Aspects for regulation and public policy in the mobile information society

- Frequency Open Policy in Japan -

March 2004

Ministry of Public Management, Home Affairs, Posts and Telecommunications

Overview of the Radio Policy Vision

(Report of the Telecommunications Council)

Basic roles of radio spectrum use

- Quality of life
- Industrial/economic activities
- safe and secure society/country
- Local economy

Mid- and long-term Outlook of Spectrum Use

- Realization of a wireless broadband environment
  - More spectrum uses in Home, Business, Medicine/Welfare, Security
- Expansion of Radio-Related Industry

Mid- and long-term Outlook of Radio Policy

Mid- to long-term goals (in 5 to 10 years)

- Realization of a ubiquitous network society
- Ensuring National Security through Diversified Networks
- Fostering Competitive Wireless ICT Industry

Desirable Radio Policy

I. Dynamic review of spectrum allocation

II. Policies for frequency refarming and spectrum use

III. Reform of Spectrum User Fee

IV. Promotion of R&D

V. Facilitating smooth prevalence of radio equipment

VI. Enhancing international strategy

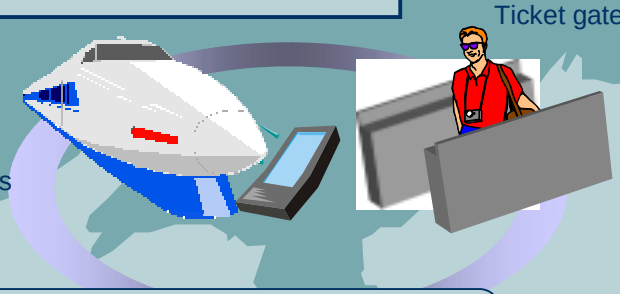
VII. Building a safer and securer environment for radio spectrum use

Realization of a ubiquitous network society through construction of wireless broadband environment

Impact: Construction of "Wireless Broadband" Environment

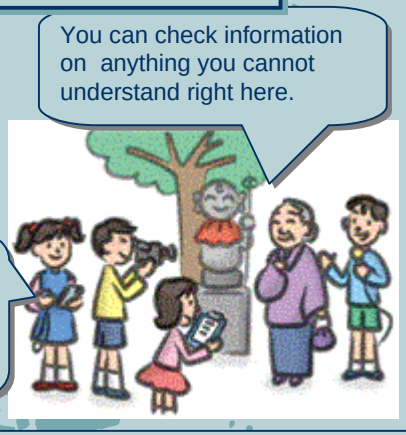
- "Ubuiquitous" Network Society -

Public Facilities



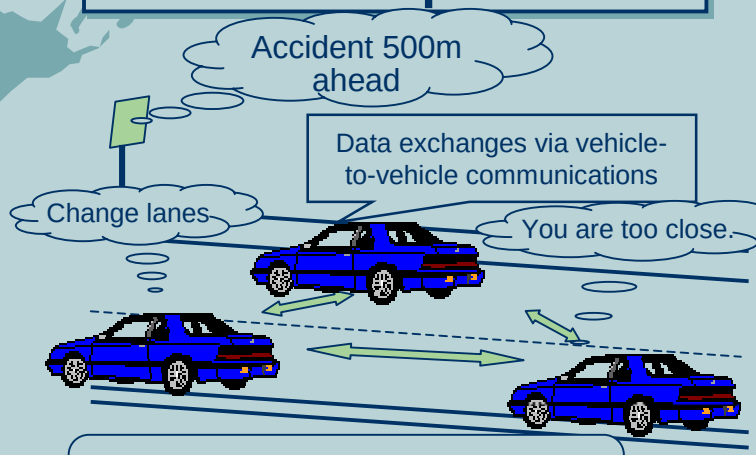
Boarding procedures using wireless terminals

Education



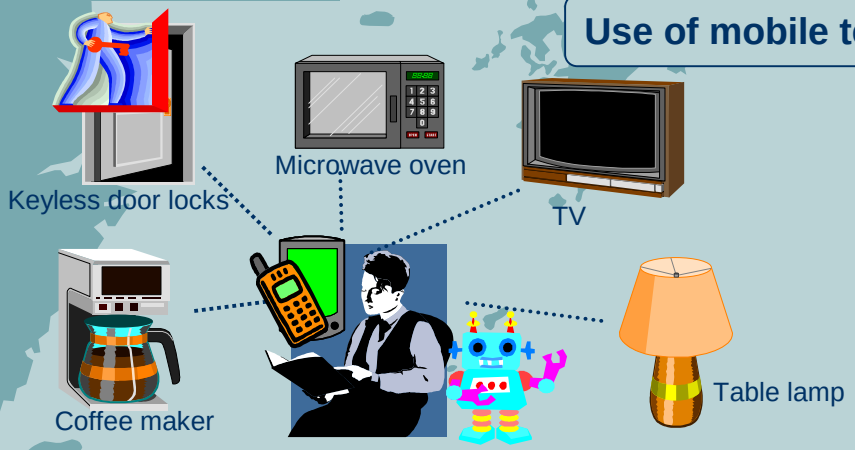
Use of mobile terminals in education

Public Transportation



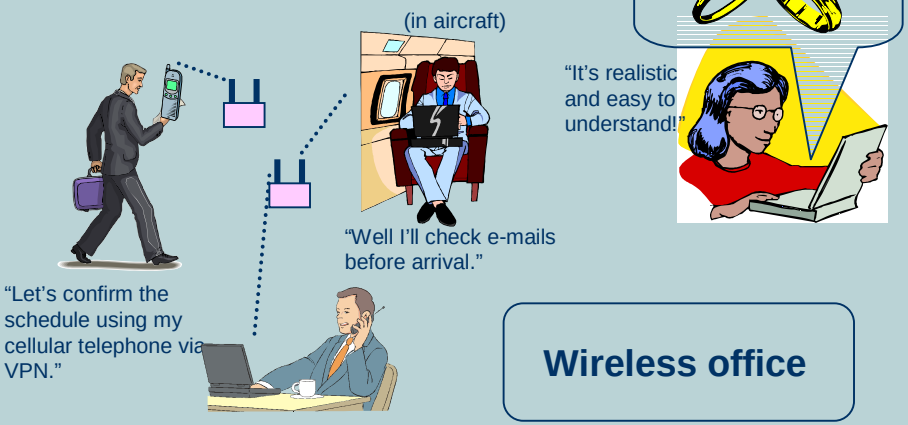
Wireless vehicle-to-vehicle communications

Daily Lives



Wireless-controlled home security

Business



Wireless office

New Frequency for the Advancement of RFID

RFID Tag

【Inventory Management System】

Frequency bands where RFID can be used

Current Common Frequencies For RFID

Japan

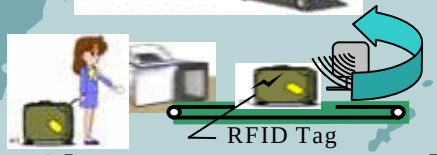
135 kHz | 13.56 MHz | 800/900MHz | 2.45 GHz

Europe

135 kHz | 13.56 MHz | 800/900MHz | 2.45 GHz

U.S.

135 kHz | 13.56 MHz | 800/900MHz | 2.45 GHz



RFID Tag

【Air Baggage Tracing System】

Demonstrative experiment is promoted for practical use on 800/900 MHz where new demand is appearing

RFID Tag

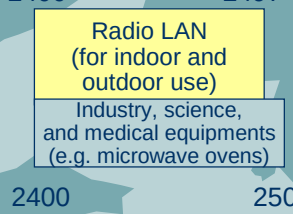
【Multifunctional IC Card】

A single Tag might be used on-worldwide-basis !

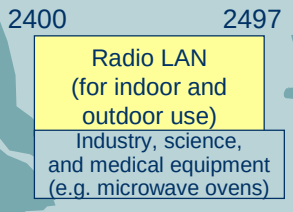
Review of the Allocations to Wireless LAN (NWA) in the 5 GHz Band

2.4 GHz band

97 MHz bandwidth



97 MHz bandwidth



5 GHz band

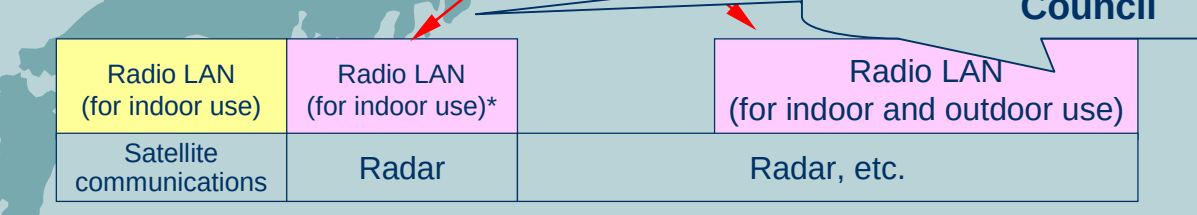
100 MHz bandwidth

New allocations for Radio LAN on a worldwide basis

355 MHz bandwidth

Currently under Study in Telecommunications Council

100 MHz bandwidth



* Limited outdoor applications are possible.

Major frequency bands being used now

- The frequency band that can be used for outdoor applications has been greatly expanded.
  ⇒ More users are able to use faster communications.

-Common frequency bands that can be used on a worldwide basis have been expanded.
  ⇒ Users can benefit from improved convenience and less expensive equipment.

Spectrum Open Policy

Target	Solution
Spectrum Identification for future needs	Dynamic review of frequency allocation (Spectrum refarming policy)
Rapid frequency refarming in order to accomodate wireless broadband systems	Introduction of compensation scheme for rapid frequency refarming
Facilitation of flexible business promotion	Partial introduction of a registration scheme with simplified process

Process of Spectrum Reform

Radio Policy Vision

Telecommunications Council

- Aug. '02 Consultation of Radio Policy
- Jun. '03 Public Comment to Report
- Jul. '03 Report

⇩

Oct. '03 the Guidelines for Spectrum Refarming published

Study on Effective Use of Radio Spectrum

Study Group on Effective Use of Spectrum Policy

- Jan. '02 Start
- Dec. '02 1st Report 【Introduction of Compensation Scheme】
- Sep. '03 2nd Report 【Introduction of Registration】
- Dec. '03 3rd Report 【Assignment of Spectrum refarming】

⇩

Feb. '04 Draft Revised Radio Law submitted to the Diet

Dynamic Review of Frequency Allocation

It is necessary to dynamically review radio spectrum allocation in order to facilitate the introduction of radio systems required for the world's most advanced Wireless Broadband Environment

(1) dynamic review of radio spectrum allocation in all frequency bands including those assigned to the national government and public corporations.
(2) Encourage licensees to return redundant spectrum not being used efficiently.
(3) refarming of radio spectrum, which are used for radio systems actually replaceable with fiber-optic cables etc., to other radio systems such as mobile communications, for which radio spectrum use is indispensable.
(4) Rapid refarming of radio spectrum to new radio systems with higher demand.

	Expansion of usage in the future *1	Concepts for addressing radio spectrum demands	Measures to be taken for promotion
Mobile Communication Systems (below 5-6GHz)	Large increase in demands for radio spectrum (based on forecast methods developed by ITU) - 270 MHz bandwidth (current status) - 330 – 340 MHz bandwidth (5 years later) - 1,060 - 1,380 MHz bandwidth (10 years later)	Based upon results of survey on actual radio spectrum usage including those in the public sector, (1) Create radio spectrum for new use, through efficient use of radio spectrum and transition to fiber-optic cables (2) Rapid refarming of radio spectrum (3) Shared-use with other radio systems	Examples of major candidates for additional frequency bands for mobile communication systems - 800MHz band, 1.5 GHz band (currently in use for MCA)*2 - 1.7 GHz band (currently in use for fixed communications) - 4 GHz / 5 GHz bands (currently in use for fixed communications)
Wireless LAN (mainly in 5GHz band)	Large increase in demands for radio spectrum (based on forecast methods developed by ITU) - 200 MHz bandwidth (current status) - Max. 480 MHz bandwidth (5 years later) - Max. 740 MHz bandwidth (10 years later)		Examples of major candidates for additional frequency bands for Wireless LANs. - 4.9-5.0 GHz band (currently in use for fixed communications) - 5.25-5.35 GHz band (currently in use for radars) - 5.47-5.725 GHz band (currently in use for radars)
Terrestrial Digital Television	Smooth penetration and development of digitalization	- Smooth implementation of measures for conversions of current TV frequencies for digitalization. - Radio spectrum vacated by the termination of conversion process (analog/digital simulcasting) will be used for mobile communications, etc.	- Frequency assignment for facilitating nationwide deployment of digital broadcasting - The UHF band except those used for digital TV will be used for mobile communications after 2012; the VHF band will be used for radio systems with high demand after 2011.
RFID (Electronic Tag)	Advanced utilization of electronic tags will evolve in diversified fields such as physical distribution.	135 kHz, 13.5 MHz, 2.4 GHz bands are currently in use.	Consideration of available frequency bands, based on concrete images of applications using RFID.
ITS, HEO *3, UWB	Development of these radio systems will progress.	Clarification of available frequency bands, necessary bandwidths, etc. based on considerations concerning trends in R&D, sharing conditions.	Implementation of domestic frequency assignment, considering international spectrum allocation and international harmonization.

*1 The figures of the bandwidths of Mobile Communication Systems and Wireless LAN are round numbers.
*2 MCA: Multi-Channel Access (a trunked radio system.)
*3 HEO : Highly Elliptical Orbit satellite system used for satellite communication, radiodetermination etc.

Ensuring Transparency of Spectrum Usage
- Survey, Publication and Evaluation System -

【Survey Items】
- ○ Number of radio stations
- ○ Traffic
- ○ Years in use of radio facilities
- ○ Replaceability with other means of telecommunications such as fiber-optic cables

etc.

Surveys on Radio Spectrum Usage

All of the radio spectrum is divided into the following three sections.
①Below 770MHz
②Above 770MHz/below 3.4GHz
③Above 3.4GHz

Publication of the Survey Results

Public Comments
For example;
"New spectrum required for emerging needs"
"Important to keep the current use"

Evaluation of efficiency in spectrum usage on each frequency band

Publication of the Evaluation Results
For example;
"Current spectrum use is efficient"
"Appropriate to compress the bandwidth"
"Should be substituted by optical fiber links" etc.

Consultation to the Radio Regulatory Council

Surveys on economic impacts on existing licensees

Reflection

Modification of Frequency Assignment Plan

Compensation Scheme for Rapid Spectrum Refarming

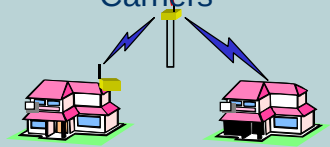
New Spectrum Users

《RLAN, etc.》

Restaurants

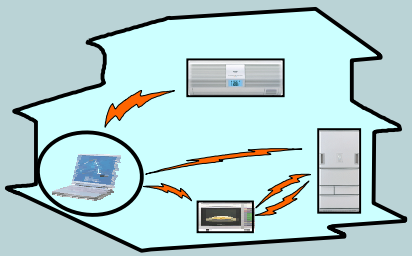
Internet

Base stations of Telecommunications Carriers



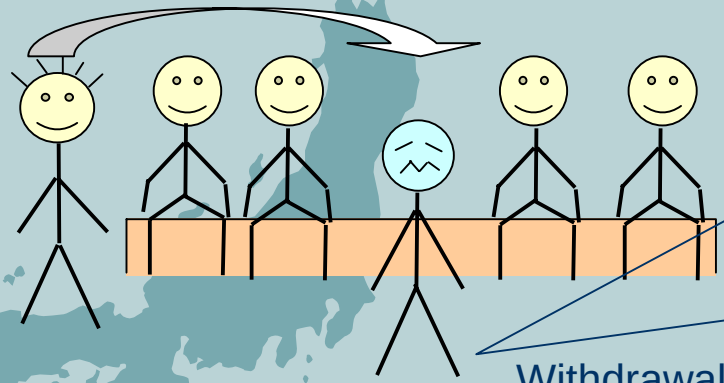
Hotel

《Intelligent Home Appliances》



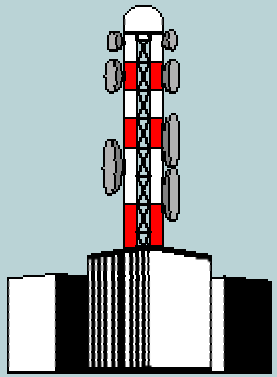
<A new entry is possible on vacated frequencies>

New entry



Incumbent Licensees

<Station for fixed microwave links>



Withdrawal

- No alternative frequencies
- Shorter transition period within 3 years (10 years for the existing scheme)

Economic Costs to Incumbent Licensees (Salvage Value, Removal Cost and so on)

Need for Compensation

Provision of Compensation

Economic benefits to new spectrum users

Collection of additional Spectrum User Fee from new spectrum users

Outline of Registration System

＜Current System＞

License System

※ No license required for Small Power or Limited Bandwidth

Background:Technological Development, etc.

<Bandwidth Guaranteed Type>
Broadcasting stations, Cellular Phones, etc.

Introduction (planned)

＜Shared Use Type＞
Best Effort systems such as High Power Out-door Radio LAN

Ex-ante Checking
（License System）

- High Power
- Exclusive Use

Ex-post Checking
（Registration System）

- Higher Power than License-free systems
- Same operation rules applied
  （Coping with Interference, limited term permission, etc.）

To Promote Multiple Use of Radio Spectrum

Substantial Deregulation for Experimental Stations

【Issue】 Early Development of Technologies
New Systems for Efficient Spectrum Use

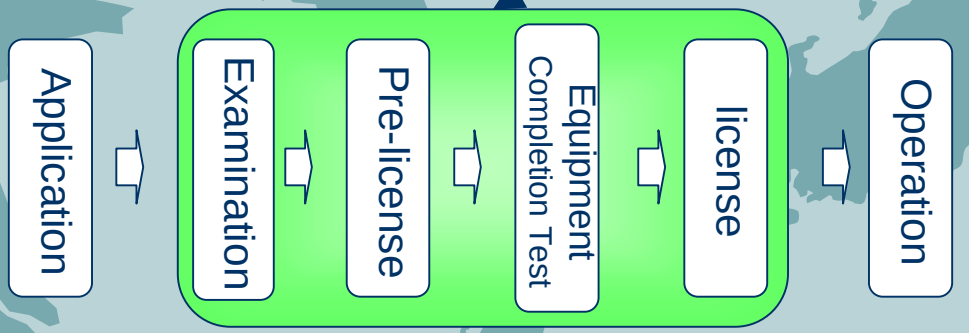
【Measure】 Foster, Application Process for Experimental Stations

【Effect】
- Contribution to Anti-Spectrum Congestion
- Industry Revitalization

Introduction of
"New Specific Experimental Station"

①Outline of Specific measures

＜Process of License Application＞



Under certain conditions;
- To Simplifying process
- To Shorten the process period

＜Certain Conditions (For Protection from Interference, etc.)＞
- ○ Usable Region, Frequency, Antenna Power is presented in advance
- ○ Coordination of Operation among the "Specific Experimental Stations"
- ○ 1 to 2 year license period

②Major Effects

＜Less Economic Burden＞

Instant License = No Equipment Completion Test Required

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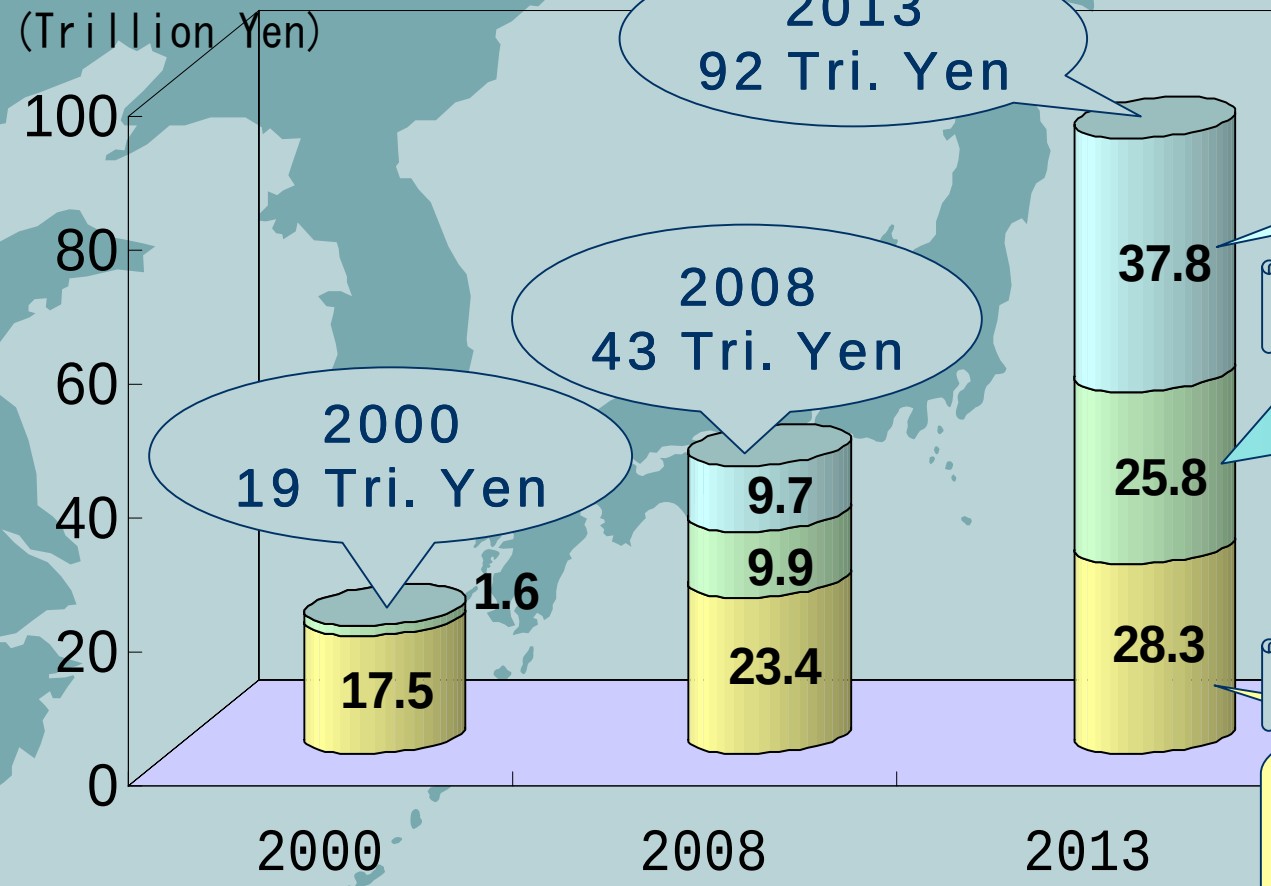
Less burden due to the abolishment of various Test Fees

⇒ Acceleration of Product R&D in Manufacturers (Laboratories, Factories)

Estimation of Market Sizes of Radio-related Industries



Industries Potentially Using Radio *

distributors, education, medical/nursing care/welfare services, games, etc.

Industries Using Radio *

Security service, Airline, Maritime, Railway and Automobile transportation services etc.

Core Radio-based Industries

Cellular Operators, Broadcasters, Related manufacturers, Contents creaters, mobile EC etc.

* Radio-related Amounts

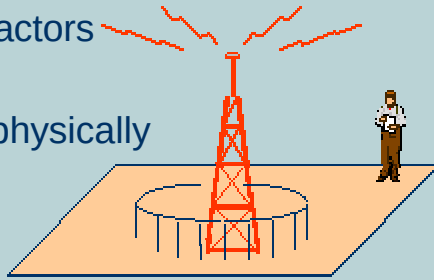
Policies and Regulations for Radio-Radiation Protection From human exposure to EMF

Radio-Radiation Protection Regulations

a. Radio-Radiation Protection Guidelines(1990,1997)
Guidelines established for human exposure to EMF in consideration of sufficient safety factors

b. Stipulations of RF emission limits at broadcasting, base stations etc. (1999 enforced)
Obligation of installing safety facilities established in order not to allow general persons physically entering places where electromagnetic field strength exceeds limit values

c. Stipulations of SAR limits on cellular terminals (2002 enforced)
Establishment of SAR limit based on Radio-Radiation Protection Guidelines



Safety Facilities

Investigation of the effects of radio waves on the human body

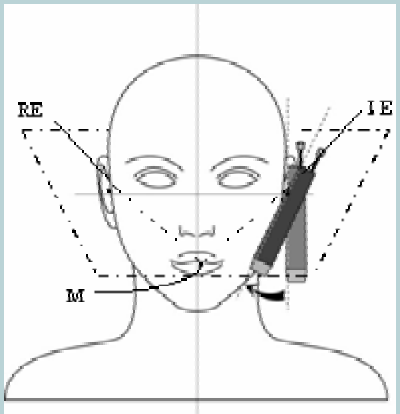
In order to investigate the possible effects of radio waves, "Committee to promote research on the possible biological effects of electromagnetic fields" was established in 1997, and this committee has been conducting studies on the effects of the radio waves to eyeballs and epidemiological research on relationship between use of cellular phones and brain tumor.

Interim report (Published Jan. 2001)

a. No evidence found that radio-radiation less than the value defined in the Guidelines cause bad effect to the health

b. Not necessary to particularly care the use of cellular phone

c. Not necessary to immediately revise the Radio-Regulation Protection Regulations etc.



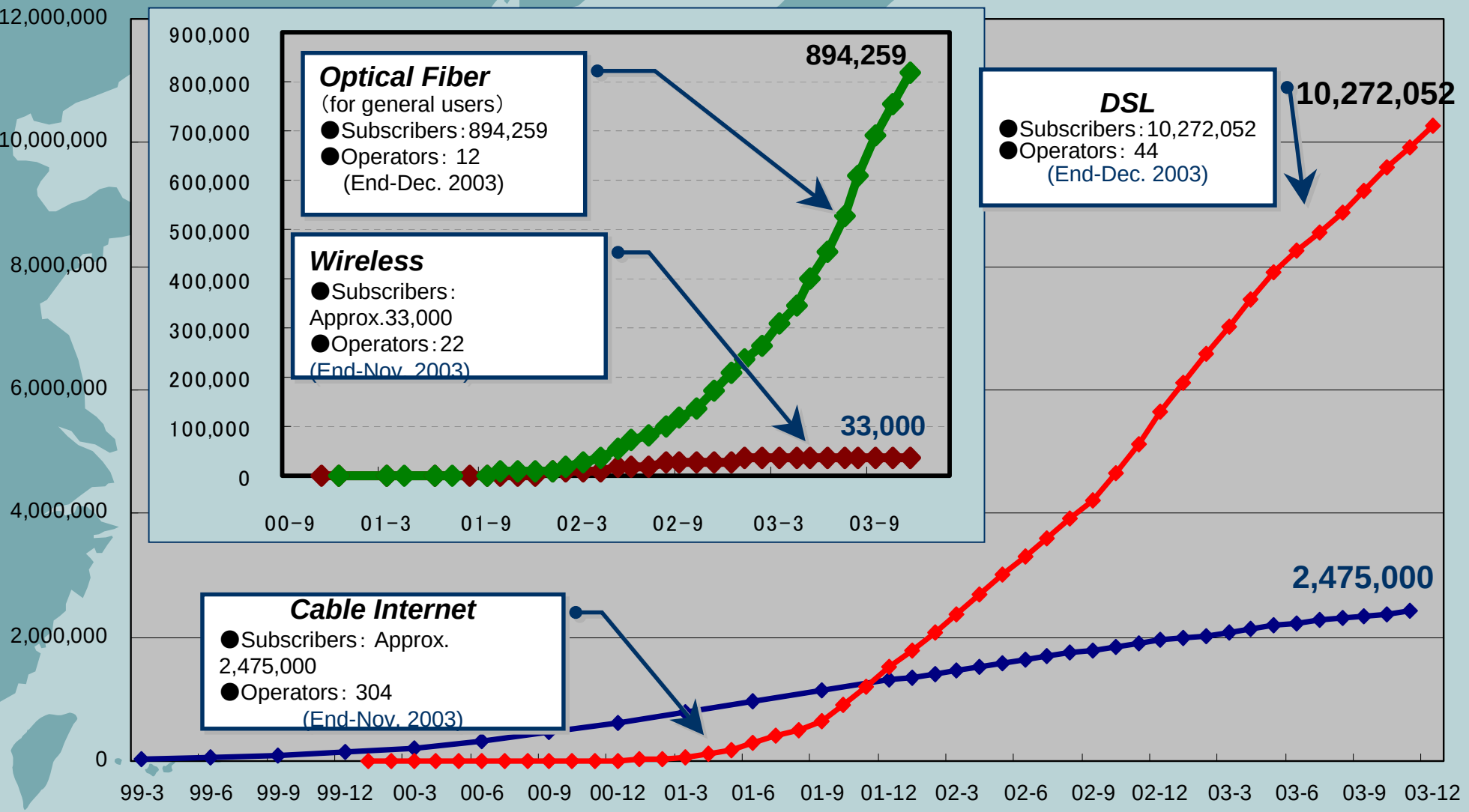
SAR measurement using PHANTOM

Confirmation that radio-radiation from cellular phone does not cause bad effect on learning and memory (Nov. 2002)

Confirmation that long-term use of cellular phone does not have relationship to the outbreak of brain tumor (Oct. 2003)

Current Status of Broadband Penetration in Japan - Number of Subscribers -

- The number of broadband subscribers in Japan, especially those of DSL has grown extensively recent years. (Number of broadband subscribers is around 13 million as of the end of December 2003.)
- Japan was first to introduce FTTH services for residences in March 2001.

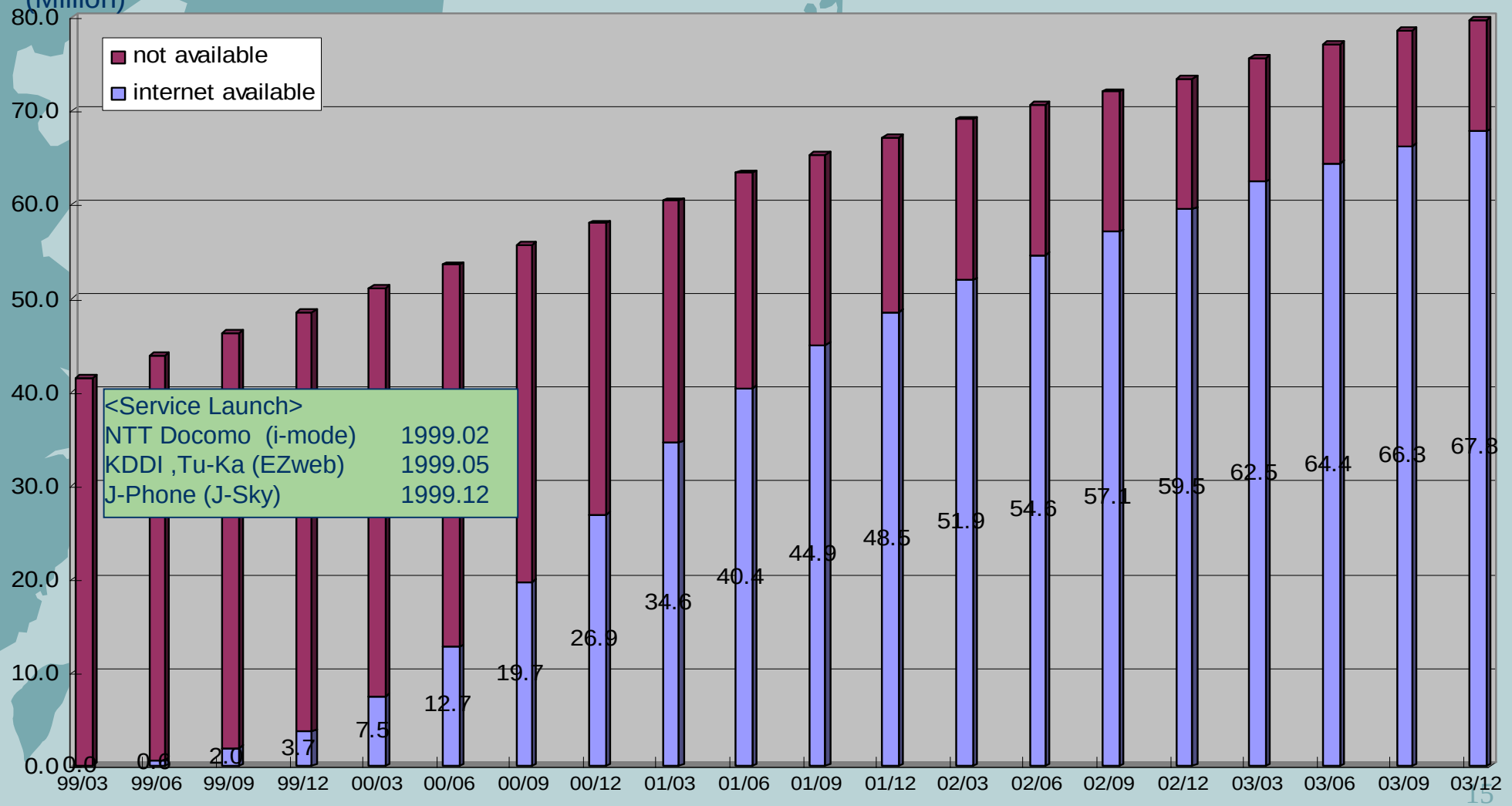


Trend of cellular internet service in Japan

- Number of Subscribers -

✧ The number of subscribers: 67.8million

=> 85% of whole cellular subscribers (=79.8million) also subscribes internet service



Towards Realization of Ubiquitous Network Society

＜Wire＞

Telephone line (ADSL, CATV)

Usable No. of line: 35 mil
actual use: 13.1 mil

Optical fiber

Usable No. of line: 16.8 mil
actual use: 0.9 mil

＜Wireless＞

Wireless Broadband

No. of subscribers using internet via cellular: 67.8 mil

Mature market for “wireless narrowband”

Frequency Open Policy

- guidelines for frequency refarming
- expansion of frequency for “Broadband”
- flexible use of radio spectrum environment

14 mil Broadband users

Broadband Convergence of Wire & Wireless
Advent of Ubiquitous Society

Creation of New Industry
(Infrastructure & Users industry)

Creation of Applications

the world’s most advanced wireless Network

Rebirth of Economy

Hopeful, affluent society

Visible existence of Japan