

Overview on NTT DoCoMo's R&D Activities towards IMT-Advanced

22 November, 2006

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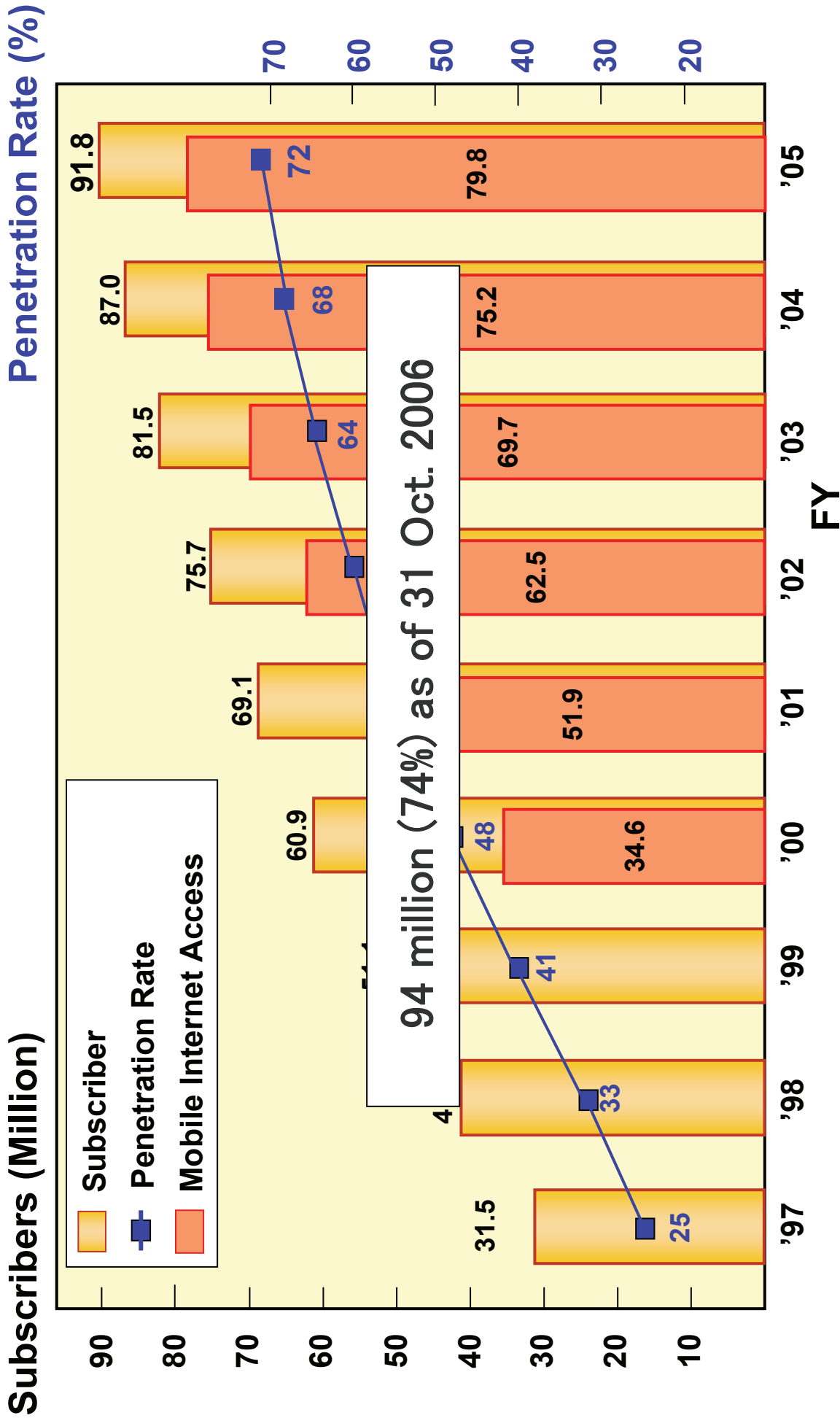
- 1. Japanese Mobile Market Key Factors**
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- 3. DoCoMo's R&D Activities**

1. Japanese Mobile Market Key Factors

Mobile Market key factors

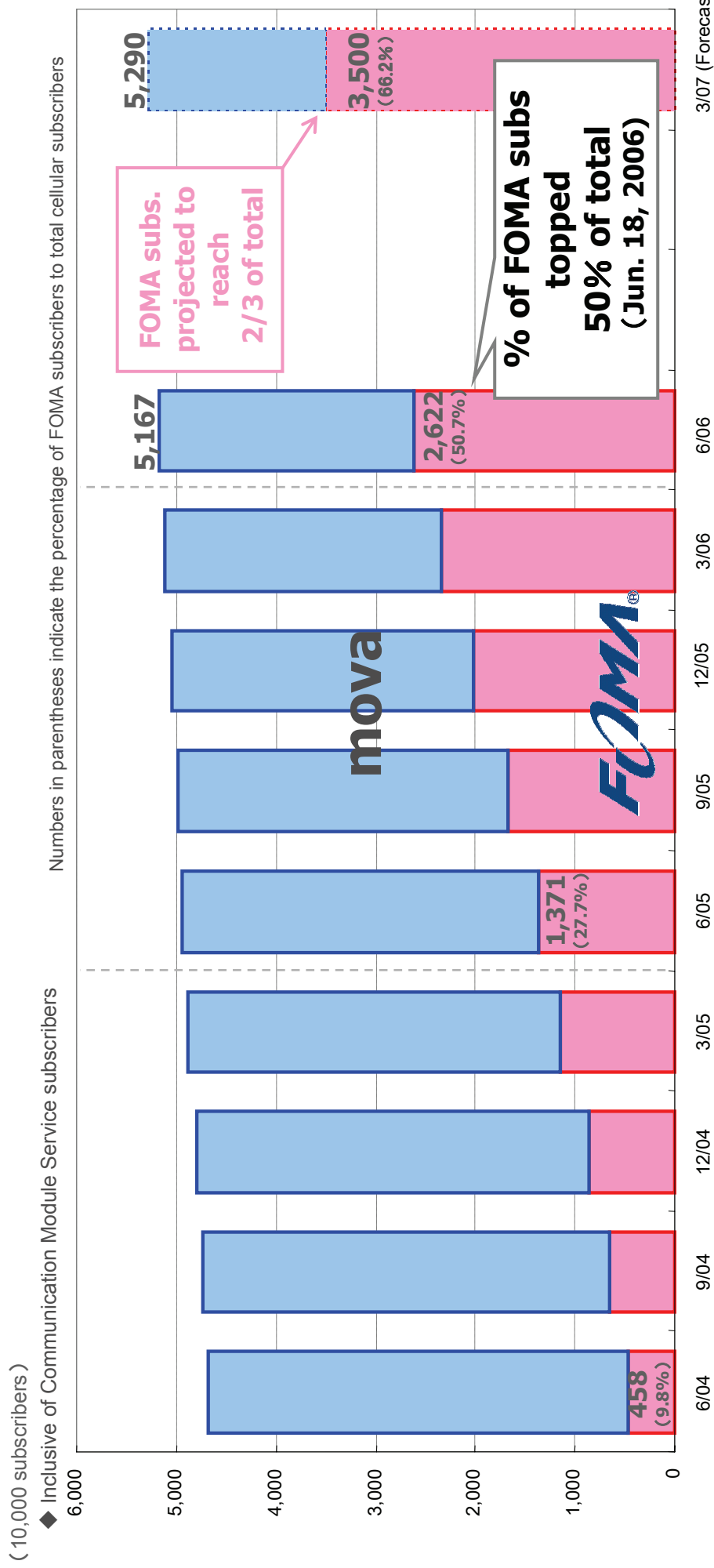
- Saturation of mobile subscribers
- Migration from 2G to 3G/3.5G
- New operators
- Introduction of MNP
- Flat rate tariff

Mobile Market in Japan



Subscriber Migration to FOMA

**FOMA subscribers exceeded 50% of DoCoMo's total subscribers.
(Total FOMA subs: 30.0 million, 58% of total As of Nov. 6, 2006)**

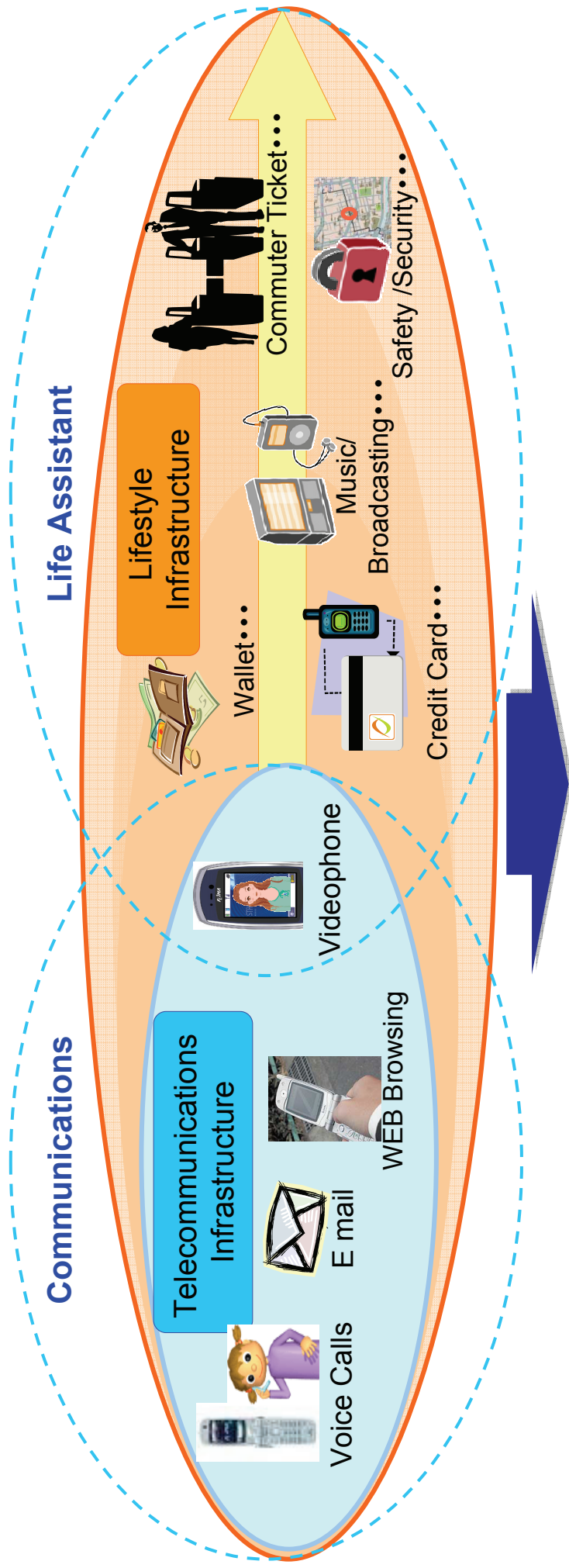


2. Business Strategy

DoCoMo's Business Strategy

“Produce Mobile Phones Useful in Daily Life / Business”

From selling “handsets” to selling “services”
Service Direction: “Innovative” and “Safe & Secure”

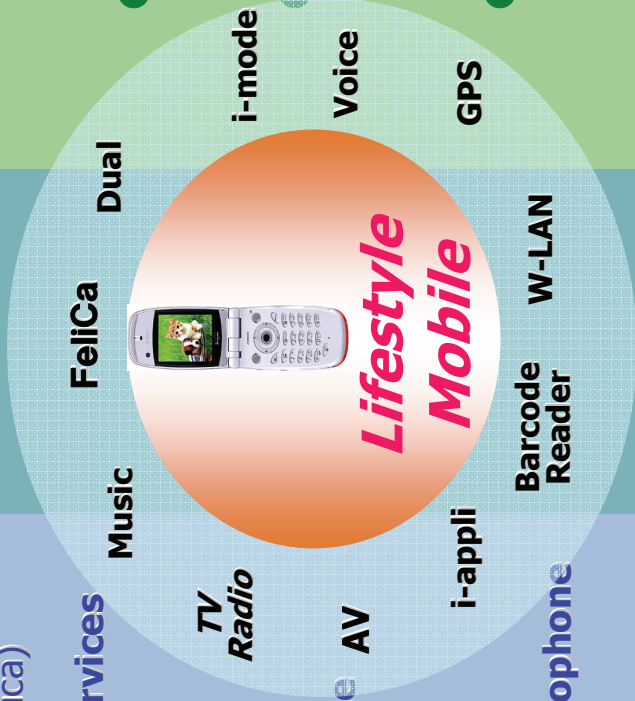


Provide new services linked to customers' daily life

Actualization of "lifestyle infrastructure"

Innovative

- **FeliCa services**
 - Payment, mobile credit
 - Commuter pass (Mobile Suica)
- **New communication services**
 - PushTalk
- **Broadcast-linked**
 - 1 seg
- **Collaboration with home appliances**
- **Music related services**
 - Music download
- **Video distribution/Videophone**
- **Corporate services**
 - Passage Duplex
- **High speed access NW**
 - HSDPA/Super 3G/4G



Safe & Secure

- **Personal data protection**
 - Remote lock
 - Data security
- **Global Services**
 - Global Roaming
- **Disaster communication**
 - i-mode disaster message board
- **Children safety protection**
 - Kid's PHONE
 - *imadoco* search
- **Spam countermeasures**
- **NW quality enhancement**
 - Over-the-air download
 - Virus Check

- Terminal PF
- Fuel cells
- FMC

Three Main Pillars of Business Operation

**Strengthen
Core Business
Even Further**

**Create
New Revenue
Sources**

**Facilitate
Cost
Reduction**

Products

Enriched product lineup, e.g., the "902iS" series equipped with more powerful credit payment/music capabilities, and the "702iS" series featuring unique and stylish designs, etc.

902iS series

High-spec models



- Preinstalled with DCMX-appli
- Significantly enhanced music capabilities
- Powerful security features (Biometric authentication, "Omakase Lock", etc.)



702iS series

new series debut!

Unique and stylish designs



Mobile devices for businesses

Mobile solutions

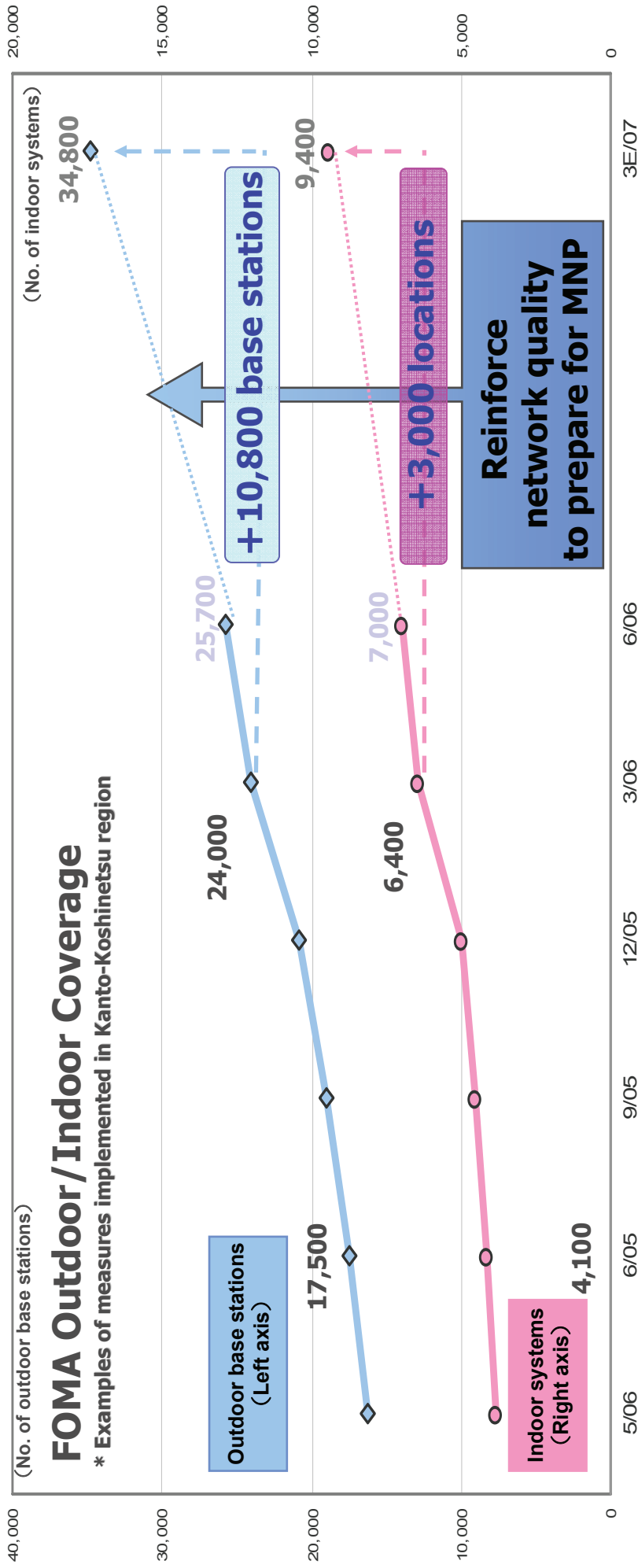
Models "hTc Z" (HTC) and "Blackberry (RIM) planned for release



hTc Z

Network

- Installed base stations at the fastest pace in our history, to build up competitiveness prior to MNP
 ⇒ No. of base stations as of Mar. 31, 2007 expected to increase to 1.5 times the number as of Mar. 31, 2006.



Expand FOMA coverage to a level superior to mova's by 2006/fall

- Comprehensive coverage in buildings/underground areas
- Plan to cover all JR stations/highway service areas/ "michi-no-eki" rest areas

Area quality improvement catered to customer requests
 ⇒ "We value your comments on FOMA quality" campaign*, etc.

Proactive PR campaigns

⇒ "We'll increase FOMA antennas declaration" *, etc.

HSDPA

Upgrade 3G network to improve FOMA's attractiveness

Service launch

31 August, 2008



**Max. transmission speed
(at service launch)**

**3.6Mbps (downlink)
384kbps (uplink)**

Service area

**Start service in Metropolitan Tokyo
(23 wards), and gradually
expand coverage thereafter**



**Projected nationwide POP coverage
of Mar. 31, 2007: 70%
of Mar. 31, 2008: over 90%**



Contract structure

**Require all FOMA users
to use service
compatible handset required)**

**Billing plan:
common with FOMA**

◆ Service details described above are plans as of today

Create New Revenue Sources

Accelerate cellular service's transformation into a "lifestyle infrastructure" leveraging the synergies of core and new businesses

⇒ Achieve "third growth" after first and second phases of growth led by telecommunications/IT infrastructure businesses

(1) Payment/commerce

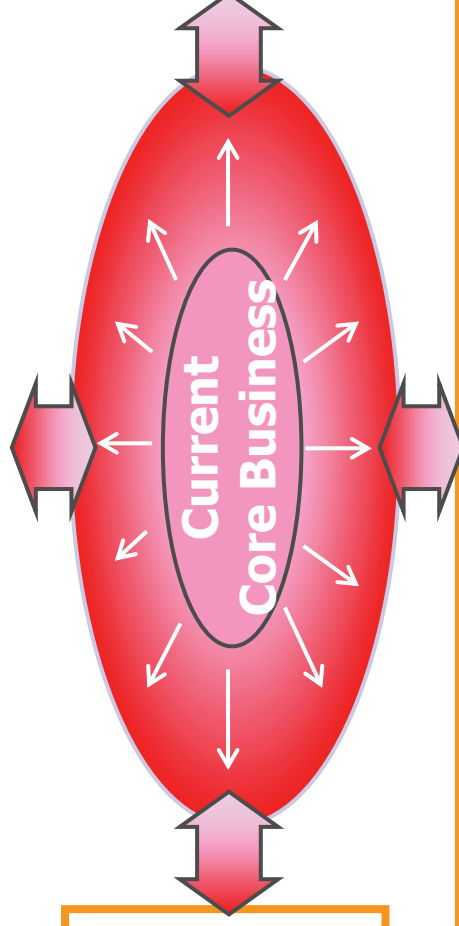
- Sumitomo Mitsui Card
- UC Card
- am/pm
- Lawson
- AEON*
- FamilyMart*
- Tower Records
- East Japan Railway (LLP)

(2) Broadcast

- Fuji Television
- Nippon Television (LLP)

(3) Content/ Internet business

- Rakuten Auction
- CA Mobile



(4) Global business

- KT Freetel
- Guam Cellular
- Guam Wireless
- PLDT
- ※ Asia Pacific Mobile Alliance (tentative name)






(5) Mobile-related peripheral business






- ACCESS
- Aplix
- Renesas Technology*
- TI*

* non-invested alliance

Credit card Business

DCMX : 2 Types for different purposes

	<h3>DCMX mini™</h3> <p>Easy mobile credit function You can join immediately</p> <p>Service started on April 28, 2006</p>
<p>Credit limit up to 10,000 yen /month</p> 	<p>Payment together with mobile phone charges</p> 
<p>Free membership /annual fees</p> 	<p>Check statement through i-mode</p> 

	<h3>DCMX</h3> <p>For credit more than 10,000 yen Use DCMX as your main credit</p> <p>Service started on May 26, 2006</p>
<p>Credit limit more than 200,000 yen</p> 	<p>Earn DoCoMo points</p> 
<p>VISA or MasterCard (planned)</p> 	<p>Over sea travel insurance</p> 

Fulfillment of Security Functions

User recognition with:

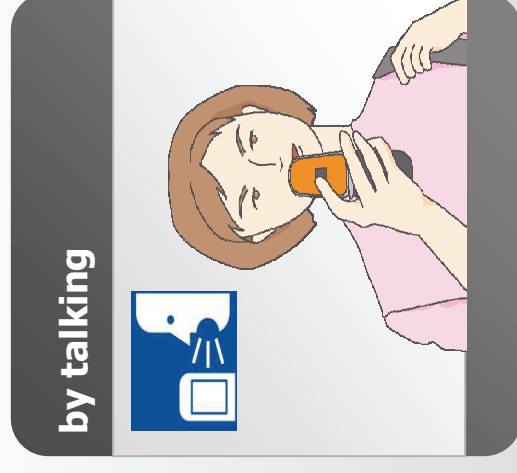
Face



Voice

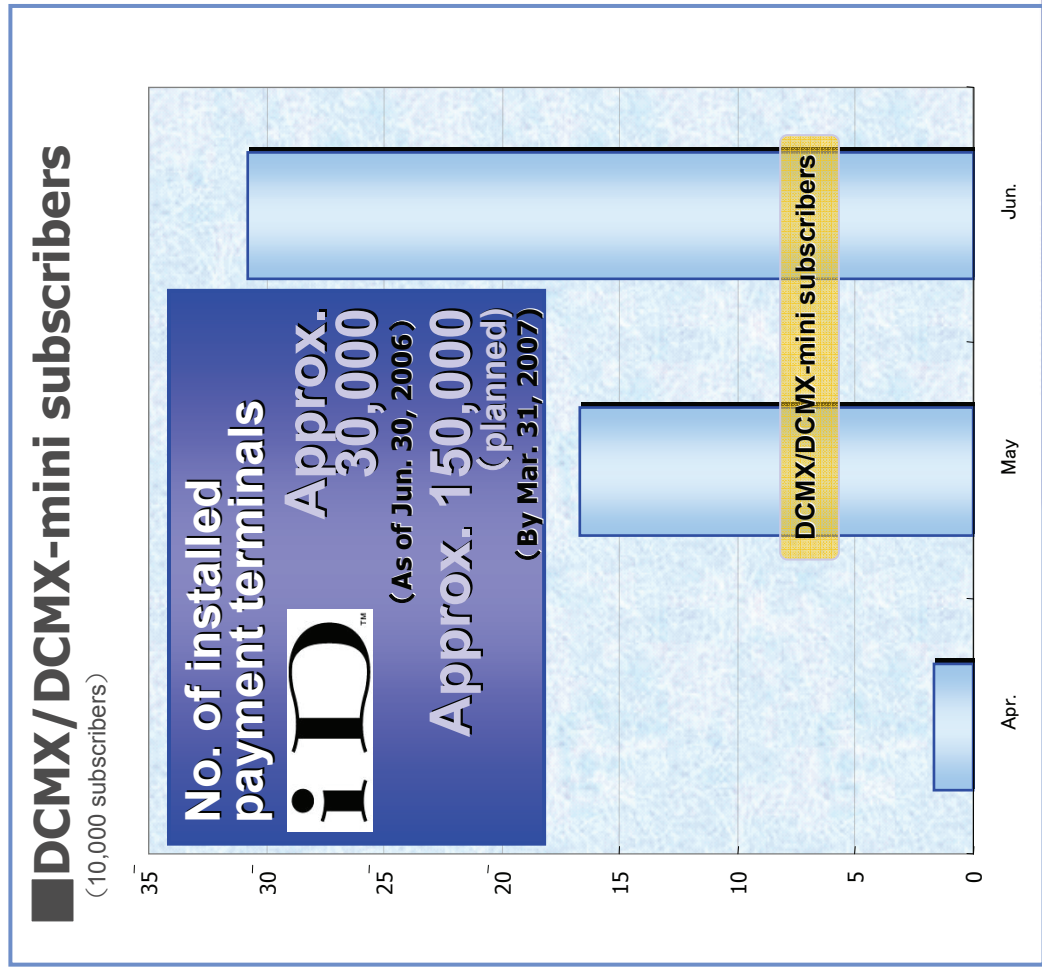
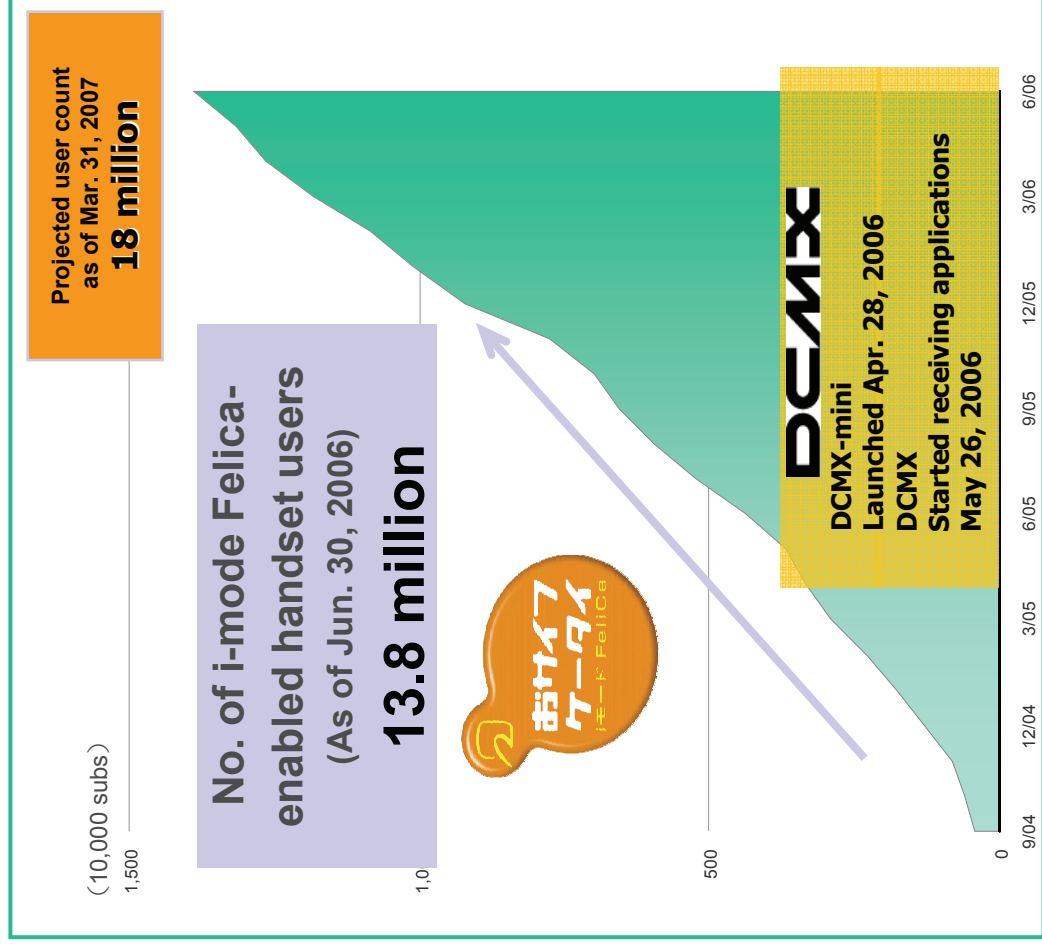


Finger print



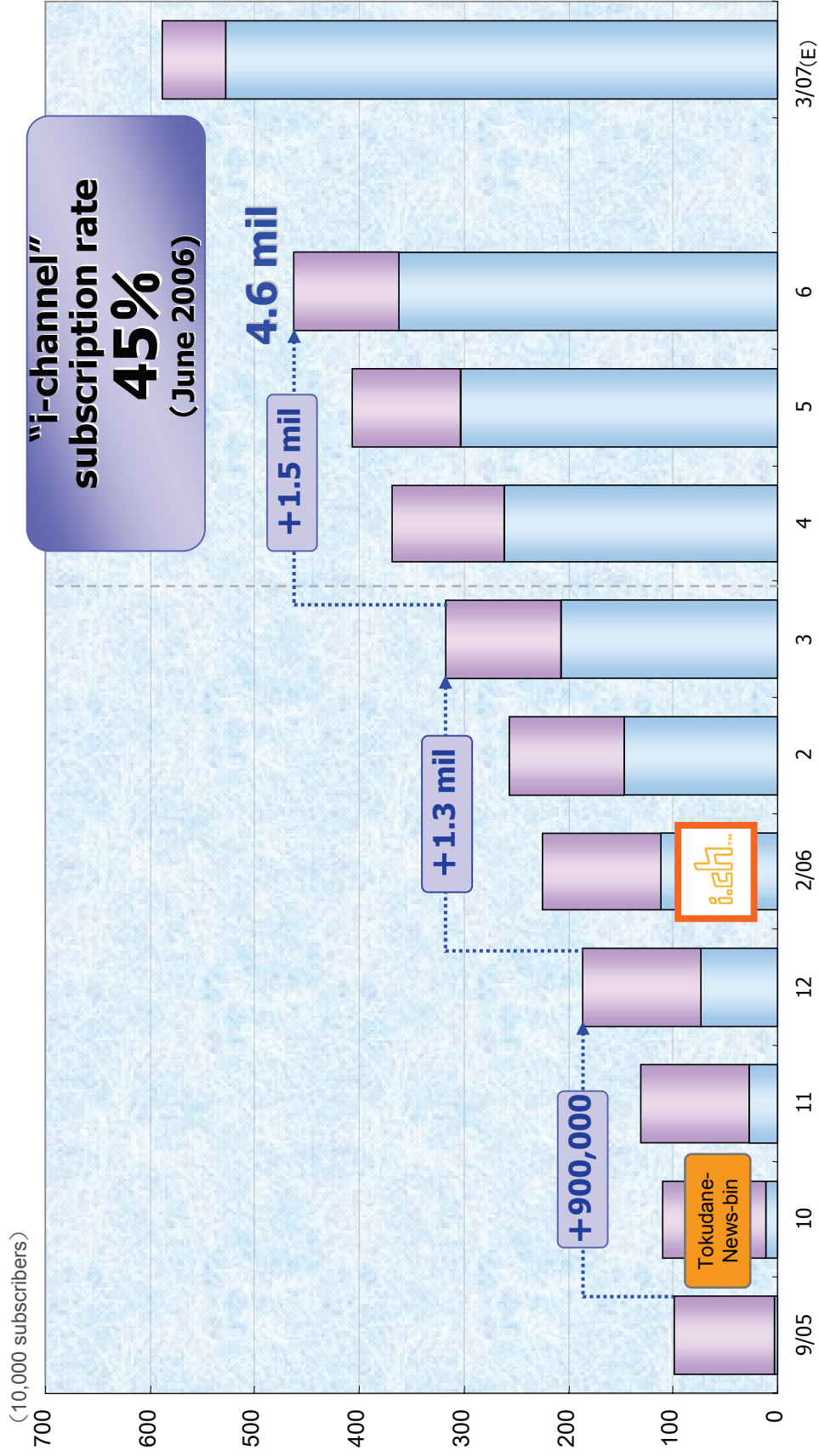
Credit card Business

- “DCMX” made a favorable start, acquiring over 450,000 subs by late July 2006.
- “DCMX-mini” has been used primarily for small-amount purchases.



Push Information Delivery Service

Uptake of push information delivery services (“i-channel”+“Tokudane-News-bin”) has been growing at a rapid pace.



* "i-channel" subscription rate: No. of "i-channel" subscribers/ Total users of compatible handsets

Three Main Pillars of Business Operation



3. DoCoMo's R&D Activities

Mission of R&D Activities at NTT DoCoMo

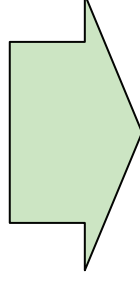
Contribute to DoCoMo's business by promoting unified R&D activities in the fields of radio, network and devices.

- **Enhance DoCoMo's core business**

(by improving functionality and performance of the communication system etc.)

- **Creation of new business domains**

(early realization of various services etc. for differentiations)



Contribute to the evolution of the mobile industry

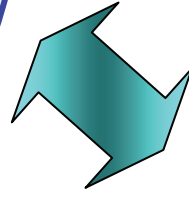
(Launching of the first W-CDMA service in the world, realization of i-mode service etc.)

R&D Activities at NTT DoCoMo

<Future mobile technologies and systems>

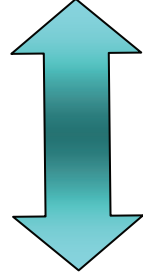
Research

- Broadband radio transmission technology
- Next generation network technology
- New generation communication, new concept communication
- Combating EMC issue etc,



Development

- Systemization technology
- Core network technology
- Handset technology
- Service application
- Advanced operation system etc..



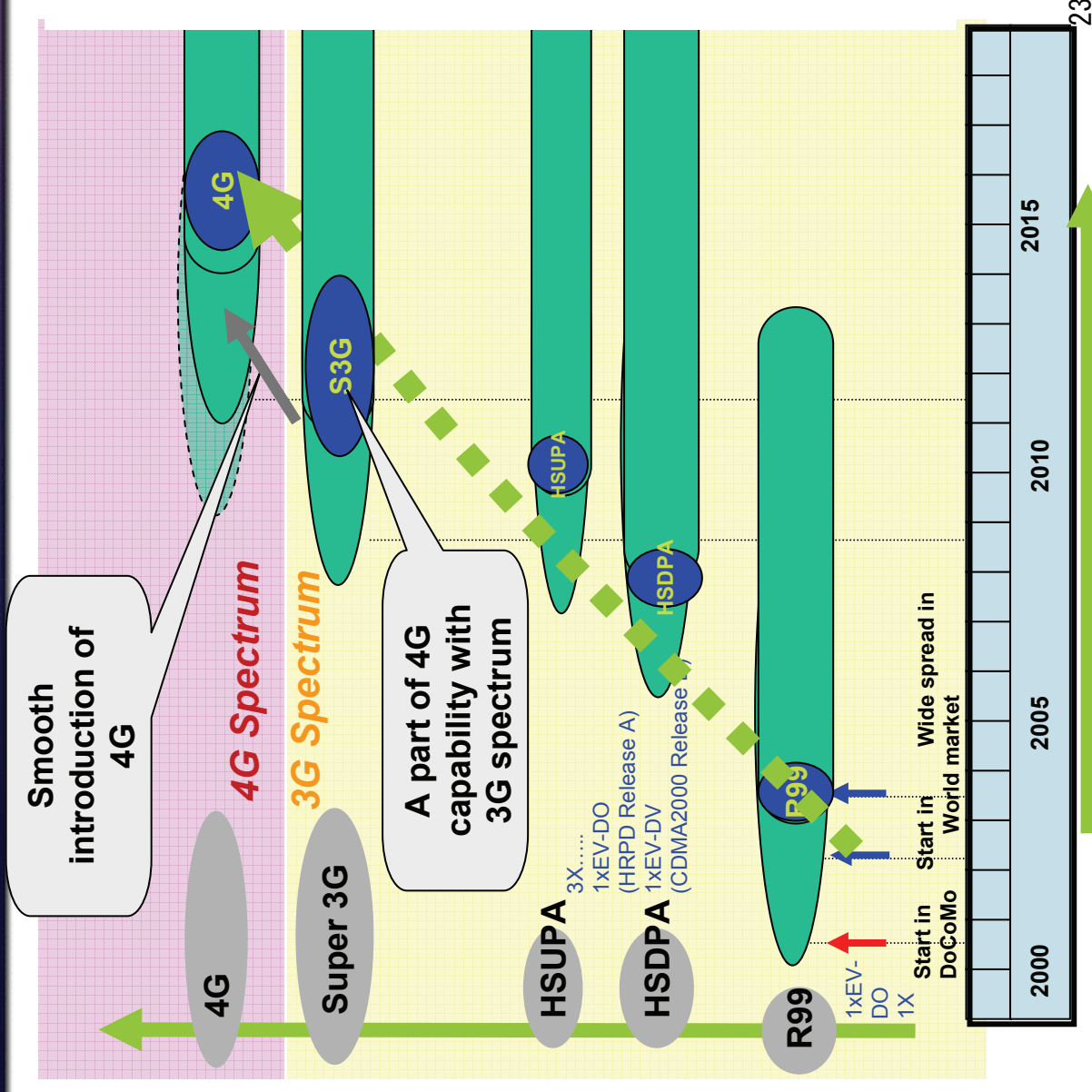
Promote improvement and development of related technologies

- Platform
- Information system (billing system etc.)
- Operation and maintenance

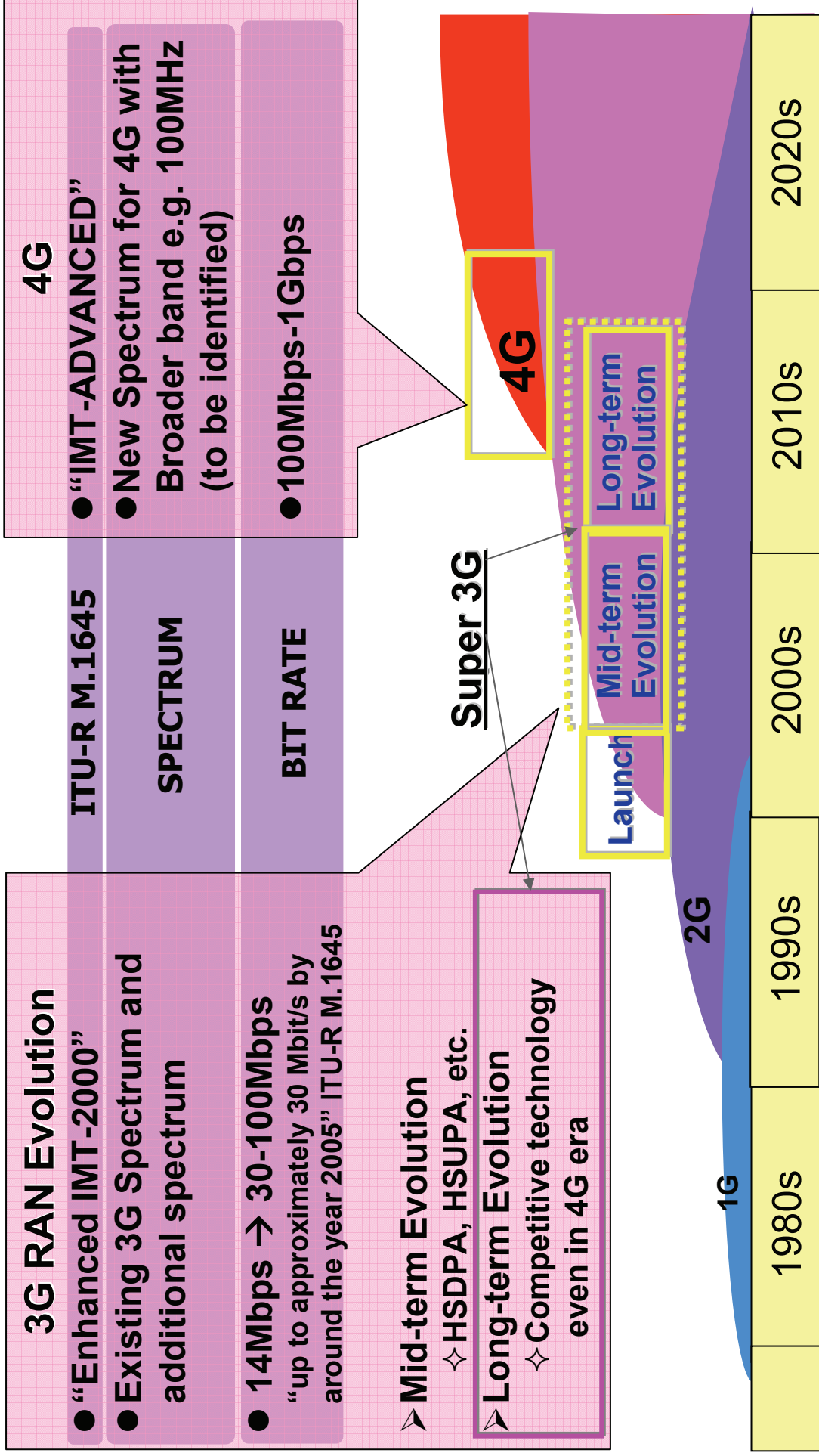
<Current/planned systems>

Super 3G Contents

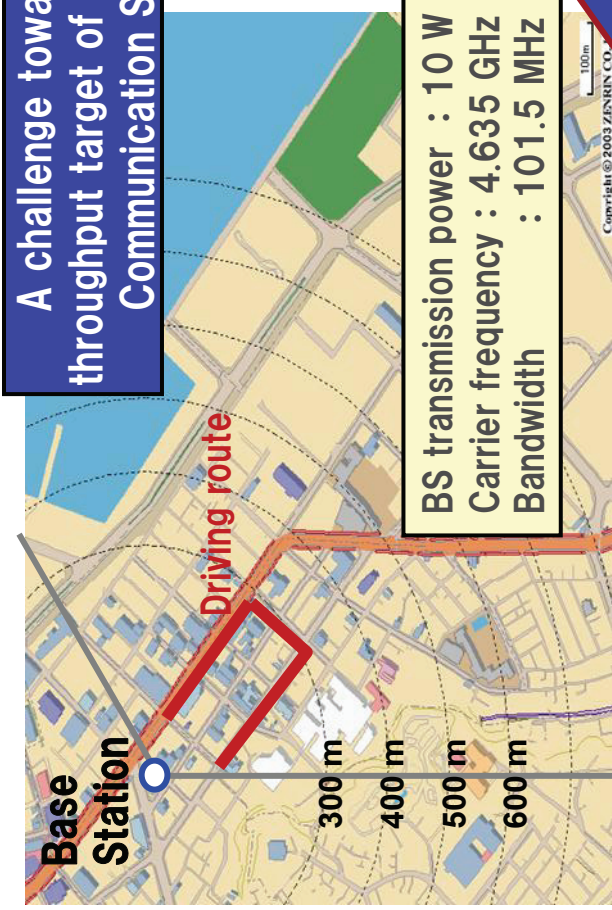
- **High-level Objective**
 - To ensure the continuous and long-term growth of mobile communication industry
 - To provide competitive capability even in the 4G era (Realization of a part of 4G capability using 3G spectrum)
 - Realization of excellent access which has no restriction caused by radio transmission (All services, such as real-time VoIP communication, can be provided without CS NW in the ultimate stage)
 - To provide a smooth migration path to 4G
- **Technical requirements**
 - Low latency (Short transmission delay and call establishment time)
 - High data speed, Capacity
 - Smooth migration with reasonable CAPEX and OPEX



Position of Super 3G versus 4G



4G Technologies : Field Experiments(1Gbps)

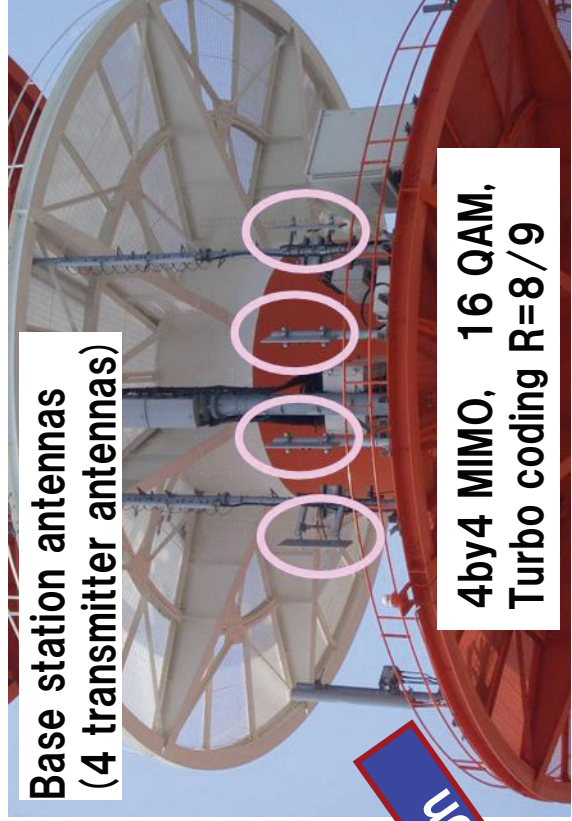


A challenge toward the throughput target of 4G Mobile Communication System

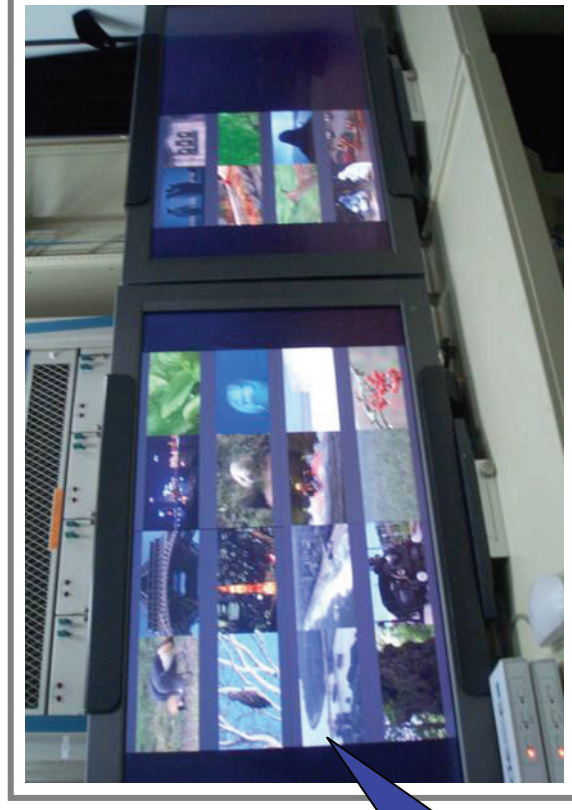
BS transmission power : 10 W
Carrier frequency : 4.635 GHz
Bandwidth : 101.5 MHz



Simultaneous display of 24channels of HD video by 1Gbps transmission



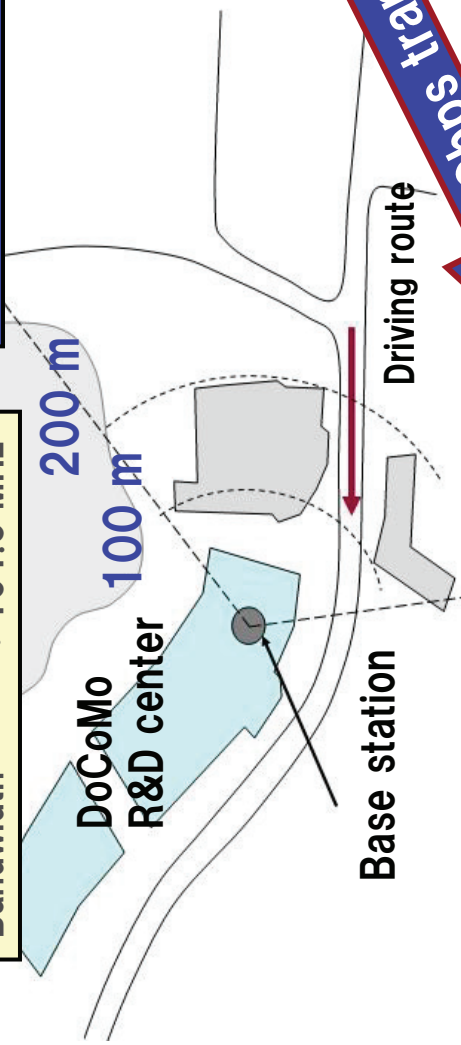
1 Gbps transmission



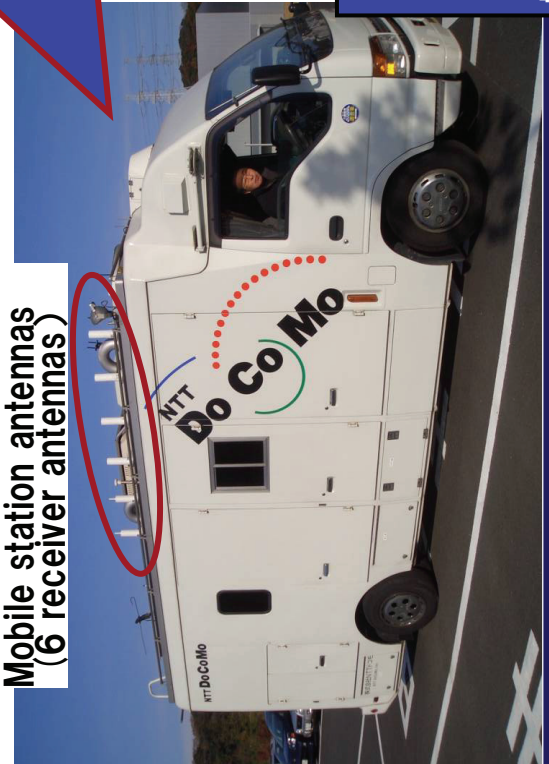
4G Technologies : Field Experiments(2.5Gbps)

A challenge toward the target of spectral efficiency

BS transmission power : 19 W
 Carrier frequency : 4.635 GHz
 Bandwidth : 101.5 MHz



Mobile station antennas (6 receiver antennas)



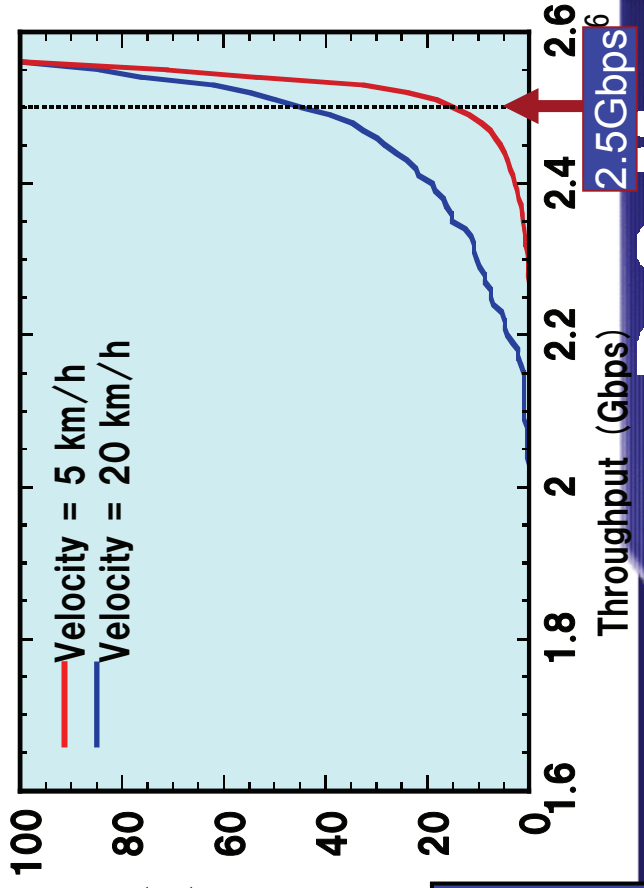
1000-times higher transmission speed than WCDMA.
 100 channels of high definition image can be transmitted simultaneously.

2.5 Gbps transmission



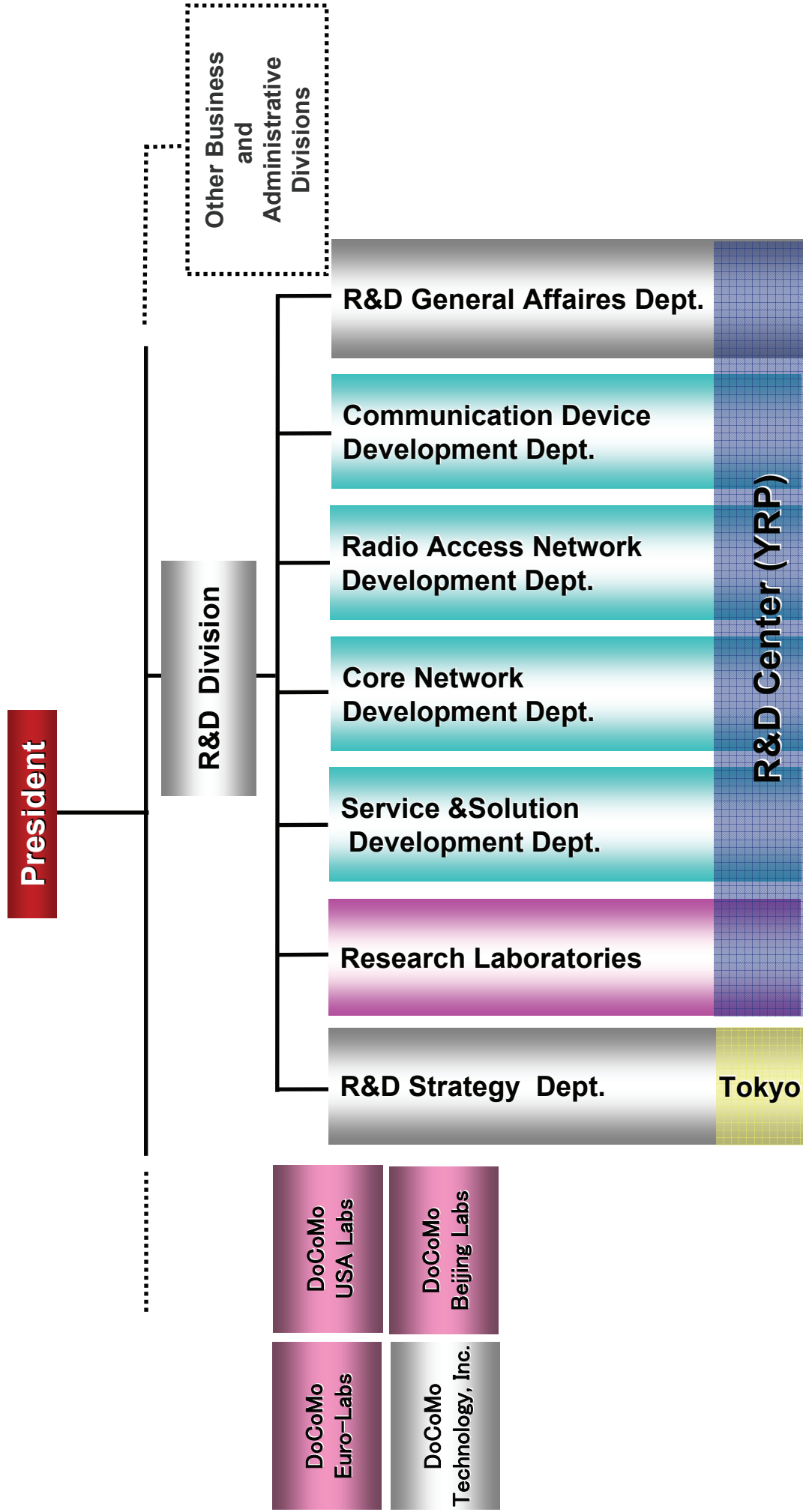
Base station antennas (6 transmitter antennas)

6 MIMO, 64 QAM, Turbo Coding R=8/9



4. DoCoMo'S R&D Organization

DoCoMo R&D Related Organizations



R&D Organization to discover new technologies

DoCoMo Capital, Inc.

**Founded
May 2005**

DoCoMo Beijing Labs.

Dec. 2003



DoCoMo USA Labs.

Nov. 1999



YRP R&D Center

Mar. 1998



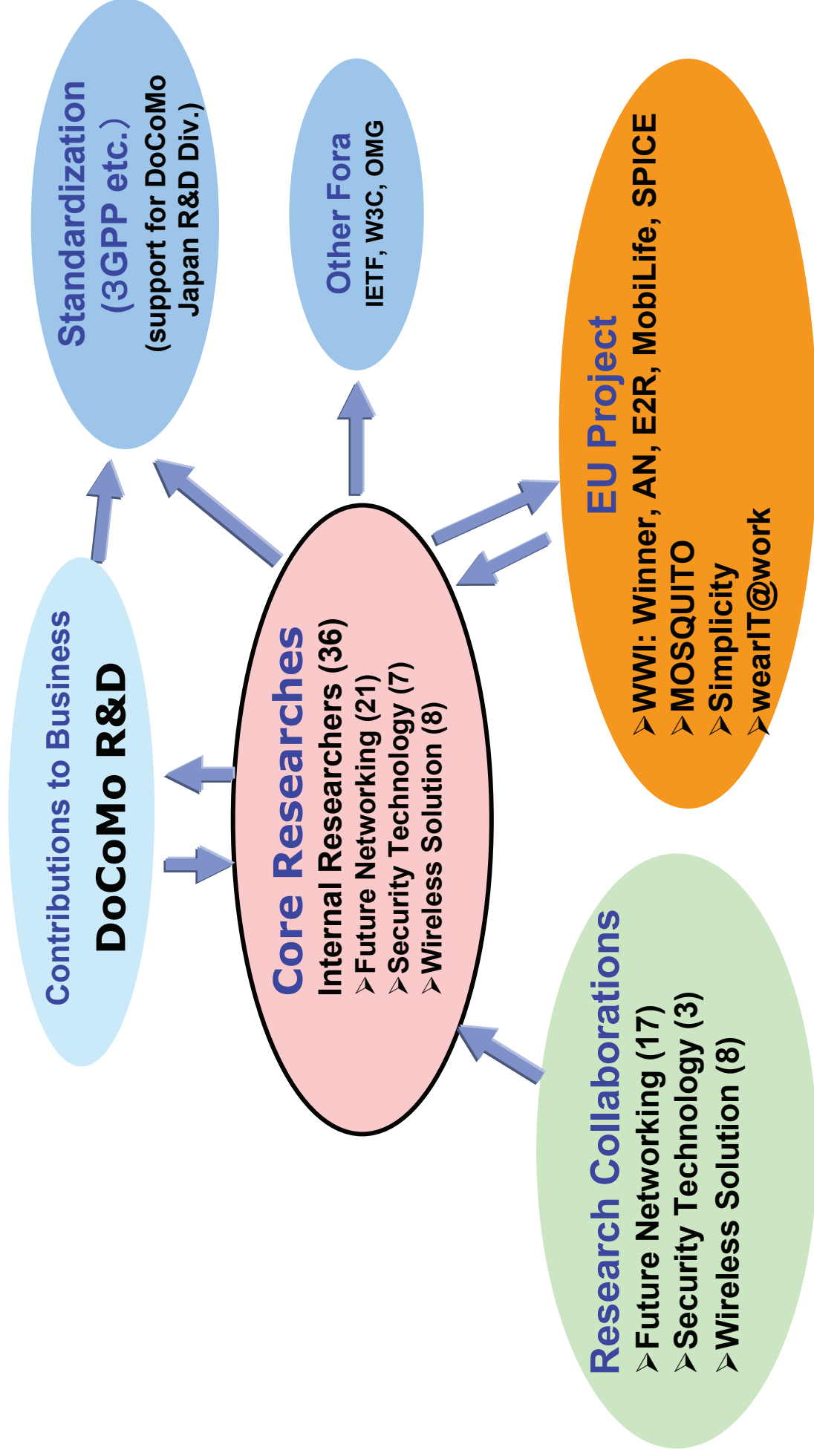
DoCoMo Euro Labs.

Nov. 2000



YRP: Yokosuka Research Park

Framework for research activities

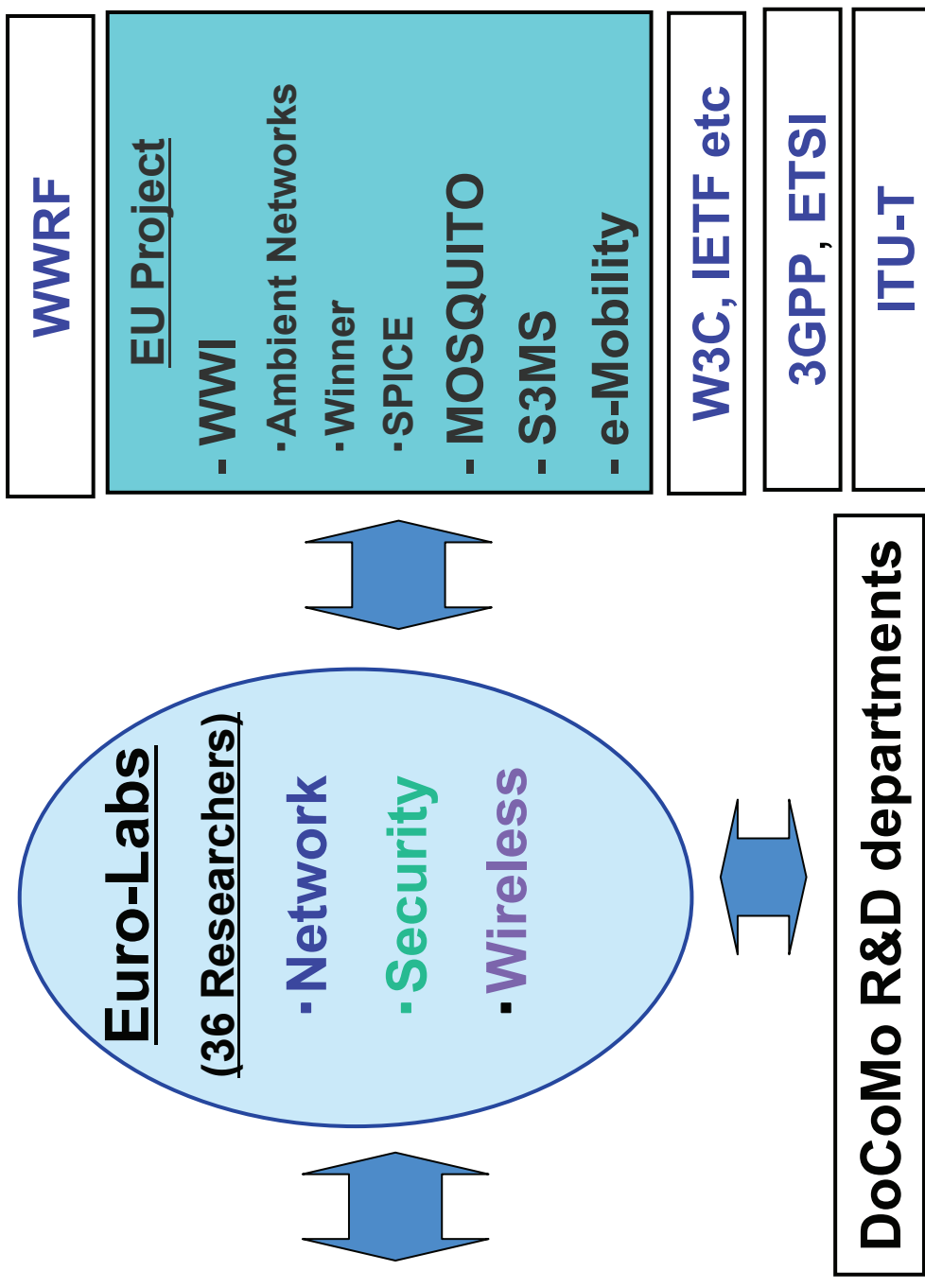


Euro-Labs research activities

Universities

Technical Univ. of Munich
Technical Univ. of Berlin
Univ. of Karlsruhe
Univ. of Ulm
ETHZ, Switzerland
EPFL, Switzerland
Coimbra Univ.
Univ. of Columbia
etc.

Research Projects/ Standardization Bodies



Thank you

