

## 2.9 Distinctive Features of the Telecommunications Industry in Vietnam

We have discussed the present status of telecommunications service, telecommunications-related, computer, broadcast and non-telecommunications industries in Vietnam based on the framework for the information and communications industry given in Figure 2.3-1.

Although the subject has received some mention in previous chapters, we provide the following summary of the characteristics of the telecommunications industry in Vietnam, pointing to problems that need to be considered in discussions of the industry's future development.

- (1) As Figure 2.4.1-1 shows, the past seven years have seen steady increases in GDP share for output from the construction and service industries and from the transport, postal, and telecommunications industries. But the agriculture, forestry, and fisheries industry sector still accounts for over one-fourth of the GDP, a share that marks Vietnam as an agricultural country.

**Table 2.9-1 Labour Force by Industrial Origin (until 1<sup>st</sup> July 1997)**

(1,000 People)

|  | 1990     | 1991     | 1992     | 1993     | 1994     | 1995     | 1996     | 1997'    |
|--|----------|----------|----------|----------|----------|----------|----------|----------|
| Industry   | 3.392    | 3.422,0  | 3.485,9  | 3.562,7  | 3.550,3  | 3.497,0  | 3.529,3  | 3.571,0  |
| Construction   | 818,0    | 822,5    | 836,7    | 909,9    | 983,8    | 996,0    | 1.005,2  | 1011,0   |
| Agriculture, Forestry,<br>Aquaculture                      | 21.638   | 22.875,7 | 23.583,6 | 24.235,4 | 24.324,0 | 24.106,0 | 24.328,3 | 24.790,0 |
| Transportation<br>Communication, Post                      | 511,0    | 528,5    | 539,9    | 557,1    | 571,5    | 578,0    | 583,3    | 594,0    |
| Trade  | 1.681,0  | 1.727,0  | 1.755,5  | 1.801,6  | 2.020,6  | 2.214,0  | 2.234,4  | 2.263,0  |
| Finance, Banking,<br>Insurance                             | -        | 116,0    | 115,7    | 119,0    | 123,3    | 126,0    | 127,2    | 132      |
| State Administration,<br>Culture, Healthcare,<br>Education | -        | 1.463,3  | 1.493,2  | 1.530,3  | 1.673,4  | 1.795,0  | 1.811,6  | 1.839,0  |
| Services & Others  | -        | 439,6    | 456,1    | 474,6    | 879,2    | 1.277,0  | 1.288,8  | 1.317,0  |
| Total  | 30.286,0 | 31.394,6 | 32.266,6 | 33.190,6 | 34.126,0 | 34.589,0 | 34.908,1 | 35.517,0 |

Note: 1997 is estimated

Source: SNA Department, GSO

Table 2.9-1 suggests that labor allocation to each economic sector has changed little. After declining in the period from 1990 to 1995, the labor force across the country and in each economic sector grew during the period 1995 to 1997, while

the ratio of economic growth dropped from 9.5% in 1995 to 9.0% in 1997.

One of the goals of the five-year plan for 1996 through 2000 is to alter this economic structure. To attain this goal, Vietnam must:

- (a) increase the productivity of the agriculture, forestry and fisheries sector
- (b) attract foreign investment
- (c) create employment opportunities in other sectors by raising the ratio of capital available in the country
- (d) improve conditions that push the national economy toward industrialization and modernization

Boosting the telecommunications industry will increase the service sector's share of the GDP. It will also increase the share of the manufacturing industry, which supplies equipment to the telecommunications service industry and is responsible for the construction of the telecommunications infrastructure.

- (2) As discussed in 2.8, the size of the market in Vietnam for products of the information and communications industry, including both telecommunications and non-telecommunications services, is still quite small. As is well-known, in developed nations in which this industry has reached a certain critical level in terms of the GDP, the information and communications industry not only constitutes a key industrial sector in itself but significantly influences, and even pervades, other industrial sectors.

In following other countries along the path toward an information-intensive society, Vietnam must encourage a wide range of industries, including those for electronics, software, broadcast, and content, in addition to the telecommunications service industry run by VNPT. To this end, the Vietnamese government must promote research and development with long-term goals and introduce systems of finance, loans, taxation, laws, and administration that encourage investment.

- (3) Most of the investment for the construction, expansion, and development of a telecommunications system has been handled through loans and Business Cooperation Contracts (BCCs) and joint ventures, while the government has contributed about 2% of total investment in this sector.

Investment in the telecommunications sector increased from VND 187 billion in 1991 to 4,200 to 4,500 billion in 1995, or from 0.24% in 1991 to 1.9 to 2.1% in 1995 in terms of GDP share. The total investment in the five years from 1991 to 1995 amounts to about VND 11,000 billion.

Table 2.9-2 shows share of investment in the telecommunications sector in GDP at different stages of economic development, according to information released by the ITU. The Table suggests that the level of investment in the telecommunications sector is closely related to national economic development. As shown in Table 2.9-3 the trends for investment in the telecommunications sector in Republic of Korea show that certain investment levels must be maintained to increase teledensity.

The teledensity in Vietnam has more than doubled, from 0.64 in 1994 to 1.56 in 1996, because the country sharply increased investment in the telecommunications sector as a share of GDP. Still, the targeted teledensity cannot be met unless investment in telecommunications, particularly foreign investment, is diligently cultivated and maintained at high levels.

**Table 2.9-2 Telecommunication Investment**

| Country Group | GDP per inhabitant | Telecommunication Investment /GDP |
|---------------|--------------------|-----------------------------------|
| 1             | 60-311(\$)         | 0.25(%)                           |
| 2             | 339-1,153          | 0.39                              |
| 3             | 1,163-3,816        | 0.68                              |
| 4             | 4,061-8,809        | 0.74                              |
| 5             | 9,467-17,055       | 0.62                              |

Source: ITU (1990), Yearbook of Common Carrier Telecommunications Statistics

**Table 2.9-3 Trend of Telecommunication Investment and Teledensity  
in Korea (Rep.)**

|   | 1965-69   | 70-74     | 75-79     | 80-84      | 85-88       |
|---|-----------|-----------|-----------|------------|-------------|
| Average telecommunication investment (\$ million) | 29        | 66        | 316       | 1,209      | 1,605       |
| Telecommunication investment/GDP (%)              | 0.6       | 0.6       | 0.8       | 1.7        | 1.3         |
| Teledensity (%)                                   | 0.87/1.64 | 1.51/2.61 | 3.05/6.09 | 7.34/14.09 | 16.10/24.99 |

Source: Studies on the Impacts of Telecommunications on Economy, Society, and Culture, KISDI

- (4) Vietnam's telecommunications and broadcast industries are government-owned. Thus, operational modernization and systems improvements are promoted by

government policies rather than market mechanisms or technological development.

In most LDCs that seek quick development of their telecommunications industries, the development of networks through competition or market mechanisms entails too high an initial cost for the creation of demand. Thus, LDCs generally set a national target and adopt industrial policies to attain it.

The most important problem for Vietnam is not state-owned industries or oligopolistic markets, but the fact that private industries or markets haven't developed sufficiently to counterbalance the public sector. A national target set at a certain level may be attained by government policies. But to maintain and further develop it, domestic markets must be expanded and invigorated through a market mechanism.

- (5) One key factor in the development of domestic markets in the telecommunications industry is the desire among business customers and enterprises alike to create information networks and develop systems. In this respect, there is little reason to be optimistic for the future of telecommunications in Vietnam.

As Table 2.9-4 indicates, small-scale enterprises whose annual business receipts are lower than VND 100 million account for more than 90% of the total number of enterprises in Vietnam. Located mostly in Ho Chi Minh City and Hanoi, these enterprises don't yet require the introduction of computers or LANs. Dealings between enterprises haven't developed to a point requiring information flow or goods distribution networks. After the national target for the telecommunications infrastructure is attained, further development of the telecommunications industry will depend on competition among business customers to utilize this infrastructure and develop new applications.

- (6) As the convergence with the computer industry gathers speed, the telecommunications industry is rapidly shifting from the creation of information networks to the development of operation technologies and software applications. As mentioned in 2.6, the software industry in Vietnam is still in its early stages. This may prove to be an advantage if Vietnam can correctly assess the status of the information and telecommunications industry and pursue the right path in shifting the industry from a hardware to software focus.

- (7) National policies for these industries should ensure the creation of a certain level of development for the telecommunications infrastructure, as discussed in (4). But since the need for telecommunications cannot be expected to materialize so quickly in Vietnam, means for activating domestic markets should be sought overseas.

**Table 2.9-4 Annual Business Receipts of Enterprises**

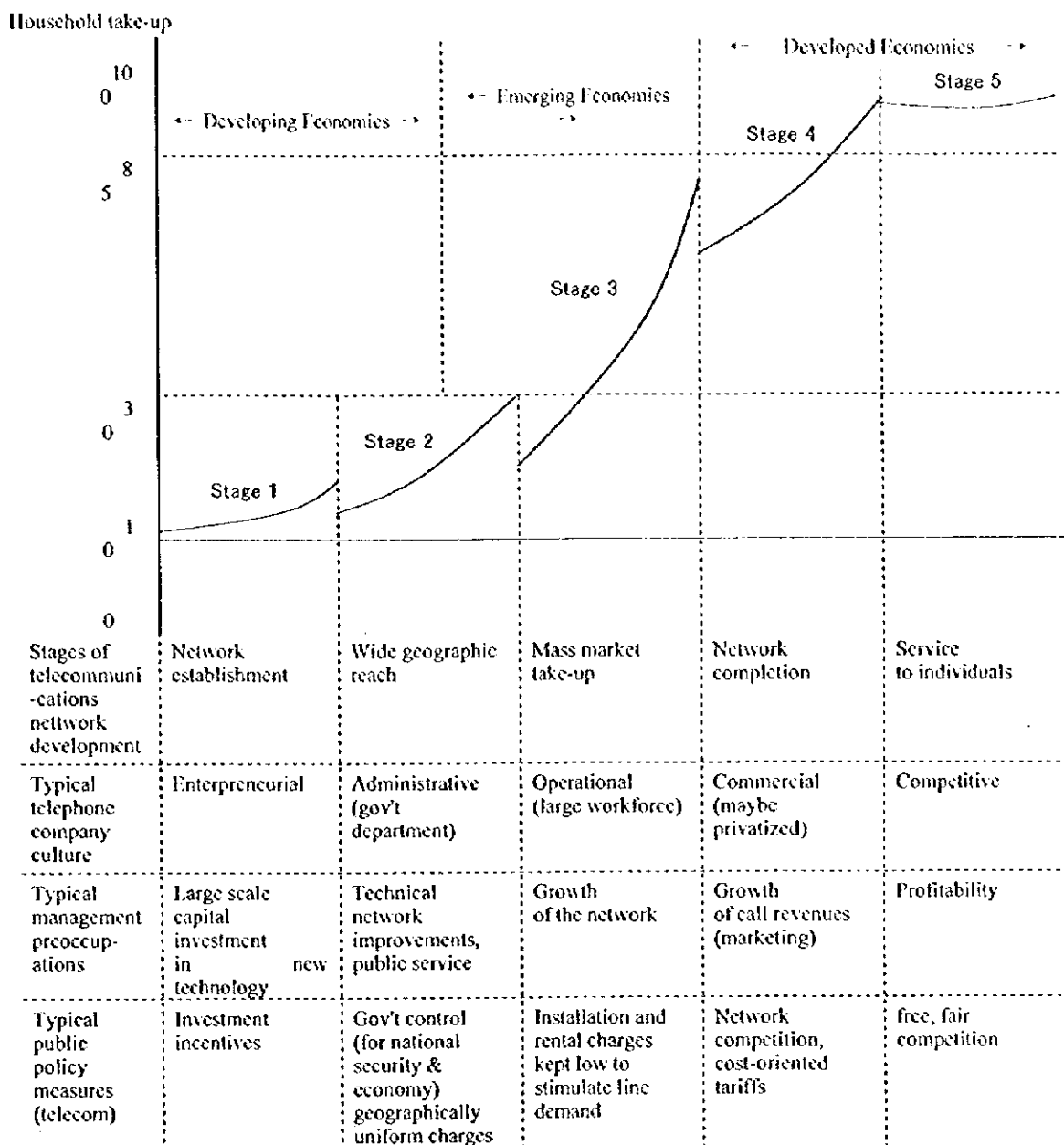
|                                      | Ho Chi Minh City |       | Hanoi |       | The Whole country |        |
|--------------------------------------|------------------|-------|-------|-------|-------------------|--------|
|                                      | 1                | 2     | 1     | 2     | 1                 | 2      |
| Below 100 million dong               | 87.41            | 68.92 | 99.30 | 91.71 | 93.25             | 80.08  |
| 100-200 million dong                 | 7.82             | 21.62 | 0.70  | 7.18  | 4.30              | 14.46  |
| 200-300 million dong                 | 2.38             | 2.97  | 0.00  | 0.55  | 1.20              | 1.77   |
| 300-500 million dong                 | 1.36             | 2.97  | 0.00  | 0.28  | 0.69              | 1.77   |
| 500-700 million dong                 | 0.68             | 2.16  | 0.00  | 0.00  | 0.34              | 1.09   |
| 700 million dong<br>- 1 billion dong | 0.34             | 0.81  | 0.00  | 0.00  | 0.17              | 0.41   |
| 1-2 billion dong                     | 0.00             | 0.27  | 0.00  | 0.28  | 0.00              | 0.27   |
| Above 2 billion dong                 | 0.00             | 0.27  | 0.00  | 0.00  | 0.00              | 0.14   |
| Total                                | 100              | 100   | 100   | 100   | 100               | 100(%) |

Note: 1: five Years ago, 2: in 1995

Source: Central Institute of Economic Management

## 2.10 Evaluation of Current Status of Telecommunications Industry in Vietnam

In the foregoing sections, we discussed the current status and features of the telecommunications industry in Vietnam in detail by classifying it into categories such as telecommunications service industry, computer broadcasting, non-telecommunications industry from the viewpoint of the information and communications industry.



Source: Milne, C Paper for the 25th annual Telecommunications Policy Research Conference, September 1997

**Figure 2.10-1 Five Stages of Telecommunications Industry Development**

Based on the above analysis of the current situation in Vietnam, in this section we evaluate the current status of Vietnam's telecommunications industry, considering the construction of information and telecommunications infrastructure for the 21st century. For this purpose, it is important to correctly assess the level of development of the telecommunications network in Vietnam, as the development of the telecommunications industry and that of a telecommunications network are mutually dependent.

It is perhaps more helpful to consider these criteria shown in Figure 2.10.1 as representing different stages of telecommunications network development. While most developed countries and a small group of developing countries have successfully managed to reach stage 4, the majority of developing countries are widely dispersed across the first three stages of development. A handful of emerging economies at stage 3 are on the way to achieving higher level of household telephone penetration.

Telecommunications network development in Vietnam is now at stage 1, early stages of network development, without widespread geographic availability, less than 5 per cent household telephone penetration. Although investment in telecommunications has rapidly increased and the telecommunications network has steadily developed, both the telecommunications network and the telecommunications industry in Vietnam are currently at developmental stage 1. This conclusion is based on the current status of the telecommunications industry as described below, in addition to that of the household take-up, typical telephone company culture, typical management preoccupation, and typical public policy measures shown in Figure 2.10-1.

- (1) The telecommunications service industry has not yet achieved its purpose of establishing a network using the latest international-standard telecommunication facilities.
- (2) The telecommunications equipment industry has just introduced a domestic production system on a joint venture basis.
- (3) The size of the market for products of the information and communications industry is still quite small.
- (4) For both hardware and software, the computer industry is still in its early stage.
- (5) State enterprises haven't developed to a point requiring information transaction or goods distribution networks, utilizing telecommunications infrastructure and developing new applications.

## **2.11 Technological Innovation and Its Impact**

Technological innovation in the field of information and communications has been one of the main driving forces that have brought about today's borderless economy and society. This innovation is leading to structural changes not only in the information and communications industry but also in every other industry. Innovation in this field is represented by advanced network and computer technologies, and digitization is the

common key element of these two pillars of innovation.

Optical fiber communication has greatly increased the transmission capacity of networks, while significantly reducing the cost. The use of digitized networks has not only made network control easy, but in combination with terminal and content digitization, has also realized lower costs and easier production, processing, distribution, and management of information.

Furthermore the increasing use of wireless technology, along with a broader usable bandwidth, smaller terminals, and increased cost efficiencies, has enabled the provision of wireless information and communication services that cover the whole world using many low-orbit satellites. Such innovations in network technology have created highly advanced industrial infrastructure, resulting in rapid expansion of the borderless economy and a great increase in time efficiency.

### **2.11.1 Convergence of Telecommunications and Computer Technologies**

As shown by the rapid progress of the Internet, a major shift in the social/economic paradigm is being caused by the expansion of computer networks. The enormous impact of the technological integration of telecommunications and computers is being felt not only at the industrial level, but also at social and cultural levels.

As described in 2.11, the main technological characteristics of computer networks are digitization and progress in distributed processing, which is a result of digitization. Information flow which used to be largely one-directional, with most people staying on the receiving side, will change in the future - anybody who wishes to send information will easily be able to do so.

Also, in the economic sphere, these networks have removed barriers between previously unrelated industries, promoting global competition and cooperation in a wide range of areas such as physical distribution, service, and finance.

### **2.11.2 Impacts of Innovation on the Information and Communications Industry**

The innovations in network and computer technologies have had three major impacts on the information and communications industry:

#### **(1) Intensified Competition in the Telecommunication Market**

The telecommunication industry, which used to be subject to monopoly and



regulations due to technological restrictions, has been released from its old framework by rapid technological progress. A great change in the market structure has occurred as a result of the introduction and encouragement of competition in all fields of telecommunication.

(2) **Advanced Globalization**

In response to the globalization of customers' needs, networks have become more and more borderless and seamless worldwide, allowing more countries the option of including foreign capitals in their telecommunication business. The telecommunication market is experiencing structural changes incorporating global competition and cooperation.

(3) **Emerging New Business due to a Broader Range of Needs in Information and Communications and Industrial Convergence**

Since the development of multimedia resulting from technological innovation has expanded the range of needs in information and communications, new businesses such as electronic commerce are being developed in order to permit information, merchandise, and money to be exchanged through computer networks.

### **2.11.3 Implications for the Development of the Telecommunications Industry in Vietnam**

Given that technological innovation in the field of information and communications is causing global structural changes in the information and communications market, many important questions arise. For example, in order to meet challenges related to both demand and supply in this dynamic industrial sector, what kind of strategies are required of Vietnam? The present rapid progress in information and communications technologies offers an important opportunity to make great strides in the development of a telecommunication industry, and the selection of appropriate policies may allow LDCs to drastically improve their communications efficiency.

Many developed countries are facing the need to replace or scrap their existing communication facilities, which rely on the telecommunications technologies of the previous generation. In addition, the digitization of information and communications technologies has caused a shift in emphasis with regard to technological requirements in the telecommunication industry. Although both analogue electromechanical and digital systems require two types of technology, namely equipment manufacturing and

network/service technology, digitization places less emphasis on equipment manufacturing processes such as hardware production and maintenance. Instead, it puts more stress on software technology that improves network performance and telecommunication operating systems such as software specification, interface coordination, application programming, as described in 2.9.

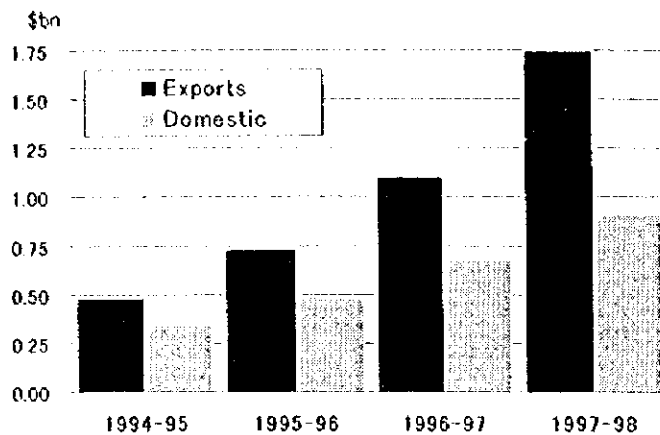
Therefore digitization is providing a chance for LDCs to catch up with more advanced countries.

To stand on its own legs, the industry for digital switching and digital transmission systems manufacture requires enormous investments and time to accumulate manufacturing technologies and establish component procurement systems. In contrast, setting up a software business requires only the capabilities to keep up with the latest technologies and develop software: a well-educated human resource pool, facilities for the exhibition of products, personal computers, and office space.

It is possible for a telecommunications industry to develop with information technologies and software businesses as core elements if it can cope with the needs of global markets. This has been demonstrated by India's success in the software industry, now one of the most prosperous export industries in the world. Pakistan and Sri Lanka have followed suit in jump-starting software industries. In an increasingly information-driven world, the competitiveness of developing countries will depend on their ability to access and exchange information globally. This is particularly relevant for countries looking to exports to generate economic growth.

India has established Teleports at nine Software Technology Parks, including India's so-called Silicon Valley centered around the city of Bangalore. They provide the communications support for India's burgeoning computer software export industry. Satellite earth stations provide international data communications connectivity. An integrated network service called SoftNET provides electronic mail, file transfer and videoconferencing required by software developers.

As shown in Figure 2.11.3-1 India has emerged as one of the leading software exporters among developing countries with annual exports expected to top \$10 billion within the next three years. More than 600 IT companies employ 200,000 software engineers.



Source : Nascom December 2, 1998 Financial Times

**Figure 2.11.3-1 Software Sales (India)**

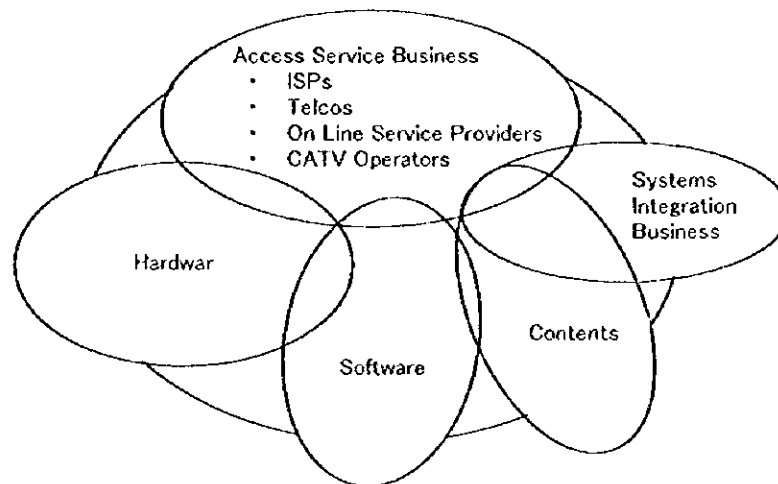
## 2.12 Principles of the Development of the Telecommunications Industry in Vietnam

As described in 2.11, technological innovations in the fields of information and communications have caused a significant paradigm shift in the information and communications industry, as well as in the information and communication market for the next century. The 21st century information and communications industry, which can be summarized by the key word, "convergence", has the following three characteristics:

- (1) **A Growing Market, and Intensified Global Competition**  
As a result of convergence, global competition has been intensified in new markets such as Internet appliance, mobile computing, and call centers.
- (2) **Advanced Business Integration**  
As shown in Figure 2.12-1, the various aspects of the 21st century information and communications market/business is not independent. Individual fields of business - access, hardware equipment, software, contents, and system-integration - are showing a growing tendency to overlap.
- (3) **A Shift in the Driving Force**  
The driving force of the information and communications industry is swiftly shifting from common carriers to their successors, software vendors. U.S. venture

businesses constitute the core of this rapidly developing and highly competitive market.

Based on the above-mentioned global structural changes in the information and communications industry for the 21st century, the following principles are recommended for promoting telecommunications industry in Vietnam.



Source: InfoCom Research, Inc Japan

**Figure 2.12-1 Information and Communications Market Structure**

**(1) Early Implementation of a National Telecommunication Network Using the Latest International-Standard Facilities**

As described in 2.9, rapid progress in information and communications technology will eliminate the need to replace and scrap existing facilities, which could be an advantage for Vietnam, if appropriate policies are implemented.

If Vietnam successfully provides incentives for introducing the latest facilities and improves people's purchasing power by means of the present joint venture system, the country will soon achieve its objective of early implementation of a national telecommunication network using the latest international-standard telecommunication facilities.

But unless Vietnam formulates a long-term plan for applying transferred technology to its telecommunications industries, the result will be an understanding of piecemeal technology, rather than of the overall system. Due in part to the

rising importance of software in telecommunications, a field in which different technologies merge, manufacture through joint venture is shifting to a system in which components are manufactured in other countries and assembled in Vietnam.

(2) The Attainment and Maintenance of Universal Service

Universal service is a concept that has increasingly become focused upon connection of individual household to the public telephone network. Basing telecommunications development around policies of universal service could be problematic. This is because contemporary universal service is not a single concept but rather, a composite, comprising nationwide coverage, non-discriminatory access and widespread affordability - which have typically been achieved in stages.

As shown in Table 2.12-1 pursuing all three simultaneously requires conflicting policy choices. Reconciling the three contending criteria of contemporary universal service - availability, accessibility and affordability - has proven a difficult task for most governments.

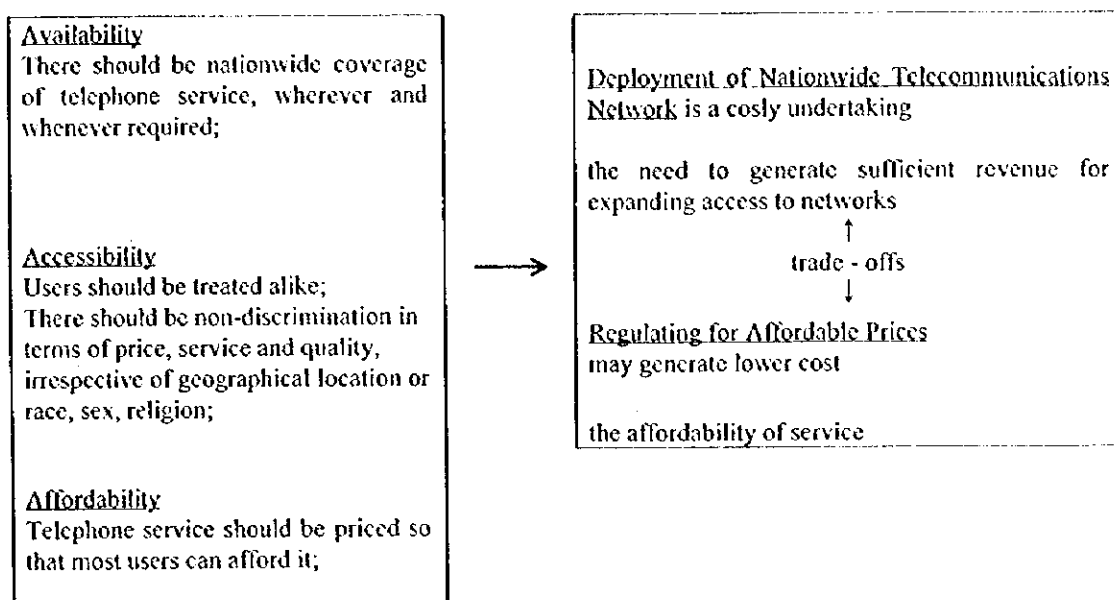
DGPT has set targets for National Telecommunications Development Plan in Vietnam up to 2000 and 2010 as:

- By the year 2000, Vietnam will have 4 telephone sets per 100 inhabitants.
  - By the year 2010, Vietnam will have 12-15 telephone sets per 100 inhabitants.
- Telecommunications services will be provided to 100% villages throughout the country

In order for it to be attainable in practice, however, a target for teledensity should be set based on the definition of universal access from the viewpoint of Vietnamese socio-economic development in the future. To define universal access in consideration of the geographic conditions in Vietnam and the difference between rural and urban areas, the example in Table 2.12-2 will be helpful. As a means of universal access, shared access through mobile cellular phones and public payphones should be discussed in addition to fixed telephone lines. To devise appropriate policies, policy makers must not only define universal access, but also collect detailed information such as demographic, economic, social, geographic, and telecommunication data.

Improvement will require coordination between DGPT, VNPT and national statistical offices. Based on detailed analysis of collected information, establishment of network targets and its periodically reassessing as well as re-establishing operator targets are needed. There are a number of interrelated aspects such as maintaining or realizing affordability, devising effective telecommunication market structure, creation of effective funding mechanism, utilizing appropriate technology and monitoring for policy makers to consider.

**Table 2.12-1 The Attainment of Universal Service**



Source: ITU

**Table 2.12-2 Defining Universal Access**

Universal access definitions

| Criteria   | Definition   | Example   |
|------------|--|---|
| Population | A telephone for every permanent settlement of 'x' population | In Ghana, defined as a telephone in every locality of more than 500 people.   |
| Distance   | A telephone within 'x' kilometres                            | In Burkina Faso, defined as a telephone within every 20 kilometres.           |
| Time       | A telephone within 'x' minutes                               | In South Africa, proposed as a telephone within 30 minute traveling distance. |

Source: ITU

(3) **Technology Transfer and Selection of High Technologies**

Regarding the present state of Vietnamese information and communications

industry, a detailed analysis by individual industrial field is made in our Progress Report. The results of the analysis show that telecommunications service, broadcasting, telecommunications-related industries, and non-telecommunications industries are all in the early stages of development and need to be fostered by means of intensive industrial policies.

Chapter 10, "Human Resource Development Plan" of this report points out that human resources in Vietnam are limited, particularly in terms of the number of technicians and engineers. Taking into account the global paradigm shift in the information and communications industry for the 21st century, it is advisable to decide which technological areas the country should specialize in and to concentrate the limited resources on these areas. From this point of view, the following are required:

- (a) Intensified promotion of development in areas of software and operating technology such as software specifications, interface coordination, and application programming.
- (b) Meeting the needs of equipment manufacturing through transfer of the latest technology by joint ventures.
- (c) R&D system based on effective cooperation between the industrial, academic, and political spheres.

Alongside the transfer of technologies through joint ventures, Vietnam must promote programs to develop human resources and invest in basic research, or risk being reduced to competence in mere assembly. Development of a telecommunications industry is inextricably linked to basic research and human resources development.

- (d) To meet the needs of software and operating technology, it is indispensable to employ a wide-ranging education program covering not only telecommunications service, but also PCs, and the Internet.

While the development of the telecommunications industry forms the basis of a country's industrial policies, the development of other domestic industries is in turn also essential for the growth of the telecommunications industry - thus the importance of a favorable climate for enterprise investment in developing systems and information networks.

- (e) Incentives and favorable measures must be used to encourage information technology investment by other industries and businesses.

As discussed, a strong global market within the information and communications markets has emerged for software. If Vietnam can establish its own markets and organizations for software development and adapt itself to software markets within the global information and communications markets, software businesses should flourish on the foundation of the government-created telecommunications infrastructure.

Vietnam's 21st century information and communications industry development program and a medium-term five-year plan should be based on the above-mentioned principles. Efficient implementation will depend on effective leadership by the government.

## **2.13 Emerging Telecommunications Industry**

### **2.13.1 Telecommunications Industry Trend**

Telecommunication is a dynamic sector. No other sector matches its pace of development. Beside being a fast growing industry by itself, it serves as the basic information transport mechanism for all other sectors of economy.

Let us analyze the global telecommunications industry trends as follows;

- (1) Due to high level of integration and programmability, the costs of equipment are dramatically decreasing.
- (2) Conformity of standards to ensure interoperability and seamless operation of networks is removing the network boundaries.
- (3) There is a shift from hardware/technology based platform to software/marketing based platform.
- (4) There is a progressive migration to multimedia services and information infrastructure, Internet. Many telecommunications administrations and research labs are engaged in Internet telephony projects.

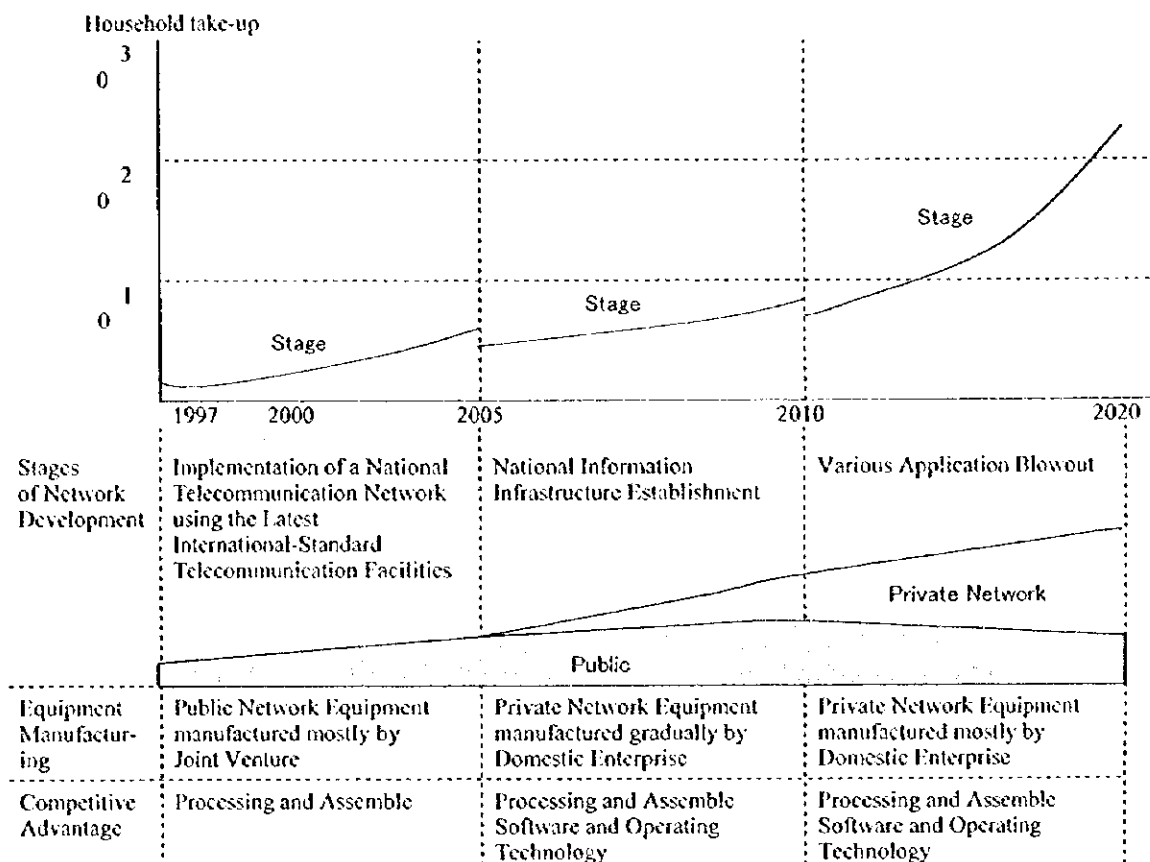


- (5) Need for establishment of national, regional and global information infrastructure is getting great.
- (6) Trading in telecommunication services is becoming an accepted norm.
- (7) Review of accounting rate mechanism is being seriously pursued. The Internet traffic is occupying the circuits for longer than ordinary telephony. Much of the content providers are in the U.S.
- (8) GMPCS (Global Mobile Personal Communication Systems, Satellite based, e.g., IRIDIUM, Globalstar, Teledesic, etc.) are likely to become operational between 1999 and 2002 which will make it technologically possible to bypass the national gateways.

### **2.13.2 Three Stages of Telecommunications Industry Development in Vietnam**

Based on the above trends in the global telecommunications industry, Figure 2.13.2-1 shows the three stages of development of a telecommunications industry, assuming that Vietnam becomes an industrialized country by 2020.

For this purpose, it is necessary to use telecommunication facilities that conform to the latest international standards to implement a national telecommunication network in stage 1, which is targeted for 2005. In stage 2, which is targeted for 2010, it is also necessary to establish a national information infrastructure that integrates the public and private networks through systematization and networking of the Internet, LANs, WANs and other systems in the private sector using the latest technologies. In stage 3 from 2010 to 2020, applications will be developed and used in the government and private sectors based on the national information infrastructure established in stage 2.



Source: InfoCom Research, Inc JAPAN

**Figure 2.13.2-1 Three Stages of Telecommunications Industry Development in Vietnam**

The application may be various, e.g., interactive voice (telephony audio conferencing, etc.), interactive video (video conferencing, telemedicine, teleducation, teleshopping, telework, etc.), electronic commerce, electronic government and so on.

### 2.13.3 Asia-Pacific Region Telecommunications Development

The Singapore Declaration at APEC June 1998, set out the framework for development of telecommunication in the region. Almost all countries in the region have implemented or have planned network solutions taking advantage of the recent technological developments. In some countries the governments have taken the initiatives, in some other the development is pursued by close relationship between the government and private sector, e.g. Malaysia and Philippines, yet in some it is borne out of the market forces at play.

Electronic commerce is now under detailed discussion in APEC. At the summit and

cabinet member meetings held in Vancouver in November 1997, the following three points were agreed upon, in view of the fact that EC is an important technological innovation. Namely, APEC will:

- (1) Emphasize the leading role of the private sector in the establishment of EC
- (2) Expedite the introduction of clear and fair legal regulation.
- (3) Promote wide-ranging research on EC.

According to this Vancouver summit declaration, the 17th APEC Telecommunications WG meeting held in Brunei in March 1998 discussed actual means of addressing the above EC issues, and agreed upon the necessity of a wide range of approaches, in addition to technological developments through the following major EC projects currently under way.

- (1) INGECEP / CyberNet (Integrated Next Generation Electronic Commerce Environment Project)
- (2) Electronic Commerce Survey
- (3) Public Key Authentication Framework
- (4) Database of Existing Certification Authorities
- (5) Proposals to promote Internationally Harmonized Data Protection Practices

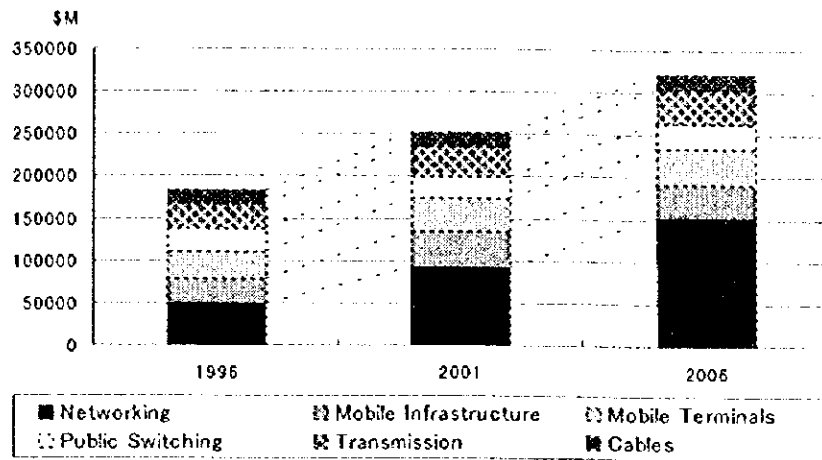
## **2.14 Recommendation for The Development of Telecommunications Industry in Vietnam**

### **2.14.1 Trends of Telecommunications Equipment Manufacturing Industry**

Future trends in the telecommunications equipment manufacturing industry based on technological innovations may be summarized into the following five points.

- (1) **Lower Prices in the Terminal Equipment Domain**  
The prices of terminal equipment, whether it may be mobile or fixed, will drop further due to both the development of digital technology and the establishment of manufacturing technology in NIEs and other countries.

(2) Increases in the Demands for Private Network Elements and Networking Equipment



| 1996 \$M              | 1996           | 2001           | 2006           |
|-----------------------|----------------|----------------|----------------|
| Networking            | 49,333         | 92,789         | 152,041        |
| Mobile Infrastructure | 30,188         | 42,600         | 39,543         |
| Mobile Terminals      | 31,869         | 39,973         | 42,718         |
| Public Switching      | 27,758         | 25,737         | 30,350         |
| Transmission          | 29,631         | 35,557         | 40,891         |
| Cables                | 14,233         | 15,715         | 17,350         |
| Others                | 38,195         | 52,671         | 67,389         |
| <b>Total</b>          | <b>221,207</b> | <b>305,041</b> | <b>390,282</b> |

Source: 1997 IDATE

**Figure 2.14.1-1 Demand Forecast of World Information and Telecommunications Equipment**

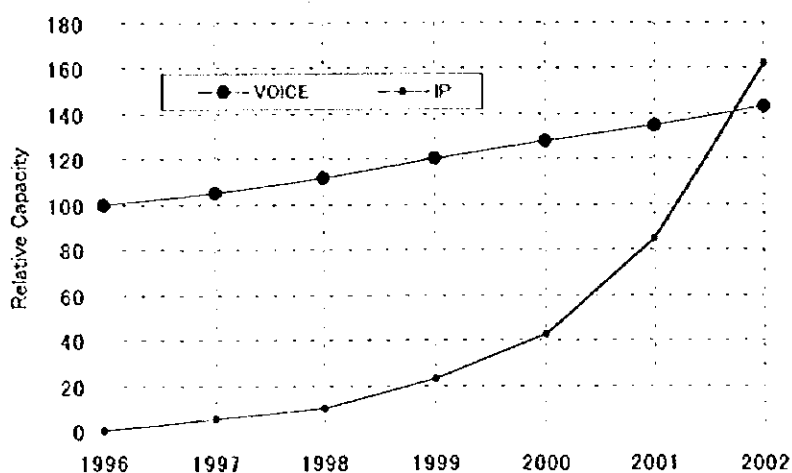
Introduction of Intranet, LAN, and WAN into enterprises expedited by the popularization of Internet will increase the demands for routers, hub, gateway equipment, and other networking equipment. Under the circumstances, the market for telecommunications equipment (manufacture) is shifting from public networks to private networks, particularly rapidly from conventional public switching and transmissions to the emerging networking equipment, as shown in Figure 2.14.1-1. Although the market for public switching and transmission is not expected grow at all for the next 10 years, that of networking equipment is expected to triple during the same period.

(3) Progress of Convergence of Telecommunications and Computer Industries

A shift from circuit switch networks to computer networks is rapidly progressing in the telecommunications equipment industry in the form of information technologies developed via Internet for computer networks edging out into the "old

world," or vintage circuit-switching networks. This leaves no room for compromise between the telecommunications and computer industries.

The scale of the market for telecommunications network equipment was \$160 billion as of 1998, while that of computer network equipment was only \$30 billion, or about one-fifth of the former. It is expected, however, that the market for computer network equipment will rapidly grow in the future, in contrast to the matured market of telecommunications network equipment.



Source: Vint Cerf of MCI, Internet Explosion : 21st Century Solutions

**Figure 2.14.1-2 Voice vs Internet : 1996-2002 Traffic Forecast**

As seen in Figure 2.14.1-2, data traffics developing at an even higher rate than that of the voice traffic in the U.S. To respond to this situation, collaborative movements are being accelerated between Sprint and Cisco, between MCI and Lucent, and between other telecommunications operators and networking/computer equipment vendors.

**(4) Increase of Software used in Network Elements**

Today telecommunication services are using enormous amount of software in the network elements as well as in the different applications. Software continues to pose biggest challenge for the development of telecommunications network and services. Digital switching systems of today employ a few million lines of source code.

The key element of the main exchange is therefore the software. Today it is imperative that the exchange have Signaling System No.7 (SS7) software, ISDN

signaling software, advanced operations and management (including network management) software. The broadband ISDN also is expected to employ software in the range of 10 to 20 million lines of source code. The development of such a complex software is a great challenge to information and communications industry. Software forms an integral part of telecommunication system and it plays a major role in the preparation for developing information society as well as information and telecommunications industry.

(5) **Increase of Software used in the Customer Related Application Packages**

Software used in customer related application packages are needed based to improve the customer satisfaction. Such software packages can be standardised to meet a specific requirement. Different application packages can be networked so that common and related information flow can take place between them to provide easy access to information and data integrity.

**2.14.2 Evaluation of Telecommunications Equipment Manufacturing Industry in Vietnam**

Because Vietnam was required to modernize its telecommunications network in a short period of time, it imported most of its telecommunications equipment from other countries, while producing only wires, cables, and transmission equipment for subscribers at domestic companies. Of the nine subsidiary companies of VNPT, seven companies manufacture telecommunications equipment. Except POSTEF, a telephone set manufacturer, these seven subsidiaries are small-scale companies with less than 200 employees.

Although VITECO maintains its own pool of expertise in the field of small-capacity digital switching by placing manufacturing orders with sub-contractors based on its own specifications, assembling products and performing final tests, most of the other subsidiaries remain at a position that merely complements joint venture companies in the field of manufacture and maintenance of copper cables and microwave equipment. Despite the increasing export of telecommunications equipment, the country is still trapped in an unfavorable balance of trade.

Table 2.14.2-1 indicates that the import of telecommunications equipment has increased since 1992 to keep up with the improvement and expansion of domestic networks. This trend has been growing remarkably since 1994, when the teledensity roughly doubled from

0.61 to 1.05. The fact that the majority of imported equipment consists of switching and transmission equipment suggests that imported equipment has been appropriated to major domestic network elements, and that the subsidiary companies of VNPT have played an important role in the implementation and maintenance of such equipment.

**Table 2.14.2-1 Telecommunications Equipment Import**  
(US\$ thousand)

|              | 1991         | 1992          | 1993          | 1994          | 1995          | 1996          | 1997          |
|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Switching    | 1,940        | 17,907        | 13,619        | 34,126        | 32,155        | 47,144        | 15,114        |
| Transmission | 1,153        | 17,328        | 9,197         | 7,764         | 10,926        | 17,016        | 10,232        |
| Data         |              | 1,396         |               | 3,664         | 3,727         |               |               |
| Others       |              | 1,626         | 8,054         | 1,845         | 34,560        | 5,725         | 24,085        |
| <b>Total</b> | <b>3,094</b> | <b>38,269</b> | <b>30,870</b> | <b>47,400</b> | <b>81,369</b> | <b>69,885</b> | <b>49,431</b> |

Source: 1998, DGPT

When evaluated from the viewpoint of circumstances where the first priority must be placed on the establishment of national telecommunications networks by using the latest standard international telecommunications facilities, Vietnam has no choice but to maintain its system and manufacture and supply major network elements on a joint-venture basis for the time being. From the viewpoint of cultivating the domestic telecommunications industry, however, Vietnam is required to develop the domestic telecommunications equipment manufacturing industry, with consideration given to the global trends in the telecommunications industry described in Section 2.14.1.

### 2.14.3 Competitive Advantage and Disadvantage in Vietnam

As explained in Section 2.11.3 "Implications for the Development of the Telecommunications Industry in Vietnam," the rapid progress of telecommunications technology is by no means a disadvantage for Vietnam, where the development of a telecommunications industry has been delayed. On the contrary, the selection of appropriate policies may allow Vietnam to drastically improve its communications efficiency.

In an increasingly information-driven world, the competitiveness of developing countries will depend on their "ability to globally access and exchange information." On the other hand, developing countries without the relevant facilities may find themselves at a competitive disadvantage. One of the most important advantages for Vietnam is its potential ability to make a paradigm shift to a country with an advanced information industry by skipping whole stages of development, though in order to do so, it must

implement appropriate policies. Table 2.14.3-1 shows the competitive advantages and disadvantages of eight countries including Vietnam in terms of supplying information services.

(1) Highly Productive Work Force

The large, well-educated, and highly productive work force in Vietnam is one of the country's most important assets. When compared with countries at similar income levels, Vietnam has a remarkably high literacy rate and widespread access to basic education. However, there are still weaknesses in the education system in terms of education quality, efficiency and equity. The current illiteracy rate is reportedly six percent, while the rate of enrollment in primary education is estimated to be 91 percent.

The age-wise structure of population in Vietnam is a typical inverse pyramid type, in sharp contrast to that of Japan, which has reached the stage of an "aged society". In the information society of the 21st century, individuals, firms, and the nation as a whole are expected to have the ability to use information, which is likely to depend more on age and education than on wealth.

(2) Low Wages

Another potential advantage of the labor force in Vietnam is its low wages. Depending on the industrial policy, such low wages may simply lead to Vietnam serving as a supply of cheap labor for NIES and ASEAN countries. However, Vietnam will be able to successfully turn low wages to an advantage, if it can establish a pattern of processing industry that creates large-scale employment in the telecommunications equipment manufacturing field.

In the past, labor-intensive textile and other industries shifted from developed countries to developing countries in quick succession, e.g., from Japan to NIES, Indonesia, China, and other low-wage countries. This pattern was also observed in the process of transformation from light industries to high-tech industries. Such "wild-goose-flight" industrial development was cited as one of the conditions contributing to economic development in Asia. If a division style of consignment processing can be established in the telecommunications equipment manufacturing field, Vietnam will be able to attain the goals of developing its telecommunications industry and securing employment using low wages as a competitive advantage.



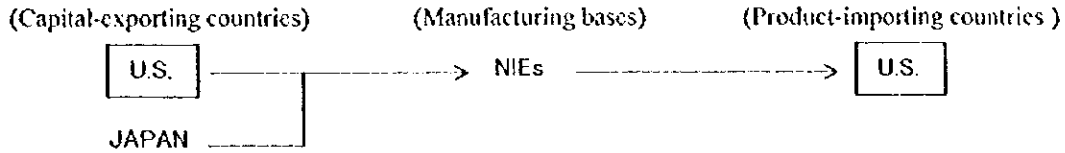
(3) Position of Vietnam in the Division System in Asia

In the 1990s, the division system among Asian countries has changed to a structure that targets markets within the region, while intensifying mutual dependence between countries. The dynamism of structural change, which symbolizes the maturing of the Asian economy, constituted a step towards exploiting new markets in the region. In this context, Vietnam, which has increasingly shifted to a market economy since the middle of the 1980s, has the potential to support part of the Asian economy. Due to its geographical location among NIES and ASEAN countries, Vietnam is expected to play a role in the division system by importing parts and raw materials from NIES and other Asian countries and exporting processed, assembled, and completed products to those countries as shown in Figure 2.14.3-1.

As the Vietnamese government has promoted a consignment processing and production system when receiving investment from foreign countries, the system of processing and assembling on a joint venture basis has become established. Joint ventures are expected to supply the main elements of switching and transmission equipment required to establish a public network. If Vietnam can establish a system to import items of telecommunications equipment from Asian countries, assemble them at domestic manufacturing facilities, and export completed products, while responding to the future trends of the global telecommunications equipment manufacturing industry, it will be able to develop a telecommunications industry by utilizing its competitive advantages in Asia.

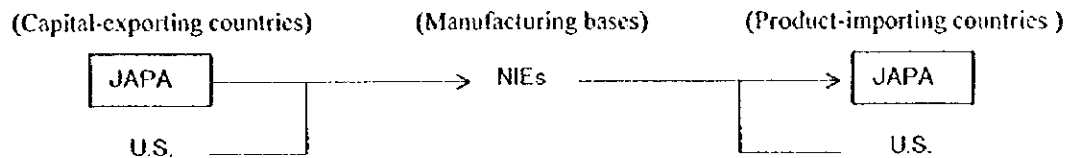
**Before 1985**

Rapid expansion of domestic demand in the United States resulting from Reaganomics brought about a strong dollar, high interest, and high wages in the U.S., thereby causing U.S. manufacturers to make inroads into newly industrializing economies (NIEs), with U.S. markets absorbing those manufacturers' exports from NIEs.



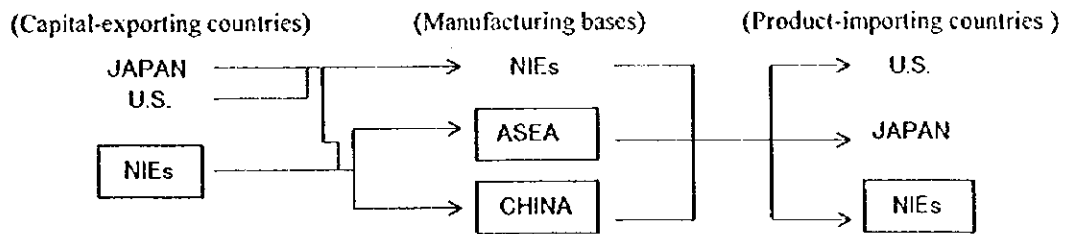
**Second Half of the 1980's**

Taking advantage of the strong yen and weak dollar that resulted from the Plaza Accord reached in September 1985, Japanese enterprises rapidly increased their direct investments in NIEs. At the same time, Japan sharply increased its imports as a result of its domestic demand-led economic growth.



**End of the 1980's**

Currency revaluation and wage hikes in NIEs resulted in a sharp increase in the investments of NIEs in ASEAN. At the same time, China emerged as an investee country, and NIEs grew as market.



Note : The foregoing represents economic realities simplified for the purpose of characterizing the respective periods covered, without reference to the EU and other regions.

Source: Ministry of Post and Telecommunications, JAPAN

**Figure 2.14.3-1 Changes in the Division-of-Labor System Centering Around East Asia**

**Table 2.14.3-1 Competitive Advantage and Disadvantage for Supplying  
Information Services**

| Country            | Pros   | Cons   |
|--------------------|--|--|
| Vietnam            | Highly productive workforce, low wages proximity to Asean market                   | High telecommunications costs, Distance from North American Market                                 |
| China              | Low wages, work ethic  | Distance, language, telecommunications, vague business and intellectual property laws              |
| Dominican Republic | Low wages, good infrastructure, proximity to North American market                 | Lack of language and cultural affinity to North America  |
| India              | Established software export industry   | High telecommunications costs  |
| Ireland            | English speaking, proximity to European market                                     | Though wages are low relative to developed countries they are higher than developing countries     |
| Israel             | Skilled workers, emerging export industry  | Distance, degree of language barrier, wages  |
| Mexico             | Low wages, proximity to North America, telecommunications infrastructure improving | Language, relatively low literacy, uncertain macro-economic situation                              |
| Philippines        | Low wages, emerging industry   | Distance from North American market, foreign ownership restrictions, high telecommunications costs |

Source: InfoCom adapted from ITU

#### **2.14.4 Targets for the Development of Telecommunications Industry in Vietnam**

This Section summarizes the discussions in Section 2.11 “Technological Innovation and its Impact” and subsequent Chapters and Sections, and indicates a road map for the development of a telecommunications equipment manufacturing industry in Vietnam, assuming that Vietnam will become an industrialized country by 2020.

Table 2.14.4-1 shows the road map that has been derived from the rapid innovations in information technology since the middle of the 1990s, the impact of such innovations on the information and communications industries, and the trends in the telecommunications industry and telecommunications equipment manufacturing.



**Table 2.14.4-1 Roadmap for the Development of Telecommunications Industry in Vietnam**

**Evaluation**

**2.10 Evaluation of Current Status of Telecommunications Industry in Vietnam**

Although investment in telecommunications has rapidly increased and the telecommunications network has steadily developed, the telecommunications industry in Vietnam is currently at developmental stage I.

**2.14.2 Evaluation of Telecommunications Equipment Manufacturing Industry in Vietnam**

Although VITECO maintains its own pool of expertise in the field of small-capacity digital switching, most of the other subsidies remain at a position that merely complements joint venture companies.

**2.14.3 Competitive Advantage and Disadvantage in Vietnam**

The rapid progress of telecommunications technology is by no means a disadvantage for Vietnam.

Competitive Advantage:

- (1) Highly productive workforce
- (2) Low wages
- (3) Position of Vietnam in the division system in Asia

**Trend**

**2.11.2 Impacts of Innovation on the Information and Communications Industry**

- (1) Intensified competitive in the telecommunication market
- (2) Advanced globalization
- (3) Emerging new business due to a broader range of need in information and communications and industrial convergence

**2.13.1 Telecommunications Industry Trend**

- (1) Costs of telecommunications equipment are dramatically decreasing.
- (2) Conformity of standards is removing the network boundaries.
- (3) Shift from network/technology based platform to software/marketing based platform.
- (4) Progressive migration to multimedia services and information infrastructure, internet.
- (5) Need for establishment of national, regional and global information infrastructure.
- (6) Trading in telecommunications services is becoming an accepted norm.
- (7) Review of accounting rate mechanism is becoming seriously pursued.
- (8) GMPCS are likely to become operational.

**2.14.1 Trend of Telecommunications Equipment Manufacturing**

- (1) Low prices in the terminal equipment domain
- (2) Increases in the demands for private network elements and networking equipment
- (3) Progress of convergence of telecommunications and computer industries
- (4) Increase of software used in the network elements
- (5) Increase of software used in the customer related application packages



**2.14.4 Targets for the Development of Telecommunications Industry in Vietnam**

**2005**

- Establishment of a system for joint ventures to supply most public network elements
- Development and accumulation of software and operating technologies
- Improvement of the domestic supply system for private network equipment and networking equipment manufacturing with a subsidiary company of VNPT (e.g., VITECO) as a key member

**2010**

- Establishment of a domestic supply system for private network equipment and networking equipment manufacturing by applying software and operating technologies, and improvement of the consignment production system for networking equipment in collaboration with foreign enterprises

**2020**

- Manufacture of networking equipment using the software and operating technologies developed by Vietnam and supply to overseas markets

**2.14.5 Required Policies**

**2005**

- Implementation of a national telecommunications network using telecommunications facilities that meet the latest international standard
- Promotion of education on computer/software
- Preferential investment in, protection of, and development of domestic core companies to manufacture private network equipment and networking equipment manufacturing
- Preferential taxation system for investment in information technologies and systematization of companies

**2010**

- Establishment of national information infrastructure
- Establishment of software technology parks in several cities in the country
- Introduction of competition into the markets for private network equipment and networking equipment manufacturing

**2020**

- Encouragement of advancement to overseas markets for private network equipment and networking equipment manufacturing companies



The Table shows the targets that must be attained by 2005, 2010, and 2020. They correspond to the three stages in the development of a telecommunications industry in Vietnam for the purpose of the country's industrialization by 2020, which were discussed in Section 2.13.2 based on the evaluation of the current status of telecommunications industry and equipment manufacturing in Vietnam. In order to assess the changing demands in the global telecommunications equipment markets and adapt telecommunications equipment manufacturing in Vietnam to the market needs of the information and telecommunications industries in the 21st century, the initiative will be taken by private network elements rather than public network elements, and using software and operating technologies rather than hardware technology.

As explained in Section 2.14.1, the global demand for telecommunications equipment is rapidly shifting from public network elements to networking elements. Reflecting such a market movement, mergers and acquisitions among telecommunications equipment manufacturing, Internet, and computer software industries are also progressing on a global scale.

#### **2.14.5 Required Policies**

If the direction in which telecommunications equipment manufacturing in Vietnam must proceed is via the private networks, networking elements, software, and operating technologies, the policies required to attain this target are self-evident.

In addition to education on computer software and policies to promote R&D, the most important policies are to introduce personal computers, LANs, WANs, and the Internet, expedite the introduction of information technologies into companies, and accelerate systematization, given the current status of Vietnamese industries. Unless information technologies and systematization are developed by companies, domestic demand for networking elements cannot be expected, and the telecommunications equipment manufacturing industry in Vietnam has little incentive to develop. The government should discuss favorable treatment, including a preferential taxation system, for investment in these fields.

Please refer Table 2.14.5-1 for the required policies.

**Table 2.14.5-1 Subsidies for Information and Telecommunications Industries  
in Japan**

To develop information and telecommunications industries, Japan implemented subsidies based on the following two special laws during the period from 1975 to 1984.

(1) Temporary Law on the Development of Specified Machine and Information Industries

The Law specified businesses to be promoted and plans for development during a specified period, and (1) provided loans to develop industries, (2) implemented a special taxation system for advanced machines that combined hardware and software, and (3) exempted joint activities to promote the development plans from the application of the Anti-Monopoly Law.

(2) Law on Information Technology Promotion Agency Japan

The Law established the Information Technology Promotion Agency Japan (IPA), and provided subsidies for (1) the development and popularization of programs and (2) information processing business in and after 1970.

In addition, the Ministries in charge implemented various policies including subsidies for technological development, business promotion, and development of applications, and preferential financial treatment and special taxation systems.

Similar policies have also been adopted in the US and Europe to develop information and telecommunications industries.

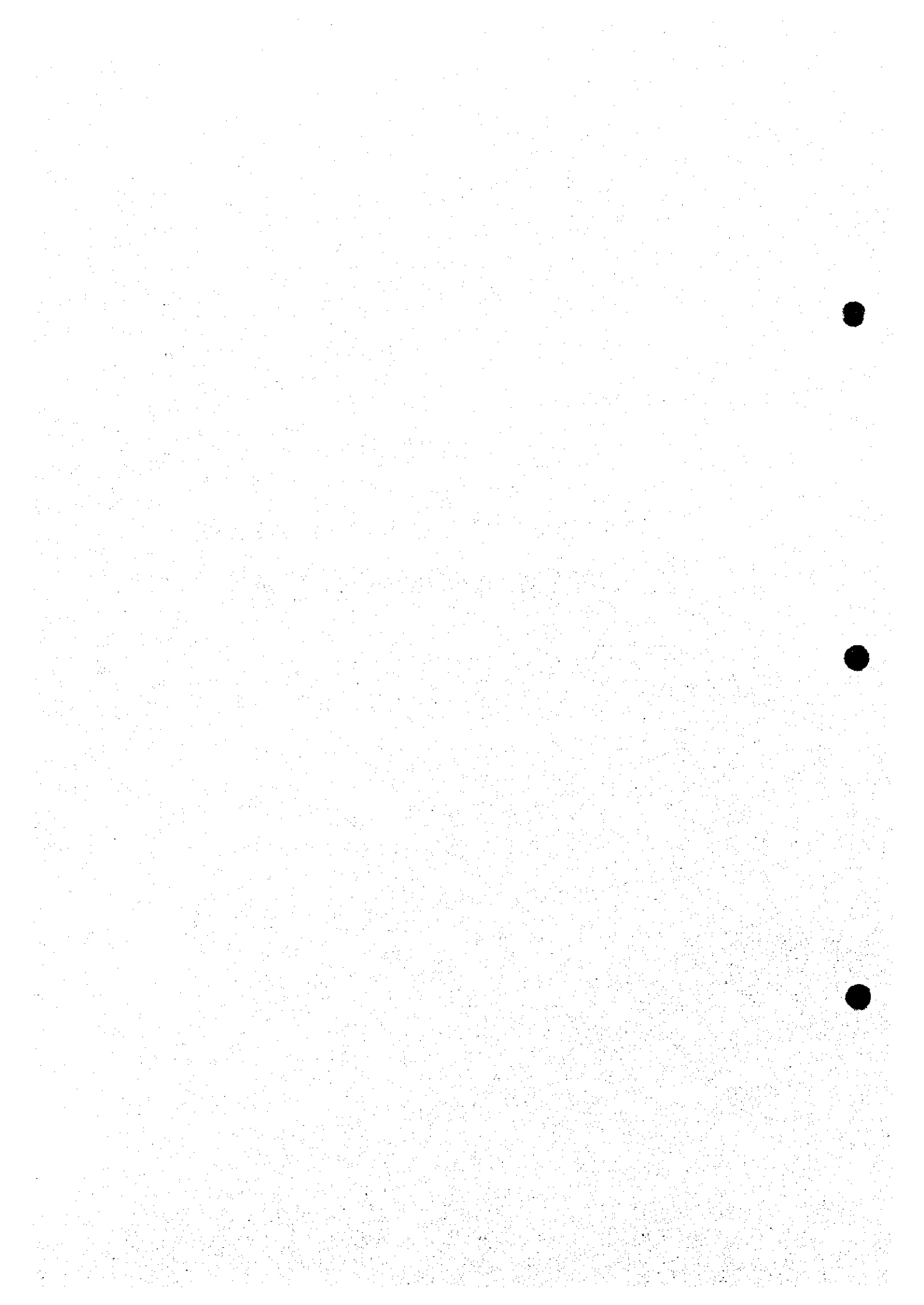
Source: 1995, RITE Japan



**CHAPTER 3**

**INSTITUTION, ORGANIZATION**

**AND MANAGEMENT PLAN**



## CHAPTER 3 INSTITUTION, ORGANIZATION AND MANAGEMENT PLAN

### 3.1 General

One of the recent subjects of the institutional reform in the world telecommunications sector has been the establishment of regulatory body and the operational organization or operation carrier which are independent from each other. In Vietnam, the Department General of Posts and Telecommunications of the Socialist Republic (DGPT) is a Ministry of the Vietnamese Government. Until July 1995, it possessed undivided authority over the areas of telecommunications regulation and operation. In July 1995, regulatory and operational roles were separated so that another body, the Vietnam Posts and Telecommunications Corporation (VNPT) was established and endowed with operational power.

Up to the first quarter of 1998, besides VNPT and its state-owned subsidiaries, two (2) companies have been granted licenses: VIETEL (Military Electronic and Telecommunications Company) and SAIGON POSTEL (Saigon Posts and Telecommunications Service Company). These three (3) operational corporations have entered into the free and fair competition for national fixed and mobiles service under the administration of DGPT. Thus, it can be said that Vietnam has joined an open competition in Telecommunications in conformity with the world-wide trend in the telecommunication sectors.

On the other hand, with the target of becoming an industrialized country towards 2020, Vietnamese Government set the following main objectives in the field of telecommunications;

- (1) To provide the telecommunications services throughout the country;
- (2) To improve the quality of the telecommunications services;
- (3) To satisfy the demand for the telecommunications services and to improve the efficiency of the telecommunications operation.

In order to meet the requirements made by the Vietnamese Government, some recommendations and reference are presented in this Study as an improvement plan for the institution, organization and management in the telecommunication sector in Vietnam according to the following basic concepts.

- (1) Organization structure has to be reviewed according to the new environment;
- (2) Organization Structure has to follow up the corporation and/or company strategic business policy;
- (3) Strategic business policy has to be carried out with effectiveness and better performance through the powerful institution and organization.

The business will be able to function when those following three (3) essential elements are mutually well complemented and harmonized:

- (1) Institution and organization,
- (2) Management Procedures, and
- (3) Human Resources.

### **3.2 Present Status and Problems on Telecommunications Operation and Management**

#### **3.2.1 Present Status of Regulatory Body and Operators**

##### **(1) Regulatory Body**

The regulatory body of the Socialist Republic of Vietnam is DGPT which is under control of Government Prime Minister. DGPT is headed by General Secretary with assistance of two (2) Deputy General Secretaries. As for the Headquarters bureau and departments of DGPT, there are 11 principal organizations such as "Administrative Bureau", "Science, Technology & Int'l Cooperation Department", "Posts & Telecom Policy Department", "Economic & Planning Department", "Personnel Department", "Posts & Telecom. Inspection Department", "Radio Frequency Department", etc.

DGPT was established in 1991 as an independent state ministry to be under Government Prime Minister since the past Ministry of Transportation and Communication had been restructured at that time. DGPT is the State Regulatory body to administrate the nation-wide postal services and telecommunication services as well in accordance with Vietnamese government laws and regulations. There are about 400 employees (most of them are highly educated) in DGPT including Postal and Telecommunications organizations.

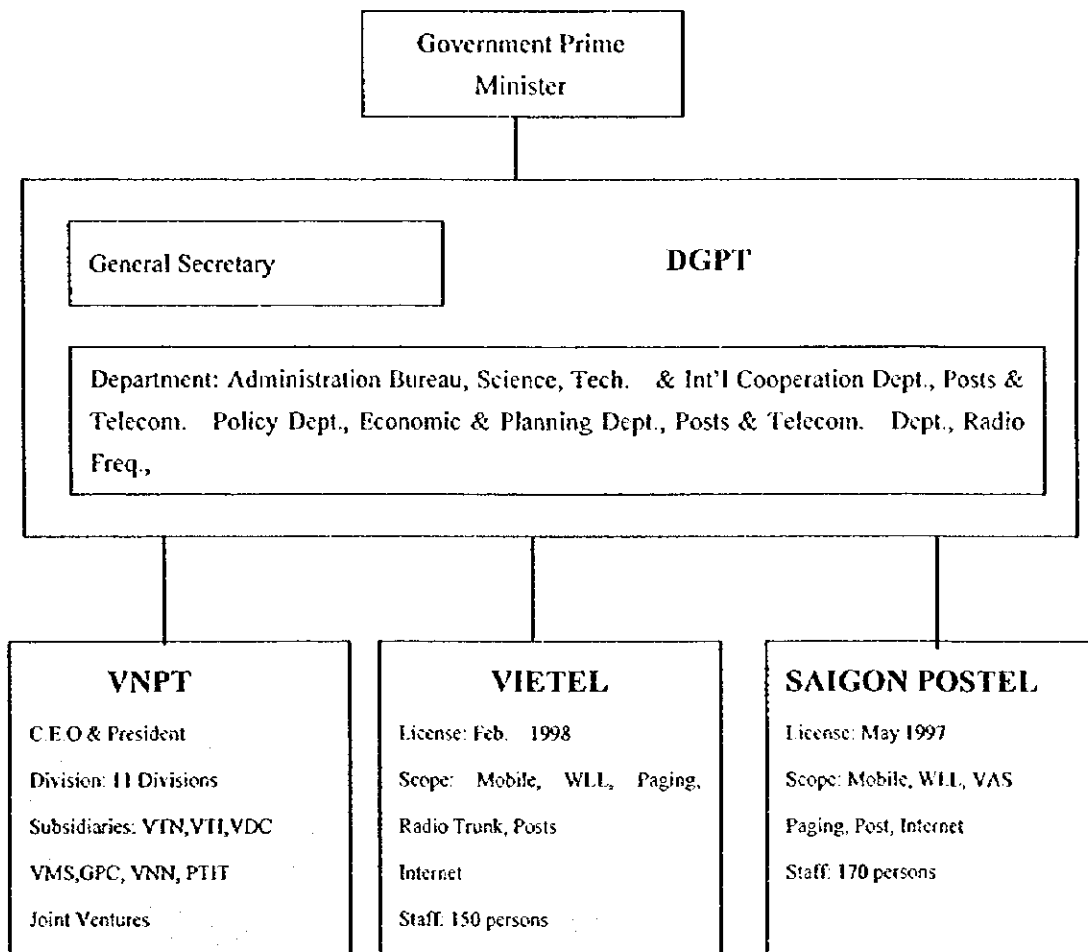
(2) Telecommunications Operators

Vietnam Posts and Telecommunications (VNPT) is organized as a State Entity in 1995 in accordance with Vietnamese laws and regulations. Besides VNPT, VIETEL and SAIGON POSTEL are allowed to deal with the national Posts and Telecommunications services.

The scopes of business of non-VNPT companies are regulated by DGPT, and the two companies have started their business by 1998.

In VNPT, there are about 80,000 employees, about 150 persons in VIETEL and about 170 persons in SAIGON POSTEL.

Relationships of the State Regulatory body and these 3 Operators are illustrated in Figure 3.2.1-1.



Source: DGPT

Figure 3.2.1-1 Present Organization of Telecommunications Sector

### 3.2.2 Current Organizations and Functions of Telecommunications Sector

#### (1) Vietnam Posts and Telecommunications (VNPT)

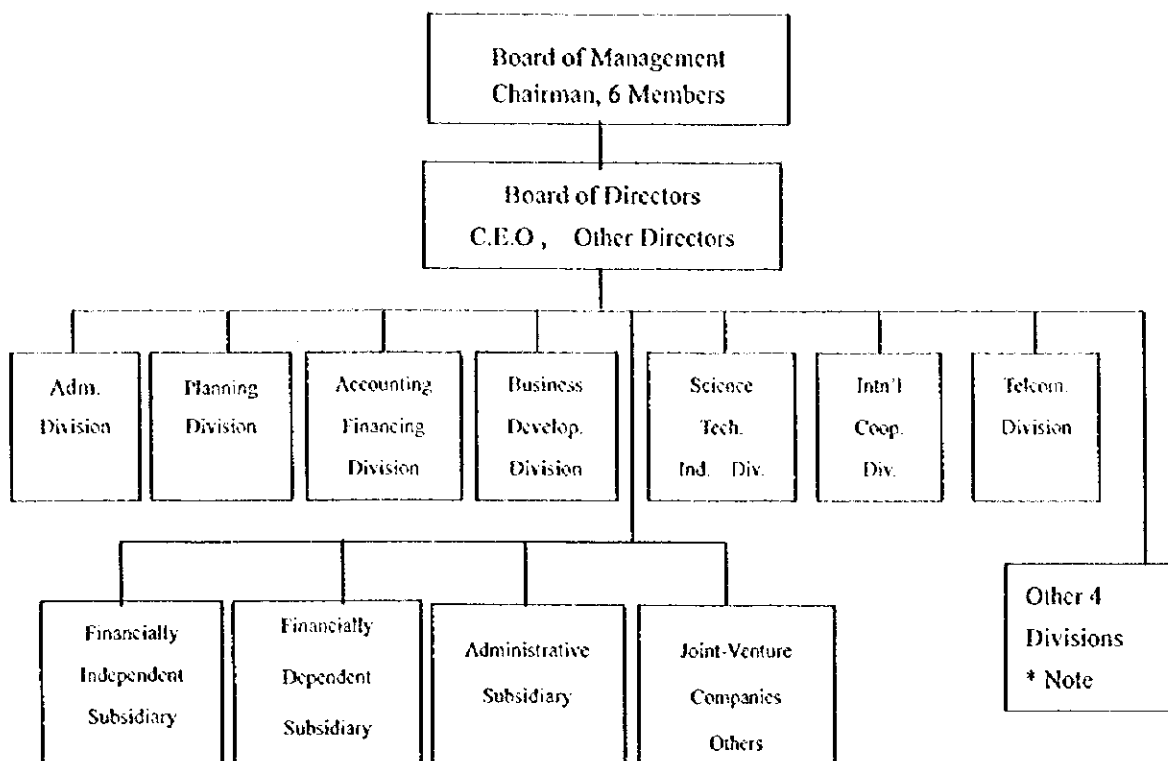
The Department General of Posts and Telecommunications (DGPT) is a state regulatory body which administrates and regulates all kinds of Posts and Telecommunications activities including spectrum management in Vietnam.

As for the operating enterprise, Vietnam Posts and Telecommunications (VNPT) is a state organization charged with the responsibility of providing, managing and operating all public telecommunications facilities and services in Vietnam. In addition, the enterprise is also responsible for manufacturing telecommunications equipment. VNPT have the following subsidiaries:

- Vietnam Telecom International (VTI) is responsible for the international telecommunication network.
- Vietnam Telecom National (VTN) is responsible for the national long distance telecommunication network.
- Vietnam Data Communication (VDC) is responsible for the establishment of data communication services. VDC has installed a national X.25 data network and is also responsible for providing Internet services.
- Vietnam Mobile Telecom Services (VMS) is responsible for providing mobile telecommunications in Vietnam.
- Vietnam Telecom Services (GPC) is responsible for providing nation-wide telecommunications of mobile, paging and cardphone.
- Provincial P&Ts are responsible for the provincial telecommunications network as well as the postal services. Each provincial P&T is again subdivided into P&T organizations by administrative units.

Besides VNPT and its subsidiaries, two (2) companies are granted licenses and in preparation for telecommunications services: VIETEL (Military Electronic and Telecommunications Company) and SAIGON POSTEL (Saigon Posts and Telecommunications Service Company).

Current organizations and functions of VNPT is shown in Figure 3.2.2-1.



\*Note: Other 4 divisions are "Postal Services & Newspaper Division", "Personnel, Organization & Labor Division", "Tariff & Marketing Division" and "Inspection Division"

Source: VNPT

Figure 3.2.2-1 Organization of VNPT

(2) Other 2 Operators

The first step in ending the monopoly in telecommunication services was taken back in 1996 as DGPT granted licenses for the operation of two joint stock companies, Vietel in Hanoi and SAIGON POSTEL in Ho Chi Minh City.

(a) Saigon Post and Telecommunications Services Joint Stock Corporation (SAIGON POSTEL)

SAIGON POSTEL is established on December 1995 as a joint-stock corporation with starting capital of US\$ 4.2 million from 11 State-own enterprises, including VNPT with a share of 18%. The scope of its activities is as follows:

- i) Manufacturing and assembling telecommunications, electronics, and information equipment, raw materials, spare parts.
- ii) Undertaking import, export, and trade of post and telecommunications products, equipment.
- iii) Designing, installing, maintaining subscribers' equipment systems and post and telecommunications network. Implementing post and telecommunications works.
- iv) Providing post and telecommunications services.

Its operational area is nationwide. In telecommunications services, SAIGON POSTEL will develop its services in areas allowed by the Government and planned by DGPT.

On May 1995, SAIGON POSTEL officially gained license for telecommunications services as follows:

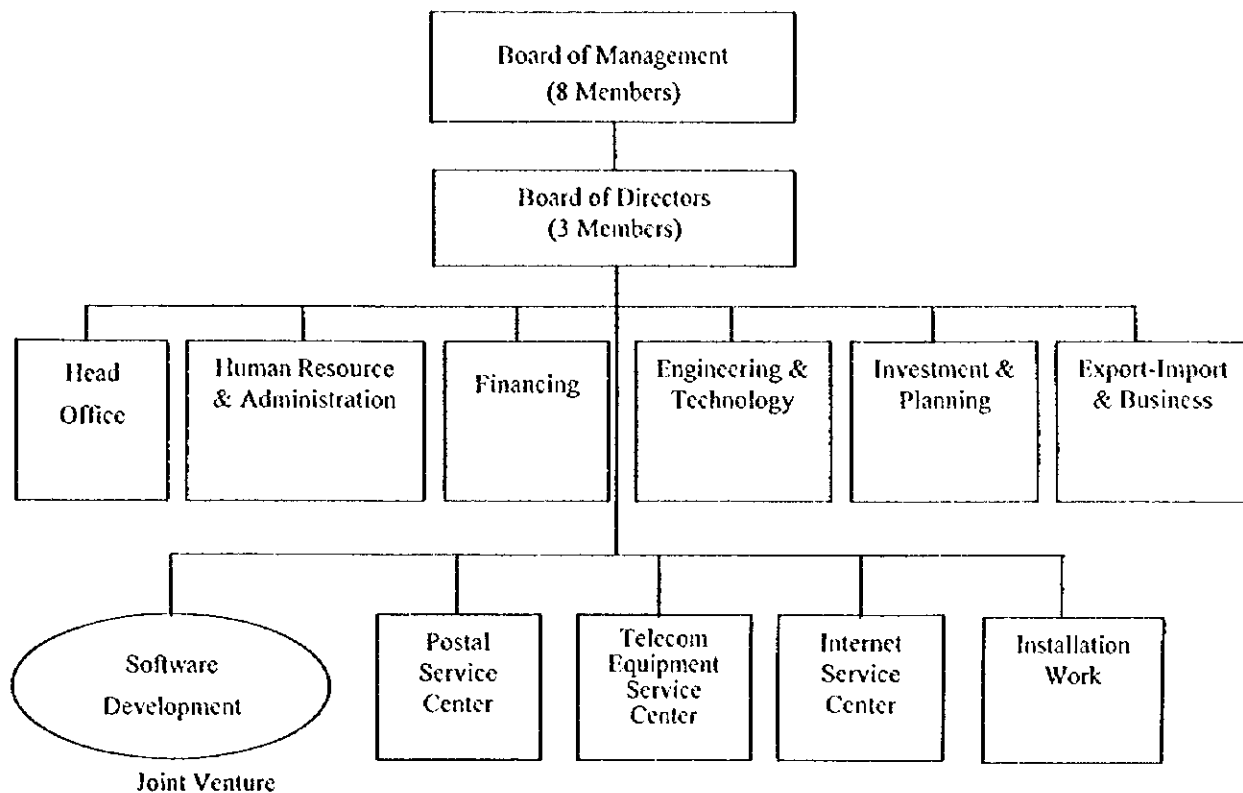
- mobile phone service
- fixed wireless telephone service
- paging service
- internet service provider
- other value-added services including fax, voice-mail, CATV.

Saigon Postel also gained license for postal services later on, and is applying for trunk radio trial service with an estimated 2,000 subscribers in Ho Chi Minh city.

At present, SAIGON POSTEL has activities in import and export, postal service, Internet service provider (4% share of Internet subscribers). SAIGON POSTEL has already set up its own post bureaux in Ho Chi Minh city and Vung Tau, the coastal resort south-east of Ho Chi Minh city, to provide postal services like express deliveries of mail and parcels. In 1998, its import turnover reached US\$ 10 million, and revenue US\$ 1.5 million.

With staffs of 170 persons, 60 persons are now concentrating on developing business as well as new services. Its organization structure is as follows:





Note: : Organization data show the situations as of February 1999

Source: SAIGON POSTEL.

**Figure 3.2.2-2 Organization of SAIGON POSTEL**

SAIGON POSTEL is calling for foreign investment and cooperation in the following fields:

- i) **Development of Telecommunications Network:** to develop 400,000 subscribers until 2005 with an estimated total investment of US\$400 million by applying CDMA technology at frequency of 800 MHz. The project has been listed by DGPT as one of major projects calling for foreign investment in period 1998~2000 under Business Cooperation Contract.
- ii) **Postal Service:** Package Forwarding Services, Express Postal Services, Money Remittance which will base on Business Cooperation Contract.
- iii) **Manufacturing telecommunications, information, electronics equipment:** based on Joint-Venture Contract.

(b) Vietnam Military Electronics-Telecoms Corporation (VIETEL)

VIETEL, formerly known both as Sigelco and as the Army Telecommunications Company (ATC), is a subsidiary of the Ministry of Defense and it is organized under the Peoples Army of Vietnam's Signal Corps. Initially established on June 1989 as a telecommunication construction company providing private network telecom service and equipment procurement to the Vietnamese army, the company changed its name to VIETEL in 1995 to restart as a new carrier when granted license for telecommunication services from Government. Like VNPT, VIETEL can enter services such as mobile, fixed WLL, paging, trunk radio, postal services, Internet service provider and some other value-added services.

Though established in 1995, VIETEL only obtained official licenses for telecommunications services in February 1998, due to lack of appropriate regulations and law for competition in telecommunications field. Since receiving its licenses, VIETEL has looking for business chances with foreign partners under Business Cooperation Contract. In the meanwhile, it is focusing on manufacturing and distributing equipment, and completing turn-key network installation projects. While its main customer is the Ministry of Defense, the company is not limited in whom it can serve. Other customers have included the Marines Telecom Company and the Vietnamese Railway.

VIETEL is calling for foreign investment and cooperation in telecommunication project, which is to develop about 300,000 lines until 2005 with an estimated total investment of US\$300 million by applying CDMA technology at frequency of 800 MHz. The project has been listed by DGPT as one of major projects calling for foreign investment in period 1998~2000 under Business Cooperation Contract.

As for other services, VIETEL will not provide Internet service at this stage though it has Internet service license. VIETEL is now preparing to launch its initial service "trunk radio" in Hanoi and neighboring towns. Its customers will be domestic and joint venture service companies such as taxi companies, etc.

VIETEL has staffed with 150 employees at the end of 1998, most of them are former military. And because it belongs to Ministry of Defense, all of its

business plans must be approved by the direct authorities before getting approved by DGPT.

VIETEL and NewTel, a joint venture set up a \$20 million manufacturing plant in July 1996. The plant is located 20 km from Hanoi in Ha Tay province, and will operate in association with the Ministry of Defense-owned MI factory. The plant manufactures electronics and telecom equipment, such as telephones, faxes, pagers, and later low-capacity PBXs.

### **3.3 Improvement Plan of Organization and Management**

#### **3.3.1 Fair Competition and Strengthening of DGPT Administration**

With the licensing for two (2) new Posts and Telecommunications operators and for the purpose of achieving the expansion program for 10 % penetration target (fixed telephone – POTS and mobile telephone) of the telecommunication development plan up to 2010, the organization and management of DGPT should be strengthened.

- (1) For strengthening the DGPT administrative organizations, such as planning, financial investment, accounting, frequency control regulation and inspection for the telecommunications regulations and administration, it is recommended to set up independent and proper organizations of telecommunications separated from the postal services in DGPT up to 2005.
- (2) It may be recommendable to organize a new Communication Policy Bureau and Telecommunications Bureau in DGPT. The functions of these new organization are described in the followings:

#### **Communication Policy Bureau**

Communication today is developing at an unprecedented rate toward a diversification and sophistication until recently almost beyond the imagination. Taking up the change of this new era, for example, a new organization named by "Communication Policy Bureau" must employ its expertise and resources to guide the future development of new telecommunication in the most promising directions in DGPT.

### Telecommunications Bureau

Building an advanced telecommunications society in the future in Vietnam which is vigorous and flourishing will require the realization of various measures to foster and promote the telecommunications business and stimulate radio applications. It is necessary to establish a new organization called, for example, as "Telecommunications Bureau". This bureau should be charged with actively pursuing effective means of achieving these goals. The new organization should be also responsible for regulating the telecommunications business in accordance with the applicable laws as well as for guiding and supervising the activities of telecommunications operators and overseeing radio communications.

### **3.3.2 Project Administration and Management**

#### **(1) Project Implementation**

The formulation of Telecommunications Development Plan can be considered as one of the projects on the mutual cooperation between Vietnam Government and foreign partner. To make the project be more effective and more fruitful, it is recommendable to set up a co-called "Project Steering Committee" and to adopt a plan-do-check -action method in order to supervise the overall project implementation by use of such tools of check sheet, diagrams, charts and a various kinds of graphs, as described in Volume I Chapter 12.

#### **(2) Role of DGPT for Information Society-IT and NII**

The DGPT will coordinate a national steering committee (for example, IT 2000 or NII: all are governmental national programs) through a secretariat to facilitate future efforts with respect to implementation of a national project IT or NII strategies. The steering committee must be chaired by DGPT and comprises representatives from MPI, DGPT, Universities, and private sectors firms in telecommunication and information technology.

### **3.3.3 Information and Management Organization**

The official statistic data and information which will be released and disclosed to the public and utilized among operators and related companies should be standardized and uniform so that the parties concerned can share the resources in common. In parallel with this, it will be recommendable to provide a standard documentation with parties

concerned in order to make the any project more effectively and more smoothly.

### **3.4 Organization and Management for New Information Industry Society**

#### **3.4.1 General**

When a new era of multimedia society will come, the current industries of communication, electronics/computers and broadcasting will be converged into an info-communication industry to further improve the industry performance and effectiveness.

In this connection, a majority of government of the countries in the world, restructuring of the government body itself has carried out.

To cope with this trend effectively and smoothly, some organizations and institutions of Vietnam may be rebuilt and be integrated into a combined organization of the government organization.

#### **3.4.2 Examples of Other Countries**

##### **(1) Korea**

In accordance with the administrative reform and restructuring policy of the Korean Government dated 23<sup>rd</sup> December 1994, the related organization and functions of four (4) governmental organizations - that is to say, the former Ministry of Posts and Communications, Trade, Ministry of Industry and Resource, Agency of Science and Technology and Agency of Public Information- were integrated into one ministry called as " Ministry of Information and Communications (MIC) of the Korean Government and the new Ministry MIC has made its debut since then.

With the unification and integration of the then info-communications policy to MIC which the telecommunications policy and administrations had been separated and dislocated in different organizations within the Government until that time, the Government of Korea has been making its utmost efforts to promote activities on the infrastructure development of Super Highway Info-Communications and fostering and developing Multi-Media society in Korea.

(2) China

(a) Previous Situation up to March 1998

Until the end of March 1998, it was said that China's telecommunication sector is still a sort of "domestic-demand-pull market" where the most important feature remains that demand exceeds supply and China's telecommunications growth has yet to reach the point where domestic telecommunications demand would shrink.

In April 1998, the government of China issued the decision to separate and integrate the existing organizations and management functions of posts and telecommunication into a new Ministry of Information Industry (MII), based upon the government policy of restructuring.

At that time, the telecommunications policy and administration were carried out by separated and various organizations of the China's Government, as shown in Figure 3.4.2-1.

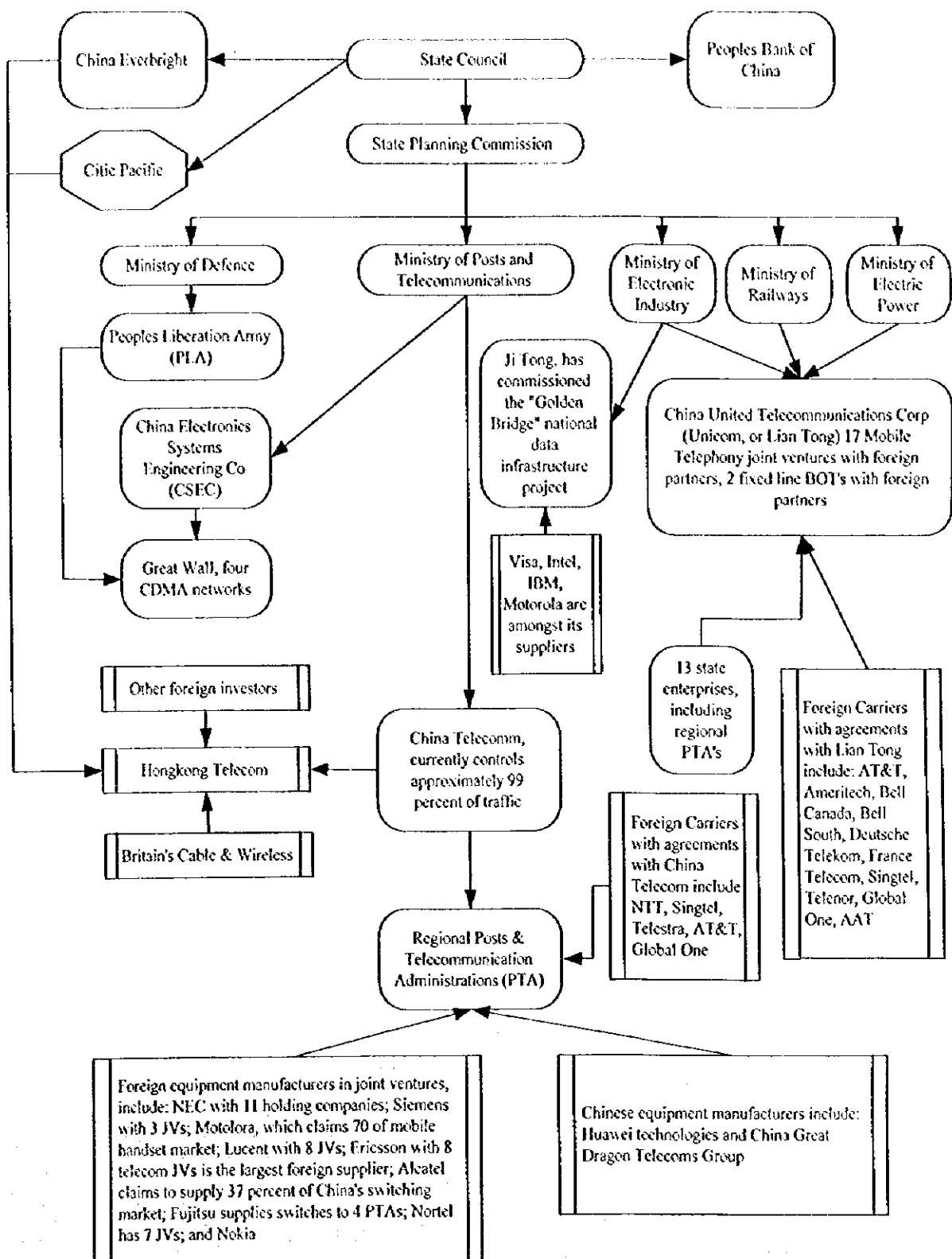


Figure 3.4.2-1 Interaction of Government Departments in China

(b) New Integrated and Unified Organization

The typical form in China for unification and integration of information for the coming of new era called as super-highway information and the society of multi-media can be shown in Fig. 3.4.2-1. Because, the restructuring of the government ministries in China was executed in April 1998 to cope with the innovation in new information industry.

In this case, three ministries have been integrated into new Ministry of Information Industry, as shown in the Figure.

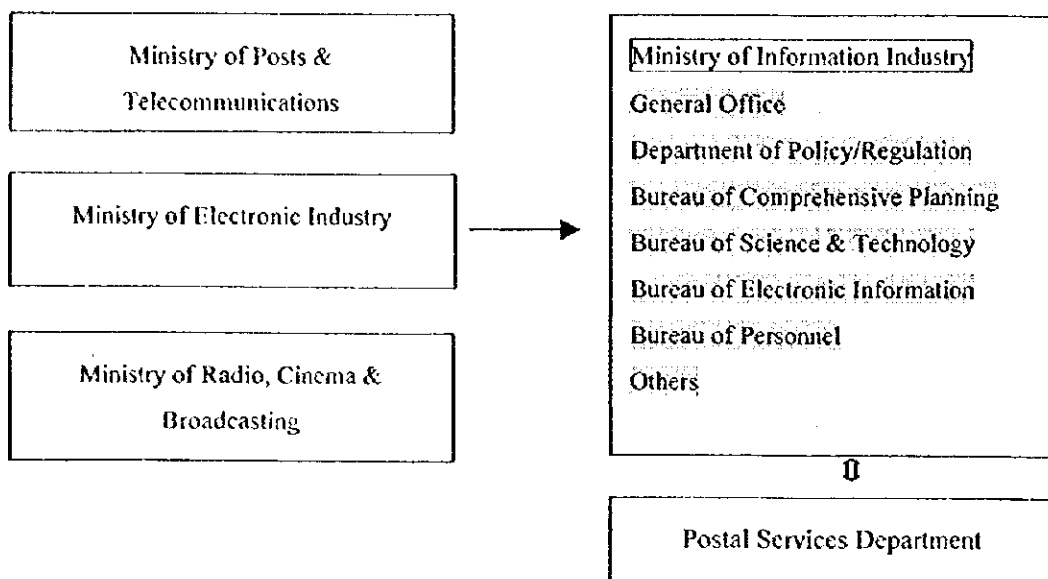
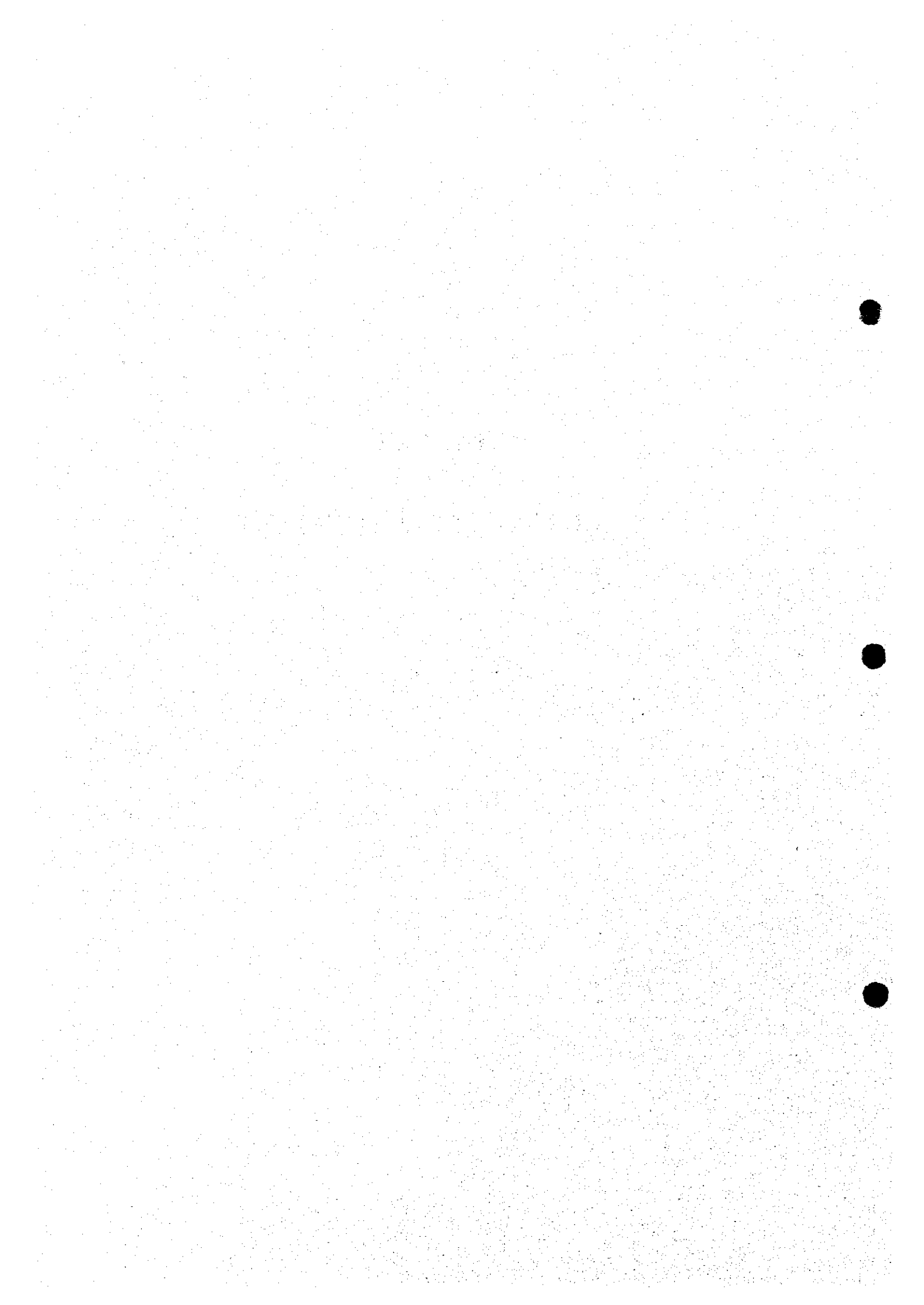


Figure 3.4.2-2 New Organization of MIC in China



## **CHAPTER 4**

# **SPECTRUM MANAGEMENT**



## CHAPTER 4 SPECTRUM MANAGEMENT

### 4.1 General

In proportional to the growth and expansion of economic and social activities, the radio frequency utilization is dramatically increasing in Vietnam.

On the other hand, the restructuring of telecommunications sector was executed in 1993 and spectrum management work was transferred to the DGPT from the Ministry of Transportation.

Before the restructuring of spectrum management, the major users were the governmental organizations such as military and police, and the spectrum management was carried out by only themselves.

In recent, illegal radio stations are increasing on the above conditions, therefore, the improvement and expansion of spectrum management functions/organization are indispensable matters in Vietnam.

In this report, the following terms regarding frequency distribution are used according to the definition by Radio Regulation.

**Table 4.1-1 Terms for Frequency Distribution**

| Frequency Distribution to | Terms                    | Remarks |
|---------------------------|--------------------------|---------|
| Services                  | Allocation (to allocate) |         |
| Areas or Countries        | Allotment (to allot)     |         |
| Stations                  | Assignment (to assign)   |         |

In addition, "frequency monitoring" expresses the same meaning as "spectrum monitoring" in this report.

### 4.2 Frequency Allocation and Reuse

#### 4.2.1 General

##### (1) International Frequency Allocation

The international frequency allocation has been defined in the **Table of Frequency Allocation of the Radio Regulations (RR)** as stipulated in the ITU Constitution.

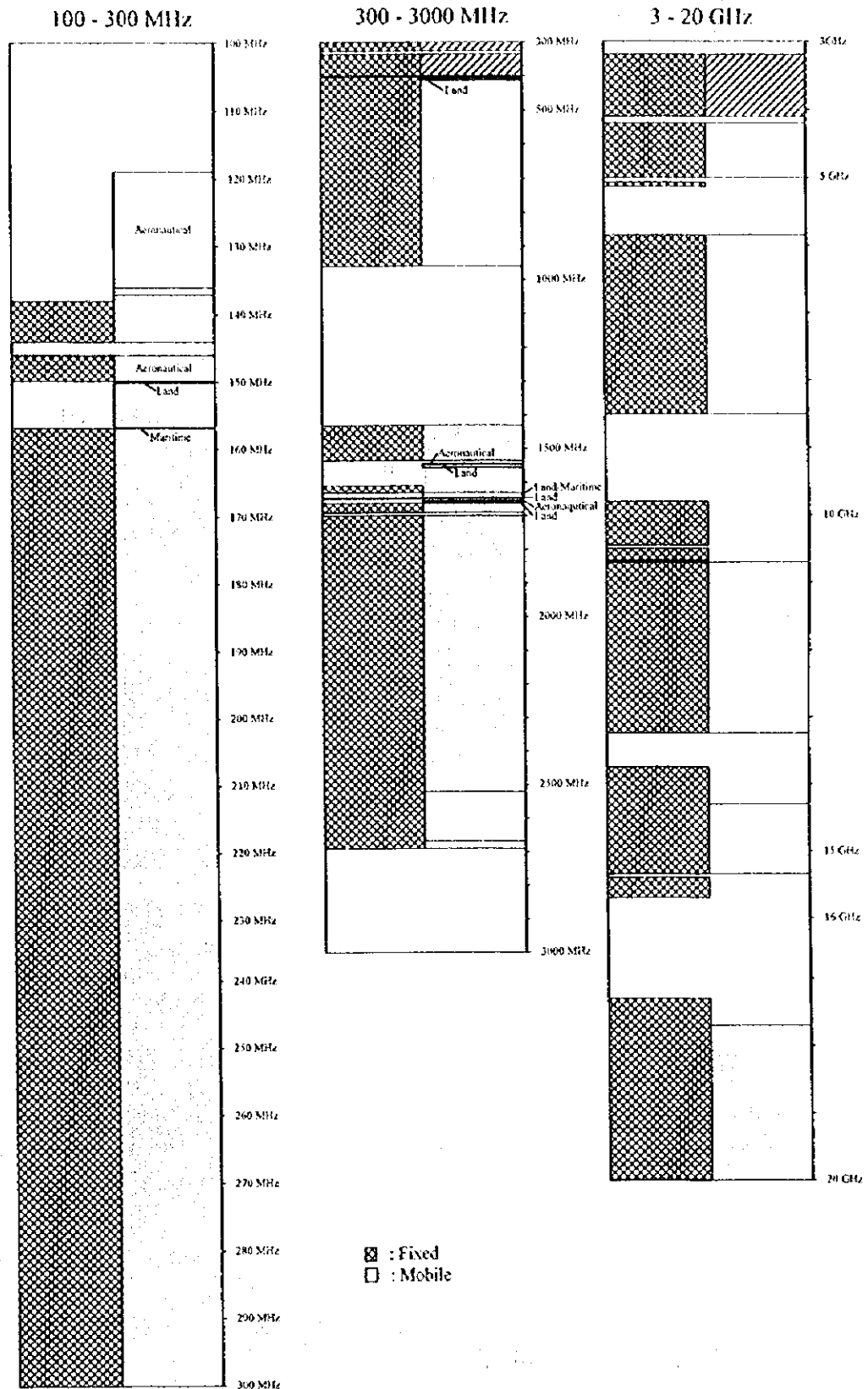
This Frequency Allocation Table is reviewed and revised as required in the **World Radiocommunication Conference (WRC)** of the ITU.

(2) Frequency Allocation in Vietnam

The DGPT has built and completed the strategy on dividing and using of radio frequencies, planning of channels and reuse of frequencies so as to ensure united State management and effectiveness of the national resource within the framework of the international frequency allocation decided by the ITU.

The radio frequencies have been allocated to the various services based on the Radio Regulations in Vietnam. The radio frequency allocation (100 MHz -- 30 GHz) in Vietnam, which belongs to Region 3, is shown in Figure 4.2.1-1 and the detailed allocation is attached in Appendix II-4-1.

In addition to the allocation to services, the assignment to stations is carried out application by application from users (refer to section 4.5 Frequency Licensing), but allotment, especially for HF/VHF to areas is executed according to no guidelines, therefore the guidelines for frequency allotment shall be established in Vietnam.



Source: DGPT

Figure 4.2.1-1 Radio Frequency Allocation in Vietnam

## 4.2.2 Specific Frequency Allocation

In addition, the specific radio frequency bands have been stipulated in detail in "DECISION No. 85/1998/QĐ-TTg OF APRIL 16, 1998 TO APPROVE THE PLAN ON VIETNAM'S RADIO FREQUENCY SPECTRUM FOR SERVICES" as shown in Table 4.2.2-1.

**Table 4.2.2-1 Specific Radio Frequency Allocation in Vietnam**

| Radio Frequency Bands   | Allocated System/Service  | Original Band  | Remarks                                      |
|---|---|--|--|
| 825 – 845 MHz (*1)<br>870 – 890 MHz                                 | Cell System<br>(priority to CDMA technology)                          | CDMA<br>824 – 849 MHz<br>869 – 894 MHz                                     | *1: Plan to modified as shown Figure 4.2.2-1 |
| 890 – 915 MHz (*1)<br>935 – 960 MHz                                 | GSM   | GSM<br>880 – 915 MHz<br>925 – 960 MHz                                      |  |
| 915 – 925 MHz<br>2400 – 2483.5 MHz                                  | High Capacity Radio Communication Systems (Spread Spectrum Technique) |  | For LAN                                      |
| 1610 – 1626.5 MHz<br>2483.5 – 2500 MHz                              | Elements-satellite of GMPCS   |  |  |
| 1710 – 1750 MHz<br>1805 – 1845 MHz                                  | DCS-1800<br>(Digital Communication System)                            | DCS1800<br>1710 – 1785 MHz<br>1805 – 1880 MHz                              |  |
| 1850 – 1880 MHz<br>1930 – 1960 MHz                                  | PCS (Personal Communication System) employing CDMA                    | PCS<br>1850 – 1910 MHz<br>1930 – 1990 MHz<br>(1910 – 1930 MHz: unlicensed) |  |
| 1880 – 1918.1 MHz   | Radio Telephony Access Systems employing TDMA/IDD                     |  |  |
| 2690 – 2700 MHz<br>10.68 – 10.7 GHz<br>15.35 GHz<br>182 – 185 GHz   | prohibited  |  |  |
| Reference (Other Cellular Mobile Telephone Systems)                 |   |  |  |
| PDC: 810 – 826 MHz, 940 – 956 MHz, 1477 – 1501 MHz, 1429 – 1453 MHz |   |  |  |
| PHS: 1895 – 1918.1 MHz  |   |  |  |
| IMT-2000: 1885 – 2025 MHz, 2110 – 2200 MHz                          |   |  |  |

Source: DGPT ("DECISION No. 85/1998/QĐ-TTg OF APRIL 16, 1998 TO APPROVE THE PLAN ON VIETNAM'S RADIO FREQUENCY SPECTRUM FOR SERVICES")

According to the specific radio frequency allocation in Vietnam mentioned in Table 4.2.2-1, the radio frequency bands are little bit different from the original radio frequency bands stipulated in each system. The relationship between original bands and allocations in Vietnam is indicated in Figure 4.2.2-1 and Figure 4.2.2-2.

In addition, the applicable frequency bands for the radio subscriber system are as shown in Figure 4.2.2-3 among the potential radio subscriber systems.

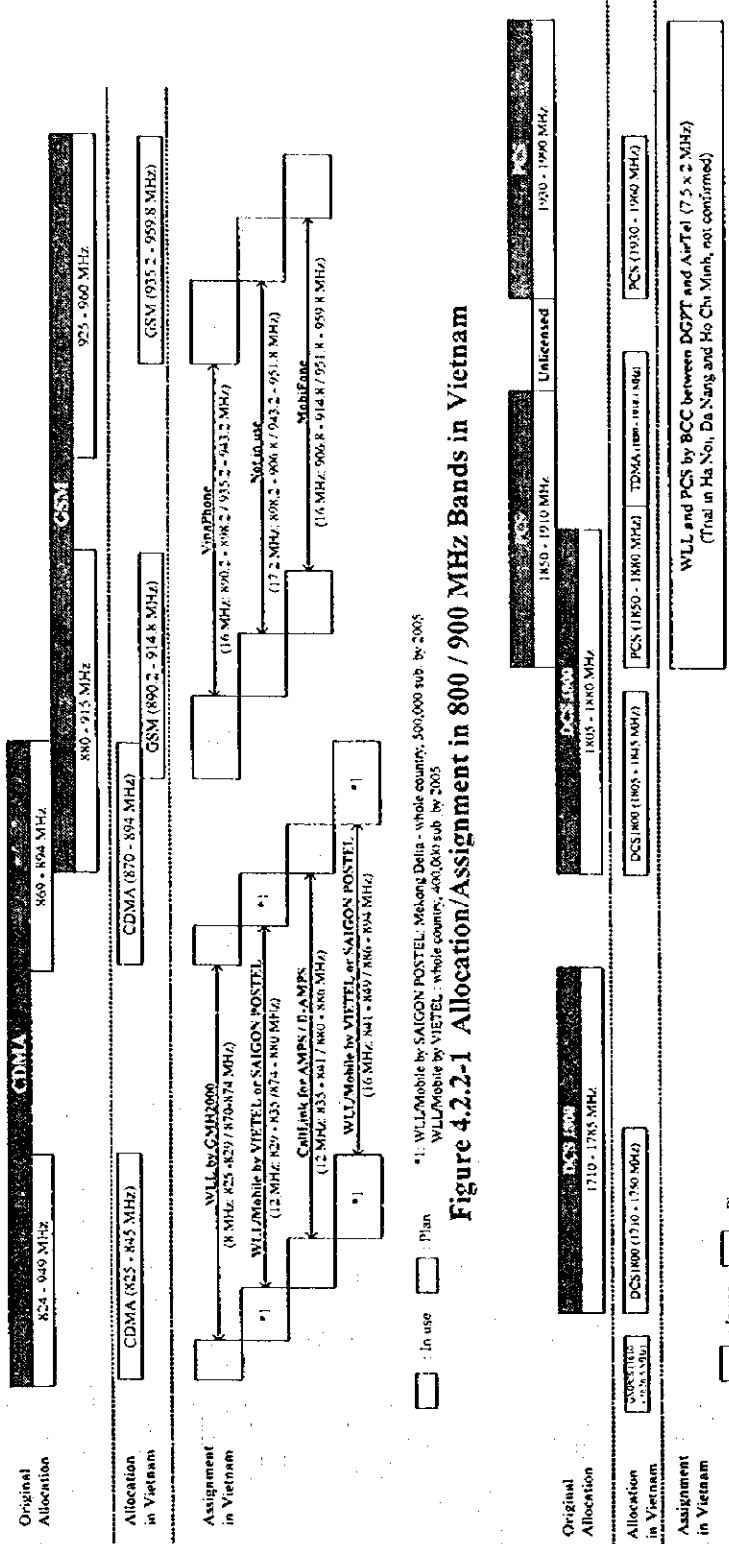


Figure 4.2.2-1 Allocation/Assignment in 800 / 900 MHz Bands in Vietnam

Figure 4.2.2-2 Allocation/Assignment in 1600 - 2000 MHz Bands in Vietnam

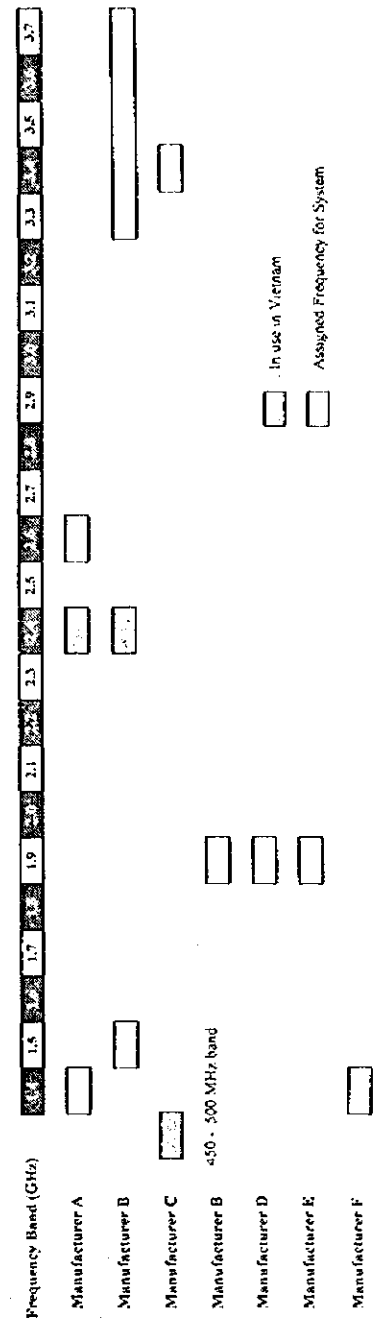


Figure 4.2.2-3 Applicable Frequency Bands for Radio Subscriber System

According to the allocation/assignment/allotment plan in Figure 4.2.2-1 and Figure 4.2.2-2, the frequency bands of 800, 900, 1600 - 2000 MHz are expected to be used densely, therefore, the assignment/allotment of these frequency bands should be carefully carried out to avoid interference.

In addition, the existing radio subscriber systems can be used in the frequency bands in Figure 4.2.2-3, so the systems to be applied should be selected considering the applicable frequency bands and the feature of systems.

### **4.2.3 Frequency Allocation and Reuse in Japan**

#### **(1) General**

In Japan the national frequency allocation has been also decided according to the Radio Regulations.

#### **(2) Frequency Allocation in Japan**

The technical standards and available frequency bands are formulated and established as MPT (Ministry of Posts and Telecommunications) ordinances by the following procedure:

##### **(a) Preparation of Draft Technical Standards and Available Frequency Bands**

The MPT prepares the draft report based on the advice from the Telecommunications Technology Council.

##### **(b) Submission to WTO**

The draft report is sent to international organizations such as WTO to seek opinion.

##### **(c) Reference to MPT Ordinance**

After that the technical standards and available frequency bands are referred to the Radio Regulatory Council by the MPT as a draft MPT ordinance regarding radio equipment rules.

##### **(d) Deliberation**

The Radio Regulatory Council asks opinions of interested parties, and deliberates on the draft.



(c) Establishment of MPT Ordinance

Based on the council's report the MPT establishes the MPT ordinance.

(3) Specific Radio Frequency Allocation in Japan

The specific radio frequencies are allocated to various services/systems in Japan.

The allocations to major services are shown in Table 4.2.3-1.

**Table 4.2.3-1 Specific Radio Frequency Allocation in Japan**

| Frequency Band  | Service/System  | Remarks  |
|---|---|--|
| Under preparation   | Subscriber Radio Access System<br>(Radio Subscriber System) |  |
| Using frequency bands of fixed/mobile telemetering systems and local satellite communications network | Disaster Prevention Administration                          | 88 % of 3,200 municipalities in Japan as of March 1998 |
| Using frequency band of local satellite communications network  | Regional satellite communication network                    | 32 prefectures, 3,200 earth stations as of March 1998  |
| C (6/4 GHz), Ku (14/12 GHz), Ka (36/33 GHz) bands   | Fixed-satellite communication services                      | 13 satellites for domestic services                    |
| 800 MHz and 1.5 GHz bands   | Portable and automobile telephone                           |  |
| 280 MHz band  | Radio paging  |  |
| 380 and 250 MHz bands   | Cordless telephone  |  |
| 1.9 GHz band  | PHS (Personal Handyphone System)                            |  |
| 400 MHz band  | Train public telephone                                      |  |
| 12/14 GHz bands   | Land mobile satellite data communication system             |  |
| 60, 400 and 800 MHz bands   | Anti-disaster administration radio                          |  |
| 400 MHz band  | Digital mobile communication system for public use          |  |
| 400 MHz band  | Taxi radio  |  |
| 800 MHz and 1.5 GHz bands   | MCA (Multi Channel Access, Trunked system))                 |  |
| 2.45, 19 GHz bands  | Radio LAN system  |  |
| 400 MHz band  | Radio security system                                       |  |
| 1.5 GHz band  | GPS (Global Positioning System)                             |  |

### 4.3 Spectrum Control

The spectrum control is being carried out by the DGPT, and Asia Pacific Telecommunity (APT) implemented technical and regulatory assistance in radio frequency spectrum to the DGPT in order to improve the work.

#### 4.3.1 Legal System

The DGPT is trying to build a complete legal document system regulating the management of frequency spectrum. The present situation of legal systems is as follows:

(1) Radio Law

As a principal law for the spectrum management in Vietnam, a radio law has not yet been completed.

(2) Radio Standard

It is required to build Vietnam's radio standard system to ensure that all of imported equipment is uniform and cause no interference, and to save radio frequencies.

At present, the radio standard system has not yet been completed.

(3) Radio Registration System

It is necessary to build the registration system and coordinate with international frequency to protect national frequency utilization.

The necessary measures for this matter have already been taken and completed to build them.

(4) Decisions concerned to Spectrum Control

To effectively execute the spectrum control in Vietnam, decisions regarding spectrum control have been established. (DECISION No.85/1998/QĐ-TTg OF APRIL 16, 1998 TO APPROVE THE PLAN ON VIETNAM'S RADIO FREQUENCY SPECTRUM FOR SERVICES)

### 4.3.2 Organization

#### (1) Organizations for Spectrum Management

There are several organizations concerned spectrum management. The major organizations concerned spectrum management are as follows:

##### (a) Radio Frequency Department (RFD)

The spectrum management is mainly carried out by the Radio Frequency Department (RFD) of the DGPT. Also, this organization includes several monitoring centers nationwide. The detailed roles and activities of the RFD are stated in this chapter.

##### (b) Radio Frequency Committee

The Radio Frequency Committee has the following roles and rights:

###### i) Formulation of strategic plan

The committee decides basic policy, strategy and technical standards for radio frequency allocation/assignment/allotment under the coordination between relevant organizations. The committee advises the Government and the Prime Minister on approval regarding frequency utilization.

###### ii) Coordination between governmental organizations / private users

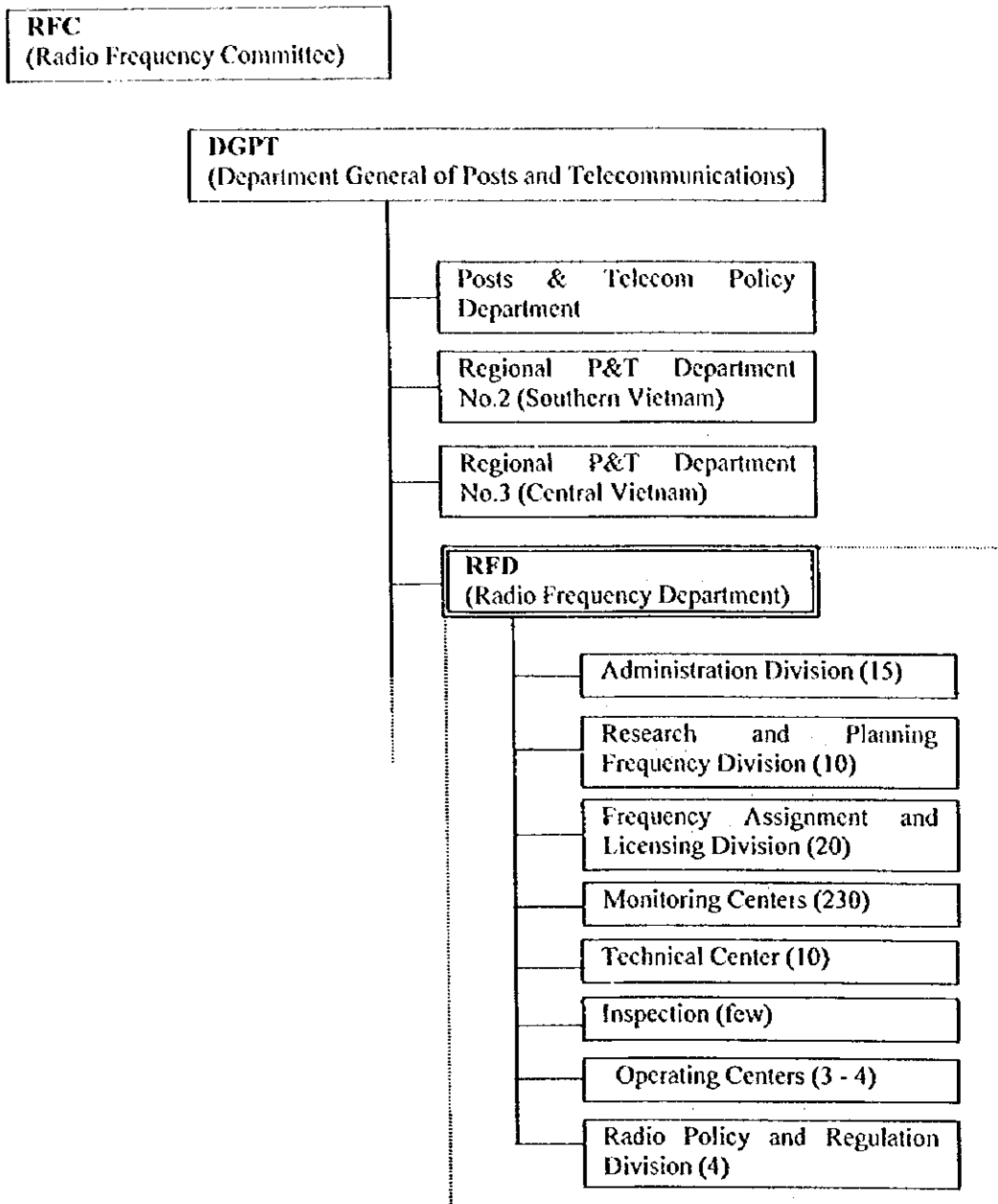
The committee carries out the coordination between the governmental organizations such as the department of defense, the department of the interior and/or private users in order to secure the utilization of radio frequency.

###### iii) Spectrum management and supervision

The committee carries out spectrum management and necessary treatment against violation regarding radio frequency utilization in cooperation with the department of defense, the department of the interior and the DGPT.

The chairman is the Secretary General of the DGPT and the other members are composed of executives of army and police.

The relevant organizations are shown in Figure 4.3.2-1.



Source: DGPT

**Figure 4.3.2-1 Organization of Spectrum Management**

**(2) Staff**

The total number of the RFD staff is approximately 280. The deployment of the staff is shown in Figure 4.3.2-1. In each monitoring center, about 30 staff are deployed and engaged in monitoring work. (Hanoi and Ho Chi Minh City: 35 – 40 staff each)

### 4.3.3 Spectrum Control Activities

The spectrum control activities stipulated in ITU-R SM 1048 have been carried out by the RFD in Vietnam as follows:

(1) Record Keeping

Database containing frequency assignment/allocation/allotment, information for individual license holders and technical data is maintained in personal computers of the RFD in Hanoi. At present, computers are of personal type, but will be upgraded to workstation in future.

(2) Frequency Assignment

Radio frequency assignment is carried out according to the ITU recommendations. For the purpose of interference calculation, the tool (ELLIP system for workstation) will be introduced in near future.

(3) Border Coordination

Coordination with bordering countries is carried out by the Vietnam government (DGPT) as follows:

(a) Coordination with China

The necessary data and information are under collecting.

(b) Coordination with Laos and Cambodia

The coordination with Laos and Cambodia will be implemented from 1999.

(4) Notification to the Radiocommunication Bureau (BR)

BR notification and creation of notification are carried out complied with the ITU recommendations/Radio Regulations.

(5) Licensing Fees and Fee Collection

The license fee is established by the DGPT, and fee collection is carried out by the RFD.

(6) Monitoring

The frequency monitoring is performed by the RFD as mentioned in the section 4.4.

- (7) **Equipment Approval Process**  
Equipment approval such as provision of authorization, certification, type acceptance and type approval is carried out under the preparation by the Posts & Telecom Policy Department.
- (8) **Reports Generation**  
Reports regarding license conditions and statistics data can be done by the RFD corresponding to necessity of reporting.
- (9) **User Interface**  
User interface of spectrum control activity is in Vietnamese, and software for computer applies windows. At present, user interface for license application is of type of paper.

#### 4.3.4 Spectrum Control in Japan

The spectrum control is carried out in Japan as follows:

- (1) **Legal Systems**  
The radio regulatory administration is implemented in Japan according to the Radio Law, the Law for Establishment of the Ministry of Posts and Telecommunications and other domestic laws.
- (a) **Telecommunication Legal System**  
The telecommunication legal system is composed of the following laws:
- Radio Law
  - Law for Establishment of the Ministry of Posts and Telecommunications
  - Wire Telecommunication Law
  - Cable Television Broadcast Law
  - Law Regulating Operations of Cable Sound Broadcasting Service
  - Organization Law of Communication and Broadcast Satellite
- (b) **Radio Legal System**  
Among the telecommunication legal systems, the radio legal system is composed of the following law, orders and ordinances:
- i) **Principal Law**
- Radio Law

ii) Cabinet Orders

- Order for Designation of the Scope of Operation by Radio Operator
- Order for designation of Transmission Interference Prevention Zones admitted under the Radio Law

iii) Principal Ministry's Ordinances

- Ordinance for Executing the Radio Law
- Ordinance for Licensing Radio Stations
- Ordinance for Radio Operators
- Ordinance for Operating Radio Stations
- Ordinance for Installing Radiocommunication Facilities
- Ordinance for Certifying the Conformity of Particular Radiocommunication Facilities to the Technical Standard
- Ordinance for Transmission Systems for VHF Broadcasting
- Ordinance for Transmission System for Television Broadcasting
- Ordinance for Giving Type-Approval to Radio Equipment
- Regulations for Preventing Radio Propagation Obstacles under the Radio Law
- Basic Standards for Establishing Radio Stations other than Broadcasting Stations
- Basic Standards for Establishing Broadcasting Stations
- Basic Standards for Establishing Particular Radio Stations
- Ordinance for Hearing of the Radio Regulatory Council
- Ordinance for Proceedings of the Radio Regulatory Council
- Ordinance for Standard Transmission Systems for Multiplex Character Television Broadcasting
- Ordinance for Standard Transmission Systems for Multiplex Voice Television Broadcasting

(c) Radio Law

The Radio Law aims "to promote public welfare by ensuring the just and efficient use of radio waves" as the basic law concerning radio regulation, and the Radio Law can be regarded as a working law.

The Radio Law provides that "any person who installs a radio station must obtain a license from the Ministry of Posts and Telecommunications" and adopts a license system so as to prohibit the free emission of radio waves.

**(d) Law for Establishment of the Ministry of Posts and Telecommunications**

The aim of this law is "to prescribe the scope and the competence of the Ministry of Posts and Telecommunications and prescribe the standards for the organization capable of efficiently performing administrative work" concerning radio regulation.

**(2) Organization**

The organizations for spectrum control in Japan are classified as follows:

**(a) Internal Bureaus of the MPT**

- Communications Policy Bureau
- Telecommunications Bureau
- Broadcast Administration Bureau

**(b) Region Office**

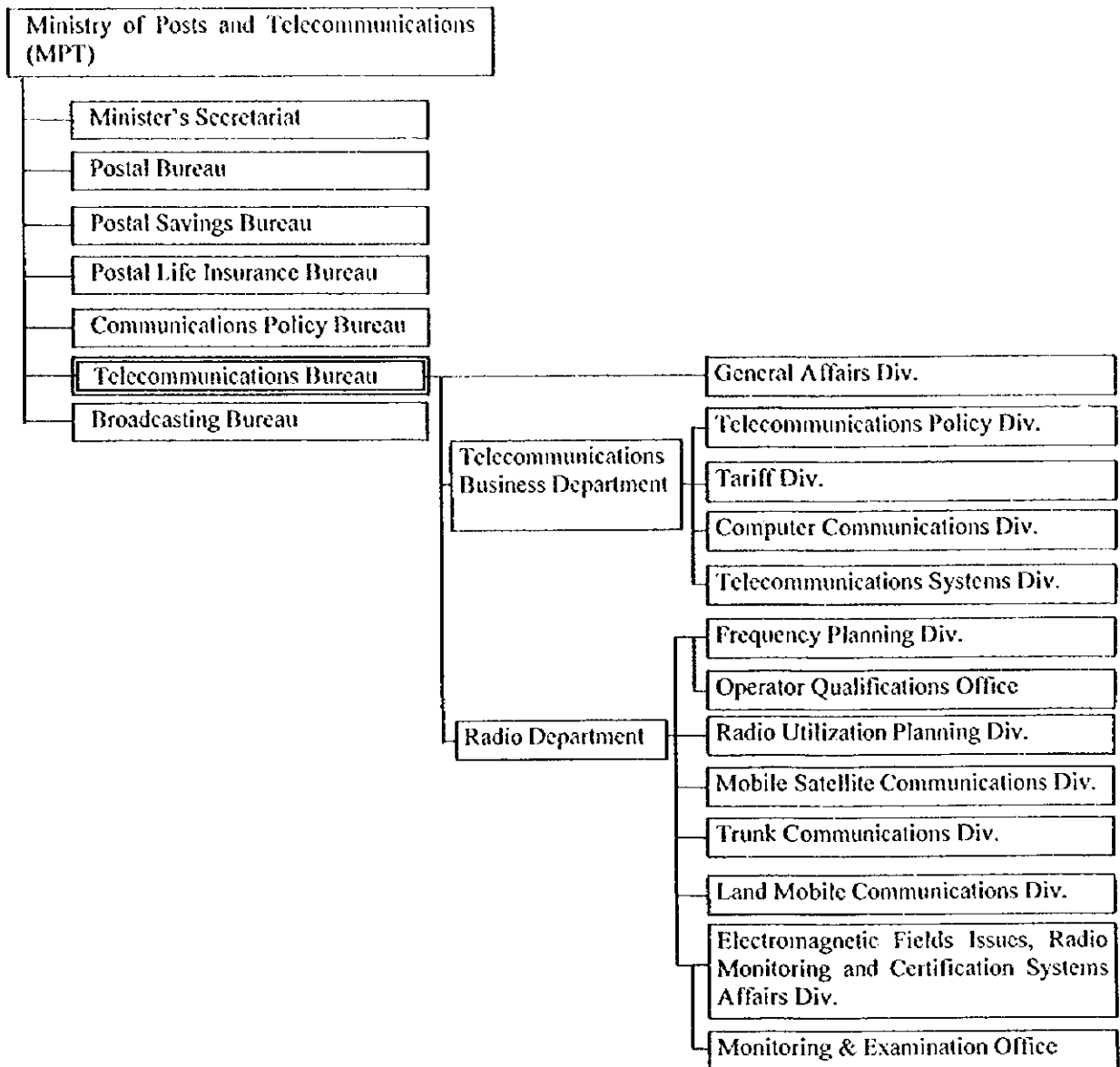
- 10 Regional Telecommunication Administrations Bureaus
- OKINAWA Office of Posts and Telecommunications

**(c) Subsidiary Organs**

- Training Institute of Telecommunications Administrations Technology Council
- Telecommunications Council
- Radio Regulatory Council
- Telecommunications Technology Council
- Telecommunications Council

About 300 personnel, including those of both the Ministry and Regional Bureaus of Telecommunications engage in the work of frequency monitoring. Each Regional Bureau of Telecommunications has a staff of about 10 (small-scale station) to 80 people (large-scale station) to perform monitoring operations.





**Figure 4.3.4-1 Organization of the Ministry of Posts and Telecommunications**

**(3) Spectrum Control Activities in Japan**

Spectrum control activities stipulated in ITU-R SM 1048 are also carried out in Japan. By expansion of radio frequency utilization in Japan, the administrative work on telecommunications is increasing enormously in volume. Therefore, the MPT built a computer system (PARTNER: Productive and Reliable Telecommunications Network for Radio Stations) in order to prepare databases of all the licensed radio stations and support quick and efficient execution of radio administrative work in April 1996.

The functions of the PARTNER are shown in Table 4.3.4-1.

**Table 4.3.4-1 Functions of PARTNER**

| Function                                  | Outline   | Remarks |
|---|---|---------|
| Radio Station Application Processing      | The services concerned with permission and authorization of radio stations by the use of databases of all the radio stations (acceptance of applications, examination, preparation of licenses, etc.) |         |
| Radio Monitoring Support                  | Provision of information necessary for quick investigation of the sources of interference   |         |
| Collection of Spectrum User Fees          | The services concerned with collection of spectrum user fees  |         |
| Supervision of Radio Stations             | History management of radio station inspections, planning of inspections, etc.  |         |
| Spectrum Management                       | Preparation of frequency usage planning, examination of frequency assignments, preparation of frequency tables, preparation of data on international procedures, etc.                                 |         |
| Prevention of Anomalous Radio Propagation | Designation of areas for prevention of anomalous radio propagation, and judgement of anomalies.   |         |
| Technical Computation                     | Investigations of interference, propagation routes, etc.  |         |
| Radio Station Statistics                  | Preparation of statistics on radio stations, etc.   |         |

The system and network configuration of the PARTNER is shown in Figure 4.3.4-1.

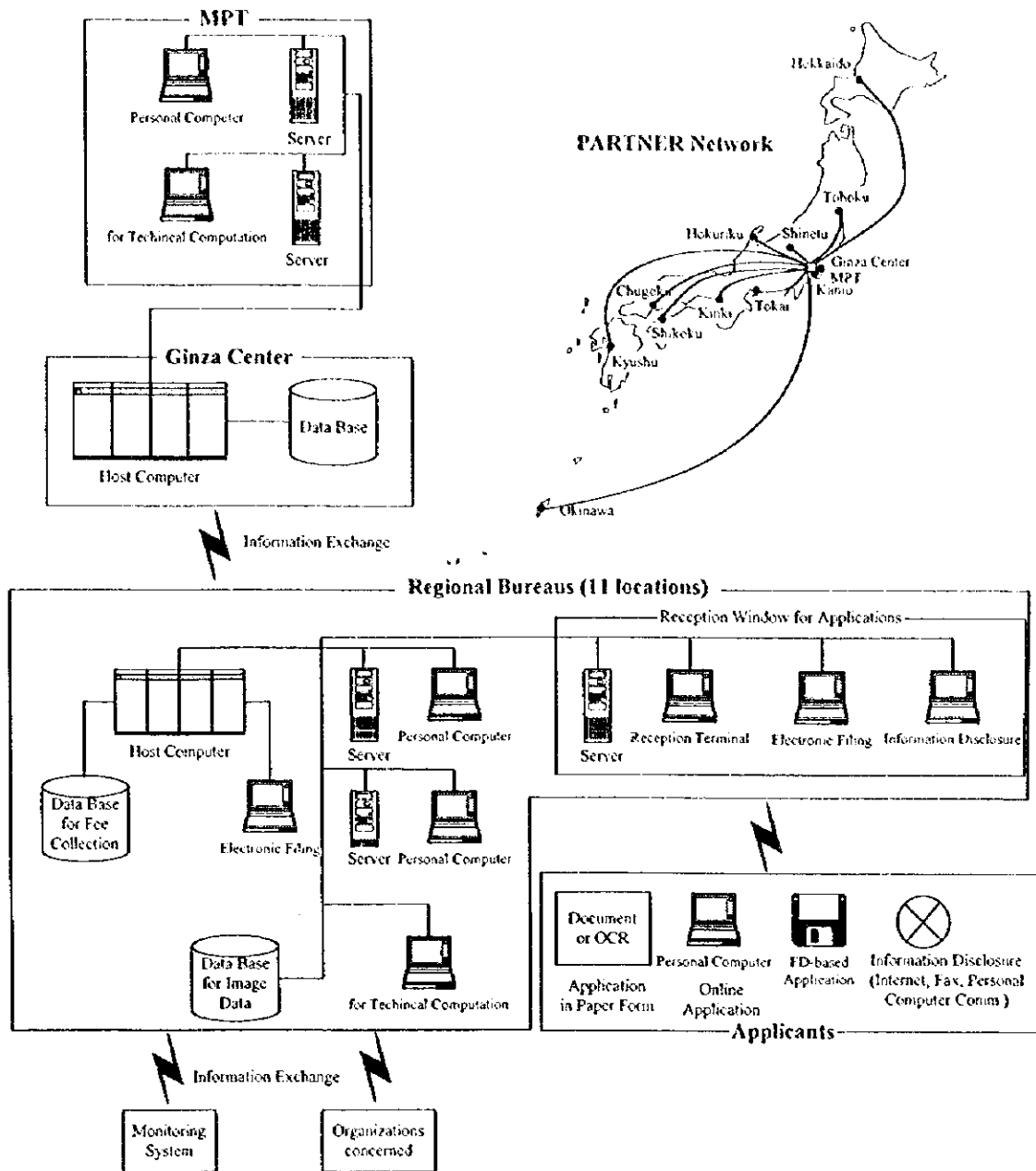


Figure 4.3.4-1 PARTNER System and Network Configuration

## 4.4 Frequency Monitoring System

### 4.4.1 General

Frequency monitoring is carried out by the RFD, however the facilities and equipment for frequency monitoring is insufficient. The DGPT has a plan to improve frequency-monitoring system for inspecting and controlling of radio frequencies. By implementation of this plan, the following systems/centers will be finally introduced:

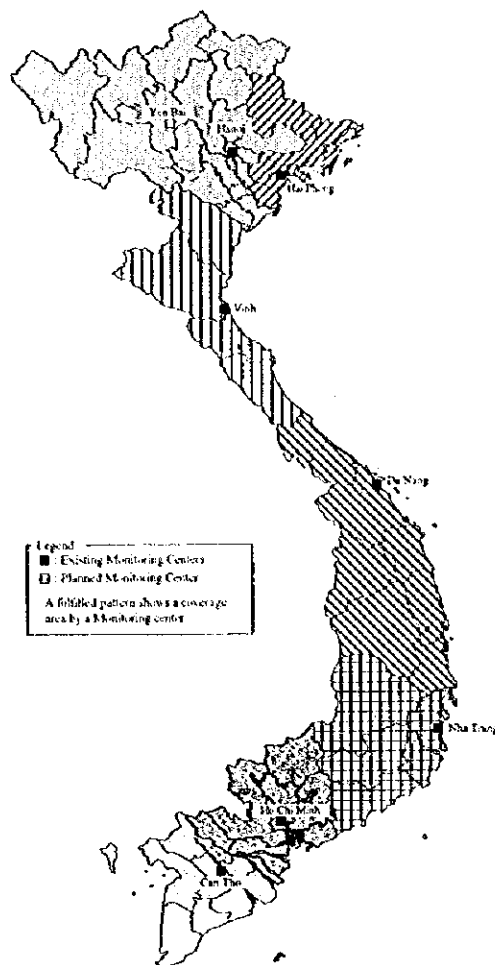
- (1) Eight (8) monitoring centers
- (2) 24 fixed control stations
- (3) 16 travelling vehicles

Also, the DGPT has the following targets concerning improvement of frequency monitoring system:

- (1) To control 100 % of key areas by the year 2000 to keep security in radio frequency using
- (2) To regularly control at least over 50 % of the territory to keep security in radio frequency using

### 4.4.2 Frequency Monitoring Area

At present, there are seven (7) monitoring centers (Hanoi, Ho Chi Minh City, Hai Phong, Da Nang, Vinh, Nha Trang, Can Tho) for frequency monitoring in Vietnam. In the near future, one (1) monitoring center will be added in Yen Bai. The frequency monitoring areas are currently divided into seven (7) areas controlling center by controlling center, but by the introduction of a center in Yen Bai, the monitoring area will be re-structured and divided into eight (8) areas in the future.



**Figure 4.4.2-1 Frequency Monitoring Systems in Vietnam**

#### **4.4.3 Facilities and Equipment for Frequency Monitoring**

In recent, the facilities and equipment for frequency monitoring are deployed, but the quantity of these facilities and equipment are still insufficient considering the drastic expansion of radio frequency utilization in Vietnam.

The facilities and equipment for frequency monitoring are as follows:

(1) **Monitoring centers**

In seven (7) monitoring centers, the following monitoring systems are deployed. In Hai Phong, only a few kinds of facilities and equipment were deployed and can not function sufficiently as a monitoring center.

**Table 4.4.3-1 Type and Specifications of Monitoring Systems**

| Equipment                   | Frequency Range                      | Manufacturer                         | Remarks |
|-----------------------------|--------------------------------------|--------------------------------------|---------|
| VHF / UHF Receiver          | 30 KHz - 2 GHz                       | ICOM                                 |         |
| Spectrum Analyser           | 9 KHz - 26.5 GHz                     | Hewlett Packard<br>Wandel & Gottmann |         |
| Telecommunications Test Set | 10 MHz - 1 GHz                       | Hewlett Packard<br>Marconi           |         |
| Direction Finding System    | 20 MHz - 2.7 GHz<br>9 KHz - 2.7 GHz  | Thomson<br>Rohde & Schwarz           |         |
| Frequency Counter           | 10 MHz - 26.5 GHz<br>10 MHz - 40 GHz | Hewlett Packard<br>Marconi           |         |
| Hand Direction Finding      | 9 kHz - 1 GHz                        | Taiyo-Musen                          |         |

(2) Semi-Fixed Equipment

At present, four (4) semi-fixed monitoring systems are used in Vietnam. The semi-fixed monitoring system is composed of VHF/UHF receiver, Direction finding system and Frequency counter, and would be tentatively used as same as fixed monitoring center in a short/medium term.

(3) Mobile Monitoring Vehicle

There are two (2) mobile monitoring vehicles, including VHF/UHF receivers and Direction finding systems, in Vietnam. The vehicles would be used as mobile monitoring systems at a location, where the monitoring work is required.

The monitoring systems mentioned above are deployed in Vietnam as shown in Table 4.4.3-2.

**Table 4.4.3-2 Deployment of Monitoring Systems**

| Type / Equipment         | Ha Noi     | Hai Phong | Vinh    | Da Nang | Nha Trang | Ho Chi Minh | Can Tho | Yen Bai |
|--------------------------|------------|-----------|---------|---------|-----------|-------------|---------|---------|
| Monitoring Center        | ○          | ○         | ○       | ○       | ○         | ○           | ○       | Planned |
| Semi-fixed Equipment     |            |           | ○       | ○       | ○         |             | ○       |         |
| Mobile Monitoring        | ○          |           |         |         |           | ○           |         |         |
| VHF/UHF Receiver         | ○          |           | ○       | ○       | ○         | ○           | ○       |         |
| Spectrum Analyzer        | ○          | ○         | ○       | ○       | ○         | ○           | ○       |         |
| Telecomm. Test Set       | ○          |           | ○       | ○       | ○         | ○           | ○       |         |
| Direction Finding System | ○          |           | ○       | ○       | ○         | ○           | ○       |         |
| Frequency Counter        | ○          | ○         | ○       | ○       | ○         | ○           | ○       |         |
| Hand Direction Finding   | ○          |           | ○       | ○       | ○         | ○           | ○       |         |
| Other Equipment          | GPS        |           |         |         |           |             |         |         |
| Computer                 | ○<br>WS/PC | ○<br>PC   | ○<br>PC | ○<br>PC | ○<br>PC   | ○<br>PC     | ○<br>PC |         |

Note: ○ : Deployed

Source: DGPT

#### 4.4.4 Frequency Monitoring System in Japan

##### (1) General

The frequency monitoring organization consists of Monitoring Control Room at the Radio Department of Telecommunications Bureau of the MPT, ten (10) Regional Bureaus of Telecommunications throughout the country and Okinawa Postal Service Office.

In addition, the International Monitoring Department of Kanto Bureau of Telecommunications is solely responsible for international monitoring.

About 300 personnel including those of both Ministry and Regional Bureaus of Telecommunications engage in the work of radio monitoring. Each Regional Bureaus of Telecommunications has a staff of about 10 (small-scale station) to 80 people (large-scale station) to perform respective radio monitoring operations.

##### (2) Frequency Monitoring Area

The frequency monitoring is implemented throughout the country by using the monitoring systems named "DEURAS (Detect Unlicensed Radio Stations)" as shown in Figure 4.4.4-1.



##### [Center Station]

Center stations, which is located in the regional bureaus of Telecommunications, are used for DEURAS-D and DEURAS-R, and connected with sensor stations through relay stations.

##### [Local Center Station]

Local center stations are located in three (3) regional bureaus of telecommunications and work as a station for DEURAS-H.

Figure 4.4.4-1 Center Stations

[Relay Station]

High-speed digital private lines connects the center station and sensor stations through Relay stations.

[Sensor Station]

Sensor stations installed in every area of Japan and mounted in motor vehicles are remotely operated from central stations established in the Regional Bureaus of Telecommunications. Sensor stations receive and identifies the positions of unlicensed radio stations by detecting the directions of the sources of radio wave emission.

(3) Facilities and Equipment for Frequency Monitoring

The MPT reorganized facilities in order to reinforce radio monitoring as a revenue source of spectrum user fees. A radio monitoring system (DEURAS) is the key system in Japan.

The DEURAS will be introduced in the major cities with 50,000 population or more, and will be able to cover about 74 % in term of population in year 1999 – 2000.

Table 4.4.4-1 DEURAS System

| Type  | Function                   | Remarks   |
|---|----------------------------|---|
| Remote controlled direction finder system (DEURAS-D)  | DEURAS Direction Finder    | Installed in local medium-size cities                                   |
| Remote controlled receiving system (DEURAS-R)         | DEURAS Receiver            | Installed in prefectural governments (total 47 cities) and major cities |
| Unlicensed radio station detecting vehicle (DEURAS-M) | DEURAS Mobile              | Stationed in Regional Bureaus of Telecommunications                     |
| High frequency monitoring facility (DEURAS-H)         | DEURAS HF Direction Finder | Installed Kanto, Kyusyu and Okinawa                                     |



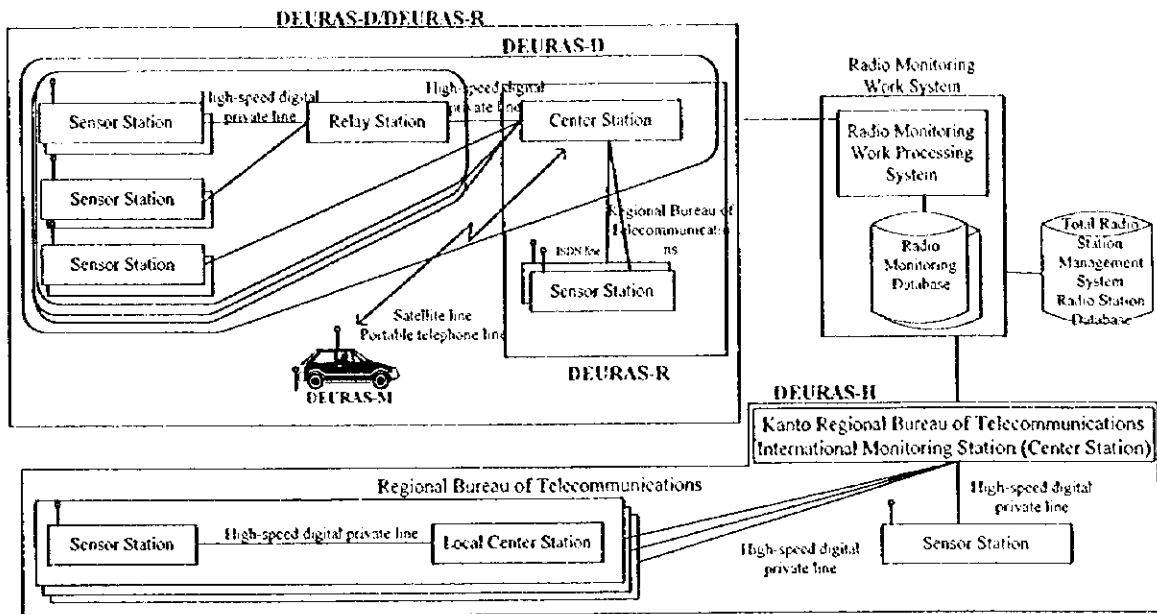


Figure 4.4.4-2 DEURAS System Configuration

Other than the DEURAS system, the following types of monitoring equipment are being utilized in Japan:

- (a) Electric Field Strength Meters
- (b) Frequency Counters
- (c) Radio Monitoring Apparatus such as spectrum analyzer
- (d) Tone Signal Identification Apparatus
- (e) ATIS Signal Decoder
- (f) Automatic Spectrum Recorder
- (g) Wattmeters
- (h) Receivers
- (i) Radio Goniometers
- (j) Signal Generators
- (k) Radio Apparatus for Internal Communications
- (l) Radio Apparatus for Control of Radio Stations
- (m) Others

## 4.5 Frequency Licensing

### 4.5.1 Procedure for Frequency Licensing

#### (1) Classification of Applicants

Frequency licensing procedures are classified into two (2) types, i.e., Class-1: A user is required to obtain an operator license, Class-2: A user is required to obtain only frequency license.

##### (a) Class-1 Applicants

The following applicants are categorized as Class-1 applicants, who must obtain an operation license:

- Applicants, who provide public communications services.
- Applicants, who operate/use private network nationwide (more than two (2) zones), which has transmit power with more than 5 W, uses a private paging system, or uses new technology.

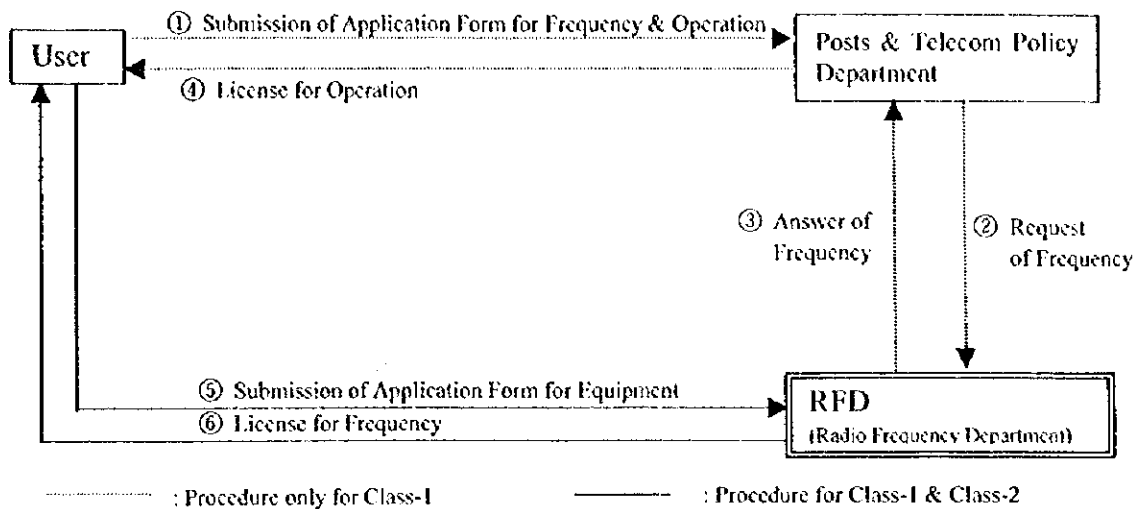
##### (b) Class-2 Applicants

The following applicants are considered as Class-2:

- Ship station, aircraft station, microwave station
- Stations for broadcasting service, maritime service, aeronautical service or amateur

#### (2) Licensing Procedure

The radio frequencies are assigned to the users by the RFD in Ha Noi according to the following procedure:



**Figure 4.5.1-1 Procedure of Frequency Licensing**

[Procedure to be applied to only Class-1]

① Submission of Application Form for Frequency and Operation

A user submits an Application Form to the Posts & Telecom Policy Department in the DGPT regarding radio frequency.

② Request of Frequency

The Posts & Telecom Policy Department requests radio frequency to the RFD.

③ Answer of Frequency

The RFD studies and decides the radio frequency to be assigned, and answers it to the Posts & Telecom Policy Department.

④ License of Operation

Based on the assignment of radio frequency, the Posts & Telecom Policy Department grants a license for operation, if necessary. (Most cases don't require a license for operation.)

[Procedure to be applied to Class-1 & Class-2]

⑤ Submission of Application Form for Equipment

After obtained the license for operation, the user submits an Application Form for equipment including system parameters of equipment.

⑥ License for Frequency

Based on the Application Form submitted by the user, the RFD studies and judge the applicability of the system, if the system is acceptable, the RFD grants a license to the user for frequency.

Samples of license and application form are attached in Appendix II-4-2 to II-4-4.

#### 4.5.2 License Fee and Spectrum Utilization Fee

The fees regarding radio frequency utilization consist of the following two (2) fees; License fee and Spectrum utilization fee.

##### (1) License Fee

License fees are decided category by category, and the maximum expiration of license is two (2) years. In the case of licensing to joint venture with foreign company, the fee is proportional to the investment between domestic and foreign, and paid in VDN and US\$.

**Table 4.5.2-1 License Fee**

| Category                              |   | Domestic<br>(VDN 1,000)                                    | Foreign<br>(US\$)  | Remarks |  |
|---------------------------------------|---|--|--|---------|--|
| New<br>License                        | For Radiocommunications services (including coast station in maritime mobile service, earth station in aeronautical service, microwave, broadcasting, etc.) except the below categories | 15 W or less   | 300  | 60      |  |
|                                       |   | 15 W - 150 W   | 500  | 100     |  |
|                                       |   | 150 W - 500 W  | 600  | 120     |  |
|                                       |   | 500 W or more  | 800  | 150     |  |
|                                       | Ship stations, Aircraft stations  |  | 450  | 90      |  |
|                                       | Amateur   |  | 200  | 40      |  |
|                                       | Earth station, VSAT   | 500W or less   | 1,000  | 200     |  |
|                                       |   | 500W-1000W   | 1,500  | 300     |  |
|                                       |   | 1000W or more  | 2,000  | 400     |  |
| Cordless Telephone (Distance > 500 m) |   | 100  | 20   |         |  |
| Renewal License                       |   | Charging 20 % of the new license fee of correspondent type | Charging 20 % of the new license fee of correspondent type |         |  |

Source: DGPT

##### (2) Spectrum Utilization Fee

Spectrum utilization fees are also decided in detail category by category. The major spectrum utilization fees are shown in Table 4.5.2-2. The following spectrum utilization fee is applied annually, and in the case of licensing to joint venture with foreign company, the spectrum utilization fee is also proportional to the investment between domestic and foreign, and paid in VDN and US\$.

**Table 4.5.2-2 Spectrum Utilization Fee**

| Category  |  | Domestic<br>(VDN 1,000) | Foreign<br>(US\$) | Remarks |  |
|---|--|-------------------------|-------------------|---------|--|
| Fixed Service<br>including point-<br>multipoint | 30 MHz or less   | 650                     | 130               |         |  |
|   | 30 - 1,000 MHz   | BW: 1 - 36 KHz          | 800               | 160     |  |
|   |  | BW: 37 - 200 KHz        | 1,200             | 240     |  |
|   |  | BW: 201 - 500 KHz       | 2,000             | 400     |  |
|   |  | BW: 501 - 2,000 KHz     | 3,600             | 750     |  |
|   | 1 - 3 GHz  | BW: 1 - 36 KHz          | 500               | 100     |  |
|   |  | BW: 37 - 200 KHz        | 600               | 120     |  |
|   |  | BW: 201 - 500 KHz       | 700               | 150     |  |
|   |  | BW: 501 - 2,000 KHz     | 800               | 160     |  |
|   |  | BW: 2,001 - 7,000 KHz   | 900               | 200     |  |
|   |  | BW: 7,001 - 14,000 KHz  | 1,300             | 260     |  |
|   |  | BW: 14,001 - 28,000 KHz | 1,500             | 300     |  |
|   | 3 - 10.5 GHz   | BW: 28,000 KHz or more  | 2,000             | 400     |  |
|   |  | BW: 1 - 36 KHz          | 400               | 100     |  |
|   |  | BW: 37 - 200 KHz        | 550               | 120     |  |
|   |  | BW: 201 - 500 KHz       | 650               | 130     |  |
|   |  | BW: 501 - 2,000 KHz     | 750               | 150     |  |
|   |  | BW: 2,001 - 7,000 KHz   | 850               | 180     |  |
|   |  | BW: 7,001 - 14,000 KHz  | 950               | 200     |  |
| BW: 14,001 - 28,000 KHz                         |  | 1,300                   | 250               |         |  |
| 10.5 GHz or<br>more                             | BW: 28,000 KHz or more   | 1,800                   | 400               |         |  |
|   | BW: 20 MHz or less   | 1,000                   | 200               |         |  |
| Cellular Service                                | BW: 20 MHz or more   | 1,500                   | 300               |         |  |
|   | Hanoi, Ho Chi Minh City  | 200/MHz                 | 40/MHz            |         |  |
|   | Da Nang, Hai Phong, Can Tho, Vung Tau                                    | 100/MHz                 | 20/MHz            |         |  |
|   | Hue, Vinh, Bien Hoa, Quang Ninh, Nha Trang<br>Other provinces and cities | 30/MHz<br>10/MHz        | 6/MHz<br>2/MHz    |         |  |

Source: DGPT, BW: Bandwidth

### 4.5.3 Present Situation of Frequency Licensing

At present, the numbers of licensees and licensed stations are summarized by category in Table 4.5.3-1. However, there are many radio facilities and equipment without the DGPT's control and license.

**Table 4.5.3-1 Number of Licensees**

As of September 1998

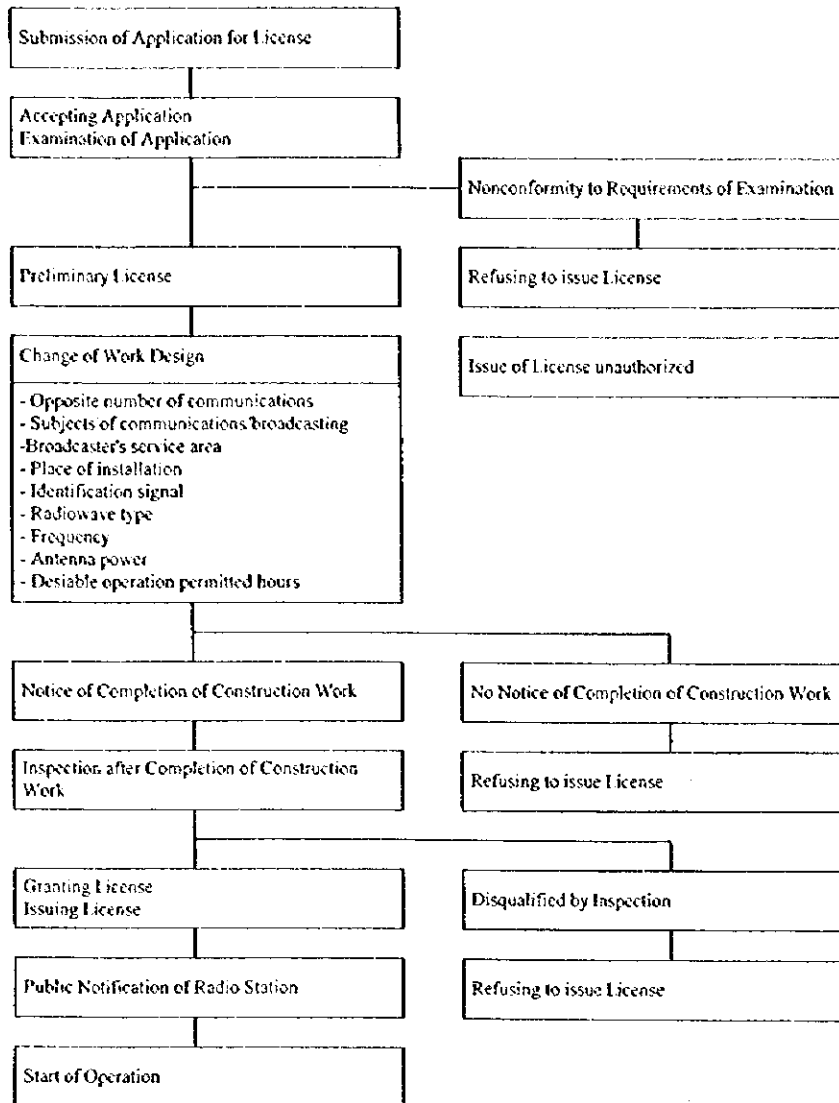
| Category              | No. of Licensees | Remarks          |
|-----------------------|------------------|------------------|
| HF and VHF            | 13,000           |                  |
| UHF                   | 5,000            | Including mobile |
| Microwave             | 4,000            |                  |
| Broadcasting Stations | 150              |                  |
| Earth Stations        | 110              |                  |

Source: DGPT

#### 4.5.4 Frequency Licensing in Japan

##### (1) Procedure for Frequency Licensing in Japan

The frequency licensing is carried out in Japan by the following procedure:



**Figure 4.5.4-1 Licensing Procedure in Japan**

##### (2) Spectrum User Fee in Japan

The use of radio frequencies in Japan has been increased and diversified greatly with economic development and advances in information communication technology. Corresponding to the increasing of radio stations, the following

problems need to be addressed promptly and appropriately to ensure trouble-free and greater utilization of radio frequencies in the future.

- (a) Rapid increase in the number of illegal radio stations
- (b) Increasing volume of administrative work on telecommunications such as dealing with license applications
- (c) Shortage of the frequencies available

On the situations mentioned above, a spectrum user fee system was established on April 1, 1993, whereby the direct beneficiaries (license holders) would be charged to fund the measures required to solve these problems.

The spectrum user fees are charges disbursed by all the radio station license holders that are the beneficiaries in order to cover the total expenditure of the public administrative work for all the radio stations.

The spectrum user fees are used for

- (a) Improvement of radio monitoring, etc.
- (b) Databases of radio station data
- (c) Office work for technical examination for a measure of tight frequency
- (d) Other works carried out by the MPT

The spectrum user fees in Japan are shown in Table 4.5.4-1.

**Table 4.5.4-1 Spectrum User Fee in Japan**

| Type of Radio Station  | Spectrum User Fee<br>(Annual: Yen/Station) | Typical Examples   |
|--|--|--|
| Mobile Radio Stations  | 600  | Personal Radio<br>Ship Station                           |
| Inmobile Radio Stations installed on land for the purpose of communication with mobile radio stations or portable receivers  | 7,200                                      | Base Stations<br>Radio Paging Stations<br>Coast Stations |
| Satellite Stations   | 25,800                                     | Communication Satellite<br>Broadcasting Station          |
| Radio Stations which set up radiocommunication by relay via a satellite station  | 11,600                                     | INTELSAT Earth Stations                                  |
| Radio Stations which set up radiocommunication by relay via a satellite station and which are either installed on mobile vehicles such as cars or ships or carried by people | 2,500                                      | Ship Earth Stations<br>Aircraft Earth Stations           |
| Broadcasting Radio Stations  | 25,300                                     | TV Broadcast<br>MF Broadcast                             |
| Multiplex Broadcasting Radio Stations  | 900  | Multiplexed Text Broadcast                               |
| Experimental Radio Stations and Amateur Radio Stations   | 500  | Experimental Stations<br>Amateur Radio                   |
| Other types of Radio Stations  | 17,800                                     | Fixed Stations   |

(3) Present Situation of Frequency Licensing in Japan

The present situation of frequency licensing in Japan is shown in Table 4.5.4-2.

**Table 4.5.4-2 Frequency Licensing in Japan**

| Category                  | Number     | Remarks          |
|---------------------------|------------|------------------|
| Number of Radio Stations  | 39,478,889 | As of March 1998 |
| Number of Radio Operators | 5,073,577  | As of March 1998 |

**4.6 Recommendations regarding Spectrum Management**

By comprehending and comparison of the present situations of spectrum management in Vietnam and in Japan, the following critical issues can be comprehended. The improvement of the spectrum management should be implemented not only in hardware, but also software such as organization and legal system. These issues to be solved are pointed out and some improvements are recommended herein.

(1) Frequency Allocation and Reuse

The radio frequency allocation in Vietnam is studied considering the present



situation and future plan of telecommunications services in Vietnam compared with the conditions in Japan, and the following issues are pointed out:

(a) General Aspect

The radio frequency allocation/allotment has been established complied with the Radio Regulations and is being carried out adequately in Vietnam. For the effective utilization of radio frequencies, the assignment to the users and reuse of radio frequencies should be executed according to the radio frequency allocation. In addition, the frequency allotment to areas shall be strengthened to avoid interference between radio frequencies allotted in different areas.

(b) Reuse of Radio Frequencies

The reuse of radio frequencies should be carried out from the following viewpoints:

i) Transition to new services/system

By transition to new service/system, it is better that the aged/superannuated radio systems would be removed, and their radio frequencies would be reused by new services/systems. The potential transition and reuse of the radio frequencies are as follows:

- AMPS cellular system

AMPS cellular system would be replaced by CDMA system in a same frequency band.

- Intra-provincial transmission systems

Aged and/or irregular radio transmission systems shall be replaced by the new transmission systems, and the radio frequencies for these systems shall be reused by the new radio systems.

ii) Reuse by area

The radio frequencies are limited resource, so the utilization of radio frequencies should be carefully considered.

Most of the radio communications systems can be reused by appropriate designing of the systems, therefore the design of radio communications systems should be done considering the features and characteristics of the system to be applied. To promote effective reuse of the radio frequencies, the following applications regarding frequency reuse should be considered carefully:

- Two-frequency system

In Vietnam, the relocation of microwave systems is frequently carried out, so it is suspected that the radio frequency is utilized in disorder. To prevent interference and to effectively utilize radio frequencies, microwave systems should apply two (2)-frequency system as shown in Figure 4.6-1.

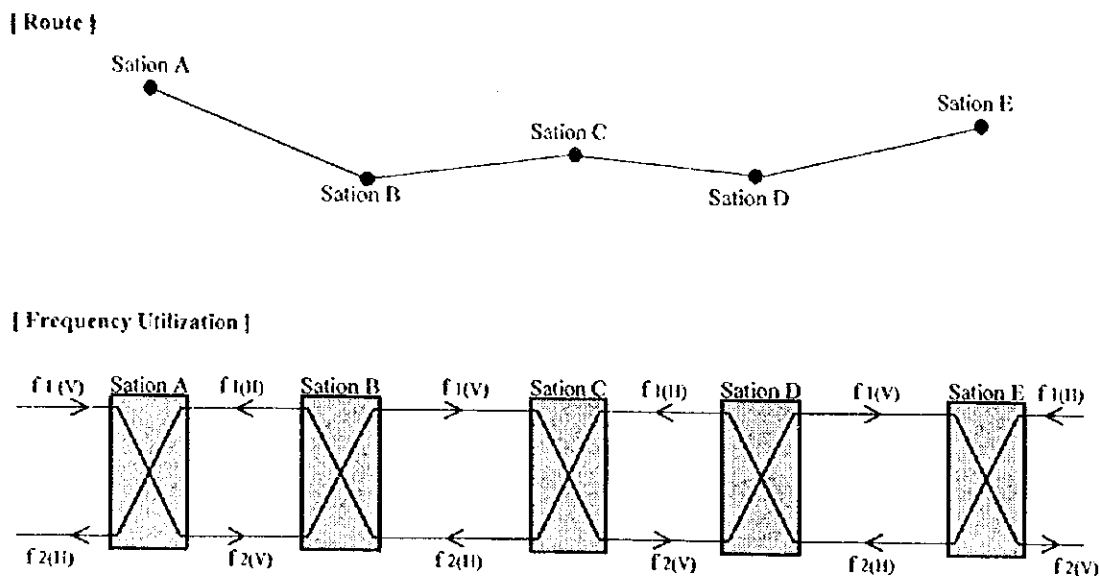


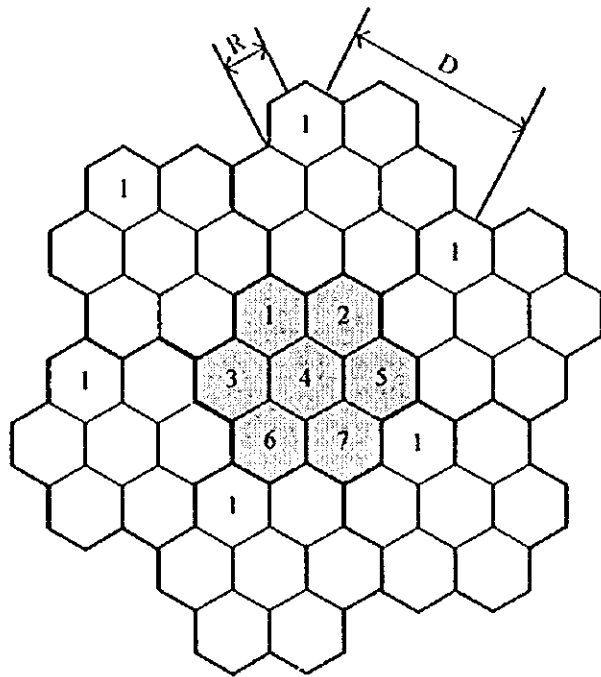
Figure 4.6-1 Two (2)-Frequency System

Both transmitter and receiver of the same system at a station use the same frequency and their polarizations are reversed alternatively as shown in Figure 4.6-1.

- Reuse pattern

The service area of cellular system is configured by cluster of small cells and each cell utilizes plural radio channels (frequencies) according to traffic conditions. To cover large areas by limited radio frequency bands, the cellular systems should be designed considering their reuse pattern of radio frequencies as shown in Figure 4.6-2.

The following figure shows the example that a frequency (radio channel) is repeatedly used every seven (7) cells.



$$D = \sqrt{3K} R$$

Where

K: Frequency Reuse Pattern

R: Radius of Cell

D: Frequency Reuse Distance

In the case of  $K=7$ ,  $D = 4.6R$

**Figure 4.6-2 Reuse Pattern (7-cell)**

**- Allotment to zones**

At present, the frequency allocation has been completed, and assignment to users/stations is properly carried out based on the frequency allocation table and frequency licensing procedure. However, the radio frequency allotment, especially for IIF/VIIF to areas has not yet been carried out due to lack of guideline of frequency allotment. To promote effective frequency reuse, the frequency allotment shall be sufficiently done as soon as possible.

**(c) Specific Allocation**

Corresponding to the future telecommunications services in Vietnam, the specific radio frequency allocation is considered as follows:

**i) Radio frequency bands for CMTS**

The radio frequency bands are allocated to the major cellular systems such as GSM and CDMA systems in Vietnam. However, the allocated radio frequency bands are little bit different from the original radio frequency bands referred to as Table 4.2.2-1.

The allocation of these frequency bands should be re-considered from the

overall viewpoints including future demand.

In addition, the radio frequency bands should be properly assigned to users area by area and system by system within the allocated radio frequency bands.

ii) Radio frequency bands for radio subscriber systems

The 1880 -- 1918.1 MHz bands are allocated to radio telephony access systems. This frequency band can accommodate PHS and DECT systems.

There are various kinds of radio subscriber systems in the world, so wider radio frequency bands should be properly allocated and assigned to radio subscriber systems (radio telephony access systems), because the radio subscriber systems are most suitable systems in remote and rural areas, or in urban areas as supplemental access system in Vietnam.

iii) Radio frequency bands for local satellite network

The radio frequency bands for local satellite network should be carefully allocated considering the following items:

- To keep good system performance considering rainfall attenuation
- To avoid interference with terrestrial microwave systems

iv) Other services

The radio frequency bands for other services such as cordless telephone, taxi radio and radio security system should be carefully allocated to avoid interference with other systems.

(2) Spectrum Control

Regarding spectrum control, the legal systems, organization and spectrum control activities are studied and recommended as follows:

(a) Legal Systems

i) The principal law (Radio Law) for spectrum management shall be completely established as soon as possible.

ii) Radio registration system

The radio registration system has been established, so the system should be adequately put into practice.

iii) Technical regulation and standard

The regulations and standards regarding transmitter power, occupied bandwidth, antenna to be applied have not yet been established, so the establishment of them is required as soon as possible.

iv) Other legal system

Other than the above legal systems regarding spectrum control, the necessary legal systems should be established corresponding to the introduction of new services.

(b) Organization

i) Training of staff

The organization for spectrum control in Vietnam has been already established, and staff have sufficient fundamental technology, capability and very diligent in their work, but experienced staff regarding spectrum management is insufficient.

Therefore, the appropriate measures such as instruction by expert and training should be taken, and skilled staff shall be deployed in the RFD and each monitoring center.

ii) Assistance by expert

At present, technical and regulatory assistance has been implemented regards to spectrum management by the APT. Such kind of assistance by expert should be expanded.

(c) Spectrum Control Activities

The spectrum control activities should be improved from the following viewpoints:

i) Record keeping

In recent, the recording and registration data of frequency utilization have been improved, but detailed utilization conditions of the existing users can't be completely comprehended by the DGPT. At least, the following technical data and information should be correctly kept by the DGPT.

- No. of systems
- Location of transmitter using coordinates
- Radio frequency
- Transmitted power (Antenna power)

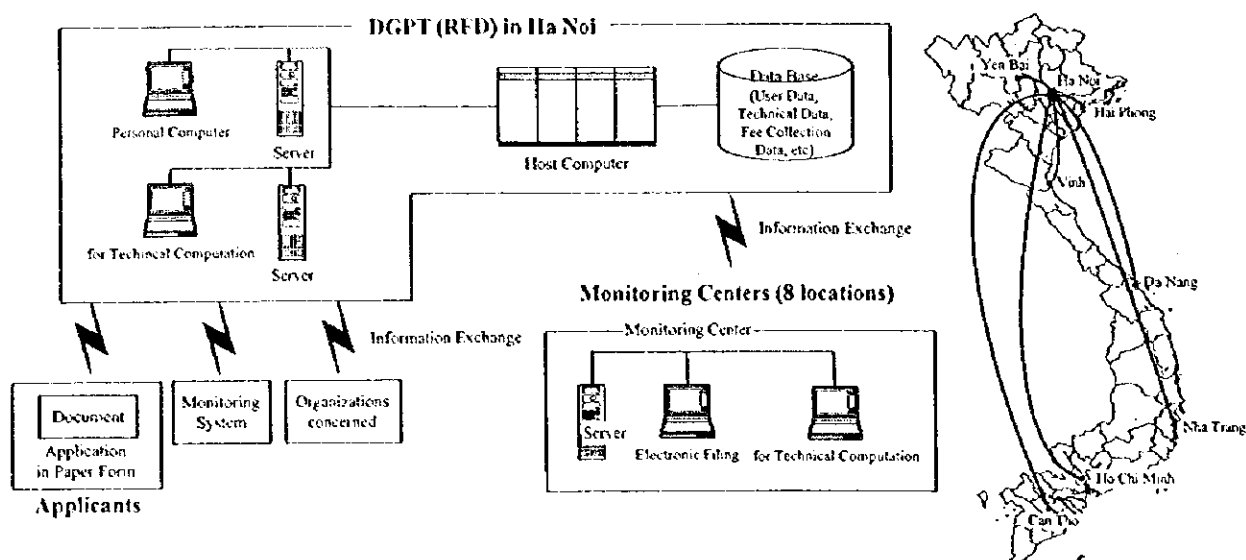
By comprehension of the data and information other than technical data the database can be built up, and the database will enable to implement the smooth spectrum control activities.

ii) Computerization

Vietnam has a plan to introduce ELLIP system for the purpose of calculating interference. Not only technical computation such as interference calculation, but also computerization of administrative work should be carried out in order to perform effectively and smoothly the spectrum control activities.

In addition, the networking of computers will enable to utilize databases nation-wide, and improve the spectrum control activities.

The conceptual plan for computerization of spectrum control activities in Vietnam is shown in Figure 4.6-3.



**Figure 4.6-3 Conceptual Computerization Plan for Spectrum Control Activities**

In parallel with the formulation of computer network for spectrum control activities, the reception windows for applications should be improved as follows:

- Improvement of application  
Other than the application in paper form, online and FD (Floppy Disk)-based applications should be applied in the future.
- Information exchange  
The computerized network should be exchanged with monitoring system and organizations concerned, and structure a total network for the spectrum control activities.
- Information disclosure  
To implement smooth spectrum control activities, the necessary data

and information should be disclosed through Internet, facsimile and computer communications as much as possible.

(3) International Frequency Coordination

As international frequency coordination, the following activities should be carried out:

(a) Orbit Position for Geostationary Satellite

To enable to launch an own satellite by Vietnam, the orbit position for geostationary satellite should be ensured through the international frequency coordination.

(b) Frequency Register and Coordination

The necessary international frequency coordination for frequency register and coordination should be carried out on time.

(c) Border Coordination with Neighboring Countries

The border coordination with neighboring countries should be adequately carried out on time.

(4) Frequency Licensing

(a) Extinction of Illegal Utilization

There are many illegal radio waves (users/stations) in Vietnam. The frequency licensing is carried out according to the stipulated procedure and fee as mentioned above. Illegal users besides the new licensee should be comprehended as soon as possible.

(b) Subsidiary by License Fee and Spectrum Utilization Fee

The license fee and spectrum utilization fee should be utilized to improve the spectrum control in Vietnam as well as in Japan. Especially, the facilities and equipment for frequency monitoring shall be improved by this fund.

(c) Modification of Licensing Procedure

The frequency licensing procedure would be modified according to the method of licensing application such as introduction of online application and FD based application.

(5) Frequency Monitoring System

(a) General

The number of staff regarding frequency monitoring is nearly same as that in Japan as mentioned in the section of 4.3.2, and the number of staff is almost

sufficient.

By improvement of frequency monitoring systems and establishment of powerful organization, the illegal users/stations will be supervised and controlled, and radio interference due to illegal radio waves might be reduced.

(b) Frequency Monitoring Area

The frequency monitoring systems have been rapidly improved in quantity and quality, but are not sufficient in Vietnam. To reduce illegal users, available frequency monitoring area should be expanded nation-wide, especially in bordering and mountainous areas.

At present, interference in cellular mobile services (between cellular mobile systems in Vietnam and China) occurred in the border of China. (The boarder coordination between China is now under going.) To solve such as interference, the expansion of monitoring area is indispensable.

(c) Facilities and Equipment for Frequency Monitoring

To cover the target areas for frequency monitoring, facilities and equipment should be improved in quantity and quality.

To correspond to the rapid expansion of the radio frequency utilization, the deployment of them is essential to secure the radio frequency utilization.






(6) Milestone for Improvement of Spectrum Management

The above recommendations shall be implemented through daily work regarding spectrum management, and the improvement shall be completed according to the recommendations as soon as possible.

The milestone of improvement and upgrading of the spectrum management in Vietnam based on the recommendations is summarized as below:



**Table 4.6-1 Milestone for Improvement of Spectrum Management**

| Up to 2000   | 2001 - 2005   | 2006 - 2010                                | Toward 2020   |
|--|---|--|---|
| <b>Frequency Allocation and Reuse</b>  |   |  |   |
| * Reuse of Radio Frequencies (Transition to new services/system, Reuse by area, Allotment to zones)<br>* Specific Allocation (for CMTS, Radio subscriber systems)  |   |  |   |
| - Establishment of Guideline for Frequency Allotment<br>- Reconsideration of Frequency Allocation<br>- Reuse of Frequency for Analog AMPS<br>- Reuse of Frequencies for aged/irregular Radio Transmission Systems<br>- Specific Allocation for Local Satellite Network<br>- Specific Allocation for Other Services | - Upgrading   | - Upgrading                                | - Upgrading    |
| <b>Spectrum Control</b>  |   |  |   |
| * Legal Systems (Radio law, Radio registration system, Technical regulation and standard, Other legal system)<br>* Organization (Training of staff, Assistance by expert)<br>* Spectrum Control Activities (Record keeping, Computerization)   |   |  |   |
| - Establishment of Radio Law<br>- Establishment of Database<br>- Computerization   | - Establishment of Technical Regulation and Standard<br>- Establishment of Computer Network | - Completion of Legal System               | - Upgrading  |
| <b>Frequency Licensing</b>   |   |  |   |
| * Extinction of Illegal Utilization<br>* Subsidiary by License Fee and Spectrum Utilization Fee<br>* Modification of Licensing Procedure   |   |  |   |
| - Upgrading  | - Improvement of Licensing Application  | - Upgrading                                | - Upgrading  |
| <b>International Frequency Coordination</b>  |   |  |   |
| * Orbit Position for Geostationary Satellite<br>* Frequency Register and Coordination<br>* Border Coordination with Neighboring Countries  |   |  |   |
| - Upgrading<br>- Obtaining of Orbit Position for Geostationary Satellite   | - Upgrading   | - Upgrading                                | - Upgrading  |
| <b>Frequency Monitoring System</b>   |   |  |   |
| * Frequency Monitoring Area<br>* Facilities and Equipment for Frequency Monitoring   |   |  |   |
| - Upgrading  | - Establishment of Frequency Monitoring System  | - Upgrading of Frequency Monitoring System | - Upgrading  |

(a) Toward 2000

i) Establishment of Radio Law

The principal law for spectrum management shall be established as Radio Law.

ii) Establishment of Guideline for Frequency Allotment

To promote effective utilization of frequencies, the guideline for frequency allotment shall be established as soon as possible.

iii) Establishment of database

By the comprehension of the present utilization conditions, the database shall be built up.

iv) Computerization

The databases shall be managed by computers and technical computation shall be carried out by computers.

v) Reconsideration of frequency allocation

According to the development of telecommunications, frequency allocation shall be reconsidered in detail.

vi) Reuse of frequency for analog AMPS

Analog AMPS shall be replaced and its frequencies shall be utilized by the new services.

vii) Reuse of frequencies for aged/irregular radio transmission systems

Aged/irregular radio transmission systems shall be replaced by the new systems and their frequencies shall be utilized by them.

viii) Complete procedure to obtain at least one orbit position for geostationary satellite

(b) From 2001 to 2005

i) Establishment of technical regulation and standard

Other than the Radio Law, technical regulation and standard shall be established in detail according to the development of new systems/services.

ii) Establishment of computer network

After the computerization and establishment of database, the computer network shall be built up and promote effective/smooth spectrum management.

iii) Establishment of frequency monitoring system

All the monitoring centers, semi-fixed equipment and mobile monitoring vehicles shall be deployed according to the DGPT plan.

iii) Improvement of licensing application

Licensing application shall be expanded not only by paper, but also by online/FD (Floppy Disk) basis.

(c) From 2006 to 2010

i) Completion of legal system

According to the introduction of new systems/services, the necessary legal systems shall be added or modified, and legal systems shall be completed.

ii) Upgrading of frequency monitoring system

The frequency monitoring system, which would be established based on the current plan, shall be upgraded to an integrated spectrum management system including licensing and administrative work.

(d) Toward 2020

The necessary treatments for spectrum management shall be completed before the year 2010, therefore, the upgrading and maintenance of the spectrum management system shall be continuously carried out reflecting the development of the new services/technologies.

