

# Wireless Broadband Business Growth Strategy

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**NEC Corporation**

To be a leading global company  
leveraging the power of innovation  
to realize an information society  
friendly to humans and the earth

**NEC Group Vision 2017**

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# **1. Business Overview**

## **2. Key Business Strategy**

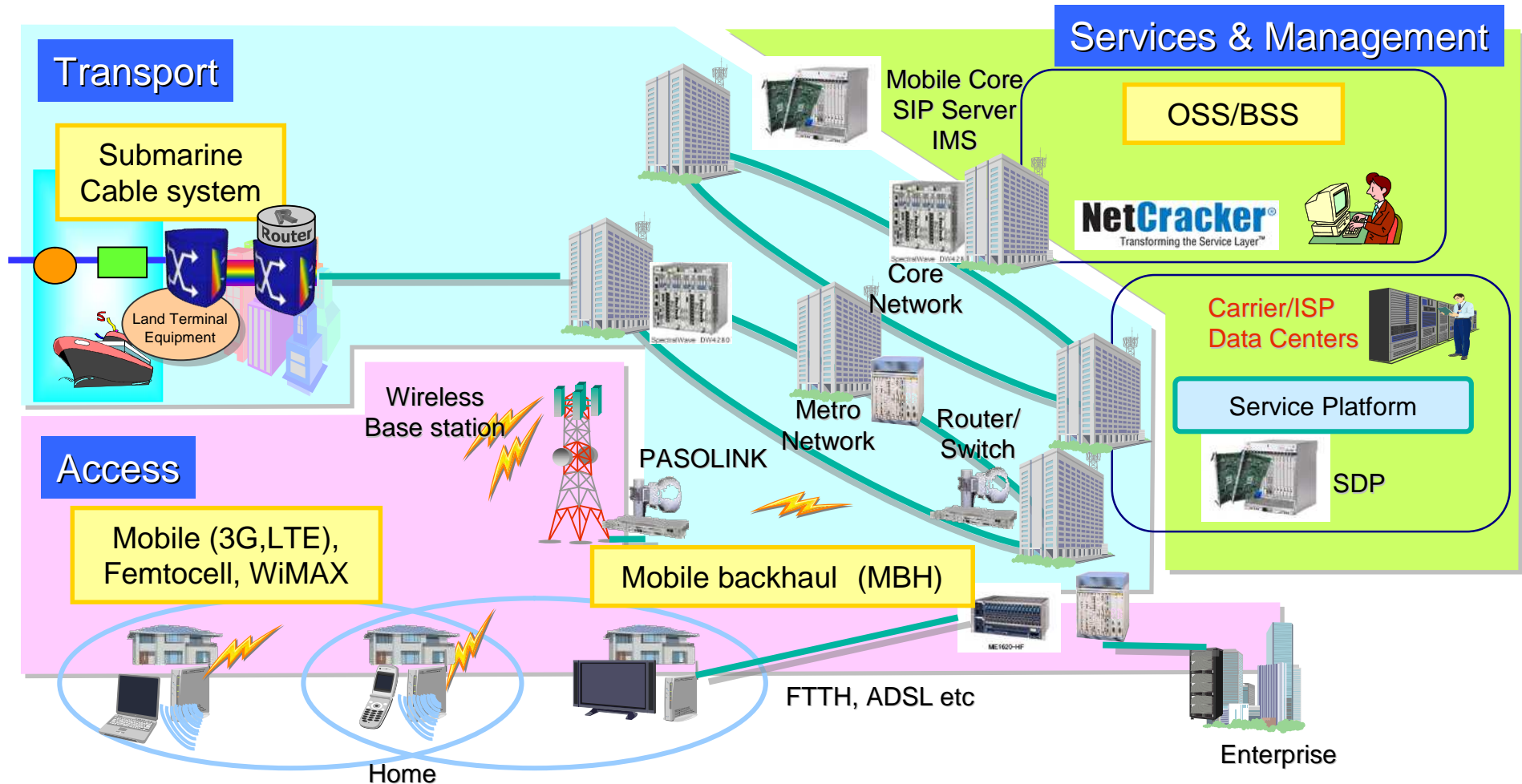
### **2.1 LTE Business Strategy**

### **2.2 Mobile Backhaul Business Strategy**

## **3. Toward Achieving V2012**

# Business Domain

- To provide products/systems/services which are necessary for transformation of carrier service as a business partner



# Wireless Broadband (WBB) Business

- **Carrier Network Business Mid Term Strategy:**

Strengthen position in the global market and recover growth and profitability

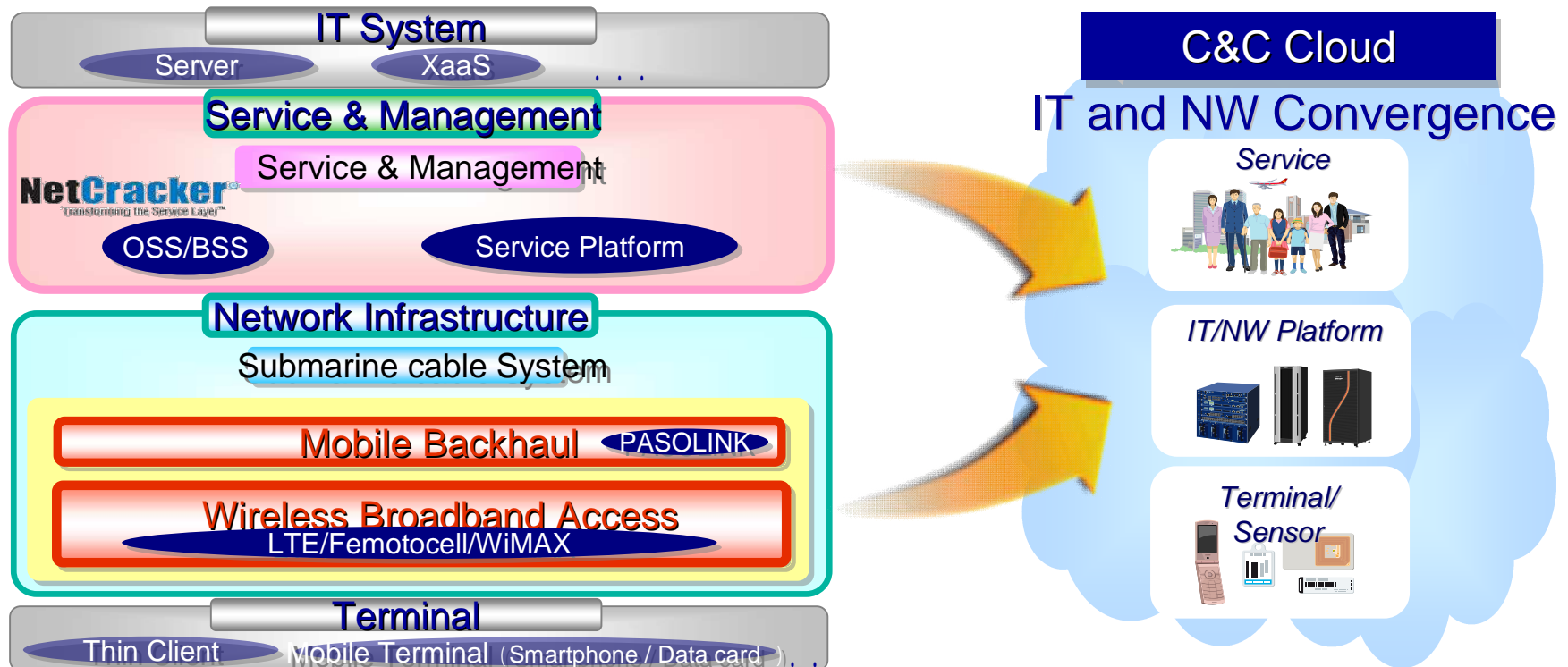
- **FY2012 Target:** Sales: JPY900B, OP Margin: 9%

Key Business Areas

1. Wireless Broadband Access
2. Mobile Backhaul

3. Submarine Cable System
4. Service & Management

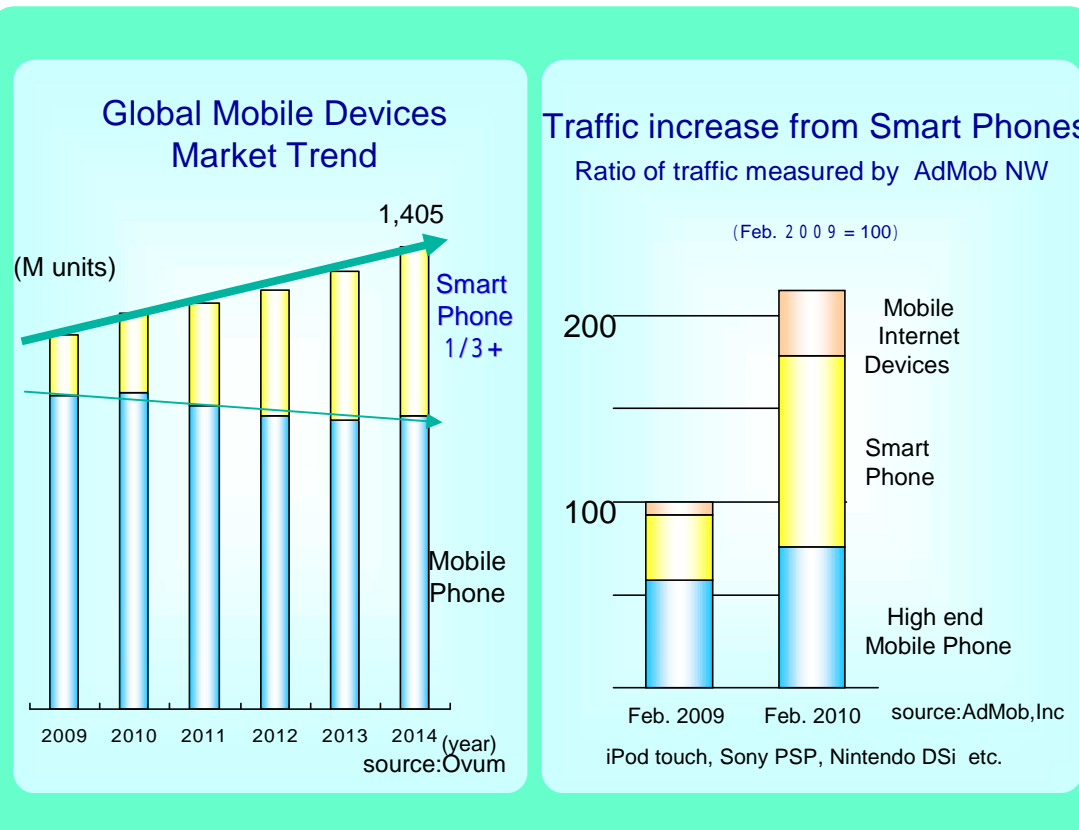
Wireless Broadband Business: Sales Target JPY 250B (FY2012)



# Wireless Broadband Access Business Environment

- Rapid increase of data traffic, including rich content, due to the increase of Smart Phones (e.g. iPhone)
- Increase in Wireless Broadband business opportunities

## Rapid increase in rich content traffic



## Business Opportunities

Provide High Speed Wireless Access/  
High Quality Radio Access Area

**<LTE>**

- Improve usability  
(High-speed, Real time)
- Expansion of rich content services

Enhanced capability and capacity  
expansion of Mobile Backhaul

**<iPASOLINK>**

- Applicable to 3G/LTE  
(Transition to packet base NW)
- Rapid increase in Mobile data traffic

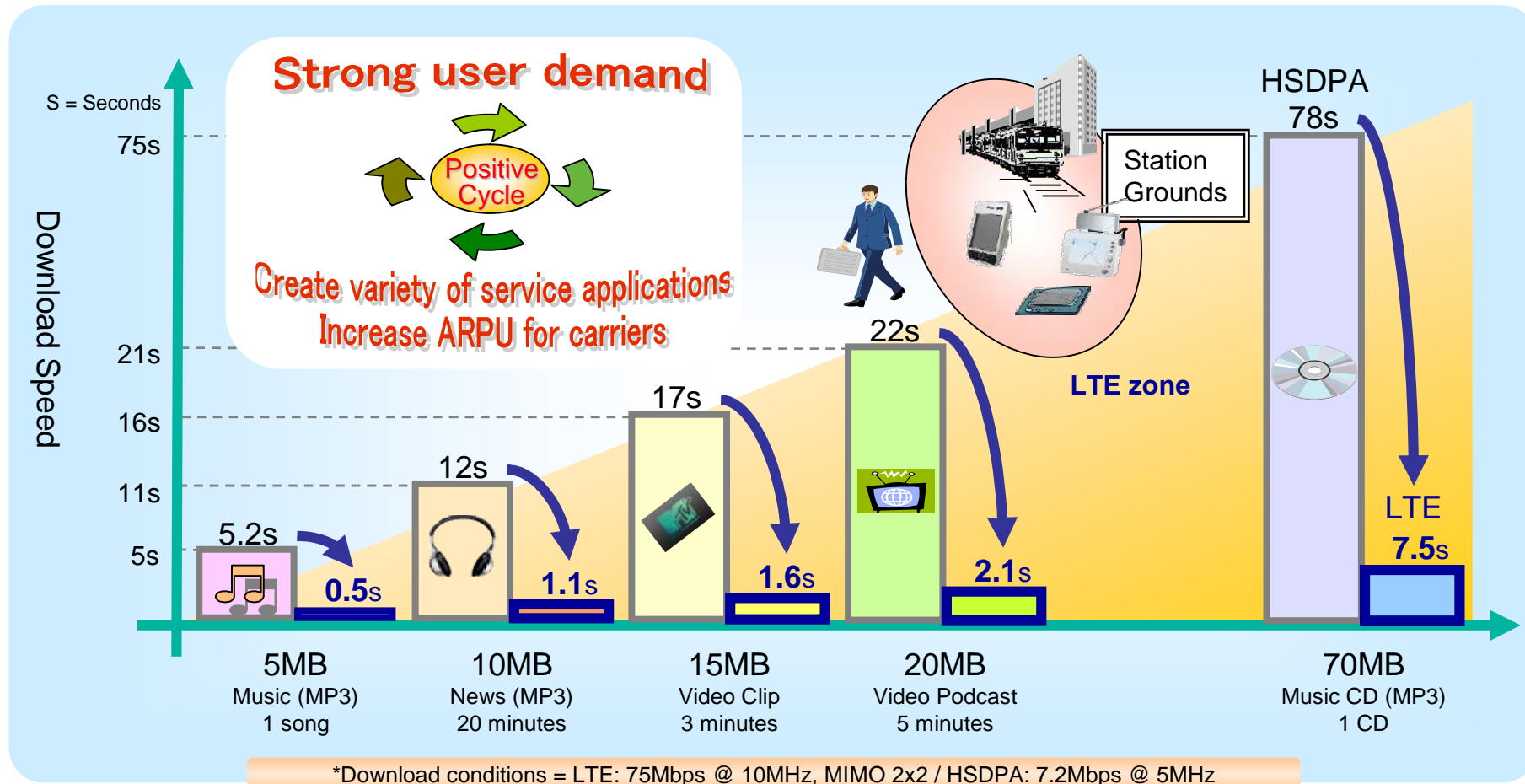
# What is LTE?

- High speed data communication service  
(**10 times faster** and **1 tenth less delay** than **HSDPA**)
- Improve spectrum efficiency (3-4 times efficient than **HSPA**)
- Support high speed mobility (up to 350km/h)

	LTE	3G (HSPA)	Points of Improvement
Access Method	Downlink: OFDMA Uplink: SC- FDMA	CDMA	<ul style="list-style-type: none"> <li>✓ Improved spectrum efficiency</li> <li>✓ Improved transmission speed</li> <li>✓ Improved transmission quality</li> </ul>
Modulation Method	QPSK/16QAM/64QAM	QPSK/16QAM	
Antenna (MIMO)	2x2 to 4x4	SISO	
Delay	< 10 ms	< 100 ms	✓ Improved transfer speed
Bandwidth	FDD 1.4, 3, 5, 10, 15, 20MHz	FDD 5 MHz	✓ Allow introduction of LTE using the existing spectrum
Transmission Speed (DL)	75Mbps@10MHz MIMO:2 x 2	14.4Mbps@5 MHz	✓ Improved transmission speed
Speed of mobility	< 350km/h	< 120km/h	✓ Support high speed mobility

# New LTE Business Opportunities

- Shorter download time and quicker responses reduces user's stress
- Creation of variety of service/applications and increase ARPU for carrier





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## 2.1 LTE Business Strategy

# Operator Trends on LTE Deployment

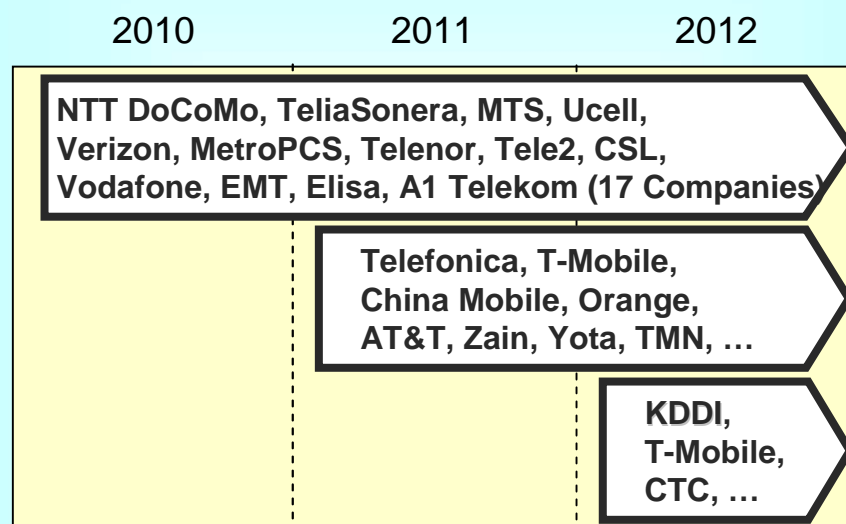
## Status of LTE deployment by operators

- 180 operators in 70 countries are investing in LTE
- 128 LTE network commitment in 52 countries
- At least 64 LTE networks are anticipated to be in commercial service by end of 2012



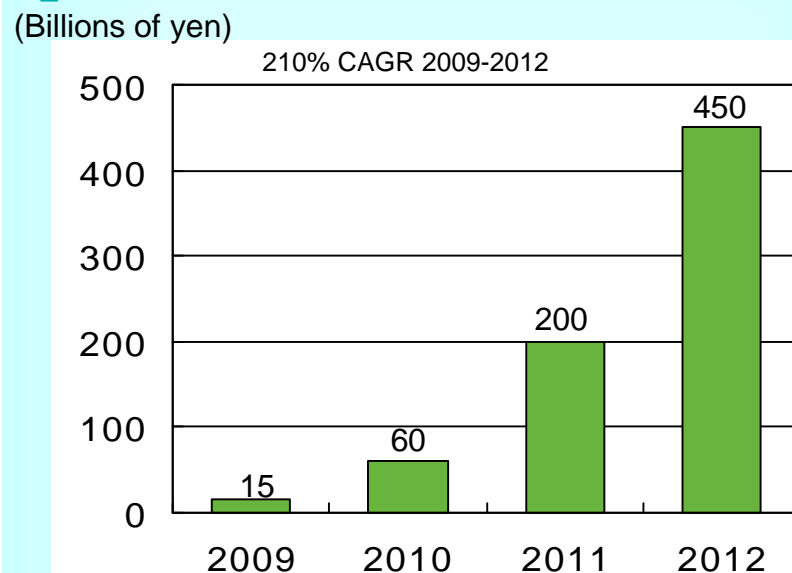
Source: Global mobile Suppliers Association (GSA)  
Evolution to LTE report (October 26, 2010) www.gsacom.com

## Launch of Commercial LTE Networks



Source: List compiled by NEC based on press announcements and research firm data

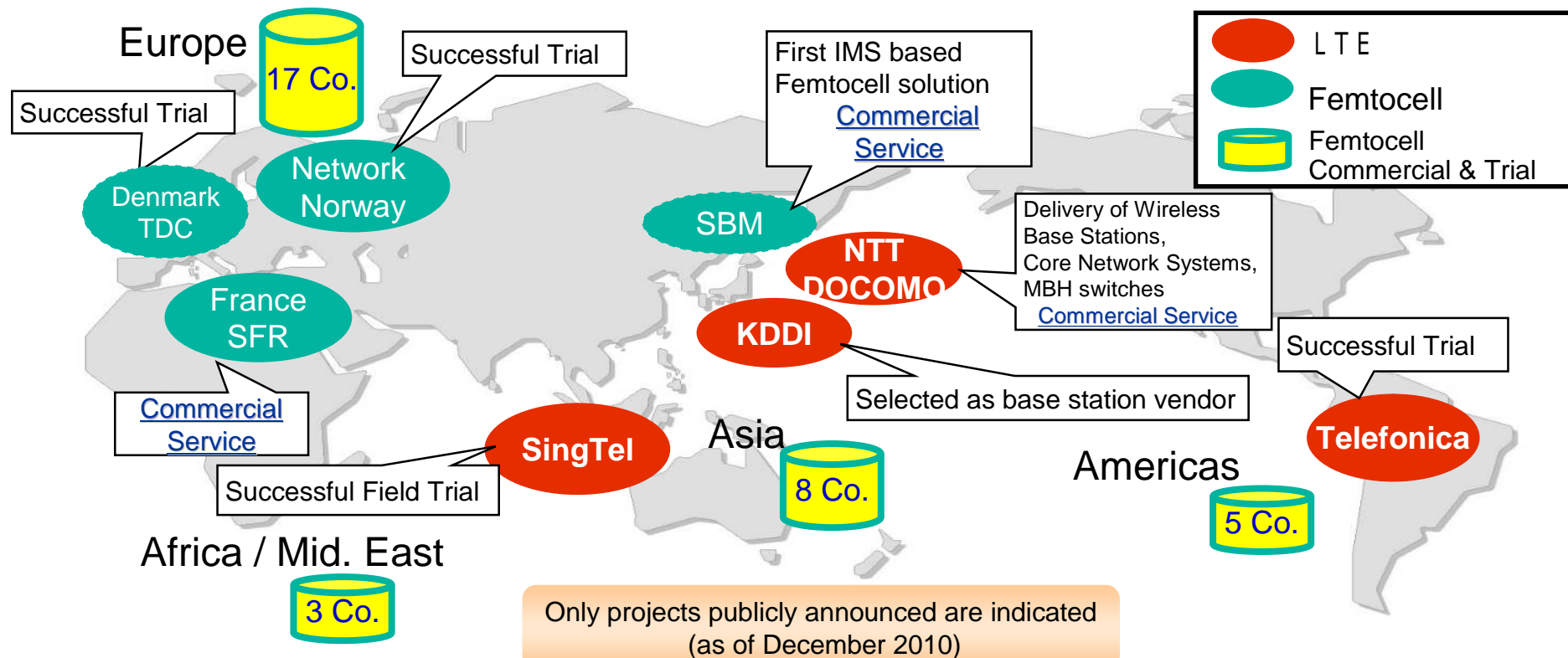
## Global Market Size of LTE Equipment



Source: NEC' estimates based on research firm data

# LTE Business Strategy

- Successfully complete projects for leading domestic carriers and expand globally
  - Capitalize on the Femtocell footprint and Small Cell Solution which manifest high speed of LTE
- Expand LTE business by entering the TD-LTE market segment



# Target Market Segments for LTE

- Cultivate enhancement market segment for mobile Broadband service providers and market segment providing high-speed WiFi / fixed Broadband services

## Mobile BB Service

- High-speed data services for 2G/3G/cdma networks
  - 3G LTE migration
  - GSM LTE migration
  - cdma LTE migration
- High-speed data services for emerging networks with LTE (TD-LTE) markets

Market Scale:  
JPY400 billion in 2012

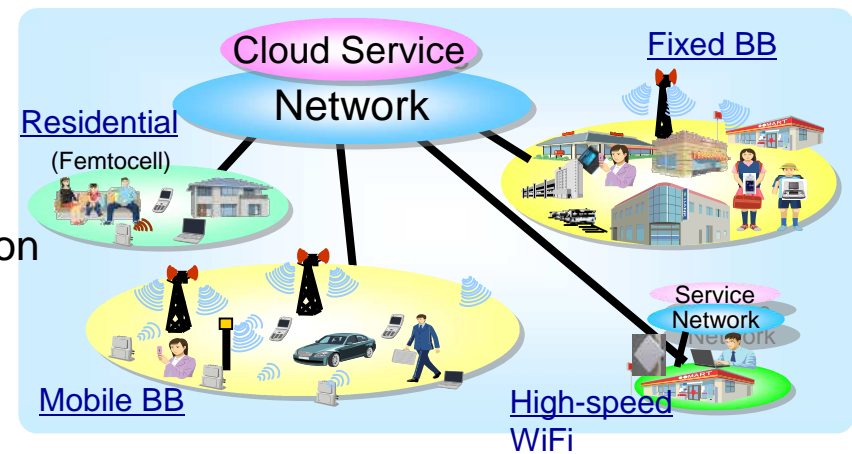
## High-speed WiFi BB Service

- Wireless backhaul for public WiFi service access points
- Wireless access for mobile WiFi routers

## Fixed BB Service

- FBWA (Fixed Broadband Wireless Access)
- Broadband wireless access for SOHO

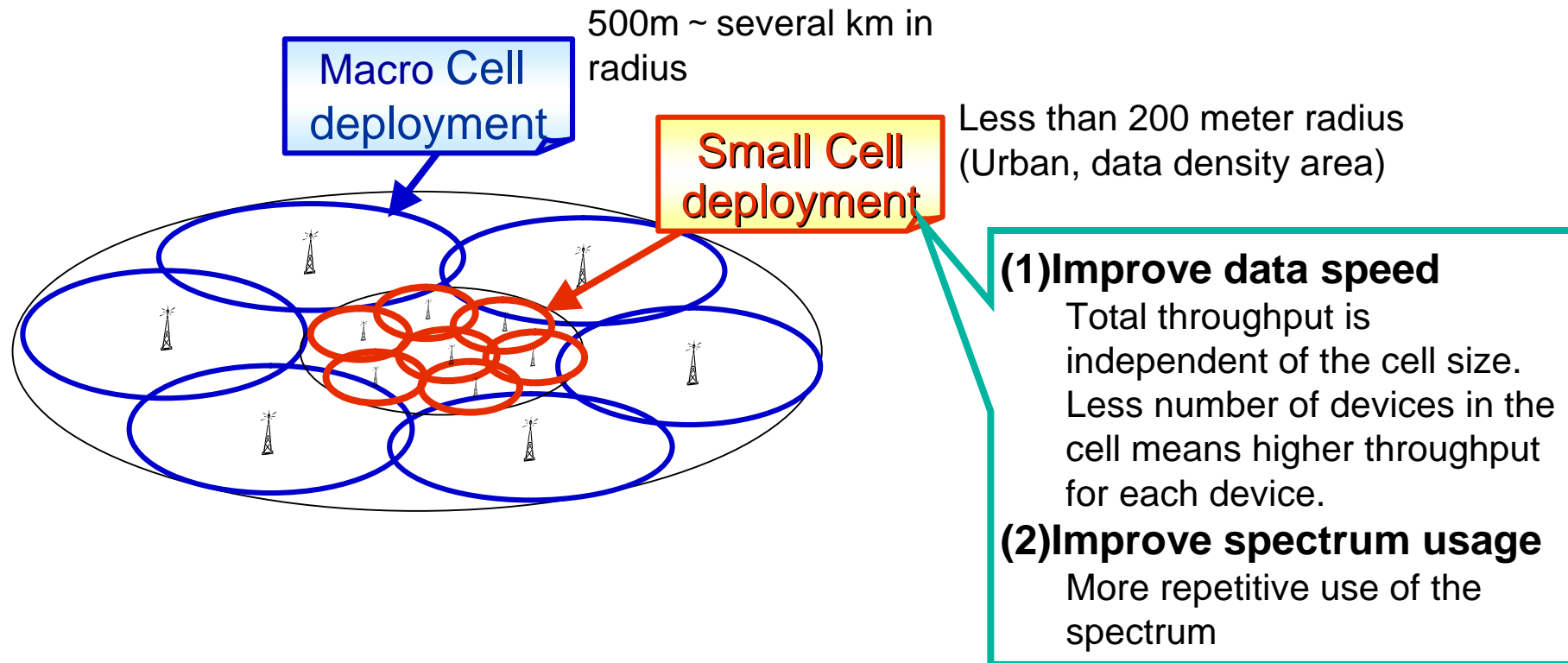
Market Scale:  
JPY50 billion in 2012



# Strategy for Mobile BB Service

## Small Cell Solution

- Provide Small Cell Solutions that manifest high speed of LTE, in addition to macro cell deployment
- Applicable to zone deployment in urban areas / data dense regions
- Enter market with small, lightweight and easy to install base stations



# TD-LTE Market Strategy

## ● TD-LTE Market Expansion

- TD-LTE is strategically promoted by Chinese government
- In India, winner of BWA spectrum in 2010 proactive to deploy TD-LTE
- TD-LTE adoption planned by Clearwire (USA), Yota (Russia), FarEasTone (Taiwan), etc.

\* 33% of 18 companies surveyed by GSA plans to deploy TD-LTE



## Chinese Market

- Joint LTE product development by business collaboration with WRI  
Capitalize on NEC's LTE development assets in combination with WRI's TD-LTE technologies to optimize development  
(Develop TD-LTE base stations with common FD/TD LTE platform)
- Leverage WRI's sales channels  
Enter Chinese market utilizing WRI's sales channel and 3G footprint

## Other Oversea Market

- Cultivate PASOLINK market footprint with products developed in China following the success in Chinese TD-LTE market

# Summary of press release (for Reference)

## ● **NEC and WRI Collaborate on LTE Infrastructure Business**

- Cooperation with WRI on development, manufacturing, sales and field support
  - Collaborative target: LTE base stations, maintenance and operation systems, and Self Organizing Network (SON)
  - These systems support both the TD-LTE and FD-LTE for Chinese market. Commercialization is planned for the second half of 2011.
- Entry into China's TD and FD-LTE market by leveraging WRI's sales channel and 3G footprint .
- Leverage the TD-LTE success in the Chinese market to expand globally

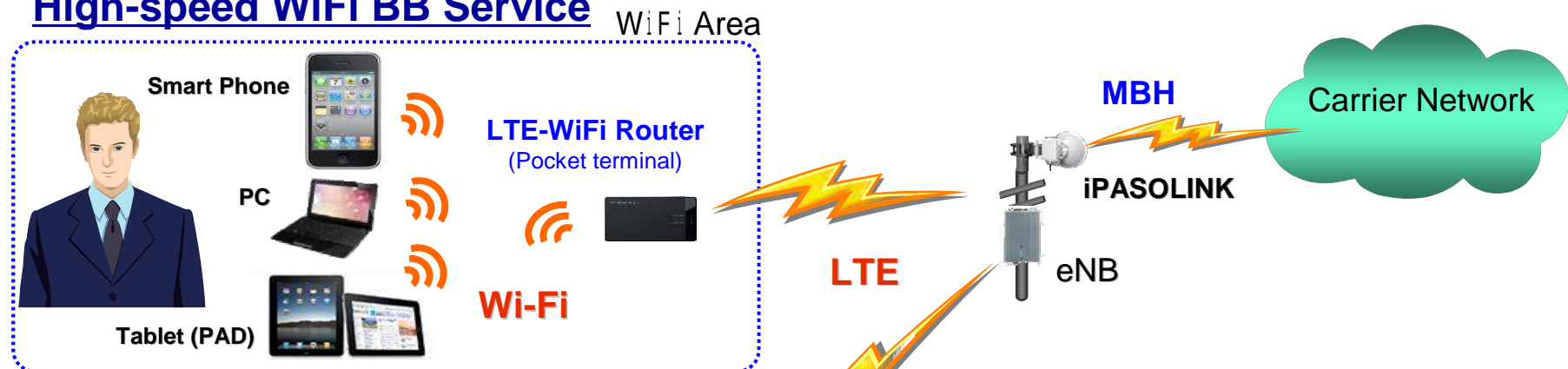
WRI operates under China's State-owned Assets Supervision and Administration Commission (SASAC) as one of the top manufacturer in China's communications Infrastructure field. Wuhan Fiberhome Mobile Communications Inc. is a joint venture between NEC and WRI established in 2005 that will market jointly developed products, mostly in the Chinese market, while NEC will mainly target other global markets.



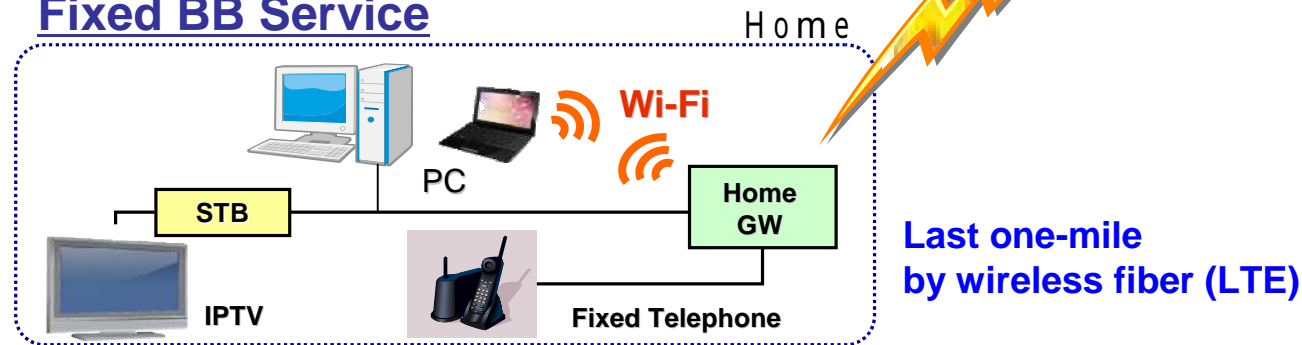
# Strategy on High-speed WiFi / Fixed BB Services

- Propose high-speed WiFi BB service / fixed BB service that utilize LTE to fixed-line operators and expand business (capitalize on the existing business footprint)

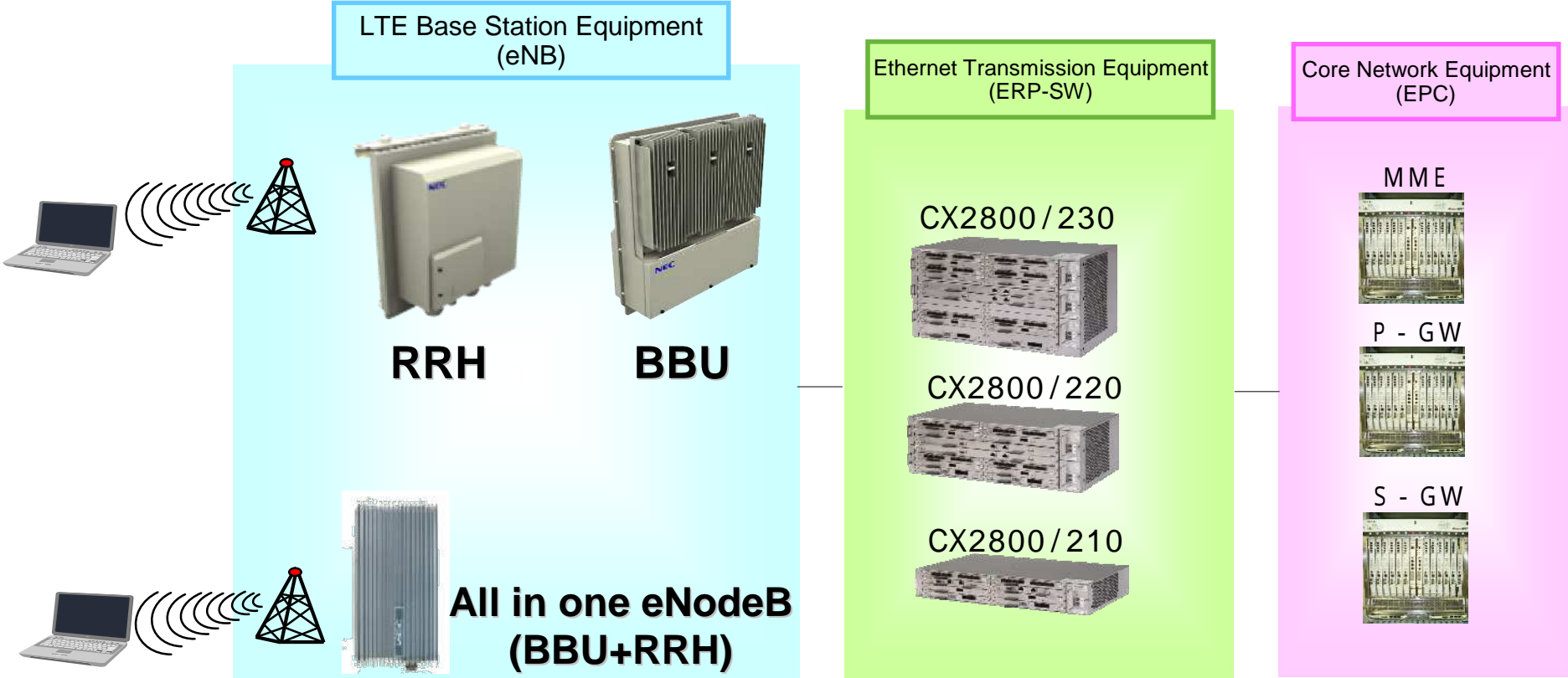
- **High-speed WiFi BB Service**



- **Fixed BB Service**



# Commercial LTE Systems

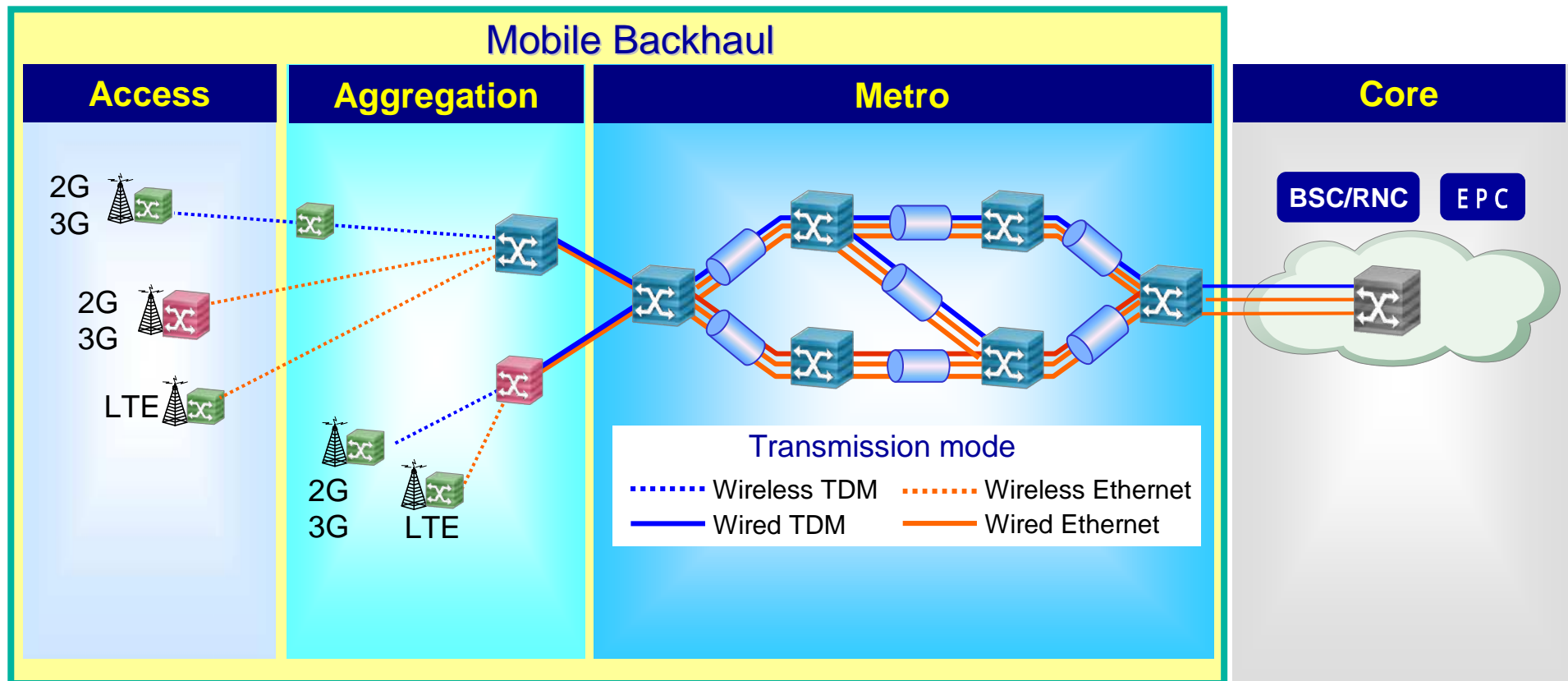


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## 2.2 Mobile Backhaul Business Strategy

# The Status and Role of Mobile Backhaul

- Mobile backhaul is an access network for mobile communications systems that transmits data traffic from mobile terminals to mobile core networks by inter-connecting several base stations scattered in wide area

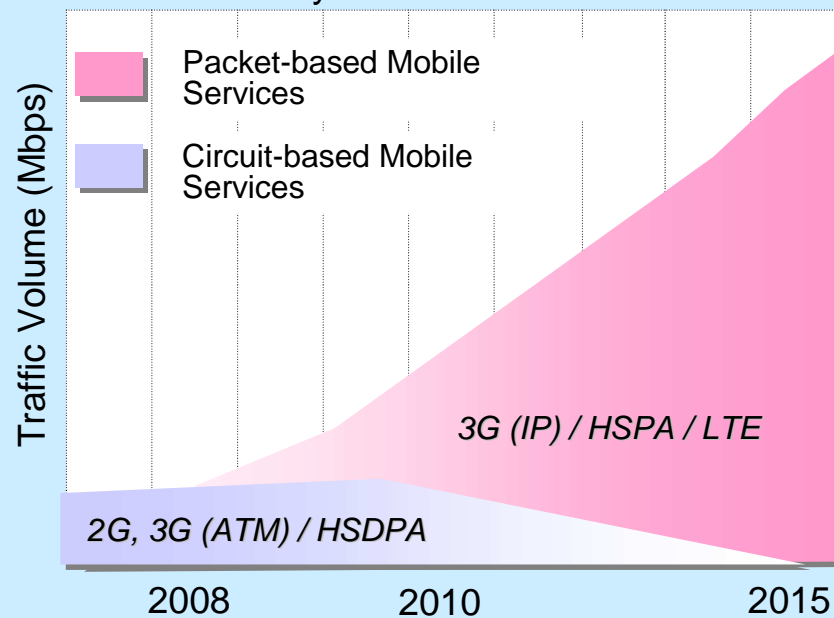


# Trends to Improve Mobile Backhaul Network

- Moving towards next generation mobile backhaul aiming to reduce OPEX and CAPEX while coping with rapid increase in mobile data traffic.
  - Demand for TDM based legacy transport such as SONET / SDH decreases
  - Demand increase for hybrid TDM & packet based transport such as ether-net

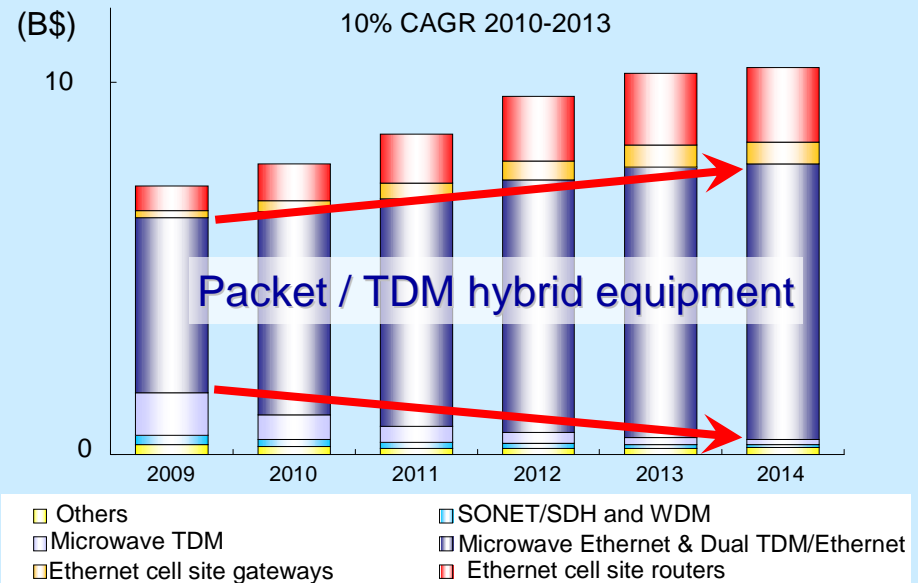
## Trend of Mobile Services

Traffic increase with wireless access system evolution



## Global Market Size for Mobile Backhaul Equipment

Packet based network migration



Source : Infonetics , Mobile Backhaul Equipment and Services

# Mobile Backhaul Requirements (Needs of Operators)

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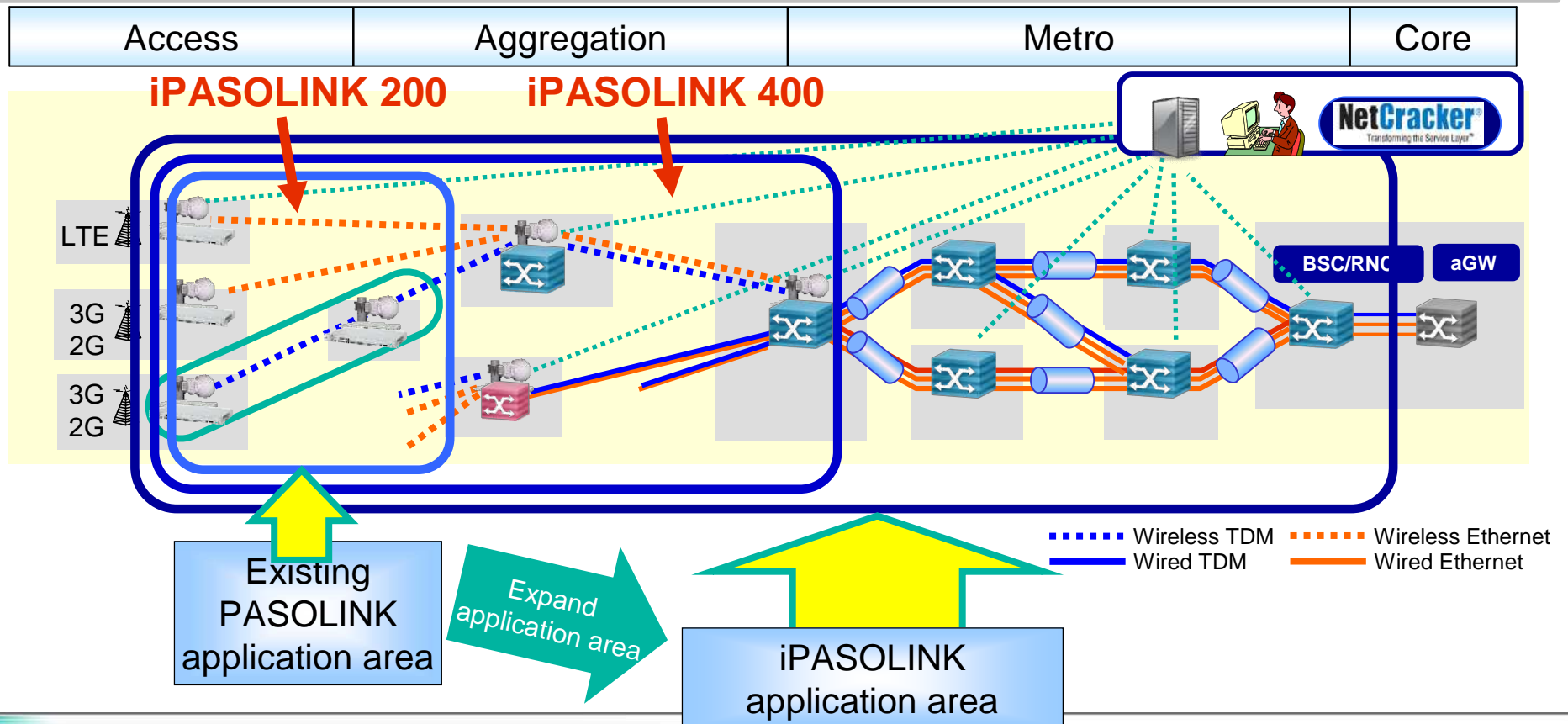
- Supports rapid growth of mobile data traffic
- Smooth migration from existing networks to next generation networks
- Power saving / space saving
- New management system to reduce operating costs



Further expand NEC's business opportunity by introducing iPASOLINK series which meets market requirements

# Meeting Next Generation Mobile Backhaul Requirements

- Converge NEC's wireless / optical / IP and OSS technologies
  - A mobile backhaul solution that uniformly and economically handle the migration from 2G 3G 3.9G (LTE)
  - The coordination of integrated NMS with OSS enables the provision of E2E / multilayer pass management and provide high reliability and scalability



# Launch of iPASOLINK 400

All-in-One Model in 1U (44mm in height)

**iPASOLINK 400**



**iPASOLINK 200**



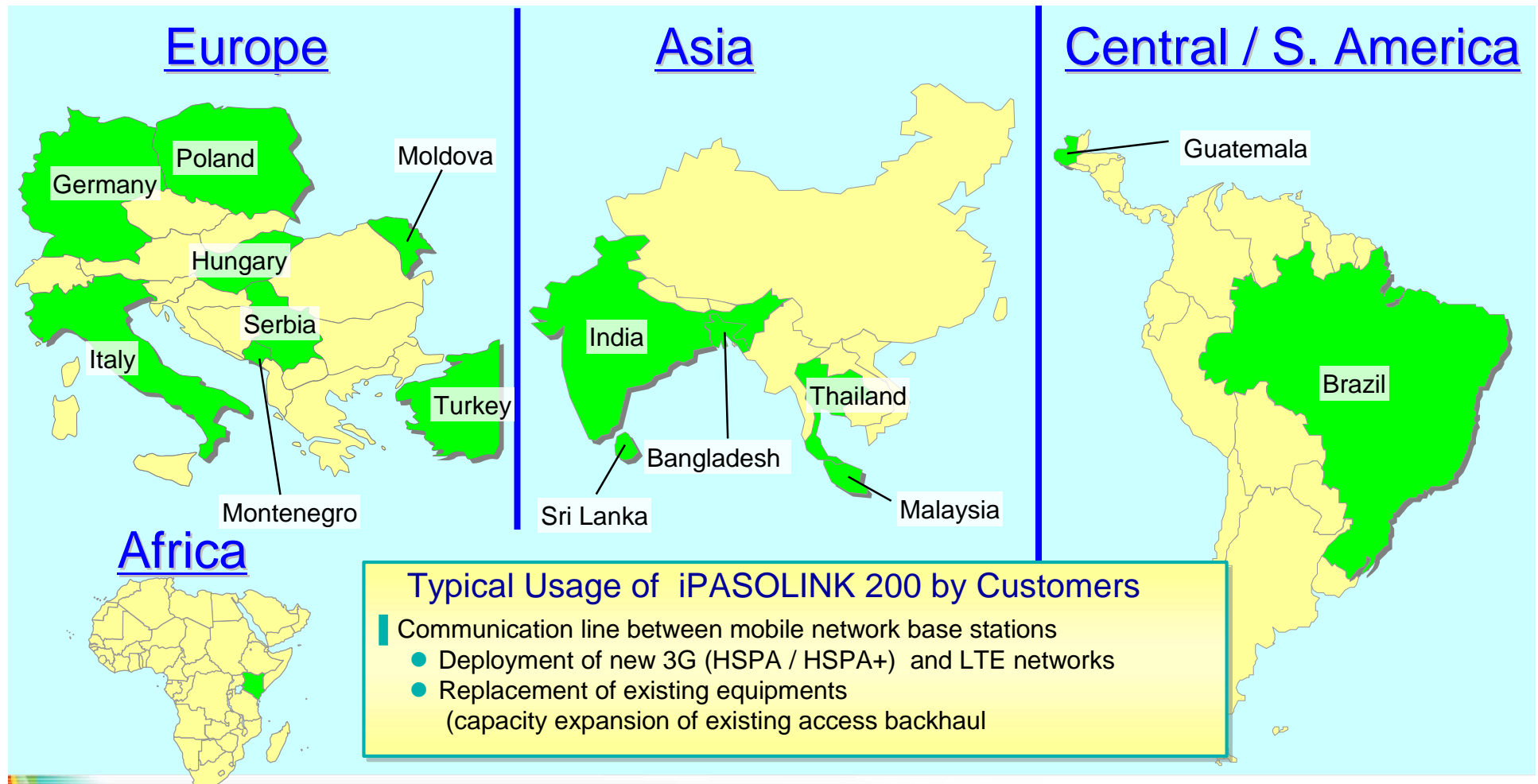
- ✓ 2-way branch (repeater function)
- ✓ Internal high capacity packet switch
- ✓ Compact design, high reliability

- ✓ Up to 4-way branch configuration in 1U
- ✓ Universal slot enables flexible expansion (transport interface and/or functionality)
- ✓ Internal high capacity packet switch
- ✓ Compact design, high reliability



# Orders for the iPASOLINK 200

- Since its commercial release on September 1, 2010 orders for 23,000 units in 18 countries has been received

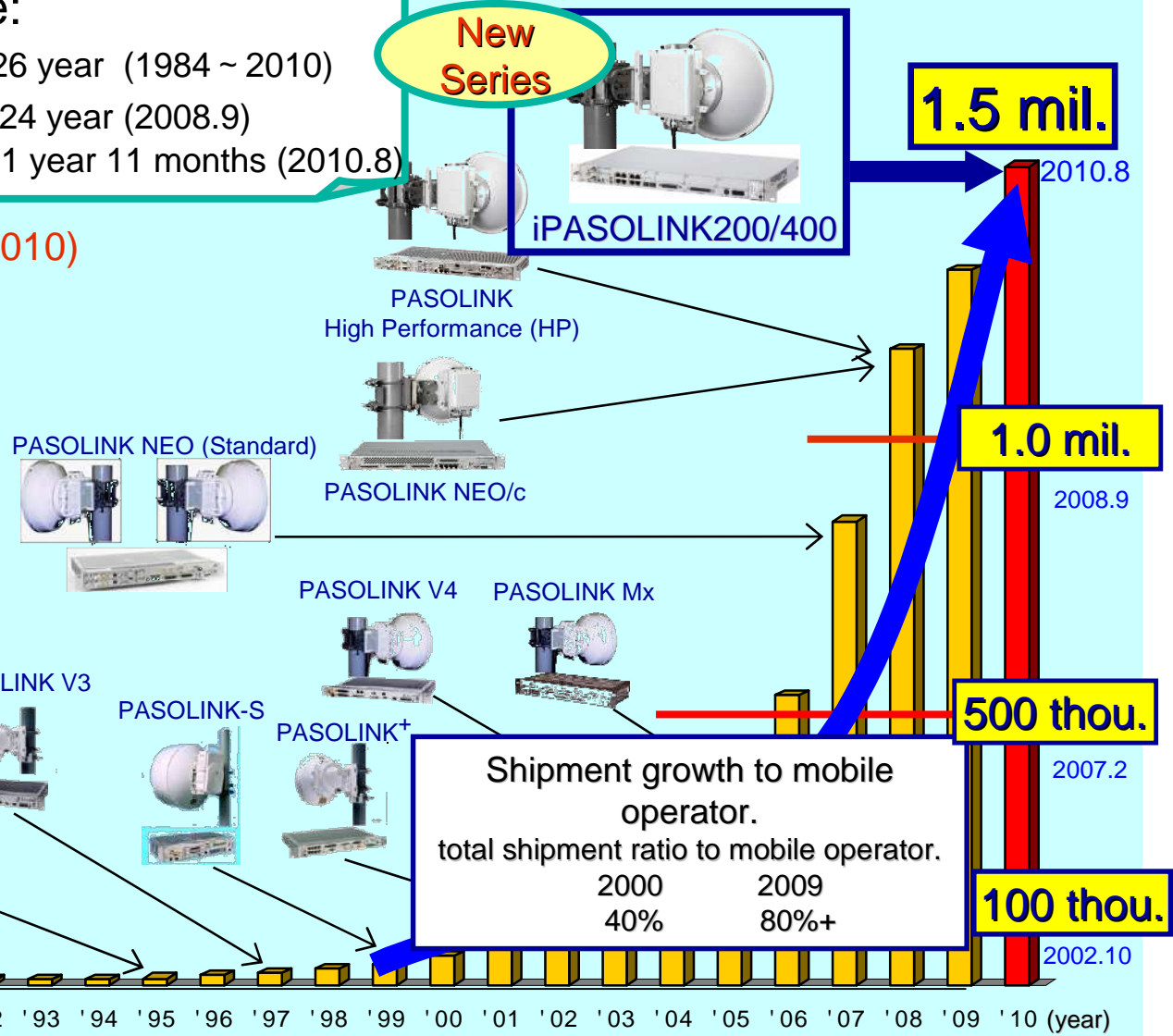
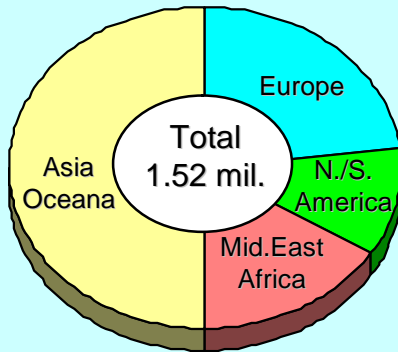


# Total PASOLINK Shipments (Over 1.5 Million)

## Major Shipment Milestone:

- 1.5 million shipments: achieved in 26 year (1984 ~ 2010)
- 1.0 million shipments: achieved in 24 year (2008.9)
- 1.0 ~ 1.5 million: achieved in 1 year 11 months (2010.8)

Countries: 145 (as of Dec. 2010)



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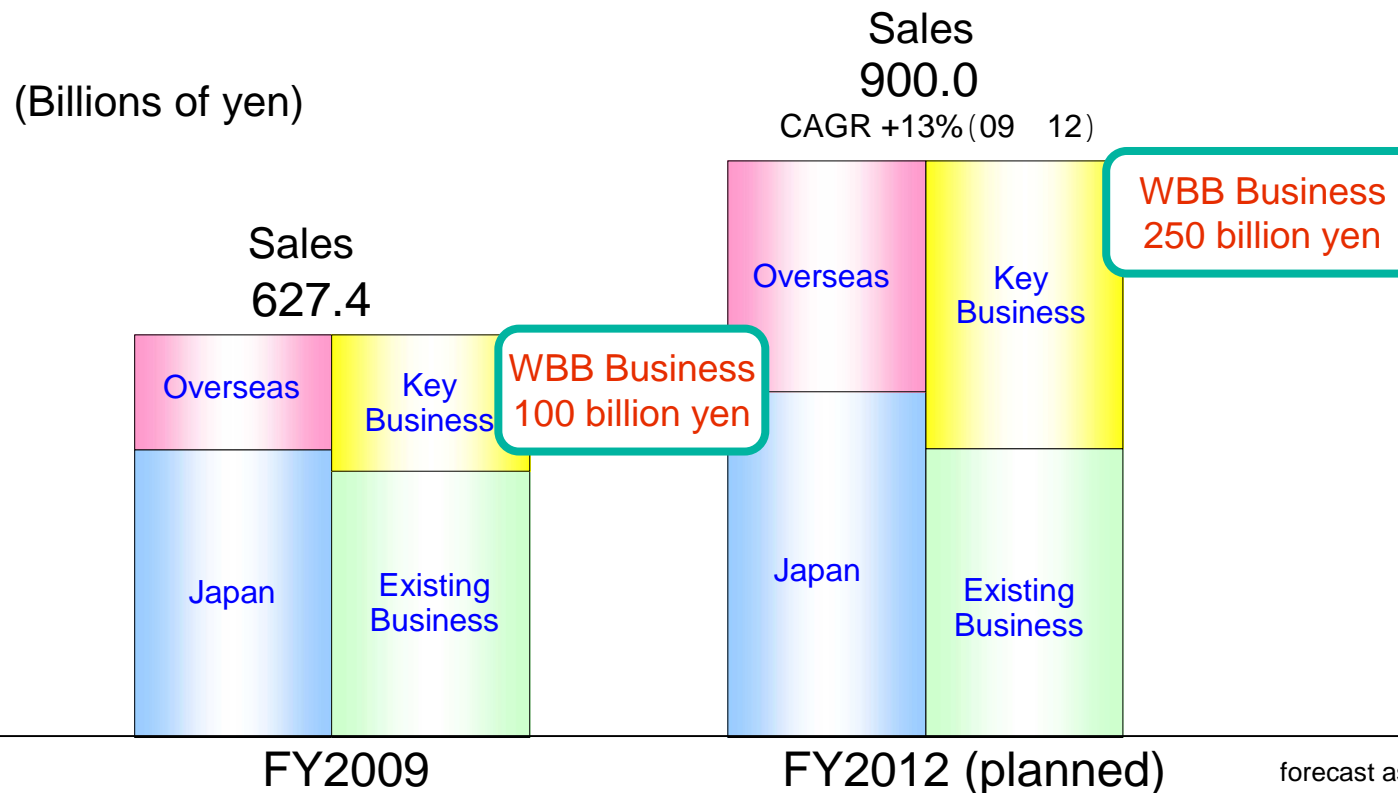
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# Toward Achieving V2012

- Sales of 900 billion yen in FY2012 (9% operating profit margin)

	FY2009	FY2012
Overseas Sales Ratio	28%	40%
Key Business Ratio	34%	50%
Operating Income Margin	5%	9%



# Abbreviations

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ARPU : Average Revenue Per User	MME : Mobility Management Entity
BB : Broadband	NMS : Network Management System
BBU : Base Band Unit	NW : Network
BDE : Base station Digital processing Equipment	OSS : Operational Support Systems
BRE : Base station Radio processing Equipment	P2P : Peer to Peer
BSC : Base Station Controller	PF : Platform
BSS : Business Support Systems/Billing Support Systems	P-GW : PDN Gateway
BWA : Broadband Wireless Access	RNC : Radio Network Controller
CAGR : Compound Annual Growth Rate	RRE : Optical Remote Radio processing Equipment
eNB : evolutional Node B	RRH : Remote Radio Head
E2E : End to End	SDH : Synchronous Digital Hierarchy
EPC : Evolved Packet Core	S-GW : Serving Gateway
ERP-SW : Ethernet Ring Protection Switch	SOHO : Small Office / Home Office
FBWA : Fixed Broadband Wireless Access	SON : Self Organizing Network
FDD : Frequency Division Duplex	SONET : Synchronous Optical Network
GW : Gateway	STB : Set Top Box
GSM : Global System for Mobile communications	TDD : Time Division Duplex
HSDPA : High Speed Downlink Packet Access	TDM : Time Division Multiplexing
HSPA : High Speed Packet Access	WBB : Wireless Broadband
IMS : IP Multimedia Subsystem	WDM : Wavelength Division Multiplexing
LRE : Low power Radio processing Equipment	WiFi : Wireless Fidelity
LTE : Long Term Evolution	WiMAX : Worldwide Interoperability for Microwave Access
MBH : Mobile Backhaul	WRI : Wuhan Research Institute of Post and Telecommunications
MIMO : Multiple Input Multiple Output	XaaS : X as a Service

Empowered by Innovation

**NEC**

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