A New Frontier in Patents: Patent Claims to Propagated Signals,

Jeffrey R. Kuester
Scott A. Horstemeyer
Daniel J. Santos

Follow this and additional works at: https://repository.law.uic.edu/jitpl

Part of the Computer Law Commons, Intellectual Property Law Commons, Internet Law Commons,
Privacy Law Commons, and the Science and Technology Law Commons

Recommended Citation

https://repository.law.uic.edu/jitpl/vol17/iss1/4

This Symposium is brought to you for free and open access by UIC Law Open Access Repository. It has been accepted for inclusion in The John Marshall Journal of Information Technology & Privacy Law by an authorized administrator of UIC Law Open Access Repository. For more information, please contact repository@jmls.edu.
A NEW FRONTIER IN PATENTS:
PATENT CLAIMS TO
PROPAGATED SIGNALS

by JEFFREY R. KUESTER
SCOTT A. HORSTEMEYER
DANIEL J. SANTOS†

I. INTRODUCTION

If you thought “Beauregard” claims were a slippery slope to an uncertain end, you were right! The new frontier after In re Beauregard is the “propagated signal” claim—a claim directed to a manufactured transient phenomenon, such as an electrical, optical, or acoustical signal, that could further revolutionize the way communications and software companies protect their intellectual property. It can make procuring patents less expensive and result in more extensive coverage, while challenging the limits of conventional wisdom. This new claim type will be viewed by some as a threat, and by others, as yet another step in the right direction. Either way, the new propagated signal claim appears to be here to stay, at least in the electrical signal context, unless held to be non-statutory by the courts. The patentability of this new claim type appears to be fully supported by the United States Patent and Trademark Office (PTO), at least in the electrical signal context.

II. BACKGROUND

The concept of a patent claim directed to a propagated signal is not well known to patent attorneys in general and, surprisingly, is not well known even to patent attorneys whose practice it greatly affects, i.e., those who practice in the electrical, computer, software, and communica-

† Jeffrey R. Kuester and Scott A. Horstemeyer are partners and registered patent attorneys with the intellectual property law firm of Thomas, Kayden, Horstemeyer & Risley, LLP in Atlanta, Georgia. Daniel J. Santos is a patent attorney with the law firm of Thomas, Kayden, Horstemeyer & Risley, LLP. The authors gratefully acknowledge a grant from the Oracle Corporation in connection with the drafting of this Article.

1. In re Beauregard, 53 F.3d 1583 (Fed. Cir. 1995).
2. Id.
tions arts. Moreover, there appears to be no specific statutory or case law on the subject. These types of claims only recently and almost accidentally came about as a result of the battle waged by International Business Machines (IBM), against the United States Patent and Trademark Office (PTO). In the case of In re Beauregard, Appeal No. 95-1054, involving application Serial No. 07/521,858, which was appealed by IBM to the Court of Appeals for the Federal Circuit after the United States Patent and Trademark Office Board of Patent Appeals and Interferences ("Board"), on reconsideration, affirmed the Board's earlier decision affirming the Examiner's final rejection of the claims.\(^3\)

Essentially, this case involved a test application set up by IBM in an effort to pioneer better and broader patent protection for software-related inventions. The application in the case of In re Beauregard included "article of manufacture" claims, now generally referred to as "Beauregard" claims, directed to software stored on a "computer-usable medium." The idea was that, even though software is probably unpatentable by itself,\(^4\) it is patentable when stored on an article of manufacture, such as a computer diskette or CD-ROM. At the time the Board heard the appeal, the PTO was hostile in allowing any type of patent protection for software, despite clear legal precedent to the contrary and notwithstanding the fact that skilled practitioners had been obtaining some limited claim protection for software for years by carefully portraying and cleverly claiming software subject matter in patent applications.

In the case of In re Beauregard, the Board initially handed down an adverse decision on August 4, 1994, affirming the examiner's final rejection of the claims and denying patent protection for the article of manufacture claims directed to software stored on a computer-usable medium. IBM filed a Request for Reconsideration to the Board. The Board again affirmed the Examiner's final rejection, and the final rejection was appealed to the Federal Circuit. During the appeal, the PTO decided not to further pursue its position, and so the case was dropped. The application ultimately issued as United States Patent No. 5,710,578 with the article of manufacture claims and with their attendant presumption of validity.

After a period of proposing guidelines for reviewing software-related inventions and deriving legal analysis to support the proposed guidelines, the PTO finally adopted and promulgated The Examination Guidelines for Computer-Related Inventions (hereinafter "Guidelines"). The Guidelines now appear within Chapter 2100 of the Manual of Patent Ex-

\(^3\) Id.

PATENT CLAIMS TO PROPAGATED SIGNALS

Mining Procedure (MPEP). These Guidelines set forth the official examination policies for computer-related inventions, with particular recognition to the new Beauregard claims.

Shortly after the Guidelines were distributed by the PTO, the PTO made available Training Materials including, among other things, a flow chart and examples, to teach its examiners how to apply the Guidelines. Located deep inside the Training Materials, in a non-conspicuous example, was the new and provocative propagated signal claim in the form of a "computer data signal embodied in a carrier wave," with clear advocacy by the PTO and convincing legal analysis in support thereof. Early on, unlike the Guidelines, the Training Materials were only internally distributed to PTO examiners and were never widely distributed to the public, but ultimately were made available on the PTO's web site and to the public upon specific request. As a result, the concept of propagated signal claims is not widely known, understood, or appreciated, but remains a possible and potentially powerful claim format for protecting software and data communications signals propagated in electrical, optical, acoustic, and other mediums.

III. ANALYSIS

A. DEVELOPMENT OF THE LAW AND POLICY RELATING TO ARTICLE OF MANUFACTURE SOFTWARE CLAIMS

Two legal cases paved the way for the patenting of article of manufacture claims directed to software stored on a computer-readable medium, namely, In re Lowry, and In re Beauregard. Both of these cases involved rejections of claims under the "printed matter doctrine." The printed matter doctrine is a judicially-created doctrine that the PTO has used to deny patentability to inventions directed to printed lines, characters, words, and digits that are contained on a medium and readable by humans.

The invention involved in In re Lowry was a data structure stored in computer memory. The claims at issue recited a memory comprising a data structure including a plurality of attribute data objects (ADOs).

5. MPEP § 2106 includes the Guidelines except that the footnotes contained in the Guidelines do not appear in the MPEP. Also, additional material relating to patenting of computer-related inventions appears in the MPEP that is not included in the Guidelines.

6. Id. A computer data signal embodied in a carrier wave comprising: a compression source code segment comprising [the code]; and an encryption source code segment comprising [the code].


Each ADO comprised information relating to characteristics of that object as well as information relating to its relationship to one other object of the data structure, thereby establishing a hierarchy of the data objects. The examiner had rejected the claims as being non-statutory under §101 and as being obvious under §103.10

On appeal, the Board reversed the §101 rejection, holding that the claim recited an article of manufacture and therefore was statutory. However, the Board affirmed the examiner's §103 rejection on grounds that the claimed data structure corresponded to printed matter, which was to be given no patentable weight. The Board analogized the data structure to printed matter and held that the printed matter would not distinguish the claims from the prior art in terms of patentability where the printed matter is not functionally related to the substrate. Therefore, the Board held that the printed matter, i.e., the data structure on a memory, was to be given no patentable weight.

On appeal to the Federal Circuit, the court held that the printed matter rejection was inappropriate where the claimed invention requires that the information be processed by a machine, rather than by the human mind. The court went on to hold that a data structure could be patented as an article of manufacture and reversed the Board's determination that the claims were unpatentable as being obvious.11

The claims at issue in In re Beauregard all involved a computer program embodied on a computer-usable medium. The examiner had finally rejected all of the claims as being obvious. In formulating the rejection, the examiner had analogized the claimed program code to printed matter and then gave no weight to the program code in determining patentability. The examiner then rejected the claims as being obvious in view of a well known data processing technique for storing code on a storage device for later use by a computer.12 On appeal to the Board, the Board construed the claims as covering "a set of [computer] instructions printed in English (or . . . any other language including digital languages . . .) on a sheet of paper."

On appeal to the Federal Circuit, the Appellants argued that the Board erred in concluding that instructions on paper are a "computer usable medium, assuming that the computer is equipped with an optical scanner for converting that language into computer instructions."13 The Appellants argued that "{t}he Board is simply wrong. Computer instructions on paper when optically scanned produce a new and distinctly dif-

10. Id. The examiner rejected the claims as being obvious in view of U.S. Patent No. 4,774,661 and rejected some of the claims as being anticipated by that same reference. Id.
13. Id. at 13.
ferent electronic (nonpaper) document and it is only the new electronic
document that is usable by the computer.”

It should be noted that the Appellants filed their brief in In re Beau-
regard on August 4, 1994 and the Federal Circuit issued its opinion in In
re Lowry on August 26, 1994. It appears that the PTO may have decided
to allow the application involved in In re Beauregard to issue as a patent
after receiving the Federal Circuit's decision in In re Lowry, since both
cases involved the application of the printed matter rejection to claims
directed to computer programs stored in a memory device. The PTO
then filed for dismissal of the case, which the court granted.

In view of these two cases, and in view of the Guidelines, which
clearly demonstrate the PTO's acceptance of Beauregard claims, it is
fairly well settled that Beauregard claims are statutory. Since the PTO
has analogized the propagated signal claim to Beauregard claims, propa-
gated signal claims, which are also “manufactured” and, in many cases,
readable by a computer, should be statutory as well. It is also worth
noting that the printed matter rejection is not even remotely applicable
to propagated signal claims. However, the propagated signal claim may
have a different type of obstacle to overcome, and that is the ephemeral
nature of the subject matter of the claim, which may tempt examiners to
deny patentability to these types of claims. Therefore, examiners should
be properly trained as to the treatment to be accorded these types of
claims. Nevertheless, in view of the PTO's apparent acceptance of these
types of claims, they should be treated as being statutory, provided the
claims are properly drafted and properly supported by the specification.

B. CLAIMING COMPUTER PROGRAMS AS “ARTICLES OF MANUFACTURE”

Generally, the laws relating to the patenting of software are derived
from the United States Constitution, from federal statutes that have
been enacted by the United States Congress, and from decisions that
have been handed down by the federal courts. The PTO is supposed to
follow these laws when examining patent applications, and it promul-
gates examination policies, such as those set forth in the Guidelines, the
Training Materials, and the MPEP, that are supposed to reflect and be
consistent with these laws, which is not always the case. The many PTO
examiners on staff are supposed to abide by the PTO examination poli-
cies, which is not always the case.

The United States Constitution states that “Congress shall have
power . . . To promote the Progress of Science and useful Arts, by secur-
ing for limited Times to Authors and Inventors the exclusive Right to

14. Id.
15. See Guidelines, supra note 4; MPEP supra note 4, at § 2106, 2100-4.
On the basis of this Constitutional authority, Congress defined four statutory categories of patentable subject matter which are set forth in 35 U.S.C. §101. These statutory categories are machines, processes, manufactures, and compositions of matter. Abstract ideas, laws of nature, and natural phenomena are not patentable because they do not fall within any of these statutory categories. Patent claims directed to electrical signals have been analogized by the PTO to software patent claims directed to inventions that fall within the statutory category of “manufactures,” i.e., to Beauregard claims. Therefore, a detailed analysis of the requirements set forth by the PTO that must be met for patenting Beauregard claims will be provided and then that analysis will be applied to the propagated signal claim in order to shed some light on the requirements that must be met for patenting those types of claims.

As stated above, the PTO has now taken the position that computer programs claimed as articles of manufacture are statutory products, provided that certain requirements are met. The following is an example of a Beauregard claim that can be used to protect a computer program:

Example 1: Article of Manufacture or Beauregard Claim.

A computer program embodied on a computer-readable medium for monitoring and controlling an automated manufacturing plant using a telemetered processed data signal comprising: A compression source code segment comprising . . . [recites self-documenting source code]; and an encryption source code segment comprising . . . [recites self-documenting source code].

Example 1 is stated in the Training Materials as an example of an article of manufacture claim that meets the statutory requirements of §101. Generally, article of manufacture claims that are directed to software, i.e., Beauregard claims, are statutory if they are directed to a specific manufacture or to a “practical application in the technological arts.” Mere data stored on a computer-readable medium cannot be patented. Mere data, as opposed to computer instructions, stored on a computer-readable medium is labeled by the PTO as “non-functional descriptive material” because it does not impart any function to the com-

---

17. 35 U.S.C. § 101 (1994) states: “whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof. . . .” Id.
18. In re Allapat, 33 F.3d 1526 (Fed. Cir. 1994) (en banc); MPEP, supra note 4, at §2106, 2100-11.
19. Guidelines, supra note 4, at 7483 (§ IV, B.2(b)(i)); MPEP, supra note 4, at §2106, pp. 2100-11, 2100-15 through 2100-17.
20. Training Materials, Tab 11, claim 12.
puter with which the computer-readable medium is implemented. The PTO has held that non-functional descriptive material is unpatentable.\textsuperscript{22}

In addition to pure data, music and literary works are other examples of non-functional descriptive material that is not subject to patent protection. Non-functional descriptive material generally is entitled to copyright protection under the United States copyright laws.\textsuperscript{23}

The claim set forth in Example 1 recites what is referred to by the PTO as "functional descriptive material," which is patentable when claimed as embodied on a computer-readable medium.\textsuperscript{24} However, even a claim directed to functional descriptive material may be held by the PTO to be unpatentable if it does not meet certain requirements. An example of a type of functional descriptive material that cannot be patented is a computer program not embodied on a computer-readable medium, \textit{i.e.}, a computer program \textit{per se}. Thus, if the preamble of the claim set forth in Example 1 only recited a computer program without stating that the computer program is embodied on some type of a computer-readable medium, then the PTO would hold the claim unpatentable on the grounds that the claim is directed to functional descriptive material \textit{per se}. It stands to reason that the PTO might apply a similar rationale to article of manufacture claims directed to propagated signals and, therefore, require the claim to state that the signal is embodied in a carrier wave or some other medium. If the carrier wave or medium is not recited in the claim, the claim may be rejected as being a "signal \textit{per se}" and thus not subject to patent protection.

Generally speaking, the Guidelines and Training Materials require that claims directed to software or other computer-related inventions set forth a specific manufacture, pre or postcomputer processing activity, or a practical application in the technological arts in order to meet the statutory requirements of 35 U.S.C. §101. The PTO has developed several tests which are set forth in the Guidelines for assisting each patent examiner in determining whether a claim meets these requirements. With respect to article of manufacture claims directed to software, the Guidelines require the examiner to make an initial determination as to whether the claim at issue claims a natural phenomenon (\textit{e.g.}, energy, magnetism, etc.), non-functional descriptive material, functional descriptive material \textit{not} embodied on a computer-readable medium, or functional descriptive material \textit{that is} embodied on a computer-readable medium. As stated above, of these four subject areas, only functional

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{22} Guidelines, supra note 4, at 7482 (§ IV.B.1(b)); MPEP, supra note 4, at §2106, 2100-11.
\item \textsuperscript{23} 17 U.S.C. §101 (1994).
\item \textsuperscript{24} In re Lowry, 32 F.3d 1579 (Fed. Cir. 1994).
\end{itemize}
\end{footnotesize}
descriptive material embodied on a computer-readable medium may be patented, and only if certain other requirements are met.

Assuming the claim recites functional descriptive material embodied on a computer-readable medium, such as code segments of a computer program embodied on a computer-readable medium, the examiner must then determine whether the claim is directed to a specific manufacture or, alternatively, whether the claim covers any manufacture capable of causing a computer to perform the underlying process. If the examiner determines that the claim is directed to a specific manufacture, the claim will be held to be statutory.25 However, as will become apparent from the following discussion, while this determination easily crosses the statutory subject matter hurdle, it may also unduly limit the scope of the claims, and thus should generally be avoided unless necessary. On the other hand, if the examiner determines that the claim covers any and every manufacture for causing a computer to perform the underlying process, then the examiner must determine whether the underlying process is statutory to determine whether the claim is statutory.26

A specific manufacture corresponds to either specific software stored on a specific type of computer-readable medium or, alternatively, specific software embodied on a general type of memory device. The examiner will analyze the specification and claims to determine whether the claim covers a specific manufacture, or whether it covers any and every manufacture for causing the computer to perform the underlying process. Generally, if the claim does not recite specific code segments that perform specific functions, and if the specification is not limited to one particular program for performing the functions set forth in the claim, the claim will not be held to be directed to a specific manufacture. Conversely, if the claim recites specific code segments for performing specific functions and the specification only recites one computer program for performing those functions, the claim may be held to cover a specific manufacture.

Patent practitioners should immediately recognize the danger of having a Beauregard claim held to be directed to a specific manufacture. Such a holding, although resulting in a finding that the claim is statutory, will mean that the examiner has construed the claim as covering only the embodiment explicitly described in the specification of the application. If this happens, the attorney should not acquiesce in this holding, unless such a specific claim is necessary to overcome prior art and the applicant is willing to waive any right to a broader claim.

26. Guidelines, supra note 4, at 7483 (§ IV.B.2(a)(ii)); MPEP, supra note 4, at §2106, 2100-12.
Therefore, if broad protection is sought, the patent practitioner should ensure that the specification makes clear that the invention is not limited to any specific embodiments for the computer program disclosed in the application. One way to do this is by including flow charts and/or state diagrams in the application that are broad enough to cover several different software implementations. If specific code is disclosed in the application, the specification should state that the code demonstrates the preferred implementation of the invention and that the invention is not limited to that implementation. If this type of language is included in the specification, and the claim itself is not limited by its language to a specific manufacture, i.e., to specific code, the examiner will find that the claim covers any and every manufacture for causing the computer to perform the underlying process. The examiner will then analyze the underlying process to determine whether the claim is statutory.

When the examiner analyzes the underlying process to determine whether the claim is statutory, the claim will be held to be statutory if the claim recites (1) post-computer process activity, (2) pre-computer process activity, or (3) a practical application in the technological arts. Post-computer activity relates to physical acts performed outside of the computer independent of and following the steps to be performed by the computer. An example of post-computer-process activity would be using a signal output from a computer to control a rubber curing process to cause a physical step to be performed, such as the opening of a mold. This category will not apply to Beauregard claims because, in order to fit into this category, the post-computer processing step must be recited as a limitation in the claim, which will not be the case with a Beauregard claim.

The pre-computer process activity category requires that “measurements of physical objects or activities be transformed outside of the computer into computer data, where the data comprises signals corresponding to physical objects or activities external to the computer system, and where the process causes a physical transformation of the signals which are intangible representations of the physical objects or activities.” An example of this type of activity is measuring human cardiac activity to obtain measurement data, converting the measurement data into time segments, filtering the time segments through a high-pass filter, determining the amplitude of the output of the high-pass filter, and using a computer to compare this amplitude value with a threshold value. As with post-computer process activity, this category

27. Guidelines, supra note 4, at 7483 (§ IV.B.2(b)(i)); MPEP, supra note 4, at §2106, 2100-15 through 2100-17.
28. Id.
29. Id.
typically will not apply to Beauregard claims because this category requires the pre-computer process activity to be recited as a positive limitation in the claim,\textsuperscript{30} which will not be the case with a Beauregard claim.

Even if the claim does not recite pre-computer process or post-computer process activity, the claim will be held to be statutory if the claim recites a practical application in the technological arts, even if the claim only recites events occurring solely within a computer. A claim directed purely to manipulating an abstract idea or performing a mathematical algorithm will not meet the requirements of the practical application category. The claim must be directed to something useful, and not just to something that has some potential usefulness that is not positively stated in the claim.\textsuperscript{31} However, in most cases, this should not be a difficult requirement to meet. The Guidelines provide several examples of claims that meet the requirement of this category. One example of a claim that meets this requirement cited in the Guidelines is "[a] method of controlling parallel processors to accomplish multi-tasking of several computing tasks to maximize computing efficiency."\textsuperscript{32}

With respect to Beauregard claims, the patent practitioner will normally want to meet the requirements of the practical application category, while avoiding a finding by the examiner that the claim is directed to a specific manufacture. The practical application test will, in most cases, be easy to meet, and the claims will not have to be unduly narrowed.

C. CLAIMING PROPAGATED SIGNALS AS ARTICLES OF MANUFACTURE

In view of the requirements set forth above relating to Beauregard claims, in order for a propagated signal claim to be statutory, it appears that it must (1) be manufactured (not a natural phenomenon), (2) be directed to functional descriptive material embedded in a carrier wave or some other medium (not functional descriptive material \textit{per se} and not non-functional descriptive material), and (3) recite a practical application in the technological arts or cover a specific manufacture.

The Training Materials for the Guidelines cite the following as an example of a statutory claim:

Example 2: Signal Claim With Carrier Wave.

A computer data signal embodied in a carrier wave comprising a compression source code segment comprising [the code]; and an encryption source code segment comprising [the code].\textsuperscript{33}

\textsuperscript{30} Id.

\textsuperscript{31} Guidelines, supra note 4, at 7483 (§ IV.B.2(b)(ii)); MPEP, supra note 4, at §2106, 2100-16.

\textsuperscript{32} Id. \textit{See also} In re Bernhart, 417 F.2d 1395 (C.C.P.A. 1969).

\textsuperscript{33} Training Materials, Tab 11, claim 13.
For this example, the Training Materials provide a specification which discloses only one computer program for compressing and decompressing the data signal, namely, Huffman coding, and only one computer program for encoding and decoding the data signal, namely, the Data Encryption Standard algorithm. Therefore, the claim set forth in Example 2 was determined to be statutory by the PTO since it meets the "specific manufacture" requirement. This is the only example provided in the Training Materials of a propagated signal claim. However, even if a propagated signal claim does not recite a specific manufacture, it should be statutory if it meets the practical application test.

Example 2 is also discussed in a law review article written by the Solicitor of the PTO, Nancy J. Linck, and co-authored by the Assistant Solicitor of the PTO, Karen A. Buchanan. In that article, at page 677, Example 2 was recited as an example of a statutory article of manufacture claim because it recites a specific manufacture. The article also stated that the claim was statutory because it has a practical application in the technological arts in that "it can be used to monitor and control the physical processes in an automated manufacturing plant." These persons also participated in the drafting of the Training Materials and the Guidelines. Therefore, it would appear that propagated signal claims that meet the practical application test are likely to be found statutory.

In order to meet the practical application test, it will probably be necessary that the practical application be stated within a limitation of the claim, rather than merely in the preamble of the claim, since the preamble often is not taken into consideration in determining patentability. However, this should probably not unduly limit the claim as long as the practical application is recited broadly. Furthermore, if there is more than one practical application for the invention, multiple claim sets can be included in the application so that each practical application is covered.

It is unclear whether the PTO will require that a carrier wave or propagation medium be recited in a propagated signal claim. Since the carrier wave or medium is supposed to be analogous to the computer-readable medium of a Beauregard claim, the PTO will probably require, at least at first, that a carrier wave or other medium be recited in the claim. However, it would appear that such a requirement would elevate form over substance. For example, although reciting a carrier wave in a claim may not present a problem in many cases since a carrier wave is typically present, there are times when a carrier wave is not present,

35. Id. at 677-678.
such as with a purely digital signal comprised of a stream of bits being transmitted in a digital format without being modulated onto an analog carrier wave. Whether or not a carrier wave must be recited in a propagated signal claim to make it allowable and valid remains unclear at this point.

It is also important to note that claims directed to a method or apparatus for generating a particular signal have always been viewed by the PTO as being statutory. Therefore, these types of claims should also be included in the patent application due to the uncertainty surrounding the issue of patenting propagated signal claims.

Another important issue with respect to the new propagated signal claim is the content of the specification of the application. In order to prevent the claims from being treated as "specific manufacture" claims, the specification should make it clear that there is more than one way to generate the signal. If computer algorithms are used in generating the signal, the specification should provide alternative algorithms for producing the data signal, or at least make it clear that the disclosed algorithm is only the preferred algorithm and that persons skilled in the art will understand that other algorithms can be used as well. It may also be a good idea to state in the specification that the order of the data comprised in the data signal is not critical. This may prevent a finding by the examiner that the data signal itself is a specific data signal. In essence, broadening language should be used in the specification wherever possible and applicable and any known alternative embodiments should be disclosed in the specification and claimed. It may also be desirable to use the doctrine of claim differentiation when drafting the claims to show that the claims are not directed to a specific manufacture.

D. Strategic Advantages of Propagated Signal Claims

Propagated signal claims offer unique advantages in obtaining patent protection for data communications inventions and software inventions where the software is transported over and/or interacts with a propagation medium. Just as with article of manufacture claims, propagated signal claims increase the breadth of patent coverage. Along these lines, just as article of manufacture claims make direct infringers of those who produce and transport computer programs on diskettes or CDs, propagated signal claims make direct infringers of those who transport and produce signals on propagation mediums, such as electrical wires, optical fiber cables, air, and water.

Whoever without authority "makes, uses, offers to sell or sells any patented invention," such as a "signal," infringes a patent. For the

communications and software industries, these claims can potentially be used to establish direct infringement against any carrier of the signal or proprietor of the propagation medium, such as, for instance, an Internet service provider (ISP), a telephone company, users of bridges and routers, etc., because they all "make" and/or "use" the signal. The propagated signal claim gives new meaning to the concept of an "innocent" infringer by making direct infringers of those who merely communicate the infringing signal, without perhaps any infringing intention, knowledge of the infringement, and in many cases, virtually no control over the transmission.

Furthermore, the manufacturer, seller, and user of the transmitters and receivers for communicating the signals respectively to and from the propagation medium are also potential infringers, as each of these parties also falls within one or more of the statutory infringement categories.37

Interestingly, the transmitting party, the proprietor of the propagation medium, and the receiving party may be involved in a completely different business than that associated with the invention covered by the patented signal. More specifically, the propagated signal claim may be tailored to protect a computer program in an area of business that is foreign to that of the potentially infringing parties. Yet the potentially infringing parties might have to answer to a probably unforeseen charge of infringement. This leaves the infringing party in a very vulnerable situation, as it may not have any patents to cross license if a patent charge is brought.

The new propagated signal claim can, although not always, make it easier to discover and prove infringements. A signal can be captured and analyzed directly to determine infringement without the need to know how a transmitter or a receiver that uses the infringing signal are specifically implemented and operated. Adequate analysis may be accomplished simply by utilizing a computer, an oscilloscope, and/or a spectrum analyzer, or by utilizing other devices, such as a logic analyzer, a protocol analyzer, or a deep memory oscilloscope.

Another advantage of the propagated signal claims is that they may ultimately make it less expensive to protect data communications and software inventions. In patent applications, patent practitioners often include the following types of independent claims, in addition to a series of dependent claims for each independent claim: (1) an apparatus claim without "means plus function" elements, (2) an apparatus claim with "means plus function" elements, and (3) a method claim. There is generally a different body of law interpreting each form of these claims, with each form having its own advantages and disadvantages. Moreover, in

37. Id.
many patent applications directed to data communications, patent practitioners are often forced to include claims directed to a transmitting apparatus and claims directed to a receiving apparatus, because a patent claim having both transmitting and receiving elements is usually not very difficult to avoid infringing. Therefore, in these cases, the practitioner might find it necessary to include, in addition to a series of dependent claims, at least six independent claims to cover all of the claim permutations, i.e., claim formats (1)-(3) for the transmitter and claim formats (1)-(3) for the receiver. This undesirable predicament makes the patenting process expensive, as most patent offices around the world, including the PTO, charge for excess claims beyond a prescribed limit. Also, this expense is compounded when the application is filed in more than one country.

One of the beauties of the propagated signal claim is that it can potentially and significantly reduce the number of claims that are required in many software and data communications applications by eliminating the need to file separate sets of transmitter and receiver claims. The manufacturer of a transmitter and/or a receiver that produces, processes or uses the infringing signal will directly infringe a properly drafted propagated signal claim. Hence, in a United States patent application, all that would be needed, assuming there is no question that the propagated signal claim is statutory, is the three claim formats (1)-(3) noted previously directed to the propagated signal, and in the United States, this would result in no extra charges for claims, provided that the total limit of 20 is not exceeded. It remains to be seen whether countries other than the United States will accept these types of patent claims.

IV. CONCLUSION

Finally, as a word of caution, it should also be noted that, until the Federal Circuit specifically addresses the issue of whether the propagated signal claim is statutory, it is wise to include the other conventional types of claims mentioned above in the application to ensure that the invention is adequately protected in the event that the propagated signal claim is held to be non-statute.

38. The PTO charges fees for independent claims in excess of 3 and for total claims in excess of 20.