MIC International Policy Division, Global ICT Strategy Bureau

Communications News

Vol. 20 No. 7
July 17, 2009

Biweekly Newsletter of the Ministry of Internal Affairs and Communications (MIC), Japan

ISSN 1349-7987

TOPICS

Outline and Trends from Research Study on Women's Employment and the Possibilities of Telework

Introduction

The government formulated its Telework Action Plan (May 29, 2007: setting up of a consultative committee of ministries involved with the promotion of telework and obtaining the approval of the IT Strategic Headquarters) with the aim of doubling the number of people who telework by 2010, to 20% of all employed people and has been putting in place an environment for the penetration of telework. But in order to achieve that goal, there are certain issues that need to be settled, both on the side of employees and employers. What is needed for the penetration of telework? In order to find the answers to this question, it is useful to grasp the current situation on the side of employees and employers, as well as to study and analyze perceptions concerning actions relating to telework, and to extract from these the above topics.

Based on such a perspective, Atsushi Umino (senior researcher, Policy Research Department, MIC's Institute of Information and Communications Policy) and Makoto Osajima (special researcher, Institute of Information and Communications Policy, and associate professor, Waseda University's Global Information and Telecommunications Institute, Graduate School of Global Information and Telecommunication Studies), collaborated on implementing "Research Study on Women's Employment and the Possibilities of Telework" and announced their results to date in the form of a discussion paper in May 2009. This document is an outline of these research results. Please note, however, that any opinions expressed in the text are those of the writers.

Furthermore, in addition to the writers mentioned above, also collaborated on Toshihiko Takemura (special researcher, MIC's Institution of Information and Communications Policy and visiting junior researcher, Waseda University's Global Information and Telecommunications Institute), Masahito Toyokawa (Waseda University's Graduate School of Global Information and Telecommunication Studies) and Kenji Yoshimi (Waseda University's Graduate School of Global Information and Telecommunication Studies), this text bringing the total number of contributors to the discussion paper to five.

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Aims and methodology of research study

There were two main aims in conducting this research study. The first was that it is said that there are many people around who are untapped source of talent and this research study particularly targeted women among these in investigating the elimination of insufficient labor power as well as ways of recognizing and utilizing afresh the capacities of women. In order to carry out this investigation, research was conducted by sending out a survey to the members of a federation of women's organizations in Tokyo metropolitan area and investigating the elements that have been thwarting an increase in the population of women who telework. The second aim was to clarify the various types of issues perceived by employers (corporations) to create difficulties in operating a telework environment and to review the elements that are at the root of a reluctance by corporations to introduce or expand telework. In order to carry out this review, research was carried out through interviews on the current status of telework at employers, focusing on major private-sector corporations, following which issues relating to the penetration of telework were analyzed.

The concept and configuration of telework

Before moving on to concrete results and analysis, we would like to start by making some clarifications concerning the concept and configuration of telework. Originally, telework refers to a flexible work method that makes use of ICT (information and communications technology) and is not tied in to a work place or time. Its importance has been growing in looking for work-life balance, and as a step to bring about greater business efficiency and productivity. It is seen as a major contributor to addressing fewer children and an aging population, revitalizing regional areas, and reducing our impact on the environment.

According to the government's IT Strategic Headquarters, the configuration of telework can be divided as shown in Table 1. First of all, it can be divided into those who are employed and those who are self-employed, depending on whether people are employees of a corporation they work for or are self-employed or running a small business themselves. And beyond that, those who work for corporations are divided into those who work at home, those who are mobile, and those who use a facility. In addition to that, it is also possible, as seen in Table 2, to divide them further according to frequency of implementation.

Table 1: Major telework configurations

Category		Outline
Employed	At home type	Work style in which the employees work from their own homes
	Mobile type	Work style with no fixed facility, in which work is conducted at customers' or at companies while on the move
	Facility use type	Work style in which satellite offices or telework centers are used
Self-employed		Work style in which small scale operators engage in their activities using IT

Source: Assembled from *Telework jinko baizo action plan* (Action Plan to Double Telework Population), IT Strategic Headquarters, 2007.

Table 2: Breakdown of telework by implementation frequency

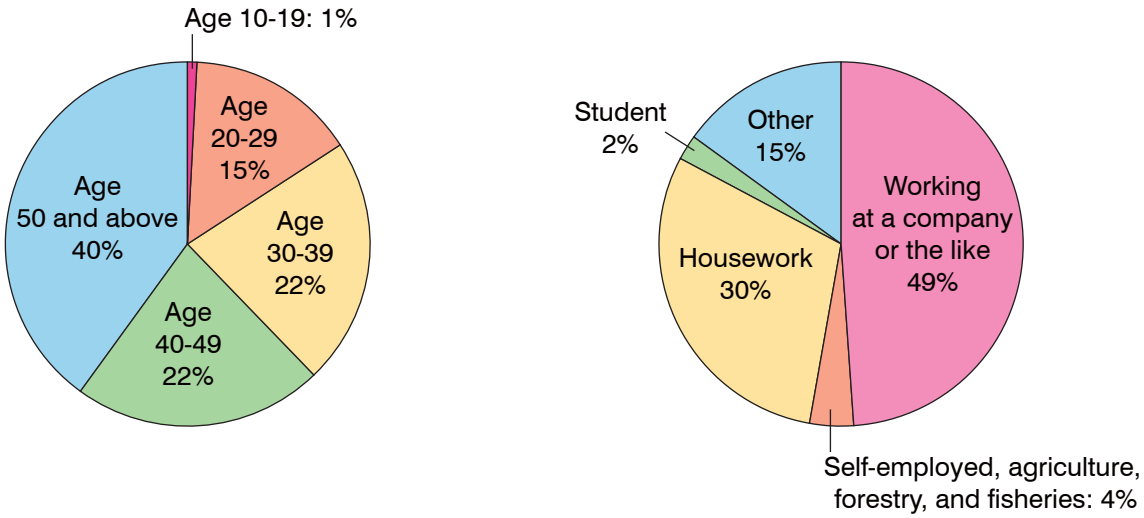
Full-time telework	Work style in which frequency and time of telework are greater than the frequency and time seen at the place of work (office, etc.)
Part-time telework	Work style in which the frequency and time of work, for example, once or twice a week, or mornings only, are less than the frequency and time seen at the place of work (office, etc.)

Source: Assembled from *Telework hakusho 2008* (Telework White Paper 2008), Japan Telework Association, 2008.

Telework as seen from women's perspective

Based on the first aim of the research study, as stated above, a non-name specific mail survey was carried in June 2008 among women who are members of a federation of women's organizations in Tokyo metropolitan area. This survey targeted (1) attitude to work, (2) the state of awareness of telework and the image of telework, and (3) concern and interest in telework, with 156 respondents (a 52% response rate). The age breakdown and work situation breakdown of the respondents were as shown in Figure 1.

Figure 1: Age and work breakdown for respondents (women) to the survey



As is clear from Figure 1, something like 30% of women are employed doing house work, and if they become teleworkers, corporations would have access to a greater pool of human resources and the broad knowledge and experience that women possess would be better utilized.

Figure 2 shows the results compiled from questions concerning issues which are considered important within the framework of working. Looking at the results, with the exception of status, it is possible to see what many women feel to be important in working. In particular, the number of women who attach particular significance work hours is very high at 44%.

Figure 3 shows the state of awareness concerning telework. One can see from the results that awareness of telework is at a fairly high level, at 63%

Figure 2: Attitude to work of respondents (women) to the survey (figures shown inside the graph are for the number of respondents)

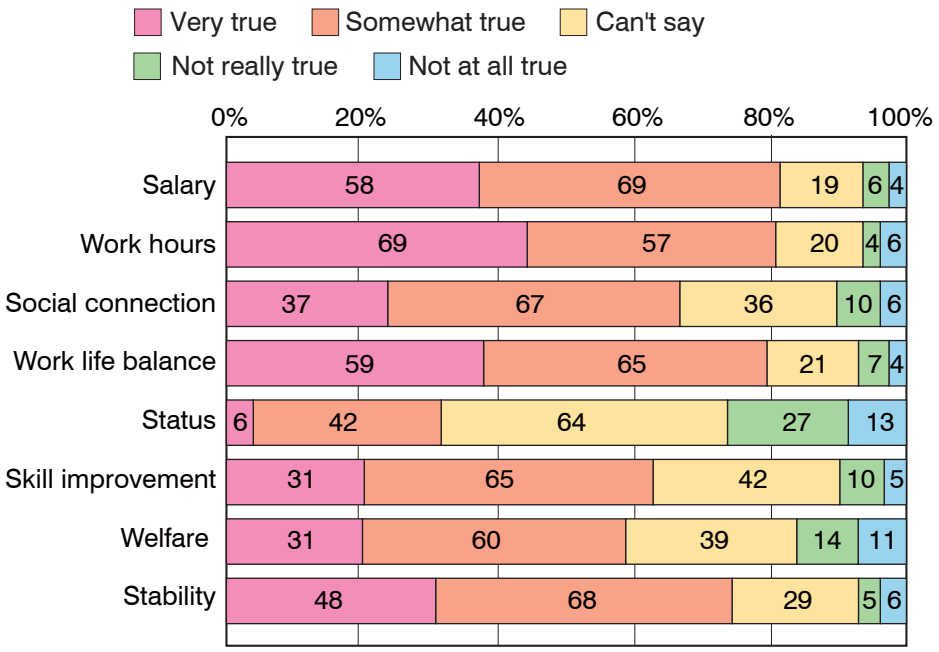
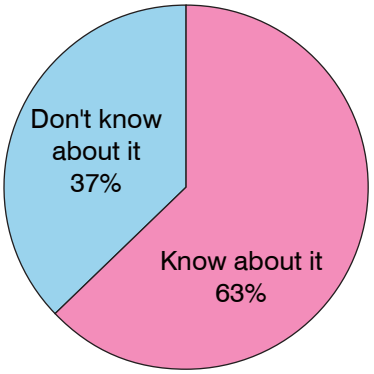


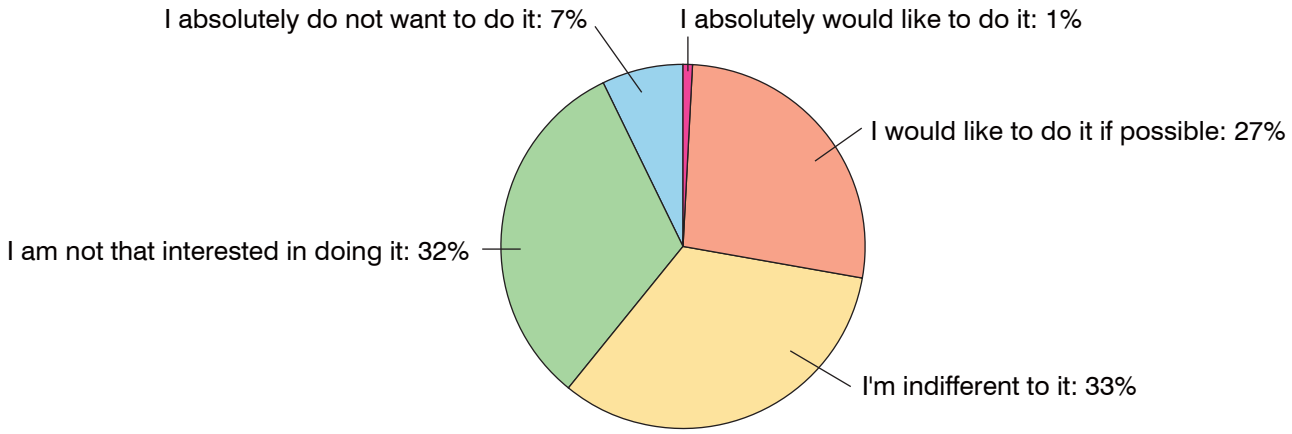
Figure 3: The state of awareness of respondents (women) to the survey concerning telework



Also, in terms of the image of telework, over 65% of women selected it as advantageous, with responses such as "there is no hassle of commuting," "we don't need to leave our job or take a break," "with the greater amount of time spent at home, we can have a work life balance," "we can take care of raising children smoothly," and "it's easy to put specialized knowledge to use." However, only 37% of women chose as an advantage that "it leads to an improvement in productivity and efficiency." On the other hand, it was also clear that the number of women who saw disadvantages such as "the kind of work we are given can easily be unbalanced" or "we have to put in place a strict separation between work and private life."

Figure 4 shows the state of interest in telework. It shows that more than 28% of women have both an interest and willingness to engage in telework. In addition to that, another 33% are indifferent to it, and as it is possible to change the mindset of this group to "I would like to try" by using information and education, for example, it would appear that the percentage of "potential teleworkers" is high and that there is room for further expansion in telework among women.

Figure 4: Awareness and interest of respondents (women) in telework



Since the trends that emerge from the results of a study such as this one are that there is a relatively high level of awareness of telework among women and that they tend to be sensitive to the question of work hours, there are possibilities for promoting a willingness in them to become teleworkers. At the same time, it has become clear that one of the biggest barriers to the promotion of telework is the separation of work and private life. With regard to this matter, there are questions in the interviews with corporations that are referred to later, and the topics will be discussed separately.

In addition, based on the results of the survey, Spearman's rank correlation coefficient was used to calculate the relationship between "attitude to work" and "awareness and interest in telework." The results of this are shown in Table 3 and 4. Table 3 was done using all of the respondents, whereas Table 4 was done after eliminating those respondents who had said they were indifferent in terms of awareness and interest in telework. Both sets of results determined that there is a 1% level true correlation between life work balance and awareness and interest in telework. This shows that either that people who place a focus on work life balance have a strong interest in telework, or that people who are strongly interested in telework emphasize life work balance. In addition, it became clear that, at the 10% level, salary, status and welfare had a correlation with awareness and interest in telework, and among these, only the negative correlation for status was verified. One can observe from this that (1) whether people who place importance on salary and welfare have a strong interest in telework, or whether the more people are interested in telework, the more they are concerned about this, (2) whether people who place importance on status have no strong interest in telework, or that the people who are interested in telework have no great interest in status.

When it comes to the negative correlation relationship between awareness and interest in telework and importance of status, it is possible that this reflects concern that teleworkers would be at a disadvantage in terms of personnel evaluation and career advancement. With regard to this matter, there are questions in the interviews with corporations that are referred to later, and the topics will be discussed separately.

Table 3: Rank correlation analysis I

	Q1	Q2	Q3	Q4
Interest	0.114*	0.041	-0.014	0.193***
	Q5	**Q6**	**Q7**	**Q8**
Interest	-0.109*	0.021	0.103*	-0.044

***: p (Correlation coefficient) < 1%, *: p < 10%

Table 4: Rank correlation analysis II

	Q1	Q2	Q3	Q4
Interest	0.118	0.048	0.110	0.245***
	Q5	**Q6**	**Q7**	**Q8**
Interest	-0.153*	0.030	0.115	-0.042

***: p (Correlation coefficient) < 1%, *: p < 10%

Telework as seen from the corporate perspective

Taking into account the results of the analysis concerning telework based on the perspective of the women who are employed, an interview study was then implemented from October 2008 to January 2009, concerning the status and topics related to telework as seen from the corporate perspective. The companies that participated in the survey are shown in Table 5. The article on "The 100 Best Companies for Women to Work For" that appeared in the 20th anniversary commemorative issue of *Nikkei Woman* (May 2008), published on April 7, 2008, was useful in selecting the companies that were interviewed. In Table 5, the rankings of the companies that figured in the top 100 are shown in the right-hand column.

Table 5: List of companies that participated in interviews

Date of interview	Industry sector	Name of company	Location of company	*Nikkei Woman* ranking
October 17, 2008	Electronics/precision equipment	IBM Japan	Tokyo	2
October 27, 2008	Communications	KDDI	Tokyo	65
October 28, 2008	Communications	NTT DoCoMo	Tokyo	48
October 29, 2008	Communications	Panasonic	Osaka	3
November 7, 2008	Communications	Communications operator A	Tokyo	-
November 11, 2008	Food/beverage	Food manufacturer B	Tokyo	-
November 14, 2008	Transport	ANA	Tokyo	22
December 2, 2008	Insurance	Sumitomo Life Insurance	Tokyo	10
December 11, 2008	Government	MIC	Tokyo	-
December 12, 2008	Trading company	Itochu	Tokyo	95
January 15, 2009	Skincare/household goods	P&G Japan	Hyogo	1

Among the 10 private sector companies that were interviewed, 5 companies are in the information and communications field (electronics/precision equipment and communications). This is because it would seem that the information and communications field would be a particularly early adopter in investing in internal ICT, including telework. Furthermore, for the remaining 5 companies, a balance was sought in selecting a variety of other sectors. With regard to the 5 in information and communications, these include companies that are either in the testing or investigative stage for the introduction of telework. Also, MIC, which oversees information and communications policy, was included as an example of a central government ministry. An outline of the interview survey is given below.

(1) Basic mindset concerning telework

There are two major divisions, as outlined below, in terms of the goals for corporations to introduce telework. The first is aiming for an improvement in work life balance from the perspective of providing support in raising children. The second aims at improving productivity by increasing empowerment with regard to work. The results of the interviews put 7 companies as giving priority to the work life balance, and 3 as looking for an improvement in productivity.

One of the major focuses of the researchers is the use of telework as a tool to support women's activities within society, so that they had great expectations concerning the possibilities of promoting telework to corporations from the work life balance stance, but, in reality, it was the companies that focused more on it as a tool for increased productivity that showed a great likelihood to promote it. It can be construed that setting that kind of corporate goal does also tie in with bringing about a work life balance for employees.

(2) The state of implementation of telework

Since, as a whole, the 5 companies in information and communications show a greater use of ICT in their business than those in other sectors, it would seem that the cost associated with the introduction of telework would also be lesser. As an example, in the cases of both IBM and KDDI, internal systems can now also be used from home. Also, both NTT DoCoMo and KDDI lend out data communications cards that can be used for telework.

In addition, since MIC has, since the 1990s (when it was still the Ministry of Posts and Telecommunications), been implementing a variety of measures related to the promotion of telework, as the ministry in charge of this, its employees are ahead of those at other government ministries when it comes to approaches to telework. The ministry was the first among government ministries to inaugurate telework (working from home) on demand from October 2006 to employees who were raising children or caring for someone, and from May 2007, expanded the framework of this to apply to all employees of the ministry. Also, in conjunction with the establishment (in June 2008 by the Global Warming Prevention Headquarters) of "Cool Earth Day" (July 7 of every year) in order for the population to reappraise the importance of the planet's environmental problems, there is a focused implementation of activities to strengthen telework by MIC employees over a 2-week period that follows this date, termed "Cool Earth Telework Weeks."

Also, among the companies that have introduced telework, IBM Japan and Panasonic have a particularly high number of teleworking employees, and have put in pace a full range of related facilities. In concrete terms, at IBM Japan, with the exception of employees of the manufacturing divisions and some of the executive secretaries, the majority of employees with more than a year of seniority qualify for telework, which comes to approximately 90% of employees. In terms of frequency, once or twice a week is most common and even though no special facilities have been put in place for telework, an environment has been provided so that the same work that is done at the office can be done at home. At Panasonic, employees other than new recruits and line (manufacturing) workers are able to telework, and about 10% of those who qualify, or about 3,000 people have actually experienced telework. The frequency of implementation ranges from once a week to once a month but when it is clear that being at the office is noticeably difficult, special permission can be given to take several days in a row exceptionally. In terms of telework-related facilities, the company lends employees PCs which are thin-client equipped and have information security measures such as hard disk encoding, for their use. The company has also introduced web cameras as a communications tool, and these are used as needed for occasions such as web-conferencing. Added to that, they have introduced IP phones with outside access to company internal numbers so that even people working at home can answer their company extension numbers.

Aside from the above two companies, most are just at the stage of implementing some trials and there are few that have taken an all-company approach. In terms of frequency of telework, once a week is most commonly seen, including for the companies

that are implementing trials. The assumption is that in general, for white collars, the kind of work that can be handled from home would take up one day, or at most two days, a week, and that is how they are managing and operating work from home.

In terms of the type of job that is best suited to telework, this does apply to most of the employees who work inside the company and are on the career track. In terms of type of work, one can mention accounting, preparation of documents, and writing of research papers. On the other hand, the opinion was that sales-related jobs which basically require contact with customers are not suited to working at home. It was also believed that jobs such staffers for air transport, production line workers at factories, and executive secretaries were not suited to home work.

In terms of the process for authorization to telework, the most common is obtaining permission from one's direct boss, but there are also other conditions such as work conditions and grade. There are differences in the stance adopted by various companies in terms of whether granting authorization is made simple or whether it is complicated, including supervision of work contents.

As for the telework environment, in general, those in the information and communications field were better organized than those in other fields. There are two major trends in putting in place a work environment: one that maintains information security by using thin client terminals, verification systems, and Internet VPNs (virtual private networks), and one that facilitates remote communications by using equipment such as teleconferencing systems. As opposed to the information and communications field where the communications infrastructure is already in place, other industries are noticeably lagging, but many of them are operating telework programs by making their own individual efforts and using manpower for management, such as formulating guidelines concerning telework and holding follow-up interviews between the teleworkers and their bosses. As for bearing the cost burden for turning the home into a suitable work environment, the extent of most companies' efforts is limited to lending out the necessary terminals and data communications cards, and there are no companies that include help in paying rents or similar.

(3) Telework issues seen in companies

If one analyzes corporate telework issues based on the results shown above, one can note the following points:

(a) Implementation frequency and management of work

With regard to implementation frequency (how many days a week one teleworks), the majority of answers is once a week at the moment, but for women who are giving birth or raising small children, it is difficult to use telework in conjunction with work at that frequency. Consequently, greater use of ICT and a drastic revision of work are desirable so as to make mid- to long-term full-time telework possible.

On the other hand, analysis of the survey conducted among women, there was a negative correlation between awareness and interest in telework and the importance of status, and with the current frequency of telework, the influence on status is limited. Determining in concrete terms what the influence would be in increasing the implementation of telework to mid- to long-term on a full-time basis is a subject for future study.

There are certain barriers to mid- to long-term full-time telework, such as maintaining cooperative relationships with one's boss and colleagues, as well as difficulties in determining the content of work and its evaluation. In particular, when it comes to managing work for the boss, in addition to the lack of face to face communications, the need for detailed daily evaluation of what has been achieved on a daily basis would appear to add a considerable burden on the side of the boss. Therefore, for example, when women express the desire to return to the office environment after taking mid- to long-term full-time home employment while giving birth and raising small children, in addition to the problem of maintaining skill levels at the point of return, the added burden on the boss of managing work during the telework period can be realistically considered to be a problem.

(b) Concern about excessive workloads and separation with private life

Since home-based telework is carried out in one's own home where other employees cannot see, there is the fear of it ending up as being extremely long hours. In the case of occasional telework, it is possible that it becomes something like overtime that is taken home. Within companies that have actually been implementing working at home via telework, there are reports of this ending up as extremely long hours. Due to the difficulty in this type of work hour management, quite a few companies are concerned about guidance from the Labor Standards Office.

In addition, the very fact of conducting investigations as part of managing work at home ties in

to greater costs, and also to problems of people's privacy. Consequently, one can say that the putting in place of suitable measures to manage this efficiently and discreetly is desirable. For example, there have been cases that came up at corporate interviews of logs being left on the server side concerning thin client operation hours, and used to manage working hours, and this kind of approach that combines information security measures with management of work hours can be said to tie in with the elimination of some of the elements that are blocking the promotion of telework. Further research is necessary in order to properly grasp the effectiveness of such measures.

(c) Compatibility with information security measures

As part of putting in place the environment necessary for the implementation of telework, one can point to the importance of maintaining information security. Information security measures can be broadly divided into two parts, one that is terminal based, and the other that is network based. In terms of terminal-based information security measures, 7 of the companies interviewed had introduced thin clients and PCs equipped with information security measures. Also, 3 companies had either introduced or were planning to introduce VPN in terms of network-based security measures.

A special note needs to be made about Sumitomo Life Insurance which could not conceive of using regular Internet lines in implementing telework, from the perspective of handling customer information, and so found itself in a situation where it had to make its Intranet usable outside of its offices. Other companies also have limited the framework of information that can be handled via telework, and it has become clear that information security measures present an enormous cause of concern in terms of companies introducing telework. As for combining telework and information security measures, the type of business and management approach weigh heavily and, at this stage, it is difficult to determine what approach would be most desirable, but, at a minimum, there is a need to take appropriate information security measures from the standpoint of promoting telework.

Trends in future research studies

In conducting this survey, as opposed to receiving evaluations that are hopeful and forward looking, in particular during the corporate interviews, various issues became clear such as the problems connected with management issues at the executive level, the fears associated with the risk of leaked information on company secrets or employee information, and the issues associated with smooth communications between teleworkers and other employees. In addition, the fears from the women's side that were communicated in the survey, such as "The kind of job I'm given can easily be biased" or "I would have to be very strict about separating work from my private life" are likely to gain greater and greater prominence with the future expansion of telework.

With regard to the importance of the telework mindset and work life balance, all of the companies interviewed are tackling the matter positively, but opinions on methods for the actual implementation of telework are divided so that even within the ICT companies that are representative of Japan, there cannot be said to be anyone with proven expertise concerning information and communications tools that should be used in telework and methods for managing the work.

For example, with regard to the usage of thin clients, whereas some companies consider it vital from the point of view of preventing information leaks and managing telework employees, others don't consider it that necessary and in fact hold the opinion that there should be no difference with the terminals that are ordinarily used in offices. Also, in the case of TV monitors too, there were many negative opinions on using them for surveillance, but in the case of telework applying to all employees rather than just a few designated employees on a trial basis, it was thought that their usage might be desirable in conjunction with the necessity of following the state of telework in real time.

Taking the above perspectives in consideration, the topics that will continue to be studied in the future center on which information and communications tools can be concretely used in order to make it possible for telework to be conducted in a way that is appropriate and efficient in terms of work by employees and management of work.

TOPICS

3.9-Generation Mobile Communications Systems - Moving towards Mobile Communications Systems That Are Even Faster, Carry Greater Volume and Are More Convenient -

Introduction

Subscribers to mobile telephone and PHS services in Japan now number approximately 112.39 million (as of April 2009), with third generation phones accounting for more than 90% of the market, and a continuing shift away from second generation. In addition, against a background of greater social and economic performance and diversification, the trend is towards greater utilization of mobile phones for data transmission such as connection to the Internet or video transmission, leading to expectations of grater speed, volume and convenience in mobile communications systems. Taking this background into consideration, the public and private sectors have together proposed the introduction of the 3.9-generation mobile communications system* which is an advanced version of third generation mobile communications systems. In this issue we introduce this situation.

*The 3.9-generation mobile communications system was given that name because it comes close to fourth generation while still being third generation.

Domestic and overseas trends relating to the 3.9-generation mobile communications systems

Within the international cooperative NGMN (Next Generation Mobile Network) in which major vendors, operators and companies from various countries participate, there are already in existence a number of demos concerning LTE (Long-Term Evolution) which is suitable for the 3.9-generation mobile communications system. In addition, developing vendors have already implemented demos for UMB (Ultra Mobile Broadband) which has also been positioned as the 3.9-generation mobile communications system, and HSPA+ (using 64QAM and MIMO) which is an advanced version of HSPA(High-Speed Packet Access).

Also, in terms of information released by operators worldwide, Verizon (US) and Tele2 (Sweden) plan to introduce LTE around 2010, with AT&T Mobility (US) following in 2011.

In terms of standardization activities, 3GPP (3rd Generation Partnership Project) completed in December 2008 major standardization relating to LTE, HSPA+ and DC (Dual Cell)-HDSPA which uses dual cells to increase speed, and 3GPP 2 completed in March 2009 standardization of test specifications for UMB.

On the other hand, Japan's vendors and operators are carrying out on-site testing and pursuing aggressive development ahead of the introduction after 2010. All four domestic operators plan to adopt LTE as the 3.9-generation mobile communications system.

Figure 1 shows trends in various countries concerning the 3.9-generation mobile communications system.

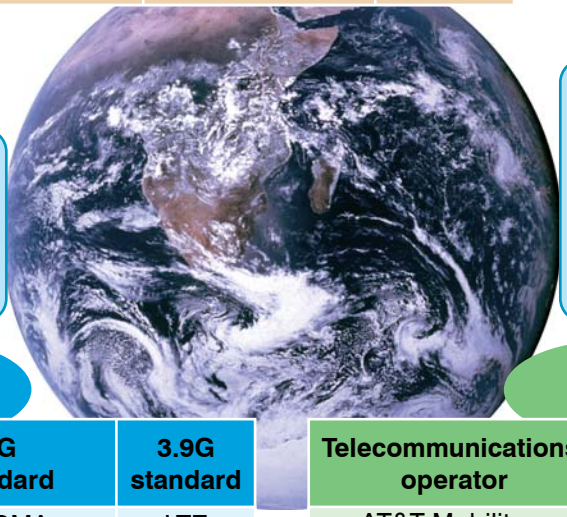
Figure 1: International trends in the 3.9-generation mobile communications system

Vendors such as Huawei (China) and Samsung (Korea) are developing LTE equipment.

Japan

Telecommunications operator	3G standard	3.9G standard
NTT DoCoMo	W-CDMA	LTE
KDDI	CDMA2000	LTE
Softbank Mobile	W-CDMA	LTE
e-Mobile	W-CDMA	LTE

- NTT DoCoMo is implementing on-site testing of LTE.
- NEC, Fujitsu, Panasonic and others are developing LTE equipment. (The same goes for vendors in other countries)



- Nokia and Siemens (Finland)
- Ericson (Sweden)
- Alcatel-Lucent (France)

Vendors such as these are developing LTE equipment

- Verizon (US) plans to implement LTE testing.
- Motorola (US) and Nortel (Canada) are developing LTE equipment.
- Intel (US) is developing WIMAX (FDD).

Europe

Telecommunications operator	3G standard	3.9G standard
(UK) Vodaphone	W-CDMA	LTE
(France) Orange	W-CDMA	LTE
(Germany) T-Mobile	W-CDMA	LTE
(Spain) Telefonica02	W-CDMA	LTE

USA

Telecommunications operator	3G standard	3.9G standard
AT&T Mobility	W-CDMA	LTE
Verizon	CDMA2000	LTE
Sprint	CDMA2000	not yet determined

Source: Prepared by MIC based on various information sources

MIC's actions regarding the 3.9-generation mobile communications system

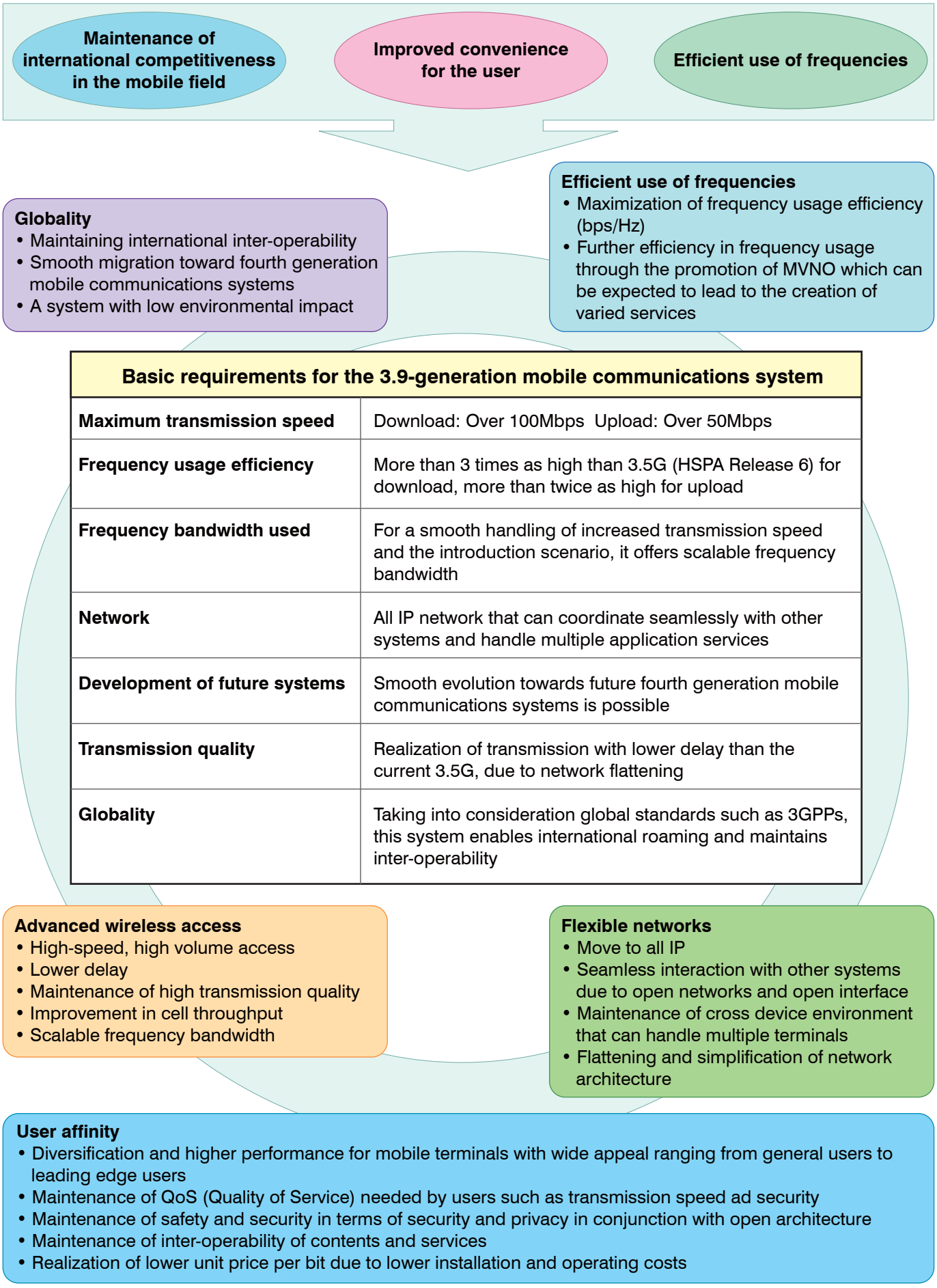
(1) Concerning technical requirements

MIC received a report from the Information and Communications Council in December 2008 concerning the conditions that were necessary for the introduction of the 3.9-generation mobile communications system. The outline of the report is introduced below.

- **The basic concept of the 3.9-generation mobile communications system**

The characteristics of the 3.9-generation mobile communications system include its maximum transmission speed of 100Mbps (download), with a frequency usage efficiency that is more than 3 times greater than in the existing 3.5-generation mobile communications system, and high transmission quality with minimal delay transmission (about 5ms), and an all IP network that coordinates seamlessly with other systems and can handle varied application services. All of the characteristics of the 3.9-generation mobile communications system are shown in Figure 2.

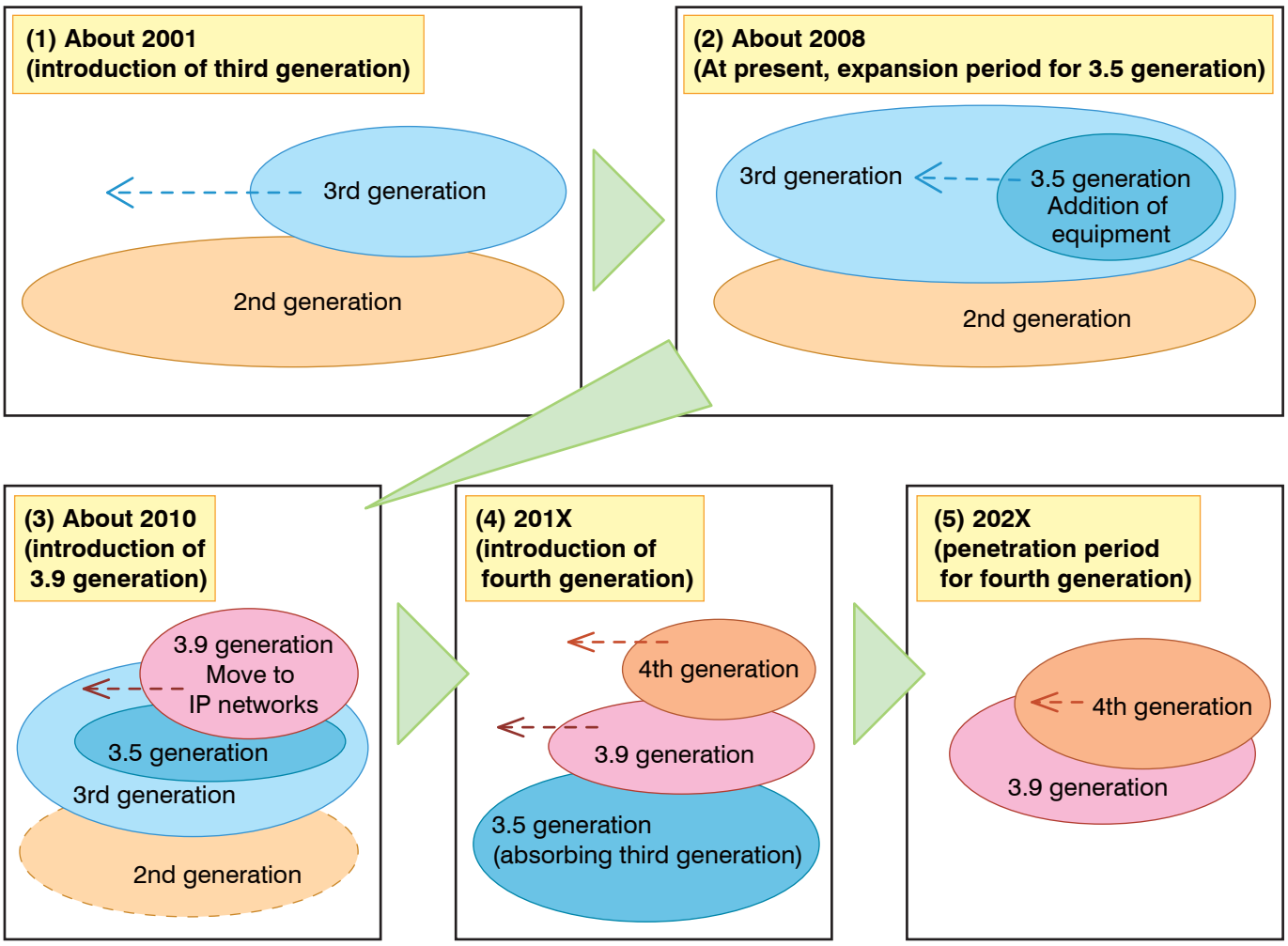
Figure 2: Basic concepts for the 3.9-generation mobile communications system



• **Network development image for the 3.9-generation mobile communications system**

At present, the 3.5 generation is still at the penetration and expansion stage but when the 3.9 generation network, which fulfills all of the requirements outlined above, is introduced around 2010, generation 2 will come to an end, and it is expected that 3.9 generation will overlay generations 3 and 3.5. After that, generation 3.9 will gradually expand, and sometime towards the middle of 2010, the generation 4 mobile communications system will begin to appear, and the area of coverage of generation 4 will expand after 2020. It is expected that generation 4 will come in as overlay, with generation 3.9 networks acting as a foundation. An image of future network development is shown in Figure 3.

Figure 3: Network evolution image for the 3.9-generation mobile communications system



• **Principal technical requirements for the 3.9-generation mobile communications system**

When investigating the introductions of the 3.9-generation mobile communications system, the following were studied: (1) In addition to direct introduction of the 3.9-generation mobile communication system for function expandability such as interaction with other systems through an all IP network and to enable smooth migration to fourth generation mobile communications systems, and (2) the gradual increase in performance of the existing 3.5 generation system which can be done cheaply and fast.

Taking the results of these investigations into consideration, major technical requirements were defined for the 3.9-generation mobile communications system, concerning the 800MHz/1,5GHz/1.7GHz and 2GHz frequency bandwidths that are being used for existing mobile phone systems. (Figure 4)

Figure 4: Major technical conditions for the 3.9-generation mobile communications system

	3.9-generation mobile communications system		Advancement of 3.5 generation	
	LTE	UMB	HSPA Evolution	DC-HSDPA
Multiplexing format	Download OFDM/TDM Upload SC-FDMA	Download OFDM/TDM Upload OFDMA	Download CDM or CDM/TDM Upload CDMA	Download CDM or CDM/TDM Upload CDMA
Modulation format	BPSK/QPSK/ 16QAM/64QAM	QPSK/8PSK/ 16QAM/64QAM	BPSK/QPSK/ 16QAM/64QAM	BPSK/QPSK/ 16QAM/64QAM
Occupied frequency bandwidth	5MHz/10MHz/ 15MHz/20MHz	5MHz/10MHz/20MHz	5MHz	5MHz
Antenna power	(Base station) Not stipulated Rated antenna power within ±2.7dB	(Base station) Not stipulated Rated antenna power within ±2.0dB	(Base station) Not stipulated Rated antenna power within ±2.7dB	(Base station) Not Stipulated Rated antenna power within ±27dB
	(Mobile station) Under 23dBm Rated antenna power within ±2.7dB	(Mobile station) Under 23dBm Rated antenna power within ±2.0dB	(Mobile station) Under 24dBm Within rated antenna power ±1.7dB to -3.7dB However, where the rated power is under 23dBm, acceptable value is ±2.7dB	(Mobile station) Under 24dBm Within rated antenna power ±1.7dB to -3.7dB However, where the rated power is under 23dBm, acceptable value is ±2.7dB
Antenna gain	(Base station) Not stipulated	(Base station) Not stipulated	(Base station) Not stipulated	(Base station) Not stipulated
	(Mobile station) Under 3dBi	(Mobile station) Under 3dBi	(Mobile station) Under 3dBi	(Mobile station) Under 3dBi
(Reference 1) Standardization organization	3GPP	3GPP2	3GPP	3GPP
(Reference 2) Maximum transmission speed	Download 300Mbps Upload 75Mbps	Download 288Mbps Upload 75Mbps	Download 43.2Mbps Upload 11.5Mbps	Download 43.2Mbps Upload 11.5Mbps

(2) Concerning approval of plan for establishment of specified base stations

MIC held an open consultation in November 2008 that brought together those people with concrete plans for the introduction of the 3.9-generation mobile communications system and experts. Also, in March 2009, an inquiry was made to the Radio Regulatory Council concerning a proposal for the installation of specified base stations for the introduction of the 3.9-generation mobile communications system, and received a response from the council that same day. In addition, an inquiry was submitted to the same council and a response received the same day with regard to proposed amendment of the relevant ordinances in conjunction with the introduction of the 3.9-generation mobile communications system, and these went into effect from April 3. An outline of the guidelines concerning the installation of specified base stations for the introduction of the 3.9-generation mobile communications system is given below.

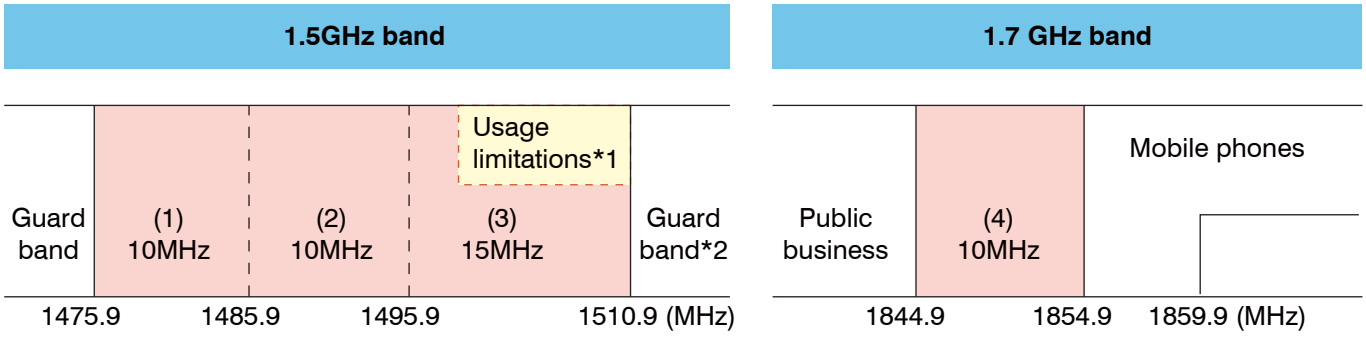
• **Outline of guidelines concerning the installation of specified base stations for the introduction of the 3.9-generation mobile communications system**

With regard to the 1.5GHz and 1.7GHz bandwidth, a maximum of 4 companies, regardless of whether they are new entrants or existing operators, will be granted 10MHz or 15MHz and the principle is that they have a plan for coverage, within 5 years from the day of approval, of over 50% of the population with the 3.9-generation mobile communications system, in each of the areas that fall under the administration of each of the Telecommunications Bureaus. (Figure 5)

As for applications for approval of set-up plans, these were received from April 3, 2009 until May 7, 2009 with applications from 4 companies. Deliberations are currently under way of applications for set-up approval, and approval is expected to be granted around the summer, with the operators being decided on.

Figure 5: Outline of guidelines concerning the installation of specified base stations for the introduction of the 3.9-generation mobile communications system

Allocated to a maximum of 4 companies from the point of view of realizing an even faster and higher volume wireless broadband environment, along with working towards strengthening Japan's international competitiveness



*1 Cannot be used in the Tokyo, Nagoya and Osaka areas where there are limitations in the use of business-use wireless until the end of March 2014

*2 Guard band: bandwidth which is considered necessary to leave unused in order to avoid interference with neighboring systems

Main points of installation guidelines

- Allocated to a maximum of 4 companies, regardless of whether they are newcomers or existing operators
- A population coverage rate for 3.9 generation of over 50% within 5 years for each of the 11 blocks nationwide

Conclusion

The above was an introduction of the measures being taken ahead of the introduction of the 3.9-generation mobile communications system. MIC will continue to be pro-active in putting in pace environment for the early introduction of the 3.9-generation mobile communications system so as to work towards maintaining international competitiveness in the mobile field, as well as for the effective use of frequencies, and user convenience.