

United States District Court,
S.D. New York.

LEIGHTON TECHNOLOGIES LLC,
Plaintiff-Counterclaim Defendant.

v.

OBERTHUR CARD SYSTEMS, S.A.,
Defendant-Counterclaim Plaintiff.

No. 04 CIV. 2496(CM)

March 9, 2005.

Background: Suit was brought alleging infringement of patents describing a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element and an aesthetically pleasing, smooth finished surface that was capable of receiving dye sublimation printing. Defendant denied infringement and contested the validity of the patents.

Holdings: In construing disputed claim terms, the District Court, McMahon, J., held that:

(1) phrase "electronic element," was not susceptible to narrow construction which limited the term to a combination of a microchip and an antenna, and

(2) terms "first," "second" and "third," as used in patent claims referred to the sequential order in which the steps were to be performed.

Claims construed.

5,817,207, 6,036,099, 6,214,155, 6,514,367. Construed.

Blair M. Jacobs, Robert A. Gutkin, Sutherland, Asbill & Brennan, L.L.P., Washington, DC, Joseph Floriani, Patrick L. Parker, Valeria Calafiore, Patrick Lee Parker, Clifford Chance US LLP, New York, NY, for Plaintiff.

Frank Michael Gasparo, Baker & McKenzie (NY), New York, NY, for Defendant/Claimant.

James David Jacobs, Baker and McKenzie, New York, NY, for Claimant.

DECISION CONSTRUING DISPUTED CLAIM TERMS
(Markman Decision)

MCMAHON, District Judge.

This is a patent infringement case.

Plaintiff, Leighton Technologies LLC ("Leighton"), owns U.S. Patent Nos. 5,817,207, 6,036,099, 6,214,155 and 6,514,367 (collectively, the "Patents" or "patents in suit"). All four Patents relate to radio frequency identification ("RFID") technology, which is the basis for the so-called "smart card," a plastic card that

includes an electronic element (such as a computer chip) and a reader, and that is used in numerous common applications including security swipe cards, credit/debit cards, mass transit access, toll collection (EZ-Pass), and government identification. (Plaintiff's Brief in Support of Its Claim Construction, dated Nov. 5, 2004 ("Pl. Br.") at pp. 1, 3-4.)

Smart cards come in three forms. As the name suggests, a "contactless" smart card transmits a signal when it is placed near the reading device, even if the card is contained in a purse or wallet. A "contact" smart card requires contact between a magnetic strip on the card and the reading device. A "dual function" card works with or without contact. (*See* Defendant Oberthur Card Systems, S.A. Markman Brief, dated Nov. 5, 2004 ("Def. Br.") at p. 3.) Contactless and dual function smart cards all contain a computer chip and antenna, one or both of which are encapsulated between plastic sheets. (*See, e.g.*, '207 patent; '099 patent.) In addition to an embedded electronic element, dual function cards also have an exposed electronic surface to facilitate contact transmission. (*See, e.g.*, '099 patent; '367 patent.)

The Patents describe processes for making smart cards. Specifically, they claim the use of a "highly coordinated" lamination process involving heat, cooling and the application of pressure to encapsulate an electronic component that is essential to signal transmission between two plastic sheets to form contactless and dual function smart cards. (Pl. Br. at 1, 4.) The Patents allegedly improve over prior art by eliminating the need to create a protective barrier around the embedded electronic element, thereby uncomplicating the manufacturing process. Plaintiff's process also produces a card with a surface smooth enough to receive dye sublimation printing. (*See, e.g.*, '207 patent, Abstract; Def. Br. at 5-6 (citing the 60,005,685 provisional application that matured into the '207 patent); Pl. Br. at 1, 9.)

Defendant Oberthur Card Systems, S.A. ("Oberthur") also manufactures smart cards. Plaintiff alleges that Defendant and its subsidiaries knew about and infringed the Patents in Oberthur's manufacturing processes. (Pl. Br. at 1.) Defendant denies infringement and contests the validity of Plaintiff's Patents, noting that "chip" cards, including contactless and dual function smart cards, have been manufactured using lamination techniques for years prior to the Patents, and that lamination has long been a well-known procedure for bonding card layers using heat and pressure. (Def. Br. at 4.)

[1] Before reaching the issues of validity and infringement, this Court must construe the claims. This function has resided with the Court since the Federal Circuit decided, in *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 978-79 (Fed.Cir.1995), *aff'd* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996), that claim construction presented a question of law for a judge, not one of fact for a jury.

Leighton has identified 36 claims in the Patents requiring construction: claims 1, 6, 7, 8, 11, 14-16 of the '207 patent; claims 1, 6, 7, 8, 12-15 of the '155 patent; claims 1, 6, 7, 9, 12, 14-16 of the '099 patent; and claims 1, 6, 9, 12, 15-17, 19-23 of the '367 patent. (Pl. Br. at 13). The parties agree on the meaning of most of the terms used in the Patents. The fourteen disputed terms in these claims requiring construction are: (1) "electronic element" (Def. Br. at 2; Pl. Br. at 13); (2) "non-electronic carrier" (Def. Br. at 2; Pl. Br. at 13); (3) "directly" (Def. Br. at 2; Pl. Br. at 13); (4) "comprising the steps of" (Def. Br. at 2); (5) "encapsulated by/encapsulating" (Def. Br. at 2); (6) "coating at least one of said outer surfaces of said core with a layer of ink" (Def. Br. at 2; Pl. Br. at 13); (7) "minimal first ram pressure" (Def. Br. at 2); (8) "first pressure, second pressure, third pressure" (Def. Br. at 2); (9) "controlled flow" (Def. Br. at 2); (10) "cooling said core while applying a second pressure" (Def. Br. at 2); (11) "cooling said core in conjunction with the concurrent application of a third pressure" (Def. Br. at 2); (12) "plastic core sheets" (Pl. Br. at 13); (13) "laminator apparatus" (Pl. Br. at 13); and (14) "milling" (Pl. Br. at 13).

Principles of Claim Construction

Certain principles deeply embedded in patent law guide the court in claim construction.

The meaning of a claim should be interpreted, if at all possible, in light of the intrinsic evidence: the claim language itself, the specification contained in the patent and the patent's prosecution history. *Markman*, 52 F.3d at 979. The intrinsic evidence constitutes the public record of the patent on which the public is entitled to rely. *Id.* If the intrinsic evidence is sufficient to resolve the meaning of a disputed term, it is improper to resort to extrinsic evidence, such as expert testimony or treatises, in constructing claim language. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed.Cir.1996). Only if intrinsic evidence is insufficient to resolve an ambiguity in a disputed claim term may a court resort to extrinsic evidence. *CVI/Beta Ventures, Inc. v. Tura, L.P.*, 112 F.3d 1146, 1153 (Fed.Cir.1997).

To define the scope of the patented invention, the Court must look first at the words of the claims themselves. *Vitronics Corp.*, 90 F.3d at 1582 (citing *Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 620 (Fed.Cir.1995)). Words in the claim are generally given their ordinary and customary meaning as understood by someone skilled in the art. However, "a patentee may choose to be his own lexicographer" and assign special definitions to the words in the claim, as long as those definitions are clearly stated in the patent specification or file history. *Id.* (citing *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1578 (Fed.Cir.1996)). Therefore, "it is always necessary to review the specification to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning. The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication." *Id.* (citing *Markman*, 52 F.3d at 979). The Federal Circuit has stated that "claims must be read in view of the specification, of which they are a part." *Id.* (citing *Markman*, 52 F.3d at 979); *see also Gart v. Logitech, Inc.*, 254 F.3d 1334, 1341 (Fed.Cir.2001) ("it is certainly correct that the specification and the prosecution history should be consulted to construe the language of the claims."). Because the specification must contain a description sufficient to enable those of ordinary skill in the art to make and use the invention, the specification "is the single best guide to the meaning of a disputed term." *Vitronics*, 90 F.3d at 1582.

The Court also may consider the prosecution history of the patent. *Id.* (citing *Markman*, 52 F.3d at 980; *Graham v. John Deere*, 383 U.S. 1, 33, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966)). The prosecution history is the complete record of the proceedings before the Patent and Trademark Office. During the course of these proceedings, the applicant may have made express representations regarding the scope of the invention, so the prosecution history is "often of critical significance to determining the meaning of the claims." *Id.* (citing *Markman*, 52 F.3d at 980; *Southwall Tech., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576 (Fed.Cir.1995)). Claim terms may appear to contain plain language, but the prosecution history may demonstrate that the claims do not cover some matters that would otherwise be encompassed in the plain meaning of the words used. Prosecution histories often contain an analysis of the distinctions between the prior art and the applicant's claims, providing the Court with clues to limitations of the claims. *Id.* at 1573; *Autogiro Co. of America v. United States*, 181 Ct.Cl. 55, 384 F.2d 391, 399 (1967). Furthermore, "the prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution." *Southwall Tech., Inc.*, 54 F.3d at 1576. Even when the written description would otherwise support a construction, the prosecution history, which is generated afterwards, can relinquish coverage of a claimed embodiment. *Rheox, Inc. v. Entact*, 276 F.3d 1319, 1325-27 (Fed.Cir.2002).

[2] For process or method claims like the ones at issue here, claim interpretation may involve ascertaining whether the claim may be interpreted to require that the steps be performed in a specific order. *Interactive Gift Express, Inc. v. CompuServe Inc.*, 256 F.3d 1323, 1342 (Fed.Cir.2001). The Federal Circuit recently crafted a two-part test, both prongs of which involve only intrinsic evidence, to determine whether the steps included in a process claim must be performed in the recited order:

First, we look to the claim language to determine if, as a matter of logic or grammar, they must be performed in the order written ... If not, we next look to the rest of the specification to determine whether it "directly or implicitly requires such a narrow construction."

Altiris, Inc. v. Symantec Corp., 318 F.3d 1363, 1369-70 (Fed.Cir.2003) (internal citations omitted).

[3] [4] Ordinarily, terms are to be construed so that they have the same meaning throughout a patent. Southwall Technologies, Inc. v. Cardinal IG Co., 54 F.3d 1570, 1574 (Fed.Cir.1995). Finally, claim language should be read in a manner that causes the claim to make sense: courts are to construe claims so as to sustain a patent's validity where possible. ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577 (Fed.Cir.1984).

Background of the Patents At Issue

In this case, there are four patents in suit.

The '207 patent describes a hot lamination process for manufacturing a "contactless smart card" with an embedded electronic element and an aesthetically pleasing, smooth finished surface that is capable of receiving dye sublimation printing. *See, e.g.*, '207 patent, Abstract, Ex. 1 to Declaration of James David Jacobs, dated Nov. 5, 2004 ("Jacobs Decl."). Noting increased credit card and ATM fraud, the Background of the Invention for the '207 patent elaborates that this particular type of smart card-with its embedded computer chip that is capable of storing information about the holder-is intended to fill "a need in the plastic card industry to provide a more secure plastic card that is very difficult or impossible to fraudulently manipulate." '207 patent, col. 1:52-54. To that end, the embedded electronic element "may perform a wide variety of functions and take a wide variety of forms." '207 patent, Detailed Description of the Invention, col. 3:35-37. In addition, the process described in the '207 patent (which yields a card that complies with all industry standards and specifications) is not as expensive or difficult as other smart card processes, and produces a more aesthetically pleasing card than prior patented processes-i.e., a thinner, smoother card that can receive dye sublimation and so does not reveal its embedded computer chip. '207 patent, col. 1:58-col. 2:13.

Claim 1 of the '207 patent (an independent claim) is representative of the context of most of the disputed terms at issue in this suit (bolded): FN1

FN1. The parties do not cite to the same sections of the Patents for the context of the disputed terms, however neither party appears to contest the context relied upon by the other. Plaintiff, for example, cites to the '207 and '099 patents in the beginning of its brief, and indicates that the context is representative of the '155 and '367 patents, respectively. (*See, e.g.*, Pl. Br. at 4, n. 4.) This would appear to be accurate; as discussed below, the Patents are all continuations or continuations-in-part of the '207 patent. Therefore, for purposes of this Markman decision, I will refer to the Patents where possible, and to the briefs where necessary to avoid confusion.

A process for incorporating at least one **electronic element** in the manufacture of a plastic card, **comprising the steps of:** (a) providing first and second **plastic core sheets**; (b) positioning said at least one **electronic element** in the absence of a **non-electronic carrier directly** between said first and second **plastic core sheets** to form a core, said **plastic core sheets** defining a pair of inner and outer surfaces of said core; (c) positioning said core in a **laminator apparatus**, and subjecting said core to a heat and pressure cycle, said heat and pressure cycle **comprising the steps of:** (i) heating said core for a first period of time; (ii) applying a **first pressure** to said core for a second period of time such that said at least one **electronic element** is **encapsulated by** said core; (iii) **cooling said core while applying a second pressure** to said core; (d) **coating at least one of said outer surfaces of said core with a layer of ink**; and (e) applying a layer of overlamine film to at least one of said outer surfaces of said core.

'207 patent, col. 6:18-40. (*See also* Declaration of Neil G. Cohen in Support of Plaintiff's Brief in Support of Its Claim Construction ("Cohen Decl."), Vol. 2 at L2-4.)

Claim 16 of the '207 patent (also an independent claim) includes in the first chronological step of the heat and pressure cycle the following additional instruction, which incorporates additional disputed terms:

(i) heating said core in a laminator, in the presence of a **minimal first ram pressure**, to a temperature which causes **controlled flow** of said plastic which makes up said first and second **plastic core sheets**; (ii) applying a **second pressure** uniformly across said core for **encapsulating** said at least one **electronic element** within said **controlled flow** plastic; (iii) subsequently **cooling said core in conjunction with** the concurrent application of a **third pressure** uniformly across said core.

'207 patent, col.8: 12-32.

In plain English, the '207 patent teaches that an electronic element is positioned between plastic sheets to form a "core." The specification acknowledges that these "electronic elements ... and their insertion into plastic cards is not new, however, the present invention provides a new hot lamination process for manufacturing plastic cards ... with these electronic elements." '207 patent, col. 3:53-62. (*See also* Pl. Br. at 4.) Specific disclosed examples of the electronic element include microchips connected to various types of antennas and "any other suitable electronic element." '207 patent, col. 3:48-52. During oral argument at the Markman hearing, the court likened this "core" to a sandwich, in which the plastic sheets were the pieces of bread and the electronic element was the filling.

Once created, the plastic core "sandwich" is then placed in a laminator between upper and lower "platens," one of which is movable. The laminator heats, cools and applies hydraulic pressure to the core via intermediate layers consisting of "laminating pads" and "steel plates." *Id.* at col. 4:22-40. (*See also* Pl. Br. at 5.) The core and the intermediate layers form a "book. " '207 patent, col. 4:33-40.

A first lamination cycle is initiated by closing the laminator platens and applying little or no pressure to the book. '207 patent, col. 4:41-44. A heat cycle is initiated to bring the temperature of the platens up for a predetermined period of time (e.g., 275-400 (deg.) F for more than 5 minutes). '207 patent, col. 4:44-48. (*See also* Pl. Br. at 5.) The pressure of the laminator is then increased to facilitate the flow of the plastic core sheets to encapsulate the electronic element within the sheets. '207 patent col. 4:48-54. (*See also* Pl. Br. at 5.) The pressure cannot be too great or it will damage the electronic element.

The laminator then applies a chill cycle to the book in which the pressure of the laminator is increased until the platens have cooled to a predetermined temperature for a predetermined period of time (e.g., approximately 40-65 (deg.) F for approximately 10-15 minutes). '207 patent, col. 4:66-5:5. (*See also* Pl. Br. at 5-6.)

The core is then removed from the laminator, whereupon it may be coated on at least one of its outer surfaces with a layer of ink. '207 patent, col. 5:6-12. A clear layer of overlamine film may be applied to the ink-coated core. *Id.* at col. 5:25-31. Individual cards may be cut out from the laminated core. *Id.* at col. 5:67-6:4.

The '155 patent application was filed approximately two years after the '207 application. (*See* Def. Br. at 10.) The '155 patent application is a continuation of the '207 patent application and duplicates in all substantive respects the '207 patent specification. (*Id.*) The similarities between the '155 and '207 patents are substantial. Looking just at the independent claims: claim 1 of each is identical, except that claim 1 of the '155 patent omits the ink-coating step; and claim 15 of the '155 patent is the same as claim 16 of the '207 patent, except that claim 15 of the '155 omits the printing step. The lamination process claimed in the '207 and '155 patents, including the serial steps of heating, cooling and applying pressure, is identical. (*Id.*)

Leighton filed the application that matured into the '099 patent approximately 10 months after filing the application that matured into the '207 patent. The '099 patent is a continuation-in-part of the '207 patent

application. (*Id.* at 8.) Whereas the '207 patent is directed to the hot lamination process for creating a contactless card, the '099 patent is directed to a dual function card—a combination contact/contactless card. (*Id.*) Despite the fact that the patents relate to different types of cards, the specifications of the '207 and '099 patents share virtually the same disclosure. There is, however, an additional step involved in creating the dual function card, which includes the last group of additional terms: "**milling** a region of said core to a controlled depth so as to form a cavity which exposes at least one contact pad of said **electronic element**," and "inserting a second **electronic element** into said cavity, the second **electronic element** being in electrical communication with the at least one **electronic element**." '099 patent, col. 9:3-5, col. 10:17-19; *see also* '367 patent, claims 1, 22, 23.

This additional step allows for placement of a second electronic element into the cavity to facilitate the contact function of a dual function card.

Leighton filed the application that matured into the '367 patent approximately three years after the '207 application, and approximately two years after filing the application for the '099 patent. (*See* Def. Br. at 11.) The '367 patent application is a continuation of the '099 patent and, except with respect to matters not relevant here, the specifications are identical. (*Id.*) It is also a continuation-in-part of the '207 patent. The '367 patent, like the '099 patent, describes a hot lamination process for creating a dual function contact/contactless smart card, and so it contains the "milling" step and insertion of a second electronic element as in the '099 patent.

The main difference between the contactless card process (the '207 and '155 patents) and the dual function card process (the '099 and '376 patents) appears to be that one or more electronic elements are embedded during lamination in the plastic core sheets in the process described by the former patents, whereas in the latter patents, in addition to that embedding, another electronic element is inserted into a milled cavity after lamination to allow the card to function in either a contact or contactless mode. (*See, e.g.*, Pl. Br. at 10, describing Figures 1 and 2 of the '099 patent.)

Significantly, there is nothing—no container, no recess and no physical buffer of any sort—that protects the embedded electronic element during lamination in any of the Patents at issue here—whether a micro-chip and antenna, or just an antenna. *See, e.g.*, '207 patent, col. 6:23-25. Both parties acknowledge that the absence of a "buffer" or "buffer zone" is the critical improvement of these patents over prior art, specifically over U.S. Patent No. 4,450,024, which required protection for the electronic element during lamination. *See, e.g.*, '024 patent, col. 6:60-7:8.

Indeed, the Patent Office initially rejected application Claims 1-19 of the '207 patent as being obvious over the '024 patent. (Pl. Br. at 19.) Claim 1 of the '207 patent originally recited:

1. A hot lamination process for the manufacture of a plastic card, said process comprising the steps of: (a) providing first and second plastic core sheets; (b) positioning at least one **electronic element between said first and second plastic core sheets** to form a layered core.

(*Id.*) In response to the Patent Office's rejection, the bolded language was modified to read, "**electronic element in the absence of a non-electronic carrier directly between said first and second plastic core sheets...**" (*Id.* (emphasis added).) This modified language appears in each of the four Patents, to reflect this same improvement. In distinguishing the '207 patent from the '024 patent, Leighton noted that the '024 patent required that the "electronic element ... be placed in a protective carrier disk," which protection is not necessary in the '207 patent (or any of the Patents at issue in this case). (Pl. Br. at 20.) Thus, Leighton's modification of the language indicated that the '207 patent—and the rest of the Patents—improved on the '024 patent by eliminating the need to specifically protect the electronic element during lamination.

Construction of the Disputed Terms

With one key exception, Oberthur and Leighton agree that all the terms should be defined in the same way across all four related Patents. Oberthur believes that the term "electronic element" cannot be defined in the same manner for the '367 and '099 patents as it is for the '207 and '155 patents-and, indeed, argues that it cannot be defined at all for the former patents. I disagree.

1. "Electronic Element"

[5] This term will be defined as "a device or thing that has (1) distinct characteristics related to electricity; together with (2) terminals at which it may be connected to other distinctly electrical devices or things in order to form a circuit (3) in which electrons move through devices called semiconductors."

The phrase "electronic element" appears in claim 1 of each of the four Patents: "A process for incorporating at least one **electronic element** in the manufacture of a plastic card ... positioning said at least one **electronic element** in the absence of a non-electronic carrier directly between said first and second plastic core sheets to form a plastic core..." '207 Patent, Claim 1; '155 Patent, Claim 1; '099 Patent, Claim 1; '367 Patent, Claim 1; '367 Patent, Claim 20. (*See also* Cohen Decl., Exh. L.)

It also appears in the following language of the '207 and '155 patents: "[P]ositioning at least one **electronic element** in the absence of a non-electronic carrier directly between said first and second plastic core sheets..." '207 Patent, claim 16 and '155 Patent, Claim 15. (*See also* Cohen Decl., Exh. L.) "**Electronic element** may take a wide variety of forms and perform a wide variety of functions. As shown ... **electronic element** may be provided by a micro-chip and a circuit board antenna, a read/write micro-chip and a wire coil antenna, or any other suitable electronic element." '207 Patent, Specification, col. 3:46-52 (internal references omitted).

The specification of the '099 patent states that the "**electronic element** may take a wide variety of forms (microprocessor chip, circuit board, transponder, etc.)." (Pl. Br. at 15-16, quoting the '099 Patent at col. 4:35-37.)

Plaintiff urges that an "electronic element" in all of the patents in suit should be construed to mean "a device having distinct electrical characteristics and having terminals at which it may be connected to other elements to form a circuit that utilizes a semiconductor device." (Pl. Br. at 14).

Defendant urges that the term be construed to mean "A microchip and an antenna" in the '207 and '155 patents. Defendant further contends that the term is ambiguous in the context of the '099 and '367 patents, and thus cannot be defined at all.

Because this is the most hotly contested term, and its definition is critical to the construction of the patents, I will summarize the parties' arguments in some detail. *Definitional Sources:*

Plain Meaning: Both parties place great reliance on dictionary definitions. Yet while using the same dictionary, they come up with two different "plain" meanings for this key phrase.

Plaintiff notes that the Dictionary of Scientific and Technical Terms (McGraw Hill 5th ed. 1994) ("McGraw Hill") does not contain a definition for the phrase "electronic element." But it does define both the word "electronic" and the word "element." FN2 So Plaintiff puts those two definitions together and argues that the "definitions of the words that make up this term provide a clear ordinary meaning." (Pl. Br. at 14).

FN2. Both parties agree on the use of the McGraw Hill Dictionary of Scientific and Technical Terms.

Plaintiff cites to the definition the word "element," as "component," which in turn is defined as, "any

electric device ... having distinct electrical characteristics and having terminals at which it may be connected to other components to form a circuit." Id. at 424. McGraw Hill defines "electronic" as "[p]ertaining ... to circuits ... utilizing electron devices ..." id. at 661, and defines "electron device" as "a device in which conduction is principally by electrons moving through a vacuum, gas, or semiconductor." Id. at 660. Observing that vacuum and gas conduction are irrelevant to the patents in suit, Plaintiff notes that McGraw Hill defines the term "semiconductor device" as an "electronic device in which the characteristic distinguishing electronic conduction takes place within a semiconductor." Id. at 1790. (McGraw Hill (6th ed.2003), p. 1895 also defines "semiconductor" to mean, "A solid crystalline material whose electrical conductivity is intermediate between that of a conductor and an insulator, ranging from about 10^5 mhos to 10^{-7} mho per meter, and is usually strongly temperature-dependent." Plaintiff makes no reference to this definition.)

Defendants agree with Plaintiff's definition of the word "electronic" and also with Plaintiff's observation that the word "element" is synonymous with "component." But taking off from that, they observe that McGraw Hill-while lacking a definition for the phrase "electronic element"-does contain a definition for the phrase "electronic component." And it is not the same as the combined definition of the words "electronic" and "element" crafted by Plaintiff. Rather, "electronic component" means, "A component which is able to amplify or control voltages or current without mechanical or other non-electrical command, or to switch currents or voltages without mechanical switches; examples include electron tubes, transistors, and other solid-state devices." McGraw Hill at 701. Defendant argues that this is superior to a definition that combines the separate definitions for the terms "electronic" and "component" because, *inter alia*, the term "component" as defined by McGraw Hill relates to the wrong field-Electricity as opposed to Electronics-and is therefore not apt.FN3

FN3. I find it interesting that McGraw Hill contains no definition for the term "element"-the admitted synonym for "component" (and the word Leighton actually uses in the patent)-that falls within the field of Electronics, either. Indeed, the "element-component" synonym that Defendant invokes in order to turn my attention to the phrase "electronic component" (which is not the phrase used in the patent) is found under the heading Electricity, not Electronics, which turns Defendant's argument back on itself!

It is important to Defendant that I prefer the definition of "electronic component" over Plaintiff's combined definition of the separate terms "electronic" plus "component" because the definition of "electronic component" incorporates (and, according to Defendant, is limited to) "solid-state devices." That term is defined by McGraw Hill to mean, "A device, *other than a conductor*, which uses magnetic, electrical and other properties of solid materials, as opposed to vacuum or gaseous devices." The italicized language (which appears to limit "electronic components" to solid-state devices, such as micro-chips) is critical to Defendant for two reasons. First, Defendant argues that the only solid state device that satisfies the criteria of the patent is a micro-chip. Second, in the '099 and '367 patents, a bare antenna, which is a conductor (and thus not a solid state device), is embedded. It is that, Defendant argues, which renders the term "electronic element" indefinable in connection with those two patents.

The fact that both parties agree that the word "component" is synonymous with the patentee's chosen word "element," and that there is a definition for the phrase "electronic component" in McGraw Hill, might be thought to solve the definitional conundrum. Indeed, there is a certain Occam's Razor kind of elegance to Defendant's point.

However, there are two serious flaws with this argument. First, defining "electronic element" to exclude a conductor, like an antenna, reads a disclosed embodiment (in the case of the '099 patent, the preferred embodiment) out of the patent. Adopting that definition is thus inconsistent with the rules that claims are to be construed so as to (1) make sense and (2) be consistent with the specifications.

Second, as is so often the case with scientific and technical definitions, Defendant's proposed definition is tautological-that is, it contains the very word ("component") that it purports to define. To be useful to a jury, the construction of the phrase "electronic component" cannot define the word "component" as "a component." FN4 Since there is no clue within the definition of "electronic component" to what a "component" might be (other than a non-exhaustive list of examples, about which more in a moment), one could only craft a workable definition of "electronic component" by incorporating into it the definition of the undefined word-"component"-that appears elsewhere in the McGraw Hill Dictionary. Of course, Defendant does not want me to do that, because then we would end up with Plaintiff's definition (or its functional equivalent)!

FN4. Since Defendant insists (and Plaintiff agrees) that "component" is synonymous with "element," I could turn to yet another dictionary-the Oxford English Dictionary, which is used by persons not skilled in any art except the art of looking up words-and find a definition of "element" that fits quite nicely into the language of the patent: "a constituent part." However, that definition would be far too broad to fit within Plaintiff's claimed invention (see below at 374-375).

What should be obvious from all of the above is that I cannot fashion a so-called "ordinary meaning" definition of the term "electronic element" by using a dictionary alone. Nor should I. When interpreting terms used in a patent, one is required to look at how the term is used in the patent itself and in its prosecution history, to see if that use is consistent or inconsistent with any dictionary definition. It is to that exercise that we now turn.

Specifications: The specifications for the '207 patent certainly do not suggest that the term "electronic element" should be defined as narrowly as Defendant urges. For example, it says:

Electronic element 20 may take a wide variety of forms and perform a wide variety of functions...[It may include] a micro-chip 22 including a wire antenna 24 connected thereto, a micro-chip 22' and a circuit board antenna 24', a read/write micro-chip 22" and a wire coil antenna 24", or any other suitable electronic element.

Similarly, in the related '099 patent, "Electronic element 20 may take a wide variety of forms (microprocessor chip, circuit board, transponder, etc.)." And as noted above, Fig. 4, one of the disclosed embodiments of the '099 patent, shows the electronic element to be a bare antenna.

Plaintiff has specifically disclaimed to the court any effort to invoke patent rights in whatever the "electronic element" might be. However, Plaintiff's use of broad language in the specifications clearly evinces an attempt to include any sort of electronic element that presently can or might in the future be usefully implanted in a smart card-not just micro-chips and antennas, which appear to be the preferred embodiment given today's technology.

[6] Defendant correctly notes that all of the disclosed embodiments in the '207 and '155 patents are variations on the "micro-chip plus antenna" theme, and all the disclosed embodiments in the '099 and '367 patents are variations on the "micro-chip or antenna" theme. But it is hornbook law that a patent is not limited to its disclosed embodiments. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed.Cir.2004) (unless patentee specifically indicates such a limitation, claims should not be construed as limited to embodiments of invention having a particular feature simply because all embodiments disclosed in the specifications share that feature). A review of the file wrapper does not disclose anything suggesting that Leighton ever disclaimed the use of any type of electronic device in connection with its process during the prosecution of the patent, so Oberthur cannot invoke any patent estoppel to limit the patent's scope to the disclosed embodiments.

Plaintiff further argues that construing "electronic element" to mean "micro-chip and antenna" with respect to the '207 and '155 patents would violate the doctrine of claim differentiation. Under this doctrine, each claim in a patent is presumed to have a different scope. *See, e.g., Versa Corp. v. Ag-Bag Int'l Ltd.*, 392 F.3d 1325, 1329-30 (Fed.Cir.2004). "The difference in meaning and scope between claims is presumed to be significant '[t]o the extent that the absence of such difference in meaning and scope would make a claim superfluous.'" *Id.* (quoting *Tandon Corp. v. United States Int'l Trade Comm'n*, 831 F.2d 1017, 1023 (Fed.Cir.1987)). Therefore, limitations of dependent claims are not read onto independent claims, because to do so would render the independent claims superfluous as duplicative of the dependent claims.

In the '207 patent, dependent claims 13 and 14 of the '207 patent narrow the scope of the term "electronic element" as it appears in independent claim 1 by specifying that the "electronic element" must be "a micro-chip and an associated wire antenna" (claim 13) or "a micro-chip and an associated circuit board antenna" (claim 14). Defining "electronic element" to mean only "a micro-chip and an antenna" would improperly impose the limitations of dependent claims 13 and 14 onto independent claim 1. Defendant fails to refute this argument.

Prosecution History: Plaintiff also argues that the prosecution history of these patents demonstrates that the term "electronic element" as used in the patents in suit should be read as broadly as Plaintiffs urge-and, moreover, that a person of ordinary skill in the art would so read it.

One of the critical prior art patents is U.S. Patent No. 5,519,201, a prior art patent that is cited in the prosecution history of the '367 patent. This patent relates to "smart card" technology. Persons skilled in the art would be expected to be familiar with this patent.

The '201 patent contains the following language concerning the electronics that make smart cards work:

Some identification cards include an integrated circuit and are known as 'integrated circuit cards' or 'Smart Cards.' More generally, herein, 'Smart Card' refers to any portable card-like device which includes one or more electronic components, i.e., active components such as integrated circuits, transistors and diodes, and passive components such as resistors, capacitors and inductors.

Col. 1:32-38.

Elsewhere in the '201 Patent, the inventor states that electronic elements (or components, as he calls them) can include:

integrated circuit modules, transistors, diodes, and passive components such as resistors, inductors and capacitors. Further, an integrated circuit module for use with the invention can be a printed circuit board to which is attached one or more integrated circuit chips, a printed circuit board without an integrated circuit chip attached, or just an integrated circuit chip.

(Pl. Br. at 16, quoting the '201 patent at col. 2:55-64.) This language is extremely broad and does not at all suggest that "electronic elements" in "smart cards" are limited to micro-chips and their antennas.FN5 Nor does it support Defendant's argument that the term "electronic element" as used in the '367 and '099 patents is indefinable because an antenna-which all parties agree is a "passive component" or an "inductor"-falls outside the ambit of "electronic elements." Defendant urges the Court to read these passages (in particular the former passage) such that only "active components" are encompassed within the reach of the term "electronic components," but such a reading defies logic as well as basic principles of English grammar.FN6

FN5. Similarly, the prior art U.S. Patent No. 5,412,192, cited in the provisional application for the '207 patent and teaching a system for changing the activation status of a data card, such as a charge card, uses

the phrase "internal electronics" to refer to the "wire coil antenna and micro chip" of the '207 provisional application and defines that phrase in an extremely broad manner to include "battery, fuses, crystal display, and photocell." ('207 Provisional Application at 19).

FN6. The quoted language in the '201 patent also indicates that Defendant's proposed use of the McGraw Hill definition of "electronic component" for the patents in suit is misplaced since it would read out the "passive components" included within the category of "electronic component" used in the '201 patent.

Defendant argues that an antenna cannot possibly be an electronic device because it is an electromagnetic device (according to McGraw Hill), which is something entirely different. However, as noted above, the word "electronic" mean "pertaining to electron devices." Antennas "pertain" or relate to "electron devices" by functioning with them to complete the circuitry that embodies the "smart card" technology.

Moreover, the prior art patents draw a distinction between active and passive electronic devices, with the latter plainly including devices that function using electromagnetic action. For example, the '201 patent notes that "electronic components" can include "passive components" such as "inductors," which would encompass antennas. '201 patent, col. 1:32-38.

Result

It is easy to reject Defendant's proposed definition of "electronic element" as "a combination of a microchip and an antenna" with regard to the '207 and '155 patents. Such a construction, as Plaintiff correctly observes, would violate almost every rule of claim construction. It is inconsistent with the broad language used in the specifications. It is inconsistent with prior art patents that use the same term. And it is far narrower than even the dictionary definition of the phrase "electronic component" that Defendant advances.

It is equally easy to reject Defendant's argument that the term "electronic element" is used differently in the '376 and '099 patents, and cannot be defined at all as used in those patents because one disclosed embodiment identifies something (an antenna) that is not, in fact, an electronic element. Defendant's thesis that this term is used differently in the latter two patents is entirely dependent on acceptance of its extremely narrow construction of the term "electronic element," which "limits that term to a combination of a microchip and an antenna." FN7 Since I have rejected that narrow construction, I must reject the argument based thereon. And the preceding discussion highlights the flaws in Defendant's claim that the term cannot be defined.

FN7. Specifically, Oberthur claims that because the '099 patent and '367 patents indicate that the *embedded* "electronic element" is only an antenna-not a micro-chip and antenna-this distinction renders the term ambiguous. (Def. Br. at 51.) Unless the definition of "electronic element" is confined to "microchip and antenna"-an argument I decline to accept-this argument makes no sense.

This leaves me with the task of deciding whether Plaintiff's proposed definition (or some variant on it) is the correct construction of the term, based solely on intrinsic evidence. As I make this decision, I must keep in mind that claim construction is essentially the crafting of a jury instruction, so the term definition must be comprehensible by a lay juror as well as one skilled in the art.

Leighton's proposed definition is "a device having distinct electrical characteristics and having terminals at which it may be connected to other elements to form a circuit that utilizes a semiconductor device." This combines the following definitions (from McGraw Hill):

Electronic: pertaining...to circuits.....utilizing electron devices

Electron devices: a device in which conduction is principally by electrons moving through a...semiconductor

Semiconductor Device: an electronic device in which the distinguishing electronic conduction takes place within a semiconductor

Component: any electric device...having distinct electrical characteristics and having terminals at which it may be connected to other components to form a circuit.

Plaintiff's invocation of the McGraw Hill definition of "component" rules out the use of a broader, less technical definition for the word element, such as "a constituent part." This is consistent with the argument made in Plaintiff's brief that, because the word "electronic" modifies "element," the patentee claims use of just one specific type of circuit—one that uses a semiconductor device.

Coupling this with the broad wording of the specification ("Electronic element 20 may take a wide variety of forms.....") and the equally broad use of the term electronic element and the analogous term electronic component in critical prior art patents, I conclude that to construe this term with reference solely to intrinsic evidence we must define additional terms (from McGraw Hill):

Semiconductor: a solid crystalline material whose electrical conductivity is intermediate between that of a conductor and an insulator...

Conductor: a wire, cable or other body or medium that is suitable for carrying electric current.

Insulator: a device having high electrical resistance and used for supporting or separating conductors to prevent undesired flow of current from them to other objects.

Electrical: related to or associated with electricity, but not containing or having its properties or characteristics.

I craft the following instruction to give to the jury concerning the phrase "electronic element":

Ladies and gentlemen, the first term that I must define for you is "Electronic element." That is a technical term. The word "electronic" means "pertaining to circuits that use something called electron devices." An electron device, for the purposes of this patent, is a device or thing in which electrical current is carried ("conducted" is the technical term) principally by electrons moving through something called a semiconductor. So electronic means "pertaining to circuits utilizing a semiconductor device." An "element" is the same thing as a "component," and a "component" is an electrical device (something that has distinct characteristics related to or associated with electricity) and that has terminals, or end points, at which it can be connected to other components to form a "circuit," which is a combination of electrically interconnected components. So "electronic element" means "a device or thing that has distinct characteristics related to electricity, and that also has terminals at which it may be connected to other distinctly electrical devices or things in order to form a circuit, in which electrons move through devices called semiconductors."

2. "Non-Electronic Carrier"

[7] A "non-electronic carrier" means, "A device that holds an electronic element to protect it from physical damage during lamination, where the device is not part of a circuit that utilizes a semiconductor device."

Plaintiff states that the phrase "non-electronic carrier" generally appears in the claims at issue in the

following context: "positioning said at least one electronic element in the absence of a **non-electronic carrier** directly between said first and second plastic core sheets." (Pl. Br. at 18, citing Cohen Decl. at Exh. L, p. 2.) Defendant refers to the same language in claim 1 of the '207 patent. Thus, as noted above, the essence of the Patents is the lack of any "non-electronic carrier."

According to Plaintiff, a "carrier" is defined as a "compartmentalized holder used for storing, transporting, hauling, and testing electronic devices to protect them from physical damage." (Pl. Br. at 18, quoting the Electronic Packaging, Microelectronics, and Interconnection Dictionary ("EPMI Dictionary"), p. 26.) Plaintiff refers to its prior definition of "electronic" as "pertaining to circuits utilizing semiconductor devices," and to Webster's Collegiate Dictionary (10th ed. 1999) ("Webster's"), p. 788, for the definition of "non-" as negating the "usual esp[ecially] positive characteristics" of "electronic." (Pl. Br. at 18.)

Plaintiff also urges that these dictionary meanings should be modified to reflect the prosecution history of the '207 patent, discussed above, during which Leighton clarified that no buffer zone or protection was needed for the embedded electronic element during lamination in any of the Patents. (See discussion supra, p. 369.)

Based on the dictionary definitions and the prosecution history, therefore, Plaintiff argues that a "non-electronic carrier" should be construed to mean "a holder used for electronic devices to protect them from physical damage, which device is not part of a circuit that utilizes a semiconductor device." (Id. at 372-373). Plaintiff omits from the dictionary definitions cited above words that it claims would be inaccurate here (i.e., compartmentalized, storing, transporting, hauling, and testing).

Defendant's proposed definition is very similar, and reads, "A structure without any substantial electronic function, such as a recess, buffer or protective carrier, that at least partially protects during lamination the 'electronic element' from damage caused by lamination pressure." (Def. Br. at 22.) Defendant also relies on the prosecution history of the '207 patent to support the idea that the significant difference between the '207 patent and the '024 patent is the fact that the '207 patent does not require protection of the electronic element during the lamination process. (Id.) Defendant additionally concludes-and I agree-that Leighton relinquished any interpretation of "non-electronic carrier" that includes any protection for the electronic element. *Southwall Techs., Inc. v. Cardinal IG Co.*, 54 F.3d 1570 (Fed.Cir.1995). (See Def. Br. at 22.) Defendant notes that Leighton made the same arguments about the absence of protection of the electronic element during prosecution of the '099 patent. (Def. Br. at 52.)

I agree with the parties that Leighton intended to distinguish the Patents at issue here from the '024 patent on the basis of, among other things, the fact that no protection is needed for the electronic element during lamination in the Patents at issue. Plaintiff's construction of the phrase "non-electronic carrier" addresses this issue without redundancy or ambiguity. I therefore adopt it *in haec verba*.

3. "Directly"

"Directly" means, "In immediate physical contact."

[8] Plaintiff states that "directly" appears in each claim in the following context, "positioning said at least one electronic element in the absence of a non-electronic carrier **directly** between said first and second plastic core sheets." (Pl. Br. at 21; Cohen Decl., Exh. L.) Defendant refers to the same language in claims 1 and 16 of the '207 patent. (Def. Br. at 25.)

Both parties cite to Webster's for the definition of "directly" as meaning "in immediate physical contact." (Pl. Br. at 21; Def. Br. at 25.) Plaintiff rests on this. Defendant urges additional language, however, defining "directly" to mean that "there is nothing between the 'electronic element' and the first plastic core sheet and nothing between the 'electronic element' and the second plastic core sheet." (Def. Br. at 25.) That just says

the same thing in more words that add nothing to the definition. I therefore elect to go with Plaintiff's sparser and more elegant version.

4. "Comprising the Steps Of"

This phrase is-or ought to be-self-explanatory. However, Defendant contends that these words mean that the steps recited in the patent must be performed in the exact order indicated in the patent.

The words themselves admit of no such meaning. "Comprising" means "being made up of," and nothing more than that.FN8 "Step" means "a stage in a process" (both definitions of these plain English, utterly non-technical words are taken from Webster's New Collegiate Dictionary). Neither of these words necessarily implies that there is any particular order in which the steps must be taken.

FN8. It certainly does not mean "additional," as argued by Plaintiff in its Markman hearing presentation.

Defendant argues that if the steps are not performed in the order indicated, the end product will not be a plastic card with a sufficiently smooth surface to receive dye sublimation printing. (Def. Br. at 29.) That may be or it may not be, but there is nothing in the words "comprising the steps of" that imparts the concept of order. At various points in the patent claims, Plaintiff does use "ordering" language-for example, Leighton's use of the word "subsequently" in claim 15 of the '155 patent and claim 16 of the '207 patent means that step (c)(iii) must follow step (c)(ii). Similarly, the use of words like "following" ('099 patent, claim 8, and '367 patent, claim 7); "prior to" ('367 patent, claims 8 and 14) and "after" ('367 patent, claim 22) expressly indicate that the patentee intended things to flow in a sequential order. In the absence of such language, no order will be presumed. *Altiris Inc. v. Symantec Corp.*, 318 F.3d 1363, 1369 (Fed.Cir.2003).

A variant of Defendant's argument, but a far more interesting one, will be found when we reach the issue of whether the use of the words "first" and "second" in several patent claims fairly implies sequential ordering, or is simply an attempt to distinguish between different applications of pressure without imparting any order. But that is for later discussion.

5. "Encapsulated By and Encapsulating"

[9] The phrase "encapsulated by" is construed to mean, "Enclosed by," and "encapsulating" is construed to mean, "Enclosing."

Plaintiff again argues that the plain meaning of these words suffices to construe them for the jury. I agree.

The phrase "encapsulated by" appears in claim 1 of the '207 patent as follows: "positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle... applying first pressure to said core for a second period of time such that said at least one electronic element is **encapsulated by** said core." (internal numerical references omitted). *See also* claim 17 of the '099 patent; claim 20 of the '367 patent; claim 1 of the '155 patent. Claim 16 of the '207 patent recites the term in the second step of the heat and pressure cycle "applying a second pressure uniformly across said core for **encapsulating** said at least one electronic element within said controlled plastic flow."

Defendant proposes that the phrase means:

that the 'core' must fully enclose the 'electronic element' which has been placed 'directly' between the 'first and second plastic core sheets' so that even the sides of the 'electronic element' are surrounded by the 'first and second plastic core sheets.' That is, if the 'electronic element' is not placed directly between the 'first and second plastic core sheets' or has been already encapsulated by other material, the 'first and second plastic

core sheets' cannot encapsulate the 'electronic element.'

(Def. Br. at 31.)

Defendant again uses far too many words to define a simple phenomenon. Webster's non-technical definition of "encapsulate" is "to enclose in or as if in a capsule." (Def. Br. at 31.) "Capsule" is defined as "a compact often sealed and detachable container or compartment." (*Id.*) Thus, according to Defendant, when an element is encapsulated by something, that something fully encloses the element, as though it were contained within a sealed compartment. Defendant notes that in the '207 specification, for example, the electronic element is "fully" sealed in by the plastic core sheets after lamination, and that nothing "intervenes between the core sheets and the electronic element." (Def. Br. at 32-33.) Leighton apparently amended "encapsulated *in* said core" to "encapsulated *by* said core" during the prosecution of the '207 patent, a revision the Defendant views as highly significant. (Def. Br. at 33, citing Office Action Response, p. 75 (emphasis added).) According to Defendant, "encapsulated in" would allow an intervening material, such as "air." By contrast, according to Defendant, "encapsulated by" precludes air and requires that the plastic core sheets completely surround and make contact with the electronic element. (*Id.*)

All this is interesting, but when parsed (as we did at the Markman hearing), it is apparent that Defendant is again trying to read the specifications out of the definition-and to render the patent meaningless. The patent discloses a process in which the first step is to place an electronic element between two sheets of plastic, thus making what the Court called "a sandwich." In this sandwich, the element touches both sheets of plastic and is not shielded from them. However, for the plastic to touch every square millimeter of the electronic element at the moment the sandwich is made (which is while the plastic is still a solid, before it has been heated and liquefied), the element would have to be completely planar. The electronic elements shown in the disclosed embodiments-such as microchips, wire coil antennas, circuit boards, transponders-are not completely planar. They are three dimensional objects, and they can have irregular surfaces. This means that, when the "sandwich" is made by placing the element between the two sheets of plastic, it is possible that not every square millimeter of the element will be touching the plastic. But these infinitesimal pockets of air do not take the "sandwich" out of the ambit of the claims in suit, because they do not "protect" the element from the plastic (so that when the plastic melts it will touch every square millimeter of the element) and so do not cross the great divide between this family of patents and the prior art '024 patent, which placed the element in a little container before melting the plastic sheets.

6. "Coating At Least One of Said Outer Surfaces of Said Core With a Layer of Ink"

[10] "Coating at least one of said outer surfaces of said core with a layer of ink" means, "Covering at least one of said outer surfaces of said core with a finishing layer of ink."

The only term in this phrase requiring construction is the word "coating."

Plaintiff's proposed definition is that "coating" means "covering." (Pl. Br. at 24.) Plaintiff cites Webster's, p. 219, for the ordinary meaning of "coating" as "2: to cover or spread with a finishing, protecting, or enclosing layer," and notes that the claims in the Patents specify that the layer is ink. (Pl. Br. at 24.)

Claim one of the '207 patent recites the coating step as follows:

(b) positioning said at least one electronic element ... directly between said first and second plastic core sheets to form a core, said plastic core sheets defining a pair of inner and outer surfaces of said core, (c) positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle..., (d) **coating at least one of said outer surfaces of said core with a layer of ink**, and (e) applying a layer of overlamine film to at least one of said outer surfaces of said core.

'207 patent, col. 6:22-38. The specification further provides, "... the use of matte finished laminator plates provides surfaces with a slightly roughened or textured quality which will facilitate the application of a coating thereto..." '207 patent, col. 4:54-58. The Summary of the Invention in the '207 patent describes that "at least one of the upper and lower surfaces of the core compris[es] a coating printed or otherwise applied thereon," '207 patent, col. 2:20-24, and further explains that the "core is coated on at least one of it's [sic] upper and lower surfaces with a layer of printing ink. This may be accomplished by a wide variety of printing techniques." '207 patent, col. 5:6-12.

The '099 patent contains similar language, using "coating" and "covering" interchangeably-"the sheet of plastic card stock ... comprises at least core with at least one surface thereof covered by a layer of ink." '099 patent, col. 7:45-51 (numerical references omitted). The prosecution histories of the '207 patent and the '099 patent clarify that "coating" is used to mean more than merely "printing on."

It is important to note that the word "core" is used in all of the patents to describe what I have termed the "sandwich"-that is, the electronic element and the two plastic sheets that directly touch it. Nothing more is included in the definition of the word "core." FN9

FN9. Note that the "book," referred to earlier, is comprised of the "core" *plus* laminating pads and steel plates that facilitate the lamination process but are not a part of the finished product. *See, e.g.*, '207 patent, col. 4:35-40.

Defendant proposes that "coating... with a layer of ink" means that "the ink layer must directly contact at least one of the 'outer surfaces' of the 'core.'" (Def. Br. at 34.) Defendant cites to the claim and specification language cited above in support of its definition. Defendant also notes that the '207 specification states that, "This printing step is performed to coat at least one surface of core with a layer of aesthetically pleasing ink." (Def. Br. at 35, quoting '207 patent, col. 5:6-17. (numeric references omitted).) Finally, Defendant notes that Leighton "did not disclose applying another layer with ink imprinted on it to an outer surface of the core itself," and then quotes the '207 patent, "This layer of ink cosmetically hides the one or more electronic elements that are embedded within core, and prevents these one or more electronic elements from showing through the relatively thin core." (Def. Br. at 35, quoting the '207 patent, col. 5:17-21 (numerical references omitted).) In sum, Defendant argues that the intrinsic evidence leads to the conclusion that "coating ... with a layer of ink" means the ink is applied to at least one of the "outer surfaces" of the "core," so the layer of ink "directly contacts that outer core surface." (Def. Br. at 25.)

As is clear from the above language, Defendant is trying to preclude Plaintiff from claiming that the patent covers a process wherein something is applied directly to the surface of the core before the surface is covered with ink. The analogy used by the parties at the Markman hearing was as follows: Assume we are interpreting the sentence, "The table is covered with ink." Obviously, if a layer of ink is applied directly to the top surface of the table, the table is covered with ink. The question posed by the parties was whether, if a tablecloth were placed over the top surface of the table and the cloth were then covered with ink, the table would be covered with ink.

The answer is no. The table would then be covered with an ink-stained tablecloth. The ink would cover the cloth, and the cloth would cover the table. But the ink would not coat the table-it would coat the cloth. This notion of immediacy (or what Defendant calls direct contact) is implicit in the dictionary definition of "coat," which is "to cover or spread with a finishing, protecting or enclosing layer." Ink applied otherwise than to the surface of the core itself would not "finish" or "enclose" the core.

7. "Minimal ... Ram Pressure"

[11] The word "minimal" in the phrase "minimal first ram pressure" means, "The smallest or least amount

[of ram pressure] necessary to accomplish the designated step."

At the outset, I note that I am focusing here solely on the words "minimal... ram pressure" rather than on the entire phrase "minimal first ram pressure." This is because the parties greatly dispute what "first" means as used in this phrase, and this is not the place to discuss that issue. This phrase appears in claim 16 of the '207 patent, and claim 15 of the '155 patent:

positioning said core in a laminator apparatus, and subjecting said core to a heat and pressure cycle ... comprising the steps of: (i) heating said core in said laminator, in the presence of a **minimal first ram pressure**.

'207, col. 8:19-23; '155 patent, col. 8:15-19.

The specifications for the '207 patent indicate that "minimal" means "little or no." Col. 4:41-44.

Defendant proposes that this phrase means "applying little or no pressure to the 'core,' but in no event a ram pressure more than about 10 pounds per square inch."

According to Defendant, "minimal" is not a technical term, and it is defined in Webster's to mean "relating to or being a minimum: constituting the least possible size, number or degree." (Def. Br. at 36.) "Minimum" is defined in Webster's to mean, "the least quantity assignable, admissible, or possible." (Id.) To this extent, Defendant is precisely correct.

But Oberthur goes on to argue Leighton has capped the minimal first ram pressure at 10 pounds per square inch for all applications. (Def. Br. at 37.) It derives this number from language in the specifications for the '099 and '367 patents (whose claims, interestingly, do not use the phrase "minimal....ram pressure"). The '099 patent (col. 5:56-61) says this about the amount of pressure required for a particular step:

One book is positioned in laminator ... the first lamination cycle is initiated by closing laminator platens preferably applying little or no ram pressure to book. This is preferably done using hydraulic pressure, and a pressure not to exceed about 10 pounds per square inch is believed sufficient for most applications.

'099 patent, col. 5:56-61 (numerical references omitted.)

I reject Defendant's proposed definition. The word "minimal" does not connote any sort of numeric cap. And to the extent the references in the '099 and '367 specifications to 10 p.s.i. are relevant at all, I am constrained to note that the patentee expressly states that he "believes" this amount of pressure will be "sufficient for most applications"-indicating that it is entirely possible that slightly more pressure (how much is not specified) may be needed for some applications.

But nothing in Webster's or the patent specifications remotely suggests that 10 p.s.i. of ram pressure will qualify as "the least possible size" in every possible case. Therefore, I reject Defendant's argument.

8. "First Pressure," "First Ram Pressure," "Second Pressure" and "Third Pressure"

[12] Claim 1(c) of the '207 patent recites these terms in the following manner:

(i) heating said core for a first period of time; (ii) applying a **first pressure** to said core for a second period of time such that said at least one electronic element is encapsulated by said core; (iii) cooling said core while applying a **second pressure** to said core.

'207 patent, col. 6:32-36.

Claim 16(c) recites:

(i) heating said core in said laminator, in the presence of a minimal **first ram pressure**, to a temperature which causes controlled flow of said plastic which makes up said first and second plastic core sheets; (ii) applying a **second pressure** uniformly across said core for encapsulating said at least one electronic element within said controlled flow plastic; (iii) subsequently cooling said core in conjunction with the concurrent application of a **third pressure** uniformly across said core.

'207 patent, col. 8:22-32.

The issue here is whether the terms "first," "second" and "third," as used in this and other claims, refer to the sequential order in which the steps are to be performed—so that, in claim 1, step (c)(ii) must be performed before step (c)(iii), and in claim 16, step (c)(i) must be performed before step (c)(ii), which must be performed before step (c)(iii)—or whether these words are used simply to differentiate between like elements (three different applications of pressure), without intending any sequential limitation, so that the steps can be performed in any sequential order.

It is of course well settled that "comprising" language renders a claim open-ended. *Invitrogen Corp., v. Biocrest Mfg.*, 327 F.3d 1364, 1368 (Fed.Cir.2003). And in many patents, the words "first pressure," "second pressure," and "third pressure" would indicate nothing more than that there are several different levels of pressure, which readers of the patent would have to distinguish among as they parsed the patent.

[13] It is also true, however, that the terms "first," "second" and "third" can be read to denote the order of steps. *See Applera Corp. v. Micromass UK Ltd.*, 186 F.Supp.2d 487, 505 (D.Del.2002), *aff'd without published opinion*, 60 Fed.Appx. 800 (Fed.Cir.2003). While the terms "first," "second," and "third" are commonly used to identify separate claim elements, nothing precludes finding that the terms also specify temporal or positional relationships. *Id.* Where the language of the claim, the specification and the prosecution history logically indicate a sequential process, recited steps in a claim must be read to require a sequential order. *See, e.g., Loral Fairchild Corp. v. Sony Corp.*, 181 F.3d 1313, 1322 (Fed.Cir.1999); *Mantech Envtl. Corp. v. Hudson Envtl. Services Inc.*, 152 F.3d 1368, 1376 (Fed.Cir.1998).

The context of these terms in the patents in suit makes it abundantly clear that the terms are used to denote the relative order of the steps—that is, their order vis-a-vis each other. Indeed, counsel for Plaintiff admitted as much at the Markman hearing. For example, in claim 1, step (c) of the '207 patent, the pressure that is applied during cooling must follow the pressure that is applied to "encapsulate" the element in plastic. In claim 16 of the same patent, the "minimal ram pressure" that is applied during the process of heating the core and melting the plastic necessarily precedes the application of the "second pressure" which encapsulates the element in liquefied or partially liquefied plastic, which in turn necessarily precedes application of the "third pressure" as the hot, molten plastic cools. FN10 Thus, the words "first," "second" and "third" both distinguish among three distinct steps in the claimed process and denote the order in which the three steps outlined in the claims are to be performed relative to one another.

FN10. Plaintiff conceded in its Markman presentation that in claim 16, step c(iii) must follow step c(ii), pointing to the use of the word "subsequently" in step c(iii).

However, Defendant would have me go further. Oberthur argues that these terms should be construed so that "first pressure" and "first ram pressure" would be limited to "the very first pressure applied during the heat and pressure cycle." The term "second pressure" would be limited to "the next pressure applied after the first pressure during the heat and pressure cycle." And the term "third pressure" would be limited to "the next pressure applied after the second pressure during the heat and pressure cycle." (Def. Br. at 37.)

Defendant's proposed construction precludes the application of any pressure prior to the application of whatever pressure is designated as "first" and the insertion of any pressure between the step involving the "first pressure" and the step involving the "second pressure." In other words, Defendant argues that the words "first," "second," and "third" indicate not only the relative order of the claimed steps vis-a-vis each other, but also the absolute order in which they must be performed.

Defendant has not presented any convincing reason why the words "first," "second" and "third" as used in the cited claims mean connote absolute order as opposed to relative order. Defendant's counter-arguments based on the purported "main objective" of the patent is not persuasive; neither does the patentee's use of the phrase "highly coordinated" process indicate that "first," "second" and "third" mean "very first" and "next one after the very first," etc.

Moreover, language taken from a dependent claim strongly suggests that the words ought not to bear the limiting meaning assigned to them by Defendant. Dependent claim 18 of the '367 patent recites, "The process according to [independent] claim 1 wherein the pressure on said core in step (c)(i) is less than 10 p.s.i." Step (c)(i) in claim 1 recited heating the core for "a first period of time." It is not until step (c)(ii) of claim 1 that "a first pressure" is applied. Indeed, in the '207 provisional application, claim 1 expressly indicated that no pressure was to be applied to the core at the beginning of the first heat cycle. (That restriction was removed from the final '207 application.) Thus, dependent claim 18 of the '367 patent narrows claim 1 by reciting an application of very light pressure (less than 10 p.s.i.) prior to the application of "a first pressure."

But Defendant argues that claim 18 does not help Leighton because the claim itself is indefinite under the "Lack of Antecedent Basis" doctrine as set forth in the Manual of Patent Examining Procedure (MPEP) s. 2173.05(e).

Dependent claim 18 recites "the pressure" to be applied during a certain step (step (c)(i)) as disclosed in claim 1. Step (c)(i) in claim 1 does not mention any application of pressure. Therefore, according to Defendant, " *the* pressure on said core in step (c)(i)" (emphasis added), as recited in claim 18, has no antecedent, and Leighton is trying to read something into that claim that is not there.

Plaintiff responds that claim 1 and claim 18 of the 367 patent disclose two different embodiments of a single invention, and that as long as the two or three pressures disclosed in the patent claims are part of an enclosure/lamination process, that process is covered by the patent.

On reflection, I reject defendant's argument as too narrow a reading of the "lack of antecedent basis" doctrine.

Section 2173.05(e) of the MPEP reads, in pertinent part,

A claim is indefinite when it contains words or phrases whose meaning is unclear. The lack of clarity could arise where a claim refers to "said lever" or "the lever," where the claim contains no earlier recitation or limitation of a lever and where it would be unclear as to what element the limitation was making reference...

However, the Manual goes on to read:

Obviously, however, the failure to provide explicit antecedent basis for terms does not always render a claim indefinite. If the scope of a claim would be reasonably ascertainable by those skilled in the art, then the claim is not indefinite... The totality of all the limitations of a claim and their interaction with each other must be considered to ascertain the inventor's contribution to the art.

Considering the "totality of all the limitations" of claims 1 and 18 of the '367 patent, Defendant's

interpretation cannot be correct. Step (c)(ii) of claim 1 recites, "applying *a* first pressure to said core." As noted above, "a first pressure" does not necessarily mean that no pressure was applied during a prior step. While step (c)(i) does not specifically state that pressure must be applied, it does not preclude the application of pressure, either. Dependent claim 18 is most reasonably interpreted to limit claim 1 to the situation where pressure on the core in step (c)(i), *if any*, is less than 10 p.s.i. And I note that "less than 10 p.s.i." of pressure encompasses no pressure whatsoever.

[14] Courts interpreting patents routinely avoid indefiniteness by interpreting language to provide for an antecedent basis. *See, e.g.*, *Astra Aktiebolag v. Andrx Pharmaceuticals, Inc.*, 222 F.Supp.2d 423, 458 (S.D.N.Y.2002) (interpreting an antecedent phrase, "alkaline reacting compound," to include by definition the phrase in question, "micro-environment," in order to (i) find antecedent basis for " *the* micro-environment" and (ii) avoid indefiniteness for lack of antecedent basis) (emphasis added). Most particularly, in *Digital Biometrics, Inc. v. Identix, Inc.*, 149 F.3d 1335, 1344 (Fed.Cir.1998), the Federal Circuit noted that if a claim is "susceptible to a broader and narrower meaning, and the narrower one is clearly supported by the intrinsic evidence while the broader one raises questions of enablement under [the MPEP], [the court must] adopt the narrower of the two." *See also Rhine v. Casio, Inc.*, 183 F.3d 1342, 1345 (Fed.Cir.1999) (if a claim is susceptible to two interpretations, one of which renders it valid and the other of which renders it invalid, the claim must be construed to sustain its validity).

Outside the patent context, there are cases concluding that use of the definite article "the" particularizes the subject and narrows the possible class of possible antecedents. For example, in *Freytag v. Commissioner of Internal Revenue*, 501 U.S. 868, 902, 111 S.Ct. 2631, 115 L.Ed.2d 764 (1991), Justice Scalia, in a concurring opinion that did not command a majority on the Supreme Court, concluded that use of the definite article "the" in the phrase "the Courts of Law" (which appears in the Appointments Clause of the Constitution, Art. II, s. 2, cl. 2) narrowed a class to specific "envisioned" members. Similarly, while engaging in statutory construction in the context of a patent case, the Federal Circuit concluded that Congress's decision to say "the use" rather than "a use" meant "a specific" use rather than a "previously undefined" use. *Warner-Lambert Co. v. Apotex Corp.*, 316 F.3d 1348, 1356 (Fed.Cir.2003)(citing *Freytag*, 501 U.S. at 902, 111 S.Ct. 2631). Finally, in *American Bus Association v. Slater*, 231 F.3d 1, 4-5 (D.C.Cir.2000), the D.C. Circuit called the notion that the article "the" particularizes its subject "a rule of law."

But none of these pronouncements involved patent claim construction, which has its own specialized rules, the first of which is that, wherever possible, a claim is to be construed to make sense of the claim. No case has been cited to the Court, and I have found none, that applies Justice Scalia's *Freytag* analysis to render a patent claim indefinite. I conclude that the cases cited in the preceding paragraph are inapposite here.FN11

FN11. I am bolstered in this conclusion by the fact that Oberthur did not cite these cases in its brief. My law clerk found them while we were exploring Oberthur's argument.

Therefore, considering the "totality of the limitations," I find claim 18 has antecedent basis in claim 1, step (c) as a whole, and is not indefinite.

9. "Controlled Flow"

[15] The term "controlled flow" is construed to mean, "Regulated and directed forward continuous movement."

The phrase appears in claim 16 of the '207 patent:

(i) heating said core in said laminator, in the presence of minimum first ram pressure, to a temperature

which causes **controlled flow** of said plastic which makes up said first and second plastic core sheets; (ii) applying a second pressure uniformly across said core for encapsulating said at least one electronic element within said **controlled flow**.

'207 patent, col. 8:22-28. The specification states that "A heat cycle is applied to the core sheets in the laminator thus liquefying or partially liquefying the sheets." '207 patent, col. 2:34-36. The specification further describes that the purpose of the "controlled flow" is to enclose the electronic element, "Once the heat cycle has been applied to the book as is set forth above, the ram pressure of laminator is increased to facilitate the flow of the plastic core sheets so that the one or more electronic elements are encapsulated thereby..." '207 patent, col. 4:48-52.

The meaning of the phrase "controlled flow" would appear to be self-evident. When a liquid "flows" it moves forward continuously. "Controlled" indicates some degree of restraint (Plaintiff's proposed term) or regulation or direction (my preferred term).

Defendant claims the phrase means that " 'the first and second plastic core sheets' at least partially liquefy so as to fully enclose the 'electronic element' at the ram pressure and heat applied to the 'core sheets' and allow the outer surfaces of the finished card before dye sublimation printing to assume a smoothness of approximately .0005 inches or better." (Def. Br. at 41.)

According to Defendant, "flow" is a technical term. (Id.) McGraw Hill defines "flow" to mean "the forward continuous movement of fluid, such as gases, vapors, or liquids, through closed or open channels or conduits." Defendant cites the language of the specifications quoted above as supporting the premise that the electronic element is fully encapsulated by the first and second plastic core sheets, which at least partially liquefy in order to "flow" and surround the electronic element. (Def. Br. at 42.) Defendant also notes that Leighton stresses in the '207 specification that his invention lies in producing a contactless card with a sufficiently smooth and regular surface to receive dye sublimation printing, and that this smoothness cannot be achieved unless the core plastic sheets at least partially liquefy and flow. (Id.)

I agree with Defendant to the extent that plastic, in the state we normally encounter it, would not "flow." And we know from the specifications and claims discussed above that the lamination process at issue here involves heating the plastic core sheets. So I do agree that the plastic core sheets only "flow" because they have been heated, intentionally, during lamination. However, Defendant's proposed definition of "controlled flow" attempts to introduce into the definition of that phrase concepts that are not even found in the claims—a transparent effort to limit the meaning of this phrase to one disclosed embodiment. That is not the proper function of claim construction.

10. "Cooling Said Core While Applying a Second Pressure"

[16] The phrase "cooling said core while applying a second pressure" is construed to mean, "Cooling said core during the time that a second pressure is applied."

The phrase appears in claim 1 of the '207 patent:

(i) heating said core for a first period of time; (ii) applying a first pressure to said core for a second period of time such that said at least one electronic element is encapsulated by said core; (iii) **cooling said core while applying a second pressure** to said core.

'207 patent, col. 6:31-36.

The only dispute between the parties is the meaning of the word "while." Plaintiff asserts that "while" means "during the time that." Defendant urges that the phrase means "that cooling starts later than, or at the same

time as, applying a second pressure." (Def. Br. at 43.) In other words, Defendant asks me to conclude that the word "while" fairly implies the moment at which the process of providing the pressure starts-and, in particular, to exclude from the ambit of the claims any process that involves the application of the "second pressure" before the core cooling begins, even if the cooling and the second pressure proceed simultaneously for some period of time.

Defendant's attempt to limit the claim in this way is unavailing. Webster's defines "while" to mean "during the time that"-in other words, simultaneously or concurrently. Defendant's suggestion that this word says or implies anything about the relationship between the time the cooling begins and the time the application of pressure begin makes no sense. The claim language neither says nor implies anything about whether (1) cooling starts before pressure, (2) pressure starts before cooling, or (3) they start at the same time. The claim language requires only that the cooling and second pressure be happening simultaneously, regardless of the start sequence of the cooling and the application of pressure.

At the Markman hearing, the parties illustrated this term with the example of taking a nap "while my roommate goes shopping." The illustration works well. Clearly, as long as roommate # 1 is napping at any point in time during roommate # 2's trip to the store-regardless of when the nap commenced-roommate # 1 would have been napping "while" roommate # 2 went shopping.

11. "Cooling Said Core in Conjunction With the Concurrent Application of a Third Pressure"

[17] Claim 16 of the '207 patent states, "(iii) subsequently **cooling said core in conjunction with the concurrent application of a third pressure** uniformly across said core, said core including and [sic] upper and lower surfaces." '207 patent, col. 8:29-32.

The phrase is construed to mean, "Cooling said core while at the same time applying a third pressure."

As above, Defendant urges that the phrase "in conjunction with" fairly implies that the cooling "starts and ends at the same time a third pressure is applied." (Def. Br. at 44.) For the reasons recited above, I reject the Defendant's argument that these words suggest absolute synchronicity (though I question why the patentee could not have used the same terminology in both claims).

12. "Plastic Core Sheets"

[18] The phrase "plastic core sheets" is construed to mean, "Sheets of plastic between which the electronic element is positioned."

The phrase appears in claim 1 of the '207 patent, for example:

A process for incorporating at least one electronic element in the manufacture of a plastic card, comprising the steps of: (a) providing first and second **plastic core sheets**; (b) positioning said at least one electronic element in the absence of a non-electronic carrier directly between said first and second **plastic core sheets** to form a core, said **plastic core sheets** defining a pair of inner and outer surfaces of said core; (c) positioning said core in a laminator apparatus, and subjectingsaid core to a heat and pressure cycle.

'207 patent, col. 6:18-29. *See also* '099 patent, col. 5:13-17.

Defendant does not address this term.

Plaintiff asks me to construe the phrase, but urges that the meaning of the phrase is clear from the wording of the subject claims. (Pl. Br. at 17.) I agree.

13. "Laminator Apparatus"

[19] The phrase "laminator apparatus" is construed to mean, "Equipment that is used to unite two or more layers of material, such as the core, by the application of heat and pressure."

The specification of the '207 patent notes that the laminator apparatus is used for "the manufacture of plastic cards including at least one electronic element therein," '207 patent, col. 2:16-20, and that it is used to unite the plastic core sheets and the electronic element, col. 4:22-5:5.

Plaintiff proposes that the specifications and the prosecution histories of the Patents indicate that a "laminator apparatus" is "equipment that is used to unite two or more layers of material, such as the core, by the application of heat and pressure." (Pl. Br. at 23-24.) Defendant does not object, so I adopt Plaintiff's definition. (Pl. Br. at 23-24.)

14. "Milling"

[20] "Milling" is construed to mean, "using a machine to remove."

Claim 1 of the '099 patent recites a step of "**milling** a region of said core to a controlled depth so as to form a cavity which exposes at least one contact pad of said electronic element." '099 patent, col. 9:3-5. Claims 1 and 22 of the '367 patent recite virtually identical steps.

Plaintiff proposes that the ordinary meaning of the word milling, from the Dictionary of Composite Materials, p. 91, is "[a] machining process for removal of material." (Pl. Br. at 25.) The specifications are consistent with this construction, stating that each card undergoes a controlled-depth milling operation to form a window or cavity. '099 patent, col. 8:1-6. Defendant does not object, so I adopt Plaintiff's definition.

Conclusion

For the foregoing reasons, the disputed terms are construed in the manner noted above.

This constitutes the decision and order of the court.

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