Disputes over the Intellectual Property Rights of Telecommunications Standardization

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ABSTRACT

Both telecommunications standardization activities and an intellectual property rights (IPRs) system are regarded as effective mechanisms for improving social benefits. Because of inherent conflicts that exist between the two, however, serious problems are generated in the international arena where the competition for technology development and markets is becoming increasingly fierce. In this paper, ways of harmonizing the relationship between the two are explored and explained. For this purpose, telecommunications standardization and IPRs protection mechanisms are described, and their positive and negative effects as well as their inter-relationship are also analyzed. In addition, IPR case studies related to international standardization are explained and analyzed. The current status and problems of IPRs policy of major international standardization organizations are analyzed as well. Finally, based on the results of the analyses, viable policy recommendations and research strategies for more comprehensive study of the above problems are proposed.

I. INTRODUCTION

Standardization with the social and industrial infrastructure, for the purpose of harmonization of diversity, flexibility, exchangeability and compatibility, has been carried out in the level of promotion of user convenience as well as industry and technology development [1]. Recently, telecommunications standardization reflects the interconnectivity of networks and the interoperability of services, and the requirements of the service environment [2].

In addition, intellectual property rights (IPRs) are protected by making the details of inventions and intellectual properties known to the public and granting exclusive right to their usage to the inventors and holders for a pre-specified time, thus providing them with an opportunity to secure the benefits from their inventions and intellectual properties, facilitating the technology development at the same time.

As has been discussed above, standardization and IPRs, in regard to the increase of social benefits relating to technology, are considered as effective systems in their own rights, even if the methodologies are different between them. In some cases, however, the application of standards and the exercise of exclusive rights of intellectual property holders are in conflict with each other, thus causing many problems.

Today, the protection of IPRs in telecommunications standardization carried out concurrently with technological development is becoming a major issue. More IPR holders are exercising their exclusive rights so that they can cope effectively with competition for developing technology and products. To be competitive, telecommunications companies are investing heavily in technology development and research activities, and implementing appropriate strategies for handling IPRs. Those engaged in standardization activities are well aware that standardization is crucial for securing advanced technology and ensuring competitiveness, and that there are conflicts between standardization and IPRs.

In addition, the private sector has changed the telecommunications environment [3]. No longer do government-run organizations play a dominant role, and no longer services are offered to users without concern for IPRs [4]. Private companies now play a more active role. Due to changes caused by Uruguay Round (UR) and WTO, accordingly, IPRs problems have risen greatly in status.

Against this background, standardization organizations are searching for ways to harmonize the conflicts between standardization and IPRs. At the same time, each country is pushing to have its standards to be selected as a level of international standards for better market occupation, and to contrive profit maximization by holding exclusive IPRs in advanced technology.

In this paper, conflicts between telecommunications standardization and IPRs are specified. In detail, first, their respective definitions are given, and their positive and

negative effects are examined. Based on the results, the relationship between standardization and IPRs are analyzed with special emphasis on conflicts generated between the two. Case studies of such conflicts are also given. In addition, IPR policies of major standardization organizations are examined to find out how they solve the conflicts between the two. Finally, problems with recently implemented standardization policy and suggestions for solving them are given.

II. THE DEFINITION AND EFFECT OF IPRs SYSTEM

In this section, telecommunications standardization and IPRs are respectively defined and their inter-relationship is explained in detail. Special emphasis is given on the conflicts that arises between the two, even though their relationship can be regarded as substitutional or complementary.

1. Definition and Effect of Telecommunications Standardization

Telecommunications standards are undertakings that have been prepared and pre-agreed by multi-parties on the methods and procedural syntaxes of the communications carried out among different systems or areas. Standardization can be defined as a series of dynamic processes carried out to establish these undertakings, and implement, provide, and utilize various types of communications services based on these.

For some time, telecommunications standardization has been carried out in the level of development of industry and technology, and user convenience through achievement of interoperability.

Today, however, such standardization is mainly regarded as a means to secure advanced technology and enhance the competitive edge of a country or corporation, as the importance of the telecommunications industry grows. This trend becomes more apparent when we examine the standards created recently, and how they differ from traditional industrial standards and social regulations, the way they reflect and meet fully the requirements of technologies and services providing the connectivity and interoperability between networks under environmental changes caused by the combination of telecommunications services and technologies, software diversification, interworking of PCs and network, and the diversification of mobile communications and satellite equipments.

The most important economic benefit of telecommunications standardization is the effect of network economy or economy of scale [5]. This external effect on network users depends on the size of the networks. The greater the size, the greater the effect on network users.

Moreover, as competitive products are standardized, uncertainty is reduced, and price and performance become more important than design in determining the competitiveness of products, thus making it

possible to prevent unnecessary overlapping investment. In other words, the competitiveness of products is enhanced by reducing transaction costs, such as information search costs and measurement costs. In addition, standardization improves compatibility between products so that small-and-medium size companies producing hardware, software, peripheral devices, and complementary products can market their products, thus expanding the complementary product market [6]. This will also be an economic effect. Furthermore, product standardization enables consumers to compare more easily the quality and features with other products, thus reducing their search costs and adjustment costs for technology and service selection.

Standardization, however, may cause trapping or lock-in to a poor standard, and reducing technology benefits or product diversity. Namely, through standardization of the market, it has the trap or lock-in to a less efficient product, and in case of elevation from base standards to the enhanced and more efficient standards, it may result in non-efficiency by being trapped or locked-in to an old and poor standards in the long run. In particular, when concerned parties affected by standardization fail to coordinate their differences or the size of the installed base is large, poor and less efficient standards may continue to be used because of excess inertia [7]. Standardization that has been set up and implemented may suppress new technological innovations. Furthermore, it may hinder the introduction and use of new technology.

There are other negative effects of standardization beyond those outlined above, but because of the practical attraction of standardization, authorized standardization organizations and civilian consortia are preparing various types of standards, and advanced countries are competing fiercely in order to get their standards selected as international standards.

2. Definition and Effect of IPRs System

The World Intellectual Property Organization (WIPO) is in charge of international problems on IPRs. According to Article 2 of the WIPO Installation Agreement, IPRs are defined as the rights on the protection of inventions, scientific discoveries, logos, trademarks, service marks, trade names and other names, literature, arts, scholastic works, movies and plays, songs, TV programs, and human resources and the rights generated due to intellectual activities in the field of industry, literature, science, or arts. IPRs are intangible properties and the rights over them are protected only if they are specifically applied and utilized in tangible forms [4],[8]. In the telecommunications industry, inventions and technological innovations are made in order to meet a wide range of the customer needs in a competitive market environment. As industry starts to play a major role in the new information age, more attempts are made to acquire industrial property rights, such as patents and copyright on technology and services developed in this field.

The IPRs protection system is defined as a process of assigning the exclusive rights to use intellectual properties to right holders for a pre-specified time and protects these legally with the condition that the right holders disclose publicly the contents of the intellectual properties. For some time, economists have extensively discussed the goals, effects, and benefits of this system. Currently, it is generally regarded as the most available and effective mechanism for encouraging new innovations and providing incentives for doing so at the same time [9].

One of the important benefits of the IPRs protection system for standardization is that it offers solutions for problems and supplies appropriate innovation, which is related to public properties such as free ride, etc. If telecommunications technology is singularly standardized, it, as a typical public property, gives benefits to many peoples by the external effects of networks. As might be, a free ride by others on the efforts of the initial developers is relatively easy because of the non-exclusiveness and non-rivalry of network use. Most people, instead of investing on risky venture industries, such as the telecommunications field, wait for others to innovate necessary technologies and then they copy or reproduce them at low prices. In the process, this discourages those attempting to innovate technology, causing the undersupply of required innovations and technologies, from which to protect is the main goal of IPRs protection system [5].

Another beneficial effect is to facilitate technological innovations by legal regulation against unfair competition. Most people pursuing short-term profits in the market economy tend not to invest in information technology which has a high risk level, and accordingly there is a need to encourage and protect technological innovations. Also, technology protection facilitates technological innovations by implementing expected profits of inventors and creators through regulating unfair competition activities, such as illegal use of creative inventions [10].

On the contrary view, some of the negative effects of IPRs protection on standardization are that the excessive protection of IPRs may slow the development of information technology, and the exclusive IPRs protection may deteriorate service quality by allowing monopoly price and monopoly supply rather than through market competition. The National Commission on New Technological Uses of Copyrighted Works (CONTU) recommendations of the U.S. have analyzed protection mechanisms from the perspective of IPRs rather than standardization of information technology. The result was that IPRs protection has considerably slowed the development of the computer industry by suppressing improved innovations because of monopoly technology of large corporations.

In addition, where supply is less than market needs, prices are set higher than market equilibrium prices, and low quality

of service causes further problems. In addition, restrictions on development of products complementary to innovative products, and an increase in unnecessary costs for research and development activities carried out to avoid infringement of IPRs may also be regarded as problems.

3. Causes of Conflicts

As has been discussed, telecommunications standardization and IPRs protection are in conflict with each other owing to their inherent nature and characteristics [11], [12].

Basically, standardization encourages the share of related technologies, whereas IPRs protection fosters the exclusive ownership of related technologies. In addition, the goal of standardization is to spread technological innovations widely and accordingly, so it focuses on their supply and utilization through commercialization. Therefore, openness, transparency, and the right to make claims are emphasized in standardization activities. On the other hand, the goal of IPRs is to protect the advanced technologies as exclusive properties. It is an incentive system for creative invention and innovation efforts. So, we can think of standardization as a centrifugal force for spreading technology socially, whereas IPRs can be regarded as a centripetal force for technological innovation of which the relationship is shown in Fig. 1.

The conflicts between standardization and IPRs are becoming more important than ever as the competition for technology development and market becomes more fierce in international relationship [13], [14]. On an international level, the advanced countries, which have high technology, are protecting their core technologies, and at the same time attempting to dominate the international market by getting their technologies internationally standardized. As technology advances, the value of technological innovations created from patents and IPRs that have been commercialized in the market is increasing as never before. On the other hand, currently, less time is allowed to develop standards for technology commercialization according to the rapid change of user needs.

4. Types of Conflicts Raised and Their Status

Generally, due to their inherent natures, conflicts may arise between standardization and IPRs protection. However, this is not always true. The types and degrees of conflicts generated vary depending on standardization types, their implementation methods, types of IPRs and their protection methods, and the intellectual property policies of standardization organizations.

To be more precise, types of conflicts generated between standardization and IPRs protection differ according to the profit(or revenue) generated as a result of using a specific IPR and profit obtainable

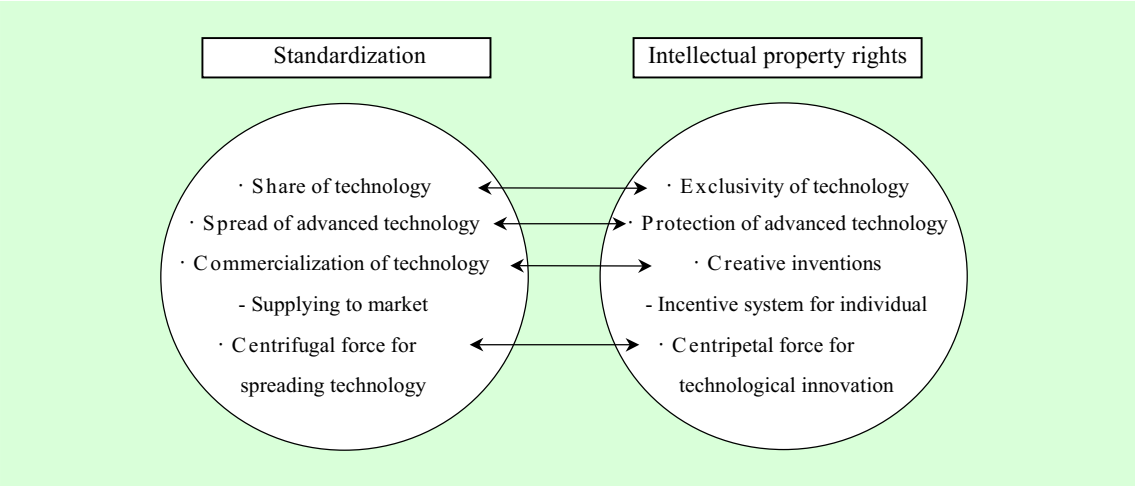

Fig. 41. The relationship between standardization and intellectual property rights.

through the universal application of a specific standard. Namely, standardization and IPRs are not always in conflict. Only the possibilities and methods for standardization including IPRs are changed by the amount of interests on standardization of a specific IPR, and the amount of profit generated through its use. Table 1 shows the conflicts that may arise between the two [8].

Conflicts may arise between the two if great interest is shown in a specific IPR during the standardization process and, at the same time, great profits will be generated by the use of a specific IPR. This is the most difficult case to solve, especially when IPR is essential IPR, conflicts will be more intense [8].

We may assume a case where profits generated from a specific IPR are great but standardization organizations are not interested in standardization of the item. In this case, that IPR will remain as exclusive property. Moreover, if there is a great interest in standardization of a specific IPR but profits generated from its use are low, the IPR can be standardized relatively with ease through some negotiations among relevant parties. Finally, we may assume a case where profits generated from the use of a specific IPR are low and interest shown on its standardization is low as well. In this case, generally, it is likely to be obsoleted as a poor technology by advent of new technology, after a specific time is passed.

Also, standardization restricted by IPRs is examined in the following three cases. First, we may assume a case where one standard is restricted by one IPR. This is the most simple case theoretically and is relatively easy to solve. Second, we may assume a case where many implementation methods for one standard exist, and are

Table 8. Conflicts between standardization and intellectual property rights

Standardization / Intellectual property rights		Standardization organization's interest in a specific intellectual property right	
		Great	Small
Profits generated from a specific intellectual property right	Great	In conflict	Exclusive property
	Small	Orderly coordination	Public property

restricted by many IPRs held by different individuals or companies. In this case, in most instances, standardization cannot be realized without infringing one or more IPRs and, accordingly, this type of case is very complicated and difficult to solve. This is mainly because a standardization organization cannot realistically obtain full information on a specific IPR and concerned parties having a wide range of interests cannot easily reach agreement on the subject. Third, we may assume a case where many IPRs restrict one standardization job. In this case, the standardization job becomes impossible when the use of several IPRs held by different individuals or companies is not permitted. Cases similar to this occur more frequently, as described in the reports prepared by standardization organizations. In addition, this case generates complicated problems and is relatively difficult to solve.

If IPR holders permit the use of their IPRs for standardization under the proper conditions to those qualified, standardization will not be restricted by IPRs. In reality, standardization may or may not be restricted by IPRs depending on the willingness of the rights holders to permit their use, the terms and conditions, and the willingness and capability of those applying the relevant IPRs. However, if a single standard is restricted by many IPRs even if restriction does not occur directly, standardization will be restricted because of the cumulative effects of royalties, requested by permit-sharing persons. Namely, if royalties on the permit-sharing of essential IPRs are too high, making the sale of products and services covered by them impossible, the standardization of that IPR can be regarded as restricted.

III. CASES OF CONFLICTS BETWEEN STANDARDIZATION AND IPRs

In this section, several cases are examined. These are based on conflicts which have actually arisen between standardization and IPRs, because great interests were

shown in a specific IPR during the standardization process as well as great profits could be generated for the use of the IPRs in Table 1 [15].

1. The G3 Fax Modem

In 1970, CCITT (later, renamed the ITU-T) initiated the standardization of facsimile. Ever since, it has continued to advise on patents related to encoding technology of G3 facsimile modems, and matters of free or not-free of patents of bandwidth compression technology.

Recommendation V.29 of 9,600 b/s modems was further elaborated in CCITT Study Group (SG) XVII (later, ITU-T SG14), and standardization of the G3 facsimile was studied in CCITT SG XIV (later changed to SG VIII, and then into ITU-T SG8). Between SG meetings, several rounds of technical reviews were held on the application of the facsimile of this V.29 modem. During review sessions, patent statements by the rights holder (CODEX Co. Ltd.) were not requested since the participants held the view that SG XIV patent problems had already been solved in SG XVII.

The Japanese Telecommunications and Machine Industry Association, before the sixth CCITT Plenary Meeting for approving recommendations held in autumn of 1976 made a recommendation to the Ministry of Posts and Telecommunications (MPT) of Japan that the patent scope of CODEX Co. Ltd. was not clearly defined, and accordingly, they did not want the development of V.29. However, V.29 recommendations were established under the condition that already defined patent policy would be continuously reviewed. As a result, at the seventh Plenary Meeting held in 1980, the standard of the G3 facsimile was recommended as T.4.

After passing the General Trade Laws of the U.S. and implementing new policy in 1988, with special emphasis on patent policy, the U.S. government took a more aggressive stand on patent-related problems. It asserted that the facsimile based on the international standard of the CCITT infringed a specific patent right and asked relevant parties to respond on the related matter within a specified time. Then, it increased charging rates, banned the importation, and carried out aggressive actions including legal one. Although countermeasures about it were different for each company, there were many companies which were forced to sign a not-free contract for the patent-using right in order to avoid the danger of legal suit.

In retrospect, the above case was generated because of a failure to make the following points clear: the meaning within the CCITT (now ITU-T) of a statement submitted to Recommendation A when citing Recommendation A (V.29) as Recommendation B (T.4) and the need to reconfirm the willingness to allow use of the patent. The above points are not defined and specified in the current patent policy of ITU-T.

2. The CDMA

The Code Division Multiple Access (CDMA) is being developed as a core technology of next-generation mobile communication. The patent infringement problem of CDMA is a good example of the conflicts between standardization and IPRs. This case is in the spotlight because of the complex relationship that exists among the patent holders in the U.S., the company developing the product, and the Korean research center and companies engaged in the joint development of CDMA with the U.S. company.

InterDigital Co. Ltd. is reported to have five patent rights on CDMA technology. Problems surfaced when the Telecommunications Industry Association (TIA) of the U.S. established this technology as the tentative standard (IS-95) of the association. At that time, InterDigital Co. Ltd. submitted confirmation statements on five patent rights and later took legal action after being threatened by Qualcomm Co. Ltd., which independently developed CDMA technology for commercial purposes.

Based on the tentative standard of the TIA, Qualcomm Co. Ltd., a telecommunications equipment manufacturer, entered a joint-project of developing CDMA equipment with Korean companies. InterDigital Co. Ltd. filed a suit against Qualcomm Co. Ltd. in the Philadelphia (U.S.) Court for infringement of three of five patent rights held by InterDigital Co. Ltd(including U.S. Patent No. 5119375). For the remaining two patents(U.S. Patent Nos. 5081643, 5093840), InterDigital Co. Ltd., recently agreed with Qualcomm Co. Ltd. to drop the suit filed at San Diego Federal Court. Not long ago, TIA determined that four of five patent rights held by InterDigital Co. Ltd., a company supposedly related to the CDMA-related tentative standard of TIA, were not essential IPRs. However, they failed to reach a consensus on the remaining one patent.

3. Handling of Intellectual Property Problems Generated during the Implementation of MPEG2 Standardization

The international standardization of multimedia encoding (image processing emphasized) is being carried out by ISO/IEC JTC1 SC29 (Voice, Video, Multimedia, and Hypermedia Information Encoding) and ITU-T SG15. These two organizations are working closely together to prepare a common standard. Motion Picture Image Coding Experts Group-Phase 2 (MPEG2) has selected the encoding standards for video and voice at a transmission speed of 5 Mb/s or higher as three standards for system, video, and audio [16], [17]. Many patents are related to international standards prepared by JTC1/SC29 and ITU-T/SG15. Traditionally, permission for using a specific patent was granted through negotiation carried out among concerned parties. However, since more than 100 companies

were involved in the MPEG2 standardization process carried out in JTC1, where each company's patent right was fully reviewed and reflected in the standardization process, attention was paid to the following points :

i) There are a great number of patents and they are inter-related in a complicated manner.
ii) MPEG2 will be a major technology for future TV broadcasting and multimedia communication. Its effect will be great and, accordingly, the number of patents is expected to increase while standardization progresses.

For this reason, an informal Ad Hoc Group was installed outside of SC29/WG11 and the patent problems of MPEG2 were reviewed. The review was carried out based on the consideration that even though several patent rights are involved in MPEG2, the patent processing procedure of ISO/IEC employed by JTC1 failed to process the application of patents in proper condition and time.

As a result of several Ad Hoc Group reviews, MPEG IPR Group, which consisted of IPR experts, was formed outside of JTC1 in order to review solutions to patent problems of MPEG. The group began activity from July 1993. Many corporations showed interest in this MPEG IPR Group. More than 50 company representatives participated in a conference held in March 1994.

Regarding this case, those responsible for setting up standards believed that ISO/IEC patent policy was inadequate for the effective implementation of standards. The case was characterized by the following points :

i) The review and patent study were carried out by IPR experts outside of JTC1.
ii) Several right holders were involved in coordinating rational permit conditions for the standard implementation. In addition, a realistic solution was proposed on the patent problems related to several patent rights.

4. Standardization Process of the Optical Memory Card

The optical memory card is an ID-I card (similar to a credit card) onto which digital information is recorded optically. Standardization activities concerning the optical memory card were carried out in the U.S., Japan, and Europe around 1985. However, it was only after 1990 that international standardization activities were initiated. In that year, WG9 (Optical Memory Cards) was installed in ISO/IEC JTC1/SC17. This was the first attempt at international standardization after the initiation of standardization activities carried out by some countries.

The first cause of delay was the time required for technical review and the preparation of a draft standard. In Japan, "JBMS-39-1988 Optical Memory Card" was issued in March 1988 by Japan Business Machine

Makers Standards (JBMS). Later, a revised edition was published in June 1990. Also, the American National Standards Institute (ANSI) prepared a tentative draft at the same time and is now revising it.

The SC17 Ad Hoc Committee of Japan that attempted the international standardization activities with the preparation of JBMS worried about the patents of Drexler Technology Corporation (DTC) and several other companies. Notably, DTC Co. Ltd. has been very active concerning the patent policy at that time. Eventually, this problem was considered when Japan's New Work Item (NWI) was proposed, and the following questions were addressed to five companies (Optical Recording Corporation, Drexler Technology Corporation, Discovision Associates, N.V. Philips Gloeilampen Fabrieken, and Thomson) on behalf of the SC17 Domestic Committee :

i) We are interested in the implementation of international standardization of optical memory cards (NWI). Do you have your own patents related to the manufacturing of optical memory cards or reader/writer?
ii) If the answer to i) is yes, would you allow the patents to be used by desiring parties in accordance with reasonable terms and conditions after negotiation?
iii) If the answer to ii) is yes, what terms and conditions are you willing to propose?

The SC17 Ad Hoc Committee of Japan received responses to the above questions from four of the five companies. Thomson of France and Philips of Netherlands responded that they would allow the use of their patents under reasonable terms and conditions. However, they did not give concrete answers. Also, ORC of Canada specified 25 patents it holds (including six patents of the U.S.) and then responded as follows :

i) Optical Card Systems : initial license fee = US$ 100,000, running royalty rate 2%.
ii) Optical Card Media : initial license fee = US$ 50,000, running royalty rate 2%.

On the other hand, DTC Co. Ltd. of the U.S. proposed that it would permit use by applying a running royalty of whichever is greater between 5 % or US$ 0.25 when selling one card, with an initial payment of US$ 10,000,000.

The SC17 Ad Hoc Committee members expected these responses, but some members were not satisfied with the proposal contents. So, SC17 Ad Hoc Committee had frequent disputes over its proposal to JTC1 as a NWI. Suggested royalty fees are different because of each company's danger to business. However, two opinions, which are "NWI may suggest" and "NWI may not suggest," showed. The result was five companies for the agreement, one company for the agreement with a condition sending the opinion that the proposal condition of DTC

Co. Ltd. is not reasonable, four companies for disagreement, three companies for pending and etc., and one company for abandonment. As a result of that, in June of 1989, this committee did not propose the NWI.

ISO/IEC JTC1/SC17/WG9 held its first meeting in July of 1990. Representatives from Japan, Canada, England, Switzerland, and Italy attended in this meeting. Japanese representatives submitted reports containing questionnaires and responses raised by SC17 Domestic Committee. At the same time, Japanese and Canadian representatives expressed the opinion that the initial royalty fee of 10 million US dollars proposed by DTC Co. Ltd. was too high and was detrimental to the development of the industry. They also proposed an implementation of re-confirming requests for license fees by ISO. This would reduce initial license fees instead of increasing the running royalty rate, and would also a good method. England and Switzerland disagreed to this proposal and added that the intervention of ISO would not bring positive results. The chairman of this meeting concluded that the contents of discussion would be properly recorded in the meeting record book for future reference and that this issue should not be addressed to SC17. However, in the meeting record book, doubts expressed by the participating members on reader/writer, system integration, and the license fees of card sales were recorded.

SC17 requested that the members of each country discuss what they know about patents during the Committee Draft (CD) voting process. Thus far, four CD mail votes related to the standard draft on optical memory cards have been carried out. The secretariat of SC17 requested a statement on its patents from DTC Co. Ltd. and that the company, with submission of the patent statement, designated several Japanese corporations and then asked selected Japanese corporations to submit patent statements. Five Japanese corporations respectively submitted patent statements accordingly. The contents of the patent statement of each corporation were not disclosed to the public but were reported by SC17 to JTC1. Afterwards, two volumes of International Standards (IS) were published in July and August of 1994.

5. The Japanese Digital Car-Phone System

The standardization of the digital car-phone system, Personal Digital Cellular Telecommunication System (PDC) of Japan was reviewed by the Research and Development Center for Radio System (RCR) starting in 1990, and service was initiated in March 1993. RCR, in accordance with the guidelines for processing standard systems and IPRs proposed by the Digital System Car-Phone Study Research Association, an advisory organization to the MPT, set-up the "System Subcommittee and IPR Subcommittee" as part of its effort to initiate the digital car-phone system standardization and IPR processing task in May 1990.

In 1991, the RCR prepared basic operation guidelines for handling industrial property rights on the digital car-phone system. During the set-up of a telephone system (full rate specification) standard (STD-27A) in accordance with the above, the RCR requested that right holders having industrial property rights related to this system submit an industrial property rights certificate including a special list. The basic guidelines for processing the industrial property rights recommended that essential industrial property rights be granted free of charge. At the same time, those granting requests for industrial property rights were given three options : unconditional permission, reasonable condition permission, and permission rejection. During the standardization process, the IPR Subcommittee discussed whether essential industrial property rights were to be permitted unconditionally or reasonably. Finally, all right holders submitted confirmation statements stipulating that they would permit use of their rights.

In addition, in 1992, facsimile and data specifications were added to the telephone system (full rate specification) standard (STD-27A), and this was published as a standard specification (STD-27B). Five companies submitted confirmation statements permitting their unconditional use. Also, in 1994, a standard specification (STD-27C) that included the half rate specification was enacted and eight companies holding 53 patents submitted certificates permitting free use of their patents.

IV. IPR POLICIES AND LIMITS OF MAJOR STANDARDIZATION ORGANIZATIONS

Major standardization organizations such as the International Telecommunication Union (ITU), European Telecommunications Standards Institute (ETSI), American National Standards Institute (ANSI), Telecommunication Technology Committee (TTC), RCR, Committee T1, Telecommunications Standards Advisory Councils of Canada (TSACC) have set up and implemented guidelines and basic policy for handling IPRs related to standardization. Realizing their importance, domestic standardization organizations are currently reviewing related guidelines (draft) [18].

Depending on the characteristics, social/cultural backgrounds, and the states, standardization organizations take different approaches in solving problems related to standardization and IPRs. When setting up policy in accordance with the requirements of major member countries of the world, as in the case of the ITU, the concerned party principle is applied and only basic items are defined. On the other hand, when setting up policy solely on the requirements of member countries forming a bloc (as in the case of ETSI), more detailed and enforceable items are defined. In addition, in the case of ANSI and T1, strict market economy principles are observed (when

doing so). In the case of TTC, it sets up policy based on conflicts it has experienced, and detailed operation procedures have been prepared.

These IPR policies of major standardization organizations in worldwide allow conflicts between standardization and IPRs protection to be solved through some negotiations. Further, when problems related to IPRs are generated during the standardization process, the opinions of IPR holders are respected: the right holders are asked permission to use their IPRs. Standardization is carried out only when right holders permit their use. Moreover, to avoid legal disputes, the contents of IPRs are reconfirmed. Accordingly, the basic stand of standardization organizations on IPR problems, cases where the implementation of standardization is possible, and the submission of statements is that they should be defined commonly. In addition, whereas IPRs are legally enforceable, standardization is not protected by laws adequately, thus creating problems related to responsibilities and control measures. These problems are further elaborate below [19].

1. Problems Related to the Scope of IPR Policy

While many standardization organizations only deal with patents, TTC and RCR handle utility models and company logos as well. In the case of ETSI, complete IPRs are handled. Also handled by ETSI are copyrights that include new IPRs having recognized that IPRs other than patents can be related to standardization.

However, a survey on copyright is very difficult. That is, the IPR policy of the major standardization organizations mainly deals with patents and does not consider copyright separately. In addition, unlike patent rights, copyright is in intangible forms and therefore, the subject, right holders, or detailed contents are not clear. Accordingly, the application scope of the copyright or patent rights for each country is different and consequently, accurate interpretation is difficult.

These types of problems may become more complicated in the future. This is because IPRs likely to encounter conflicts with standardization cover new IPR fields, such as patents, programs, and semi-conductor layout designs, and the increasing importance of new IPRs. Moreover, as advanced technological fields become more integrated, conflicts may occur among industrial property rights, copy right, and new IPRs. Also, their concepts and boundaries are hard to define and classify.

2. Difficulties in Surveying Essential IPRs (or Related IPRs)

When reviewing the IPR policy of major standardization organizations, in the standardization process, there are rules that information related to IPRs known by those responsible for setting up standards and the

members of the standardization organizations should be reported or surveyed as related IPRs. However, these rules are not binding. Accordingly, most standardization organizations are not responsible for such survey. These types of information are used as a basis for ensuring the set-up and distribution standards by negotiating and coordinating the execution of related IPRs. As a result, the following problems are generated :

A. Enforceability of the IPR Survey Request

Under current IPR policy, survey of the IPRs of standardization organizations is not legally binding. That is, it is a random and autonomous survey and report based on the opinions of those responsible for set-up standards and members. Accordingly, when executing the right after set-up standards without applying for this right, it may be ethically viewed as a violation of right. However, it is not clear whether legal responsibility for this can be secured.

B. Limits of Studying and Reporting

It is very hard for those holding IPRs to report to relevant parties on their IPRs and the results of studying the IPRs held by others. No standardization organizations or members can thoroughly survey an IPR throughout the whole world due to time and economic constraints. When a member of a standardization organization holds all the IPRs that are necessary for corresponding standards, the situation is a little better. However, the study on patents held by third parties regardless of standardization is difficult to carry out because of constraints imposed on studying and reporting. Moreover, it is not easy to find them out in detail based on the current rules.

C. Patents Applied For

Those patents that have already been applied for and been made public can be easily studied and discovered. However, the standardization based on these things can create the following problems. First, their necessity cannot be evaluated since the scope of their rights has not been defined clearly. Second, several opinions on corresponding patent applications before defining the right may affect the right acquisition process, and furthermore, patents applied for but not made public from the very start can not be examined at all (other than by the right holder or in such as the U.S., where no patent disclosure system exists).

D. Evaluation of Necessity

In most cases, because the technical specifications of a standard are fixed by the agreement of concerned parties, evaluation of necessity in the standardization process including IPRs encounters many difficulties until they will be specified in the completion period of the standardization task. Moreover, the evaluation criteria for the necessity of manufacturing technology required to manufacture products that meet the requirements of corresponding standards or the existence of alternative technologies are not clear.

3. Problems Generated in IPR Policy Application Areas

Most standardization organizations do not define application areas separately. Basically, though, the standard application scope as supervised by a designated standardization organization is regarded as the application scope of IPR policy.

In the case of regional standards, statements related to the IPRs applied in that area are generally requested. However, sometimes, these types of regional standards are applied outside of their areas. In addition, corresponding standards may be applied in areas other than a production area. In such case, IPRs other than the corresponding areas may be considered. Accordingly, the study on IPRs applied in other areas is more difficult to carry out than a study carried out in a specific area.

4. IPR Process Discovered after Enactment of Standards

TTC and ANSI require that the same procedures be followed for IPRs, whether or not they are discovered before enactment of standards. Then, in case those IPRs not permitted for use, considerably ambiguous rules, such as searching for proper remedies or considering the withdrawal of the standards are stipulated. Other standardization organizations also do not have clear rules on the above.

However, essential IPRs may often be discovered after enactment of standards. In such cases, TTC and ANSI request right holders to submit statements. If they fail to obtain permission for implementation under non-exclusive and rational conditions, they modify or withdraw standards. However, changes with maintaining the objective of corresponding standards are difficult. In addition, such a process is very expensive. And, Moreover, manufacturers and consumers currently implementing corresponding standards may experience setbacks. Accordingly, it is believed that this procedure is impractical to use.

5. Uncertainty over Legal Enforceability of Statements Related to IPRs

The IPR policy of major standardization organizations stipulates that, when standards and related essential IPRs are discovered, they request their right holders to submit statements permitting the use of their rights under non-exclusive and rational conditions. Standardization is processed only when these statements are submitted. However, the enforceability of corresponding statements is not clear legally and the following problems may occur :

A. When Standards are Cited

For example, when standard B cites the contents of standard A, the meaning of statements submitted pertinent to standard A is not clear for the implementation of standard B.

B. When IPR is Transferred

When IPR is transferred to a third party from the right holder who has submitted a statement, it is not clear form "does the enforcement of statement submitted change? (Namely, does a third party who was transferred the corresponding IPR have responsible for observing its contents?)."

C. When the Statement Conditions Change

When the conditions for permission disappear from statements (ex. free of charge) or are changed (for most cases, statements are re-submitted), the relationship among the statements submitted is not clearly defined.

6. Problems Related to Non-exclusive or Rational Conditions

A. Interpretation of Non-exclusive and Rational Conditions

The IPR policy of major standardization organizations stipulates that, the holders of IPRs related to corresponding standards should submit statements confirming the use of their rights under non-exclusive and rational conditions. However, since there are no exact criteria on non-exclusive and rational conditions, the evaluation of their rationality cannot be made objectively.

Currently, the rational evaluation of conditions is not carried out by standardization organizations. When conditions are not valid, there are no rules for processing them. In addition, depending on the status of a right holders(manufacturer, non-manufacturer or industry using a corresponding standard), the evaluation of rational conditions may be changed.

Furthermore, those who obtained permission to use IPRs may evaluate rational conditions differently in accordance with the risk evaluation of business, utilizing corresponding standards or the possibility of obtaining permission for sharing. Accordingly, problems related to non-exclusive and rational interpretation may become more complicated.

B. Solving of Disputes over IPR Related to Statements

As mentioned earlier, each statement related to IPRs has a different rational interpretation. When rational situations are ambiguously suggested as in the cases discussed so far, charging rates on them may cause disputes. However, when considering the smooth supply of standards on time, more simple and rapid conflict solution methods should be reviewed since solving disputes and conflicts through legal actions may be uneconomical and time-consuming.

Furthermore, it has been pointed out that, in the case of international standards, no country has clearly defined laws by which evaluation can be made.

C. Accumulative Effect of Rational Conditions

In the case of pre-standardization, especially, when a great number of IPRs are related to standards, the sum of total fees for use each patent within the range regarded as rational conditions may exceed a rational range. In other words, since there are no mechanisms for evaluation of rational conditions for standardization of the current standardization organizations or coordination between right holders, the problem is how to coordinate this states.

V. RECOMMENDATIONS ON POLICY

Thus far, the causes and cases of problems generated by standardization and IPRs have been analyzed. In addition, countermeasures and problems proposed by major standardization organizations have been discussed as well.

Problems related to IPRs protection generated during the telecommunications standardization process are expected to worsen as rapid advances of related technology surrounding telecommunications technology, expansion of the complication of standardization items, distribution of the standardization system, and the unbundling of the telecommunication industry occur. However, since protection problems of standardization and IPRs have very important social, cultural, and economic legitimacy, it is very difficult to harmonize and coordinate between the two. Also, the problem "which one of the two will assign a higher priority" is a problem of integrated national strategy level, and contains the social, cultural, and economic factors of each country [20].

More detailed research on the above problems is required. As concluding remarks, we would like to make several policy suggestions or recommendations for dealing with conflicts generated between standardization and IPR problems.

At present, an available and realistic approach is to make IPR holders recognize that their rights could be protected, even if their inventions and discoveries are standardized, thus inducing them to participate aggressively in negotiation (indeed, many standardization organizations are employing this method). When compensated adequately for their IPRs, right holders are willing to give permission to use their patents. Thus, standardization is not affected when some right holders assert the ownership of their IPRs. For this purpose, IPRs should be studied in detail beforehand. Of course, because of time and cost constraints, a perfect study cannot be carried out, but survey activities to reduce the number of conflicting cases are very important.

Another approach is to set up a legal system capable of balancing patents and standards, as a basic alternative method to solve problems and conflicts generated during the implementation of telecommunications standardization and IPRs protection. However, in the telecommunications field, it

is very difficult to legally coordinate standardization and IPRs granted with the exclusiveness of use. In reality, even though each country faces a slightly different situation, this is because more emphasis is placed on IPRs and requests for the submission of patent statements at the standardization site can be ignored without encountering any legal problems. Currently, the compulsory permission for use of patents is not allowed in accordance with relevant international treaty.

However, the proper application of Anti-Trust Law may be used as one standardization method. A good example of the above is the actual standardization on IBM peripheral devices, carried out through negotiation among the IBM companies in reaction to EC Committee' instituting a lawsuit on that IBM infringed the Anti-Trust Law.

In addition, we can consider the proper application of patent laws. Domestic Patent Laws, too, have stipulated that legally binding implementation can be carried out when problems related to IPRs occur during the standardization process. Namely, in accordance with Article 107 of the Patent Law, negotiation may be requested of IPR holders to obtain permission for using their rights. Still, there are no court decisions made on this. However, when the 'public benefit' of standardization can be proven adequately, a binding permission may be legally allowed in accordance with this article. Moreover, since the WTO Agreement Regulation, too, recognizes the right of compulsory public benefits, the proper application of this method may be another alternative. Furthermore, we recommend that the IPR policy of major standardization organizations be modified and upgraded. This is because, as has been discussed previously, current policy experiences major problems where IPR statements are concerned [21].

Lastly, to rapidly process problems related to standardization and IPRs, we recommend that alternative mechanisms that reflect the characteristics of standardization organizations other than currently operating procedures be sought after [22]. The processing of related IPRs should be carried out accurately in order to set up and implement standards properly. However, the procedural burden for this may cause the delay of standardization itself. Recently, some experts have pointed out that formal standards enacted after a considerable time do not reflect fully the requirements of the users and market. Accordingly, even if precise and detailed procedures have been taken, this point should be seriously considered. For some time, disputes generated between standardization and IPRs have not been handled by the standardization organizations, but instead, handed over to the court for solutions, thus burdening those involved financially. Therefore, we recommend that a mechanism for coordinating and arbitrating disputes and conflicts raised between the two be set up.

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