

SuperGuide Corp. v. DirecTV Enterprises, Inc., 358 F.3d 870 (2004)

69 U.S.P.Q.2d 1865

358 F.3d 870  
United States Court of Appeals,  
Federal Circuit.

**SUPERGUIDE CORPORATION,**

Plaintiff–Appellant,

v.

**DIRECTV ENTERPRISES, INC.,** DirecTV,  
Inc., **DirecTV Operations, Inc.,** and **Hughes**

**Electronics Corporation,** Defendants/  
Third Party Plaintiffs–Appellees,

and

**Thomson Consumer Electronics, Inc.,** Defendant/  
Third Party Plaintiff–Cross Appellant,

and

**Echostar Communications Corporation,**

**Echostar Satellite Corporation,** and

**Echostar Technologies Corporation,**

Defendants/Third Party Plaintiffs–Appellees,

v.

**Gemstar Development Corporation,**

Third Party Defendant–Appellant.

Nos. 02–1561, 02–1562, 02–1594. |

DECIDED: Feb. 12, 2004. | Rehearing

and Rehearing En Banc Denied April 13, 2004.

### Synopsis

**Background:** Suit was brought alleging infringement of patents for interactive electronic television programming guides (IPGs). The United States District Court for the Western District of [North Carolina, Lacy H. Thornburg, J., 211 F.Supp.2d 725](#), entered a judgment of noninfringement., and patentee and its licensee appealed.

**Holdings:** The Court of Appeals, [Prost](#), Circuit Judge, held that:

[1] terms “regularly received television signal,” “radio frequency information,” and “mixer” did not limit the scope of the claimed invention to analog technology, but rather, covered digital signals;

[2] phrase “a search on at least said updated television programming information contained in RAM” meant any examination of the program listings stored in RAM to find those that met a user's search criteria;

[3] doctrine of waiver precluded patentee from proffering a broader definition of claim term than it advocated before the district court; and

[4] event timer could include additional information and memories, including volatile memory, however, the nonvolatile event timer memory containing the event timer information sequences had to directly control the recording device.

Affirmed in part, reversed in part, vacated and remanded.

[Michel](#), Circuit Judge, filed opinion concurring in the result.

West Headnotes (15)

#### [1] Patents

🔑 Plain, ordinary, or customary meaning in general

#### Patents

🔑 State of the art

There is a “heavy presumption” that the terms used in patent claims mean what they say and have the ordinary meaning that would be attributed to those words by persons skilled in the relevant art.

[29 Cases that cite this headnote](#)

#### [2] Patents

🔑 Specifications and Drawings; Written Description

#### Patents

🔑 Effect of drawings, diagrams, and models

Court reviews patent's written description and drawings to confirm that the patentee's use of the disputed term is consistent with the meaning given to it by the court.

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[13 Cases that cite this headnote](#)

[3] **Patents**

🔑 [Specification as limiting or enlarging claims in general](#)

Though understanding of patent claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim.

[28 Cases that cite this headnote](#)

[4] **Patents**

🔑 [Preferred embodiment](#)

A particular embodiment appearing in the written description may not be read into a patent claim when the claim language is broader than the embodiment.

[38 Cases that cite this headnote](#)

[5] **Patents**

🔑 [Prosecution disclaimer](#)

Although prosecution history is always relevant to patent claim construction, prosecution history may not be used to infer the intentional narrowing of a claim absent the applicant's clear disavowal of claim coverage; to be given effect, such a disclaimer must be made with reasonable clarity and deliberateness.

[32 Cases that cite this headnote](#)

[6] **Patents**

🔑 [Television and motion pictures](#)

Terms “regularly received television signal,” “radio frequency information,” and “mixer,” as used in patent disclosing a system that stored electronic television program schedule information in the memory of a microcontroller, did not limit the scope of the claimed invention to analog technology, but rather, covered digital signals; patentees were aware of the existence of

analog and digital signals and did not explicitly limit the disputed claim language to technologies that were “conventional” at the time of the invention.

[24 Cases that cite this headnote](#)

[7] **Patents**

🔑 [Preferred embodiment](#)

Patent applicant is not required to describe in his specification every conceivable and possible future embodiment of his invention.

[17 Cases that cite this headnote](#)

[8] **Patents**

🔑 [Television and motion pictures](#)

Phrase “a search on at least said updated television programming information contained in RAM,” as used in patent disclosing a system that stored electronic television program schedule information in the memory of a microcontroller, meant any examination of the program listings stored in RAM to find those that met a user's search criteria.

[8 Cases that cite this headnote](#)

[9] **Patents**

🔑 [Television and motion pictures](#)

Phrase “desired format,” as used in patent disclosing a system that stored electronic television program schedule information in the memory of a microcontroller, meant a user selected format for the display of the results of the search performed by the system.

[6 Cases that cite this headnote](#)

[10] **Patents**

🔑 [Television and motion pictures](#)

Phrase “at least one of,” as used in patent for interactive electronic television programming guides (IPG) required that the user select at least one value for each category, i.e., at least

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one of a desired program start time, a desired program end time, a desired program service, and a desired program type.

[18 Cases that cite this headnote](#)

[11] **Patents**

[🔑 Presentation and Reservation in Lower Court of Grounds of Review](#)

On appeal in patent infringement suit, doctrine of waiver precluded patentee from proffering a broader definition of claim term than it advocated before the district court.

[3 Cases that cite this headnote](#)

[12] **Patents**

[🔑 Television and motion pictures](#)

Phrase “automatically electronically converting,” as used in patent allowing a viewer to use the program schedule listings stored in an interactive electronic television programming guide (IPG) to control a recording device such as a VCR (video cassette recorder), excluded extraction or copying of information from memory and restoring it into alternate memory; however, the claimed “conversion” did not require that the event timer sequences be capable of controlling a particular VCR.

[6 Cases that cite this headnote](#)

[13] **Patents**

[🔑 Television and motion pictures](#)

Phrase “for directly controlling a recording device,” as used in patent allowing a viewer to use the program schedule listings stored in an interactive electronic television programming guide (IPG) to control a recording device such as a VCR (video cassette recorder), meant that the event timer information sequences stored in an event timer were used to provide the information and generate the signals that were necessary to control a recording device.

[3 Cases that cite this headnote](#)

[14] **Patents**

[🔑 Television and motion pictures](#)

Phrase “event timer,” as used in patent allowing a viewer to use the program schedule listings stored in an interactive electronic television programming guide (IPG) to control a recording device such as a VCR (video cassette recorder), meant “at least nonvolatile memory and logic for storing event timer information sequences that were used to control the recording of a television program”; the event timer also could include additional information and memories, including volatile memory, however, the nonvolatile event timer memory containing the event timer information sequences had to directly control the recording device.

[Cases that cite this headnote](#)

[15] **Patents**

[🔑 In general; utility](#)

[US Patent 4,751,578](#), [US Patent 5,038,211](#), [US Patent 5,293,357](#). Construed.

[1 Cases that cite this headnote](#)

**Attorneys and Law Firms**

\***872** [John J. Barnhardt, III](#), Alston & Bird LLP, of Charlotte, NC, argued for plaintiff-appellant SuperGuide Corporation. Of counsel on the brief were [A. Ward McKeithen](#) and [Everett J. Bowman](#), Robinson, Bradshaw & Hinson, P.A., of Charlotte, NC. Of counsel was [John A. Wasleff](#), Alston & Bird.

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[Elizabeth J. Hoult](#), of Washington, DC; and [Michael John Newton](#), of Dallas, TX.

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[Lawrence K. Nodine](#), Needle & Rosenberg, P.C., of Atlanta, GA, argued for defendants/third party plaintiffs-appellees EchoStar Communications Corporation, et al. With him on the brief were [Nagendra Setty](#); and [Larry McDevitt](#) and [W. Carleton Metcalf](#), Van Winkle, Buck, Wall, Starnes and Davis, of Asheville, NC.

[William F. Lee](#), Hale & Dorr LLP, of Boston, MA, argued for third party defendant-appellant Gemstar Development Corporation. With him on the brief were [James L. Quarles III](#) and [Mark G. Matuschak](#), of Washington, DC.

Before [MAYER](#), Chief Judge, [MICHEL](#), and [PROST](#), Circuit Judges.

### Opinion

Opinion for the court filed by Circuit Judge [PROST](#). Opinion concurring in the result filed by Circuit Judge [MICHEL](#).

[PROST](#), Circuit Judge.

SuperGuide Corporation (“SuperGuide”) and Gemstar Development Corporation (“Gemstar”) appeal the grant of summary **\*873** judgment in favor of DirecTV Enterprises, Inc., DirecTV, Inc., DirecTV Operations, Inc. (collectively “DirecTV”); Hughes Electronics Corporation (“Hughes”); Thomson Consumer Electronics<sup>1</sup> (“Thomson”); and EchoStar Communications Corporation, EchoStar Satellite Corporation, EchoStar Technologies Corporation (collectively “EchoStar”). The United States District Court for the Western District of North Carolina ruled that DirecTV, Hughes, Thomson and EchoStar did not infringe the asserted claims of [United States Patent Nos. 4,751,578](#) (“the ‘578 patent”), [5,038,211](#) (“the ‘211 patent”) and [5,293,357](#) (“the ‘357 patent”). *SuperGuide Corp. v. DirecTV Enters., Inc.*, 211 F.Supp.2d 725 (W.D.N.C.2002). Because the district court erred in construing certain of the claims upon which its non-infringement judgment was based,

we affirm-in-part and reverse-in-part the district court's claim construction, vacate the judgment, and remand this case for further proceedings consistent with this opinion.

## I. BACKGROUND

### A. The Patents

Program guides provide viewers with television program schedule information for upcoming programs. These program guides were initially available only in printed version. Broadcasters subsequently began transmitting online program guides to viewers' televisions. Viewers, however, could not perform a search of this information and had to wait until the desired information appeared on the television screen.

The patents in suit address this shortcoming by claiming a device that allows the user to display, on a television screen, only the program information desired by the user. These devices are hence commonly referred to as interactive electronic program guides (“IPG” or “IPGs”). The [‘578 patent](#) claims the storage in IPG memory and subset searching of a large volume of program schedule information. The [‘211 patent](#) claims the storage of only predesignated programming information until it is intentionally updated. The [‘357 patent](#) claims a method for converting the electronic program guide information into event timer information sequences that may be used to control a recording device.

### B. The Parties

SuperGuide owns the three patents in suit and Gemstar is an exclusive licensee of these patents in certain fields of use under a License Agreement entered into in August 1993. DirecTV operates a satellite-broadcasting network whose transmissions include program guide information that supports IPGs as part of the DirecTV subscription service. Hughes and Thomson manufacture systems that receive DirecTV broadcasts and process them for display on television. These systems include antennas, filters, and a module known as an Integrated Receiver/Decoder (“IRD”), which is typically packaged in a “set top box.” EchoStar also broadcasts satellite transmissions, which

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include program guide information that supports IPGs. In addition, EchoStar manufactures systems, including IRDs, marketed commercially as “The Dish Network,” which receive and process the broadcast information.

### C. Proceedings Below

On June 27, 2000, SuperGuide filed an infringement suit against DirecTV, Hughes, Thomson, and EchoStar alleging infringement of the three patents at issue. \*874 Based on the License Agreement between SuperGuide and Gemstar, the district court granted the motions by defendants DirecTV and Hughes to implead Gemstar as a third-party defendant. Gemstar alleged that EchoStar infringes each of the asserted three patents, and cross-claimed against SuperGuide for breach of the License Agreement and declaratory relief. SuperGuide counterclaimed against Gemstar for a declaration of the field of use reserved in the License Agreement between the two. Thomson moved for summary judgment of non-infringement based upon a sublicense from Gemstar. The district court denied as premature Thomson's motion for summary judgment, ruling that it could not decide the motion without first construing the disputed claim language.

On October 25, 2001, the district court issued a decision construing the contested terms of the asserted claims in the three patents in suit. *SuperGuide Corp. v. DirecTV Enters., Inc.*, 169 F.Supp.2d 492 (W.D.N.C.2001). Based on this claim construction decision, the defendants filed a joint motion for summary judgment of non-infringement with respect to each of the patents, and third-party defendant Gemstar cross-moved for summary judgment of infringement. Both SuperGuide and Gemstar opposed defendants' motion for summary judgment with respect to the '578 patent. With respect to the '357 and '211 patents, however, Gemstar opposed only EchoStar's motion for summary judgment of non-infringement, whereas SuperGuide opposed summary judgment as to all defendants. Thomson renewed its motion for summary judgment of non-infringement based on its license from Gemstar. On July 2, 2002, the district court issued a decision granting summary judgment of non-infringement in favor of all defendants as to all asserted claims and products with the exception of two EchoStar models. Because the court found no infringement by Thomson, it declined to decide Thomson's motion and denied

it as moot. *Id.* at 777. The court dismissed all remaining claims, counterclaims, cross-claims, affirmative defenses, and defenses without prejudice, including Gemstar's request that its cross-claims against SuperGuide be tried before a jury.<sup>2</sup> *Id.* at 777–78. On July 22, 2002, the parties then filed a stipulation that SuperGuide would be unable to establish infringement of the two EchoStar models if the district court's claim construction and summary judgment rulings were upheld on appeal. The district court entered final judgment on July 25, 2002, and the parties timely appealed. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(1).

## II. RELEVANT LAW

We review the grant of summary judgments of noninfringement de novo. *IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1429 (Fed.Cir.2000).

A determination of infringement involves a two-step analysis, the first step being to properly construe the asserted claims. *Carroll Touch, Inc. v. Electro Mech. Sys., Inc.*, 15 F.3d 1573, 1576 (Fed.Cir.1993). Claim construction is a question of law that this court reviews without deference. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed.Cir.1995).

[1] [2] [3] [4] There is a “heavy presumption” that the terms used in claims “mean what they say and have the ordinary meaning that would be attributed to those words by persons skilled in the relevant art.” \*875 *Tex. Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1202 (Fed.Cir.2002). Moreover, dictionaries are often helpful in ascertaining the plain and ordinary meaning of claim language. *Id.* at 1202–03; *Inverness Med. Switz. GmbH v. Warner Lambert Co.*, 309 F.3d 1373, 1378 (Fed.Cir.2002). We review the patent's written description and drawings to confirm that the patentee's use of the disputed term is consistent with the meaning given to it by the court. *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342 (Fed.Cir.2001). Specifically:

claim terms take on their ordinary and accustomed meanings unless the patentee demonstrated an intent to deviate from the ordinary and accustomed meaning of a claim term by redefining the term or

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by characterizing the invention in the intrinsic record using words or expressions of manifest exclusion or restriction, representing a clear disavowal of claim scope.

*Teleflex, Inc. v. Ficoso N. Am. Corp.*, 299 F.3d 1313, 1327 (Fed.Cir.2002); see *Tex. Digital Sys.*, 308 F.3d at 1204. The written description, however, is not a substitute for, nor can it be used to rewrite, the chosen claim language. “Specifications teach. Claims claim.” *SRI Int’l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107, 1121 n. 14 (Fed.Cir.1985) (en banc). Though understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment. *Electro Med. Sys. S.A. v. Cooper Life Sci., Inc.*, 34 F.3d 1048, 1054 (Fed.Cir.1994).

[5] Last, we consider the prosecution history when determining the proper meaning of disputed claim terms. “Although [it] is correct that the prosecution history is always relevant to claim construction, it is also true that the prosecution history may not be used to infer the intentional narrowing of a claim absent the applicant’s clear disavowal of claim coverage.” *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1327 (Fed.Cir.2003). To be given effect, such a disclaimer must be made with “reasonable clarity and deliberateness.” *N. Telecom Ltd. v. Samsung Elecs. Co.*, 215 F.3d 1281, 1294 (Fed.Cir.2000).

The parties dispute the construction of claim language in the three related patents at issue. We address each patent and each disputed phrase or term in turn.

### III. ¶578 PATENT

#### A. Background of the ¶578 Patent

The ¶578 patent was filed in May 1985 and issued in June 1988. It discloses a system that stores electronic television program schedule information in the memory of a microcontroller. The invention allows the viewer to

direct the microcontroller to perform subset searches on the stored information. The desired information is then sent to a “mixer,” which mixes it with a “regularly received television signal.” The system sends the mixed signal to a “radio frequency (‘RF’) section” where it is forwarded to the user’s television for display.

On appeal, Gemstar challenges the district court’s construction of claim 1 of the ¶578 patent. This claim, with the disputed language underlined, reads as follows:

1. A system for electronically controllably viewing updateable information on a television having a screen comprising:
  - (a) a microcontroller including input/output interfaces, a microprocessor, and an updateable memory comprising at least a RAM, said RAM of ¶876 said microcontroller being updateable via an electronic medium and storing updated information including at least television programming information;
  - (b) a *mixer* for mixing a *regularly received television signal* with the signal generated by the microcontroller in accord with instructions of said microcontroller;
  - (c) an RF section for receiving instructions from said microcontroller and for receiving *radio frequency information* from the mixer and a television station and properly converting the information into video signals which may be sent to said television for viewing; and
  - (d) a remote control system, said microcontroller being controllable by said remote control system, for permitting a viewer of said television to direct said microcontroller to *perform a search* on at least said updated television programming information contained in said RAM of said microcontroller, a subset of at least said updated television programming information being output to said mixer so as to provide on the television screen television programming information desired by the viewer in a *desired format*.

¶578 patent, col. 8, ll. 8–38 (emphases added).

With respect to the ¶578 patent, Gemstar argues that the district court failed to apply the plain language of the terms, improperly read limitations from one embodiment into the

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claim, improperly found another embodiment that conflicted with that construction to be disclosed and unclaimed, misapplied cases addressing after-developed technology in the means-plus-function claim context, and entered summary judgment in the face of disputed issues of material fact.<sup>3</sup>

Of the five disputed claim phrases, the first three involve a determination of whether the claimed invention covers digital technology. Thus, we construe the first three disputed claim phrases concurrently, and the remaining two separately.

**B. “Regularly received television signal,”  
“radio frequency information,” and “mixer”**

[6] The principal issue with respect to the disputed claim language is whether claim 1 covers digital signals. The district court observed that the only type of television signals that were broadcast in 1985 were analog signals. *SuperGuide Corp.*, 169 F.Supp.2d at 498. Relying on a portion of the specification explaining that when the programming guide is not in use the received television signals are sent directly through the RF section to the television for viewing, the district court reasoned that the terms “radio frequency information” and “regularly received TV signals” must be limited to analog signals and, more specifically, do not embrace digital television signals. In light of its construction that the ‘578 patent is limited to the type of television signals that were broadcast in 1985, i.e., analog signals, the district court held in its infringement decision that the patentees disclosed but did not claim digital captioning and that the patentees could not invoke the doctrine of equivalents to extend the scope of the ‘578 patent to encompass digital technology. *Id.* at 510. The district court suggested that the patentees’ ‘877 failure to enlarge the scope of the claims to explicitly include digital signals or closed captioning signals indicates that the disclosed embodiment directed to closed captioning was dedicated to the public. To reach such a conclusion, the district court operated under the assumption, which we find to be incorrect below, that the claimed invention is limited to analog television signals. The district court concluded that “regularly received television signal” means “an analog signal modulated onto a carrier wave and transmitted *via* terrestrial antennae or through a cable or satellite system” and does not include “a digital television signal as understood in the state of the art

in the mid–1990’s.” *SuperGuide Corp.*, 169 F.Supp.2d at 509. The court construed “radio frequency information” to mean “modulated or unmodulated analog signals containing television programming and video information received either from the mixer internal to the system or from a television station” and as not including “digital television signals.” *Id.* at 526.

The court also relied on the specification and the state of the art in 1985 to construe the disputed term “mixer.” The court noted that the information generated by the microcontroller is in digital format and that the specification states that the mixer converts such digital information into a format which can be viewed in the same way as the video data received from the RF section. The court found that the video data received in the RF section is in analog format.<sup>4</sup> Recognizing that the literal scope of a claim term is limited to what it was understood to mean at the time the patent was filed, the court concluded that in 1985, one of ordinary skill in the art would have understood that the digital data received from the microcontroller would of necessity be converted into analog format. Thus, the district court determined that the “mixer” first converts the digital signal from the microcontroller into an analog format and then mixes it with the video data. The court therefore construed the term “mixer” as follows:

the electronics for (a) receiving an unmodulated digital signal generated by the microcontroller which contains television programming information and converting the same into an analog format; (b) receiving from the RF section an analog television signal, whether demodulated or unmodulated, which contains television video information; (c) receiving and stripping a modulated analog signal which contains television video information from the RF section; and (d) mixing the two analog signals to produce an analog signal containing television programming and video information which is then transmitted to the RF section. The mixer does not function as a switch.

*Id.*

On appeal, Gemstar maintains that the ‘578 patent covers systems that receive digital as well as analog television signals. It specifically argues that the district court misapplied cases involving “means-plus-function” claims and “after-arising technologies.” In addition, Gemstar contends that the court failed to apply the plain meaning of the disputed

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claim language, erred by reading analog limitations from one embodiment into claim 1, and improperly adopted a claim construction inconsistent with a preferred embodiment.

**\*878** According to Gemstar, “regularly received television signal” means non-customized, acquired electrical information representing visual images with the form of the signal not being relevant; “radio frequency information” means the information received from the mixer, microcontroller, and/or a television station that is carried on or derived from a radio frequency signal; and “mixer” means the electronics that receive the “regularly received television signal” and a signal generated by the microcontroller, and that combine those two signals as instructed by the microcontroller.

In response, relying primarily on the state of the art when the [578 patent](#) was filed in 1985 and the knowledge of those skilled in the art at that time, EchoStar argues that the phrases “regularly received television signal” and “radio frequency information” refer to the ordinary analog television signals that were being broadcast in 1985 and that an ordinary television could receive and process at that time.<sup>5</sup> It contends that nothing in the specification or prosecution history suggests that the [578 patentees](#) gave these phrases a different meaning. Thus, according to EchoStar, the district court correctly construed the disputed claim language as excluding digital television signals. EchoStar next relies on the specification and its interpretation of “regularly received television signal” and “radio frequency information” as limited to analog signals to argue that the recited mixer requires circuitry that converts the signal from the microcontroller into analog signals. It adds that the district court correctly concluded that the “mixer” does not function as a “switch” because the patentees disclaimed switching or toggling when distinguishing their invention over a prior art reference.

We begin our review of the district court's construction of the asserted claim by agreeing with Gemstar that the court improperly relied on cases involving means-plus-function claims to conclude that later or “after-arising technologies” cannot fall within the literal scope of the claim at issue. Method and apparatus claims not written in means-plus-function format are not necessarily limited to that disclosed in the specification but rather are defined by the language of

the claims themselves. See [SRI, 775 F.2d at 1121](#) (“It is the claims that measure the invention.”).

In construing the terms “regularly received television signal,” “radio frequency information,” and “mixer,” the district court should have begun its analysis by first examining the claim language. The district court held and the defendants argue essentially that “regularly received television signal” refers to the format of television signals that were “regularly” received by televisions as of 1985, and that because no televisions existed as of that date that could receive digital signals, the term, as understood by those skilled in the art, necessarily excludes digital technology.

While that argument appears persuasive at first blush, closer analysis of the intrinsic record does not bear support for such a claim construction. The claim language does not limit the disputed phrases to any particular type of technology or specify a particular type of signal format, such as analog or digital. Indeed, neither “analog” nor “digital” appears in any of the asserted claims.

**\*879** We find that the district court's and EchoStar's reliance on [Kopykake Enters., Inc. v. Lucks Co., 264 F.3d 1377 \(Fed.Cir.2001\)](#), as authority for limiting the meaning of the disputed claim language to analog technology is likewise misplaced. The limitation at issue in *Kopykake* required “screen printing” of images on foodstuffs and the accused product used “ink jet printing.” *Id.* at 1380. Thus, the issue was whether the claim language “screen printing” literally covered ink jet printing. *Id.* The specification explicitly defined the term “screen printing” as limited to “ ‘conventional’ ” or then-existing technologies. *Id.* Specifically, the specification stated that “ ‘the term screen printing as used herein encompasses not only conventional screen printing, but also includes any other conventional printing process and any other conventional means.’ ” *Id.* (citation omitted). Although ink jet systems were well known in the field of paper printing, it was not a conventional printing process for applying images to foodstuffs. *Id.* at 1383–84. We therefore held that ink jet printing was not covered by the claim term at issue. *Id.* at 1384. That holding, however, does not have relevance here because the patentees in *Kopykake* explicitly limited the claim term to technologies that were “conventional” at the time of the invention. In contrast, the [578 patentees](#) did not explicitly



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limit the disputed claim language to technologies that were “conventional” at the time of the invention.

[7] The “regularly received television signal” received by the mixer is referred to in the specification as “video data.” [’578 patent](#), col. 5, ll. 3–6; col. 6, ll. 44–47; fig. 1. “Regularly received television signal” therefore refers not to signal directly received by the RF section and sent directly to the television, but rather to the video data received by the mixer. It appears indisputable that it was known to those skilled in the art during the pendency of the [’578 patent](#) application that video data could be communicated in either analog or digital format. Although analog may have been the dominant format of video data when the [’578 patent](#) application was filed, we have little doubt that those skilled in the art knew of the existence of digital video data at the time.<sup>6</sup> Indeed, the first digital television standard was created in 1981, and as early as 1983, systems were used to transmit digital data to provide videoconferencing and videotext. By 1985, work on developing a standard for the transmission of digital video data for telephony had begun, and by 1988, the year the [’578 patent](#) issued, there was sufficient interest by those in the video industry to establish a Motion Picture Experts Group to create a digital video standard for television broadcasts. Moreover, a review of the [’578 patent](#) specification reveals that the patentees were aware of the existence of analog and digital signals. For example, the specification describes examples of transmitting digital signals, such as those conveyed to and from the microprocessor \*880 and from digital sound files. Had the patentees intended to limit the disputed claim terms to “analog” technology, they could have easily done so by explicitly modifying the disputed claim language with the term “analog.” We find nothing in the written description of the [’578 patent](#), much less the claim language, that precludes the mixer of the claimed invention from receiving video data in digital format. The law “does not require that an applicant describe in his specification every conceivable and possible future embodiment of his invention.” [SRI, 775 F.2d at 1121](#). We find no reason here to limit the scope of the claimed invention to analog technology, when “regularly received television signals,” i.e., video data, is broad enough to encompass both formats and those skilled in the art knew both formats could be used for video.

During the prosecution of the [’578 patent](#), the Examiner rejected the asserted claim over the Lindman reference, which describes the receipt and mixing of two “baseband analog video signals” to superimpose text or symbols representing military hardware onto a map. The “map” displayed and selected by the user comes from a video signal from a videodisc player; the military icons and text data are obtained from computer memory. The [’578 patentees](#) distinguished their invention from Lindman by arguing that Lindman does not “appear[ ] to mix *regular* RF television station signals with information stored in [computer] memory” and then overlay them. (Emphasis added). In both Lindman and the claimed invention, a mixer mixes video data with data generated by a microcontroller. Because the data that is mixed in Lindman is in analog format, the patentees could not have intended for the term “regular” merely to mean “analog” because that would not have provided any distinction from Lindman. The patentees sought to distinguish the claimed invention from Lindman by emphasizing that their invention mixed information from computer memory with regular television signals, as opposed to a video-on-demand source, such as a videodisc player. The patentees’ argument suggests that “regular” refers to signals customarily received by the television viewing public at large, *see* American Heritage Dictionary of the English Language 1098 (6th ed. 1976) (defining “regular” to mean “customary”), and not to video-on-demand signals, such as those received by the military in the Lindman invention or pay-per-view, which other customers ordinarily would not receive unless special ordered.

Nothing in regard to the Bourassin reference alters our interpretation of the pertinent claim language. The Examiner initially rejected the claim at issue over the Bourassin reference, which describes the mixing of two analog television signals in a picture-in-picture display. The Examiner stated that Bourassin’s “regular TV signal” met the applicant’s “regularly received TV signal” limitation. In distinguishing Bourassin, the patentees argued that “[t]he image-on-image of Bourassin is *regular* TV signals as opposed to TV signals overlaid by signals being generated by a microprocessor.” (Emphasis added). According to EchoStar, this prosecution argument shows that the patentees and the Examiner equated the “regularly received television signal” with the analog television signals in Bourassin. Gemstar, on the other hand, argues that because the [’578 patent](#) undisputedly covers at least analog signals, they had no

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reason to argue that the analog television signals described in Bourassin were different from a “regularly received television signal.” We agree with Gemstar. The patentees distinguished their invention from Bourassin on the ground that it overlaid “image on image” regular television signals “as opposed \*881 to TV signals overlaid by signals being generated by a microprocessor,” and thus the patentees had no reason to distinguish the signal format used in Bourassin.

Thus, the prosecution history does not preclude a construction of the asserted claim as covering any particular type of signal format. It is irrelevant that the patentees did not argue during prosecution of the [’578 patent](#) that “regularly received television signal” also included digital technology because the absence of such an argument does not necessarily indicate a clear and deliberate disavowal. See *DeMarini Sports, Inc. v. Worth, Inc.*, 239 F.3d 1314, 1326 (Fed.Cir.2001) (stating that silence cannot serve as a basis for prosecution history estoppel because “we can draw no inference from what [the patentees] did not argue”). Therefore, we see nothing in the prosecution history to alter our conclusion that claim 1 is not limited to analog technology.

Accordingly, we construe “regularly received television signal” to mean video data that is customarily received by the television viewing public and not video-on-demand. The form of the television signal is irrelevant; it could be an analog signal, a digital signal, some combination of the two, or another format. The [’578 patent](#) defines “radio frequency information” as the signal generated from the antenna, mixer, and microcontroller. [’578 patent](#), col. 2, l. 48. We therefore construe “radio frequency information” to mean the information received from the mixer, microcontroller, and/or a television station that is carried on or derived from a radio frequency signal. Finally, we construe the term “mixer” to mean the electronics that receive the “regularly received television signal” and a signal generated by the microcontroller, and that combine those two signals as instructed by the microcontroller. The mixer is not limited to any particular electronics because the claim language does not so limit the scope of the mixer. The preferred embodiments may describe the mixer as including certain components, including a digital-to-analog converter, but that does not mean that the claims are so limited. Accordingly, for the reasons stated, we reverse the district court’s construction of the disputed claim language and adopt the constructions discussed above.

**C. “To perform a search”**

[8] We next turn to the phrase “a search on at least said updated television programming information contained in RAM.” In construing this claim language, the district court quoted a portion of the specification and summarily stated, “[i]t is clear from the language of the claim and the specification that the search is of all the information contained in the RAM in order to produce the subset of data specified by the viewer.” *SuperGuide Corp.*, 169 F.Supp.2d at 511. The district court noted that the invention, as described in the specification, also envisions storing information other than television scheduling information, and that the claim states that the search will be conducted on “at least said updated television programming information.” The court therefore construed the disputed phrase to mean “a user-directed examination by the microcontroller of all the television programming information stored in the random access memory of the system and the retrieval of a subset of that information which meets the criteria specified by the user for display on the television set.” *Id.* at 526.

On appeal, Gemstar challenges the court’s construction of this claim limitation. According to Gemstar, the claim phrase does not require a search of all television programming information stored in memory. Gemstar specifically argues that the \*882 district court’s analysis of this phrase did not address the absence of claim language requiring any particular method of searching, the specification’s teaching that listings may be coded for searching, or the specification’s discussion of searching less than all the information contained in the RAM.

EchoStar responds that the limitation at issue requires an examination of all the records in memory. In support, EchoStar notes that during prosecution the [’578 patentees](#) distinguished their invention over a prior art reference by arguing that in their system a “search of all the coded information is carried out by the microcontroller.” EchoStar further explains that a search is not complete until all the items in memory that meet the search criteria have been located.

We begin with the claim language. Although claim 1 requires “a search on at least said updated television programming

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information contained in RAM,” that requirement is not commensurate with examining all of the programming information in RAM. One of the dictionary definitions of “search” is “to look into or over carefully or thoroughly in an effort to find something.” *Webster's Third New International Dictionary* 2048 (1993). This definition, however, says nothing about how the search is to be conducted. Thus, the ordinary dictionary meaning of the disputed language covers any method of searching the program listings stored in RAM to retrieve those that satisfy a user's search criteria. It does not require that all the records in memory be searched as urged by EchoStar.

An examination of the specification does not overcome the presumption that the patentees intended to adopt the ordinary meaning. The two specification excerpts relied upon by the district court in construing this language state that a search is conducted on the information in the RAM, without specifying what portion of the RAM, and emphasizes that only the requested information is retrieved. *'578 patent*, cols. 5–6. These excerpts do not expressly or implicitly limit the search to “all” the program listing information in memory or otherwise limit the covered method of searching.

EchoStar's main argument in support of the district court's construction is that the *'578 patentees* disclaimed all searches other than a search that touches all records. EchoStar maintains that during prosecution of the *'578 patent*, the Examiner rejected the asserted claims in view of the Skerlos reference. Skerlos discloses an invention that allows the user to assign a location in memory where a desired telephone number is stored. To retrieve a stored telephone number, the Skerlos user enters the specific address location to recall the number from memory. In response to the Examiner's rejection, the patentees explained that in Skerlos “no search of the information in RAM takes place.” The patentees further stated that the *'578 patent* involves “a search of all of the coded information.” EchoStar focuses on this statement to argue that it mandates a claim construction that requires examination of all the records in memory.

We are not persuaded by EchoStar's reliance on the prosecution history to support the district court's construction for two reasons. First, the *'578 patentees* were merely distinguishing their invention from one that requires no searching at all by pointing out that their invention provides for searches of coded information stored in memory. They did

not clearly disavow the scope of searches covered by claim 1 because Skerlos did not conduct any type of search. *See Amgen*, 314 F.3d at 1327. Moreover, a statement that a search is \*883 conducted on “all of the coded information” is not commensurate with an examination of every piece of data stored in memory. If the memory is ordered in such a way that a search of only part of the memory can retrieve all the records that meet the user's criteria, the search has been conducted on all the coded information without having examined every record in memory. EchoStar does not argue that such a search is not possible or that the *'578* specification does not enable such a search. Indeed, the specification contemplates that the “microcontroller 60 must be logically arranged ... [i]n order to accomplish the quick display of the requested information.” *'578 patent*, col. 5, ll. 55–57. Accordingly, we conclude that the claim phrase “to perform a search” means any examination of the program listings stored in RAM to find those that meet a user's search criteria.

**D. “Desired format”**

[9] Lastly, we turn to the disputed claim phrase “desired format.” The district court construed the phrase “desired format” to mean “a user selected format for the display of the results of the search performed by the system. Although additional information may be provided to the system by the service provider, the format for viewing that information is viewer directed.” *SuperGuide Corp.*, 169 F.Supp.2d at 526–27.

On appeal, Gemstar does not challenge the district court's construction of this claim phrase. Rather, in response to EchoStar's position, it contends that the court never applied the claim phrase “desired format” in granting summary judgment of non-infringement in favor of the defendants and never made findings of fact about whether that limitation is met by any of the accused devices. Gemstar further notes that the record cited by EchoStar to support its argument on this issue addresses only whether the accused devices met the separate limitation of “to perform a search” under the doctrine of equivalents.

EchoStar argues that the district court properly granted it summary judgment of non-infringement on the ground that its accused devices do not meet the “desired format” limitation.

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According to EchoStar, the court interpreted the phrase “desired by the viewer in a desired format” as requiring that: (1) the desired display format of the search results (a subset of schedule data) be “viewer directed” rather than determined by the IRD or pre-selected by the service provider; and (2) three display formats be available for the user to choose from—entire screen, window or overlay. EchoStar contends that based on the application of this construction to its accused devices, the court correctly granted summary judgment in its favor. Specifically, it argues that the court made a factual finding that its devices do not allow the viewer to choose among entire screen, window, or overlay display formats in viewing subset search results.

Because the parties do not argue for a construction of “desired format” that is contrary to the one provided by the district court, we do not reinterpret that phrase. We do not agree with EchoStar that the district court interpreted this phrase as requiring three display formats or that the court granted summary judgment of non-infringement based on the “desired format” limitation not being met by the accused devices. The part of the district court’s summary judgment decision relied upon by EchoStar to support its position does not address the “desired format” limitation. Rather, as Gemstar argues, it addresses only whether the accused devices met the separate claim limitation \*884 “to perform a search” under the doctrine of equivalents.

To the extent that EchoStar argues that the district court’s findings in addressing the “to perform a search” limitation nevertheless entitle it to summary judgment of non-infringement under the “desired format” limitation, we decline to make such a finding. *See Dayco Prods., Inc. v. Total Containment, Inc.*, 258 F.3d 1317, 1328 (Fed.Cir.2001) (stating that “[w]e decline Dayco’s suggestion to enter summary judgment of infringement in its favor since this question is best addressed first by the district court using a proper claim construction”).

#### E. Conclusion

We have further considered SuperGuide’s separate arguments with respect to the ‘578 patent and conclude that they are either redundant of the arguments asserted by Gemstar or lack merit. Accordingly, we reverse the district court’s

construction of the claim phrase “to perform a search” to the extent discussed above. Specifically, we adopt the construction urged by Gemstar to clarify that the term “search” does not require an examination of all the records in RAM. We further affirm the court’s construction of the phrase “desired format.”

## IV. ‘211 PATENT

### A. Background of the ‘211 Patent

The ‘578 invention presented two drawbacks that posed an economic obstacle to its commercialization. These were the necessity for (1) RAM capable of storing voluminous information and (2) a high-speed processor capable of processing that information. The ‘211 patent, applied for in 1989 and issued in 1991, addressed these problems by allowing selective storage of only the television program schedule information (or “schedule listings”) desired by the user. This invention operates by comparing the received television program schedule listings to the user chosen criteria and determining whether to store portions of the received program schedule information.

SuperGuide disputes the claim construction of language in claim 1, which includes “means-plus-function” claim limitations. The relevant portion of claim 1 with the disputed claim language underlined reads as follows:

An online television program schedule system comprising:

first means for storing *at least one of* a desired program start time, a desired program end time, a desired program service, *and* a desired program type;

means for receiving television program schedule information, said television program schedule information comprising *at least one of* program start time, program end time, program service, *and* program type for a plurality of television programs;

second storing means, connected to said first storing means and said receiving means, for storing selected portions of received television program schedule information which *meet at least one of* the desired program start time, the

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desired program end time, the desired program service, and the desired program type; and....

[211 patent](#), col. 8, ll. 4–27 (emphases added).

SuperGuide generally argues on appeal that the district court's interpretation of the disputed language in claim 1 is inconsistent with the claim language, the specification and the prosecution history.<sup>7</sup>

**\*885 B. “At least one of”**

[10] The phrase “at least one of” also appears in claims 2, 5 and 6.<sup>8</sup> SuperGuide does not dispute that this phrase should be construed to have the same meaning in each instance. In interpreting this phrase, the district court concluded that the term “a desired,” which precedes “at least one of,” is repeated for each category and because the final category in the criteria list is introduced by “and a desired,” the list is conjunctive. *SuperGuide Corp.*, 169 F.Supp.2d at 517. The court also concluded that accepting SuperGuide's position that “at least one of” refers only to one category of the criteria would contradict the purpose of the invention as described in the written description, as depicted in Figure 4a and recited in claim 1. *Id.* Thus, the court construed the phrase “at least one of ... and” as meaning “at least one of each desired criterion; that is, at least one of a desired program start time, a desired program end time, a desired program service and a desired program type. The phrase does not mean one or more of the desired criteria but at a minimum one category thereof.” *Id.*

On appeal, SuperGuide contends that the claim phrase “at least one of” unambiguously requires the selection and storage of *one or more* of the four listed criteria (start time, end time, service channel, or type) and does not require storing all four criteria. SuperGuide first argues that the patentee's use of the term “and,” rather than “or,” was dictated by then-existing United States Patent and Trademark Office (“PTO”) rules and further that it did not have the opportunity to fully develop this point below because of the court's moratorium on filing papers. As further support, SuperGuide cites to examples in the specification that describe a user who has chosen only two desired programming criteria (e.g., start time and stop time). In addition, SuperGuide contends that the district court erroneously relied on Figure 4a in its analysis

because that figure does not cover the asserted claims. SuperGuide lastly emphasizes that during prosecution the patentee repeatedly characterized the invention as requiring the presence of one or more of the four listed criteria and interchangeably used the terms “or” and “and.”

DirecTV counters that the district court's construction is supported by the patentee's use of the conjunctive word “and” and by the grammatical rule requiring that the phrase “at least one of” be applied to each category in the list. Moreover, it disputes SuperGuide's arguments that the patentee used “and” out of necessity and that it could not introduce relevant evidence on that point. With respect to the specification, DirecTV contends that every disclosed embodiment of a desired criteria list, including Figure 4a, teaches a conjunctive list that is consistent with the plain meaning of the claim language. Responding to SuperGuide's argument, DirecTV maintains that even though Figure 4a relates to a data structure involving the transmission of data in packet form, claim 1 is written to also cover such a system. DirecTV lastly argues that accepting SuperGuide's prosecution argument would improperly allow the prosecution history to enlarge the claim scope beyond its ordinary meaning. DirecTV also points out **\*886** that the [211 patentee](#) never explicitly stated that “and” should be interpreted as “or” in the claim language and they did not refute the Examiner's characterization of the criteria list as being conjunctive.

We conclude that the plain and ordinary meaning of the disputed language supports the district court's construction and that the phrase “at least one of” means “one or more.” *Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed.Cir.1999). The issue here is what does “at least one of” modify? The criteria listed in the claim at issue consist of four categories (program start time, program end time, program service, and program type). Each category is further comprised of many possible values. SuperGuide contends that the phrase “at least one of” modifies the entire list of categories, i.e., selection and storage of one or more values for one or more of the four listed categories is required.<sup>9</sup> DirecTV, on the other hand, argues that the phrase “at least one of” modifies each category in the criteria list, i.e., one or more values in each category are required.

We agree with DirecTV. The phrase “at least one of” precedes a series of categories of criteria, and the patentee used the term

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“and” to separate the categories of criteria, which connotes a conjunctive list. A common treatise on grammar teaches that “an article of a preposition applying to all the members of the series must either be used only before the first term or else be repeated before each term.” William Strunk, Jr. & E.B. White, *The Elements of Style* 27 (4th ed. 2000). Thus, “[i]n spring, summer, or winter” means “in spring, in summer, or in winter.” *Id.* Applying this grammatical principle here, the phrase “at least one of” modifies each member of the list, i.e., each category in the list. Therefore, the district court correctly interpreted this phrase as requiring that the user select at least one value for each category; that is, at least one of a desired program start time, a desired program end time, a desired program service, and a desired program type.<sup>10</sup>

We are also not persuaded by SuperGuide's argument that the '211 patentee was precluded from using “or” in place of “and” as a result of the PTO rules that were applicable at the time the '211 patent application was prosecuted. In support of this argument, SuperGuide refers only to a portion of the Manual of Patent Examining Procedures (“MPEP”), which states:

Alternative expressions such as “brake or locking device” may make a claim indefinite if the limitation covers two different elements. If two equivalent parts are referred to as “rods” or “bars,” the alternative expression may be considered proper.

MPEP § 706.03(d) (1990). According to SuperGuide, at least some of the criteria referred to in the claims at issue, such as “program start time” and “program type,” are not equivalent in the same sense that a “rod” may be equivalent to a “bar.” SuperGuide's argument lacks merit for three reasons. First, the cited MPEP rule only \*887 states that the given example “may make a claim indefinite,” it does not absolutely preclude such alternative expression. Moreover, the example given is distinguishable from the language the '211 patentee could have arguably used here because the modifying phrase “at least one of” does not precede the alternatives in the example. The use of the phrase “at least one of” in the claims at issue provides definiteness that is not present in the example provided in the MPEP rule.<sup>11</sup> Lastly, even assuming arguendo that the patentee drafted the claim at issue in response to the PTO's instructions on avoiding indefiniteness,

we fail to see how this instruction compels us to construe the term “and” as “or.”

We further conclude that nothing in the specification rebuts the presumption that the '211 patentee intended the plain and ordinary meaning of this language. See *Tex. Digital*, 308 F.3d at 1204. Every disclosed embodiment teaches that the user must choose a value for each designated category. See, e.g., '211 patent, fig. 1. The written description explains that in this embodiment “the [predetermined] selection criteria 17 may include a desired service list 17a, a desired types of programming list 17b, desired times of listings 17c and other criteria 17d.” *Id.* at col. 4, ll. 23–26. SuperGuide points to another part of the written description, describing the same embodiment, which states the following:

[f]or example, if a user is only at home in the evening he may only wish to view listings from 6 p.m. to 11 p.m. Other criteria 17d may also be selected or provided.

*Id.* at col. 4, ll. 49–52. This description, however, does not teach that a value for less than all the designated categories can be chosen. Further, “[o]ther criteria” refers to either another category or another list of categories that require values.<sup>12</sup> In other words, it explains that other categories, besides the ones specified, are possible.

We also conclude that Figure 4a of the '211 patent supports the plain and ordinary meaning of the asserted claims. This figure and its corresponding explanation are the only parts of the specification that explain how only certain portions of the transmitted schedule information are stored. The figure consists of a flow chart describing a method for storing portions of the received schedule information according to the chosen criteria. The method compares the received information to determine whether the information “meets”<sup>13</sup> all the criteria chosen by the user. Importantly, the flow chart uses a conjunctive criteria list, i.e., the system's user must choose at least one value for each designated criteria, or the logic would be inoperable. '211 patent, fig. 4a.

SuperGuide argues that Figure 4a is inapplicable to the construction of the disputed language because the figure relates to the processing of received information that has been transmitted in group format whereas the asserted claims do

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not require such a group format. We disagree. The asserted claims do not require the transmission \*888 of schedule information in any particular format. Thus, the asserted claims could cover a system with schedule information that is transmitted in group format. There is also no suggestion in the specification that Figure 4a is applicable only to the transmission format disclosed in the figure. Indeed, the specification states that Figures 4a–4c “are a block diagram illustrating the logic and sequence of operations for storing broadcast TV program information according to the *present invention*.” *Id.* at col. 3, ll. 41–44 (emphasis added).

Lastly, we decline to enlarge the claim scope from its plain and ordinary meaning based on the prosecution history in this case because the '211 patentee did not clearly and explicitly define the term “and” in the covered criteria list as “or.”<sup>14</sup> See *N. Telecom*, 215 F.3d at 1295 (holding that vagueness and inferences in the prosecution history do not rebut an ordinary meaning of a claim term).

### C. “Meet”

Lastly, we turn to the disputed claim term “meet.” The relevant part of the third limitation of claim 1 of the '211 patent with the disputed term underlined reads as follows:

second storing means ... for storing selected portions of received television program schedule information which *meet* at least one of the desired program start time, the desired program end time, the desired program service, and the desired program type

'211 patent, col. 8, ll. 16–22 (emphasis added). The district court construed this term to mean “that the information matches or equals at least one of each of the desired criteria, not one or more categories thereof.” *SuperGuide Corp.*, 169 F.Supp.2d at 528.

Acknowledging the variety of dictionary definitions for the term “meet,” SuperGuide advocates “satisfies” as the one definition that makes most sense as used in claim 1. It further maintains that it preserved its right to assert this construction. According to SuperGuide, this definition subsumes, but is not limited to, the district court's construction. It further contends

that the court's construction precludes certain embodiments disclosed in the specification that describe a viewer entering a start and end time and receiving a range of program listings falling within that period. SuperGuide argues that construing “meet” as “satisfies,” however, allows a selection of a range of times, services, and types. Additionally, SuperGuide maintains that by citing a specification passage describing the operation of the “group format transmission” embodiment, the court erroneously imported an unclaimed comparison function into the “second storage means” limitation of claims 1 and 5. Lastly, SuperGuide contends that the passage cited does not support the court's construction.

DirecTV responds by first making a procedural argument that SuperGuide conceded before the district court that “meet” means “equal to or matching” and thus waived its right to assert a different construction on appeal. On the merits, DirecTV argues that the term “satisfies” is more indefinite than “meet” and also that \*889 the specification, particularly Figure 4a, is consistent with the district court's construction. In this regard, DirecTV explains that in Figure 4a, “meet” defines the comparative test that compares the received program schedule listings with the user chosen criteria.

[11] We agree with DirecTV that SuperGuide waived its right to assert a construction other than “matches or equals” for the term “meet.” Before the district court, DirecTV and EchoStar agreed that the term “meet” means “equal to or matching” and they presented this construction in their consolidated brief. In its reply brief, SuperGuide agreed that the term “meet” should be interpreted as “matches or corresponds.” The parties filed a stipulation before the *Markman* hearing listing all the disputed terms that required construction and the term “meet” was not listed. Nevertheless the term came up at the hearing and SuperGuide made the following comments:<sup>15</sup>

[T]he next term that [defendants] go to is meet. There are two interesting things about the meet term. First of all, they say it's got to be exactly and you've got to have identity of what you're talking about. And *I don't think there's any disagreement that meet means that it's equal to*. Where there's disagreement is that in their comments concerning that claim, they are trying to say that the only thing that it can be is exactly or the identity. And what that leaves out is the analysis under the comprising claim that it can do

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more than just meet. It can meet it, and it can also do other things along the way because the claim reads comprising. And, so, it has a certain number of things that are within the claim, and if a defendant is out there doing those things plus something else, they can still be found to infringe the claim. And that's exactly the type of thing they're trying to prevent in this case because there may be other things that they're doing in addition to that.

(Emphasis added). SuperGuide argues that these comments demonstrate its efforts to broaden the scope of the term “meet” as used in the claim at issue. We disagree and conclude that this discussion by SuperGuide shows that it agreed that “meet” means “equal to.” Rather, it was arguing about the meaning of the term “comprising” in the preamble of the asserted claims. It was making the point that an accused product infringes a claim if it “exactly” meets every limitation and thus has “identity” with the claim. See *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1328 (Fed.Cir.2003); *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 812 (Fed.Cir.2002) (stating that whether an accused system literally infringes an asserted claim depends on whether it “meets every limitation” recited in the properly construed claim). SuperGuide was further noting that an accused product infringes a “comprising” claim if it meets every limitation and also has additional components. See *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 811 (Fed.Cir.1999) (stating that “comprising” is “generally understood to signify that the claims do not exclude the presence in the accused apparatus or method of factors in addition to those explicitly recited”). Because we conclude that SuperGuide is now proffering a broader definition of “meet” than it advocated before the district court, we decline on appeal to address SuperGuide's new construction. See *Interactive Gift Express, Inc. v. Compuserve, Inc.*, 256 F.3d 1323, 1346 (Fed.Cir.2001) (discussing cases in which the \*890 appellate court applied the doctrine of waiver to preclude a party from adopting a new claim construction on appeal because the new construction proffered on appeal changed the scope of the claim construction asserted before the trial court).

In conclusion, we affirm the district court's construction of the claim language “at least one of” and “meet.”

## V. .357 PATENT

### A. Background of the .357 Patent

The .357 patent allows a viewer to use the program schedule listings stored in an IPG to control a recording device, such as a VCR. The program listings include such information as the time, channel, title, program type and subtype, service provider, and a description. In the prior art, these listings could be stored in “volatile” memory. The information was lost, however, in the event of a power failure. The listings could also be stored in “non-volatile” memory to prevent the loss of recording instructions in the event of a power failure. Because large amounts of memory were required to store the program listing information, however, the use of non-volatile memory was expensive.

The .357 patent addressed this drawback by storing entire schedule information in volatile memory and the minimal information necessary for controlling a recording device in non-volatile memory. Thus, when a viewer chooses a program for recording, the listing is “automatically electronically converted” into an “event timer information sequence,” which includes only the minimal amount of information actually needed to control a recording device—start time, stop time or duration, and channel. The system then stores this information in the non-volatile memory of an event timer, which is located either in the VCR or external to the VCR.

Gemstar disputes the construction of claim 1 of the .357 patent. The relevant part of this claim with the disputed language underlined reads as follows:

A method for setting an event timer to control a recording device for recording television programs, comprising the steps of:

...

*automatically electronically converting* the selected ones of said television program schedule listings into event timer information sequences for *directly controlling* a recording device to record television programs in response to the user



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designation of selected ones of the electronically stored television program schedule listings for recording, said event timer information sequences including a television program start time, a television program end time or duration and a television program channel for each of the user selected ones of the television program schedule listings; and

...

loading the event timer information sequences into an *event timer*, such that the event timer information sequences in the event timer are used to control a recording device for recording television programs corresponding to the selected ones of the electronically stored television program schedule listings.

[357 patent](#), col. 8, ll. 16–42 (emphases added). On appeal, Gemstar generally argues that the district court ignored the plain language of the claim, improperly imported a number of limitations from the specification into the claim, and ignored a disclosed embodiment contradicting its [\\*891](#) construction.<sup>16</sup> We review each of the disputed claim phrases in turn.

### B. “Automatically electronically converting”

[12] We first focus on the disputed claim language “automatically electronically converting.” In construing this language, the district court noted that, according to the specification, those skilled in the art would understand that many techniques for loading event timer information into the event timer may be used depending upon the particular configuration of the schedule information and event timer information. *SuperGuide Corp.*, 169 F.Supp.2d at 523–24. The specification further notes that one of these techniques is the conversion of the event timer information into appropriate digital electronic signals. *Id.* at 523. Thus, the court construed the phrase “automatically electronically converting” as meaning:

a change in form of the selected television program listings by an electronic means without further involvement of the system's user. Conversion is not extraction of information but an actual change in

form of the information. The change or conversion results in event timer information sequences which can be processed by the configuration of the particular recording device and television involved.

*Id.* at 529. The court further concluded that because the program listings are converted into event timer information sequences, the “start,” “stop,” and “channel” information must also be converted. *Id.* at 524.

Gemstar argues on appeal as it did before the district court that “automatically electronically converting” means each television program listing selected by the user for recording is automatically converted by electronics into “event timer information sequences” that provide the information necessary to control the recording device. According to Gemstar, the appropriate dictionary definition of “convert” is “to change or turn from one state to another; alter in form, substance, or quality.” *Webster's Third New International Dictionary* 499 (1993). Gemstar contends that this plain and ordinary meaning does not require or disclaim any particular method of conversion. Rather, it only requires that a program listing as a whole undergo a conversion. Thus, Gemstar maintains that claim 1 does not cover a device that copies the entire selected program listing from the program guide and stores it in the “event timer,” but does cover a system that copies less than all, or a subset, of the program listing and stores it in the “event timer.” Next, relying on the specification, Gemstar contends that the [357 patent](#) does not require each field stored in the event timer to be separately converted. With respect to the prosecution history, Gemstar argues that the patentee did not disclaim all forms of “extraction” by distinguishing the Kinghorn reference. Lastly, Gemstar disagrees that the claimed “converting” must result in “event timer information sequences” that are appropriate to a particular VCR.

Thomson responds first that the plain and ordinary meaning of the disputed phrase is the process of changing from one form or format to another; where information is concerned, a changeover that affects form but not substance.<sup>17</sup> According to [\\*892](#) Thomson, no dictionary includes “extraction” as a definition of electronic conversion. Moreover, relying on the prosecution history, Thomson contends that the [357](#)

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patentee specifically disclaimed “extraction” as a possible interpretation of “converting.”

We agree with Thomson that the [’357 patentee](#) specifically disclaimed “extracting” from being covered by “directly electronically converting” when distinguishing the prior art Kinghorn reference. *See Tex. Digital*, 308 F.3d at 1204; *Teleflex*, 299 F.3d at 1325 (stating that there must be a “manifest exclusion or restriction, representing a clear disavowal of claim scope”). Kinghorn involves the transmission of teletext information consisting of viewable program listings and non-visible VCR control information. When a viewer of the Kinghorn system selects a program for recording, the non-visible VCR control information is copied or extracted in full from memory and restored in other memory, which is used to control a VCR. In distinguishing Kinghorn, the [’357 patentee](#) made the following comments:

Since the information is already in the stored program schedule listings, Kinghorn's controller need not effect any conversion of television program listings into event timer information for directly controlling a recording device. Kinghorn's microcontroller 9 need only *extract* programming information from a page stored in memory and restore this programming information into memory 15.... Conversion is neither described nor suggested.

Counsel reiterated that Kinghorn's microcontroller does not have conversion means because it performs the function of “extract[ing] ... programming information from a page stored in the page memory and the re-stor[ing] of the programming information in the memory.”

On appeal, Gemstar argues that the [’357 patentee](#) did not disclaim all forms of “extraction” because Kinghorn “extracts, and does not convert, non-visible codes and neither extracts nor converts visible program information.” We conclude, however, that the patentee disclaimed more than just the extraction of non-visible code. Indeed, the visible versus non-visible information distinction Gemstar draws on appeal is not found in the prosecution history. Rather, during prosecution, the patentee emphasized that because

the VCR control information in Kinghorn “is already in the stored program schedule listings,” the microcontroller only extracts programming information from one memory and restores the information into another memory. He stated that this process neither describes nor suggests “conversion.” The district court, therefore, properly interpreted “automatically electronically converting” as excluding extraction or copying of information from memory and restoring it into alternate memory.

We, however, disagree with Thomson that the claimed “conversion” must result in event timer sequences that are appropriate to a particular VCR. In support of its argument, Thomson relies on the specification and the prosecution history. Thomson first notes that the specification states that the conversion of the program listing information is into “appropriate” start time, stop time or duration, and channel number. [’357 patent](#), col. 7, ll.41–50. This excerpt does not lead to the conclusion that claim 1 is limited to a particular VCR. Indeed, the specification teaches that additional signals must be generated to control recording event after program listings are converted into “event timer information sequences.” *Id.* at col. 3, ll. 51–52; col. 6, ll. 33–34 (stating that the event timer controls the VCR according to **\*893** its well known function by sending appropriate signals).

The prosecution history upon which Thomson relies, in our view, further confirms that claim 1 covers a system that is compatible with every brand and type of VCR. Indeed, the patentee distinguished Kinghorn, in which the VCR control information “may not be compatible with every brand and type of VCR” by arguing that the conversion means of the present invention “can be adapted for *any* particular VCR.” (Emphasis added).

Accordingly, we affirm the district court's construction of “automatically electronically converting,” but clarify that the claimed “conversion” does not require that the “event timer sequences” be capable of controlling a particular VCR.

### C. “For directly controlling a recording device”

[13] We next turn to the phrase “for directly controlling a recording device.” In construing this phrase, the district

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court reasoned that the purpose of the present invention was to provide a commercially viable system by use of a “small nonvolatile memory” to turn on or control the recording device. *SuperGuide Corp.*, 169 F.Supp.2d at 525. The district court therefore construed this phrase as meaning that “the event timer sequences [stored in the nonvolatile memory of an event timer] are used to turn on or control the recording device; however, only the [sic] those sequences are so used and stored.” *Id.* at 529–30.

According to Gemstar, the disputed phrase means that the “[e]vent timer information sequences stored in an event timer are used to provide the information and generate the signals that are necessary to control a recording device.” Thus, Gemstar maintains that the court's construction, as modified by its summary judgment ruling, erroneously interpreted the instant phrase as excluding electronic signals generated by the “event timer information sequences” to control the recording device, including infrared signals. Gemstar also contends that the asserted claim does not require that recording be “directly controlled” from non-volatile memory.

Agreeing with the district court's construction, Thomson argues that “directly controlling” means that the event timer information sequences, not the program schedule information, control the recording device. Thomson further contends that the event timer information sequences control recording completely independent from the program schedule information after the “event timer” is loaded. Accepting that there is no generally accepted meaning in the art for the phrase “directly controlling,” Thomson maintains that the specification and prosecution history show that the '357 patentee used “directly controlling” to mean that only event timer information sequences are used to control the recording device. In addition, Thomson asserts that Gemstar agreed before the district court that “no additional schedule information from the stored television program schedule information beyond that loaded into the event timer is used to control the recording device.” Lastly, in response to Gemstar's argument, Thomson asserts that nothing in the court's construction excludes the use of infrared activation signals in the process of “directly controlling”; it only excludes the use of program guide information to control recording.

The phrase “directly controlling” does not have an accepted meaning in the art and we therefore look to the specification

for the necessary guidance in interpreting \*894 this phrase.<sup>18</sup> The asserted claim requires that recording be “directly controlled” from the nonvolatile event timer memory rather than the schedule listings contained in volatile memory. Indeed, this is the purpose of the '357 patent. The specification teaches that the claimed system does not control the recording device directly from the schedule information. '357 patent, col. 3, ll. 39–41. Rather, this information is used to load an event timer with “event timer information.” *Id.* at col. 3, ll. 41–43. “The event timer then controls the [recording device].” *Id.* at col. 3, l. 43. In order to maintain unattended control of recording by the VCR after a power interruption, only the event timer need be made of nonvolatile memory. *See Id.* at col. 3, ll. 58–60. The specification further explains that because the event timer only requires time and channel information for a limited number of events, the nonvolatile memory can be small and thus not prohibitively expensive. *Id.* at col. 3, ll. 60–65.

In addition, although the event timer must control the recording device, the claim does not exclude the event timer from referring back to or accessing the schedule information before recording occurs. The patent emphasizes that the “VCR event timer information *exists* independent of the information in the TV schedule listings.” *Id.* at col. 6, ll. 18–20 (emphasis added). Thus, the ability to record the designated program is not lost if the TV schedule listings are lost or discarded. *Id.* at col. 6, ll. 8–18. Further, if the TV schedule listings are updated, the event timer information sequences are not *automatically* updated and *may* not reflect the updated schedule listings. *Id.* at col. 6, ll. 13–17. The patent does not, however, exclude the event timer from referring back to or accessing the stored schedule information before controlling the recording device, e.g., to update the event timer information sequences. The claim only requires that the VCR control information exist independently of the program listing information and that at the time of recording “[t]he event timer ... controls the [recording device].” *Id.* at col. 3, l. 43.

Nothing in the prosecution history dissuades us from this construction. Thomson notes that the '357 patentee distinguished Kinghorn during prosecution because it did not describe television schedule listings which are free of information for directly controlling a recording device. This distinction only confirms that in the claimed invention the

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VCR control information exists independently from the program listing information.

Accordingly, we adopt Gemstar's definition of "for directly controlling a recording device" as meaning that the "[e]vent timer information sequences stored in an event timer are used to provide the information and generate the signals that are necessary to control a recording device." The district court's construction is modified to the extent discussed above.

**D. "Event timer"**

[14] The last disputed phrase we address is "event timer." Based on the same reasoning it relied upon in construing the disputed phrase discussed above, the district court construed "event timer" to mean "nonvolatile memory for storing the event timer information sequences used to \*895 control directly the recording of the selected television program. It does not include multiple memories." *SuperGuide Corp.*, 169 F.Supp.2d at 525, 529–30.

According to Gemstar, this phrase means "at least nonvolatile memory and logic for storing 'event timer information sequences' that are used to control the recording of a television program. It may include additional information and memories as well, including volatile memory." Gemstar contends that the court erred in holding that the claimed "event timer" may store only "event timer information sequences" because claim 1 is a "comprising" claim. In support of its proffered construction, Gemstar first argues that the plain language of claim 1 does not limit the type or number of memories used by the event timer. Gemstar also points out that claim 1 is a "comprising" claim. With respect to the specification, Gemstar contends that the district court inserted the requirement of a single, nonvolatile memory by relying solely on one embodiment while ignoring another embodiment, Figure 2, which discloses an event timer with two memories.

According to Thomson, the "event timer" element requires non-volatile memory for storing the event timer information sequences which directly control the recording device. Thus, Thomson maintains that the court's construction does not exclude multiple event timers, but the particular event timer that controls recording must be nonvolatile. In support,

Thomson relies on the specification and prosecution history to point out that one of the primary objectives of the '357 patent is to store VCR control information in the nonvolatile memory of the event timer so that it is not lost in the event of a power failure. Lastly, in response to Gemstar's argument about Figure 2, Thomson explains that it is an embodiment of claim 4, which depends on claim 1, and covers a second event timer located externally to the recording device.

As with the previous phrase, the disputed phrase "event timer" does not have a plain and ordinary meaning in the art. The claim language does not limit the "event timer" from consisting of multiple memories or event timers. In addition, the specification teaches that the event timer that directly controls the recording device must consist of nonvolatile memory. As we discussed above, the specification emphasizes that storage of the event timer information in nonvolatile memory is necessary if the system is to control recording even if the memory containing the program schedule listings is erased by a power interruption. See '357 patent, col. 3, ll. 47–65. Furthermore, Figure 2, which is an embodiment of claim 4, consists of two event timers. However, the specification teaches that one of the event timers consists of nonvolatile memory and it is this memory that controls the recording device. *Id.* at col. 6, ll. 20–39.

The prosecution history further supports this construction. During prosecution, the '357 patentee emphasized that in the claimed invention the schedule listings are automatically converted into event timer information and stored in the event timer such that if the schedule information is lost, the VCR programming information will not be lost. This purpose can be fulfilled only if the event timer memory that controls the recording device consists of nonvolatile memory.

Accordingly, we accept Gemstar's construction and define "event timer" as meaning "at least nonvolatile memory and logic for storing 'event timer information sequences' that are used to control the recording of a television program." The event timer also may include additional information and memories, including volatile \*896 memory. However, the nonvolatile event timer memory containing the event timer information sequences must directly control the recording device.

## VI. OTHER ISSUES

Because we remand this appeal for further proceedings, including infringement findings based on the revised claim construction, we also remand Thomson's motion for summary judgment of non-infringement based on its sub-license from Gemstar and Gemstar's breach of contract and declaratory judgment cross-claims against SuperGuide.

## VII. CONCLUSION

We affirm in part and reverse in part the district court's claim construction as discussed above. We further vacate the district court's judgment of non-infringement and remand for further proceedings consistent with this opinion. Because the claim construction set forth in this opinion is derived from the arguments raised by the parties, they are presumed to have had ample notice of how their proposed claim constructions would be read in the context of other claim language. Therefore, the parties are precluded from raising new construction issues regarding other claim language. We have considered all the remaining arguments raised by the parties and to the extent any argument is not discussed in this opinion, we conclude that it lacks merit.

No costs.

*AFFIRMED-IN-PART, REVERSED-IN-PART, VACATED and REMANDED.*

MICHEL, Circuit Judge, concurring in the result.

The majority's claim constructions expand the scope of the '578 patent far beyond what the named inventors say they actually invented in their application, and what it describes and enables. Thus, the patent now covers home receivers for digital television signals not even transmitted by television stations until nearly a decade after the '578 patent issued. Further, the court's constructions ignore the expert declarations and rely instead on a literalistic and abstract reading of the term "signal," and the absence of a clear disavowal of digital signals in the specification or claim language. Indeed, under the court's analysis, the term "regularly received television signal" would have to have read "regularly received *analog* television signal" for it to be

limited to the technology actually in use at the time. With such fundamentally incorrect constructions and methods, I must respectfully disagree.

Construing "regularly received television signal," "radio frequency information," and "mixer" in the '578 patent, the majority holds that these terms encompass receiving and processing digital signals not transmitted by television broadcasters at the time the patent issued. As in the majority opinion, I treat these three terms together because they present the common issue of whether digital signals fall within the literal scope of the claim; that is because the latter two terms involve downstream processing of the "regularly received television signal."

The majority's only support for its broad meaning of "regularly received television signal" as encompassing digital television signals is that, because digital television standards were under development in the early 1980s, and because videoconferencing and videotext systems transmitted digital data at the time, a person of ordinary skill in the art would have known that regularly received television signals could someday be transmitted in either analog or digital form. This statement ignores the fact that such videoconferencing and videotext systems \*897 are distinct from systems for digital television signals from television stations, which were indisputably not broadcast until the mid-1990s. Moreover, the majority states that because the patentees were surely aware of the difference between digital and analog technology, having described certain intra-system digital data in their patent disclosure, they could have easily limited the "regularly received television signals" to analog signals, and that digital signals must be included because they did not. I disagree.

The question is not the meaning of the term, in isolation, to laymen or later, but whether "regularly received television signal" would have had a particular meaning to *one of ordinary skill* in the television art *at the time*, in the context of this patent disclosure. Though it cites to "indisputable" evidence of the state of the art at the time, the majority cites no evidence whatsoever indicating how one of ordinary skill in the art would have understood the critical claim term in 1985, despite expert declarations on that precise issue.<sup>19</sup> The majority never even mentions, much less rebuts, the declaration of Martin Sperber, an expert retained by

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DirecTV and Hughes. Mr. Sperber unequivocally asserted that in the 1985 time frame, one skilled in the art would have understood the phrase “a regularly received television signal” in claim 1 of the [’578 patent](#) to mean an “*analog* NTSC television signal transmitted from a regular television station,” and that in 1985, “a person skilled in the television art would not have interpreted this to mean a *digital* satellite signal.” (emphasis added). S. Merrill Weiss, although an expert retained by Gemstar, confirmed that “[o]riginally, all television signals were analog signals” and only “[i]n the mid–1990’s, various system providers *began* transmitting digital television signals.” (emphasis added). Though Mr. Weiss went on to state that a “regularly received television signal” could be in digital or analog form, this assertion was not temporally limited to the 1985 time-frame. Nor could it have been. Superguide’s expert, Teresa Dahlberg, noted that, while she had “not been asked to state opinions on the meaning of the claim language,” she disagreed with “the essence of Mr. Sperber’s opinions and regard[s] them as not correct as relates to the meaning of the claim language.” Ms. Dahlberg did not, however, specifically contradict Mr. Sperber’s two assertions about signal transmissions circa 1985 being analog signals, as quoted above. Neither did Ms. Dahlberg, or any other plaintiffs’ expert, offer an opinion on how one of ordinary skill in the art would have read these terms in 1985. Surely, the declarations of these experts are the best evidence, particularly as the specification gives little, if any, guidance, and the two critical assertions of Mr. Sperber were not directly challenged by Mr. Weiss or Ms. Dahlberg.

In my view, the expert evidence briefly summarized above establishes that a person of ordinary skill in the art in 1985 would have read the critical claim term to mean only the analog television signals that were being regularly transmitted at the time, and not the later-developed, later-transmitted digital signals.<sup>20</sup> I therefore **\*898** cannot extend the literal scope of the claims to systems for receiving signal technology that was not then in use by the television industry, nor even conceived of and reduced to practice by these inventors, much less described and enabled in their [’578 patent](#) application filed in 1985.<sup>21</sup>

But the cause of my alarm extends far beyond this case. I am also concerned that the court’s opinion relies on

certain imprecise statements prior panels of this court have occasionally made in recent years concerning the “plain” or “ordinary” meaning of claim terms. Despite the now-common references to the “plain meaning” or “ordinary meaning” of claim terms, or even the “ordinary dictionary meaning” cited in the majority’s opinion, our precedent requires that the correct meaning of claim terms is that determined from the standpoint of a person of ordinary skill in the relevant art and at the time of the patent. I am concerned then that the use of these “short-hand” expressions about ordinary meaning obscures the correct analysis, tempting panels to look for an “ordinary meaning” divorced from the proper perspective—the artisan’s—and the preferred, proper sources of interpretation—the disclosure, technical dictionaries, prior art patents, and expert testimony. The ultimate result of this trend is claim constructions providing the broadest possible scope to claim terms, absent express limiting language in the claim, specification or prosecution history, but regardless of what the inventors actually invented.

If we fall into such error, we may render ineffective the examination process at the Patent and Trademark Office, for patents will later get broader scope than what the examiner understood, and found new and non-obvious, and hence patentable, at the time. Such error also compromises two fundamental tenets of the patent system: first, that the applicant must be the “inventor” of the things covered by the patent claims, and second, that the right to exclude will be no broader than the inventor’s enabling disclosure. The inventors here most assuredly did not invent a system that receives digital signals; their patent cannot therefore cover such systems.

Because I agree with the court that there is at least a triable issue as to infringement of the [’578 patent](#) under the doctrine of equivalents, I concur in the result as to the [’578 patent](#). As to its rulings respecting the other patents and terms, I have no disagreement with the majority and join its opinion.

#### Parallel Citations

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Footnotes

- 1 Thomson Consumer Electronics, Inc. is now known as Thomson Multimedia, Inc.
- 2 Before entry of final judgment, the parties by stipulation dismissed a patent misuse defense previously filed by EchoStar against Gemstar.
- 3 SuperGuide adopts Gemstar's arguments regarding the construction of the ['578 patent](#) and raises additional arguments.
- 4 The court stated that the parties agreed that, at least as it is received in the RF section from the outside, the video data is in analog format. [SuperGuide Corp.](#), 169 F.Supp.2d at 504. Based on the record, however, it is unclear how the court arrived at this conclusion.
- 5 DirecTV, Hughes, and Thomson adopt EchoStar's arguments regarding the construction of the ['578 patent](#).
- 6 The district court also did not resolve the disagreement between Gemstar and EchoStar as to the state of the art in 1985. On appeal, EchoStar asserts that in the 1985–1988 time frame, digital television was still in its infancy, while Gemstar would have us believe that digital television was at a more advanced stage of development. EchoStar acknowledges, however, that when the ['578 patent](#) was filed, “[c]onceptual work for digital television had begun but was ‘little known’ ” and “[t]he essential ‘Motion Picture Expert Group’ (MPEG) standards for compressing video for digital transmission were not issued until 1988.” It further characterizes digital television as “at best an ‘emerging technology’ in the 1985–1988 timeframe.” Based on these statements by EchoStar, we are confident in stating that in 1985 the ['578 patentees](#) were at least aware that digital television signals could be broadcast in the future.
- 7 Gemstar adopts SuperGuide's arguments with respect to the district court's claim construction of claim 1 of the ['211 patent](#) and its grant of summary judgment of non-infringement of that claim by EchoStar.
- 8 We note that the district court stated that SuperGuide withdrew allegations that the defendants' products infringe claims 2, 5 and 6. DirecTV, however, does not contest that claims 1, 2, 5 and 6 have been asserted in this case.
- 9 We note that SuperGuide characterizes the four claimed categories as “alternative criteria,” but because each consists of more than one value, i.e., “a desired program start time” comprises many possible start times, they are more aptly called categories.
- 10 Indeed, SuperGuide does not articulate its argument that “at least one of” means “one or more of the four listed criteria” without using the term “or” to separate the four listed categories. See [Brown v. 3M](#), 265 F.3d 1349, 1352 (Fed.Cir.2001) (interpreting the phrase “at least one of two-digit, three-digit, or four-digit year-date representations” as “only two-digit, only three-digit, only four-digit, or any combination of two-, three-, and four-digit date-data”).
- 11 Having concluded that the ['211 patentee](#) was not precluded from using the term “or,” we do not address SuperGuide's argument that the patentee was also precluded from using a “Markush” format.
- 12 DirecTV contends that 17a-d in Figure 1 are “alternative lists of categories of criteria,” whereas SuperGuide contends that they are “alternative criteria.” We find it unnecessary to resolve this dispute. In either case, the figure does not teach a conjunctive list of categories.
- 13 The meaning of this term is discussed below.
- 14 SuperGuide argues that the district court erred by failing to consider the ['211](#) prosecution history. However, because the claim construction is unaffected by the prosecution history, any error was harmless. See [Lemelson v. United States](#), 752 F.2d 1538, 1550 (Fed.Cir.1985) (holding that the district court properly interpreted the claim at issue, and the court's failure to consider the prosecution history was therefore harmless error not meriting reversal).
- 15 Gemstar did not dispute these comments.
- 16 SuperGuide adopts Gemstar's arguments regarding the claim construction of the ['357 patent](#).
- 17 EchoStar, DirecTV and Hughes adopt Thomson's arguments with respect to the ['357 patent](#).
- 18 We note that Thomson agrees that the disputed phrase does not exclude the use of activation signals, such as infrared signals, to control recording. Thomson does argue that this construction was not a basis for the court's non-infringement finding. Because we are remanding this case for further proceedings, we do not find it necessary to resolve this factual dispute.
- 19 Neither does the majority cite any technical treatises, technical dictionaries, or other technical publications, or contemporaneous or prior art patents, to support its ordinary meaning of “regularly received television signal.”
- 20 Though it is undisputed that digital signal technology was under development by other technologists in the mid–1980s, the patentees in this case were not developing systems that receive such signals. The claimed invention was, moreover,

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undeniably directed to marketable commercial products for use in the home, not the laboratory. It is undisputed that, as of 1985, reception for home use was limited to analog television signals. Thus, claim construction here is less a matter of the state of the laboratory art than of the history of commercial television.

**21** Nor does it matter that the district judge did not discuss the expert declarations in his opinion, as we must uphold trial judge rulings when supported by the record, even if not discussed in its opinion.

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