

NOTE: This disposition is nonprecedential

**United States Court of Appeals
for the Federal Circuit**

**IN RE REMBRANDT TECHNOLOGIES, LP,
PATENT LITIGATION**

**REMBRANDT TECHNOLOGIES, LP AND
REMBRANDT TECHNOLOGIES, LLC (doing business
as Remstream),
*Plaintiffs-Appellants,***

v.

**CABLEVISION SYSTEMS CORPORATION AND
CSC HOLDINGS, INC.,
*Defendants-Appellees,***

AND

**ABC INC., CBS CORPORATION, AND NBC
UNIVERSAL, INC. (now known as NBCUniversal
Media, LLC),
*Defendants-Appellees,***

AND

**CENTURY-TCI CALIFORNIA COMMUNICATIONS,
LP, CENTURY-TCI CALIFORNIA, LP, CENTURY-
TCI DISTRIBUTION COMPANY, LLC, CENTURY-
TCI HOLDINGS, LLC, PARNASSOS
COMMUNICATIONS, LP, PARNASSOS
DISTRIBUTION COMPANY I, LLC, PARNASSOS
DISTRIBUTION COMPANY II, LLC, PARNASSOS**

**HOLDINGS, LLC, PARNASSOS, LP, AND WESTERN
NY CABLEVISION, LP,**
Defendants-Appellees,

AND

**CHARTER COMMUNICATIONS OPERATING LLC
AND CHARTER COMMUNICATIONS, INC.,**
Defendants-Appellees,

AND

**COMCAST CABLE COMMUNICATIONS
HOLDINGS, INC., COMCAST CABLE
COMMUNICATIONS, LLC, COMCAST
CORPORATION, COMCAST OF
FLORIDA/PENNSYLVANIA, LP, COMCAST OF
PENNSYLVANIA II, LP, AND COMCAST OF PLANO,
LP,**
Defendants-Appellees,

AND

COXCOM, INC.,
Defendant-Appellee,

AND

**FOX BROADCASTING COMPANY AND FOX
ENTERTAINMENT GROUP, INC.,**
Defendants-Appellees,

AND

**SHARP CORPORATION AND SHARP
ELECTRONICS CORPORATION,**
Defendants-Appellees,

AND

**TIME WARNER CABLE LLC, TIME WARNER
CABLE, INC., TIME WARNER ENTERTAINMENT
COMPANY, L.P., TIME WARNER**

**ENTERTAINMENT-ADVANCE/NEWHOUSE
PARTNERSHIP, AND TIME WARNER NEW YORK
CABLE LLC** (known as Time Warner NY Cable LLC),
Defendants-Appellees,

AND

**ADELPHIA COMMUNICATIONS CORPORATION,
ADELPHIA CONSOLIDATION LLC, AMBIT
MICROSYSTEMS, INC., CISCO SYSTEMS, INC.,
MOTOROLA, INC., NETGEAR, INC., SCIENTIFIC
ATLANTA INC., AND THOMSON, INC.,**
Defendants.

2012-1022

Appeal from the United States District Court for the
District of Delaware in case no. 07-MD-1848, Chief Judge
Gregory M. Sleet.

Decided: September 13, 2012

MICHAEL J. BONELLA, Kessler Topaz Meltzer & Check
LLP, of Radnor, Pennsylvania, argued for plaintiffs-
appellants. With him on the brief was PAUL B. MILCETIC.
Of counsel was JENNA M. PELLECCIA.

DAVID S. BENYACAR, Kaye Scholer LLP, of New York,
New York, for defendants-appellees Time Warner Cable,
LLC, et al., and EDWARD R. REINES, Weil, Gotshal &
Manges LLP, of Redwood Shores, California, for defen-
dants-appellees ABC, Inc., et al., argued for all defen-
dants-appellees. With them on the brief were DANIEL L.

REISNER, Kaye Scholer, LLP, of New York, New York, for Time Warner Cable, LLC, et al.; TIMOTHY C. SAULSBURY, Weil, Gotshal & Manges LLP, of Redwood Shores, California, for ABC, Inc., et al.; MARK A. PERRY, JOSH A. KREVITT, and BENJAMIN HERSHKOWITZ, Gibson, Dunn & Crutcher LLP, of Washington, DC, for CSC Holdings, Inc., et al.; KEVIN D. HOGG and JOHN R. LABBE, Marshall, Gerstein & Borun LLP, of Chicago, Illinois, for Charter Communications Operating LLC, et al.; MITCHELL G. STOCKWELL, Kilpatrick Townsend & Stockton LLP, of Atlanta, Georgia, for CoxCom, Inc.; JEFFREY B. PLIES, Dechert LLP, of Austin, Texas, and MARTIN J. BLACK, of Philadelphia, Pennsylvania, for Fox Broadcasting Company, et al.; RICHARD H. BROWN III, Day Pitney LLP, of Parsippany, New Jersey, for Sharp Corporation, et al.; and BRIAN L. FERRALL, Keker & Van Nest, LLP, of San Francisco, California, for Comcast Cable Communications Holdings, Inc., et al. Of counsel were SARAH J. KALEMERIS, Marshall, Gerstein & Borun LLP, of Chicago, Illinois, for Charter Communications Operating LLC, et al; and JONATHAN B. TROPP, Day Pitney LLP, of Stamford, Connecticut, for Sharp Corporation, et al.

Before RADER *Chief Judge*, O'MALLEY, and REYNA, *Circuit Judges*.

O'MALLEY, *Circuit Judge*.

Rembrandt Technologies, LP and Rembrandt Technologies, LLC (“Rembrandt”) appeal the district court’s entry of judgment in favor of the above-captioned defendants (“Defendants”). After the district court construed the disputed terms of the asserted claims of U.S. Patent No. 5,243,627 (the “627 patent”), and in light of the court’s constructions, Rembrandt and the Defendants agreed upon a stipulation that disposed of all infringe-

ment claims relating to the '627 patent. Because we find that the district court correctly construed the term “signal point,” we *affirm* the district court’s entry of judgment.

BACKGROUND

I.

The '627 patent, issued to William Betts and Edward Zuranski on August 22, 1991, discloses an improvement to a system and method for transmitting digital data across high data rate communications networks. Rembrandt has accused the Defendants of infringing the '627 patent by providing services using certain cable modems, or receiving and transmitting digital broadcast signals, that comply with the Advanced Television Systems Committee Digital Television Standard.

Communications channels used in connection with the claimed invention carry digital data across large distances through the use of analog carrier waves. Characteristics of the carrier wave, such as phase, frequency, or amplitude, are modulated—or altered—such that the transmitted signal represents the digital data input to the system. As described in more detail below, blocks of bits—referred to as signal points—correspond to permissible combinations of carrier wave characteristics and are encoded at the transmitter for transmission on the carrier wave at successive intervals. The receiver demodulates and decodes the received analog signal such that the transmitted digital bits are recovered.

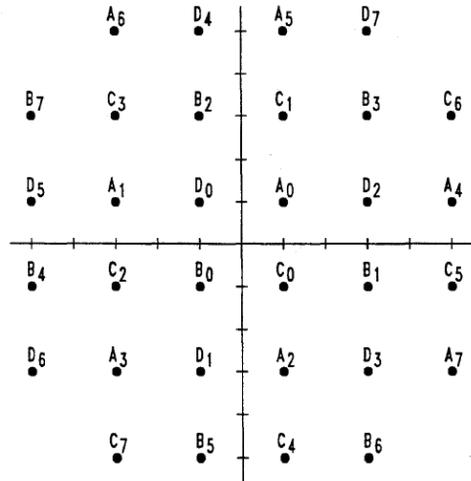
In the context of the claimed invention, each modulated characteristic represents a dimension of the transmitted signal point. To transmit a particular set of bits, one inputs those bits into a Quadrature Amplitude Modulation (“QAM”) encoder which outputs values into a modulator. The modulator then generates a carrier wave

with the characteristics specified by the encoder. The transmitter sends the wave to the receiver, where the process used to transmit the signal point is performed in reverse, interpreting the characteristics of the carrier wave and from those determining the sent bits:

Thus referring to FIG. 4, the line signal transmitted by the transmitter of FIG. 3 is received from the channel and applied to demodulator/equalizer 455 which, in conventional fashion—including an input from phase tracking loop 457—generates a stream of outputs on lead 456 representing the demodulator/equalizer's best approximation of the values of the I and Q components of the signal points of the transmitted interleaved signal point stream. These outputs are referred to herein as the "received signal points."

'627 patent col. 5 ll. 48-57. Figure 2 of the '627 patent shows a representative signal constellation comprised of signal points, with the axes of the constellation representing characteristics (referred to as I and Q) of the analog waveform modulated by the transmitter, and the signal points on the constellation representing strings of 1s and 0s, or bits.

FIG. 2



The signal points shown in Figure 2, e.g. A₀, are considered to be two-dimensional, in reference to the two characteristics, I and Q, represented on the x and y axis. The parties dispute whether “signal point,” as used in the ’627 patent refers only to two-dimensional signal points such as those shown in Figure 2, or may include signal points having only a single dimension.

Data transmission in the manner described is susceptible to noise bursts which may alter the carrier waves prior to receipt. “Due to distortion and other channel impairments that the demodulator/equalizer is not able to compensate for, the I and Q components of the received signal points, instead of having exact integer values, can have any value.” *Id.* at col. 5 ll. 57-61. This can result in a received signal being demodulated as a signal point that does not exist on the signal constellation. *Id.* at col. 5 ll. 61-64 (“Thus a transmitted signal point having coordinates (3, -5) may be output by the demodulator/equalizer

as the received signal point (2.945, -5.001).). When the coordinates received are sufficiently close to a permissible signal point, such as in the example provided, the receiver may be able to guess the desired signal point correctly. In many instances, however, the received signal point is too far from an acceptable point on the constellation that a guess is impossible and the signal point transmitted is unrecoverable at the receiver.

Achieving a high data rate is preferable in these communication systems, and as data rates approach the limits of the channel, “various channel impairments, whose effects on the achievable bit rate were relatively minor compared to, say, additive white Gaussian noise and linear distortion, [] become of greater concern.” *Id.* at col. 1 ll. 18-22. To compensate for those impairments, while maintaining high data rates, encoding techniques have been introduced that separate related data and permit the recovery of information lost in transmission. One such technique, trellis encoding, may be used to assist the receiver in recreating or recovering data lost in transmission.

A trellis encoder adds, into each set of data, non-data redundant bits that are correlated to each other according to a pattern. The receiver can then use these redundant bits to determine whether the inserted bits follow the prescribed pattern. If they do not, the receiver can tell not only that an error has occurred, but also where the error has occurred based upon the location of the deviation from the expected pattern of the redundant bits. Accordingly, trellis encoding is useful for small errors in transmission that alter the characteristics of the wave, but it has limited utility in dealing with larger bursts of noise that disrupt entire sequences.

In an effort to address the disruptions due to these larger bursts of noise, Betts, a named inventor of the '627 patent, filed for U.S. Patent No. 4,677,625 (the "625 patent"). The '625 patent, issued on June 30, 1987, expands on the use of trellis encoding in data communication systems using two-dimensional signal points selected by a QAM encoder. Specifically, the patent describes a system in which "through the use of a distributed trellis encoder/Viterbi decoder, the effects of many of these impairments can be reduced." '627 patent col. 1 ll. 34-38. As described in the '627 patent, the '625 patent improves upon the prior art "by distributing the outgoing data to a plurality of trellis encoders in round-robin fashion and interleaving the trellis encoder outputs on the transmission channel." *Id.* at col. 1 ll. 59-62. The receiver in the '625 patent contains a corresponding plurality of trellis decoders to which the stream of received interleaved channel symbols is distributed. *Id.* at col. 1 ll. 62-64. Thus, each redundant bit inserted by each encoder is separated from its related redundant bits, increasing the receiver's ability to recover channel symbols lost due to bursts of noise. *Id.* at col. 1 l. 65—col. 2 l. 2. ("Since the successive pairs of channel symbols applied to a particular trellis decoder are separated from one another as they traverse the channel, the correlation of the noise components of these channel symbol pairs is reduced from what it would have otherwise been.")

The improvements claimed in the '625 patent, however, failed to achieve the level of error correction required as demands for greater bit rates increased. Additional trellis encoders could theoretically enhance the error correction of the system, but, in the '625 patent, each expansion operation of a trellis encoder selects only one signal point. Thus, one redundant non-data bit must be transmitted for every signal point. This limitation

constrains the efficiency of the system and one's ability to increase the bitrate. To address this problem, the '627 patent improves upon a "data communication system using 2N-dimensional channel symbols" as described in the '625 patent. *Id.* at Abstract. Specifically, Betts sought to enhance the distributed trellis encoder/Viterbi decoder technique disclosed in the '625 patent by combining it with "a signal point interleaving technique which causes the constituent signal points of the channel symbols to be non-adjacent as they traverse the channel." *Id.* at col. 2 ll. 11-13. Interleaving is "essentially shuffling data," and in the claimed system, the "transmission-reception system shuffles data, transmits it, and then reorders the data back to its original order again at the receiver." Appellants' Opening Brief at 20. Thus, interleaving "reduces the effect of bursts of noise during transmission since any error of discrete duration will be spread out when the data is reordered at the receiver." *Id.*

The steps of the claimed invention can be understood with reference to Figures 3 and 4 of the '627 patent which show a block diagram of the transmitter and receiver sections of a modem embodying the principles of the invention. Digital data is encoded through trellis encoders 319 and the signal point interleaver 341 to reduce vulnerability to noise due to the channel medium. The data is then modulated and transmitted via modulator 328. That analog waveform is received and demodulated at the receiver such that the original digital data is recovered. Figure 5 of the '627 patent illustrates both the deficiencies perceived in the prior art as well as the claimed improvement. In the examples shown, each channel symbol is composed of two two-dimensional signal points that are referred to as a four-dimensional channel symbol.

Representative claim 11 of the '627 patent recites:

A method for forming a stream of trellis encoded signal points in response to input information, said method comprising the steps of

generating a plurality of streams of trellis encoded channel symbols in response to respective portions of said input information, each of said channel symbols being comprised of a plurality of signal points, and

interleaving the signal points of said generated channel symbols to form said stream of trellis encoded signal points, said interleaving being carried out in such a way that the signal points of each channel symbol are non-adjacent in said stream of trellis encoded signal points and such that the signal points of adjacent symbols in any one of said channel symbol streams are non-adjacent in said stream of trellis encoded signal points.

II. Procedural History

This appeal arises out of fifteen separate actions brought by Rembrandt against the Defendants in various district courts, alleging infringement of the '627 patent and other patents not at issue in this appeal. The Judicial Panel on Multidistrict Litigation centralized all actions in the District of Delaware before Chief Judge Gregory M. Sleet. The transferee court grouped the consolidated actions into two cases for case management purposes: one relating to the '627 patent and a second for the remaining patents. The court then held a *Markman* hearing in August, 2008, with a full day devoted to the

'627 patent.¹ On November 7, 2008, the district court issued an order construing the disputed terms of the '627 patent. Order Construing the Terms of U.S. Patent No. 5,243,627, *In Re: Rembrandt Technologies, LP Patent Litigation*, No. 07-MD-01848, ECF No. 445 (“*Claim Construction Order*”). In relevant part, the district court determined that a “signal point” is “a point on a 2-dimensional constellation having a pair of coordinates representing two components of a corresponding signal.” *Claim Construction Order* at 1.

Following the entry of the *Claim Construction Order*, Rembrandt informed the district court and the Defendants that it wished to stipulate to a judgment of noninfringement of the '627 patent based solely on the construction of “signal point” and postpone any further discovery pending appeal of that construction to this court. The Defendants agreed that a judgment of noninfringement was appropriate under the construction of “signal point,” but also sought leave to move for summary judgment of noninfringement based on the construction of several other terms. Rembrandt advised the Court that it would oppose summary judgment with respect to the terms referred to by the parties as the “trellis encoded channel symbol,” “stream of trellis encoded channel symbols,” and “intedeaving/deinterleaving” limitations. On May 28, 2009, the district court granted the Defendants’ motion for leave and, on July 21, 2009, the Defendants moved for summary judgment of noninfringement.

¹ A *Markman* hearing was held in one of the prior actions, *Rembrandt Technologies, LP. v. Comcast Corp. et al.*, Civ. No. 2:05-CV-443 (E.D. Tex.), construing the '627 patent. The Texas district court issued an opinion and order construing the phrase “signal point,” but that construction was vacated by the transferee court when the various actions were consolidated before it.

In opposition, Rembrandt agreed that the district court should enter summary judgment of noninfringement based on the construction of “signal point,” but argued that the Defendants failed to carry their burden of showing that no genuine dispute existed on the other limitations, as construed by the district court.

After considering the Defendants’ motion, the district court determined that numerous disputed material facts raised genuine issues for trial as to the Defendants’ alternative grounds for finding noninfringement. The parties thereafter agreed upon a Stipulation for Entry of Final Judgment and Order, based on the construction of “signal point,” that disposed of all infringement claims relating to the ’627 Patent. The district court entered the Stipulation for Entry of Final Judgment and Order on September 7, 2011. Rembrandt timely appealed and we have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

DISCUSSION

On appeal, Rembrandt asserts error in the district court’s construction of the terms “signal point,” “stream of trellis encoded channel symbols,” and “trellis encoded channel symbol . . . comprised of a plurality of signal points.” The Defendants argue that the district court correctly construed the terms at issue and that the constructions of “stream of trellis encoded channel symbols” and “trellis encoded channel symbol . . . comprised of a plurality of signal points” provide alternative grounds for affirming summary judgment of noninfringement. Finding no error with the district court’s construction of “signal point,” we do not address either the remaining constructions or the Defendants’ alternative arguments.

I.

This court reviews a district court's claim construction de novo. *Cybor Corp. v. FAS Techs. Inc.*, 138 F.3d 1448, 1453 (Fed. Cir. 1998) (en banc). To ascertain the scope and meaning of the asserted claims, we look to the words of the claims themselves, the specification, the prosecution history, and any relevant extrinsic evidence. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315–17 (Fed. Cir. 2005) (en banc). As a general rule, a claim term is given its plain and ordinary meaning as understood by a person of ordinary skill in the art at the time of invention. *Id.* at 1312-13. Although claim construction begins with the language of the claims themselves, the claims “must be read in view of the specification, of which they are a part.” *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc). Indeed, the specification “is the single best guide to the meaning of a disputed term” and it “acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication.” *Phillips*, 415 F.3d at 1321 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

Similarly, we review the grant of summary judgment without deference. *Dynacore Holdings Corp. v. U.S. Philips Corp.*, 363 F.3d 1263, 1273 (Fed. Cir. 2004). Summary judgment is appropriate if no genuine issues of material fact exist such that the moving party is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(c); see also *Ethicon Endo-Surgery, Inc. v. U.S. Surgical Corp.*, 149 F.3d 1309, 1315 (Fed. Cir. 1998). This court reviews the evidence in the light most favorable to the non-moving party. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255 (1986).

II.

We begin by addressing the district court’s construction of the disputed term “signal point” as “a point on a 2-dimensional constellation having a pair of coordinates representing two components of a corresponding signal.” *Claim Construction Order* at 1. Rembrandt presents two primary arguments against the district court’s construction: (1) neither the claims nor the specification limit a signal point to two dimensions, or, conversely, the plain language of the claims and specification permits any dimensionality; and (2) claim differentiation requires that no limit be placed on dimensionality.²

Rembrandt first argues that the court’s construction is inconsistent with the plain meaning of the term because there is no language in claims 11 and 19 that references a specific signaling scheme or constellation, and that Defendants’ own expert agreed that it is possible to have a one-dimensional signal point. According to Rembrandt, moreover, limiting “signal point” to a two-dimensional coordinate contradicts the express statement

² Defendants argue that Rembrandt proposed a specific construction of signal point at the *Markman* hearing, and cannot now rely on plain and ordinary meaning after conceding that the term required construction. Defendants also contend that, by presenting a different construction on appeal, Rembrandt waived its ability to challenge the district court’s construction. “[P]resenting proposed claim constructions which alter claim scope for the first time on appeal invokes the doctrine of waiver as to the new claim constructions.” *NTP, Inc. v. Research In Motion, Ltd.*, 418 F.3d 1282, 1296 (Fed. Cir. 2005) (citations omitted). Because we find that the district court correctly construed “signal point,” however, we need not determine whether Rembrandt presents a new construction on appeal or opine on the effect of any waiver that may have occurred.

in the specification that “the invention can be used with signaling schemes of any dimensionality.” Appellant’s Opening Brief at 36 (quoting the ’627 patent col. 8 ll. 59-61). Rembrandt asserts that the two-dimensional embodiment described in the specification is merely illustrative and represents one possible embodiment.

While the Defendants admit that one-dimensional signal points are conceivable in the abstract, they assert that, in the context of the ’627 patent, signal points exist only as points on a two-dimensional constellation. Indeed, Defendants argue that the ’627 patent unambiguously refers to the invention as an improvement on an existing system—as described in the ’625 patent—using only two-dimensional signal point constellations, and that all references within the specification are consistent with that understanding. Accordingly, the reference to “any dimensionality” refers not to the dimensionality of the signal points themselves, but rather to the channel symbols. *See, e.g.*, ’627 patent at col. 4 ll. 54-56 and col. 8 ll. 23-26 (illustrating embodiments with four and eight dimensions, respectively). We agree.

A “person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Phillips*, 415 F.3d at 1313. Here, the Abstract and Summary of the Invention make clear that the claimed invention is an improvement on the system described in the ’625 patent which utilizes only two-dimensional signal point constellations. As stated in the Summary, “[i]n accordance with the present invention, performance in a data communication system using 2N-dimensional channel symbols can be further enhanced by an interleaving technique” ’627 patent col. 2 ll. 5-9. The parties do not dispute that “2N-dimensional channel symbol” refers

to a variable number (N) of two-dimensional signal points per channel symbol. Oral Arg. at 00:31, *available at* <http://www.cafc.uscourts.gov/oral-argument-recordings/2012-1022/all>. And this understanding is clearly set forth in the specification:

Note that, implementationally, the 2N-dimensional channel symbol is generated by having the trellis encoder identify, interdependently, N subsets of the two-dimensional constellation of FIG. 2, then select a two-dimensional signal point from each of the subsets thus identified. The concatenation of the N two-dimensional signal points thus selected is the desired 2N-dimensional channel symbol.

'627 patent col. 4 ll. 4-11.

Moreover, every contemplated embodiment flows from the general two-dimensional scheme, varying the value of N to permit “signaling schemes of any dimensionality.” See, e.g., '627 patent col. 3 ll. 19-20 (“N=1, i.e., a two-dimensional signaling scheme . . .”); *id.* at col. 4 ll. 54-56 (“four-dimensional, i.e., N=2, signaling scheme . . .”); *id.* at col. 8 ll. 57-67 (comparing the general, 2N-dimensional, case to the “four-dimensional signaling scheme” of “the illustrative embodiment”); *id.* at col. 9 ll. 8-13 (“when dealing with 2N-dimensional signaling where $N > 2$, it is necessary to add additional delay elements to the signal point interleaver/deinterleaver . . .”); *id.* at col. 9 ll. 14-15 (“N=4, i.e., an eight dimensional case . . .”). We see no indication that the patentee contemplated anything other than a specific improvement to the system described in the '625 patent or claimed a deviation from the two-dimensional signal constellation set forth in Figure 2 of the specification.

Rembrandt contends that these descriptions of the embodiments are insufficient to limit the '627 patent to two-dimensional signal points. But Rembrandt points only—and repeatedly—to the phrase “signaling schemes of any dimensionality” as justification for broadening the scope of the '627 patent to include one-dimensional signal points. This reliance is misplaced. Properly understood in the context of the '627 patent and the surrounding sentences, the phrase on which Rembrandt relies merely relates to the variable N and the contemplation of N two-dimensional signal constellations.

Rembrandt correctly highlights our repeated warnings against confining claims to a particular embodiment and the need to avoid importing limitations from the specification into the claims. *Phillips*, 415 F.3d at 1323. Generally, a claim is not limited to the embodiments described in the specification unless the patentee has demonstrated a clear intention to so limit the claim's scope. *i4i Ltd. P'ship v. Microsoft Corp.*, 598 F.3d 831, 843 (Fed. Cir. 2010). But this concern is tempered by the consideration that “[a]n inventor is entitled to claim in a patent what he has invented, but no more.” *MySpace, Inc. v. Graphon Corp.*, 672 F.3d 1250, 1256 (Fed. Cir. 2012). A determination of what was invented requires examination of the entire patent with particular focus on the specification. *Id.* For example, in *MySpace, Inc.*, we declined to read a preferred embodiment into the claims and found that the specification was “devoid of a clear indication that the invention should be limited to one particular type of database” 672 F.3d at 1257. Similarly, in *Symantec Corp. v. Computer Associates International, Inc.*, 522 F.3d 1279, 1290-1291 (Fed. Cir. 2008), we determined that the district court unduly limited the scope of the claims to a single personal computer because the specification failed to expressly define

the relevant terms nor did it suggest that it had adopted a special definition.

Where the specification clearly limits the invention to a particular form, however, it is appropriate to construe the claims consistently with that limitation. In *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (Fed. Cir. 2009), after examination of the specification, we limited the claimed graft devices as intraluminal. We explained that, “when the preferred embodiment is described in the specification as the invention itself, the claims are not necessarily entitled to a scope broader than that embodiment.” *Edwards*, 582 F.3d at 1329 (citing *Chimie v. PPG Indus. Inc.*, 402 F.3d 1371, 1379 (Fed. Cir. 2005)); *see also Honeywell Int’l, Inc. v. ITT Indus., Inc.*, 452 F.3d 1312, 1318 (Fed. Cir. 2006) (holding that the claims were limited to fuel filters, despite the fact that the claims contained no fuel filter limitation, because “[o]n at least four occasions, the written description refers to the fuel filter as ‘this invention’ or ‘the present invention. . . .’”). Here, the ’627 patent repeatedly refers to the “present invention” as a specific improvement on a known system and as limited to using two-dimensional signal points. The specification clearly defines the dimensionality of signal point and contemplates no variation on that system. Accordingly, Rembrandt is incorrect that the district court imported a limitation from the specification in its construction of signal point.

Finally, Rembrandt argues that the doctrine of claim differentiation requires a construction of signal point without a dimensional limitation. Rembrandt notes that independent claim 15 specifically recites a “2N-dimensional constellation,” while independent claim 11 includes no such limitation. Similarly, claim 13 recites “[t]he method of claim 11 wherein said channel symbols

are 2N-dimensional channel symbols, $N > 1$.” ’627 patent col. 11 ll. 65-67.

The doctrine of claim differentiation stems from “the common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope.” *Seachange Int’l, Inc. v. C-COR Inc.*, 413 F.3d 1361, 1368-1369 (Fed. Cir. 2005) (quoting *Karlin Tech. Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971-72 (Fed. Cir. 1999)). Although the doctrine is at its strongest “where the limitation that is sought to be ‘read into’ an independent claim already appears in a dependent claim,” *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004), there is still a presumption that two independent claims have different scope when different words or phrases are used in those claims. *Kraft Foods, Inc. v. Int’l Trading Co.*, 203 F.3d 1362, 1365-69 (Fed. Cir. 2000); *see also Tandon Corp. v. U.S. Int’l Trade Comm’n*, 831 F.2d 1017, 1023 (Fed. Cir. 1987). The doctrine is not a hard and fast rule, however; it “only creates a presumption that each claim in a patent has a different scope” and “the written description and prosecution history [may] overcome any presumption arising from the doctrine of claim differentiation” *Kraft*, 203 F.3d at 1368 (internal quotations omitted); *see also Edwards Lifesciences*, 582 F.3d at 1331.

There is no reason to apply the doctrine of claim differentiation, however, where, as here, the district court’s construction does not render any claim redundant or superfluous. *Andersen Corp. v. Fiber Composites, LLC*, 474 F.3d 1361, 1370 (Fed. Cir. 2007). Claims 15 and 13 both add limitations not found in claim 11, namely “dividing said stream of input bits” and “selecting an individual channel symbol” in claim 15 and “said interleaving step [of claim 11] causes every Nth signal point in said inter-

leaved signal point stream to be the Nth signal point of a respective one of said channel symbols” in claim 13. ’627 patent col. 11 l. 40-col. 12 l. 35. The claims thus have a different scope under the district court’s construction and Rembrandt’s reliance on claim differentiation is misplaced.

Even assuming that the claims, as construed by the district court, “cover substantially the same subject matter . . . overlapping patent claims are not unusual, and the overlap does not require us to construe” signal point as including one-dimensional signal points. *See Andersen Corp.*, 474 F.3d at 1370. Ultimately, “the doctrine of claim differentiation can not broaden claims beyond their correct scope, determined in light of the specification and the prosecution history and any relevant extrinsic evidence.” *Multiform Desiccants, Inc. v. Medzam Ltd.*, 133 F.3d 1473, 1480 (Fed. Cir. 1998).

There is, moreover, a practical reason why claims 13 and 15 recite “wherein said channel symbols are 2N-dimensional channel symbols” and “2N-dimensional constellation,” respectively, while claim 11 does not. Each claim includes the additional restriction that the variable N have a value greater than one. Absent use of the language “2N-dimensional,” these limitations on the variable N would lack antecedent basis.

CONCLUSION

The district court correctly construed “signal point” as “a point on a 2-dimensional constellation having a pair of coordinates representing two components of a corresponding signal.” We see nothing in the ’627 patent that is directed towards anything other than an improvement on the system described in the ’625 patent or is not limited to a two-dimensional signaling scheme. Because Rembrandt admits that Defendants do not infringe under that con-

struction, affirming the judgment below is appropriate on that basis alone. We do not reach the parties' remaining arguments and express no opinion on the other constructions entered by the district court.

AFFIRMED

COSTS

Each party shall bear its own costs.