured to count up to n counts, where n is any whole number."	"receiver counter that counts from 0 to n, where n represents the interval between attempted transmission signals"

In this case, the two disputes between the parties appears to be whether: (1) the counter resets to zero after each transmission; and (2) whether the time interval between all transmissions is the same (a period labeled as "n"). The Court agrees with the construction provided by Barnes & Noble – one that has been previously adopted by the ITC.

The court in *Agere* has previously construed this term. In that case, Agere Systems advanced a construction that is materially similar to that advanced by LSI in this case – that the "timestamp represents a value of a counter in the transmitter." The court "expressly disapprov[ed] . . . of Agere's proposed constructions, because they appear to broaden the scope of the claims beyond their plain language." *Agere*, 2008 WL 2078308, at *8. Sony, in turn, advanced the following construction of the timestamp terms: "the timestamp contains the value of a modulo n counter in the transmitter at the time of transmission of the transmission signal, wherein n is the period between successive TIM messages." *Id.* at *7. The court rejected this construction as well, finding that one claim – claim 49 – was "ambiguous on the issue whether the timestamp must be a value m in a count sequence of the transmitter timer." *Id.* at *8. Accordingly, the court stated that Sony's construction was improper because "the applicants did not clearly and unmistakably limit the scope of their invention to transmitters that include modulo n counters as described in the preferred embodiment and the cited portions of the prosecution history." *Id.* Ultimately, the court provided the following

construction: "a timestamp which represents a value within a count sequence of the transmitter timer for synchronizing the receiver with a transmitter timer that counts up to n counts." *Id.*

By contrast, the ITC construed the "timestamp" phrases as meaning "a timestamp representing a value m within the range 0 to n in the counter of the transmitter, where n represents the interval between transmission signals" – the precise construction advanced by Barnes & Noble in the instant case. *In Re Certain Audiovisual Components*, 2013 WL 4406820, at *113. The Court agrees with the ITC's construction.

First, the Court finds that requiring that a count sequence be between 0 and n and that the timestamp be a "value m" where $0 < m < n$ is supported by the prosecution history of the '867 Patent. In a brief appealing the PTO's final rejection of an early version of the '867 patent, the applicants noted that "the term 'time stamp' is well defined in Appellants' specification," "that it "represents a value m within a count sequence," and that the "count sequence ranges from 0 to n, where $0 < m < n$." 7/18/1995 Brief on Appeal in App. Ser. No. 08/155,661, at 11-12 & n.* (Dkt. No. 270-27). *See, e.g., Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002) ("Arguments and amendments made during the prosecution of a patent application and other aspects of the prosecution history, as well as the specification and other claims, must be examined to determine the meaning of terms in the claims." (citation omitted)). It is apparent that the inventor was not just describing a preferred embodiment, but rather relied upon the count sequence ranging from 0 to n, and the term m being between 0 and n, in distinguishing prior art. Specifically, the inventor sought to distinguish the Nagata invention. While the details of the Nagata invention are not provided in the '867 inventor's brief, the Nagata invention apparently employed a sync code detector which employed a 31-bit shift register. *Id.* at 14. In distinguishing the Nagata invention, the '867 inventor provided:

> Nagata's "sync code" does not represent a value m within a count sequence of a counter of a transmitter . . . at a time of transmission of a TIM packet . . . .
>
> In contrast, detection of Nagata's sync code by the sync code detector 430 . . . causes a detection pulse to be generate which in turn resets a timer 460 and causes a timer 470 to start counting . . . . Note that timer 470 is not caused to start counting from a value which is intermediate any [sic] count sequence such as a value m, where the count sequence ranges from 0 to n, and $0 < m < n$.

> Thus, Nagata's sync code is not equivalent to the "time stamp" of Applicants' claim 11.

Id. See also Andersen Corp. v. Fiber Composites, LLC, 474 F.3d 1361, 1374 (Fed. Cir. 2007) ("[A]s we have made clear, an applicant's argument that a prior art reference is distinguishable on a particular ground can serve as a disclaimer of a claim scope even if the applicant distinguishes the reference on other grounds as well.").[2]

Second, while the *claims* do not define "n," the specification repeatedly indicate that "n" is the interval between the transmission attempts of the TIM packet. *See, e.g.*, '867 Patent, Col. 4: 57-61 ("The modulo n counter **22** functions as a timer and when the count value reaches n, a TIM function generator **24** is triggered by way of an interrupt signal **25** indicating that the next TIM packet should be constructed, and transmitted . . . ."); *id.* at Col. 6:43-48 ("Once the modulo n counters **22, 58** in the station **12.1** and the access point **14** are accurately synchronized, the counter **58** provides the station **12.1** with an accurate indication of the time at which the counter **22** in the access point **14** reaches its n value and generates a TIM packet for transmission."). Further, the specification indicates that the transmitter attempts its transmissions at regular intervals. *See, e.g.*, '867 Patent, Col. 3:8-10 (recognizing that TIM packets are "transmitted at *regular intervals* from the access point **14** and indicate for which stations . . . in the BSA **10** data packets are buffered in the access point **14.**").

The Court is aware that claims " are not necessarily restricted in scope to what is shown in a preferred embodiment." *Phonometrics, Inc. v. N. Telecom Inc.*, 133 F.3d 1459, 1466 (Fed. Cir. 1998). At the same time, however, neither are the "specifics of the preferred embodiment irrelevant to the correct meaning of claim limitations." *Id.* As discussed above, the inventor expressly distinguished the present invention from prior art by reference to a timer employing a count

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[2] LSI argues that the statements in the 1995 appellate brief before the PTO should be disregarded because the '867 Patent was only approved after the "application was amended with the 'account for delay' limitations and related requirements." Dkt. No. 273-4, at 16. While it may be true that the '867 Patent was further amended to include additional limitations, it does not change the fact that the applicants advanced an express definition of the term "time stamp" before the PTO in an attempt to distinguish prior art. As cited above, "an applicant's argument that a prior art references is distinguishable on a particular ground can serve as a disclaimer of a claim even if the applicant distinguishes the reference on other grounds as well." *Anderson*, 474 F.3d at 1374.

sequence between 0 and n. In finding that the value n represents the interval between transmission attempts was more than simply a "preferred embodiment," the ITC noted that "[t]he '867 patent . . . discloses and suggests no value for n that represents anything other than the interval between transmission signals." *In Re Certain Audiovisual Components*, 2013 WL 4406820, at *114. The Court agrees and finds that the repeated references in the specification, combined with the inventor's statements during the prosecution history establishes the definition of n as the interval between transmission attempts. *See Phillips*, 415 F.3d at 1315

Finally, LSI argues that Barnes & Noble's construction would render the invention inoperable and read out desired embodiments because if the "time between transmissions is fixed at 'n,'" the "timestamp would never include a busy delay, excluding the embodiments in the specification." Dkt. No. 267-4, at 22. At the hearing, Barnes & Noble acknowledged that it would be more accurate to construe the term as stating that "n" represents the interval between the time when the transmitter will begin its attempt to transmit. Adjusted in this way, the construction takes into account potential delays. For example, consider a transmitter's modulo n counter that is configured for a count sequence of 10 (i.e., 0 through 9) and to begin its transmissions at count 0. If at count 0, the transmitter encounters message processing and busy-signal related delays such that it is not until count 3 of the following count sequence that the actual transmission occurs, the timestamp would be "3." This timestamp would indicate to the receiver to set its own counter to 3, rather than resetting it to 0, thus synchronizing the respective counters. Hence, it is clear that a regularized count sequence from 0 to n is central to the teaching of the '867 Patent.

Furthermore, it is clear from the language of Claims 1 and 20 and prosecution history discussed above that the time stamp "represents a value within a count sequence" means that $0 < m < n$..

For the foregoing reasons, the court construes the timestamp phrases as "a timestamp representing a value m within the range 0 to n in the counter of the transmitter, where n represents the interval between attempted transmission signals."

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VI. ‘087 PATENT

A. Background and General Patent Description

The ‘087 Patent is entitled “MPEG Decoder System and Method Having a Unified Memory for Transport Decode and System Controller Functions.” The invention describes an MPEG decoder system that uses a unified memory that is used by the MPEG decoder’s system controller, the transport logic, and the MPEG decoder logic. ‘087 Patent, Col. 4:65-5:28. This patent represents an advantage of prior art MPEG decoders that required separate memories for these three functions. *Id.*, Col. 4:28-35. By providing for a unified memory, the invention provides for reduced memory requirements for the decoder and thus reduced cost. *Id.*, Col. 4:44-48. The invention’s memory savings gains are further advanced by the implementation of various “frame memory saving schemes” such as compression or dynamic allocation. *Id.*, Col. 5:29-33.

B. Representative Claims

Claims 10 is a representative claim for the ‘087 patent and contains the terms the parties have indicated are most significant as to this patent. Claim 10 provides (with terms to be construed in bold):

> 10. A method for performing video decoding in an MPEG decoder system which includes a **single memory** for use by transport, decode, and system controller functions, the method comprising:
>
> receiving an **MPEG encoded stream**;
>
> **demultipliexing one or more multimedia data streams from the encoded stream**, wherein said **demultiplexing one or more multimedia data streams from the encoded stream** operates using a **first unified memory**;
>
> performing MPEG decoding on the multimedia data streams, wherein said performing MPEG decoding **operates using said first unified memory**; and
>
> a system controller operations within the MPEG decoder system, wherein said **controlling operations accesses code and data from said first unified memory**;
>
> wherein said demultiplexing one or more multimedia data streams, said performing MPEG decoding, and said controlling operations each use said **first unified memory**.

‘087 Patent, Col. 18:14-34.

C. "single memory" / "first unified memory"

Barnes & Noble	LSI	Court
"a single memory chip which stores code and data for the transport logic, system controller and MPEG decoder functions"	"memory functioning as a unit"	"a single memory device which stores code and data for the transport logic, system controller and MPEG decoder functions."

The sole dispute regarding this term is whether "single memory" / "first unified memory" should be construed as limiting the memory to a single chip or whether it expresses a more general idea that the memory functions as a unit.

The patent's abstract provides that the invention is an "MPEG decoder system" which "includes a unified memory for multiple functions." '087 Patent, abstract. Specifically, the video decoding system described in the invention "includes a single unified memory which stores code and data for the transport, system controller and MPEG decoder functions." *Id.* The specification distinguishes this "single memory" or "first unified memory" from prior art MPEG video decoders as follows:

> Prior art MPEG video decoder systems have generally used a frame store memory for the MPEG decoder motion compensation logic which stores the reference frames or anchor frames as well as the frame being reconstructed. Prior art MPEG video decoder systems have also generally included a separate memory for the transport and system controller functions. It has generally not been possible to combine these memories, due to size limitations.

Id., Col. 4:28-36.

The ITC has construed this term, adopting the construction proffered by LSI in this case: "memory functioning as a unit." *In Re Certain Audiovisual Components*, 2013 WL 4406820, at *7. In reaching this construction, the ITC noted that:

> the specification indicates that the claimed memory is not limited to a single chip. As seen in at [sic] FIG. 3 of the '087 patent, the 16-Mbit SDRAM identified by reference number 212 is depicted as four rectangles coupled together. This representation of memory 212 is consistent with four ranks (*i.e.*, chips) of memory coupled together to form a 16-Mbit SDRAM.

Id.

The Court agrees with the ITC to the extent it rejects Barnes & Noble's "single chip" limitation. The specification describes the 16Mbit SDRAM identified in Figure 3 as 212 as "an external memory **212**, also referred to as the single unified memory **212**." '087 Patent, Col. 8, 40-41. Figure 3 clearly depicts the "single unified memory" as four rectangles coupled together. As the ITC recognized, this is consistent with four ranks (or chips) of memory coupled together. Accordingly, adopting Barnes & Noble's construction would exclude a preferred embodiment. Barnes & Noble has not demonstrated the highly persuasive evidentiary support to establish such a construction. *See Rambus Inc. v. Rea*, 731 F.3d 1248, 1253 (Fed. Cir. 2013) ("A claim construction that excludes the preferred embodiment is rarely, if ever, correct and would require highly persuasive evidentiary support." (citation omitted)). Construing the invention as being capable of having multiple "chips" is further supported by *Rambus Inc. v. Hynix Semiconductor Inc.*, 569 F. Supp. 2d 946 (N.D. Cal. 2008), where the court declined to limit the phrase "memory device" in a claim to encompass only a single chip because the specification did "not clearly limit the scope of the invention to a single chip." *Id.* at 974.

Barnes & Noble cites no intrinsic evidence in support of a single "chip" (as opposed to a single "memory") limitation. Nor does its reliance on its expert, Dr. Dan Schonfeld, support such a limitation. Dr. Schonfeld merely states what the patent itself provides – that the invention uses a "single" memory. Declaration of Dr. Dan Schonfeld ¶ 12-15 (Dkt. No. 270-41). Nowhere does Dr. Schonfeld state or otherwise support the contention that the memory must be embodied in a single "chip."

The Court concludes that "single memory" and "first unified memory" refers to the fact that the memory "stores code and data for the transport logic, system controller and MPEG decoder functions." '087 Patent, Col. 5:3-6. The patent distinguishes this from the prior art my noting that prior art MPEG decoders have used: (1) "a frame store memory for the MPEG decoder motion compensation logic which stores the reference frames . . . as well as the frame being reconstructed"; and (2) "a separate memory for the transport and system controller functions." *Id.*, Col. 4:28-36. Whereas combining these two discrete memories dedicated to their separate tasks was previously impossible "due to size limitations," *id.*, Col. 4:35-36, the invention provides for "various frame

memory saving schemes . . . to reduce the required amount of frame store memory" such that the "savings in memory allow portions of the memory to also be used for transport and system controller functions. *Id.*, Col. 5:37-40; *see also See Phillips*, 415 F.3d at 1315 ("[T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." (citation omitted)). Accordingly, the Court disagrees with Barnes & Noble that rejecting its construction fails to distinguish the invention from prior art.

At the hearing, Barnes & Noble suggested a compromise construction, replacing the "single chip" limitation in its original proposed construction with the phrase "single memory device." The Court agrees that this construction is consistent with the specification and ordinary meaning of the term "memory." Further, unlike LSI's proposed construction, Barnes & Noble's revised construction describes the true purpose of the "single unified memory" development – specifically, that it stores code and data for all three of the identified functions (transport logic, system controller, and video decoder).

Accordingly, the Court construes "single memory" and "first unified memory" as "a single memory device which stores code and data for the transport logic, system controller and MPEG decoder functions."

D. "controlling operations accesses code and data from said first unified memory," "operates using a first unified memory," "operates using said first unified memory"

Barnes & Noble	LSI	Court
"system controller programmed so that operations which read from memory read exclusively from the unified memory."	Plain and ordinary meaning or "system controller programmed to access the first unified memory"	Plain and ordinary meaning
"configured so that operations which read and/or write to memory read and/or write exclusively to the first unified memory"	Plain and ordinary meaning or "operates by accessing a first unified memory"	Plain and ordinary meaning

The parties' dispute as to these terms turns on whether the decoding and system controller functions identified in the invention must *exclusively* use the unified memory. Barnes & Noble contends that the terms must be so limited because the applicants expressly distinguished itself from prior art MPEG decoders which utilized external memory in addition to internal memory. *See* Dkt. No. 270-4 ("[T]he claim language and specification describe the purported invention as being limited to exclusive use of a single or unified memory. LSI's construction only requires access or use of *some* code or data from the 'first unified memory,' while the remainder used for the same operations may come from anywhere.").

As with the "single" / "first unified memory" terms, the ITC has construed both of these terms. The ITC found that both terms should be given its "plain and ordinary meaning as understood by a person of ordinary skill in the art." *In re Certain Audiovisual Components*, 2013 WL 4406820, at *9, 10-11. There, respondents proposed an even broader "exclusivity" limitation, propounding constructions which provided for a "system controller programmed to exclusively read from and write to the unified memory" and the like. The ITC found that such a limitation did "not make sense" because, on its face, it meant that the system controller could *only* read and write to the unified memory and could not, for example, actually conduct system controller operations. *Id.* at *9. Barnes & Noble's exclusivity limitation advanced in the case at bar, by contrast, only provides that to the extent the decoder or system controller utilize memory, it exclusively utilizes the "first unified memory."

Nonetheless, the "exclusive" requirement Barnes & Noble seeks to impose does not appear in either the specification or the claims. Rather, Barnes & Noble points to the fact that the preamble of claim 10 recites a "method for performing video decoding in an MPEG decoder system which includes a single memory for use by transport, decode and system controller functions" which results in "reduced memory requirements compared to prior art designs." Dkt. No. 270-4, at 31. From this – and because the specification distinguishes the use of a "first unified memory" from prior art – Barnes & Noble argues that the invention is limited to "exclusive use' of a single or unified memory.

The Court does not agree. As an initial matter, the Court notes that claim 10's preamble language providing a "method of video decoding . . . which *includes a single memory*" for use by the three enumerated functions is inherently open ended. *See, e.g.*, *Lucent Technologies, Inc. v. Gateway, Inc.*, 525 F.3d 1200, 1214 (Fed. Cir. 2008) (noting that "includes" is an open-ended term); *see also Adobe Sys. Inc. v. Wowza Media Sys.*, No. 11-cv-02243-JST, 2014 WL 709865, at *5 (N.D. Cal. Feb. 23, 2014) ("The word 'includes' is open-ended. Accordingly, the use of the word 'includes' in the claims at issue means that a 'new media chunk' must include, *but is not limited to*, 'a plurality of new parameters in a corresponding one of said headers and uses at least one other parameter from a previous header.'"). Accordingly, that the invention in question includes a single memory that is accessible and used by the decoder and controller functions for purposes of video decoding does not mean that the decoder and controller may use *only* said single memory in the decoding process.

In addition, the specification itself acknowledges that memory other than the "single unified memory" may be used by the decoder. Figure 4 is a block diagram which illustrates the decoder logic. '087 Patent, Col. 11:33-35. Inside the decoder is a "Motion Compensation" box located at 310, which contain two elements which are unnamed in the figure, but labeled as 316 and 314. *Id.*, Col. 12:35. Outside the video decoder is the "Frame-store Memory" at 212 – this corresponds to the "single unified memory" described in the invention. *Id.* The specification describes how the motion compensation block sends and receives data from the frame store memory. It provides:

> The motion compensation block **310** analyzes each motion vector from the incoming temporally compressed data and retrieves a reference block from the frame store memory **212** in response to each motion vector. *The motion compensation block **310** includes a local memory or on-chip memory **[3]16** which stores the retrieved reference block.* The motion compensation block **[3]10** then uses this retrieved reference block to decompress the temporally compressed data.

Id., Col. 12:48-56 (emphasis added).[3] Accordingly, the specification describes an embodiment where the decoder is, in fact, using two memories – the main "frame store memory" (which in

[3] The patent text describes this on-chip memory as number 116. The number 116, however, does not appear anywhere in the Figures or elsewhere in the specification. It appears to be a typographical error as the motion compensation block lists 316 as one of the elements comprising it.

context of the figures represents the "single unified memory" accessible by the controller and decoder) and a "local memory" in the motion compensation block – an arrangement that would be precluded under Barnes & Noble's construction as the decoder would only be permitted to read or write to or from the "single unified memory." *See Rambus Inc.*, 731 F.3d at 1253 ("A claim construction that excludes the preferred embodiment is rarely, if ever, correct and would require highly persuasive evidentiary support." (citation omitted)).

Nor does the specification require Barnes & Noble's "exclusivity" limitation. Barnes & Noble argues that the applicants expressly disavowed use of the prior art's multiple memories. It is true that the '087 patent specification describes at some length the limitations of the prior art. For example, it provides:

> Prior art MPEG video decoder systems have generally used a frame store memory for the MPEG decoder motion compensation logic which stores the reference frames or anchor frames as well as the frame being reconstructed. Prior art MPEG video decoder systems have also generally included a separate memory for the transport and system controller functions. It has generally not been possible to combine these memories, due to size limitations.

'087 Patent, Col. 4:28-36. The specification highlights the "amount of memory is a major cost item in the production of video decoders" and it is "desired to reduce the memory requirements of the decoder system as much as possible to reduce its size and cost." *Id.* at Col. 4:44-47. Thus, the specification provides: "a new video decoder system and method is desired which efficiently uses memory and combines the memory subsystem for reduced memory requirements and hence reduced cost." *Id.* at Col. 4:59-62.

However, as the Federal Circuit has recognized in the context of prosecution disclaimer, disclaimer or disavowal does not apply "if the applicant simply describes features of the prior art and does not distinguish the claimed invention based on those features." *Computer Docking Station Corp. v. Dell, Inc.*, 519 F.3d 1366, 1375 (Fed. Cir. 2008). Here, the reference to prior art being limited to a separate memory for the decoder and a separate memory for the controller may describe one problem with the prior art, but in so describing, the applicants did not expressly disavow all use of additional memories. This can be seen by the specification's recognition that "[a] typical MPEG decoder includes motion compensation logic which includes local or on-chip memory." '087 Patent,

at Col. 4:14-15. As discussed above, a preferred embodiment of the invention provides for both the unified memory and a local or "on chip" memory for the motion compensation box within the decoder. It is thus apparent that the applicants were not broadly disavowing all potential uses of additional memories, but merely disclosing a way in which the three distinct functions could operate on the same memory. Significantly, at the hearing, Barnes & Noble could point to no language in the specification or claims which require "exclusive" use of the "single unified memory."

Accordingly, the Court rejects Barnes & Noble's construction. Instead, the Court concludes, like the ITC, that these terms will be given plain and ordinary meaning as understood by a person of ordinary skill in the art.

E. "MPEG encoded stream" / "demultiplexing one or more multimedia data streams from the encoded stream"

Barnes & Noble	LSI	Court
"a plurality of encoded multimedia data streams which are combined into a single stream"	Plain and ordinary meaning, or "a stream encoded in a manner permitted by one or more Motion Picture Expert Group ('MPEG') standards"	"a stream encoded in a manner permitted by one or more Motion Picture Expert Group ('MPEG') standards"
"demultiplexing one or more multimedia data streams each composed of at least a video stream from the plurality of encoded multimedia data streams"	Plain and ordinary meaning, or "separate the encoded stream into one or more individual streams"	"separate the encoded stream into one or more individual streams"

The parties' dispute as to these terms goes to whether claim 10 requires there to be many encoded "multimedia data streams" in a single "MPEG encoded streams." In other words, the parties dispute whether an "MPEG encoded stream" can consist of only a single multimedia stream. Barnes & Noble argues that "a single 'MPEG encoded stream' must be comprised of a plurality of (*i.e.*, more than one) encoded multimedia data streams." Dkt. No. 270-4, at 32.

Barnes & Noble relies upon the specification which provides, in discussing Figure 3:

> The transport and system controller block includes transport logic which operates to demultiplex the received MPEG encoded stream *into a plurality of multimedia streams*. In other words, the encoded stream preferably includes *a plurality of multiplexed encoded channels or multimedia data streams* which are combined into a single stream, such as a broadcast signal provided from a broadcast network. The transport logic **206** in the transport and system controller block **204** operates to demultiplex this multiplexed stream *into one or more programs, wherein each of the programs comprise individual multimedia data streams* including video and/or audio components.

Id., Col. 8:10-21 (emphases added); *see also id.*, Col. 7:38-41 ("As discussed further below, the video decoding system includes transport logic which operates to demultiplex received data into a plurality of individual multimedia streams."). Barnes & Noble also relies on its expert who asserts an MPEG encoded stream is one where "an MPEG-encoded broadcast typically includes a plurality of programs or channels in a single data stream, and each program is composed of video and/or audio streams." Schonfeld Decl. ¶ 18.

The Court rejects Barnes & Noble's proposed construction. The Court begins with the plain language of claim 10, which, as stated above, provides in relevant part:

> **10**. A method for performing video decoding in an MPEG decoder system . . . the method comprising:
>
> receiving an MPEG encoded stream
>
> demultiplexing one or more multimedia data streams from the encoded stream from the encoded stream operates using a first unified memory. . . .

'087 Patent, Co. 18: 14-23. The use of the phrase "an MPEG encoded stream" and demultiplexing "one or more multimedia data streams" directly conflicts with Barnes & Noble's proposed construction, in that the claim language expressly contemplate a single MPEG encoded stream that is then demultiplexed into "*one* or more multimedia data streams. As the Federal Circuit has recognized "'[a]' or 'an' in patent parlance carries the meaning of 'one or more' in open-ended claims containing the transitional phrase 'comprising.' This convention is overcome only when 'the claim is specific as to the number of elements' or 'when the patentee evinces a clear intent to . . . limit the article.'" *Free Motion Fitness, Inc. v. Cybex Int'l, Inc.*, 423 F.3d 1343, 1350 (Fed. Cir. 2005) (quoting *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1356 (Fed. Cir. 2000)); *see also*

Baldwin Graphic Sys., Inc. v. Siebert, Inc., 512 F.3d 1338, 1343 (Fed. Cir. 2008) ("That 'a' or 'an' can mean 'one or more' is best described as a rule, rather than merely as a presumption or even a convention.").

Barnes & Noble's contention that the Court should interpret claim 10 as limited by the preferred embodiment contained in Figure 3 is unavailing. First, as its own brief recognizes, the specification on this point states that "the encoded stream *preferably* includes a plurality of multiplexed encoded channels or multimedia streams." '087 Patent, Col. 8, 13-15. The use of the term "preferably" in the specification suggests that the invention is not, in fact, limited in this way. *See, e.g.*, *Candela Corp. v. Palomar Med. Techs., Inc.*, No. 9:06-CV-277, 2008 WL 3285255, at *5 (E.D. Tex. Aug. 6, 2008) ("Only where the specification uses language of requirement, rather than preference, will the specification describe an essential step or element of the claim rather than merely a preferred embodiment."). Adopting Barnes & Noble's requirement that there be multiple multimedia streams based on the language in the specification would improperly read a limitation into the claim based on a preferred embodiment in the specification which makes clear the proffered embodiment is not intended to be exhaustive of all possible embodiments. *See Kara Tech. Inc. v. Stamps.com Inc.*, 582 F.3d 1341, 1348 (Fed. Cir. 2009) ("The patentee is entitled to the full scope of his claims, and we will not limit him to his preferred embodiment or import a limitation from the specification into the claims.").

Accordingly, the Court rejects Barnes & Noble's proposed construction. Because LSI's proposed constructions provide a definition for both "MPEG stream" and "demultiplexing," the Court adopts LSI's proposed construction.

VII. '420 PATENT

A. Background and General Patent Description

The '420 Patent is entitled "Methods of and Devices for Enhancing Communications that Use Spread Spectrum Technology by Using Variable Code Techniques." The patent explains a spread spectrum technique which provides for increased system capacity and/or signal quality through the employment of unequal error protection ("UEP"). '420 Patent, Col. 1, 63-67. Specifically, the technique provides a greater degree of error protection to portions of a signal that

are relatively sensitive to signal errors, while those portions fo the signal relatively insensitive to such errors receive a lower degree of error protection. *Id.*, Col. 2, 5-15. By eliminating "over-coding" by providing a single level of error protection, the channel bandwidth is used more efficiently. *Id.*, Col. 2, 23-26.

B. Representative Claims

Claims 1 and 17 are representative claims for the '420 patent and contain the terms the parties have indicated are most significant as to this patent. Claim 1 provides (with terms to be construed in bold):

> 1. In a method of processing a signal, comprising the steps of applying a spread spectrum coding process, the signal being a function of time, the improvement comprising:
>
> (a) encoding a **first segment of the signal** with a first channel encoder operating at a first rate to generate a first encoded segment having more significant bits using a first error protection process; and
>
> (b) encoding a **second segment of the signal** with a second channel encoder operating at a second rate to generate a second encoded segment having less significant bits using a second error protection process, the second rate being different from the first rate and the first error protection process providing a greater amount of error protection than the second error protection process.

'420 Patent, Col. 14: 18-32. Claim 17 provides:

> 17. In a method of processing a signal comprising the steps of applying a spread spectrum multiple access decoding process, the signal being a function of time, the improvement comprising:
>
> (a) decoding a **first received segment of the signal** with a first channel decoder to generate a first decoded segment having **more significant bits** using a first error protection process, the first channel decoder operating at a first rate; and
>
> (b) decoding a **second received segment of the signal** with a second channel decoder to generate a second decoded segment having **less significant bits** using a second error protection process, the second channel decoder operating at a second rate, the second rate being different from the first rate and the first error protection process providing a greater amount of error protection than the second error protection process.

Id., Col. 15:57-16:5.

C. "first segment of the signal" / "second segment of the signal" and "first received segment of the signal" / "second received segment of the signal"

As to the terms "first segment of the signal" and "second segment of the signal," the parties have provided the following constructions:

Barnes & Noble	LSI	Court
"a first data stream that has been separated out from the signal to be transmitted"	Plain and ordinary meaning, or "a group of bits"	"a group of bits"
"a second data stream that has been separated out from the signal to be transmitted"	Plain and ordinary meaning, or "a second group of bits."	"a second group of bits"

As to the terms "first received segment of the signal" and "second received segment of the signal" the parties have provided the following constructions:

Barnes & Noble	LSI	Court
"a first received data stream that has been separated out from the signal prior to transmission to the receiver"	Plain and ordinary meaning, or "a group of bits received by the receiver"	"a group of bits received by the receiver"
"a second received data stream that has been separated out from the signal prior to transmission to the receiver"	Plain and ordinary meaning, or "a second group of bits received by the receiver."	"a second group of bits received by the receiver"

The dispute between the parties as to these terms is whether the "first segment" and "second segment" of the signal must be distinct, constituent parts of the signal which must be physically separated out from the signal prior to transmitting. *Compare* 270-4, at 18 (Barnes & Noble arguing that "the claim language itself makes clear that the first and second segments are separate, constituent parts of the signal"), *with* Dkt. 273-4, at 10 (LSI arguing that "[w]hile certainly some implementations of the '420 Patent may 'separate' each segment from the signal, there is nothing in the claim language that would lead one skilled in art to believe that separation prior to transmission is required").

The '420 invention discloses a spread spectrum transmission technology that provides for increased system capacity and/or improved signal quality on a cellular network. '420 Patent, Col. 1:63-65. The invention does this by employing "unequal error protection" ("UEP"). *Id.* UEP works by applying differing levels of error protection to different "segments" of a given signal – those portions that are relatively sensitive to signal errors are afforded increased protection against such errors, while those portions relatively insensitive to signal errors are afforded a reduced level of protection. *See id.*, Col. 2:5-14. The result is an efficient use of available channel bandwidth. *See id.*, Col. 2:15-17. The specification reveals that this process may be implemented in a "variety of manners," such as a variable time UEP method ("VT"), a variable code UEP method ("VC"), or a variable power UEP method ("VP") or some combination of these three. *Id.*, Col. 5:15-20. However, the claims in the '420 Patent all address the variable code UEP process.

Barnes & Noble relies primarily on the specification – specifically Figure 3 and its associated detailed description – in support of its proposed construction. Barnes & Noble points to the fact that the figure shows two separate coders – a "first channel coder" (302) and a "second channel coder" (304) that receive separate portions of the signal. In describing Figure 3, the specification states "Interface **300** separates voice data into two data streams of unequal significance." *Id.*, Col. 5:51-52. Then, a "first data stream **306** (e.g., a more significant data stream) is input into the first channel coder **302** and a second data stream **308** (e.g., a less significant data stream) is input into the second channel coder." *Id.*, Col. 5:54-56. Additional figures and discussions in the specification refer to a splitting of a signal into separate data streams. *See, e.g.*, *id.*, Col. 10:42-47 ("Referring to FIG. 6, the pre-processor **200** comprises input voice data interface **600**. The interface **600** separates the encoded voice data into two data streams, a first data stream **606** and a second data stream **608**.").

The Court finds that there is no basis for imposing a claim limitation that there be physical separation of the signal before transmission. The asserted claims *do* speak of two channel encoders – the "first channel encoder operating at a first rate" and a "second channel encoder operating at a second rate." It is also true that the specification and figures refer to the separation of the signal into a first and second segment. However, there is nothing in the claims or specification *requiring* the

physical separation of the signal. For example, there is no reason, based on the plain text of the claims, why the entire signal could not be processed serially through a single piece of hardware controlled by software which provides unequal error protection based on the particular segment of the signal currently being processed through the encoder. At the hearing, Barnes & Noble conceded that such an arrangement is technologically possible. Serial processing of the data stream would not require segments be physically separated.

Furthermore, the section of the cited specification discussing the illustrations is entitled "Detailed Description of the *Illustrative* Embodiments." '420 Patent, Col. 3, 50-51. This thus suggests that the specification's discussion is not meant to be exhaustive. *See, e.g., Roberg v. 20th Century Plastics, Inc.*, 40 F. Supp. 2d 208, 219 (D.N.J. 1999) ("In addition, references in the specification to a preferred embodiment, or an illustrative example, do not limit the scope of the patent claim." (citation omitted)). The patent then makes this explicit at the end of the specification, providing that "[a]lthough a number of specific embodiments of this invention have been shown and described herein, it is to be understood that these embodiments are merely illustrative . . . ."

Accordingly, nothing in the asserted claims requires the respective "segments" of a signal to be separated out prior to transmission. *See, e.g., Howmedica Osteonics Corp. v. Wright Med. Tech., Inc.*, 540 F.3d 1337, 1345 (Fed. Cir. 2008) (declining to impute a limitation into a disputed claim term in the absence of a clear *requirement* in the specification, even where "every disclosure of [the disputed term] in the specification shows [the alleged limitation]"); *see also Baxter Healthcare Corp. v. Fresenius Med. Care Holdings, Inc.*, No. C 07-1359 PJH, 2009 WL 330950 (N.D. Cal. Feb. 10, 2009) ("Even if every disclosed embodiment uses flexible membranes, *Phillips* squarely rejects limiting the claim on that basis, unless the specification makes clear that the patentee . . . intends for the claims and the embodiments in the specification to be strictly coextensive."). The Court concludes that the terms will be given meanings proposed by LSI.

VIII. '394 PATENT

A. Background and General Patent Description

The '394 patent is entitled "Methods and Systems for Transmitting an Information Signal in a Multiple Antenna Communication System" and addresses data communication in a wireless

system. The patent specification begins with a statement that "[t]he invention relates to a wireless radiofrequency data communication system comprising" the following:

> a base-station comprising multiple first sets and a signal processing-unit, wherein each first set comprises a transmitter- and receiver-unit provided with a transmitter and a receiver and at least one antenna which is connected to the transmitter- and receiver-unit, wherein the signal processing-unit is connected with each of the first sets for processing signals received by the first sets and processing signals to be transmitted by the first sets, and
>
> multiple second sets, wherein each second set comprises a transmitter- and receiver-unit provided with a transmitter and a receiver and at least one antenna which is connected to the transmitter- and receiver-unit.

'394 Patent, Col. 1:16-30. In other words, the patent defines the wireless communication system as one having: (1) a base-station that has "multiple first sets," each "first set" containing at least one antenna; and (2) multiple "second sets." each with at least one antenna. It is this system in which the invention described by the '394 patent operates.

In providing background for the patent, the specification noted the current limitation of existing prior art wireless systems:

> In the majority of the applications more than one second set [computer, tablet, or other wireless device] wants to communicate with the base-station. This means that the second set transmits signals to this base-station and also receives signals from this base-station. Since it would not be acceptable if all second sets would have to wait for each other's communication to be finished, there is a need for simultaneous communication. Simultaneous communication allows more second sets to communicate at the same time with the base-station.

'394 Patent, Col. 1:51-50. The patent then recognizes that the "common way of realising simultaneous communication is to assign different radiofrequencies to the respective second sets. In this way all data signals can be separated easily by the first sets in the base-station by frequency selective filters." *Id.*, Col. 1:59-63.

The object of the invention taught by the '394 patent is to "increase the capacity of the wireless communication system per frequency or frequency-band used by the system. *Id.*, Col. 2:5-7. In essence, the patent increases the number of devices which may simultaneously communicate with a base station over a wireless network by splitting the data signal from that device into a

multiple of signals which are then modulated on different frequencies according to an Inverse Fast Fourier Transformation, and then sent to the base station's antenna which reassembles the data signal. *Id.*, Col. 4:1-10. The specification also teaches a beneficial advantage of the multiple antenna system arrangement is to minimize signal error or "deep fades" as a result of "the antenna receiving diversity effect." *Id.*, Col. 4:33-34. Stated another way, because the base station in this wireless system has multiple antenna and, therefore, receives multiple copies of the signal, the risk of signal errors is reduced.

B. Representative Claims

Claims 1 is the asserted claim for the '394 patent. Claim 1 provides (with terms to be construed in bold):

> 1. A method for transmitting an information signal in a **multiple antenna communication system**, comprising the steps of:
>
> separating said information signal into K signals;
>
> **performing an Inverse Fast Fourier Transformation on said K signals to generate a signal comprising K different frequencies**; and
>
> transmitting said signal comprising K different frequencies on only one antenna.

'394 Patent, Col. 11:24-32.

C. "multiple antenna communication system"

Barnes & Noble	LSI	Court
"a communication system having multiple transmitter antennas and multiple receiver antennas such that multiple simultaneous communication channels may be generated on the same frequency or within the same frequency band"	"system with at least one transmitter or receiver with more than one antenna"	"a communication system having multiple transmitter antennas and multiple receiver antennas such that multiple simultaneous communication channels may be generated on the same frequency or within the same frequency band"

The Court adopts Barnes & Noble's proposed construction. As described *supra*, the specification begins with a general statement that "[t]he invention relates to a wireless radio frequency data communication system comprising" two distinct parts: (1) a base-station with

"*multiple* first sets," each first set having at least one antenna; and (2) "*multiple* second sets," each one having at least one antenna. *Id.*, Col. 1:16-30 (emphases added). Accordingly, the patent begins by describing the "data communication system" in which the invention operates and expressly provides that in such a system there are multiple transmitter and receiver antennas.[4]

Further this statement does more than describe a preferred embodiment of the invention; rather, it describes the wireless system to which "[t]he invention" relates. Accordingly, it is proper to read the claims as being limited to such a system. *See, e.g., Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1330 (Fed. Cir. 2009) (where specification makes descriptions of the "invention itself" or the "present invention" rather than specific embodiments, the patent indicates an intent to limit the invention to that description); *see also Microsoft Corp v. Multi-Tech Systems, Inc.*, 357 F.3d 1340, 1348 (Fed. Cir. 2004) ("Those statements, some of which are found in the 'Summary of the Invention' portion of the specification, are not limited to describing a preferred embodiment, but more broadly describe the overall inventions of all three patents."). For example, in *Honeywell International, Inc. v. ITT Industries, Inc.*, 452 F.3d 1312 (Fed. Cir. 2006), the Federal Circuit affirmed the district court's construction of a "fuel injection system component" as being limited to a fuel filter because "[o]n at least four occasions, the written description refers to the fuel filter as 'this invention' or 'the present invention.'" *Id.* at 1318. One of these four references was, similar to this case, a statement that "[t]his invention relates to a fuel filter for use in the fuel line that delivers fuel to a motor vehicle engine." *Id.*

While the language of the claims and the descriptions of "the invention" contained in the specification are controlling, the Court also notes that Barnes & Noble's construction is consistent with the purpose of the invention. At the hearing, the parties disputed at length whether the invention's teachings would have any benefit in a situation where there was only a single "second

[4] LSI and its expert appear to misconstrue Barnes & Noble's construction. Dr. Negus states in his declaration that it his opinion that the phrase "multiple antenna communication system does "not require the [sic] every transmitter or receiver in the system have more than one antenna." Negus Decl. ¶ 38. Barnes & Noble does not argue that *every* transmitter or receiver in the system have more than one antenna. Rather, it argues, and the Court agrees for the reasons articulated, that the *system* must have multiple "second sets" and multiple "first sets" such that simultaneous communications are possible.

set" with one antenna but a base station with multiple antenna. LSI correctly identified that in such a situation the wireless system would benefit from reduced intersymbol interference as a result of the multiple antennas in the "first set." *See* '420 Patent, Col. 4:32-34 ("With the present multi-antenna processing, the probability of deep fades is greatly reduced because of the antenna receiving diversity effect."). However, it cannot be disputed that the specification plainly discloses that the main benefit of the invention is that it provides a way to permit simultaneous communications on the same frequency, thus increasing the capacity of the wireless system. *See, e.g., id.*, Col. 2:8-23. Such a goal can only be realized if the wireless system described in the invention contains multiple "second sets" each with at least one antenna. *See, e.g.*, *CVI/BETA Venturs, Inc. v. Tura LP*, 112 F.3d 1146, 1160 (Fed. Cir. 1997) ("In construing claims, the problem the inventor was attempting to solve, as discerned from the specification and the prosecution history, is a relevant consideration.").

Accordingly, the Court construes "multiple antenna communication system" as "a communication system having multiple transmitter antennas and multiple receiver antennas such that multiple simultaneous communication channels may be generated on the same frequency or within the same frequency band."

D. "performing an Inverse Fast Fourier Transformation on said K signals to generate a signal comprising K different frequencies"

Barnes & Noble	LSI	Court
"performing an Inverse Fast Fourier Transformation on a number of signals that corresponds to the number of different frequencies in the transmitted signal"	"performing Inverse Fast Fourier Transformation to generate another signal containing at least as many frequencies as the number of divided signals"	"performing an Inverse Fast Fourier Transformation on said K signals to generate a signal with K different frequencies"

The patent specification teaches that each "second set" in the multiple antenna system would have a serial-to-parallel/parallel-to-serial unit which would serve to split the data signal into several signals at which point the several signals would be put through an Inverse Fast Fourier Transformation ("IFFT") which would modulate these separate signals on different frequencies prior to transmission. '394 Patent, Col. 4:3-7. Here, the parties dispute whether the claim requires that

the number of frequencies created as a result of the IFFT must equal the number of signals that went into the IFFT. In other words, when K signals go into the IFFT, are K different frequencies created? LSI argues that because the claim states that the IFFT on "said K signals" creates a signal "*comprising* K different frequencies" – comprising being an inherently open-ended term – the claim requires only that "at least" K frequencies are created.

LSI is correct that the Federal Circuit traditionally interprets the word "comprising" as being an open-ended term. For example, in *CIAS, Inc. v. Alliance Gaming Corp.*, 504 F.3d 1356, 1360 (Fed. Cir. 2007), the court noted that "[i]n the patent claim context the term 'comprising' is well understood to mean 'including but not limited to.'" *Id.* at 1360. However, in those cases where the Federal Circuit has applied an open ended definition for "comprising," the term was used in the preamble or as a transition. *See, e.g., MagSil Corp. v. Hitachi Global Storage Tech., Inc.*, 687 F.3d 1377 (Fed. Cir. 2012) ("Open claim language, such as the word 'comprising' as a transition from the preamble to the body of a claim, 'signals that the entire claim is presumptively open-ended'" (citation omitted)); *Crystal Semiconductor Corp. v. TriTech Microelectronics Int'l, Inc.*, 246 F.3d 1336, 1348 (Fed. Cir. 2001) ("The transition 'comprising' creates a presumption that the recited elements are only a part of the device, that the claim does not exclude additional, unrecited elements.").

That is not the case here. Rather, the term "comprising" is contained in the body of the claim. Courts have held that when used in the body of a claim, and not as a transition, the term "comprising" should be interpreted according to the normal rules of claim interpretation. *See Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 1272 n.8 (Fed. Cir. 1986) ("'Comprising' is not used here as a transitional phrase and has no special legal effect as such. Hence, it should be interpreted according to the normal rules of claim interpretation."); *see also Med. Res. Institute v. Bio-Engineered Supplements & Nutrition, Inc.*, No. 605CV417, 2007 WL 128937 (E.D. Tex. Jan. 12, 2007) ("The Court agrees with BSN that 'comprising' in the body of the term should be construed according to normal claim construction rules."). The definition of "comprising," separated from the legal effect given to such term when used as a transition, is "to consist of" or "to make up." Webster's Third New International Dictionary 467 (2002). The claim language includes

a numerical limitation "K" for both the signals upon which the IFFT is performed and the frequencies which would result. It would be highly unusual for a writer to use the term "comprise" as open-ended in this context given this express numerical limitation.

Further, in his expert declaration, Dr. Bambos stated:

> A person of ordinary skill in the art would understanding that the scheme used in the '394 patent (like OFDM) involves transmission of signals that are comprised of a number of frequency subchannels onto which information may be modulated. A person of ordinary skill would also understand that "performing an Inverse Fast Fourier Transformation on said K signals to generate a signal comprising K different frequencies" refers to the number of frequency subchannels in an OFDM-type system. Thus, that person of ordinary skill would understand that the requirement of claim 1 for "a signal comprising K different frequencies" means that the claim requires generation of a signal with K frequency subchannels.

Bambos Decl. ¶ 27.

Accordingly, the Court rejects an open ended reading of comprising that would only require that the IFFT result in "at least K frequencies." Instead, the Court construes "performing an Inverse Fast Fourier Transformation on said K signals to generate a signal comprising K different frequencies" as "performing an Inverse Fast Fourier Transformation on said K signals to generate a signal with K different frequencies."

IX. '552 PATENT

A. Background and General Patent Description

The '552 Patent is entitled "Variable Rate Coding for Wireless Applications." In general, the patent provides a method for managing data traffic over a wireless data network. As the specification describes, in the past, wireless communications supported only "a single communication channel per user" and that this "limited the flexibility of the telecommunication system with regard to the high data rate required in applications such as multimedia applications." '552 Patent, Col. 1:11-15. The result was that multiple transmitters and receivers were needed for "each communication channel," thus resulting in an expensive an complicated system. *Id.*, Col. 1:15-17.

The invention provides a mechanism for controlling data backlog in the wireless system. The preferred embodiment describes a wireless base station receiving data from a variety of sources.

Id., Col. 1:46-48. These sources send data to the base station at different rates. *Id.*, Col. 1:49. The data is received by buffers which permit the data to be received at one rate and removed from the buffer at a different rate. *Id.*, Col. 1:53-54. A controller in the base station monitors the buffers "to determine if an overflow situation is about to occur." *Id.*, Col. 2:1-2. If such a situation is about to occur, the controller instructs the appropriate variable rate "Walsh coder" to "increase the coding rate or number of channels for that particular buffer," resulting in a data being transferred more quickly to alleviate the overflow. *Id.*, Col. 2:2-6. Similarly, if the controller determines that a buffer has very little data backlogged, the controller instructs the appropriate variable rate "Walsh coder" to decrease the coding rate or number of channels provided to that buffer "so as to free up additional channels for other users." *Id.*, Col. 2:8-12.

B. Representative Claim

The parties have identified 9 terms in the '552 patent the construction of which they dispute. In the parties' first supplemental joint claim construction and prehearing statement, only one of these terms ("when") was included in the list of ten most significant terms as to the original patents. Dkt. No. 262, at 3. Given the magnitude of disputed terms in the present action, the Court subsequently ordered the parties to provide the Court with a list of the ten absolute most significant terms. The parties resulting list contained no terms as to '552 patent. However, in order to provide guidance to the parties, the Court will, at this time, construe the term "when" as the parties originally identified this as a significant term to the '552 patent.

The term when appears in claims 1, 3, and 4. Claim 1 provides (with the term to be construed in bold):

> 1. A method for providing variable rate wireless communications, comprising the steps of:
>
> monitoring a data backlog of data to be transmitted;
>
> increasing the data transmission rate by increasing a coding rate **when** the data backlog crosses a first threshold; and
>
> decreasing the data transmission rate by decreasing the coding rate **when** the data backlog crosses a second threshold.

'552 Patent, Col. 5:48-57.

C. "when"

Barnes & Noble	LSI	Court
Plain and ordinary meaning, or "at the time"	"After"	Plain and ordinary meaning

LSI argues that Barnes & Noble's construction is improper because requiring that the coding rate be increased (or decreased) "at the time" a backlog crosses a given threshold, Barnes & Noble would make the claim impossible to practice because electrical devices "nearly always require some amount of processing time between a triggering event and a triggered action." Dkt. No. 268-4, at 30-31. Barnes & Noble, by contrast, argues that "when" is used to connote a conditional, cause-effect relationship between the "data backlog" and an increase or decrease in the transmission rate. Dkt. No. 270-4, at 19. It further argues that LSI's construction of the term as meaning "After" is too broad as it would, in theory, encompass any increase or decrease in coding rate occurring after a backlog passes a threshold, whether or not that increase/decrease was caused by the threshold being passed. *Id.* at 20.

At the hearing, Barnes & Noble asserted that it will not contend that coding rate change must occur simultaneously with a threshold being crossed – the main dispute of the parties as to this term. In light of this concession and the non-technical nature of the term "when" the Court finds no construction necessary. Jurors will be capable of understanding the meaning of "when" in this context without assistance from the Court.

X. '006 PATENT

A. Background and General Patent Description

The '006 Patent is entitled "Two-Part Synchronization Scheme for Digital Video Decoders." The patent describes an improved apparatus and method for synchronizing a video decoder to a compressed digitized video signal. '006 Patent, Col. 1:7-9. The patent describes that in conventional prior-art video decoding systems, before being sent through the video decoder, the coded video signal is sent through a synchronizer which "pre-processes the system bitstream prior to its being input into a video decoder." *Id.*, Col. 6:52-56. The synchronizer in such systems had to

perform two complex operations – (1) aligning the symbols to determine where the various structures making up an image or group of images start and (2) evaluating and parsing the bitstream to extract the coded video data from the non-video data. *Id.*, Col. 7: 4-9. This time consuming process made "rapid synchronization difficult," and could easily lead to either an overflow of bitstream data in the buffer (as the synchronizer could not keep up) or underflow of data to the decoder making the decoding process unreliable. *Id.*

To address this problem, the invention provides increased efficiency in video decoding by employing a "pre-parser" (or first synchronizer) which, for example, performs an initial synchronization of the bitstream, filtering unwanted digital information that is irrelevant to the video signal. *Id.*, Col. 9:49-68. The filtered video bitstream is then sent through a "post-parser" and then the video decoder – the operations of both being "significantly simplified" since the video bitstream had already been synchronized and properly aligned. *Id.*, Col. 9: 60-64.

B. Representative Claim

The parties have identified 7 terms in the '006 patent the construction of which they dispute. In the parties' first supplemental joint claim construction and prehearing statement, three of these terms were included in the list of ten most significant terms as to the supplemental patents. Dkt. No. 262, at 5. On the other hand, the parties second supplemental joint claim construction and prehearing statement filed in response to this Court's order contained no terms as to '006 patent. However, in order to provide guidance to the parties, the Court will, at this time, construe the term "further parsing the bitstream" – one of the terms identified as significant by the parties in their original filing.

The term to be construed appears in claim 27 of the amended '006 patent. This claim provides:

> 27. A process of decoding a bitstream comprising the steps of:
>
> receiving a multiplexed bitstream from a transmission channel, the multiplexed bitstream including at least a video bitstream;
>
> synchronizing to the received multiplexed bitstream;
>
> parsing the video bitstream from the synchronized multiplexed bitstream;

transferring the video bitstream to a channel buffer;

further parsing the video bitstream; and

decoding the parsed video bitstream,

wherein the multiplexed bitstream has a structure that conforms to an MPEG format.

'006 Patent C1, Col. 1:39-41.

C. "further parsing the bitstream"

Barnes & Noble	LSI	Court
"extracting the layers of video information from the video bitstream and translating each layer of video information using variable length coding look-up tables or dictionaries"	"extracting the various layers comprising the video bitstream"	"extracting the various layers comprising the video bitstream"

The parties agree that the "further parsing" step in claim 27 includes extracting layers from a video bitstream. They dispute, however, whether the "further parsing" step *also* requires that each layer of video information be translated. The Court concludes that the "further parsing" step of claim 27 does not require translation to occur.

Barnes & Noble's argument that translation is a necessary component of "further parsing" is premised entirely on the specification's discussion of specific embodiments of the invention. Specifically, the embodiments in the specification describe a structure in the video decoder called a "post-parser" which performs both parsing and translating activities. *See* '006 Patent, Col. 14, 51-54 (discussing the "multi-bit symbol parallel post-parser **76**" that appears in Figure 4 and stating it is "essentially a one-event per cycle parser that performs *look-ups and translations* with respect to the video bitstream and the VLC tables" (emphasis added)). However, the Federal Circuit has cautioned against importing from the specification limitations into a patent's claims, *see Phillips*, 415 F.3d at 1323, where there is nothing suggesting that the invention was intended to be limited to the embodiments. To the contrary, the patent here expressly provides that "the scope of the present

invention should not be limited by the particular embodiments discussed above." '006 Patent, Col. 15, 50-52.

Further, Barnes & Noble's proposed construction is in tension with other portions of the specification. In at least two places in the "Summary of the Invention," the specification expressly refers to "further parsing" as a separate act from "translation." *See id.*, Col. 7:61-64 ("Preferably, the synchronized portion of the variable bit-rate coded signal stored in the channel buffer is *further parsed and translated* by a second synchronizer when it is extracted from the channel buffer." (emphasis added)); *id.*, Col. 8:38-41 ("The multi-bit symbol parallel post-parser further parses the various layers comprising the *video bitstream and translates* the encoded video data to corresponding video symbols." (emphasis added)). While both are described as occurring in the "post-parser" element, the specification does not appear to define "further parsing" as including translation. In short, while the post-parser can perform both "further parsing" and "translation"; further parsing itself need not include translation.

In addition, Barnes & Noble's construction would render certain dependent claims superfluous, thus violating the doctrine of claim differentiation. *See, e.g.*, *InterDigital Commc'ns, LLC v. Int'l Trade Comm'n*, 690 F.3d 1318, 1315 (Fed. Cir. 2012); *see also Nextec Applications v. Brookwood Co., Inc.*, 703 F. Supp. 2d 390 (S.D.N.Y. 2010) (rejecting construction of a term that would "render the dependent claims of the '792 patent redundant, a result that is to be avoided under well-established claim construction principles"). For example, independent claim 16 of the '006 patent provides, in relevant part: "A signal decoding system comprising . . . a second synchronizing means, coupled to said channel buffer, further parsing said video bitstream . . . ." '006 Patent, Col. 16, 61-63. Dependent claim 23, however, provides: "[a] signal decoding system as defined in claim **16** wherein said second synchronizing means *further includes means for translating said parsed video bitstream*." *Id.*, Col. 17:19-21 (emphasis added). Similarly, independent claim 1 describes a signal decoding system which includes, in part, "a second synchronizing means . . . for parsing said portion of said variable bit-rate coded system." *Id.*, Col. 15:66-68. Dependent claim 13, however, provides "[a] signal decoding system . . . wherein said second synchronizing means includes means for translating said parsed portion of said variable bit-rate signal." *Id.*, Col. 16:39-42. Accordingly,

construing the term "further parsing" the video bitstream so as to require a translation function (as well layer extraction) would have the effect of rendering dependent claims 13 and 23 superfluous.

Although Claim 27 is the asserted claim, claim 27, like the other independent claims, uses the same "further parsing" term. As the Federal Circuit has noted, "[o]ther claims of the patent in question, both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term." *See Phillips*, 415 F.3d at 1314; *see also Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1579 (Fed. Cir. 1995) (stating that a term "cannot be interpreted differently in different claims because claim terms must be interpreted consistently").

Accordingly, the Court rejects Barnes & Noble's construction. While the inventor clearly conceived of a post-parser that would both extract and translate layers, there is nothing in the applicable claim language requiring "further parsing" to include translation Accordingly, the Court construes "further parsing the video bitstream" as "extracting the various layers comprising the video bitstream."

XI. '663 PATENT

A. Background and General Patent Description

The '663 Patent is entitled "Method and System for Symbol Binarization." The invention is directed at an improved method of binarization of data in an MPEG data stream. '663 Patent, abstract. Specifically, the invention provides for a hybrid binarization approach, where, if a code symbol index value is less than a certain threshold value, one binzarization model will be used. If the code symbol index value is greater than that threshold value, however, a second binarization model will be used. *Id.*, Col. 2:14-19. Such a method is beneficial because it would permit, for example, small codewords to be readily distinguishable using a simple unary code while large codewords could be kept at a reasonable length using a unary prefix and an exp-Golomb suffix. Such an approach would "reduce the complexity and the bitrate/size for compressing and decompressing video, images, and signals that are compressed using binary arithmetic encoding for entropy encoding." *Id.*, Col. 2:6-11.

The patent's claims involve using this process both for video *decoding* (i.e., taking a codeword and determining the "index value" that codeword represents) and video *encoding* (doing

the reverse, i.e., taking an "index value" and generating a codeword from that index value). The claim which includes the term to be construed in this order, as discussed below, is the former.

B. Representative Claim

The parties have identified 13 terms in the '663 patent, the construction of which they dispute. In the parties' first supplemental joint claim construction and prehearing statement, three of these terms were included in the list of ten most significant terms as to the supplemental patents. Dkt. No. 262, at 5. However, the parties second supplemental joint claim construction and prehearing statement filed in response to this Court's order contained no terms as to '663 patent. However, in order to provide guidance to the parties, the Court will, at this time, construe the term "setting said index value to a threshold" – one of the terms identified as significant by the parties in their original filing.

This term is found in claim 1. Claim 1 provides:

> 1. A method for generating an index value from a code-word for digital video decoding, comprising the steps of:
>
> (A) **setting said index value to a threshold** in response to a first portion of said codeword having a first pattern;
>
> (B) adding an offset to said index value based on a second pattern in a second portion of said codeword following said first portion in response to said first portion having said first pattern; and
>
> (C) adding a value to said index value based on a third pattern in a third portion of said codeword following said second portion in response to said first portion having said first pattern.

'663 Patent, Col. 7:31-43.

C. "setting said index value to a threshold"

Barnes & Noble	LSI	Court
"setting the index value to a predetermined constant"	Plain and ordinary meaning, or "setting the index value to an initial number"	"setting said index to an initial predetermined number"

LSI argues that Barnes & Noble's construction is incorrect because it improperly provides that the "index value can only be set once during the process and never changes." Dkt. No. 268-4, at

11. Barnes & Noble, apparently because of concerns regarding brief space, did not brief this term in its claim construction briefs. *See* Dkt. No. 270-4, at 1 n.2.

At the hearing, the parties agreed that "setting said index value to a threshold" should be construed as "setting said index to an initial predetermined number." The Court adopts this construction.

IT IS SO ORDERED.

Dated: April 7, 2014

EDWARD M. CHEN
United States District Judge