APPELLEE'S BRIEF

BRIEF FOR APPELLEE DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

Appeal No. 2006-1371
(Serial No. 09/211,928)

IN RE PETRUS A.C.M. NUIJTEN

APPEAL FROM THE UNITED STATES PATENT AND TRADEMARK OFFICE,
BOARD OF PATENT APPEALS AND INTERFERENCES

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Representative Claims

1. (**allowed**). A method of embedding supplemental data in a signal, comprising the steps of:

encoding the signal in accordance with an encoding process which includes the step of feeding back the encoded signal to control the encoding; and

modifying selected samples of the encoded signal to represent the supplemental data prior to the feedback of the encoded signal and including the modifying of at least one further sample of the encoded signal preceding the selected sample if the further sample modification is found to improve the quality of the encoding process.

A119.

15. (**allowed**). 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.

A120-121.

14. (**rejected**). 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.

A120.

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STATEMENT OF RELATED CASES

The Director is not aware of any other appeal from the Board of Patent Appeals and Interferences in connection with application Serial No. 09/211,928 that has previously been before this or any other court. There is no known related case pending in this or any other court.

BRIEF FOR APPELLEE - DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

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IN RE PETRUS A.C.M. NUIJTEN

APPEAL FROM THE UNITED STATES PATENT AND TRADEMARK OFFICE,
BOARD OF PATENT APPEALS AND INTERFERENCES

I. STATEMENT OF THE ISSUE

Watermarks are added to signals (*e.g.*, audio, video) for security purposes. However, their addition can distort the underlying signal. Nuijten has invented a way to add watermarks that results in less distortion. Under controlling precedent, Nuijten's process for modifying signals constitutes patentable subject matter, as does a storage medium containing the modified signal. Accordingly, the USPTO has allowed claims to (i) Nuijten's process, and (ii) storage media containing signals encoded by that process.

However, Nuijten believes he is also entitled to claims to the "signals" themselves. The Board rejected claims to just a "signal" (claims 14, 22-24) as unpatentable under 35 U.S.C. § 101 because (i) they do not fall within one of section 101's four enumerated categories (process, composition of matter,

machine, or manufacture); and (ii) they are abstractions, and thus not patentable. The sole question presented is whether the Board properly rejected the pure "signal" claims since they failed to satisfy section 101.

II. STATEMENT OF THE CASE

This appeal arose out of the examination of patent application Serial No. 09/211,928, filed by Petrus Nuijten. The claims before the Board included (i) claims to a method of modifying a signal (representative claim 1), (ii) claims to storage mediums containing signals (representative claim 15), and (iii) claims to just the signals themselves (representative claim 14). The Board held that the first two categories of these claims – (i) method and (ii) storage medium – were statutory subject matter and allowable. However, the Board held that the claim to the "signal" itself (representative claim 14) was unpatentable because: (i) the signal by itself did not fall into one of the four categories of statutory subject matter, and (ii) the signal by itself was an abstraction, which is not patentable. Nuijten appeals the Board decision rejecting representative claim 14 (*i.e.* the claim to just the signal).

III. STATEMENT OF THE FACTS

A. Nuijten's Claimed Invention

Signals, such as audio and video signals, can be easily copied. One way to discourage unauthorized copying of signals is to add watermarks containing

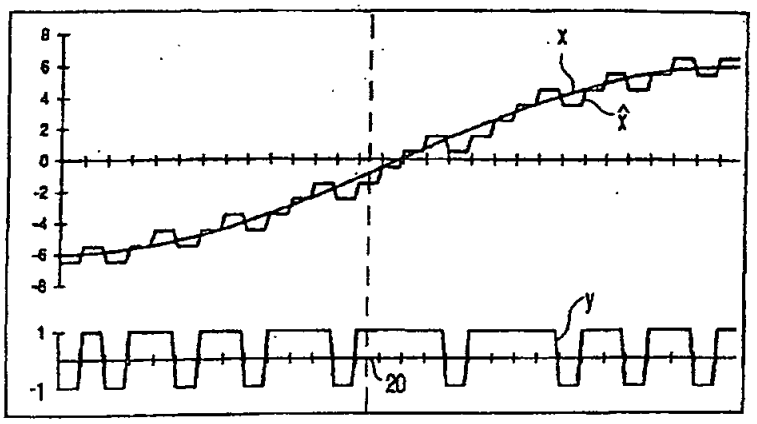

FIG. 2

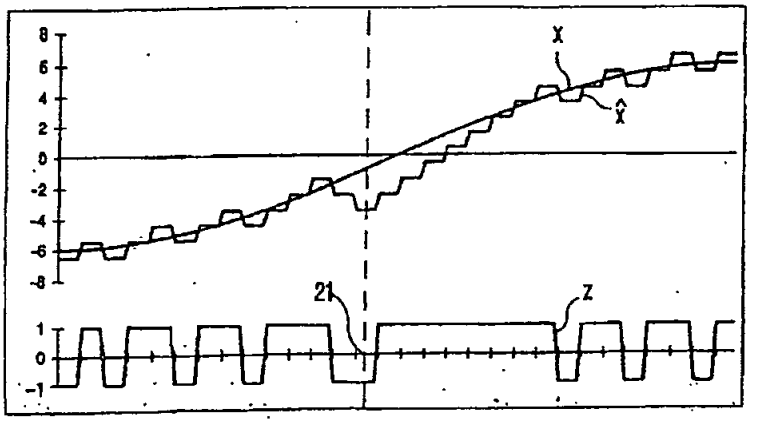

FIG. 3

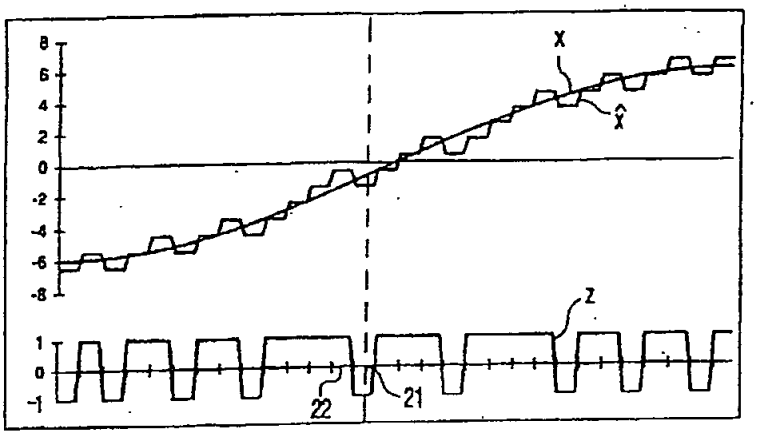

FIG. 4

ownership information to the underlying signal. A21.[1] This is done by manipulating the signal while it is in digital form, *e.g.*, by adding bits[2] or replacing bits in a pattern that represents the ownership information. A24.

However, adding watermarks distorts the signal. Nuijten has invented a new way to minimize the distortion caused by the insertion of a watermark. According to Nuijten, modifying bits in the immediate vicinity of the bits representing the watermark can reduce the distortion. A22-25. This is shown graphically in Nuijten's Figs. 2, 3, and 4 (all opposite), which illustrate how the digital signal – the series of steps – attempts to closely represent the analog signal **x**. A34. The graph at the bottom of each figure shows how the digital signal varies with time as a series of +1s and -1s.

Fig. 3 shows how inserting watermark bit **21** in the place of the previously existing bit **20** (flipping the bit from +1 to -1) causes the digital signal to depart noticeably from the original analog signal. Nuijten's solution to the problem is

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[1] Citations to the Joint Appendix are referred to as "A__"; citations to Nuijten's Brief are referred to as "Br. at __", and citations to the brief of amicus Intellectual Property Owners Association are referred to as "IPO Br. at ___".

[2] A "bit" – an abbreviation of "binary digit" – is the smallest unit of information that a computer can process, and can have one of two values (*e.g.*, 1 or 0, +1 or -1). *See* HARRY NEWTON, NEWTON'S TELECOM DICTIONARY 98 (14th ed. 1998). A series of bits, as discussed herein, refers to information that has been encoded using a binary system. While "bits" can (1) be represented by something physical – a pit or a land on the surface of a compact disk, or a charge or absence of charge in random access memory, and (2) represent something physical, such as an image or sound, the "bits" themselves have no physical existence – they are merely information. *See generally* PAUL HOROWITZ & WINFIELD HILL, THE ART OF ELECTRONICS 471-72 (2d ed. 1999).

illustrated in Fig. 4, which shows how changing bit **22** – the bit immediately preceding watermark bit **21** – from a -1 (in Figs. 2 and 3) to a +1 (in Fig. 4) – compensates for the disruption caused by the addition of watermark bit **21**. Nuijten's process of modifying signal **z** shown in Fig. 4 thus creates a digital signal with a watermark that represents the analog signal much better than the digital signal of Fig. 3.

Three representative claims are relevant: the first is to a method of modifying a signal (claim 1); the second is a storage medium containing the modified signal (claim 15); and the third is to the modified signal itself (claim 14). The first two claims have been allowed; the third has been rejected and is the subject of this appeal:

> 1. (allowed). A method of embedding supplemental data in a signal, comprising the steps of:
>
> encoding the signal in accordance with an encoding process which includes the step of feeding back the encoded signal to control the encoding; and
>
> modifying selected samples of the encoded signal to represent the supplemental data prior to the feedback of the encoded signal and including the modifying of at least one further sample of the encoded signal preceding the selected sample if the further sample modification is found to improve the quality of the encoding process.

A119.

> 15. (allowed). 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.

A120-121.

> 14. (rejected). 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.

A120.

Rejected claim 22, dependent on claim 14, specifies that the "supplemental data" is a watermark. A121. Rejected claims 23 and 24, also dependent on claim 14, specify that the signal is a "video signal" and an "audio signal," respectively. *Id.* Neither Nuijten nor amicus Intellectual Property Owners Association ("IPO") distinguish between the rejected claims; for purposes of this brief, they are treated as a group.

B. The Board's Decision

The Board agreed with the Examiner that claim 14 was not patentable under 35 U.S.C. § 101 for two reasons (in reverse order): (i) it did not fall within a statutory category, and (ii) it was excluded from patent protection under the abstract idea exception to patentability. The Board first analyzed the specific claim language, noting that whereas claim 1 was to a method, and claim 15 to a storage medium, claim 14 was simply a claim to the signal itself. In addition, the Board observed that the claimed signal is not specifically limited to "an electrical or electromagnetic signal, or a signal transmitted or stored in a physical medium." A6. Instead, it also encompasses an abstract representation of a real-world signal

and "could simply be a string of +1 and -1 sample values representing an encoded signal z, e.g., -1, +1, -1, +1, +1, -1, etc.," *id.*, and thus, in the Board's view, "Claim 14 merely recites the abstract properties of the signal." *Id.*

In considering Section 101's four categories of subject matter eligible for patentability, the Board first held that the claimed signal was not a "process," which must be recited as "a series of acts." A8. Nor was the claimed signal a "machine," which requires a physical device (A8 (citing *Corning v. Burden*, 56 U.S. 252, 267 (1854) and *Burr v. Duryee*, 68 U.S. 531, 570 (1863)). Similarly, the claimed signal was not a "composition of matter," because a composition of matter must be "composed of matter." A9 (citing *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980)).

Relying on the definition of "manufacture" – which requires an article produced "'from raw or prepared materials'" (*Diamond v. Chakrabarty*, 447 U.S. at 308) – the Board held that Nuijten's signal did not qualify. The Board found further support for this conclusion in precedent holding that the term "manufacture" in section 101 means the same thing as "article of manufacture," in section 171, which governs design patents. A10 (citing *In re Hruby*, 373 F.2d 997 (CCPA 1967)). Since design patents require "physical matter to provide substance for embodiment of the design" (A10), it followed that section 101 also required physical matter. The Board found additional indirect evidence that "Congress intended to limit patentable subject matter to physical things" in the statutory requirement that means plus function claims be construed to cover corresponding

"structure [or] material." A10-11 (citing 35 U.S.C. 112, sixth paragraph).

Even assuming the claims were construed as being limited to physical signals (such as electrical signals or signals propagated on an electromagnetic wave), the Board held that "[a]n electrical signal does not fit the *Diamond v. Chakrabarty* definition of a manufacture because it is not an object prepared from material, and thus, the answer seems to be that a signal, even if claimed as a measurable physical quantity, such as voltage, is not patentable." A11 (citing the "fabricated energy structure" held unpatentable in *In re Bonczyk*, 10 Fed. Appx. 908 (Fed. Cir. 2001) (unpublished)). The Board concluded its analysis by saying "[r]ather than invent reasons why this different type of subject matter may be statutory and open up a whole new type of subject matter for patenting, we leave it to our reviewing court, the U.S. Court of Appeals for the Federal Circuit to make this decision." A12.

In addition, the Board held that the claim encompassed an unpatentable abstract idea because the claim merely recited abstract characteristics of a signal, and was not limited to a physical, real-world signal, such as an electrical signal. A7-8 (citing *Diamond v. Diehr*, 450 U.S. 175, 185 (1981)).

IV. SUMMARY OF THE ARGUMENT

Nuijten has invented a new method of reducing the distortion that occurs when watermarks are added to signals. As a result, the USPTO has allowed claims to (i) Nuijten's new method of producing a signal having an embedded watermark with reduced distortion; and (ii) a storage medium containing a signal so

produced.

However, Nuijten's claim to just the signal itself is not patentable under 35 U.S.C. § 101. A signal, by itself, is not a process, machine, composition of matter, or a manufacture, and thus does not fall into any of the four statutory categories of § 101. There is little dispute that a signal is not a process, a composition of matter, or a machine. Nor is a signal a "manufacture," since it does not meet the Supreme Court's definition that "manufactures" be made from "raw or prepared materials." In other words, a manufacture must comprise matter, not merely energy. Moreover, the claimed signal, in view of its lack of concreteness and tangibility, is also an unpatentable abstraction.

V. ARGUMENT

A. Standard of Review

The proper interpretation of the claims is a question of law reviewed de novo on appeal. *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998) (en banc). Since claims during prosecution must be given their "broadest reasonable interpretation," this Court reviews the USPTO's interpretation of disputed claim language to determine whether it is "reasonable" in light of all the evidence before the Board. *In re Morris*, 127 F.3d 1048, 1055 (Fed. Cir. 1997).

The question whether an invention qualifies as statutory subject matter under 35 U.S.C. § 101 is a question of law reviewed de novo. *AT&T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352, 1355 (Fed. Cir. 1999); *Arrhythmia Research Technology v. Corazonix Corp.*, 958 F.2d 1053, 1055 (Fed. Cir. 1992).

Reasonable agency interpretations carry "at least some added persuasive force." *U.S. v. Mead Corp.*, 533 U.S. 218, 234-35 (2001) (discussing *Skidmore v. Swift & Co.*, 323 U.S. 134, 140 (1944)); *Bayer AG v. Carlsbad Technology, Inc.*, 298 F.3d 1377, 1381 (Fed. Cir. 2002) (deference to PTO interpretative decision applying Uruguay Round Agreements Act proper under *Skidmore*); *Blacklight Power, Inc. v. Rogan*, 295 F.3d 1269, 1273 (Fed. Cir. 2002) ("agency actions are entitled to judicial respect when they are reasonably taken and in accordance with the 'specialized experience' of agency officials and the 'validity of its reasoning'" (quoting *Skidmore*, 323 U.S. at 139-40)). For example, this Court has considered PTO guidelines in cases involving the written description requirement and found them persuasive. *See, e.g.*, *Enzo Biochem v. Gen-Probe*, 323 F.3d 956, 964 (Fed. Cir. 2002) ("We are persuaded by the Guidelines on this point and adopt the PTO's applicable standard for determining compliance with the written description standard"); *Noelle v. Lederman*, 355 F.3d 1343, 1349 (Fed. Cir. 2004); *see also In re Fisher*, 421 F.3d 1365 (Fed. Cir. 2005) (The USPTO's utility guidelines "'are not binding on this court, but may be given judicial notice provided they do not conflict with the statute'" (quoting *Enzo Biochem*, 323 F.3d at 964).).

B. Representative Claim 14 Claims Just a Signal, Nothing More

Nuijten's claim 14 recites a signal, not attached to any storage medium. Specifically, claim 14 claims "[a] signal with embedded supplemental data," and recites details about the process used to encode and then modify the signal,

without further describing the nature of the signal. As the Board correctly noted, a claimed signal "may represent either physical quantities or abstract quantities." A5-6 (quoting *In re Walter*, 618 F.2d 758, 770 (CCPA 1980)).

Here, the specification refers to a digital signal, consisting only of a series of -1s and +1s (*i.e.* "bits"), as "modified encoded signal z." A24 (discussing Fig. 4); *see also* A25 (explaining that "every 100th bit of the encoded signal *y* is to be replaced by watermark bit *w*"). The signal described in the specification can thus be construed to encompass pure information, in the form of a stream of bits arranged in a particular pattern, as well as an electrical signal carrying that information. *See* THE AUTHORITATIVE DICTIONARY OF IEEE STANDARDS TERMS 1047 (7th ed. 2000), "signal," definition (7) (defining "signal" as "[i]nformation about a variable that can be transmitted in a system").

Consistent with the specification, the Board construed the claimed "signal" to be include signals made up purely of information, but also analyzed the question whether, if construed as electrical signals, the claimed signals would be drawn to patentable subject matter. A11-12. As we show below, in either case, the signal does not satisfy the requirements of 35 U.S.C. § 101 for patentable subject matter.

C. The Claimed Signal Is Not Patentable Because It Does Not Fall Within One of the Four Statutory Categories of Section 101

Section 101 limits the scope of allowable subject matter to "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." 35 U.S.C. § 101. As we show below, Nuijten's

claims, however construed, do not fall within any of these statutory categories, and thus are not patentable subject matter.

1. The Claimed Signal Is Not a Process

"A process . . . consists of a series of acts or steps . . . . [It] consists of doing something, and therefore has to be carried out or performed." *In re Kollar*, 286 F.3d 1326, 1332 (Fed. Cir. 2002). This distinguishes a claim to a process from "a claim to a product, device, or apparatus, all of which are tangible items. *Id.; see also Gottschalk v. Benson*, 409 U.S. 63, 69-70 (1972) ("'[A process] is an act, or a series of acts'" (quoting *Cochrane v. Deener*, 94 U.S. 780, 788 (1876)); *NTP, Inc. v. Research In Motion, Ltd.*, 418 F.3d 1282, 1316 (Fed. Cir. 2005) ("'[A] process is a series of acts.'" (quoting *Minton v. Nat'l Ass'n of Sec. Dealers, Inc.*, 336 F.3d 1373, 1378 (Fed. Cir. 2003)). Allowed claim 1, for example, is a process claim: "A method of embedding supplemental data in a signal, comprising the steps of . . . ." Nuijten cites no support for his novel contention (Br. at 15) that a claim that does not recite a series of steps might nevertheless be a process claim.

2. The Claimed Signal Is Not a Machine

"A machine is a concrete thing, consisting of parts, or of certain devices and combination of devices." *Burr v. Duryee*, 68 U.S. 531, 570 (1863). The term "includes every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result." *Corning v. Burden*, 56 U.S. (15 How.) 252, 267 (1853). A signal that is not stored in a tangible medium (which at most consists of energy, not matter) is the antithesis of

a "concrete" thing. Thus, "a signal does not fit within the definition of a 'machine.'" A9.

3. The Claimed Signal Is Not a Composition of Matter

A "composition of matter" by its own terms requires matter. *Diamond v. Chakrabarty*, 447 U.S. at 308. The claimed signal does not contain matter and thus cannot be considered to be a composition of matter. A9.

4. The Claimed Signal Is Not a Manufacture

The term "manufacture" refers to:

> "'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.'"

Diamond v. Chakrabarty, 447 U.S. at 308 (quoting *American Fruit Growers, Inc. v. Brogdex Co.*, 283 U.S. 1, 11 (1931)). The Board construed this definition to "require[] a tangible article prepared from materials," A9, and properly concluded that the definition embraced "tangible things made of matter, not energy." A11.

Recent Federal Circuit cases dealing with digital infringement under 35 U.S.C. § 271(g) have specifically found the *Chakrabarty-American Fruit Growers* definition of "manufacture" to exclude intangible information and electronic transmissions. For example, in *Bayer AG v. Housey Pharmaceuticals, Inc.*, 340 F.3d 1367 (Fed. Cir. 2003), the Court considered whether "information" that resulted from a patented process could be said to have been "made by" that process for purposes of section 271(g). As a starting point, the Court observed that "[t]here is no serious dispute . . . [that] if only products that have been

"manufactured" are within the scope of 35 U.S.C. § 271(g), it necessarily follows that the statute applies only to physical goods and that information is not included." *id.* at 1371. In support of its conclusion that "manufactured" refers only to "physical goods," the Court cited dictionary definitions defining "manufacture" as "to make (as raw material) into a product suitable for use . . . to make from raw materials by hand or by machinery," and as "the making of goods or wares by manual labor or by machinery," *id.* at 1371-72 (citations and emphasis omitted). Significantly, the Court also relied on the Supreme Court's definition of "manufacture" in section 101 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,'" *id.* at 1372 n.4 (quoting *American Fruit Growers*, 283 U.S. at 11), and further refined this definition by observing that "article" means "one of a class of material things . . . piece of goods: commodity,'" *id.* (citation omitted). Based on these definitions, *Bayer* concluded that "the production of information is not within the scope of processes of 'manufacture'" (citing, *inter alia*, *Diamond v. Chakrabarty*, 447 U.S. at 308), and that information could thus not be considered "made by" the patented process for purposes of section 271(g).

Since the *Bayer* Court relied on section 101 case law for its conclusion that "manufacture" refers to "physical goods" or "material things," *Bayer*'s holding should apply in this section 101 case. Moreover, the Federal Circuit soon after relied on *Bayer*'s section 101 analysis to conclude that transmitted emails,

although argued to be a "tangible structure," "are not manufactured, physical goods, and therefore are not 'products' under section 271(g)." *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1323 (Fed. Cir. 2005). While this Court in *Bayer* and *NTP* did not formally interpret "manufacture" in section 101 to exclude transmitted signals, these recent cases interpreting section 271(g) are consistent with and support the Board's interpretation of "manufacture."

In rebutting a proposed expansive definition of "manufacture," the *American Fruit Growers* Court looked to two cases that had decided whether something had been "manufactured" for the purpose of imposing import or export duties on it. *See American Fruit Growers*, 283 U.S. at 12 (citing *Hartranft v. Wiegmann*, 121 U. S. 609, 613 (1887) and *Anheuser-Busch Brewing Ass'n v. United States*, 207 U.S. 556, 560-61 (1908)). All three of these cases took as a given that the "manufacture" must be a physical good composed of materials, and went on to analyze whether the process applied to those materials was sufficient to make the finished product a "manufacture." *See American Fruit Growers*, 283 U.S. at 11 (holding that adding borax to the rind of an orange was insufficient to produce a "manufacture" under section 101); *Hartranft*, 121 U. S. at 613 (holding that a shell that had been cleaned and ground had not been "manufactured"); *Anheuser-Busch*, 207 U.S. at 560-61 (modified imported corks did not qualify as "manufactures" for the purposes of export duties). Thus, these cases are consistent with the Federal Circuit's conclusion in *Bayer* and *NTP* that "manufactures" be limited to physical goods made from materials, and provide no support for an

interpretation that would permit a "manufacture" to be a product composed entirely of energy.

The historic usage of the terms "manufacture" and "materials" also supports the conclusion that a signal, by itself, is not a manufacture. In economic terms, "raw materials" and "prepared materials" are considered "inputs" into the production of goods, along with "machinery, equipment, tools, labor services, [and] land." *See* PAUL A. SAMUELSON AND WILLIAM D. NORDHAUS, ECONOMICS 972 (13th ed. 1989). Typical raw materials are wood, metal, cotton or wool, which can, through a manufacturing process, be converted to "manufactures," such as furniture, cars, or clothing. Consistent with the *Chakrabarty* definition, as well as the holdings of *American Fruit Growers*, *Hartranft*, and *Anheuser-Busch*, "materials" are physical, exhaustible resources that must be fashioned in some way to produce "manufactures."[3]

Law dealing with design patents also supports the proposition that

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[3] The word "manufacture" appeared in the First Patent Act in much the same way it appears today. Patent Act of 1790, Ch. 7, 1 Stat. 109-112, sec. 1 (April 10, 1790) (specifying that a patent may be obtained for "any useful art, manufacture, engine, machine, or device, or any improvement therein"). Usage contemporaneous with that enactment is consistent with the interpretations taken by the Federal Circuit and the Supreme Court. *See, e.g.*, ALEXANDER HAMILTON, REPORT ON MANUFACTURES (1791), *reproduced in* 1 Reports of the Secretary of the Treasury of the United States 78-133 (1837) (equating "manufactures" with products of "manufacturing" processes, and recommending exemptions to domestic manufacturers and placing tariffs and prohibitions on imports); *id.* at 102 (listing seventeen different types of "manufactures," all of which are physical goods made from exhaustible resources); *id.* at 111 ("The true way . . . is to lay a duty on foreign manufactures of the material, the growth of which is desired to be encouraged [domestically].").

"manufactures" must contain "matter." As the Board observed, the term "manufacture" in section 101 has been held equivalent to the term "article of manufacture" in section 171. *In re Hruby*, 373 F.2d 997, 1000 (C.C.P.A. 1967) (citing *In re Hadden*, 20 F.2d 275 (D.C. Cir. 1927)). Because to be perceptible, a design must be embodied in matter, it follows that matter is an essential feature of "manufacture." Although amicus IPO questions whether tangibility is a requirement for design patents (IPO Br. at 9), it provides no example of a design patent that does not contain matter.

The Board specifically held that construing the claimed signal as, for example, an electrical signal, does not change the result. A12. Even if the claim is to an electrical signal – and thus has some physical reality (*see Arrhythmia Research Technology, Inc. v. Corazonix Corp.*, 958 F.2d 1053 (Fed. Cir. 1992)("'the view that there is nothing necessarily physical about signals is incorrect'")), this Court's reasoning in *Bayer* and *NTP* supports the exclusion of mere energy from the definition of "manufacture."

Amicus IPO argues that "the creation of an electrical signal meets the *Chakrabarty* Court's definition of manufacture: producing a signal from electricity (*i.e.*, electrons) by giving the electricity new forms, qualities and properties, through the data encoding process, where the production occurs by a machine." IPO Br. at 6. This argument fails on several levels. First, Nuijten's claims are not limited to signals that involve electrons or any other type of matter; they include optical signals and radio signals, neither of which require electrons for

propagation, and none of which thus require matter.[4] In holding that the creation and transmission of email was not a manufacturing process, *NTP* essentially rejected the argument that IPO is now making – that signals could somehow qualify as manufactures. *NTP*, 418 F.3d at 1323 (rejecting argument that accused infringer "'manufacture[d]'" email into its tangible structure" en route to holding that "the 'transmission of information,' like the 'production of information,' does not entail the manufacturing of a physical product"). Equating energy with "materials," and signals with "manufactures" would sever the meanings of both of those terms from their historical roots, with the result that any individual sitting in front of a computer would potentially be a "manufacturer" producing "manufactures" out of "raw materials" by simply clicking on a mouse, and an Internet Service Provider would become a "manufacturer" just by virtue of passing signals through its network. This is not the law.

Even if the signals were limited to electrical signals (and somehow excluded optical, radio, and other pure-energy signals), IPO's reliance on the fact that electrons "have mass" (and thus are "matter") (IPO Br. 12-13) is misplaced. An electrical signal is not transmitted, as IPO's brief implies, by a cluster of electrons

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[4] Electromagnetic waves, such as radiowaves and light waves, are self-propagating waves that are made possible by the fact that a changing electric field induces a changing magnetic field, which in turn induces a changing electric field, ad infinitum. RICHARD WOLFSON & JAY M. PASACHOFF, PHYSICS WITH MODERN PHYSICS FOR SCIENTISTS AND ENGINEERS 887-88 (3d ed. 1999). The propagation of these waves (at the speed of light) through space does not rely on electrons; the waves consist solely of electromagnetic energy, not matter. *See generally id.* at 887-906.

traveling from point A to point B. Instead, an electrical signal propagates, at nearly the speed of light, *through* the electrons in a conductor:

> [I]t's important to distinguish between the speed of the electrons and that of the electrical signal in the wire. As soon as electrons at one end of the wire begin moving, their electric fields affect adjacent electrons, which also begin moving. This effect propagates down the wire at what is in fact nearly the speed of light, so the current begins everywhere almost simultaneously."

WOLFSON & PASACHOFF at 686-87.[5] Thus, contrary to IPO's suggestion, an electrical signal, like optical signals and radio signals, is simply energy, *i.e.*, an electric field, and does not qualify as patentable subject matter for the same reasons that other energy signals do not.[6]

In holding that electrical signals did not constitute manufactures, the Board reached the same conclusion that the USPTO reached in promulgating its Interim Guidelines. "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility," 1300 Off. Gaz. Pat. and Trademark Office 142, 152 (Nov. 22, 2005) (hereinafter "Interim Guidelines"). Those Guidelines were promulgated in November 2005, in response to questions that had arisen regarding

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[5] As Wolfson and Pasachoff elsewhere explain, the speed at which electrons flow when they form an electrical current is on the order of 1 millimeter per second, whereas the speed of light is about 300 billion times that speed. WOLFSON & PASACHOFF at 685 (noting that speed of electrons in a given example is 0.284 mm/sec); *id.* at 893 (noting that speed of light is approximately 3×10^8 m/sec).

[6] Under IPO's logic, a bridge traversed by a patented automobile would be covered by claims to the automobile. The obvious objections are (1) the claims don't cover the bridge, just as Nuijten's claims don't cover the electrons, and (2) even if they did, there would be something very wrong with allowing a patent that would convert a preexisting bridge into a patent-infringing product just by virtue of a car driving over it.

the patentability of various computer-related subject matter, including signals. According to the Guidelines, the Supreme Court's definition of "manufacture," "require[s] substance, which a claimed signal does not have." 1300 Off. Gaz. at 152. While these Guidelines are not binding on this Court, the Court has recently cited with approval USPTO guidelines in other areas. *Enzo Biochem*, 323 F.3d at 964 (Fed. Cir. 2002) ("We are persuaded by the [USPTO Written Description] Guidelines on this point and adopt the PTO's applicable standard for determining compliance with the written description standard."); *Noelle*, 355 F.3d at 1349 (adopting position taken in USPTO Utility Guidelines); *Fisher*, 421 F.3d at 1372 (same). Given the reasonableness of the Guidelines' position on signal claims, the Guidelines should carry "at least some added persuasive force." *Mead Corp.*, 533 U.S. at 234-35.

D. Other Sections of the Patent Statute Support the Conclusion That Signals Do Not Fall Within a Statutory Category

The patent statute takes into account the differences between types of statutory subject matter in various provisions. *See, e.g.*, 35 U.S.C. §§ 271(g) & 295 (special provisions for products made by patented processes); 35 U.S.C. § 287 (distinguishing between product and process patents for marking purposes); 35 U.S.C. § 287(c) (distinguishing between medical procedures and other patentable processes for purposes of remedies); 35 U.S.C. § 273 (providing for special treatment of business methods). Accordingly, if signals were intended to be patentable subject matter, one would expect the patent statute to address some of the obvious differences between signals and other classes of patentable subject

matter. Congress's failure to address the ways in which signals differ from other statutory subject matter supports the conclusion that a signal is not a "manufacture." Indeed, the "anomalous results" that would result from holding signal claims patentable provide strong reasons for rejecting an interpretation of "manufacture" that would encompass signals. *See Bayer v. Housey*, 340 F.3d at 1376-77 (rejecting expansive definition of "manufacture" in 271(g) analysis based in part upon "anomalous results" that would attend such an interpretation).

If anything, the statute as a whole suggests that signals do not qualify as patentable subject matter. For example, the statute provides that "means plus function" language "shall be construed to cover the corresponding structure, material, or acts described in the specification or equivalents thereof." 35 U.S.C. 112, sixth paragraph. This language indicates that for claims to "manufactures," claim elements will consist of "structure" and/or "material," which in turn suggests that claims to pure energy were outside Congress's contemplation in enacting the patent laws.

The marking statute presents another example. 35 U.S.C. § 287(a) can be satisfied either by "fixing [on the patented article] the word 'patent' or the abbreviation "pat.", together with the number of the patent, or when, from the character of the article, this can not be done, by fixing to it, or to the package wherein one or more of them is contained, a label containing a like notice." *Id.* Because a signal, due to its transitory nature, can neither be labeled nor "contained" in a label-bearing package as contemplated this provision, the owner

of a "signal" patent would have no way to comply with the marking statute and thus obtain the benefits of marking. The failure of the marking statute to provide a means for marking "manufactures" that do not contain matter is further evidence that Congress did not intend for mere signals to be patentable subject matter.

The lack of any guidance in the statute on how to deal with unique infringement and damages issues posed by patented signals also suggests that signals were far outside Congress's contemplation of patentable subject matter. For example, allowing signal claims would present "innocent infringement" issues that do not arise in the context of traditional manufactures. A traditional manufacturer is aware that it is manufacturing some kind of product, which might be covered by a patent. An Internet Service Provider ("ISP"), by contrast, is not aware of the content or structure of signals that pass through its network, and yet could be held liable for patent infringement if claims like Nuijten's were considered allowable subject matter. The lack of any safe-harbor in the statute – or any contemplation of a safe-harbor in the legislative history – supports the conclusion that Congress did not contemplate that transmitted signals would qualify as patentable subject matter. *Cf.* 17 U.S.C. § 512 (providing safe-harbors for ISPs for copyright infringement).

E. Neither Nuijten Nor IPO Has Provided Any Basis for Holding Signals To Be Patentable Subject Matter

1. The "Useful, Concrete, and Tangible Result" Test Does Not Bring Signals Into a Statutory Category

Cases like *State Street Bank & Trust Co. v. Signature Financial Group,*

149 F.3d 1368 (Fed. Cir. 1998), *AT & T Corp. v. Excel Communications, Inc.*, 172 F.3d 1352 (Fed. Cir. 1999), and *In re Alappat* do not support Nuijten's position. Under those cases, the existence of a "useful, concrete, and tangible result" for an invention that is already in a statutory category will preclude rejection of the patent based on the "abstract idea" exception. But the existence of a "tangible" result says nothing about whether a particular claim falls into a statutory category. *See State Street*, 149 F.3d at 1375 n.9 ("Of course, the subject matter must fall into at least one category of statutory subject matter."). Indeed, the Court in *Bayer* "rejected this 'tangible result' test for section 271(g)," *NTP*, 418 F.3d at 1323-24 (citing *Bayer*, 340 F.3d at 1378), and by implication rejected it for the term "manufacture" in section 101 as well. Because Nuijten's signal claims are not within a statutory category, they do not benefit from this test.

2. The Patentability of Transitory Compositions of Matter Does Not Make Signals Patentable

Similarly, any reliance on the patentability of transitory compositions of matter (*see* IPO Br. at 13 (citing *In re Breslow*, 616 F.2d 516 (C.C.P.A. 1980))) is misplaced. In *Breslow*, the invention at issue fell into a statutory category – composition of matter – and the only question was whether the USPTO had correctly "read into § 101 a requirement that compositions of matter must be stable." 616 F.2d at 521. The Court properly refused to read such a requirement into the definition of "composition of matter." *Id.* Here, by contrast, the claim does not fall within a statutory category. The transient nature of signals might be a good policy reason for Congress to continue to exclude signal claims from

patentability, but their transient nature should not in any way *support* patentability.[7]

3. To the Extent Policy Arguments Are Relevant, They Favor Leaving the Patentability of Signals to Congress

Amicus IPO argues that "sound policy reasons weigh against the imposition of a tangibility requirement" on "manufactures" under section 101, IPO Br. at 10, and that "[u]nduly limiting the realm of patentable subject matter would only serve to deny protection to the most novel scientific and technological advances," *id.* As an initial matter, the Director notes that such policy arguments have little place in a section 101 analysis, where the Court is tasked with interpreting the statute provided by Congress. *See, e.g.*, *In re Fisher*, 421 F.3d at 1378 ("[P]ublic policy considerations . . . are more appropriately directed to Congress as the legislative branch of the government, rather than this court as a judicial body responsible simply for interpreting and applying statutory law."); *Diamond v. Chakrabarty*, 447 U.S. at 315 ("Congress has performed its constitutional role in defining patentable subject matter in 101; we perform ours in construing the language Congress has employed. In so doing, our obligation is to take statutes as we find them . . . .").

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[7] IPO quotes MANUAL OF PATENT EXAMINING PROCEDURE § 2106 IV.B.1(c) (8th ed. 2005) as stating that "a signal claim directed to a practical application of electromagnetic energy is statutory regardless of its transitory nature." That guidance, which relied on *Breslow* for support, has been repudiated and superseded by the Interim Guidelines. *See* 1300 Off. Gaz. at 142 ("USPTO personnel are to rely on these Guidelines in the event of any inconsistent treatment of issues between these Guidelines and any earlier provided guidance from the USPTO.").

In any event, inventors are not being deprived of meaningful protection for their inventions; indeed, in this case, Nuijten's process claims stand allowed, and the rejection of his storage medium claims has been reversed. *Cf. O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 101 (1853) (acknowledging patentability of *process* claims relating to signal technology); *Dolbear v. American Bell Tel. Co.* (a.k.a. "*The Telephone Cases*"), 126 U.S. 1, 533-35 (1888) (same); *In re Warmerdam*, 33 F.3d 1354, 1361-62 (Fed. Cir. 1994) (allowing claims to machine memory storing a data structure, but not for data structure itself); *In re Lowry*, 32 F.3d 1579, 1583-84 (Fed. Cir. 1994) (allowing claims to data structure stored on a storage medium); *In re Beauregard*, 53 F.3d 1583, 1584 (Fed. Cir. 1995) (allowing claims to software stored on a storage medium). Nuijten cites the oft-quoted statement that "anything under the sun" may be patented. Taken literally, it is not true: something that does not fall within a statutory category or which falls into a judicial exception is not patentable. To be more accurate, one should state that anything under the sun that falls within a statutory category and not within a judicial exception may be patented. *See State Street Bank & Trust Co. v. Signature Financial Group*, 149 F.3d at 1375 n.9 ("Of course, the subject matter must fall into at least one category of statutory subject matter."); Interim Guidelines, 1300 Off. Gaz. at 144 ("[T]he phrase 'anything under the sun that is made by man' is limited by the text of 35 U.S.C. § 101, meaning that one may only patent something that is a machine, manufacture, composition of matter or a process.") (citing *Alappat*, 33 F.3d at 1542, and *Warmerdam*, 33 F.3d at 1358).

Given that the patent statute has consistently been interpreted in a way that would exclude energy such as electrical signals from patentability, any policy considerations weigh in favor of leaving the question to Congress. Moreover, Congress would need to consider several related issues – e.g., patent marking, infringement safe harbors, etc. (*see supra* pp. 19-21) – if it determined that pure signals were statutory subject matter under section 101. As this Court has recently stated, "[W]e think it is best to leave to Congress the task of expanding the statute if we are wrong in our interpretation. Congress is in a far better position to draw the lines that must be drawn if the product of intellectual processes rather than manufacturing processes are to be included within the statute." *Bayer v. Housey*, 340 F.3d at 1376-77 (noting the "anomalous results" that would occur if the Court accepted the appellant's interpretation of section 271(g)). Moreover, as the Supreme Court has cautioned,"It is our duty to construe the patent statutes as they now read, in light of our prior precedents, and we must proceed cautiously when we are asked to extend patent rights into areas wholly unforeseen by Congress." *Parker v. Flook*, 437 U.S. 584, 596 (1978). While it is true that "advances in science and technology often blur once-clear boundaries" (IPO Br. at 10), in this case the Director does not believe that manipulated forms of energy fall within the meaning of "manufacture" as that term appears in section 101, as interpreted by the Supreme Court and this Court. Accordingly, the Director respectfully submits that it is up to Congress, not the Agency or the courts, to decide whether to expand patentable subject matter to encompass energy forms such as signals. Congress is

in the best position to perform the complex balances necessary to promote innovation without stifling it. *See Lab. Corp. of Am. Holdings v. Metabolite Labs., Inc.*, 126 S. Ct. 2921, 2922 (2006) (Breyer, J., dissent from dismissal as improvidently granted) ("[T]he reason for the [abstract idea] exclusion is that sometimes too much patent protection can impede rather than "promote the Progress of Science and useful Arts."); *id.* ("Patent law seeks to avoid the dangers of overprotection just as surely as it seeks to avoid the diminished incentive to invent that underprotection can threaten.").

F. The Claimed Signal Is an Abstraction

Supreme Court cases dealing with the "abstract idea" exclusion to patentability typically involve subject matter that arguably meets one of the statutory categories. *See, e.g., Gottschalk v. Benson*, 409 U.S. at 67-68 (holding method claims involving use of a digital computer too "abstract" to be patentable under 35 U.S.C. § 101); *see also Diamond v. Diehr*, 450 U.S. 175, 185 (1981) ("Excluded from . . . patent protection are . . . abstract ideas.") (citing *Parker v. Flook*, 437 U.S. 584, *Gottschalk v. Benson*, 409 U.S. at 67, and *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948)). The principle from those cases – that some subject matter is too abstract to warrant patent protection – provides an additional basis for rejecting the claims at issue here. As explained above, claim 14 can be read to claim a signal that is merely data, and thus neither concrete nor tangible. As such, the Board properly held that it was too abstract to be patentable. A7-8.

Although the Board did not reach the question, the Director believes that even if interpreted as an electrical signal, the claimed signal is still unpatentable as an abstraction. As we have shown above, an electrical signal does not fall into any of the four statutory categories, essentially because it is neither "concrete" nor "tangible" enough to qualify as patentable subject matter. For similar reasons, the claimed electrical signals can be excluded from patentability as being too abstract. *Labcorp*, 126 S. Ct. at 2928 (Breyer, J) (dissent from dismissal as improvidently granted) (describing the result produced by the computer programming process in *Gottschalk v. Benson* – which rejected the claims as abstract – to be "arguably" tangible when the software is executed "within the computer's wiring system").

VI. CONCLUSION

The Board properly found that Nuijten's claims 14, 22-24 are not directed to patentable subject matter. Since Nuijten has failed to show that the Board committed any reversible error in its decision, this Court should affirm the Board's decision.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I certify that on November 7, 2006, I caused two copies of the foregoing BRIEF FOR APPELLEE DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE to be transmitted via Express Mail to the following addresses:

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