[3510-16-P]

DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

[Docket No. PTO-P-2018-0059]

Examining Computer-Implemented Functional Claim Limitations for Compliance with 35 U.S.C. 112

AGENCY: United States Patent and Trademark Office, Commerce.

ACTION: Examination Guidance; Request for comments.

SUMMARY: This guidance will assist United States Patent and Trademark Office (USPTO) personnel in the examination of claims in patent applications that contain functional language, particularly patent applications where functional language is used to claim computer-implemented inventions. Part I of this guidance addresses issues related to the examination of computer-implemented functional claims having means-plus-function limitations. Part II of this guidance addresses written description and enablement issues related to the examination of computer-implemented functional claims that recite only the idea of a solution or outcome to a problem but fail to recite details of how the solution or outcome is accomplished.

DATES: APPLICABLE DATE: The Computer-Implemented Functional Claim Limitations Guidance is effective on [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER]. The Computer-Implemented Functional Claim Limitations Guidance applies to all applications, and to all patents resulting from applications, filed before, on or after [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

COMMENT DEADLINE DATE: Written comments must be received on or before [INSERT DATE 60 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Comments must be sent by electronic mail message over the Internet addressed to: 112Guidance2019@uspto.gov.

Electronic comments submitted in plain text are preferred, but also may be submitted in ADOBE® portable document format or MICROSOFT WORD® format. Comments not submitted electronically should be submitted on paper in a format that facilitates convenient digital scanning into ADOBE® portable document format. The comments will be available for viewing via the USPTO's Internet Web site (http://www.uspto.gov). Because comments will be made available for public inspection, information that the submitter does not desire to make public, such as an address or phone number, should not be included in the comments.

FOR FURTHER INFORMATION CONTACT: Nicole D. Haines, Senior Legal Advisor, at 571-272-7717 or Jeffrey R. West, Senior Legal Advisor, at 571-272-2226, both with the Office of Patent Legal Administration.

SUPPLEMENTARY INFORMATION: The patent examination process must ensure that: (1) the claims of an application have proper written description and enablement support under 35 U.S.C. § 112(a)[1] in the disclosure of the application, and (2) functional limitations (i.e., claim limitations that define an element in terms of the function it performs without reciting the structure, materials, or acts that perform the function) are properly treated as means (or step) plus function limitations under 35 U.S.C. § 112(f), and are sufficiently definite under 35 U.S.C. § 112(b), as appropriate. These requirements are particularly relevant to computer-implemented functional claims.

The U.S. Court of Appeals for the Federal Circuit ("Federal Circuit") has recognized a problem with broad functional claiming without adequate structural support in the specification. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015) (en banc) (overruling the Federal Circuit's previous application of a "strong" presumption that claim limitations lacking the word "means" are not subject to § 112(f) to address the resulting "proliferation of functional claiming untethered to [§ 112(f)] and free of the strictures set forth in the statute"); *Function Media, LLC v. Google, Inc.*, 708 F.3d 1310, 1319 (Fed. Cir. 2013) ("'Section [112(f)] is intended to prevent . . . pure functional claiming.'" (citing *Aristocrat Techs. Australia Pty Ltd. v. Int'l Game Tech.*, 521 F.3d 1238, 1333 (Fed. Cir. 2008))); *Ariad Pharm., Inc. v. Eli Lilly and Co.*, 598F.3d 1336, 1349 (Fed. Cir. 2010) (en banc) (discussing the problem of functional claims

[1] Section 4 of the Leahy-Smith America Invents Act (AIA) designated pre-AIA 35 U.S.C. § 112, ¶¶ 1 through 6, as 35 U.S.C. §§ 112(a) through (f), effective as to applications filed on or after September 16, 2012. *See* Pub. L. No. 112-29, § 4(c), 125 Stat. 284, 296 (2011). AIA 35 U.S.C. § 112(a) and pre-AIA 35 U.S.C. § 112, ¶ 1 are collectively referred to in this notice as 35 U.S.C. § 112(a); AIA 35 U.S.C. § 112(b) and pre-AIA 35 U.S.C. § 112, ¶ 2 are collectively referred to in this notice as 35 U.S.C. § 112(b); and AIA 35 U.S.C. § 112(f) and pre-AIA 35 U.S.C. § 112, ¶ 6 are collectively referred to in this notice as 35 U.S.C. § 112(f).

defining a genus that "simply claim a desired result . . . without describing species that achieve that result"). In the context of another statutory requirement, 35 U.S.C. § 101, the Federal Circuit has also criticized improper functional claiming. *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1351 (Fed. Cir. 2016) (observing that "the claims do not go beyond requiring the collection, analysis, and display of available information in a particular field, stating those functions in general terms, without limiting them to technical means for performing the functions that are arguably an advance over conventional computer and network technology"); *see also Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1327 (Fed. Cir. 2016) (Mayer, J., concurring) (stating, "[s]oftware patents typically . . . describe, in intentionally vague and broad language, a particular goal or objective [of the software]"). Problems with functional claiming, i.e., when a claim is purely functional in nature rather than reciting with any specificity how the claimed function is achieved, can be effectively addressed using long-standing, well-understood principles under 35 U.S.C § 112. Thus, the USPTO is providing further guidance on the application of 35 U.S.C. § 112 requirements during examination.

Part I of this guidance focuses on claim interpretation under 35 U.S.C. § 112(f) and compliance with the definiteness requirement of 35 U.S.C. § 112(b), for example as discussed in the Federal Circuit decisions in *Williamson*, 792 F.3d 1339, and *Aristocrat*, 521 F.3d 1328. Part II of this guidance focuses on the requirements of 35 U.S.C. § 112(a) relative to written description and enablement, for example as discussed in the Federal Circuit decision in *Vasudevan Software, Inc. v. MicroStrategy, Inc.*, 782 F.3d 671 (Fed. Cir. 2015). [2]

[2] As is existing practice, examiners may also issue "Requirements for Information" pursuant to 37 C.F.R. 1.105. This notice does not affect current practice regarding "Requirements for Information," which remains a tool examiners can use to help resolve, among other things, issues regarding compliance with § 112 during examination.

I. Review of Issues under 35 U.S.C. § 112(f) and § 112(b) Related to Examination of Computer-Implemented Functional Claim Limitations: In its en banc decision in the *Williamson* case, the Federal Circuit recognized that some of its prior opinions established a heightened bar to overcoming the presumption that a limitation expressed in functional language without using the word "means" is not subject to 35 U.S.C. § 112(f) and concluded that such a heightened burden is unjustified. *Williamson*, 792 F.3d at 1349 (explaining that characterizing the presumption as strong "has shifted the balance struck by Congress in passing [35 U.S.C. § 112(f)] and has resulted in a proliferation of functional claiming untethered to [§ 112(f)] and free of the strictures set forth in the statute"). Instead,

> [t]he standard is whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure. When a claim term lacks the word "means," the presumption [that 35 U.S.C. § 112(f) does not apply] can be overcome and [§ 112(f)] will apply if the challenger demonstrates that the claim term fails to recite sufficiently definite structure or else recites function without reciting sufficient structure for performing that function. The converse presumption remains unaffected: use of the word "means" creates a presumption that § 112[f] applies.

Id. (internal citations and quotation marks omitted).

See, e.g., MPEP 704.10-14. For example, an examiner may request information about written description support, continuation in part support, issues related to 112(f), or enablement issues, among other things. *See, e.g.*, MPEP 704.11(a)(K), (R), (S)(2)-(3).

A. Claim Interpretation: One of the first steps in examining claims is determining the broadest reasonable interpretation (BRI) of the claim. In determining the BRI, examiners should establish the meaning of each claim term consistent with the specification as it would be interpreted by one of ordinary skill in the art, including identifying and construing functional claim limitations. If a claim limitation recites a term and associated functional language, the examiner should determine whether the claim limitation invokes 35 U.S.C. § 112(f). Application of 35 U.S.C. § 112(f) is driven by the claim language, not by applicant's intent or mere statements to the contrary included in the specification or made during prosecution. Examiners will apply 35 U.S.C. § 112(f) to a claim limitation if it meets the 3-prong analysis set forth in the Manual of Patent Examining Procedure (9th ed. Rev. 08.2017, Jan. 2018) (referred to herein as "MPEP"), § 2181, subsection I. At a high level, the 3-prong analysis includes evaluating whether: the claim limitation uses the term "means" (or "step") or a generic placeholder, the term is modified by functional language, and the term is not modified by sufficient structure, material or acts for performing the function.[3]

A claim limitation is presumed to invoke 35 U.S.C. § 112(f) when it explicitly uses the term "means" and includes functional language. The presumption that 35 U.S.C. § 112(f) applies is overcome when the limitation further includes the structure necessary to perform the recited function. *See* MPEP § 2181, subsection I. By contrast, a claim limitation that does not use the

[3] The full text reads as follows: "[E]xaminers will apply 35 U.S.C. 112(f) or pre-AIA 35 U.S.C. 112, sixth paragraph to a claim limitation if it meets the following 3-prong analysis: (A) the claim limitation uses the term 'means' or 'step' or a term used as a substitute for 'means' that is a generic placeholder (also called a nonce term or a non-structural term having no specific structural meaning) for performing the claimed function; (B) the term 'means' or 'step' or the generic placeholder is modified by functional language, typically, but not always linked by the transition word 'for' (e.g., 'means for') or another linking word or phrase, such as 'configured to' or 'so that'; and (C) the term 'means' or 'step' or the generic placeholder is not modified by sufficient structure, material, or acts for performing the claimed function." MPEP 2181, subsection I.

term "means" will trigger the presumption that 35 U.S.C. § 112(f) does not apply. Even in the face of this presumption, the examiner should nonetheless consider whether the presumption is overcome.

The USPTO's examination practice regarding the presumption that 35 U.S.C. § 112(f) does not apply to a claim limitation that does not use the term "means" is based on the Federal Circuit's standard set forth in *Williamson*. The presumption that 35 U.S.C. § 112(f) does not apply is overcome when "the claim term fails to 'recite sufficiently definite structure' or else recites 'function without reciting sufficient structure for performing that function.'" MPEP § 2181, subsection I (quoting *Williamson*, 792 F.3d at 1348). Instead of using "means" in such cases, a substitute term can act as a generic placeholder for the term "means" where that term would not be recognized by one of ordinary skill in the art as being sufficiently definite structure for performing the claimed function. The following are examples of non-structural generic placeholders that may invoke 35 U.S.C. § 112(f): "mechanism for," "module for," "device for," "unit for," "component for," "element for," "member for," "apparatus for," "machine for," or "system for." *See, e.g.*, MPEP § 2181, subsection I.A; *Welker Bearing Co., v. PHD, Inc.*, 550 F.3d 1090, 1096 (Fed. Cir. 2008); *Mass. Inst. of Tech. v. Abacus Software*, 462 F.3d 1344, 1354 (Fed. Cir. 2006); *Personalized Media Commc'ns, LLC v. Int'l Trade Comm'n*, 161 F.3d 696, 704 (Fed. Cir. 1998); *Mas-Hamilton Grp. v. LaGard, Inc.*, 156 F.3d 1206, 1214-15 (Fed. Cir. 1998). This list is not exhaustive, and similar generic placeholders may invoke 35 U.S.C. § 112(f). Note that there is no fixed list of generic placeholders that always result in 35 U.S.C. § 112(f) interpretation, and likewise there is no fixed list of words that always avoid 35 U.S.C. § 112(f) interpretation. Every case will turn on its own unique set of facts.

Even when a claim limitation uses the term "means" or a generic placeholder for the term "means," a limitation will not invoke 35 U.S.C. § 112(f) if there is a structural modifier that further describes the term "means" or the generic placeholder. *Compare Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1583 (Fed. Cir. 1996) (concluding that the term "detent mechanism" did not invoke pre-AIA 35 U.S.C. § 112, sixth paragraph because the modifier "detent" denotes a type of structural device with a generally understood meaning in the mechanical arts), *with Mass. Inst. of Tech.*, 462 F.3d at 1354 (concluding that the term "colorant selection mechanism" did invoke pre-AIA 35 U.S.C. § 112, sixth paragraph because the modifier "colorant selection" does not connote sufficient structure to a person of ordinary skill in the art). To determine whether a word, term, or phrase coupled with a function denotes structure, examiners should check whether: (1) the specification provides a description sufficient to inform one of ordinary skill in the art that the term denotes structure; (2) general and subject matter specific dictionaries provide evidence that the term has achieved recognition as a noun denoting structure; and (3) the prior art provides evidence that the term has an art-recognized structure to perform the claimed function. *See* MPEP § 2181, subsection I, for more guidance on generic placeholders.

At issue in *Williamson* was whether a "distributed learning control module" limitation in claims directed to a distributed learning system should be interpreted as a means-plus-function limitation. *See Williamson*, 792 F.3d at 1347. The Federal Circuit concluded that "the 'distributed learning control module' limitation fails to recite sufficiently definite structure and that the presumption against means-plus-function claiming is rebutted." *Id.* at 1351. In support,

the Federal Circuit determined that: "the word 'module' does not provide any indication of structure because it sets forth the same black box recitation of structure for providing the same specified function as if the term 'means' had been used"; "[t]he prefix 'distributed learning control' does not impart structure into the term 'module'"; and "the written description fails to impart any structural significance to the term." *Id*. at 1350-51.

In view of *Williamson*, examiners should apply the applicable presumption and the 3-prong analysis to interpret a computer-implemented functional claim limitation in accordance with 35 U.S.C. § 112(f) as appropriate, including determining if the claim sets forth sufficient structure for performing the recited function. A determination that a claim is being interpreted according to 35 U.S.C. § 112(f) should be expressly stated in the examiner's Office action. In response to the Office action, if applicant does not want to have the claim limitation interpreted under 35 U.S.C. § 112(f), applicant may: (1) present a sufficient showing to establish that the claim limitation recites sufficient structure to perform the claimed function so as to avoid interpretation under 35 U.S.C. § 112(f); or (2) amend the claim limitation in a way that avoids interpretation under 35 U.S.C. § 112(f) (e.g., by reciting sufficient structure to perform the claimed function).

The BRI of a claim limitation that is subject to 35 U.S.C. § 112(f), "is the structure, material or act described in the specification as performing the entire claimed function and equivalents to the disclosed structure, material or act." MPEP § 2181. Thus, if the claim limitation is being interpreted under 35 U.S.C. § 112(f), the specification must be consulted to determine the corresponding structure, material, or act for performing the claimed function. *See* MPEP § 2181,

subsection I, for more guidance on interpreting claim limitations that are subject to 35 U.S.C. § 112(f). Generally, the BRI given to a claim term that is not subject to 35 U.S.C. § 112(f) is its plain meaning unless limited by a special definition or disavowal of claim scope set forth in the specification which must be clear and unmistakable (note that changing the plain meaning of a claim term by setting forth a special definition or disavowal of claim scope is uncommon). MPEP § 2111.01, subsections I, IV. The plain meaning is the ordinary and customary meaning given to the term by those of ordinary skill in the art at the time of the effective filing date, evidenced by, for example, the words of the claims themselves, the specification, drawings, and prior art. *Id*. See, MPEP 2111, *et*. *seq*., for detailed guidance on the application of the BRI during examination.

B. Indefiniteness under 35 U.S.C. § 112(b): For a computer-implemented 35 U.S.C. § 112(f) claim limitation, the specification must disclose an algorithm for performing the claimed specific computer function, or else the claim is indefinite under 35 U.S.C. § 112(b). *See Net MoneyIN, Inc*. *v*. *VeriSign, Inc*., 545 F.3d 1359, 1367 (Fed. Cir. 2008). In cases "involving a special purpose computer-implemented means-plus-function limitation, '[the Federal Circuit] has consistently required that the structure disclosed in the specification be more than simply a general purpose computer or microprocessor' and that the specification must disclose an algorithm for performing the claimed function." *Noah Sys*., *Inc*. *v*. *Intuit Inc*., 675 F.3d 1302, 1312 (Fed. Cir. 2012) (quoting *Aristocrat*, 521 F.3d at 1333). Thus, the corresponding structure for performing the specific computer function is not simply a general purpose computer by itself but a special purpose computer as programmed to perform the disclosed algorithm. *In re Aoyama*, 656 F.3d 1293, 1297 (Fed. Cir. 2011) ("[W]hen the disclosed structure is a computer

programmed to carry out an algorithm, 'the disclosed structure is not the general purpose computer, but rather that special purpose computer programmed to perform the disclosed algorithm.'" (quoting *WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999))). An algorithm is defined, for example, as "a finite sequence of steps for solving a logical or mathematical problem or performing a task." Microsoft Computer Dictionary (5th ed., 2002). Applicant may "express that algorithm in any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure." *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1340 (Fed. Cir. 2008) (internal citation omitted).

Special purpose computer-implemented 35 U.S.C. § 112(f) claim limitations will be indefinite under 35 U.S.C. § 112(b) when the specification fails to disclose an algorithm to perform the claimed function. For example, in *Advanced Ground Information Systems, Inc. v. Life360, Inc.*, 830 F.3d 1341 (Fed. Cir. 2016), the Federal Circuit determined that the term "symbol generator" is a computer-implemented means-plus-function limitation and that "[t]he specifications of the patents-in-suit do not disclose an operative algorithm for the claim elements reciting 'symbol generator.'" *Id.* at 1348-49. The Federal Circuit upheld the district court's determination that the term "symbol generator" is indefinite, observing that "although the district court recognized that the specification describes, in general terms, that symbols are generated based on the latitude and longitude of the participants, it nonetheless determined that the specification fails to disclose an algorithm or description as to how those symbols are actually generated." *Id.* at 1349 (internal quotation marks and alterations omitted). *See also*, *Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382-83 (Fed. Cir. 2009) (concluding that the description of a server

computer's "access control manager" software feature was insufficient disclosure of corresponding structure to support the computer-implemented "means for assigning" limitation because "what the patent calls the 'access control manager' is simply an abstraction that describes the function of controlling access to course materials … [b]ut how it does so is left undisclosed."); *Aristocrat*, 521 F.3d at 1334-35 (explaining that "the [patent's] description of the embodiments is simply a description of the outcome of the claimed functions, not a description of the structure, i.e., the computer programmed to execute a particular algorithm").

Moreover, the requirement for the disclosure of an algorithm cannot be avoided by arguing that one of ordinary skill in the art is capable of writing software to convert a general purpose computer to a special purpose computer to perform the claimed function. *See EON Corp. IP Holdings LLC v. AT&T Mobility LLC*, 785 F.3d 616, 623 (Fed. Cir. 2015) (disagreeing "that a microprocessor can serve as sufficient structure for a software function if a person of ordinary skill in the art could implement the software function[,]" noting that "we have repeatedly and unequivocally rejected this argument: a person of ordinary skill in the art plays no role whatsoever in determining whether an algorithm must be disclosed as structure for a functional claim element"); *Blackboard*, 574 F.3d at 1385 (explaining that "[t]he fact that an ordinarily skilled artisan might be able to design a program to create an access control list based on the system users' predetermined roles goes to enablement[,]" whereas "[t]he question before us is whether the specification contains a sufficiently precise description of the 'corresponding structure' to satisfy [pre-AIA] section 112, paragraph 6, not whether a person of skill in the art could devise some means to carry out the recited function").

Special purpose computer-implemented 35 U.S.C. § 112(f) claim limitations are also indefinite under 35 U.S.C. § 112(b) when the specification discloses an algorithm but the algorithm is not sufficient to perform the entire claimed function(s). *See Noah*, 675 F.3d at 1319 (holding that "[c]omputer-implemented means-plus-function claims are indefinite unless the specification discloses an algorithm to perform the function associated with the limitation[,]" and that "[w]hen the specification discloses an algorithm that only accomplishes one of multiple identifiable functions performed by a means-plus-function limitation, the specification is treated as if it disclosed no algorithm."). The sufficiency of the algorithm is determined in view of what one of ordinary skill in the art would understand as sufficient to define the structure and make the boundaries of the claim understandable. For example, in *Williamson*, the Federal Circuit found that the term "distributed learning control module" is a means-plus-function limitation that performs three specialized functions (i.e., "receiving,", "relaying," and "coordinating"), which "must be implemented in a special purpose computer." *Williamson*, 792 F.3d at 1351-52. The Federal Circuit explained that "[w]here there are multiple claimed functions, as we have here, the [specification] must disclose adequate corresponding structure to perform all of the claimed functions." *Id*. Yet the Federal Circuit determined that the specification "fails to disclose any structure corresponding to the 'coordinating' function." *Id*. at 1354. Specifically, the Federal Circuit found no "disclosure of an algorithm corresponding to the claimed 'coordinating' function," concluding that the figures in the specification relied upon by patentee as disclosing the required algorithm, instead describe "a presenter display interface" and not an algorithm corresponding to the claimed "coordinating" function. *Id*. at 1353-54. Accordingly, the Federal Circuit affirmed the district court's judgment that claims containing the "distributed learning control module" limitation are invalid for indefiniteness under 35 U.S.C. § 112(b). *Id*. at 1354.

Similarly, in *Media Rights Technologies, Inc. v. Capital One Financial Corp.*, 800 F.3d 1366, 1374 (Fed. Cir. 2015), the Federal Circuit determined that the term "compliance mechanism" is a means-plus-function limitation that performs four computer-implemented functions (i.e., "controlling data output by diverting a data pathway; monitoring the controlled data pathway; managing an output path by diverting a data pathway; and stopping the play of media content"). The Federal Circuit determined "that the specification fails to adequately disclose the structure to perform all four of [the 'compliance mechanism's'] functions" and affirmed the district court's decision that the "compliance mechanism" limitation is indefinite. *Id.* at 1375. Specifically, the Federal Circuit found that "the specification fails to disclose an operative algorithm for both the 'controlling data output' and 'managing output path' functions[,]" which "both require diverting a data pathway[,]" because the recited C++ source code in the specification "only returns various error messages" and "does not, accordingly, explain how to perform the diverting function[.]" *Id.* at 1374-75. "Additionally, the specification does not disclose sufficient structure for the 'monitoring' function[,]" because the disclosed "set of rules . . . which the 'copyright compliance mechanism' applies to monitor the data pathway to ensure there is no unauthorized recording of electronic media . . . provides no detail about the rules themselves or how the 'copyright compliance mechanism' determines whether the rules are being enforced." *Id.* at 1375. *See* MPEP § 2181, subsection II(B), for additional guidance on evaluating description necessary to support computer-implemented 35 U.S.C. § 112(f) claim limitations.

A computer-implemented functional claim may also be indefinite when the 3-prong analysis for determining whether the claim limitation should be interpreted under 35 U.S.C. § 112(f) is

inconclusive because of ambiguous words in the claim. After taking into consideration the language in the claims, the specification, and how those of ordinary skill in the art would understand the language in the claims in light of the disclosure, the examiner should make a determination regarding whether the words in the claim recite sufficiently definite structure that performs the claimed function. If the applicant disagrees with the examiner's interpretation of the claim limitation, the applicant has the opportunity during the application process to present arguments, and amend the claim if needed, to clarify whether § 112(f) applies.

When a claim containing a computer-implemented 35 U.S.C. § 112(f) claim limitation is found to be indefinite under 35 U.S.C. § 112(b) for failure to disclose sufficient corresponding structure (e.g., the computer and the algorithm) in the specification that performs the entire claimed function, it will also lack written description under 35 U.S.C. § 112(a). *See* MPEP § 2163.03, subsection VI. Examiners should further consider whether the disclosure contains sufficient information regarding the subject matter of the claims as to enable one skilled in the pertinent art to make and use the full scope of the claimed invention in compliance with the enablement requirement of 35 U.S.C. § 112(a). *See* MPEP § 2161.01, subsection III and MPEP § 2164.08.

II. Review of Issues under 35 U.S.C. § 112(a) Related to Examination of Computer-Implemented Functional Claim Limitations: Even if a claim is not construed as a means-plus-function limitation under 35 U.S.C. § 112(f), computer-implemented functional claim language must still be evaluated for sufficient disclosure under the written description and enablement requirements of 35 U.S.C. § 112(a). As explained in further detail below, a specification must describe the claimed invention in sufficient detail (e.g., by disclosure of an algorithm) to

establish that the applicant had possession of the claimed invention as of the application filing date. Additionally, any analysis of whether a particular claim is supported by the disclosure in an application requires a determination of whether that disclosure, when filed, contained sufficient information regarding the subject matter of the claims as to enable one skilled in the pertinent art to make and use the claimed invention. This enablement requirement of 35 U.S.C. § 112(a) is separate and distinct from the written description requirement, *Ariad*, 598 F.3d at 1341, and serves the purpose of "ensur[ing] that the invention is communicated to the interested public in a meaningful way," MPEP § 2164.

A. Written Description Requirement of 35 U.S.C. § 112(a):

At issue in *Vasudevan* was whether the patent specification provided sufficient written description support for a limitation of the asserted claims. *Vasudevan*, 782 F.3d at 681-83. The Federal Circuit explained that "[t]he test for the sufficiency of the written description 'is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.'" *Id*. at 682 (quoting *Ariad*, 598 F.3d at 1351). The Federal Circuit emphasized that "[t]he written description requirement is not met if the specification merely describes a 'desired result.'" *Vasudevan*, 782 F.3d at 682 (quoting *Ariad*, 598 F.3d at 1349). Thus, in applying this standard to the computer-implemented functional claim at issue, the Federal Circuit stated that "[t]he more telling question is whether the specification shows possession by the inventor of how [the claimed function] is achieved." *Vasudevan*, 782 F.3d at 683.

In order to satisfy the written description requirement set forth in 35 U.S.C. § 112(a), the specification must describe the claimed invention in sufficient detail such that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention at the time of filing. For instance, the specification must provide a sufficient description of an invention, not an indication of a result that one might achieve. The level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology. Information that is well known in the art need not be described in detail in the specification. However, sufficient information must be provided to show that the inventor had possession of the invention as claimed. *See* MPEP § 2163, subsection II(A)(2).

The analysis of whether the specification complies with the written description requirement calls for the examiner to compare the scope of the claim with the scope of the description to determine whether applicant has demonstrated possession of the claimed invention. *Id.*; *see also Reiffin v. Microsoft Corp.*, 214 F.3d 1342, 1345 (Fed. Cir. 2000) ("The purpose of [the written description requirement] is to ensure that the scope of the right to exclude, as set forth in the claims, does not overreach the scope of the inventor's contribution to the field of art as described in the patent specification"); *LizardTech Inc. v. Earth Resource Mapping Inc.*, 424 F.3d 1336, 1345 (Fed. Cir. 2005) ("Whether the flaw in the specification is regarded as a failure to demonstrate that the applicant possessed the full scope of the invention recited in [the claim] or a failure to enable the full breadth of that claim, the specification provides inadequate support for the claim under [§ 112(a)]"); *cf. id.* ("A claim will not be invalidated on [§] 112 grounds simply because the embodiments of the specification do not contain examples explicitly covering the full scope of

the claim language."). While "[t]here is no special rule for supporting a genus by the disclosure of a species," the Federal Circuit has stated that "[w]hether the genus is supported *vel non* depends upon the state of the art and the nature and breadth of the genus." *Hynix Semiconductor Inc. v. Rambus Inc.*, 645 F.3d 1336, 1352 (Fed. Cir. 2011); *id.* (further explaining that "so long as disclosure of the species is sufficient to convey to one skilled in the art that the inventor possessed the subject matter of the genus, the genus will be supported by an adequate written description."). *See also Rivera v. Int'l Trade Comm'n*, 857 F.3d 1315, 1319-21 (Fed. Cir. 2017) (affirming the Commission's findings that "the specification did not provide the necessary written description support for the full breadth of the asserted claims," where the claims were broadly drawn to a "container . . . adapted to hold brewing material" while the specification disclosed only a "pod adapter assembly" or "receptacle" designed to hold a "pod").

Computer-implemented inventions are at times disclosed and claimed in terms of their functionality. For computer-implemented functional claims, the determination of the sufficiency of the disclosure will require an inquiry into the sufficiency of both the disclosed hardware and the disclosed software (i.e., "how [the claimed function] is achieved," *Vasudevan*, 782 F.3d at 683), due to the interrelationship and interdependence of computer hardware and software. When examining computer-implemented, software-related claims, examiners should determine whether the specification discloses the computer and the algorithm(s) that achieve the claimed function in sufficient detail that one of ordinary skill in the art can reasonably conclude that the inventor possessed the claimed subject matter at the time of filing. An algorithm is defined, for example, as "a finite sequence of steps for solving a logical or mathematical problem or performing a task." Microsoft Computer Dictionary (5th ed., 2002). Applicant may "express

that algorithm in any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure." *Finisar*, 523 F.3d at 1340 (internal citation omitted). It is not enough that one skilled in the art could theoretically write a program to achieve the claimed function, rather the specification itself must explain how the claimed function is achieved to demonstrate that the applicant had possession of it. *See, e.g.*, *Vasudevan*, 782 F.3d at 682-83. If the specification does not provide a disclosure of the computer and algorithm(s) in sufficient detail to demonstrate to one of ordinary skill in the art that the inventor possessed the invention that achieves the claimed result, a rejection under 35 U.S.C. § 112(a) for lack of written description must be made. *See* MPEP § 2161.01, subsection I.

For example, in *Vasudevan*, the Federal Circuit evaluated "whether the specification shows possession by the inventor of how accessing disparate databases is achieved." *Vasudevan*, 782 F.3d at 683. The defendant in district court argued that "the specification does not show that the inventor had possession of the ability to access 'disparate databases'" because "the specification describes a result, but does not show how to achieve the result." *Id*. at 682. On appeal, however, the Federal Circuit found that expert testimony given in the district court raises "a genuine issue of material fact on whether the specification shows how to achieve the functionality of accessing disparate databases." *Id*. at 683. The expert had opined that specific portions of the specification explain "that serialized files can be used to correlate parameters from two databases," and that "those correlation parameters can be used to identify data in one database that is correlated to data in another." *Id*. The Federal Circuit ruled that this expert opinion raises a genuine issue of fact as to whether the inventor has possession of an invention that achieved the claimed result.

Id. MPEP § 2161.01, subsection I and MPEP § 2163 contain additional information on determining whether there is adequate written description support for computer-implemented functional claim limitations.

B. Enablement Requirement of 35 U.S.C. § 112(a):

At issue in *Vasudevan* was also whether the patent specification enabled a person of skill in the art to make and use the claimed invention. *Vasudevan*, 782 F.3d at 683-85. The Federal Circuit explained that "[a] claim is sufficiently enabled even if 'a considerable amount of experimentation' is necessary, so long as the experimentation 'is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed.'" *Id*. at 684 (quoting *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988)). "On the other hand, if 'undue experimentation' is needed, the claims are invalid." *Id*. "In determining whether experimentation is undue, *Wands* lists a number of factors to consider: 'They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.'" *Id*.

To satisfy the enablement requirement of 35 U.S.C. § 112(a), the specification must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation. All questions of enablement under 35 U.S.C. § 112(a) are evaluated against the claimed subject matter with the focus of the examination inquiry being whether everything

within the scope of the claim is enabled. Accordingly, examiners should determine what each claim recites and what subject matter is encompassed by the claim when the claim is considered as a whole, not when its parts are analyzed individually. *See* MPEP § 2161.01, subsection III, and MPEP § 2164.08.

Not everything necessary to practice the invention need be disclosed. *Trs. of Bos. Univ. v. Everlight Elecs. Co., LTD.*, 896 F.3d 1357, 1364 (Fed. Cir. 2018) (explaining that while "the specification must enable the full scope of the claimed invention[,]" "[t]his is not to say that the specification must expressly spell out every possible iteration of every claim."). For instance, "'a specification need not disclose what is well known in the art.'" *Id.* (quoting *Genentech, Inc. v. Novo Nordisk A/S*, 108 F.3d 1361, 1366 (Fed. Cir. 1997)); *see also AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1234, 1244 (Fed. Cir. 2003). This is of particular importance with respect to computer-implemented inventions due to the high level of skill in the art and the similarly high level of predictability in generating programs to achieve an intended result without undue experimentation. However, applicant cannot rely on the knowledge of one skilled in the art to supply information that is required to enable the novel aspect of the claimed invention when the enabling knowledge is in fact not known in the art. *See* MPEP § 2161.01, subsection III, and MPEP § 2164.08.

The Federal Circuit has repeatedly held that the specification must teach those skilled in the art how to make and use the full scope of the claimed invention without undue experimentation. *See Trs. of Bos. Univ.*, 896 F.3d at 1364 ("'The scope of enablement . . . is that which is disclosed in the specification plus the scope of what would be known to one of ordinary skill in the art

without undue experimentation.'" (quoting *Nat'l Recovery Techs., Inc. v. Magnetic Separation Sys., Inc.*, 166 F.3d 1190, 1196 (Fed. Cir. 1999))). For example, in *Sitrick v. Dreamworks, LLC*, 516 F.3d 993 (Fed. Cir. 2008), the claims at issue were directed to "integrating" or "substituting" a user's audio signal or visual image into a pre-existing video game or movie. *Id.* at 995-97. While the claims covered both video games and movies, the specification only taught the skilled artisan how to substitute and integrate user images into video games. *Id.* at 1000. The Federal Circuit held that the specification "did not enable the full scope of the asserted claims" because "one skilled in the art could not take the disclosure in the specification with respect to substitution or integration of user images in video games and substitute a user image for a pre-existing character image in movies without undue experimentation." *Id.*

With respect to the breadth of a claim, the relevant concern is whether the scope of enablement provided to one skilled in the art by the disclosure is commensurate with the scope of protection sought by the claims. In making this determination, examiners should consider (1) how broad the claim is with respect to the disclosure and (2) whether one skilled in the art could make and use the entire scope of the claimed invention without undue experimentation. *See* MPEP § 2161.01, subsection III, and MPEP § 2164.08. A rejection for lack of enablement must be made when the specification does not enable the full scope of the claim. For more information regarding the enablement requirement, see MPEP §§ 2164.01 through 2164.08.

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Andrei Iancu,
Under Secretary of Commerce for Intellectual Property and
Director of the United States Patent and Trademark Office.

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