Dilemma with Patent Protection of Software Modules in China

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Nokia (plaintiff) v. Shanghai Huaqin Communication Technology Co., Ltd. (defendant), a case of dispute over an invention patent infringement, was decided, in its first instance, by the Shanghai No. 1 Intermediate People's Court.[1] The Court concluded that the apparatus claimed in the plaintiff's patent included means-plus-function technical features, but the description did not fully disclose the embodiments of configuration of the apparatus, rendering the scope of protection of the purely means-plus-function apparatus unclear and making it impossible to find the alleged infringement, and rejected the plaintiff's all litigant claims. And recently, the first-instance judgment was affirmed by the Shanghai Higher People's Court for similar reasons[2].

"Means-plus-function" is a heatedly discussed topic drawing constant attention in the community. This case also involved a special technical field and the form of claim drafting, namely involving construction of a claim using a "means-plus-function" apparatus in a patent for an invention relating to a computer program. For this reason, the view presented in the decision, once made accessible to the public, has caused another wave of heated discussion on the issue of means-plus-function claims among scholars and practitioners. This article will start with a study of the case, go on to probe into the issues of drafting, examination and enforcement, and judicial practice relating to claims to computer program, on the basis of analysis of some relevant foreign cases; focus is laid on the discussion of the issues, such as clarity, description support and sufficient disclosure of computer program-related claims in an attempt to develop some corresponding coping measures.

Drafting of claims to computer program

Improvement of the prior art made in an invention relating to a computer program possibly lies in the processing or controlling flow, or method, of external or internal object,

rather than in any change in the hardware structure, which is somewhat special compared with the inventions in other fields. Therefore, some special provisions are set forth in Chapter 9 of Part II of the Guidelines for Patent Examination on how to draft claims of inventions of the nature as follows: "A claim of an invention application relating to computer program may be drafted as a process claim or product claim, i.e., the apparatus for executing the process." "Each component in the apparatus claim shall be regarded as function modules which are required to be built to realize each step in the said computer program flow or each step in the said method. The apparatus claim defined by such a group of function modules shall be regarded as the function module architecture to realize the said solution mainly through the computer program described in the description, rather than entity devices to realize the said solution mainly through hardware."

While improvements of the prior art merely lie in software flow, it is often hoped that protection is accorded to firmware combining both software and hardware, without limiting to process *per se*. For an invention relating to a computer program, since those practically executing the patented process are often lower-stream users, or even end consumers, patentees usually do not hope to assert their rights against them; it is more likely for an end consumer to be found not infringing their patent as he uses such inventions not for production or business purposes. For example, in the above case, those executing the patented process in suit are consumers buying cell phones, whose execution was not for production or business purposes; but the defendant, as a cell phone manufacturer, did not directly execute the patented process, which makes it impossible for the patentee to enforce its patent right against it or him. This is a common phenomenon in the fields of computer and communications. For this reason, it is practically quite necessary for a patentee in the field to enforce their patent rights against manufacturers and distributors of this category of apparatus by drafting product claims with such processes incorporated in the scope of protection claimed as products. The core of such apparatus claims is that the inventions improving processes in the prior art are claimed as products so as to overcome or prevent the inadequacy intrinsic in the protection for process claims.

To incorporate apparatus products as the claimed subject matter, a considerable number of computer program-related claims are, for a long time in the filing practice, drafted in such a way, according to the provision of Chapter 9 of Part II of the Guidelines for Patent Examination, that is, with processes and flows claimed, claims to apparatuses corresponding to each step of the processes and flows are incorporated, hoping to claim the apparatus executing the processes. What is more, if the product claims of patent applications of the type are not drafted in such a way to correspond each step of the process, examiners would require applicants to make amendment under the special provisions of the Guidelines for Patent Examination for the inventions to be granted; claims drafted in other forms would run into the risk of rejection.

In the above Nokia case, the patent in suit happened to have been drafted this way, with the patented claim 1 going like this: "A method for selecting a data transfer method in a telecommunication system, wherein several data transfer methods exist for selection". The process comprised three steps of "determining a message to be transmitted", "checking property information concerning a message" and "selecting the data transfer method". Independent claim 6 related to "a terminal device", and defined the means of the device as being respectively "configured" to "determining a message to be transmitted", "checking property information concerning a message" and "selecting the data transfer method".

Of the claims, claim 1 claimed a process while claim 6 the means corresponding to each step of the process. These claims were drafted exactly in the way clearly provided for in the part of the Guidelines for Patent Examination. As the patent prosecution history shows, examiners, in their substantive examination, accepted this way of drafting the claims, and did not find it contrary to the provisions of Article 26, paragraphs three and four, of the Patent Law or Rule 20, paragraph one, of the Implementing Regulations of the Patent Law in relation to sufficient disclosure, description support or clarity of claims .

Construction of means-plus-function claims

Claim construction is a step necessary to identify the scope of protection. In the case under this study, the court found the scope of protection of the product claim of the patent in suit uncertain, and rejected all the plaintiff's claims on this ground, which seems to mean that for the court, the product claim is not clear. It is, thus, necessary to briefly look into the way claims of the type are construed.

Article 4 of the Supreme People's Court's Interpretation

of Several Issues Relating to Application of Law to Adjudication of Cases of Dispute Arising from Patent Right Infringement (No. Fashi 21/2009) (the Judicial Interpretation for short) provides: "In respect of technical features presented in terms of function or effect, the people's court shall determine them according to the embodiments of the function or effect described in the description and appended drawings and their equivalents".

By contrast, Section 3. 2. 1, Chapter 2 of Part II of the Guidelines for Patent Examination provides: "A technical features presented in terms of function or effect shall be construed to cover all the embodiments capable of performing said function".

The Guidelines for Patent Examination has made it clear that a means-plus-function claim should be supported by the description, and exclude any substitution a person skilled in the art cannot understand from the scope of protection. This, however, differs from the "cover-all" construction doctrine adopted in the Guidelines for Patent Examination. In the Judicial Interpretation, the scope of protection of means-plus-function claims is determined according to "the specific embodiments disclosed in the description and their equivalents".[3]

As is provided in Chapter 9 of Part II of the Guidelines for Patent Examination, in a patent for invention relating to computer program, when a product claim and process claim are drafted in such a way as for them to correspond to each other, it is not required, in examination, that the description discloses the hardware structure in the product. In case like this, if a court, hearing an infringement case, requires to take a hardware structure disclosed in the description as an embodiment of product, and determines the scope of protection on this account, then, claims drafted this way as guided by the patent examination authority would be rendered unenforceable as the courts construe them in a different way, which would render a lot of granted patents merely nominal and leave would-be patent applicants at a dilemma.

Regarding the issues of description support and sufficient disclosure, it should first be made clear that the substantive examination of the validity of a patent has gone beyond the scope of the courts' duty to hear a case of dispute arising from patent infringement; the validity issue should be addressed in the invalidation proceedings; the courts should presume a patent in suit valid when a patent is not invalidated. Nonetheless, according to the above provision of the Judicial Interpretation, as what are disclosed in the description and what are claimed in the claims are closely related, and the two issues will be discussed together in this article.

Cases of infringement of inventions of the type are rare in China, so the issues are looked at by citing some foreign cases.

The Judicial Interpretation takes a position identical with that of 35 U.S.C.§112 (f) that "An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof". Thus, in this type of patent infringement litigation in the U.S., identifying what are disclosed in the specification is the precondition for construing a claim, and since a U.S. court hearing patent infringement litigation is also responsible for addressing the patent validity issue, whether a claim is clear as provided for is also an important issue discussed in the court decision.

According to the rules established in the following two cases heard by the Court of Appeals for the Federal Circuit (CAFC), in a means-plus-function claim to computer program, be it possible for a person skilled in the art to perform it, disclosure of the specific structure is a must, but what is disclosed can be an algorithm, not necessarily a physically tangible entity. The scope of protection of the claim will be confined to the disclosed algorithm and its equivalents under 35 U.S.C.§112 (f).

In WMS[4], regarding the means-plus-function feature in the computer program-related claim, the CAFC found that the specification had disclosed sufficient "structure", namely a general purpose computer implementing the particular algorithm, which was sufficient to determine the scope of the protection of the means-plus-function claim. In the case, claim 1 of the patent in suit was: "A game apparatus, comprising … means for assigning a plurality of numbers representing said angular positions of said reel … means for randomly selecting one of said plurality of assigned numbers…". The CAFC concluded that the corresponding structure disclosed in the specification was a microprocessor programmed to implement specific assigning, and that programmed to generate random numbers. The court stated in its decision that "A general purpose computer, or microprocessor, programmed to carry out an algorithm creates 'a new machine, because a general purpose computer in effect becomes a special purpose computer once it is programmed to perform particular functions pursuant to instructions from program software'" and "[i]n a means-plus-function claim in which the disclosed structure is a computer, or microprocessor, programmed to carry out an algorithm, the disclosed structure is not the general pur-

pose computer, but rather the special purpose computer programmed to perform the disclosed algorithm".

In Aristocrat[5], the CAFC interpreted that the disclosure required in 35 U.S.C.§112 (f) was to confine the scope of protection of a claim to the scope of a particular structure, so as to prevent a purely means-plus-function claim, and that the "disclosure" required here was an issue different from that of "sufficient disclosure" for a person skilled in the art to perform it; hence, the disclosure as required here did not depend on the ability of a person skilled in the art. In other words, even if a person skilled in the art knew how to perform the function defined in a claim, the disclosure of the structure as required in 35 U.S.C.§112 (f) was necessary; and it was concluded in the decision that the drawings and forms of the patent in suit did not constitute disclosure of the algorithm.

Determination on whether disclosure satisfies legal requirements

As aforementioned, according to the U.S. patent infringement case law, in a means-plus-function claim to computer program, the disclosure made to satisfy 35 U.S.C.§112 (f) can be an algorithm. Then what extent of disclosure is viewed as satisfying the provision? And what extent of disclosure is regarded as contrary to it? In what form should an algorithm be expressed or presented? To answer these questions, more CAFC cases will be cited in the following section of the article.

In the above Aristocrat, claim 1 of the patent in suit included a technical feature "game control means arranged to control images displayed on the display means", and the specification neither disclosed any algorithm, nor provided any flowchart of the technical feature. The patentee once argued that "any standard microprocessor basic gaming machine appropriate programming" disclosed in the specification constituted sufficient disclosure of the structure, and citing Dossel, argued that it was not necessary to disclose the specific algorithm.

In Dossel[6], the claim in suit included the feature "means for reconstructing the current distributions of the volume elements which are situated on said surfaces on the basis of said measured values", and it was stated in the specification that "A reconstruction unit 11 reconstructs the density of the impressed current at the individual voxels Vi from the measuring values of the magnetic flux density at the various pixels at each time the same instant. Known algorithms can be used for this purpose. The relationship between the measuring values of the magnetic flux density B at the measuring points Pk and the current density J at the voxels Vi can be described in matrix form by a way of the Biot-Savart equation: B=A*j+n."[7] The CAFC finally concluded that the specification of the patent in suit disclosed the steps, such as data input, mathematical computation and data output, and specified that the known algorithm could be used to solve the equation known in the art, and that, considering the special facts of the case, the disclosure satisfied the requirement of 35 U.S.C.§112 (f) though the specification of the patent in suit did not disclose the specific algorithm.

In Aristocrat, however, the CAFC did not apply the conclusion made in Dossel, believing in its analysis that the patent in suit in Dossel presented very detailed information about how to perform the function, and the word "algorithm" was used in its narrow sense, in the case, possibly to refer to a basic, mathematical computation, not a step to perform a given function. The patentee's request for applying Dossel was refused by the CAFC, which decided that in respect of a functional feature performing the function of a computer program, while code or a very detailed description was not necessary, disclosure of the algorithm was a must.

In Intel[8], claim 1 of the patent in suit was "an interface between a system memory controller and a peripheral device, said interface comprising: an element adapted to selectively write data directly to said peripheral device at one of at least two rates; and a selection device adapted to determine whether data is able to be written directly to said peripheral device，…". The specification of the patent in suit included three tables, 35 figures showing signals and detailed explanations thereof. For example, the specification stated that "Figures 4-14 show an FW completing normally; WBF# is asserted by the AGP master on clock 6 which prevents the core logic from initiating a new transaction on clock 7 or thereafter. In this case, the core logic is not doing a fast back-to-back transaction and would have asserted transaction on clock 8 if WBF# had been deasserted on clock 7"[9] (see fig.1)

The CAFC concluded that the disclosed "core logic" constituted a structure satisfying 35 U.S.C.§112 (f), and although the circuit relevant to how to amend the core logic was not disclosed, the claim should not be found unclear merely on this account. The CAFC reaffirmed that whether the structure disclosed in the specification was due should be considered from the perspective of a person skilled in the

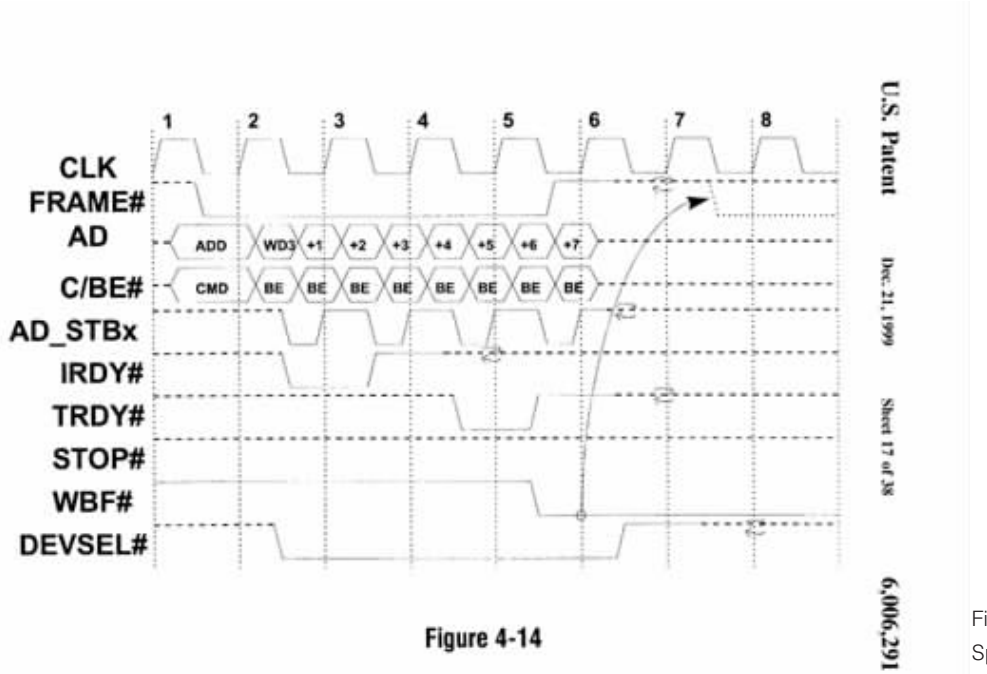

Fig. 1. Figures 4-14 of the Specification of the Intel's Patent

art, and further explained that the innovative point of the invention in suit was the signal protocol for performing the data inputting process, not a specific circuit. To design around, one might select a different protocol, but could not do it by simply changing the circuit, and performing the same protocol.

Contrast to the above two cases, the CAFC made different conclusions in Google[10] and Benz[11].

In Google, the patent in suit included the technical feature "means for transmitting said presentation to a selected media venue of the media venues"; the patentee cited some information from the specification, such as "The present invention allows a seller to create presentations on his computer, which are automatically transferred so that they are published or watched in a plurality of traditional or electronic media networks"[12]. But the court believed that the specification at most disclosed that "the structure behind transmission function is a computer transmission program", and it did not disclose the algorithm. The patentee argued that in the figures of the specification had been disclosed the sufficient

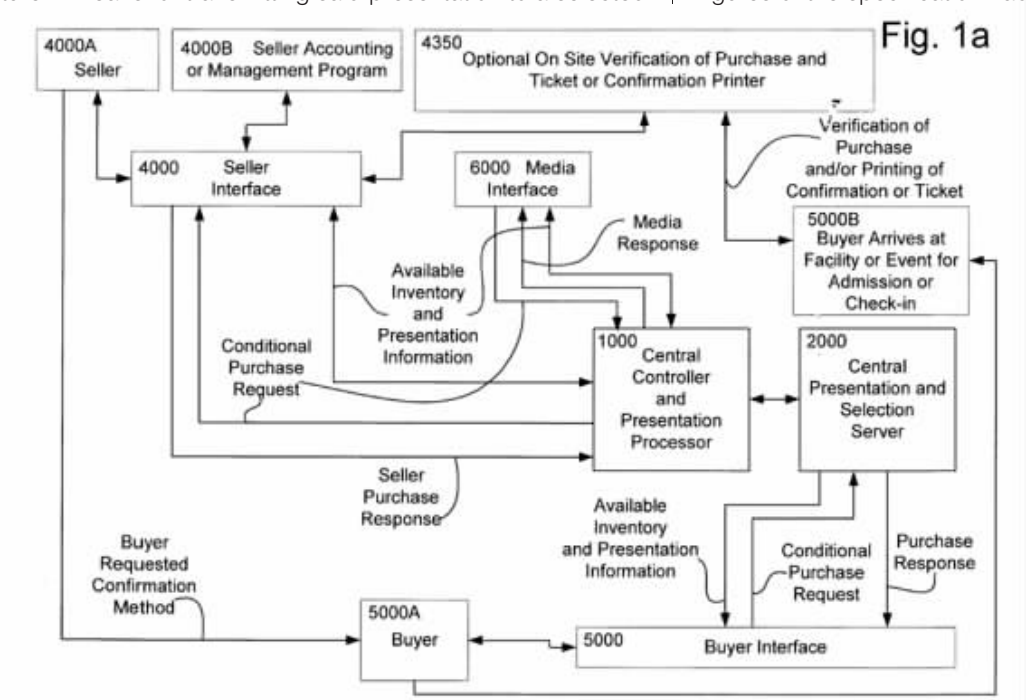

Fig. 2 Figure 1a of the Specification of the Google's Patent

structure as in Fig. 2, but the Figure only disclosed the relations of some modules. The court concluded that these relations did not disclose how the software performed the transmission function.

In the case, the court reiterated that, for a functional feature implemented by a special computer, the specification was required to disclose the algorithm performing said function. The specification of the patent in suit only disclosed the software automatic transmission, but did not explain how to implement the transmission function of the software. Besides, while the specification presented a hardware connection structure, it did not disclose the algorithm; hence the court found the claim invalid for lack of clarity. Meanwhile, the court also restated that with regard to the matter of clarity of a claim, the specific explanation of the structure can not be omitted merely because a person skilled in the art was able to design a means to implement the process.

In Benz, the patent in suit included the technical feature "computational means for weighting the operational model according to time of day in relation to the driver or operator circadian rhythm pattern (s) and for deriving, from the weighted model, driver or operator sleepiness condition and producing an output determined thereby". The court reiterated that the structure the "computational means" needed must be an algorithm, a series of computing steps to be performed, and determined that the parameter value ranges disclosed in the Tables of the specification and the simple equations (see Fig. 3) did not constitute an algorithm.

TABLE 10

Sleep Propensity Algorithm - Definition
S mod = S circ + S zerox + S rms + S light + S temp + S sleep + S road + S trip

Elemental	Bound Limit
S mod	0 < S mod < 1
S circ	0 < S circ < 1
S zerox = (F zerox/100) (Z ref-Z)	0 < S zerox
S rms = (F rms/100) (R-R ref)	0 < S rms
S light = (F light/100) (I ref -I)	0 < S light
S temp = (F temp/100) (T -T ref)	0 < S temp
S sleep = (F sleep/100) (H ref - (HXQ))	0 < S sleep
S road = (F road/100) (G ref -G)	0 < S road
S trip = (F trip/100) x D	0 < S trip

Fig. 3 Table 10 of the specification of Benz's patent

In the case, the patentee and the expert witness thereof argued that the scope of protection of the patent in suit should not be limited to the simple equation presented in the Tables of the specification, rather it should cover all the embodiments a person skilled in the art considered due with account taken of the parameters given. The court opined that this argument left the algorithm design with a skilled person in the art, and just did not disclose the algorithm for defining the boundary of the claim.

As all these cases show, in a means-plus-function claim to a computer program-performed function, the specification needs to disclose the algorithm, that is, the specific computational steps to perform the function to make it possible to define the scope of a claim, so as to prevent drafting a purely functional one. Disclosure of a hardware structure and mathematical formula is not a must for a patent of the nature, and mere disclosure of hardware structure does not suffice to satisfy the disclosure requirement. It is worth noting here that for a patent of the nature, disclosure of hardware structure is neither necessary, nor sufficient.

Discussion on solution in practice

In practice, the first issue to be addressed is how to understand the special provisions relating to implementation means-related claims in Chapter 9 of Part II of the Guidelines for Patent Examination.

As the arrangement of the parts of the Guidelines for Patent Examination shows, the general provisions concerning drafting of descriptions are set forth in Chapter 2 of Part II, in which the provision on "Based on the Description" in section 3.2.1 goes as follows: "Usually, for product claims, features of function or effect shall be avoided as far as possible to be used in defining the invention. It is only when a certain technical feature cannot be defined by a structural feature, or it is more appropriate to be defined by a feature of function or effect than by a structural feature, and the function or effect can be directly and affirmatively verified by experiments or operations as stated in the description or by customary means in the art, that definition by features of function or effect in a product claim can be permissible".

Besides, it is specified in this section that "a purely functional claim is not supported by the description, so not allowable". The so-called "purely functional" claim is "one that mentions only the objective and effect to be achieved, but does not, at all, outline the technical solution for achieving said objective or effect"[13].

Some special provisions are set forth in Chapter 9 of Part II of the Guidelines for Patent Examination on inventions relating to computer programs, in which it is made clear that "a claim of an application for a patent for an invention relating to a computer program may be written as a claim to a

process, or one to a product, namely an apparatus for implementing the process". As literally indicated in the provision in Chapter 9, in drafting the claim by saying "apparatus for implementing the process", function (namely, implementing the process) is used to define the apparatus. This complies with the provision on means-plus-function claims in Chapter 2, and the two chapters do not conflict as Chapter 9, on the basis of Chapter 2, further provides for the way to draft computer program-related claims of invention, allowing direct use of means-plus-function features without the need for applying the precondition mentioned in Chapter 2 or deeming that said precondition has been satisfied.

On the other hand, it is provided in Chapter 9 of Part II of the Guidelines for Patent Examination that "an apparatus claim defined by such a functional module shall be construed to be a functional module architecture for implementing said solution mainly though the computer program presented in the description, not to be a substantial apparatus for implementing said solution mainly though hardware", which makes it clear that a claim of the type claims or protects "a functional module architecture", not "a substantial apparatus", but there is controversy on the way of construction of such claims [14] and [15]. Views are divided as to whether one should apply the "cover-all" doctrine mentioned in Chapter 2 or something similar to the limiting construction in 35 U.S.C. in claim construction.

With a patent drafted this way, the description usually does not disclose the hardware structure of a relevant apparatus. Then is the apparatus claim a disallowable "purely functional" claim? In a particular technical field, the answer may not be affirmative. Chapter 9 sets forth special provisions on patents of inventions relating to computer programmes, and an apparatus for implementing a computer programme is, of course, a computer, whose structure is known, and it is unnecessary to disclose it. One computer implementing one program and one implementing another program do not differ substantially in hardware structure, which is the "general purpose computer + particular algorithm = special purpose computer" logic in the U.S. case law. For this reason, as for claims of the type, the description should not be specifically required to disclose the hardware structure, and the disclosure should be confined to process and/or flow. In other words, so long as the "process" is clear and sufficiently disclosed, the "means implementing said process" is clear and sufficiently disclosed.

To address issues now arising in practice, it is necessary to harmonise the ways of the examination and judicial construction of claims of the type, and choose between the two ways of construction: "the embodiments and the equivalents thereof disclosed in the description" and the "cover-all" doctrine. Meanwhile, the particularity of a specific technical field must be considered, and, in any events, disclosure of hardware structure should not be deemed to be necessary. In this regard, we shall try to develop a solution as follows:

1) The method of construction of "the embodiments disclosed in the description and the equivalents thereof" in the Judi cial Interpretation is generally adopted, with special provi sions set forth directed to inventions relating to computer programs.

The provisions of the Judicial Interpretation are similar to those set forth in 35 U.S.C.§112 (f), but attention should be paid to distinguishing technical fields when applying them, with the disclosure-related requirements properly adjusted. To date, the Judicial Interpretation only requires the presence of "embodiments" in the description while 35 U.S.C. §112 (f) requires that a specification discloses a given "structure". While "embodiment" and "structure" are somewhat different, they may be specifically applied with reference to the U.S. case law. That is, in an invention relating computer program, the description should disclose a certain algorithm or flow, not hardware structure. As for the extent of disclosure, so long as the algorithm or flow spell out clear steps, and may be used to construe the claims, the description is deemed to have disclosed the "embodiments"; it is undue to stringently require that the description should make a disclosure to such an extent as to disclose all the source codes.

As an alternative solution, some special provisions may be set forth concerning inventions relating to computer programs, so that it is allowable to more widely construe claims drafted in particular ways. It is up to a patentee to choose his way to draft a claim and a corresponding way to construe it under specific circumstances. For reference, in its internal training, the USPTO allows particular ways to draft and construe claims to components for implementing a computer program. To be specific, a component for implementing a computer program written as "a module for … " is not deemed to be a functional feature, so not construed in the way mentioned in 35 U.S.C.§112 (f).

While addressing the matter this way is not short of a feasible solution, and it limits on potential "purely functional"

claims. But inconsistence between the patent invalidation proceedings and the court procedure can be a potential issue as substantial issues, such as description support and sufficient disclosure, are not issues reviewed by the court in infringement litigation.

2) "Cover-all" doctrine mentioned in the Guidelines for Patent Examination is adopted for construction

Viewed from the perspective of the policy consistency, a patent for an invention relating to computer program is of a certain special character, and the Guidelines for Patent Examination have set forth special provisions on how to draft the claims thereof, which have long been observed in patent filing practice. If in the judicial procedure a claim is construed in a way that renders a patent of the nature unenforceable, this would make the patent meaningless, make it impossible for one to get return on the technical contribution made therein, and it is contrary to the valid patent presumption principle. Therefore, it is both reasonable and feasible to properly adjust the way to construe claims in various technical fields.

In terms of convenience in practice, if a claim is construed according to "the embodiments disclosed in the description and the equivalents thereof", a claim is construed depending, to a large extent, on the review by a court, and it would be deemed to be unclear if it is impossible to identify the specific embodiment. This makes it quite necessary to address, in the infringement litigation, issues of identifying the disclosure and scope of equivalents to determine the scope of protection of claim, and makes it also necessary, after that, to decide again on infringement by equivalents, which would make the court procedure or litigation much uncertain and increase the burden thereof. By contrast, if a claim is construed according to the "cover-all" doctrine, the claim is literally construed. If the literal scope is too broad, the claim is unlikely to be supported by the description, an issue that can be addressed in the patent invalidation procedure.

Particularly, in the Directions on the Standards for Finding Infringement and Passing off as Patents prepared by the State Intellectual Property Office (issued for comments) has also been adopted a way similar to the "cover-all" doctrine[16]. With the "two-track" protection model in China, it is indeed necessary for the administrative and judicial authorities to act in a harmonised fashion.

Meanwhile, in the patent filing practice, it is possible to take a multiple-layered claim drafting strategy: adding, on top of the existing process claim and its corresponding apparatus claim, a product claim having a more specific subject matter and with a given extent of description support for its hardware structure to prevent a functional feature from possibly making the scope of the claims uncertain. ■

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[1] http://www.a-court.gov.cn/platformData/infoplat/pub/no1court_2802/docs/201307/d_1792203.html, http://www.cipnews.com.cn/showArticle.asp?Articleid=29682, http://news.xinhuanet.com/legal/2013-07/04/c_124958749.htm.

[2] http://www.ip-talents.com/Html/NewsView.asp?ID =2152&SortID = 54&SorttID=32

[3] See A Comparative Study of Means-plus-Function Claims in China and United States, carried in the China Patents & Trademarks, 2012, issue 2.

[4] WMS Gaming Inc. v. International Game Technology, 184 F.3d 1339 (Fed. Cir. 1999).

[5] Aristocrat Techs. Australia v. Intern. Game Tech., 521 F.3d 1328 (2008).

[6] Dossel, In re, 115 F.3d 942, 946 (Fed. Cir. 1997).

[7] US 5885215 A (former US Application 07/543,600), col. 4 ll. 12-15.

[8] Intel Corp. v. Via Technologies, Inc., 319 F.3d 1357 (Fed. Cir. 2003).

[9] US 6006291 A, col. 12 ll. 60-66.

[10] Function Media, LLC v. Google, Inc., 708 F.3d 1310, 1319 (Fed. Cir. 2013).

[11] Ibormeith IP, LLC v. Mercedes-Benz USA, LLC, No. 2013-1007 (Fed. Cir. Oct. 22, 2013)。

[12] US 6446045 B1, col. 57 ll. 36-39.

[13] Zhao Li, Substantive Examination of Means-plus-function Claims, carried in the China Intellectual Property, No. 52, 2011, issue 6.

[14] Song Limei and Sun Guohui, On Form of Protection of Computer Programme Patents, Carried in the China Intellectual Property, No.71 2013, issue 6

[15] Zhang Peng, Construction of Means-plus-function Claims from Perspective or Present Situation of Development of the Industry in China, carried in the China Inventions & Patents, 2010, issue 7.

[16] The State Intellectual Property Office, Section 5.3 (2), Chapter 1 of Volume 1 of the Directions on the Standards for Finding Infringement and Passing off as Patents, 2013.