Patentability of Signals in Canada

by

Damian Kraemer

A thesis submitted in conformity with the requirements
for the degree of Master's of Law (LL.M.)

Graduate Department of the Faculty of Law

University of Toronto

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Abstract

This paper addresses the question of whether the patentability of signals is compatible with the law in Canada and attempts to develop a test for use in determining when a signal should be considered patentable subject matter. The hard-line position of the Canadian Intellectual Property Office, that signals are not patentable, is shown not to be supported in law. Canada’s domestic law is, in fact, compatible with the patentability of signals. Lessons are drawn from Europe, where signals are patentable and the United States, where they are not. Various international treaties are also examined for possible obligations concerning signals. Finally, an attempt is made to formulate a workable test for the patentability of signals that is compatible with Canadian legislation and case law.
I would like to acknowledge and to thank everyone that helped me with this project. First, I want to thank Ariel Katz, for being not only a very helpful, but also a very patient advisor. I also want to thank Natalie Raffoul, for paving the way with her earlier work on this topic. I would further like to thank Bita Amani, Aaron Sawchuk and Richard Owens for pointing me in the right direction and for conversations without which this project would have ended up somewhere very different. Finally, I want to acknowledge all the encouragement and support of family and friends that provided the motivation to push through and finish it off.
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1.0 Introduction

This paper addresses the question of whether the patentability of signals is compatible with the law in Canada and attempts to develop a test for use in determining when a signal should be considered patentable subject matter. The first section will explain what is meant by the term “signal” and outline some of the reasons why prospective patentees would find signal claims desirable. Signals are detectable, physical entities for communicating information. From the point of view of a patentee, a signal claim would be highly desirable. A patentable signal claim would provide broader protection than is currently provided by claiming the transmitter, receiver and method for generating and decoding a signal. Other benefits include fewer claims to examine and substantial easement of enforcement burdens due to the relatively simple task of monitoring publically accessible networks, and the possibility of enforcement against gateways or portions of international networks.

The second section will outline CIPO’s position on the patentability of signals, that they are non-patentable per se, and explain how this position lacks foundation in law. CIPO objects to the patentability of signals due to concerns of immateriality, lack of a proper category and transience. In actuality, the patentability of signals is compatible with domestic law. The current state of the law does not preclude the patentability of signals.

The third section of the paper will explore the patentability of signals internationally; specifically with respect to Europe, the United States and some international treaties. Signals are recognized as physical entities in Europe and are patentable. To paraphrase, signals, as information carriers, are patentable when they are inventive independent of the information being carried. Meanwhile, the United States Court of Appeal for the Federal Circuit, in Nuijten, has provided an excellent example of how not to approach the question. Further, Canada is a signatory to TRIPS and NAFTA, which can be read as requiring the patentability of signals and certainly do not impose any obligation to exclude signals.

The last section of the paper, although the focus of the paper is on the law, will raise some policy concerns regarding the patentability of signals. The section concludes with an attempt to formulate a workable test, based on the European model, which could be applied in Canada. As
long as the invention lies in the signal itself, and not in the information being carried, allowing patents on signals is compatible with Canadian law.
2.0 The Nature of Signals and Signal Claims

Most people probably have an intuitive understanding of what a signal is. The trouble is that the definition of a signal can be quite different depending on the context. The Oxford English Dictionary defines a signal as,

“1. A visible sign;

“2. A sign, token or indication;

“3. A sign agreed upon or understood as the occasion of concerted action;

“4. A sign or notice, perceptible by sight or hearing, given especially for the purpose of conveying warning, direction or information.”¹

Other definitions include: an event that incites action,² an action that serves as a warning³ or any communication that includes a message.⁴ However, for the purposes of a patent, a more technical definition is required. More specifically, electric, electromagnetic or acoustic signals all have the potential to be considered to be patentable subject matter.

Even here, there are many definitions for the word “signal.” For example,

“a detectable physical quantity or impulse (as a voltage, current or magnetic field strength) by which messages or information can be transmitted.”⁵

  “anything that serves to indicate, warn, direct, command, or the like, as a light, a gesture, an act, etc.”
  “an action, movement or sound which gives information, a message, a warning or an order.”
⁴ Definition from Webster's Online Dictionary, available online at: http://www.websters-online-dictionary.org/definition/signal.
  “Any communication that encodes a message”
“an electrical quantity or effect, as current, voltage, or electromagnetic waves, that can be varied in such a way as to convey information.”

“a: an object used to transmit or convey information beyond the range of human voice b: the sound or image conveyed in telegraphy, telephony, radio, radar, or television c: a detectable physical quantity or impulse (as a voltage, current, or magnetic field strength) by which messages or information can be transmitted.”

“an electric quantity (voltage or current or field strength) whose modulation represents coded information about the source from which it comes.”

“a series of electrical or radio waves which are sent to a radio or television in order to produce a sound, picture or message”

For now, it is enough simply to make three observations. First, that all of these definitions, even the very general ones, include an element of information transmission in the definition. This is information sent from one person to another or at least from one device to another. Signals are information carriers; in the same sense as an optical disc or a computer hard drive are information carriers. Signals are not the information itself, but carriers of information.

Second, by virtue of their function as information carriers, signals are clearly not natural phenomena. Signals are artificial. Signals are sent from one entity to another as a means of communication.

Third, notice the phrase “detectable physical quantity” and the scattered references to various measurable quantities. Signals, in order to accomplish their function of transmitting information, must cause some kind of detectable change in the world, else nobody would notice them. That change may well be oscillations of an electric or magnetic field, but there must, at a fundamental level, be some measurable change in something for a signal to exist at all.

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8 Definition from Webster’s Online Dictionary, available online at: http://www.websters-online-dictionary.org/definition/signal.
There are at least three broad types of signals that might be of interest to inventors seeking patent protection: these are electromagnetic signals, electrical signals and acoustic signals.

2.1 Acoustic Signals

Acoustic signals are probably the easiest to understand, intuitively. They are made up of acoustic waves. An acoustic wave can be defined as a disturbance moving through a medium. An everyday example of an acoustic wave that everyone is familiar with are sound waves.\(^{10}\)

Sound waves are generated by all manner of things. Sound waves require a medium through which to propagate, such as air, water or solid objects. The details of the propagation of sound waves, such as speed and distance, depend on the energy in the wave and the physical properties of the medium.

Sound waves are a type of longitudinal pressure wave, meaning that the oscillations caused by the disturbance are parallel to the direction the wave is travelling. We call them sound waves because they happen to fall within the range that humans can hear. Pressure waves can, and do, occur at frequencies that are both higher and lower than this range, which we call ultra-sonic and sub-sonic, respectively.

Imagine a loudspeaker that is generating sound waves. The loudspeaker does this by vibrating back and forth. As the loudspeaker vibrates it pushes on the air molecules next to it. These air molecules push on molecules next to them which push on molecules next to them, and so on. The result is a disturbance that moves through the air away from the loudspeaker.

Sound waves may, or may not, carry information. For example, consider the loudspeaker again. If it is being used to amplify someone’s voice, and that person is speaking intelligibly, the resulting sound waves would be carrying information. Consider, as a counter example, the roar of a waterfall or the “traffic noise” of a busy freeway. These are effectively “white noise,” that is,

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there is no attempt being made to communicate. These are essentially sound without information content.\textsuperscript{11}

In case the reader is tempted to conclude that people shouting is the only likely form of acoustic signal that might be encountered, consider SONAR devices. These devices send out acoustic signals of a known composition to bounce off of distant objects and then listen for the returning echo. These devices are commonly used in marine environments due to the difficulty of using RADAR under water. Devices operating on similar principles have been used to help map the sub-surface structure of the ground and in quality control measures in manufacturing.

An acoustic signal then, is simply an acoustic wave that is being varied or altered in some way so as to communicate information.

\textbf{2.2 Electrical Signals}

Electrical signals are probably the next easiest to grasp on an intuitive level. Hopefully, we all remember a bit of high school science class. Electrons are negatively charged particles that, under the right circumstances can move through certain materials, called conductors. When we construct a loop of conductors we have a circuit. Electrons flow around the circuit and we can use terms such as electric current, a measure of the number of electrons moving through a particular spot in the circuit per second, or voltage, a measure of the amount of energy carried per electron to describe this flow.

An everyday example of electric signals that everyone is likely to be familiar with are the signals used to transmit data or voice through telephone or cable networks. These networks all include at least a portion that uses copper wire, the aforementioned conductor, to transmit data or voice signals. Additional examples include signals sent over computer networks as well as all manner of electronic control systems in everything from light switches to aircraft.

\textsuperscript{11} This is probably not completely true. The noise of a waterfall or a freeway probably contains some information accessible to those who know exactly how to look for it, or in the sense that the noise of the waterfall contains information about the presence of the waterfall, but it is the contrast between directed speech and background noise that the author wishes to emphasize here.
An electrical signal is created by varying or altering the characteristics of the flow of electrons, such as current or voltage, in such a manner as to communicate information.

### 2.3 Electromagnetic Signals

Electromagnetic signals are carried by electromagnetic radiation. These are probably the least intuitive of the three types of potentially patentable signals.

Electromagnetic radiation\(^\text{12}\) is more commonly known as light, or any one of a number of other terms used to describe portions of the electromagnetic spectrum, in order of increasing frequency (and decreasing wavelength): radio waves, microwaves, infrared radiation, visible light, ultraviolet, X-rays and gamma rays. The details of what exactly electromagnetic radiation is, physically, are rather complex. Suffice it to say that quantum mechanics tells us that electromagnetic radiation behaves like a wave and like a particle, simultaneously.\(^\text{13}\)

On the one hand electromagnetic radiation is composed of electric and magnetic fields that oscillate perpendicular to each other and perpendicular to the direction of propagation of energy. Electromagnetic radiation has all the properties of waves\(^\text{14}\) and display phenomena associated with waves, including superposition, interference, refraction and diffraction.

On the other hand Electromagnetic radiation has all the properties of a stream of particles. The Standard Model calls these particles photons, and describes a set of well defined properties.

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\(^{13}\) We call this property of electromagnetic radiation wave-particle duality. For more information please see any introductory Physics text. For example, David Halliday and Robert Resnick, *Fundamentals of Physics, 2nd Ed.*, (1981) John Wiley & Sons, New York.

such as speed, momentum, spin, and polarization. Each photon also carries energy proportional to its frequency. When photons encounter other particles they may be absorbed and can be detected.

Electromagnetic signals have been in common use for a long time and are becoming more and more ubiquitous in modern society with the proliferation of wireless devices of all sorts. Examples of electromagnetic signals might include radio transmissions (AM or FM), RADAR, mobile phone signals, Wi-Fi, Bluetooth as well as all manner of medical diagnostic equipment such as PET, CT or MRI scanners.

An electromagnetic signal then is constructed by altering or modulating the properties of electromagnetic radiation in such a manner that information can be communicated. Such a signal, although transitory in nature, is nevertheless measurable and quantifiable enough to serve as an information carrier.

2.4 The Nature and Desirability of Signal Claims

A signal claim is exactly what it sounds like: a patent claim to a “transient manufactured phenomenon, such as an electrical, optical or acoustical signal.” In short, it is a patent claim to one of the phenomena described above. Such a claim would probably read something like, “A signal for <a purpose> comprising: <at least one technical feature>,” where the “technical feature” is distinguishable from the prior art.

Consider the following example from a European case.

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16 Stephen G. Kunin and Bradley D. Lytle, “Patent Eligibility of Signal Claims” (2007) 89 J. Pat. & Trademark Off. Soc’y 887, at 887. Kunin and Lytle use the term “optical” where electromagnetic would probably be more appropriate as optical radiation, better known as visible light, is considered to be only one part of the electromagnetic spectrum.

17 The format suggested is more or less the “standard” format for a patent claim, at least in Canada. It is susceptible to any number of variations and elaborations, depending on the facts of the individual case. For example, the transitional phrase “comprising,” although commonly used, is not required. Also, a claim need not state a “purpose.”
“A colour television signal adapted to generate a picture with an aspect ratio of greater than 4 : 3, and in which the active-video portion of a line constitutes at least 85% and preferably 90% of the line period.”

In this case, one could parse the claim so that the “purpose” is: “adapted to generate a picture with an aspect ratio of greater than 4 : 3,” and the “technical feature” is: “in which the active-video portion of a line constitutes at least 85% and preferably 90% of the line period.”

As another example, this time with several “technical features,” consider the following claim that was the subject of the Nuijten decision in the United States.

“A signal with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.”

There are many reasons why a patent owner would like to have their patent cover a signal. Signal claims can potentially provide excellent protection for any invention that works by sending signals from place to place. The protection is clearly broader than that provided by only having claims to methods of generating signals and apparatus for transmitting or receiving.

One of the main benefits of having a patented signal, at least for the patentee, is the relative ease of enforcement. As compared to the usual method or apparatus claims it can often be much easier to detect infringement of a signal claim since signals are frequently transmitted through publicly accessible media, such as the internet, wired or wireless, and the telephone system, land line or mobile. Simply put, it is much easier to monitor internet traffic than to monitor what potentially millions of home users might be doing with a patented transmitter, receiver or bit of software.

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19 In re Nuijten, (2007), 500 F.3d 1346 (Fed. Cir. 2007). This is the text of rejected claim 14.
On that same note, a signal claim would be enormously more appealing to a patentee than a regular method or apparatus claim since it has the potential to drastically reduce the number of infringers against whom the patentee must assert their rights in the marketplace. There are many millions (potentially billions) of private consumers and commercial end users, but there is a relatively small number of Internet Service Providers. If the patentee can enforce the patent against the ISPs, rather than having to pursue legal remedies against individuals or businesses, the patentee will have the potential to be able to shut down the gateways through which infringement takes place. This is always a desirable position from the point of view of the patentee.

As yet another enforcement benefit, it would become far easier to enforce a patent against an internationally based infringer, even without resorting to enforcement against gateways. Currently, many patents that use signals claim the entire “system” for generating, transmitting, receiving and decoding signals. Imagine placing one end of the system in a different country. Patents are only enforceable within national borders. In spite of several doctrines that attempt to extend the reach of a patent, enforcement usually becomes much more difficult by adding the complicating factor of an international border. A valid signal claim would mean that enforcement is possible against anyone who has even one component of the system operating within a jurisdiction where there is a patent.

Another potential benefit to signal claims, and one that benefits more than just the patentee, is that they reduce the number of claims that must be included in a patent without reducing the scope of protection. A patentee with signal claims need not necessarily have claims to transmitters, receivers, methods or entire transmission and reception systems in the patent since a transmitter or receiver that transmits or receives the infringing signal is necessarily infringing as well. This simplifies the process of acquisition of a patent and reduces the costs of patent prosecution.

Finally, “signal claims are often the most applicable to standards bodies and patent pools because it is the structure of the signal that is defined by many of the industry communication standards.”

2.5 The Nature of an Invention

This paper addresses the question of whether the patentability of signals is compatible with Canadian law. It is fundamentally a paper about whether an electromagnetic, electric or acoustic signal might be considered statutory subject matter. As will become apparent, there are many ways in which one might define the proper subject matter for a patent. The definition, on its face, is quite different in Europe than in Canada and the United States. However, it is really only a reflection of two different approaches to the same thing. In Canada and the United States the respective legislation defines an invention as anything that falls within one of a number of categories. In Europe, the approach is different and inventions must have a “technical character.” At a fundamental level, however, the question that is being asked when defining the term invention is whether the item at issue is the kind of thing that should be afforded patent protection. While attempting to distinguish patent from copyright, Abraham Drassinower summed up the nature of patentable subject matter.

“An inventor offers the public an instrument previously unavailable. This invention is no mere scientific discovery that increases or deepens the public’s knowledge for its own sake. As a matter of patent law, the invention must satisfy both a novelty and a utility requirement—that which is not useful is not an invention. Patentable subject matter is by definition radically instrumental. An invention is a tool—a product specifically designed to perform a function. It is not knowledge but applied knowledge, not science but the embodied application of scientific knowledge to practical purposes. An inventor,

24 In the United States these include any “process, machine, manufacture or composition of matter.” See 35 USC 101. In Canada the category of “art” is also added. See Patent Act, R.S.C. 1985, c. P-4, s.2; R.S., 1985, c. P-4, s. 2; R.S., 1985, c. 33 (3rd Supp.), s. 1; 1992, c. 1, s. 145(F); 1993, c. 2, s. 2, c. 15, s. 26, c. 44, s. 189; 1994, c. 47, s. 141; 1995, c. 1, s. 62.
then, offers the public novel ways of dealing with practical problems."25 [Emphasis in original]

The Supreme Court of Canada has said something similar,

"A disembodied idea is not per se patentable. But it will be patentable if it has a method of practical application."26

Fundamentally, this is the issue that the paper addresses. Though the details in Canada, the US and Europe are different, the question, at bottom, is whether a signal is the kind of thing that deserves patent protection? The remainder of this paper will show that, at least in some circumstances, they can be.

26 Shell Oil Co. v. Canada (Commissioner of Patents), [1982] 2 S.C.R. 536 at p. 554
3.0 Signal Claims in Canada

Signal claims have essentially no jurisprudential history in Canada. Despite this, CIPO has formed the opinion that signals ought not to be patentable. This position is not founded in law.

3.1 The Opinion of the Canadian Intellectual Property Office (CIPO)

The Canadian Intellectual Property Office (CIPO) has a strong opinion on the question of the patentability of signals in Canada. According to CIPO, the issue seems, at first glance, to have been decided. On August 14, 2007 CIPO released a practice notice entitled, “Office Practice Regarding Signals.” The notice expressed CIPO’s opinion that electromagnetic and acoustic signals are not patentable subject matter.

“By this notice the Patent Office is formally expressing its position that electromagnetic and acoustic signals are forms of energy and do not contain matter even though the signal may be transmitted through a physical medium. As a result, claims to electromagnetic and acoustic signals do not constitute statutory subject matter within the meaning of the definition of invention in section 2 of the Patent Act.

“More particularly, an electromagnetic or acoustic signal is interpreted to be neither an ‘art’ nor a ‘process’ because it is not an act or series of acts or method of operation by which a result or effect is produced by physical or chemical action. Neither is an electromagnetic or acoustic signal a ‘machine’, as it is not the mechanical embodiment of any function or mode of operation designed to accomplish a particular effect, or a ‘composition of matter’, as it is not a chemical compound, composition or substance. An electromagnetic or acoustic signal is taken not to be itself a material product and, therefore, not a ‘manufacture’.

“The position taken in this notice pertains to electromagnetic and acoustic signals per se and does not apply to methods, processes, machines or manufactures involved in the generation, transmission, reception, or processing of signals.
“The practice expressed in this notice is effective immediately, and supersedes any previously communicated practices related to the patentability of signals.”

In addition, CIPO has included some expressions of disbelief concerning the patentability of signals in their *Manual of Patent Office Practice* (MOPOP). The MOPOP classifies signals as “forms of energy,” along with regions of the electromagnetic spectrum and explosions. Further, MOPOP asserts that claiming a signal on a carrier does not introduce a “statutory contribution.”

“Forms of energy, such as electromagnetic and acoustic signals, regions of the electromagnetic spectrum, electric currents, and explosions are considered not to be manufactured from or composed of matter in the sense intended by the *Patent Act*. A form of energy is consequently considered not to fall within any of the categories of subject-matter...”

... 

“As noted in 12.05.04, an acoustic, electric or electromagnetic signal is not statutory subject-matter. Claiming a signal in association with a carrier such as an electric wire or a fibre-optic cable does not introduce a statutory contribution where the carrier is simply being used for its known purpose of transmission.”

On the other hand, one cannot help but notice that CIPO is not being entirely consistent with respect to the patentability of signals. In Chapter 16 of MOPOP, dealing with “Computer Implemented Inventions,” signals are listed as one possible type of “manufacture claim.”

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“Three categories of claims are possible for computer implemented inventions in accordance with section 2 of the Patent Act:

“1. Art or process (method) claims;

“2. Machine (apparatus and system) claims; and

“3. Manufacture (products or computer media, including signals, embodying code or data structures) claims.”\textsuperscript{31} [Emphasis added]

The manual even proceeds to give an example of an acceptable claim to a signal, which seems to directly contradict the earlier assertion that adding a carrier does not introduce any “statutory contribution.”

“The computer medium may exist in a transitory state of a propagated signal. The carrier of the computer program is a transmissible carrier in the following acceptable example.

“Claim 6. A carrier wave embodying a computer data signal representing sequences of statements and instructions which, when executed by a processor cause the processor to enroll signature information of an authorized user onto an identification card, the statements and instructions comprising the steps of:

“a) collecting samples of a signal at a rate of at least \( n \) times a frequency component of said signal which is to be preserved, where \( n \) is an integer greater than four;

“b) digitally filtering said samples representing said signal to remove high frequencies; and

“c) storing the remaining of the filtered samples on said card.”\textsuperscript{32}


In fairness, however, before condemning CIPO for being inconsistent one should bear in mind that chapter 12, on subject matter, was most recently revised in 2009 while chapter 16, on computer implemented inventions, was last revised in 2005. CIPO has recently released a draft of a newly revised and updated version of chapter 16 for public comment. Perhaps the updated chapter will be more consistent? Sure enough, the draft of the new chapter 16 is consistent with both the practice notice and with the more recently revised chapter 12. In fact, it reads like a word for word blending of the practice notice and the current chapter 12 of MOPOP.

“The Office regards electromagnetic and acoustic signals and waveforms to be forms of energy and not to contain matter despite that the signal may be transmitted through a physical medium. As a result, claims to electromagnetic and acoustic signals do not constitute statutory subject-matter within the definition of invention in section 2 of the Patent Act.

“More particularly, an electromagnetic or acoustic signal is interpreted to be neither an art nor a process because it is not an act or series of acts or method of operation by which a result or effect is produced by physical or chemical action. Neither is an electromagnetic or acoustic signal a machine, as it is not the mechanical embodiment of any function or mode of operation designed to accomplish a particular effect, or a composition of matter, as it is not a chemical compound, composition or substance. An electromagnetic or acoustic signal is considered not to be a material product and, therefore, not a manufacture.

“The Office considers signals to be transitory in nature, and to exist only while being propagated. Once the information contained in a signal has been stored on a physical medium, it is no longer considered to be a signal and is more appropriately referred to as data. Therefore, claims that define a physical medium storing a signal or a waveform are considered indefinite under section 27(4) of the Patent Act.”

Although signals *per se* are not patentable, methods, processes, machines or manufactures involved in the generation, transmission, reception, or processing of signals may be patentable if all other criteria for patentability are satisfied.”

What conclusions can be drawn from CIPO’s opinions regarding the patentability of signals? CIPO appears to have three objections to the patentability of signals in Canada. First, CIPO considers that signals are forms of energy and do not contain matter, i.e. signals do not have mass. CIPO concludes that this necessarily means that they are not patentable. Second, CIPO considers that signals do not fall within any of the statutory categories of art, process, machine, manufacture or composition of matter. Third, CIPO considers that signals are transitory in nature and therefore do not define patentable subject matter.

This section must be closed by noting that CIPO’s policy guidelines and Manual of Patent Office Practice do not constitute law in Canada. Sources of law include the *Patent Act*, the *Patent Rules* and judicial interpretations and applications of the legislation and regulations to individual cases. Indeed, when one looks below the surface, one cannot help but notice the rather shaky foundations upon which CIPO’s position rests. For example, given that no Canadian court has yet pronounced upon the matter of the patentability of signals and that the *Patent Act* makes no specific mention of signals in any form, it is hard to see where CIPO can find support for its position. The next section will discuss the law as it relates to the patentability of signals in Canada and why CIPO’s position is unfounded.

### 3.2 The Law on Patentability of Signals in Canada

Any discussion of patentable subject matter in Canada must begin with the *Patent Act*. More specifically, the discussion must begin with the authority to grant a patent and the definition of the term “invention.”

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Subsection 27(1) provides that the Commissioner shall grant a patent for an invention when all the requirements of the Act are met.

“The Commissioner shall grant a patent for an invention to the inventor or the inventor's legal representative if an application for the patent in Canada is filed in accordance with this Act and all other requirements for the issuance of a patent under this Act are met.”

There are two things to note regarding this passage that are relevant to this discussion. First, the Commissioner is not given any discretion regarding the grant of a patent. When all the requirements are met, “the Commissioner shall grant a patent.”

Second, patents will be granted for “inventions.” This, of course, leads to the question, “what is an invention?” The Patent Act defines the term “invention” in section 2.

“any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter”

As this paper is concerned only with the question of proper subject matter, rather than the additional issues of novelty, inventiveness and utility, the focus must rest on the list of five categories of inventions. The Supreme Court has said that, to be considered patentable subject matter, an invention must fall within one of the categories of art, process, machine, manufacture or composition of matter.

“In drafting the Patent Act, Parliament chose to adopt an exhaustive definition that limits invention to any "art, process, machine, manufacture or composition of matter". Parliament did not define "invention" as "anything new and useful made by man". By

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35 Patent Act, R.S.C. 1985, c. P-4, s.27(1); R.S., 1985, c. P-4, s. 27; R.S., 1985, c. 33 (3rd Supp.), s. 8; 1993, c. 15, s. 31, c. 44, s. 192.

36 Emphasis added. Other requirements include the usually novelty, inventiveness and utility requirements as well as more formal requirements such as the form the application must take, parts that must be included, deadlines that must be met and fees that must be paid.

37 Patent Act, R.S.C. 1985, c. P-4, s.2; R.S., 1985, c. P-4, s. 2; R.S., 1985, c. 33 (3rd Supp.), s. 1; 1992, c. 1, s. 145(F); 1993, c. 2, s. 2, c. 15, s. 26, c. 44, s. 189; 1994, c. 47, s. 141; 1995, c. 1, s. 62.
choosing to define invention in this way, Parliament signalled a clear intention to include certain subject matter as patentable and to exclude other subject matter as being outside the confines of the Act.”

So, in order to get a patent in Canada, one must have an invention that falls within at least one of the categories of art, process, machine, manufacture or composition of matter. Where would signals fit? It seems clear enough that a signal is neither an art, nor a process nor a machine, although generating a signal could be a process while the transmission and reception equipment is likely a machine. Given the Supreme Court’s acceptance of the definition of “composition” as a “substance or preparation formed by combination or mixture of various ingredients,” it seems unlikely that a signal would be considered a composition of matter. Consider, however, the category of “manufacture.” A signal, being an artificial carrier of information, might reasonably be expected to qualify as a manufacture.

3.2.1 The Definition of “Manufacture”

It has been suggested that signals might be patentable as a manufacture. To understand how this argument works, one must begin with the definition of “manufacture.” There are at least two relevant cases on this point in Canada. The first of these is Harvard.

In Harvard, the Supreme Court of Canada grappled with the notion that a genetically modified mouse, known as an oncomouse due its higher susceptibility to cancer, might be patentable as

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39 Additionally, the invention must not fall within any of the classes of prohibited subject matter. These include such things as purely aesthetic creations, scientific theories, games and professional skill and judgment, among others. Signals do not fall into any of these specifically prohibited groups.
either a “composition of matter” or as a “manufacture.” In the end, the court decided that the mouse is not, in fact, patentable subject matter, saying that higher life forms do not fall within either of these categories. However, in so doing they articulate a definition of “manufacture” that will be very helpful in understanding how signals might be patentable in Canada.

The majority in Harvard Mouse reviewed several definitions of “manufacture,” including that adopted by the United States Supreme Court in the case of Chakrabarty.

“With respect to the meaning of the word “manufacture” (fabrication), although it may be attributed a very broad meaning, I am of the opinion that the word would commonly be understood to denote a non-living mechanistic product or process. For example, the Oxford English Dictionary (2nd ed. 1989), vol. IX, at p. 341, defines the noun “manufacture” as the following:

“The action or process of making by hand . . . . The action or process of making articles or material (in modern use, on a large scale) by the application of physical labour or mechanical power.

“The Grand Robert de la langue française (2nd ed. 2001), vol. 3, at p. 517, defines thus the word “fabrication”:

”[TRANSLATION] Art or action or manufacturing. . . . The manufacture of a technical object (by someone). Manufacturing by artisans, by hand, by machine, industrially, by mass production . . .

“In Chakrabarty ... “manufacture” was defined as

“the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery.

43 This paper will not consider the issue of a signal being a “composition of matter” beyond what has already been said.

“the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery.”
“These definitions use the terminology of ‘article’, ‘material’, and ‘objet technique’. Is a mouse an ‘article’, ‘material’, or an ‘objet technique’? In my view, while a mouse may be analogized to a “manufacture” when it is produced in an industrial setting, the word in its vernacular sense does not include a higher life form. The definition in Hornblower v. Boulton (1799), 8 T.R. 95, 101 E.R. 1285 (K.B.), cited by the respondent, is equally problematic when applied to higher life forms. In that case, the English courts defined ‘manufacture’ as ‘something made by the hands of man’ (p. 1288). In my opinion, a complex life form such as a mouse or a chimpanzee cannot easily be characterized as ‘something made by the hands of man’.”

The closest the court gets to articulating a precise definition of manufacture is still rather vague; “a non-living mechanistic product or process.” Is it possible to get something more from the reasoning in this regard? It has been suggested that it is, indeed, possible to extract some additional information from the court’s decision; specifically, “a non-living product or process that has new forms, qualities, properties or combinations thereof and is man-made.”

Pause for a moment and consider whether a signal falls within this definition. Is a signal “a non-living product or process that has new forms, qualities, properties or combinations thereof and is man-made?”

A signal is clearly non-living, and the very definition of the term “signal,” and its function as an information carrier, requires that it be man-made. It is true to say that there are natural variations in electromagnetic waves, electric currents and acoustic waves. However, natural variations are not created for the purpose of transmitting information. Signals, simply by the fact that their purpose is the transmission of information, must necessarily be artificial, that is, “man-made.” A signal is not a process, but it can be a product, in the sense of being a thing resulting from a process. Signals are also mechanistic, in the sense of sharing characteristics of machines such as controllability and reproducibility.

There was also a vigorous dissent in *Harvard*, with four of the nine justices taking part (Binnie J., McLachlin C.J.C., Major J. and Arbour J.). Binnie J., writing for the dissent, had a much more expansive view of the definition of manufacture.

“The definitional approach adopted by my colleague, Bastarache J., leads him to define ‘manufacture’ in the context of the present s. 2 of the Act as ‘a non-living mechanistic product or process’ (para. 159). However, the tradition of patent jurisprudence has been expansive, not restrictive. By 1851 the learned text *Godson on Patents* (2nd ed.) noted that the word ‘manufactures’ had received from the English courts ‘very extended signification. It has not, as yet, been accurately defined; for the objects which may possibly come within the spirit and meaning of that act, are *almost infinite*’ (p. 35 (emphasis added)).

“Of course the word ‘manufacture’ in our statute appears in conjunction with the words ‘art, ... machine ... or composition of matter’ and must be read in context. Nevertheless, it is, I think, worth pointing out the contrast between the expansionist view that has characterized patent jurisprudence to date and the limiting view of the words ‘manufacture’ and ‘composition of matter’ now proposed by my colleague.

“We should not encourage the Commissioner to try to circle each of the five definitional words with tight language that creates arbitrary gaps between, for example, ‘manufacture’ and ‘composition of matter’ through which useful inventions can fall out of the realm of patentability. To do so would conflict with this Court’s earlier expression of a ‘judicial anxiety to support a really useful invention’... The definition of invention should be read as a whole and expansively with a view to giving protection to what is novel and useful and unobvious.”

The second relevant case on subject matter is the *Schmeiser* case. In this case, Percy Schmeiser, a Saskatchewan farmer was found to have infringed Monsanto’s patent for

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49 Canadian Patent No. 1,313,830.
Roundup Ready Canola. The case was primarily about the meaning of “use” under the Patent Act. Schmeiser had gathered seeds from the genetically modified crops that had blown onto his land and cultivated them the following year. The patent, claiming certain genes and cells containing those genes, was found to be valid and infringed. This case appears to stand for the proposition that patent protection for the genes and cells that make up a plant effectively extends protection to the entire plant, even though the entire plant is a “higher life form” and should therefore by unpatentable according to Harvard.50

The reason Schmeiser is important in the context of a discussion on subject matter is for comments regarding the transitory nature of some patentable subject matter.

“... all members of the Court in Harvard Mouse noted in obiter that a fertilized, genetically altered oncomouse egg would be patentable subject matter, regardless of its ultimate anticipated development into a mouse.”51

Further, Binnie J., dissenting in Harvard, but in the majority in Schmeiser, said, regarding the notion that an egg might be patentable but the animal resulting from it could not be,

“... my colleague goes on to conclude that the resulting oncomouse, that grows from the patented egg, is not itself patentable because it is not an invention. Subject matter patentability, on this view, is lost between two successive stages of a transgenic mouse's genetically pre-programmed growth. In my opinion, with respect, such a "disappearing subject-matter" exception finds no support in the statutory language."52

50 It is interesting to speculate about whether the court would have decided Harvard differently with the composition of the bench present in Schmeiser. Canada was an outlier, internationally, for rejecting the patentability of the mouse in Harvard. One way to read Schmeiser is as the Supreme Court’s way of correcting the result from Harvard. The Court split 5-4 in both decisions with many of the justices grouped the same way in both cases, except that the majority in Harvard became the dissent in Schmeiser. Of the 5 judges that took part in the majority opinion, only Lebel J. remains on the court today whereas McLachlin C.J.C. and Binnie J. remain from the dissent. Further, Rothstein, J., the author of the judgment in favour of the patentability of the oncomouse in the Federal Court of Appeal, has since joined the court.
In other words, there is no exception for disappearing subject matter in Canadian patent law.

3.3 Conclusions Regarding the Patentability of Signals in Canada

To review, CIPO considers that signals are not patentable because signals do not have mass, signals do not fall within any of the statutory categories of art, process, machine, manufacture or composition of matter and signals are transitory. The law, on the other hand, is much less emphatic on the issue. The author sees overcoming the first objection as a sort of prerequisite for the second. The third will be treated as independent of the first two. Although the first two objections are somewhat related to one another, take CIPO’s objections to patentability one at a time.

First is the issue of mass. CIPO’s practice notice states,

“An electromagnetic or acoustic signal is taken not to be itself a material product and, therefore, not a ‘manufacture’.”\(^{53}\)

Recall that the definition from Harvard is,

“... a non-living mechanistic product or process.”\(^{54}\)

There is no mention, anywhere in the decision, about whether a “manufacture” must be material, i.e. have mass. CIPO’s statements that signals are “considered forms of energy” and are therefore not patentable are not referenced to any source of law. One can only conclude that this is office policy rather than law, and that having mass is not a legal requirement for a “manufacture” to qualify for patentability in Canada.


Second is the objection that signals do not fall into any category of patentable subject matter. This objection is related to the first since CIPO suggests that the reason a signal does not fit into a category is due to the lack of mass. However, even if, as above, lacking mass is not a barrier to patentability, this does not automatically mean that a signal is therefore a “manufacture.” The requirements of the definition must still be satisfied.

Recall the definition of “manufacture” from Harvard, “a non-living mechanistic product or process.” A signal is clearly non-living, and the very definition of the term “signal” requires that it be man-made. It is true to say that there are natural variations in electromagnetic waves, electric currents and acoustic waves. However, natural variations are not created for the purpose of transmitting information. Signals, simply by the fact that their purpose is the transmission of information, must necessarily be artificial, that is, “man-made.” A signal is not a process, but can be a product, in the sense of being a thing resulting from a process. Signals are also mechanistic, in the sense of sharing characteristics of machines such as controllability and reproducibility. Using the definition of “manufacture” from Harvard the author would suggest that a signal does qualify as a manufacture.

The third objection is related to the transient nature of signals. However, when reviewing the discussion on transience stemming from the Harvard and Schmeiser cases above, it becomes clear that there is no such thing as a disappearing subject matter exception in Canada.

CIPO’s objections to the patentability of signals in Canada are therefore not founded in law. They may yet be found to be non-patentable subject matter, but the current state of the law does not foreclose the patentability of signals. Parliament could, of course, settle the issue any time by amending the Patent Act. However, until that occurs, or the matter ends up before a court, the question remains unresolved.

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4.0 Signal Claims Internationally

The world, of course, does not stop at the Canadian border. Canada, as a country with no judicial treatment of signal claims so far, can benefit from the experiences of some of our trading partners in this respect. The United States and the European Patent Office have arrived at opposing results regarding the patentability of signals. Signals are patentable in Europe but not in the US. There may be some lessons to be learned from the experience in each of these jurisdictions. In addition, Canada is a signatory to many international treaties involving patents including the Paris Convention, PCT, TRIPS and NAFTA. In addition, there are other treaties dealing with patents that are similar to these and whose interpretation could prove to be persuasive to any judicial body considering a treaty to which Canada is a party.

4.1 Signal Claims at the European Patent Office

Claims to signals are routinely allowed by the EPO. Just to cite one example, the original claims submitted by Nuijten were allowed with almost no changes. Claim 14 of the corresponding allowed European Patent Application reads,

“A signal \((z)\) with embedded supplemental data, the signal being encoded in accordance with a predictive encoding process and selected samples of the signal representing said supplemental data, characterized in that at least one of the samples preceding said selected samples is different from the sample corresponding to said given encoding process to reduce a disturbance of the encoded signal caused by the embedded supplemental data.” [Emphasis added, italics denote text added or changed from the original application]

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57 This refers to a well-known US case on signals. See Below.
The approach taken in Europe towards the patentability of signals can be summed up by saying that signals are patentable in principle, but the details of the “technical contribution” in each individual case matter.

4.1.1 Signals at the EPO

The EPC does not explicitly define the term “invention.” However, there is a non-exhaustive list of subject matter that is explicitly excluded from the definition of an invention. The items on this list are excluded from patentability only insofar as a patent application relates to them as such.

Articles 52 and 53 deal with the topic of patentable subject matter.

Article 52 reads:

“(1) European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application.

“(2) The following in particular shall not be regarded as inventions within the meaning of paragraph 1:

“(a) discoveries, scientific theories and mathematical methods;

“(b) aesthetic creations;

“(c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;

“(d) presentations of information.

“(3) Paragraph 2 shall exclude the patentability of the subject-matter or activities referred to therein only to the extent to which a European patent
application or European patent relates to such subject-matter or activities as such.”

Article 53 reads:

“European patents shall not be granted in respect of:

“(a) inventions the commercial exploitation of which would be contrary to "ordre public" or morality; such exploitation shall not be deemed to be so contrary merely because it is prohibited by law or regulation in some or all of the Contracting States;

“(b) plant or animal varieties or essentially biological processes for the production of plants or animals; this provision shall not apply to microbiological processes or the products thereof;

“(c) methods for treatment of the human or animal body by surgery or therapy and diagnostic methods practised on the human or animal body; this provision shall not apply to products, in particular substances or compositions, for use in any of these methods.”

The term invention has, however, been interpreted to include only subject matter having a “technical character.” The list of exclusions has been interpreted in this light.

The Enlarged Board of Appeal has recently made some comments on the meaning of the term “technical.” Unfortunately they are not of much assistance in coming to a usable definition of

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the term. The Board seems to be content to take an approach consisting of “we’ll know it when we see it.”

“We do not attempt to define the term ‘technical’. ... the Enlarged Board only makes the assertions that ‘a computer-readable data storage medium’ and a cup have technical character and that designing a bicycle involves technical considerations ... It is to be hoped that readers will accept these assertions without requiring a definition of exactly what falls within the boundaries of ‘technical’.”

In a decision of the Board of Appeal that was considering Article 52 exclusions, the issue of what constitutes a “technical effect,” and therefore what serves to distinguish an excluded item as such from a patentable item of that type, arose in the context of computer programs. The Board found that non-patentable computer programs, i.e. computer programs as such, are distinguishable from patentable computer programs based on the latter having a “technical effect.” The Board even went so far as to say that an invention may still be patentable when the underlying idea of the invention resides in the computer program.

“... a claim directed to the use of a computer program for the solution of a technical problem cannot be regarded as seeking protection for the program as such within the meaning of Article 52(2)(c) and (3) EPC, even if the basic idea underlying the invention may be considered to reside in the computer program itself...

“The case law thus allows an invention to be patentable when the basic idea underlying the invention resides in the computer program itself.”

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The Board later went on to say that the program with a “technical effect” is still patentable subject matter even when the “technical effect” is known in the prior art. The “technical effect” must go beyond the simple fact that a computer is a technical object or that the program causes changes in the computer, such as causing electric currents to flow.

Signals seem readily enough to pass this “know it when you see it” test for technical character. Further, since at least 1989 the EPO has been allowing claims to signals, which is also taken to be evidence of their “technical character.” There have been other potentially relevant cases with respect to signals since.

Of some importance for the issue of signals, article 52 of the EPC has been the subject of judicial scrutiny, not only on the topic of the meaning of various terms, but specifically on the issue of whether signals constitute patentable subject matter. In BBC67 the Board of Appeal at the European Patent Office addressed the issue of whether signals constituted patentable subject matter under EPC article 52.68 BBC involved a set of claims for signals per se made by the BBC

68 It should be noted that this case was decided under an earlier version of the EPC (EPC 1973). At the time, articles 52 and 53 were slightly different. Changes from the version in effect at the time and the current version include a slight addition to, and rearrangement of, article 52(1) and moving the medical treatment exception from its former position in article 52(4) to its current position in article 53(c). Article 52, as it then was, available online at the European Patent Office, http://www.epo.org/patents/law/legal-texts/html/epc/1973/e/ar52.html, formerly read:

“(1) European patents shall be granted for any inventions which are susceptible of industrial application, which are new and which involve an inventive step.
“(2) The following in particular shall not be regarded as inventions within the meaning of paragraph 1:
(a) discoveries, scientific theories and mathematical methods;
(b) aesthetic creations;
(c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;
(d) presentations of information.
“(3) The provisions of paragraph 2 shall exclude patentability of the subject-matter or activities referred to in that provision only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.
“(4) Methods for treatment of the human or animal body by surgery or therapy and diagnostic methods practised on the human or animal body shall not be regarded as inventions which are
directed to a signal for transmitting a colour television image of a wider aspect ratio than the traditional 4:3 while maintaining compatibility with the existing transmission equipment. The main advantage alleged for the invention was that TV stations could broadcast in larger aspect ratios without having to replace their existing, and expensive, transmission equipment. The examiner had initially rejected the claims on the grounds of lack of inventive step. When the case arrived at the Board of Appeal the Board added, of its own motion, an objection to the claims under article 52 of the EPC saying that a claim to a signal per se was not patentable subject matter. However, in the reasons for the decision, which eventually went in favour of the appellant, the Board changed its initial position on the patentability of signals and withdrew the objection. In the reasons for their decision, the Board first mentioned and then dismissed several arguments against the patentability of signals based on the article 52 prohibitions.

The first argument was the possibility that a TV signal might be considered a mere “presentation of information,” which is excluded under article 52(2)(d). In changing their initial position, the board distinguished between claims for two types of information when discussing its presentation. The distinction, between the first type, presentation of information per se, and the second type information which “inherently” comprises “technical features,” appears, at least to the author, to be founded on Article 52(3). Article 52(3) restricts the preceding paragraph to excluding only those enumerated items as such. In the end, the board found that

susceptible of industrial application within the meaning of paragraph 1. This provision shall not apply to products, in particular substances or compositions, for use in any of these methods.”


“European patents shall not be granted in respect of:

“(a) inventions the publication or exploitation of which would be contrary to "ordre public" or morality, provided that the exploitation shall not be deemed to be so contrary merely because it is prohibited by law or regulation in some or all of the Contracting States;

“(b) plant or animal varieties or essentially biological processes for the production of plants or animals; this provision does not apply to microbiological processes or the products thereof.”


“1. A colour television signal adapted to generate a picture with an aspect ratio of greater than 4:3, and in which the active-video portion of a line constitutes at least 85% and preferably 90% of the line period.”

70 The Board of Appeal has enunciated this position more clearly in other decisions, for example, with respect to the prohibition on the patentability of computer programs as such; see European Patent Office Board of Appeal Decision No. T-935/97, 4 February 1999, at part 4.1, available online at the European
the TV signal, as claimed, was of the second type, which is to say that it was a, “signal defined in terms which inherently comprise the technical features of the T.V. system in which it occurs.”

“However, the T.V. signal as claimed seems to be more than a mere presentation of information "as such". In fact, the T.V. signal as claimed inherently comprises the technical features of the T.V. system in which it is being used and if it is considered to present information then it represents exactly that kind of information which exhibits the technical features of the system in which it occurs.

“The Board considers it to be appropriate to distinguish between two kinds of information, when discussing its presentation.

“According to this distinction, a T.V. system solely characterised by the information per se, e.g. moving pictures, modulated upon a standard T.V. signal, may fall under the exclusion of Article 52(2)(d) and (3) EPC but not a T.V. signal defined in terms which inherently comprise the technical features of the T.V. system in which it occurs.”

How is this useful in the context of signals? It may provide some substance to the Board’s earlier pronouncement that a signal that inherently comprises the “technical features” of a T.V. system is patentable subject matter. A signal that produces a “technical effect” might, by the same chain of reasoning, be considered to be patentable subject matter.

Another argument addressed by the board was the abstract character argument. This argument begins by noticing that, due to the use of the words “in particular,” the list of exclusions in article 52(2) is not exhaustive. This implies that there could be other things that are also excluded; other things that are similar in character to those explicitly mentioned. Can article 52(2) be generalized to exclude from patentability anything which is, “essentially abstract in

character, which is non-physical and therefore is not characterised by technical features?” The board felt that it did not have to decide this issue since the signal, as claimed, would not fall under this generalized interpretation of article 52(2). In the board’s own words:

“The T.V. signal as claimed would also not fall under this more general interpretation of the exclusions of Article 52(2) and (3) EPC, because it is a physical reality which can directly be detected by technological means and, therefore, cannot be considered as an abstract entity, despite its transient character.”

Of note here is that the board of appeal is of the view that a signal is, in fact, a “physical reality,” rather than an “abstract entity,” because it can be detected by technological means. Also important is the notion that its “transient character” is not automatically fatal to patentability.

This case should be borne in mind during the remainder of this section. In BBC, the claim was allowed because the signal was “defined in terms which inherently comprise the technical features of the T.V. system in which it occurs” rather than a non-patentable presentation of information as such. The reasoning from this case was extended in Philips when carrier signals were analogized to other data carriers.

“The present board regards a record carrier having data recorded thereon as being in this respect analogous to a modulated TV signal and considers it appropriate to distinguish in a corresponding way between data which encodes cognitive content, eg a picture, in a standard manner and functional data defined in terms which inherently comprise the technical features of the system (reader plus record carrier) in which the record carrier is operative. The significance of the distinction between functional data and cognitive information content in relation to technical effect and character may be illustrated by the fact that in the present context complete loss of the cognitive content

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resulting in a humanly meaningless picture like "snow" on a television screen has no effect on the technical working of the system, while loss of functional data will impair the technical operation and in the limit bring the system to a complete halt.”

In the Board of Appeal decision in Vicom, a case dealing with digital image processing, the Board grappled with the question of when a mathematical method may nevertheless have a technical character. The Board found that,

“A basic difference between a mathematical method and a technical process can be seen, however, in the fact that a mathematical method or a mathematical algorithm is carried out on numbers (whatever these numbers may represent) and provides a result also in numerical form, the mathematical method or algorithm being only an abstract concept prescribing how to operate on the numbers. No direct technical result is produced by the method as such. In contrast thereto, if a mathematical method is used in a technical process, that process is carried out on a physical entity (which may be a material object but equally an image stored as an electric signal) by some technical means implementing the method and provides as its result a certain change in that entity.” [Emphasis added]

There are two observations that are worth making here. First, even where a mathematical method, i.e. the universally excluded “scientific principle or abstract theorem” of Canadian patent law, forms the core of the invention, it may nevertheless qualify as patentable subject matter when it produces a “technical result” or is used to carry out a “technical process” on a


80 “The Board, therefore, is of the opinion that even if the idea underlying an invention may be considered to reside in a mathematical method a claim directed to a technical process in which the method is used does not seek protection for the mathematical method as such.” See European Patent Office Board of
“physical entity.” The second important observation is that the Board recognized that a signal (in this case an electrical signal) is just such a physical entity.

Another important case is Lucent. In this case, the applicant was claiming an electronic message of a particular structure. The Board found the electronic message to be patentable since it was defined in terms of structure and function rather than content and confirmed, again, that a signal is sufficiently physical to act as an information carrier in the same way as any other computer readable medium.

4.1.2 Conclusions Regarding Signals at the EPO

Signals are patentable in Europe, at least in principle. In practice, the details of each case appear to have a significant effect on the outcome. When there is a question regarding patentability of signals, it generally revolves around whether the signal is a computer program or a presentation of information, “as such,” or whether the signal is has a technical effect independent of the content of the information it is carrying. While the term “technical” has no clear definition, it seems obvious that artificially generated signals qualify as “technical.”

Signals, especially the electromagnetic, electric or acoustic signals that are frequently the subject of patents, are more than a form of energy. They are considered to be “physical entities” and are equally as capable of acting as a computer readable medium as an optical disc or computer hard drive.


The claim at issue was,

"An electronic message comprising:
a plurality of messaging elements, at least one of the messaging elements being associated with at least a portion of the content of the message and at least one of the messaging elements comprising instructions that define a structure of the message; and an address of a recipient of the message on a messaging system that stores the message and is capable of interpreting the instructions, assembling the content-related messaging elements in accordance with the instructions, and presenting the assembled message to the recipient when the recipient retrieves the message from storage."
4.2 Signal Claims in the United States

There are many similarities between the United States patent laws and those in Canada. The two countries, at least in this respect, have been characterized as “like-minded jurisdictions” by the courts.⁸³ Given the much greater number of cases from which to draw, it is relatively common to find US cases cited by Canadian courts, especially, as would be the case for signals, when there is no Canadian jurisprudence on point. Therefore, examination of the law with respect to signals in the United States would be prudent.

4.2.1 US Legislation and Case Law

The equivalent of the Canadian Patent Act in the United States is Title 35 of the United States Code. The language is remarkably similar to the definition of “invention” found in the Patent Act in Canada. Section 101 states,

“Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.”⁸⁴

Signals, again, appear to fit best in the category of “manufacture.” As mentioned by the Canadian court in Harvard, the United States Supreme Court adopted a definition of “manufacture” in the Chakrabarty⁸⁵ case.

“the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand labor or by machinery.”⁸⁶

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The Court further goes on to characterize congress as having intended statutory subject matter to include “anything under the sun that is made by man,”\(^{87}\) thus emphasizing that the list of “process, machine, manufacture or composition of matter” was to be read expansively.

Following Chakrabarty, there were a series of cases that hinted at the patentability of signals without addressing the issue head on. In Diamond v. Diehr,\(^{88}\) the Supreme Court held that a process is not automatically unpatentable because it contains a mathematical algorithm. In re Allapat\(^{89}\) was a case where the Federal Circuit held that computer software was patentable as long as it produced a “concrete, useful and tangible result.” The case of In re Beauregard\(^{90}\) eventually resulted in the issuance of a patent containing claims to computer programs embodied in a tangible medium.\(^{91}\) Finally, the Board of Patent Appeals and Interferences, in the case of Ex parte Rice,\(^{92}\) held that electromagnetic signals, despite their “transitory and ephemeral nature,” were, nevertheless, patentable subject matter.

Eventually, however, unlike Canada, the question of signals came to a court directly. In the Nuijten\(^{93}\) case, the claim at issue read,

“A signal with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.”\(^{94}\)

The Court of Appeals for the Federal Circuit (CAFC), after reviewing each of the statutory categories, held that signals did not qualify as patentable subject matter; more specifically, that

\(^{89}\) In re Allapat, (1994) 33 F.3d 1526 (Fed. Cir. En Banc).
\(^{90}\) In re Beauregard, (1995), 53 F.3d 1583 (Fed. Cir.).
\(^{91}\) See US Patent No. 5,710,578.
\(^{92}\) Ex parte Rice, Appeal No. 2002-1554, Application 08/003,996).
\(^{93}\) In re Nuijten, (2007), 500 F.3d 1346 (Fed. Cir. 2007).
\(^{94}\) In re Nuijten, (2007), 500 F.3d 1346 (Fed. Cir. 2007). This is the text of rejected claim 14.
signals do not qualify as any one of a process, machine, manufacture or composition of matter. Again, it seems relatively obvious that a signal should not be considered a process, a machine or a composition of matter. However, the possibility of a signal being a manufacture is of some interest, since a Canadian court may one day face this same question. The CAFC held that,

“These definitions [mentioned earlier] address “articles” of “manufacture” as being tangible articles or commodities. A transient electric or electromagnetic transmission does not fit within that definition. While such a transmission is man-made and physical—it exists in the real world and has tangible causes and effects—it is a change in electric potential that, to be perceived, must be measured at a certain point in space and time by equipment capable of detecting and interpreting the signal. In essence, energy embodying the claimed signal is fleeting and is devoid of any semblance of permanence during transmission. Moreover, any tangibility arguably attributed to a signal is embodied in the principle that it is perceptible—e.g., changes in electrical potential can be measured. All signals within the scope of the claim do not themselves comprise some tangible article or commodity. This is particularly true when the signal is encoded on an electromagnetic carrier and transmitted through a vacuum—a medium that, by definition, is devoid of matter. Thus, we hold that Nuijten’s signals, standing alone, are not “manufacture[s]” under the meaning of that term in § 101.”

The court appears to think that since signals are not “articles,” in the sense of being tangible and non-transitory, then signals cannot be patentable subject matter.

Notably, there was a rather vigorous dissent in Nuijten. Circuit Judge Linn would have held signals to be patentable as a “manufacture,” saying that the majority’s interpretation of section 101 was inconsistent with the Supreme Court in Chakrabarty.

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95 See In re Nuijten, (2007), 500 F.3d 1346 (Fed. Cir. 2007). A process was considered to be “a series of acts.” A machine was “a concrete thing” with parts. A composition of matter was considered to be a “chemical union,” “gas, fluid, powder or solid.”
96 In re Nuijten, (2007), 500 F.3d 1346 (Fed. Cir. 2007).
97 Circuit Judge Linn also dissented from the court’s decision not to grant a re-hearing en banc. See In re. Nuijten, (2008), 515 F.3d 1361, 85 U.S.P.Q. 2d (BNA) 1927. The request for a hearing at the Supreme Court has also been denied. See Nuijten v. Dudas (2008), 129 S.Ct. 70.
“... I believe the majority does not follow the guidance that the Supreme Court provided in Chakrabarty as to how we should interpret § 101. As the Court observed, ‘Congress plainly contemplated that the patent laws would be given wide scope.’ Accordingly, Chakrabarty embraces the notion that the scope of patentable subject matter includes ‘anything under the sun that is made by man.’ ... the most straightforward interpretation of the Supreme Court’s guidance in Chakrabarty is that an invention qualifies as patentable subject matter if it (1) is ‘made by man,’ and (2) does not involve an attempt to patent ‘laws of nature, physical phenomena, [or] abstract ideas.’ enumerated by the Supreme Court). ... The Court’s analysis leaves little room for the term ‘manufacture’ to impose additional limitations on the scope of patentable subject matter.”

The dissent also notes that past cases have never imposed requirements of tangibility or permanence, traces the use of the term “manufacture” back to the first US Patent Act in 1790 and the English Statute of Monopolies of 1623 and cites an 1853 case involving the patent for Morse Code in order to conclude that “manufacture” ought to be interpreted broadly so as to include signals within its scope. Indeed, upon a careful examination of Chakrabarty, there is no mention of a requirement for either permanence or tangibility in order qualify as a “manufacture.”

The dissent is not the only criticism of the decision. Among many criticisms not raised by Linn J. are several inconsistencies in reasoning of the majority decision, use of an inappropriate “person of ordinary skill in the art,” the issuance, prior to the decision, of a patent with what

98 In re Nuijten, (2007), 500 F.3d 1346 (Fed. Cir. 2007), per Linn, Circuit Judge (dissenting).
99 See In re Nuijten, (2007), 500 F.3d 1346 (Fed. Cir. 2007). “... neither American Fruit Growers nor Chakrabarty confronted or decided a question of tangibility or permanence.”
100 Act of Feb. 21, 1793, ch. 11, § 1, 1 Stat. 318.
101 Statute of Monopolies, 1623, 21 Jac. 1, ch. 3.
103 For example, see Dolly Y. Wu and Steven M. Geiszler, “Patentable Subject Matter: What is the Matter with Matter?,” 15 Va. J.L. & Tech. 101.
104 This issue is simply not addressed in Nuijten.
appears to be a signal claim to Nuijten\textsuperscript{105} and the fact that claim 15 was allowed while claim 14 was not.\textsuperscript{106}

The US Supreme Court has recently revisited the area of patentable subject matter in \textit{Bilski v. Kappos}.\textsuperscript{107} The case dealt with patents for business methods. The Federal Circuit had articulated a test for whether something qualified as a patentable “process;” the “machine or transformation test”\textsuperscript{108} and many believed that the reasoning followed by the CAFC supported the decision in \textit{Nuijten}. The Supreme Court, however, in a very divided opinion, found the particular claim at issue to be directed towards non-patentable subject matter,\textsuperscript{109} but reaffirmed the notion from \textit{Chakrabarty} that “Congress plainly contemplated that the patent laws would be given wide scope.”\textsuperscript{110}

“Even though petitioners’ application is not categorically outside of §101 under the two broad and atextual approaches the Court rejects today, that does not mean it is a “process” under §101. Petitioners seek to patent both the concept of hedging risk and the application of that concept to energy markets. App. 19–20. Rather than adopting categorical rules that might have wide-ranging and unforeseen impacts, the Court resolves this case narrowly on the basis of this Court’s decisions in \textit{Benson}, \textit{Flook}, and \textit{Diehr}, which show that petitioners’ claims are not patentable processes because they are attempts to patent abstract ideas. Indeed, all members of the Court agree that the

\textsuperscript{105} See claim 20 of US Patent No. 6,157,330.

\textsuperscript{106} Claim 14 is quoted above. Interestingly, claim 15, which was allowed, read “A storage medium having stored thereon a signal with embedded supplemental data, the signal being encoded in accordance with a given encoding process and selected samples of the signal representing the supplemental data, and at least one of the samples preceding the selected samples is different from the sample corresponding to the given encoding process.” Note that the Nuijten’s original application, US Patent Application (09/211,928), is not available to the public. Claim 14 is taken from the text of the CAFC judgment and claim 15 is taken from the text of the Board of Appeal decision (Ex parte Nuijten (2006), 84 U.S.P.Q.2d 1335). Claim 15 of the corresponding PCT Application (WO/1999/033266) reads “A storage medium having stored thereon a signal as claimed in claim 14.”

\textsuperscript{107} \textit{Bilski v. Kappos}, 561 US ____ (2010).

\textsuperscript{108} See \textit{In re Bilski} (2008), 545 F.3d 943, 88 U.S.P.Q. 2d 1385 (Fed. Cir.).

\textsuperscript{109} See \textit{Bilski v. Kappos}, 561 US ____ (2010), at page 13. The court found the method in question to be a non-patentable abstract idea, rather than a statutory process.

patent application at issue here falls outside of §101 because it claims an abstract idea.”

It should be noted that the Supreme Court, while rejecting the narrow approach of the Federal Circuit to the definition of “process” explicitly refused to decide what limits should be placed on the category of “process.”

What lessons does Bilski v. Kappos have for the patentability of signals? The answer may be none. However, the affirmation of, and emphasis on, Chakrabarty and its expansive definition of patentable subject matter lends itself to the notion that the US Supreme Court, in its current composition, might support the notion of signal claims, at least in principle. For example, the court appears to take issue with having tangibility as a requirement of patentability.

“The machine-or-transformation test may well provide a sufficient basis for evaluating processes similar to those in the Industrial Age—for example, inventions grounded in a physical or other tangible form. But there are reasons to doubt whether the test should be the sole criterion for determining the patentability of inventions in the Information Age. As numerous amicus briefs argue, the machine-or-transformation test would create uncertainty as to the patentability of software, advanced diagnostic medicine techniques, and inventions based on linear programming, data compression, and the manipulation of digital signals.”

If nothing else, this lends some credibility to the dissent in Nuijten. In addition, there may something that can be taken from the way the court rejected the claims at issue. The reason the claims were rejected was because they were considered to be claims to abstract ideas. As is discussed below, the concept of not granting patents to abstract ideas can be of great use in devising a test for the patentability of signals. The Europeans, as is discussed above, have a similar concern, albeit phrased differently, with the issuance of patents on presentations of information or computer programs “as such.”

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112 Bilski v. Kappos, 561 US ___ (2010), at 9, per Kennedy J.
4.2.2 Conclusions Regarding Signals in the US

Signals are currently not patentable in the United States, even though the BPAI had found them patentable in the past. The governing case on the matter, \textit{Nuijten} has a rather poorly reasoned majority decision while the dissent is better supported by the case law, including the wide scope given to patentable subject matter in \textit{Chakrabarty}. The recent Supreme Court decision in \textit{Bilski v. Kappos}, while not determinative of the matter, lends some support to this interpretation.

4.3 Signal Claims in International Treaties

This section is an examination of the question of whether electromagnetic or acoustic signals are considered patentable subject matter in various international treaties and whether there exists any obligation to include signals within the definition of patentable subject matter that arise from these treaties. Several international treaties will be discussed with a view to determining if any of these treaties have the effect of imposing an obligation regarding the patentability of signals, either positive or negative. These include the Paris Convention on the Protection of Industrial Property, the Patent Cooperation Treaty, the Agreement on Trade Related Aspects of Intellectual Property, the North American Free Trade Agreement and the European Patent Convention. This section concludes with one possible, albeit tenuous, argument in favour of the EPC, and therefore possibly TRIPS and NAFTA as well, since similar language is used, imposing a positive obligation on nations to consider signals to be patentable subject matter.

4.3.1 Possible International Obligations Concerning the Patentability of Signals

Consider all the international treaties that have something to say on the subject of patents. Do any of them impose an obligation in regards to the patentability of signals, either positive or negative?
4.3.1.1 Paris Convention

To begin with, consider the Paris Convention, the oldest of the patent treaties. The Paris Convention covers many aspects of intellectual property protection. For example, with respect to patents, it requires that all signatories treat nationals of all signatory countries equally, establishes the concept of priority filing dates accorded to whomever is the first to file in any signatory country, establishes that patents in different countries are independent of each other and requires that the inventor be credited in the patent, among other things. However, the Paris Convention has essentially nothing to say on the topic of patentable subject matter. The treaty leaves the question of what is patentable entirely up to the member states to decide for themselves.

4.3.1.2 Patent Cooperation Treaty

The Patent Cooperation Treaty (PCT), in a similar vein, also has very little to say on the topic of patentable subject matter. Additionally, what little it does say follows the same pattern as the

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114 To be fair, the Paris Convention covers not only patents but also Trade-marks, Copyrights and Industrial Designs as well.


Paris Convention. The PCT leaves the issue of patentable subject matter up to individual nations. What little comment the PCT does make on the topic is related to whether the international searching authority or whomever is providing the international preliminary examination is required to search or provide an opinion regarding claims to certain subject matter. For example, Article 17(2)(a)(i) and corresponding Rule 39 have the following to say regarding the subject matter of an international search report. Article 17(2)(a)(i) reads:

“17(2)(a) If the International Searching Authority considers

“(i) that the international application relates to a subject matter which the International Searching Authority is not required, under the Regulations, to search, and in the particular case decides not to search...

“the said Authority shall so declare and shall notify the applicant and the International Bureau that no international search report will be established.”

Rule 39 reads:

“39. No International Searching Authority shall be required to search an international application if, and to the extent to which, its subject matter is any of the following:

“(i) scientific and mathematical theories,

“(ii) plant or animal varieties or essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes,

“(iii) schemes, rules or methods of doing business, performing purely mental acts or playing games,

“(iv) methods for treatment of the human or animal body by surgery or therapy, as well as diagnostic methods,

“(v) mere presentations of information,

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“(vi) computer programs to the extent that the International Searching Authority is not equipped to search prior art concerning such programs.”

Articles 33(5), 34(4)(a)(i) and Rule 67 provide similar language for the international preliminary examination report. Article 33(5) of the PCT states, in part:

“The criteria described above merely serve the purposes of international preliminary examination. Any Contracting State may apply additional or different criteria for the purpose of deciding whether, in that State, the claimed invention is patentable or not.”

Article 34(4)(a)(i) of the PCT states, in part:

“34(4)(a) If the International Preliminary Examining Authority considers

“(i) that the international application relates to a subject matter on which the International Preliminary Examining Authority is not required, under the Regulations, to carry out an international preliminary examination, and in the particular case decides not to carry out such examination...

“the said Authority shall not go into the questions referred to in Article 33(1) and shall inform the applicant of this opinion and the reasons therefor[sic].”

Rule 67 of the PCT Regulations states:

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“No International Preliminary Examining Authority shall be required to carry out an international preliminary examination on an international application if, and to the extent to which, its subject matter is any of the following:

“(i) scientific and mathematical theories,

“(ii) plant or animal varieties or essentially biological processes for the production of plants and animals, other than microbiological processes and the products of such processes,

“(iii) schemes, rules or methods of doing business, performing purely mental acts or playing games,

“(iv) methods for treatment of the human or animal body by surgery or therapy, as well as diagnostic methods,

“(v) mere presentations of information,

“(vi) computer programs to the extent that the International Preliminary Examining Authority is not equipped to carry out an international preliminary examination concerning such programs.”124

Although the PCT does not restrict what individual nations may consider patentable, or impose any obligations on nations to consider any particular subject matter to be patentable, it does provide a list of subject matter which need not be searched or examined at the international level. It should be noted that this list includes many things that are statutorily barred from patentability in many, if not most, of the signatory countries. It should also be noted that signals are not explicitly on the list, nor is there any clear category listed into which signals could potentially be slotted. Presumably then, an international search and preliminary examination should include claims for signals.

Also of note is the language used to enumerate the list of exclusions from the requirement to search and examine the claims in an application. It is the same language used in the European Patent Convention, discussed below.

4.3.1.3 The Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS)

TRIPS, the Agreement on Trade-Related Aspects of Intellectual Property Rights,125 in contrast to the Paris Convention and the PCT, breaks from the tradition of earlier treaties and includes an affirmative obligation on the part of member states on the topic of patentable subject matter along with some negative limitations. TRIPS begins by making a blanket statement that anything meeting a few criteria should be considered patentable and the proceeds to enumerate some exceptions to the general rule. Article 27 reads, in part:

“1. Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application...

“2. Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect ordre public or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.

“3. Members may also exclude from patentability:

“(a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals;

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“(b) plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes...

The thing to note here is that *TRIPS* appears to be imposing a general, positive obligation on member nations in favour of making inventions patentable. One is tempted to call it a presumption of patentability. This is a very important point. Unlike the international treaties considered so far, *TRIPS* has the effect of rephrasing the question. No longer is it a question of whether signals are included within the ambit of patentable subject matter, but whether signals are excluded from patentable subject matter. One might draw an analogy to a shift in the burden of proof. If patentability is presumed, as it is with *TRIPS*, then the burden shifts to those who wish to exclude signals from patentability. It should be mentioned that *TRIPS* has, in fact, been interpreted in exactly this manner, although not by a WTO panel. The board of appeal at the European Patent Office, when considering Article 27 of *TRIPS*, has taken the view that,

“This general principle [Article 27(1)], when considered together with the provisions pursuant to paragraphs 2 and 3 of Article 27 concerning exclusion from patentability ... can be correctly interpreted, in the Board’s opinion, as meaning that it is the clear intention of *TRIPS* not to exclude from patentability any inventions, whatever field of technology they belong to...

More specifically, *TRIPS* appears to be obligating member nations towards a very expansive view of patentable subject matter. In fact, the exceptions listed in paragraphs 2 and 3 do not even mention some of the items that are universally found to be non-patentable subject matter, such

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as scientific principles.¹²⁸ What to make of this? Is TRIPS saying that scientific principles should be considered to be patentable subject matter? This seems unlikely.

One interpretation is that a scientific principle is not “capable of industrial application.” However, the author believes that the most likely interpretation of the lack of an explicit exception for things like scientific principles seems to be derived from the meaning of the word “invention.” Simply put, a scientific principle is not an invention and therefore is not patentable subject matter. Those things that require explicit exceptions might therefore be assumed to be the kind of things that can be inventions, and therefore, if they are to be excluded from patentability, must be excluded explicitly. Where does a signal fall under this provision? Is a signal an invention?

To date, the author is not aware of any WTO decisions that have attempted to interpret the meaning of the word “invention” as it appears in article 27 of TRIPS. Signals, as discussed above, are not natural phenomena, and so are not analogous to scientific principles. Signals are artificial, if transitory, phenomena that are created specifically to transmit information.

*4.3.1.4 The North American Free Trade Agreement (NAFTA)*

The North American Free Trade Agreement¹²⁹ has provisions that are nearly identical to those from TRIPS in article 1709. Again, there is a blanket statement to the effect that, generally, all things are patentable subject matter followed by the same list of progressively more specific exclusions.

The relevant parts of NAFTA article 1709 read, in part:

> “1. Subject to paragraphs 2 and 3, each Party shall make patents available for any inventions, whether products or processes, in all fields of technology, provided that such inventions are new, result from an inventive step and are capable of industrial

¹²⁸ For example, consider the Patent Act in Canada which explicitly forbids the granting of a patent for any “mere scientific principle or abstract theorem.” See Patent Act, R.S.C. 1985, c. P-4, s.27(8); R.S., 1985, c. P-4, s. 27; R.S., 1985, c. 33 (3rd Supp.), s. 8; 1993, c. 15, s. 31, c. 44, s. 192.

application. For purposes of this Article, a Party may deem the terms "inventive step" and "capable of industrial application" to be synonymous with the terms "non-obvious" and "useful", respectively.

“2. A Party may exclude from patentability inventions if preventing in its territory the commercial exploitation of the inventions is necessary to protect ordre public or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to nature or the environment, provided that the exclusion is not based solely on the ground that the Party prohibits commercial exploitation in its territory of the subject matter of the patent.

“3. A Party may also exclude from patentability:

(a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals;

(b) plants and animals other than microorganisms; and

(c) essentially biological processes for the production of plants or animals, other than non-biological and microbiological processes for such production.”

The same questions remain with NAFTA as do with TRIPS since there has been no attempt, at least so far, to interpret the meaning of the word “invention” as used in article 1709(1).

4.3.1.5 The European Patent Convention (EPC)

Canada is not a signatory to the European Patent Convention. Nevertheless, as we will see, it is useful to consider it, since it is the only international patent treaty with a significant amount

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of jurisprudence to draw upon for interpretation. The EPC, while somewhat more geographically limited than TRIPS, uses much of the same language as the other global treaties discussed above. Yet again, there is the general exhortation towards patentability regardless of subject matter followed by the usual enumerated exceptions. See articles 52 and 53, above, which deal with the topic of patentable subject matter.

The EPC follows the same pattern as TRIPS and NAFTA by establishing a norm of patentability with exclusions coming from either a set of explicit and enumerated exceptions or the implication that something is not an invention. Note, in particular, the language used in article 52(1), “for any inventions, in all fields of technology.” These are almost exactly the words used in TRIPS and in NAFTA. The EPC, however, goes much further in spelling out exactly what is meant to be excluded from patentability due to not being considered an invention; specifically mentioning “discoveries, scientific theories and mathematical methods,” “aesthetic creations,” and “schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers.”

More importantly, article 52 of the EPC has been the subject of judicial scrutiny, in the BBC case as well as others discussed above. The arguments presented, while relevant in the EPC context, may not help much when interpreting the text of the various other international treaties since they rely on provisions that are not present in other treaties, namely article 52(2)(d) which explicitly prohibits patents for “presentations of information,” and the aforementioned Article 52(3). On the other hand, these decisions could help to establish that signals are not necessarily mere “presentations of information,” assuming that one is able to properly understand the distinction made by the board.

4.3.2 Conclusions Regarding Signals in International Treaties

The major international patent treaties examined here include the Paris Convention, the PCT, TRIPS, NAFTA and the EPC. Of these, two are essentially silent on the topic of patentable subject matter. Three appear to have default rules favouring patentability generally with the possibility that signals may or may not qualify as “inventions.” However, only one has any significant jurisprudence to draw upon when attempting to ascertain whether the treaty imposes any
obligations on member states, either positive or negative, with respect to signals. It is difficult at best to import a judicial interpretation of one treaty, in one context, into the interpretation of another treaty, in another context, for example, using BBC to aid in the interpretation of TRIPS, as will be attempted below. Nevertheless, it seems to be all that is available on the subject so it is wise to take from it whatever guidance there is to be had.

Assuming, for the sake of argument, that a WTO panel would find BBC highly persuasive and would try to follow it in a similar situation, there are still some difficulties in applying the analysis from BBC to TRIPS. Much of the trouble comes from differences in the text of the treaties themselves.

The first significant difference in the text seems to be the phrasing of the general rule of patentability in article 27(1) of TRIPS and article 52(1) of the EPC. A complicating factor is that BBC was decided under an earlier version of the treaty, EPC 1973. The text has recently undergone a revision and one of the changes was to article 52(1). Given the similarity in the wording of the articles of the different treaties and the fact that the drafters undoubtedly had access to the text of earlier treaties, there may be something that can be learned from looking at the evolution of the patentable subject matter provision.

Here then, for ease of reference, are the relevant sections of each treaty, presented in chronological order.

First is article 52(1) of EPC 1973.

“(1) European patents shall be granted for any inventions which are susceptible of industrial application, which are new and which involve an inventive step.”

Second, is article 27(1) of TRIPS.


“1. Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application...”\(^{134}\)

Most recent, is article 52(1) of the EPC.

“(1) European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application.”\(^{135}\)

Notice the differences in phrasing. Pay particular attention to the phrases, “whether products or processes,” and “in all fields of technology.” The simplest phrasing is the first, *EPC 1973*, which contains neither of the modifying phrases. The most complex is the second, *TRIPS*, which contains both. The most recent is *EPC* and it omits the phrase, “whether products or processes.”

One is tempted to infer that the inclusion of the two modifying phrases in *TRIPS* and the subsequent omission of one from *EPC* must have been deliberate and therefore should be expected to change the meaning of the provision somehow. One interpretation of *TRIPS* in light of *EPC 1973* is simple clarification. There may have been some worry that the simple language of the *EPC 1973* was insufficiently specific or left the door to patentability open too wide, but that doesn’t help to explain the omission in the current *EPC*.

Another explanation is that the modifying phrases in *TRIPS* are there as limitations. *EPC 1973* only limits the grant of patents to those “inventions” that meet the usual patentability criteria of novelty, inventive step and industrial applicability. In contrast, *TRIPS* adds the two modifying phrases. These could have the effect of limiting the general patentability of “inventions” to those which also qualify as a “product or process” and as a “technology.” The exact nature of


these limitations has, of course, not yet been pronounced upon by a judicial body. The “technology” limitation in particular seems very vague. Nevertheless, it seems plausible to argue that the EPC deliberately left out the phrase, “whether products or processes,” in order to make the general patentability provision broader than TRIPS.

Consider now the second large textual difference between EPC Article 52 and TRIPS Article 27; the open ended, enumerated list of non-patentable subject matter found in EPC article 52(2). It should be noted that both EPC 1973 and the current EPC have the same list in article 52(2). Given the way the enlarged board of appeal interpreted article 52(2), by suggesting that it might be read as a general prohibition on “anything abstract in character,” there may be room to argue that the first difference may be related to the second difference. That is to say that it could be argued that Article 52(2) of the EPC plays the same role as the modifying phrase “whether products or processes” in article 27(1) of TRIPS: it limits the general rule in favour of patentability to inventions which are not “abstract in character.”

If this is indeed the case then that opens the possibility of arguing that TRIPS requires nations to recognize the patentability of signals, at least in the limited sense of a signal, “defined in terms which inherently comprise the technical features of the... system in which it occurs.” The argument, at least at this early stage of development is admittedly tenuous, but given the lack of jurisprudence in this area generally, it is also far too soon to say it is clearly wrong. Even there is no positive obligation to make signals patentable, the treaties clearly allow signals to be patentable and certainly do not impose any obligation to exclude them from patentability.

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136 This is true as far as the author is aware at the time of writing.
5.0 Recommendations Regarding Signals in Canada

There are some policy considerations that might be cause for concern if signals were to be found to be patentable. Of these, the question of whether a patent might issue for information *per se*, rather than a practical application of it is foremost. However, a workable test, based on a European model but which is compatible with domestic law and addresses this concern can be formulated.

5.1 Policy Considerations

There are many advantages to allowing signal claims, as explained above. Briefly, they include broader protection with fewer claims to examine, ease of monitoring and enforcement arising from the publicly accessible nature of many networks, the possibility of enforcement against gateways rather than end-users and the possibility of enforcement against cross-border infringers.

Consider now some possible policy justifications for excluding signals from patentability. Since CIPO makes no attempt to present any such reasons for their position, other sources must be consulted. Different exclusions from patentability appear to be motivated by different considerations. The UK High Court has recently canvassed the range of exclusions from patentability in the *EPC* and suggested that the policy underlying each of the exclusions is different. Trying to find one unifying theme that explains all the exclusions is an undertaking that is, at best, unlikely to succeed.

In Europe, signals usually come up in cases dealing with computer programs or presentations of information as such. With regards to presentations of information,

“[t]he policy that lies behind this exclusion is stopping people from getting a monopoly to information as such. You cannot get round it by claiming it in conjunction with a physical artefact... Even so, it does not prevent the patenting of a useful way of
presenting information divorced from the particular information as such.”\textsuperscript{139} [Emphasis in original]

The exclusion of computer programs, on the other hand, is thought to be based on the idea that patent protection was not necessary in order to promote innovation in this area, since the “software industry in America developed at an astonishing pace when no patent protection was available.”\textsuperscript{140} Also,

“Copyright law protects computer programs against copying. A patent on a computer program would stop others from using it even though there had been no copying at all. So there would have to be infringement searches. Furthermore you cannot have a sensible patent system unless there exists a proper body of prior art that can be searched. Not only are most computer programs supplied in binary form – unintelligible to humans – but most of the time it is actually illegal to convert them into human-readable form. A patent system where it is illegal to search most of the prior art is something of an absurdity.”\textsuperscript{141}

Lord Hoffmann, formerly of the UK House of Lords appears to be of a similar opinion. In a recent speech\textsuperscript{142} he outlined two separate policy reasons for the non-patentability of software and business methods. More specifically, he finds two principles: the practical application principle and the human behaviour principle. The essence of the former is that patents cannot stop people from thinking, only from \textit{doing}. Therefore one cannot have a patent on information as such; one must claim a practical application of that information. The author would suggest that this principle might underlie exclusions such as presentations of information, aesthetic creations and scientific discoveries as well. The human behaviour principle on the other hand is concerned with preventing patents from regulating human behaviour. The author would suggest that this might also underlie exclusions for such things as methods of medical treatment and professional skill and judgment.

\textsuperscript{140} \textit{CFPH LLC, Patent Applications by}, [2005] EWHC 1589 (Pat), at para. 35.
\textsuperscript{141} \textit{CFPH LLC, Patent Applications by}, [2005] EWHC 1589 (Pat), at para. 35.
\textsuperscript{142} Keynote address to the 83\textsuperscript{rd} Annual Meeting of the Intellectual Property Institute of Canada in St. John’s Newfoundland, September 24, 2009.
What, if any, particular policy concerns apply to signals? Could some of the above reasoning apply to signals? One could argue that patent protection for signals is not necessary to spur continued innovation in this area of technology; especially since transmitters, receivers and systems using signals are clearly patentable now. This, however, is a question for Parliament, not the courts, unless a court could find a way to divine Parliament’s intent. In the face of the lack of an explicit exclusion for signals and the current state of the law, one could interpret Parliament’s silence either as indifference to the patentability of signals or as approval. The least likely interpretation would be that Parliament intended to exclude signals from patentability. There are no other areas of intellectual property law that protect signals, so if patent protection is not available then no protection will be available. The answer to these objections may be one of efficiency. Why make a patentee claim the transmitter, receiver, system and method for producing, transmitting and decoding a signal rather than simply the signal itself? Allowing signal claims has the potential to simplify patent prosecution and require fewer resources to be expended by both the patentee and the patent office during examination. Further, a signal is a technological information carrier. One might be worried about allowing signals to be patentable out of a concern for patents issuing for information per se. However, the European experience has shown that using the proper test for patentability can, at the very least, significantly mitigate this danger.

To the author, none of these issues seem adequate to the task of justifying the total exclusion of signals from patentable subject matter as a matter of principle, as CIPO prefers. Rather, the situation seems to demand the formulation of a test that can be used to assess the patentability of signals while addressing the issue of patentability of information per se.

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143 Allowing signals to be patentable has no obvious limiting effect on human behaviour directly. Also, the author has no data upon which to base any comments regarding the extent to which prior art signals would be searchable, but would suggest that since the EPO does not seem to view this as a problem it seems unlikely that it would present an insurmountable difficulty.

144 Admittedly, there may be some type of social cost that has not been accounted for here. This is because the focus of the paper is on the law, not on the policy justifications for or against the patentability of signals. Perhaps allowing signals to be patentable in Canada will result in some unforeseen calamity. However, the fact that signals have been patentable in Europe for quite some time already, with no such calamitous outcome, suggests to the author that whatever the social costs might be, they are not likely to be inordinately high. Another issue that might be raised, but that is not addressed here, is the question of whether we need patents in order to encourage innovation in the area of novel signals or whether the patentability of transmitters, etc. is sufficient. The author is currently unaware of any data that would sway his opinion strongly in either direction on this issue.
5.2 Proposed Test for the Patentability of Signal Claims in Canada

Having established that CIPO’s position regarding the non-patentability of signals per se is not founded in law and reviewed some of the possible policy issues, how ought the situation to be resolved? Can a test be devised that would allow signals to be patentable while addressing the outstanding concern regarding patents on information per se? The author suggests that the European experience demonstrates that such a test is possible to formulate, that the US experience suggests a way to do so and that the tools for addressing the potential problems are already present in Canadian patent law.

5.2.1 The Han/Raffoul Test

Sam Han has suggested one possible test that could have been useful in deciding the issue in the US context.\(^{145}\) Han’s is a four part test that begins with the question of whether, according to 35 USC 101 and Chakrabarty, the claimed subject matter is “made by man.” The test then proceeds to inquire about sufficiency of disclosure, novelty and obviousness in sequence. Natalie Raffoul has adapted the Han test for possible use in Canada.\(^{146}\) In so doing, she notes that in the

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\(^{145}\) Sam S. Han, “Analyzing the Patentability of ‘Intangible’ yet ‘Physical’ Subject Matter” (2003) 3 Colum. Sci & Tech. L. Rev. 2, at 29. It should be noted that Han was writing before the CAFC decision in Nuijten that found signals to be unpatentable.

\(^{146}\) Natalie Raffoul, “The Patentability of Electromagnetic and Acoustic Signals in Canada” (2009) 7 Can. J. L. & Tech. 125, at 146. The adapted test is,

1) According to s. 2 of the Patent Act and the Canadian jurisprudence, does the subject matter involve a non-living product or process made by the hands of man that has new forms, qualities, properties, or combinations thereof?
   - If answered in the negative, the subject matter is considered non-statutory and thus unpatentable;
   - If answered in the affirmative, the subject matter is considered statutory; move on to step 2;

2) According to s. 27(3) of the Patent Act, is the written disclosure sufficiently enabling for one of skill in the art to reproduce the subject matter (e.g., generate such a signal)?
   - If answered in the negative, the claimed subject matter is not patentable for insufficient disclosure;
   - If answered in the affirmative, there is sufficient disclosure; move on to step 3;

3) According to s. 28.2 of the Patent Act, is the subject matter novel?
Canadian context such a test would need to be confined to the category of “manufacture,” but that otherwise the test could be applied in a very similar manner.

Of note in both Han’s original formulation and Raffoul’s adaptation is that the issue of “abstractness” is considered at step two, sufficiency of disclosure, rather than at step one. The implication is that the question of whether something is too abstract to be patentable is best understood as a matter of how well it can be described.

5.2.2 The Abstract Character Test

The US Supreme Court in *Bilski* was concerned with allowing patents for abstract ideas. The Europeans have a similar concern, but phrased as a concern regarding information “as such.” The question of “abstractness,” as used here refers to a rephrasing of the European concern for issuing patents on information as such. If one wishes to deal with the question of abstractness at the level of subject matter, rather than at the level of sufficiency or enablement as proposed by Han and Raffoul, then a workable test can be formulated by drawing on the European experience with such a test, but following the lead of the US Supreme Court in *Bilski* by angling towards a solution from the direction of abstractness. Further, there is support to be found in both the *Patent Act* and the cases in Canada for just such a test.

The EPO deals with the issue by inquiring into the “technical” character of the invention. To say of an invention that it possesses technical character and that the same invention lacks abstract character is, in essence, to make the same statement twice, albeit using different words. Indeed, the concepts of technical character and abstract character can be seen as the two end points of a continuum, between which lies the threshold for patentability.

With regards to the nature of the test for technical character, the UK High Court commented on *Vicom*,

\[\text{If answered in the negative, the claimed subject matter is not patentable; }\]
\[\text{If answered in the affirmative, move on to step 4; }\]
\[4) \text{ According to s. 28.3 of the } *\text{Patent Act*}, is the subject matter obvious?}\]
\[\text{If answered in the affirmative, the claimed subject matter is not patentable; }\]
\[\text{If answered in the negative, the claimed subject matter is patentable.}\]
“What did they mean by ‘technical contribution’? Well, any invention that is patentable must add something to the existing stock of human knowledge. If it does not, it is not new. So they were writing about what the invention, as claimed by the applicant, added to the existing stock. They were saying: identify what that is, then ask "Is it 'technical'?". If yes, or in part so, it is, in principle, patentable.”

This test can be adapted, but approached from the other direction, similar to the approach in Bilski, for use in Canada. Instead of asking whether the invention is sufficiently technical, ask whether the invention is too abstract to be patentable.

More specifically, the question to ask would be whether the invention lies in the signal itself or in the information being communicated. If the invention lies in the information being communicated then the invention may be too abstract to qualify as patentable subject matter. The use of a signal to communicate information, much like any other form of electronic media, cannot render a non-patentable abstract idea patentable. If, on the other hand, the invention lies in the signal itself, i.e. the manner of communicating rather than the content of the communication, then it could be considered patentable subject matter and one might then proceed to check for novelty, inventiveness and utility. To put it another way, if the invention is the content of the communication then it may be too abstract, but a new type of information carrier could be patentable. If a new type of computer hard drive considered to be patentable as an information carrier, then why not a signal as well?

There is statutory authority for the exclusion of inventions of “abstract character.” With a little bit of interpretation section 27(8) of the Patent Act could easily serve this purpose.

“No patent shall be granted for any mere scientific principle or abstract theorem.”

Indeed, this section has been interpreted to exclude natural phenomena, laws of nature and scientific principles as well as computer programs when all that has been discovered is a

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148 Patent Act, R.S.C. 1985, c. P-4, s.27(8); R.S., 1985, c. P-4, s. 27; R.S., 1985, c. 33 (3rd Supp.), s. 8; 1993, c. 15, s. 31, c. 44, s. 192.
method of calculation, all of which are abstract in nature. It seems only a small adjustment to exclude information per se under this provision. The Patent Appeal Board has even decided some cases on the basis of this kind of reasoning. Consider the following:

- In Boussac the Board decided that the printed design on the surface of some fabric made a functional contribution to an invention; it had more than an “aesthetic, intellectual or literary appeal.” In other words, it was not the information itself, but the way it was presented that was patentable.
- The same reasoning is apparent in Dixon where the Board rejected the patentability of a series of written instructions on a page designed to improve a speaker’s voice. The alleged invention was in the content, i.e. the steps to be performed, and not the manner of communication, i.e. writing on a page.
- In Schlumberger, the Federal Court of Appeal endorsed the notion that a non-patentable method of calculation was not rendered patentable merely by claiming it as being performed by a computer. Since the invention was the content, adding a carrier did not make it patentable.

The test proposed is consistent with the jurisprudence and the Patent Act as it currently stands in Canada and it addresses the outstanding objection to the patentability of signals, the possibility of a patent issuing for information per se, by making that the focus of the test itself.

5.3 Conclusion

151 Re Application No. 996,098 of Boussac (1973), C.D. 143.
Given that CIPO’s position on the patentability of signals in Canada lacks foundation in law, what could a court do when it is faced with deciding the issue? Any Canadian court considering the matter should bear the following in mind during deliberations.

First, the patentability of signals is compatible with domestic law. Despite CIPO’s position on the matter, the law in Canada is far from settled. CIPO’s objections regarding immateriality, lack of a proper category and transience are not founded in law. Indeed, some have argued that signals are, in fact, patentable in Canada as the law currently stands. At the very least, the current state of the law does not preclude the patentability of signals and CIPO’s choice of policy is premature.

Second, Canada can learn from the European experience. Signals are recognized as physical entities in Europe. In the context of computer programs, signals are treated like any other “computer readable medium.” The Board of Appeal appears to have settled on a method for determining when a signal is patentable and when it is not. To paraphrase, signals, as information carriers, could be considered patentable when they are inventive independent of the content of the information being carried.

Third, Canada can learn from the experience of the United States. The legislation uses the same words, derived from the same original source,154 in order to constrain the allowable subject matter for patents. The CAFC in the US concluded that signals ought not to be considered patentable subject matter. However, given that the Supreme Court of Canada seems to be of the opinion that patentable subject matter need not be permanent, that the court in *Bilski v. Kappos* appears to rule out tangibility as a categorical requirement of patentability, and the numerous other criticisms of the *Nuijten* decision, the lesson to be learned here is what not to do. The author suggests echoing the US Supreme Court’s concerns in *Bilski* and focusing on the issue of abstract character.

Fourth, the patentability of signals is compatible with Canada’s international obligations. International treaties regarding patents to which Canada is a signatory, specifically TRIPS and NAFTA, can be read as requiring the patentability of signals. Even though there is no explicit,  

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154 Both Canadian and US Patent law ultimately stem from English patent law and the *Statute of Monopolies, 1623, 21 Jac. 1, ch. 3.*
positive obligation to make signals patentable, the treaties clearly allow for the patentability of signals and certainly do not impose any obligation to exclude signals.

Finally, Canada could adopt a test based on whether the alleged invention lies in the signal itself or in the information it is being used to communicate. As long as the invention lies in the signal itself, i.e. the information carrier, it could be considered to be patentable. Although the focus of the paper is not on policy, the proposed test attempts to addresses the possible concerns regarding patents issuing for information per se and is compatible with the law as it stands.