

# Comparison between Practices Related to Functional Features in China and the United States:

with Comments on Nokia v. Huaqin

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## I. Introduction

In Article 4 of the Supreme People's Court's Interpretation of Several Issues Concerning the Application of Laws to the Adjudication of Patent Infringement Disputes (Interpretation No.21/2009) ("SPC Judicial Interpretation"), the SPC provides that: "Where a technical feature in a claim is expressed in terms of functions or effects, the People's Court shall determine the contents of the technical feature in consideration of the detailed embodiments of the functions or effects described in the description and drawings and equivalents thereof."

The SPC's provision is not consistent with the practices of the State Intellectual Property Office (SIPO) during patent prosecution that "technical features defined by function in a claim shall be construed to cover all the means that are capable of performing the function". The two different interpretations and the caused potential issues have been extensively discussed in the industry.

In June 2013, the Shanghai No. 1 Intermediate People's Court, in the decision made in Nokia v. Huaqin, an invention patent infringement case, construed the technical features in the apparatus claim of Nokia's patent to be functional features, and found the scope of protection of the claim uncertain on the ground that the description did not disclose detailed embodiments of the apparatus, and found it impossible to hold Huaqin, the defendant, infringing. The court's decision has again triggered discussion on whether step-defined features in an apparatus claim of a computer software related patent should be construed to be functional features.

This article will make a comparison to show the difference between China and the United States in construction of

functional features and determination of contents by presenting an overview of the patent prosecution and judicial practice in relation to patent with functional features in the United States, and then start to discuss the decision made in Nokia v. Huaqin to probe into the special character of features in apparatus claims of a computer software related patent, look into the dilemma the patentees are now faced with in China, and try to make some recommendations.

## II. Comparison of functional features in China and the United States

We have noticed that when talking about US functional feature, it is often believed that in the United States, a functional feature refers to the claim limitation under 35 U.S.C. §112(f), namely "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".

But, in the United States, functional features are by no means limited to the circumstances mentioned in §112(f). For example, it is pointed out in a section on Functional Limitations in 2173.05 (g) of the Manual of Patent Examining Procedure (MPEP) that a claim term is functional when it recites a feature by what it does, rather than by what it is (Here we call it "a functional feature in its broad sense"). The "means-plus-function" form under §112(f) is a specific functional language, and only under the circumstance where §112(f) is invoked would the feature be constructed to cover the corre-

sponding structure, material, or acts described in the specification and the equivalents thereof. Conversely, if §112 (f) is not invoked, a functional feature is construed under the doctrine of the broadest reasonable interpretation (BRI), and is not subject to the specific structure, material or acts disclosed in the specification and the equivalent thereof.

Therefore, it is very important to determine whether §112(f) is invoked. Specifically, §112(f) is invoked if a feature of a claim meets the following three-prong analysis<sup>2</sup>:

i) The claim feature uses the phrase “means”, “step” or a term used as a substitute for “means” that is a generic placeholder;

ii) The phrase “means” or the substitute term is defined by functional terms; and

iii) The phrase “means” or the substitute is not modified by sufficient structure or material for performing the claimed function.

Take “filter” and “means for separating particulates from a solution” as an example. “Filter” does not use the “means for” form, and §112 (f) is not invoked, so it has a broader meaning, but meanwhile it is likely to be anticipated by more prior art. By contrast, the term “means for separating particulates from a solution” is compatible with the above three-prong analysis, and §112(f) is invoked. If a structure for separating particulates from a solution described in the specification is one specific type of filter, then the “means for separating particulates from a solution” is likely to have a relatively narrower meaning, and therefore can only be anticipated by that particular type of filter and its equivalents. If a means-plus-function feature is used to modify a non-structure term in a claim, then §112(f) is not invoked. For example, “filter system for filtering particulates” will not invoke §112(f) because the non-structure term “system for” is defined by “filter” which has a known structural meaning in the art.

Only a functional feature that meets the above particular requirement is viewed to be the functional feature in the “means-plus-function” form under §112 (f) and construed to cover the corresponding structure, material, or acts described in the specification and the equivalents thereof. For a functional feature in the broad sense that is not under §112 (f), both the USPTO and the court construe and determine its contents the same way as they do for other claim features.

Things are somewhat different in the court’s practice in China. A technical feature expressed in terms of function or effect in a claim is construed to be a functional feature, and so long as it is determined as such, the SPC Judicial Inter-

pretation applies; it is necessary to construe the feature according to the embodiments of the function or effect described in the description and drawings and the equivalents thereof, with only some rather special circumstances excluded from the scope of functional features<sup>3</sup>.

Fig. 1 below shows the differences in construction of functional features in the United States and China:

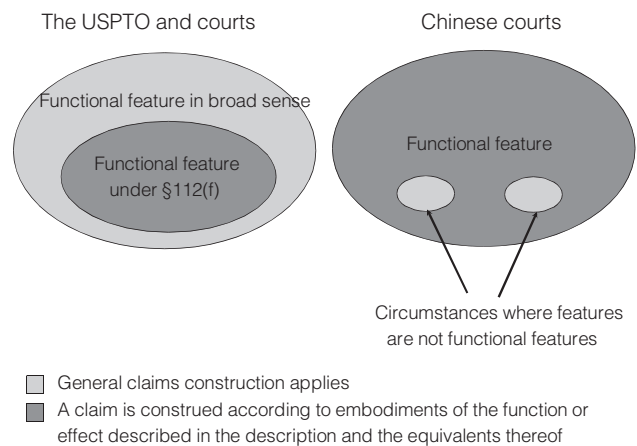


Fig. 1 Comparison of construction of functional features between the United States and China

Fig. 2 Further indicates the differences in determining the content of functional features in the United States and China:

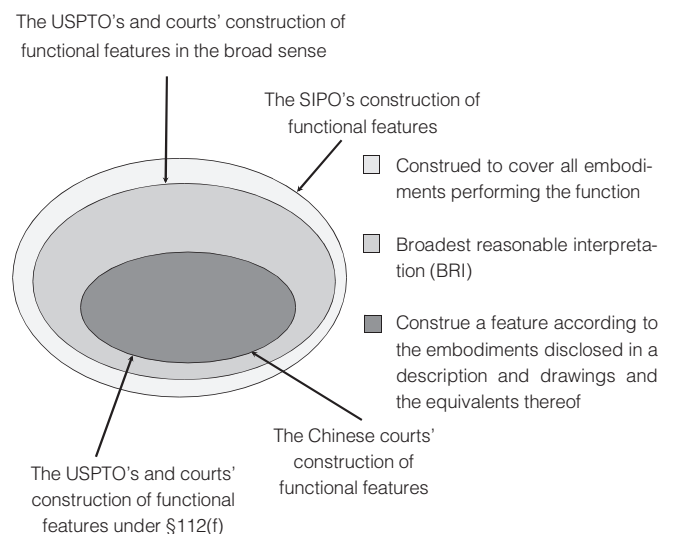


Fig. 2 Comparison of determination of contents of functional features between the United States and China

As shown above, the SIPO's construction of functional features is closer to that of the USPTO and US courts; while the Chinese courts' construction of functional features is consistent with the USPTO's and US courts' construction of

the specific functional features defined in §112 (f), which shows from another angle that the USPTO and courts are consistent in their construction for both functional feature in broad sense and the specific functional features defined in §112 (f). By contrast, in China, definition of functional feature has not been made clear, nor do the SIPO and the courts construe them in a harmonised way.

### III. “Functional feature” in computer software related patent

A discussion on functional features invariably involves computer software related patents. A feature in an apparatus claim of a patent implemented by computer software is often defined by way of the software program steps. Besides, during patent prosecution, under the relevant provisions of Chapter 9 of Part II of the Guidelines for Patent Examination (GPE), examiners often require an applicant to amend features in an apparatus claim in way of exactly corresponding to the software program steps.

Whether a feature defined by the software program step in an apparatus claim of a computer software related patent should be construed to be a functional feature, or be construed to be an apparatus feature defined by software program step? We'll discuss it below.

#### 1. Provisions on drafting claims in Chapter 9 of Part II of the GPE

In Chapter 9 of Part II of the GPE, the following provisions have been set forth on drafting claims for a computer software related application: “If an apparatus claim is drafted on the basis of computer program flow completely and according to the way completely identical with and corresponding to each step in the said computer program flow, or according to the way completely identical with and corresponding to the process claim reflecting the said computer program flow, i.e., each component in the apparatus claim completely corresponds to each step in the said computer program flow or each step in the said process claim, then 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.”

In its explanation of the amendment to the GPE, SIPO

pointed out: “if the description has sufficiently disclosed the process or steps preformed by the computer flow, then a process claim or a product claim may be drafted based on said flow and steps”. In other words, SIPO does not deem an apparatus claim drafted under Chapter 9 of Part II of the GPE to be a conventional product claim, nor does it require to describe, in detail, the hardware structure of the apparatus in the description. So long as the description sufficiently discloses the steps implemented by the computer flow, the scope of protection of the apparatus claim is believed to be clear, and the claim is supported by the description.

#### 2. An example of prosecution of a computer software related application

In the following, we shall exemplify the process of prosecution in China for a computer software related application which originated from the United States.

When filing in the United States, to avoid falling within the scope of §112 (f), for a computer software related invention, the applicant drafted an apparatus claim which corresponds to a process claim in a form as follows:

“An apparatus, comprising:

at least one transmitter/receiver pair; and

a processor, wherein the processor is configured to:

set at least one transmitter parameter and at least one receiver parameter in the computing device and recording error rate;

adjust the at least one transmitter parameter and the at least one receiver parameter, and record the error rate until the at least one transmitter parameter and the at least one receiver parameter are margined from a minimum to a maximum;

compare the recorded error rate to error rate for known cable lengths; and

determine a cable length based on the comparison.”

During prosecution in China, according to the current practice in SIPO, the examiner issued an Office Action (OA), stating that the apparatus claim is not complying to Article 26, paragraph four, of the Patent Law on the ground that the process limitation to the processor should be construed to have covered all the embodiments capable of implementing the process; however, the description only discloses the specific embodiments of using the computer program flow to implement the process, and a person skilled in the art could not appreciate that the process could be carried out by another equivalent not mentioned in the description; hence the technical solution as claimed is not supported by the description.

To get the patent granted, the applicant has to amend

the software-implemented feature as functional modules under Chapter 9 of Part II of the GPE. And to satisfy the mechanical requirements of having functional modules completely identical with and corresponding to the software steps, the hardware structure features have to be defined in the preamble of the claim instead of in the characterizing portion. The apparatus claim that is finally allowed by the examiner is as follows:

“An apparatus for detecting cable length in a computing device, the computing device including at least one transmitter/receiver pair, and the apparatus comprising:

a module for setting at least one transmitter parameter and at least one receiver parameter in the computing device and recording error rate;

a module for adjusting the at least one transmitter parameter and the at least one receiver parameter, and recording the error rate until the at least one transmitter parameter and the at least one receiver parameter are margined from a minimum to a maximum;

a module for comparing the recorded error rate to error rate for known cable lengths; and

a module for determining a cable length based on the comparison.”

The amended claim looks very similar to the “means-plus-function” language under §112(f).

As above illustrated, in respect of a computer software related invention, an apparatus claim, which has been drafted to avoid falling into §112(f) in the U.S., is not allowable according to the SIPO’s current examination practice, and the examiners often require to amend it into a functional module architecture under Chapter 9 of Part II of the GPE. Since this amendment is made to suit the prosecution practice in China, the claim itself does not exist in the application as filed, and the modules implementing the process or steps in the apparatus claim have not been described in the specification. So long as such a claim corresponds to the flow or process steps, the examiner considers it clear and supported by the description, and complying with Article 26, paragraph four, of the Patent Law.

### 3. Treatment of computer software related patents in patent infringement determination

In June 2013, Shanghai No. 1 Intermediate People’s Court, in the Judgment (No. Huyizhongmin 5 (zhi) chuzi 47/2011) made in *Nokia v. Huaqin*, construed the features defined with the process steps in the apparatus claim to be functional features, and found the protection scope of the claim uncertain on the ground that the description did not

disclose the detailed embodiments of the apparatus. In February 2014, the Shanghai Higher People’s Court made the second-instance Judgment (Hugaominsan(zhi)zhongzi 96/2013) in the appeal by Nokia, which rejected the appeal and sustained the former judgment.

To be specific, claims 6 and 7 of the allegedly infringing patent are as follows:

“6. A terminal device configured to determine a message to be transmitted on the basis of inputs received from a user, and the terminal device is further configured to check at least one piece of property information concerning the message being entered or already entered; and

the terminal device is configured to select, in order to transmit the message, a data transfer method associated in predetermined selection conditions with the property information, characterised in that:

the property information is one of the following: information type, which represents format of information entered into and/or selected for the message; the identifier of the receiver; the type of the identifier if the receiver.

7. The terminal device according to claim 1, characterized in that:

the terminal device is configured to apply the selected data transfer method in a message editor used for entering messages:

the terminal device is configured to transmit the message, on the basis of the selection of the data transfer method carried out in the message editor, to a data transfer application supporting the selected data transfer method; and

the terminal device is configured to transmit the message according to a data transfer protocol used by the data transfer application to a telecommunication network.”

The involved Nokia’s patent related to an invention implemented by computer software, and the features in the apparatus claim were defined by the software-implemented process steps. The first-instance court opined that claim 7 on the basis of which Nokia, the plaintiff, asserted its right claimed a device capable of realizing or implementing the process of claims 1 and 2, but the contents presented in the description of the patent mostly related to the process, steps or function, and there is no description of the apparatus *per se* and its detailed embodiments in the description. Therefore, the scope of protection of the plaintiff’s patent could not be made certain on the basis of the description. Given that the scope of protection of the plaintiff’s claim 7 was uncertain, it was not necessary, nor possible to ascertain whether the defendant had exploited the plaintiff’s patent; hence the

defendant should not be found infringing. Accordingly, the court decided, in its first-instance decision, to reject all Nokia's litigant claims<sup>4</sup>.

In the second-instance judgment, although the Shanghai Higher People's Court pointed out that if the technical contents of a technical feature defined with functional language can be directly, unambiguously identified by a person skilled in the art upon reading the claims, description and drawings, the feature may not be deemed to be a functional feature, the Court believed that the process steps described in the description could not be deemed to be embodiments of the step of "configuring" the device and the message editor in claim 7, and there was no common technical means that was known to a person skilled in the art and was capable of achieving the function or effect embodied by the technical feature. Thus the court rejected the appeal.

As shown by the decisions, the court first construed such an apparatus feature to be a feature expressed in terms of function or effect, namely a functional feature, and when determining the contents of the functional feature, the court believes that the embodiments of the process step in the description and drawings does not constitute embodiments of the apparatus claim, and thus found no infringement on the ground that the scope of protection of the claim was uncertain.

As far as we understand it, the court made the decision under Article 8 of the Shanghai Higher People's Court's Patent Infringement Dispute Adjudication Guidelines (2011) that "when there is no detailed embodiment of the function of a claimed functional feature in the description and drawings, it may be directly determined that the patent infringement accusation is not tenable." The Shanghai Higher People's Court's provision may be applicable to a functional feature in a claim, however, whether it applies to a step-defined feature in an apparatus claim in a computer software related patent, we think it is open to question.

According to the above adjudication practice of this case by the Shanghai No. 1 Intermediate People's Court and Shanghai Higher People's Court, a computer software related invention, especially a computer software related invention from the United States, would fall into the dilemma as follows:

First, for a computer software related invention, apparatus claims are drafted in a way to avoid falling into §112(f) in the United States, and this way of drafting is not allowed according to the present prosecution practice of SIPO. Ex-

aminers will require applicants to revise the claims into those in functional module form, which is very similar to "means-plus-function" form under §112 (f). During patent infringement litigation, the court will construe a feature in this functional module form to be a functional feature, and find, under the Supreme People's Court's Judicial Interpretation, it necessary to find embodiments of the functional feature in the description. However, what the court seeks in the description are description of the apparatus *per se* and the embodiments of how the apparatus "is configured ...", and the court believes that the detailed embodiments of the described process steps in the description are not embodiments of the functional feature in apparatus claims. In case like this, the court will conclude that embodiments of the functional feature in the apparatus claim are absent in the description. According to Article 8 of the Shanghai Higher People's Court's Patent Infringement Dispute Adjudication Guidelines (2011), the court will directly determine that the patent infringement accusation is not tenable.

Similar problems also exist with computer software related inventions made locally in China. To be consistent with the prosecution practice in China, a patent attorney, when drafting description and claims, often draft the apparatus claims in way of corresponding to the program steps under the provisions set forth in Chapter 9 and Part II of the GPE. Meanwhile, the description and block diagram of each functional module in an apparatus claim are provided in the description. Since these functional modules are not improvements of the hardware of the apparatus, the functional modules are described, in the description, in a form of function to which the process step implemented by the functional modules correspond. In this case, whether the court would construe the relevant description of the functional modules in the description to be the detailed embodiments of the functional feature in an apparatus claim, from the view the Shanghai No. 1 Intermediate People's Court and Shanghai Higher People's Court held in the Nokia case, it's also unsure.

#### 4. Recommendations regarding treatment of "functional features" in computer software related patents

Since the implementation of the above relevant provisions in Chapter 9 and Part II of the GPE in 2006, the SIPO has granted a large number of computer software related patents each year, with apparatus claims drafted according to those provisions. Applicants also always believe that these apparatus claims are enforceable. But according to the courts' decisions made in the Nokia case, all these SIPO

granted claims may eventually not be enforceable in infringement litigations. Inconsistent practices of the SIPO and the court system not only impact public trust in the patent system, but also seriously inhibit the development and innovation of the software industry. Therefore, we recommend that the court, during patent infringement adjudication, fully consider the special character of computer software related patents, and the continuity of the patent policy, and treat, in a due manner, the features included in apparatus claims of computer software related patents.

For most computer software related patents, their contribution to the prior art lies only in software innovation. Each step of the flowchart/block diagram described in a description may be implemented by computer program instructions. The computer program instructions can be provided to processors of general-purpose computers, and modules for implementing the relevant process steps are generated by loading and executing them on general-purpose computers. Even if a claimed apparatus is identical with a general-purpose computers in hardware structure, the apparatus, due to the function of the software incorporated therein, presents features different from the general-purpose computer, and generates an apparatus different from the prior art. The process of loading and executing computer program instructions is the process for “configuring” the apparatus to implement the relevant process steps. It’s understood that the “configuring” process is a common technical means that are directly and clearly identifiable to a person skilled in the art, and a process that even ordinary users without any special expertise can easily operate.

Take smart phones and applications or apps in these smart phones for examples, a smart phone manufacturer only pre-installs some necessary operating system software in the phones it sells. A user can download applications from the application provider’s website, and install them in his phone. The installation process is a process to configure the phone to implement the function of the application. The hardware structure of the phone remains unchanged, and the configuration for the hardware is done entirely with software. With the function of the installed relevant application, a phone presents a character different from the one before installation, and becomes a phone with new features. For an invention relating to an application of a cell phone, a description of the specific software flow of a cell phone application in the description may be sufficient enough to enable a person skilled in the art to fully understand how to load and

install it in a cell phone, without the need to describe the interaction between the hardware and the software.

In this situation, for a person skilled in the art, so long as the description presents a detailed description of the software process steps, which makes the limitation of these steps *per se* clear and supported by the description, the apparatus defined with these software process steps is correspondingly clear, and supported by the description. In Chapter 9 of Part II of the GPE, the features of apparatus claim defined by the software process steps are construed to be the functional module necessary for implementing the program steps. Examination as to whether the function module is clear and supported by the description is completely consistent with that for process/steps. Then, it is undue for the court to construe them to be functional feature, use the principle for construing functional feature to construe the apparatus feature defined by this software process steps, and limit its scope of protection to the detailed embodiments presented in the description and the equivalents thereof. Rather, the court should adjudicate the case under the principle for construing the ordinary feature of a claim.

To take a step back, even if the court, when adjudicating an infringement case, construe an apparatus claim feature of the type to be a functional feature, and construe the infringing contents according to the embodiments of the function or effect presented in the description and drawings and the equivalents thereof, the court should also consider that since contribution of such computer software related patent to the prior art lies only in innovation of software, so long as the description has sufficiently described the process steps implemented by the software flow, a person skilled in the art would be able to know how the functional modules performs the process steps, and the description of the software flow steps constitutes the detailed embodiments of the functional feature. In this situation, even if the claims are construed under the Supreme People’s Court’s Judicial Interpretation, the contents and scope of protection of them are clear, and it is possible to make the infringement adjudication and comparison accordingly.

To sum up, for features in an apparatus claim of a computer software related patent, either treating them as features defined by software process steps instead of as functional features, or treating them as functional features and taking description of software flow steps in the description as embodiments of the functional features, it does not impact a court’s construction of said apparatus claim features and



comparison for finding patent infringement in its adjudication of an infringement.

#### IV. Conclusion

Along with the transition from the corporate IT era to the consumers IT era, more and more software innovations are leading innovations in the IT industry. The kernel innovations made in recent years in the Cloud Computing and the Internet of Things lie in software. To further promote or spur the technological and social change brought about by software innovation, patent protection for software-related inventions is becoming vital. In addition, China is now changing and upgrading its mode of economy, hoping to change from “Made in China” into “Made with Chinese Intelligence”, and the software technology will inevitably play a decisive role in this transition. To date, innovative enterprises are mushrooming. A considerably large number of patents owned by these innovative enterprises are software-technology-related patents. For this reason, how to stimulate the potential of these Chinese innovative enterprises for innovation and development and protect their achieved innovations and developments are issues requiring urgent solution, and making

clear the form of protection of computer software related patents, and due and explicit construction of the claims of these patents is crucial to software innovation. ■

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<sup>1</sup> This article presents only the authors’ personal views, not views or position of the Corporation they work for.

<sup>2</sup> The MPEP 2181 Identifying a 35 U.S.C 112, Sixth Paragraph Limitation.

<sup>3</sup> For example, Article 16 of the Patent Infringement Adjudication Guidelines issued by the Beijing Higher People’s Court in 2013 provides: “The technical features in the following circumstances should not be regarded as functional technical features: i) technical features that are expressed in functional or effect language and have become the technical terms commonly known to a person skilled in the art, such as conductor, heat-dissipating device, adhesive, amplifier, transmission, and filter; and 2) technical features that are expressed in functional or effect language but are also described with corresponding structure, material, step and other features.”

<sup>4</sup> Source of information: [http://news.k8008.com/html/201311/news\\_10819832\\_1.html](http://news.k8008.com/html/201311/news_10819832_1.html).