

Recent Development of Wireless Broadband Technology in South Korea



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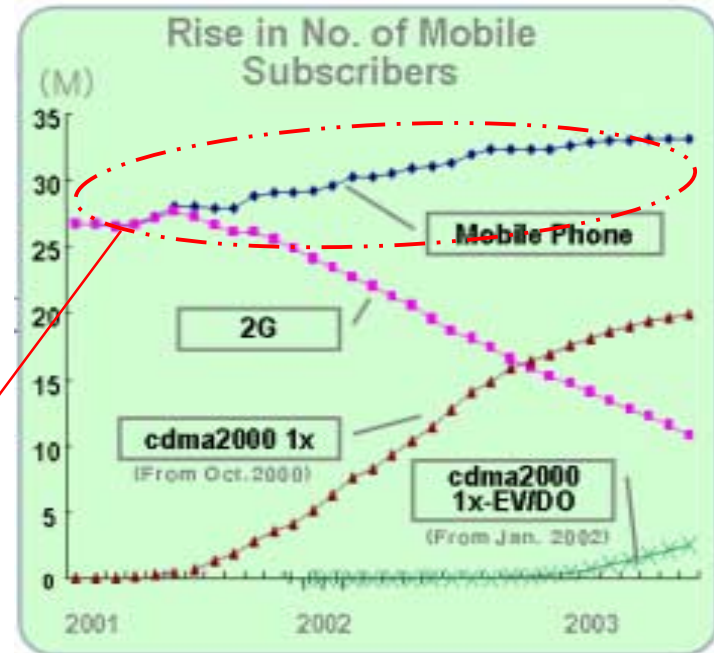
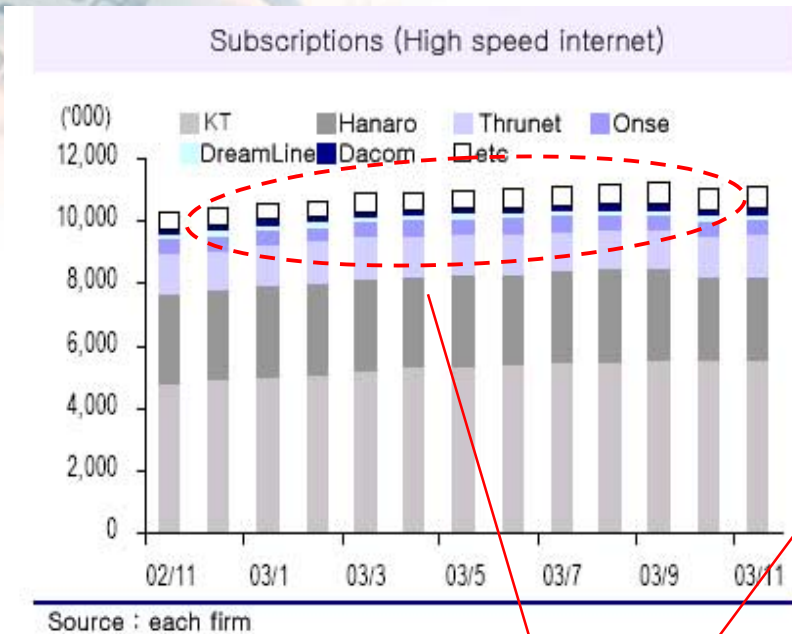
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Current communication service market



Rate of growth is slow

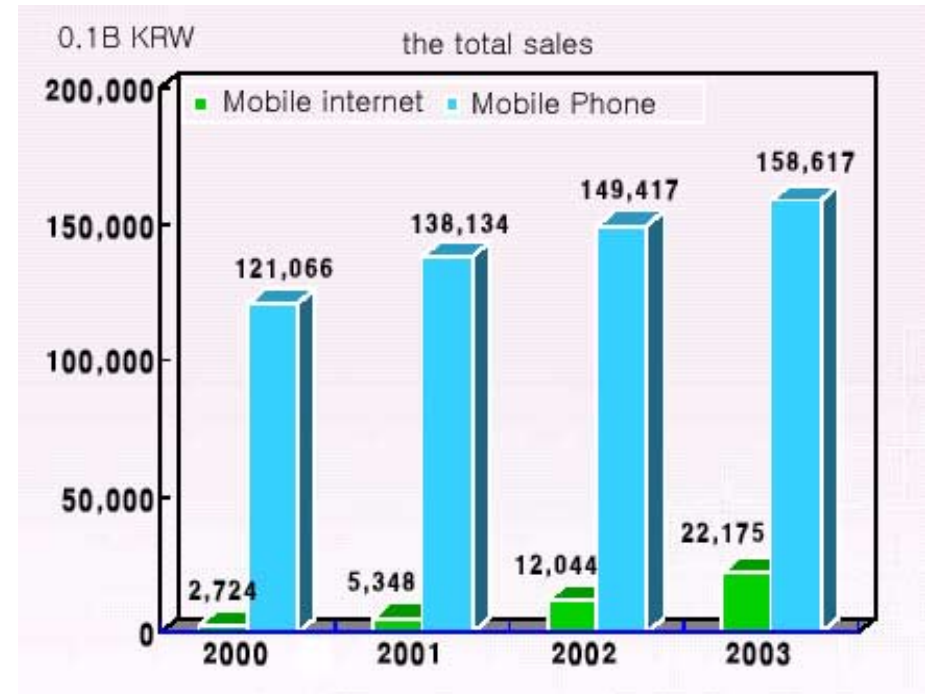
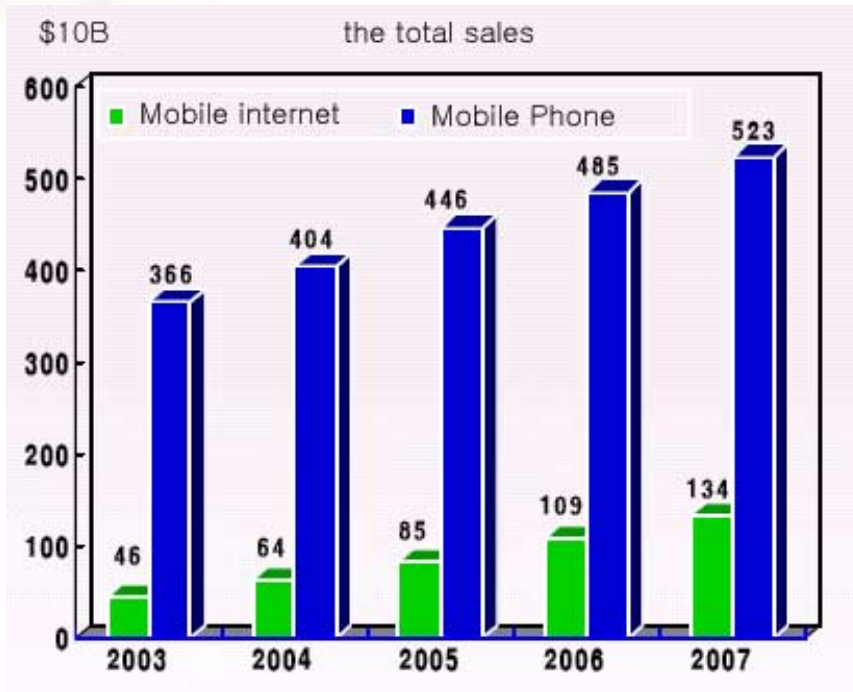
SO

We need NEXT BIG THING !!!

Current mobile service market (2)

- Forecast of international wireless data service market

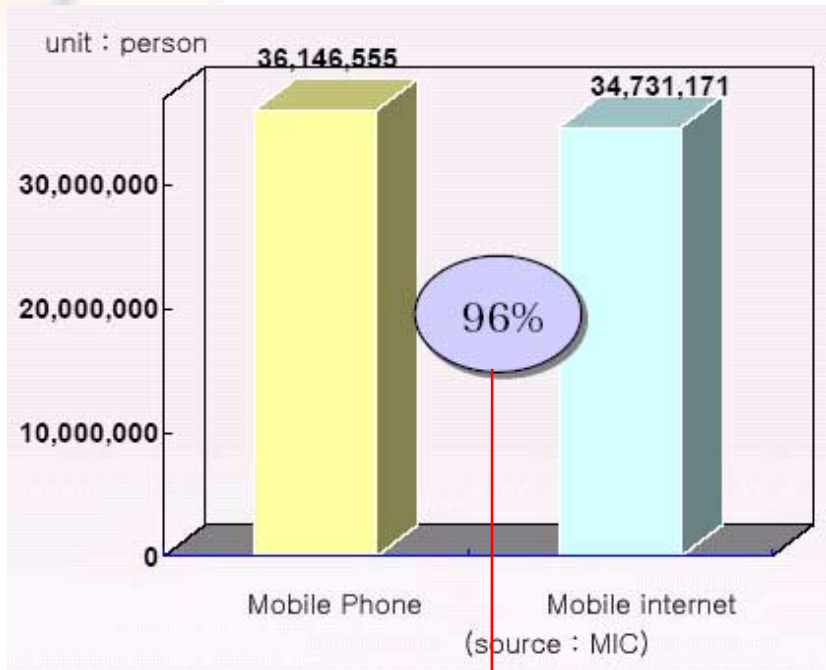
- Current status of wireless data service market in Korea



Rapid increase of wireless data market compared with wireless voice market !!

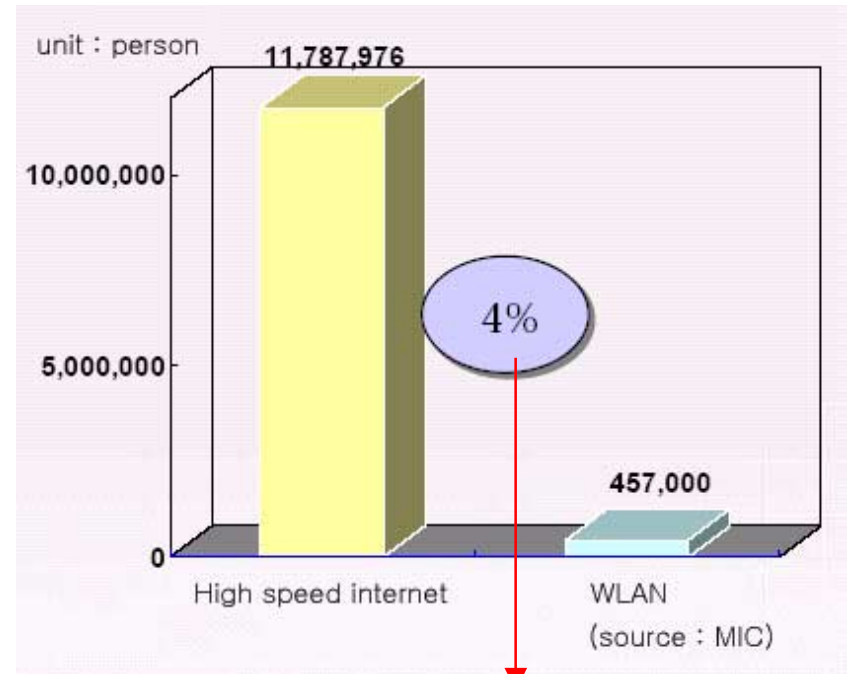
Current mobile service market (3)

- Number of subscribers of wireless internet in mobile service



But, application service is not so activated

- Number of subscribers in public WLAN service

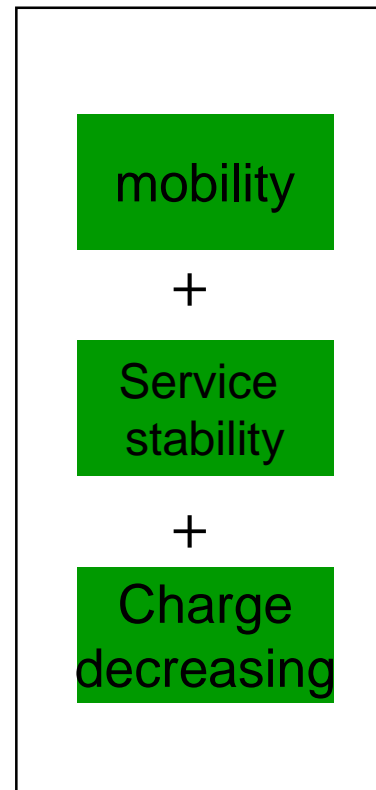
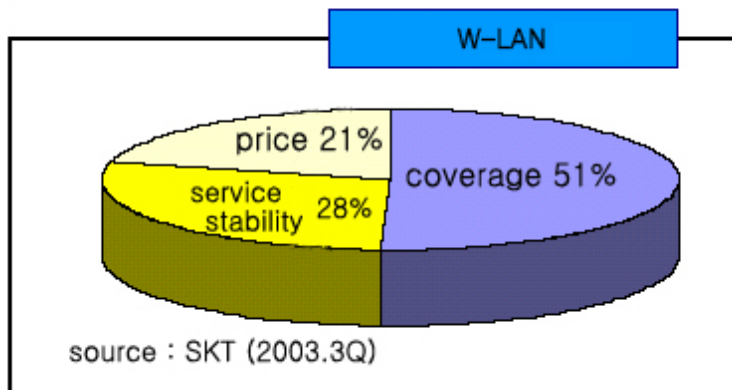
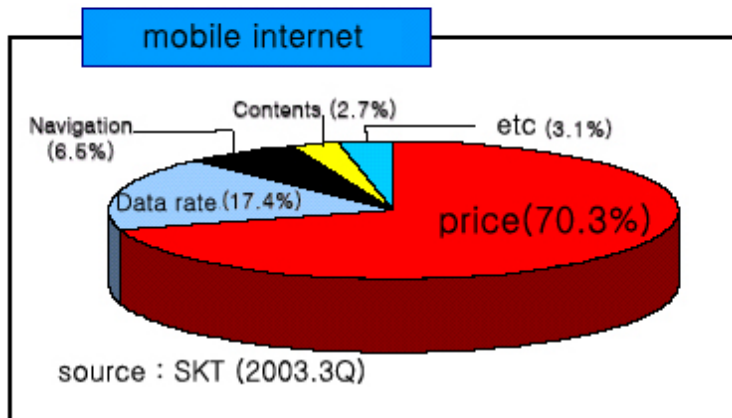


Fail to create mass market

Current mobile service market (4)

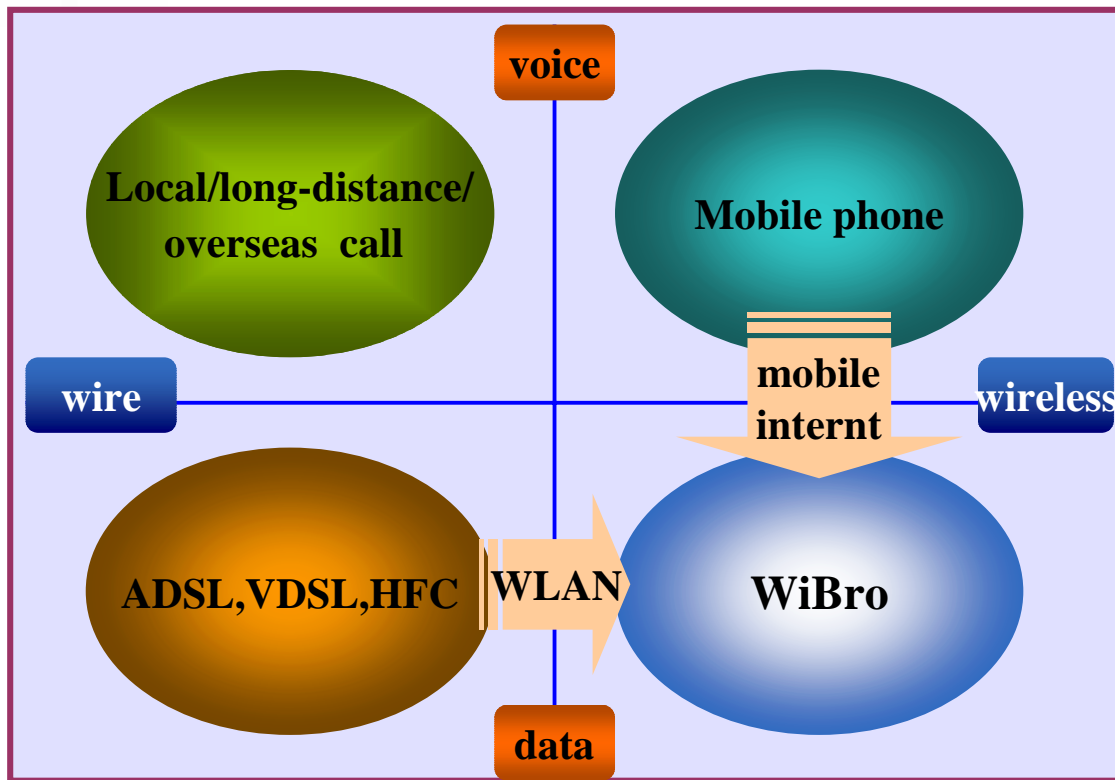
- What's problem in growth of mobile internet ?

Dissatisfaction



What is WiBro?

- Providing hi-speed wireless internet connection service in anytime, anywhere using portable terminals
 - *WiBro* is the abbreviation for *Wireless Broadband*



Portable Subscriber Station
Service shall support the various types of multimedia-enabled terminals such as handset, notebook, PDA, or smart phone
Under the stationary or mobile environment
Service shall support stationary, nomadic and medium-speed mobile users.
Anytime and Anywhere Internet
Service shall provide seamless Connectivity regardless of the place and time.
High data rate
Service shall support the various types of wireless multimedia applications with a data rate of at least 1 Mbps.

Features of WiBro (1)

- Major technical specifications of WiBro

Category	Specifications
Spectrum	2.3 GHz ~ 2.4GHz
Channel Bandwidth	10Mhz
Multiplexing Technology	OFDMA
Duplexing Technology	TDD
Mobility	Under 60 Km/h
Data rate	Downlink : over 3 Mbps/subscriber
	Uplink : over 1Mbps/subscriber
Handover time	Under 150ms
Cell range	Pico : 100 M
	Micro : 400 M
	Macro : 1 Km

Features of WiBro (2)

- Comparison with other wireless services

Service / Category	WLAN	WiMAX	WiBro	Satellite DMB	W-CDMA (HSDPA)
MAX data rate	11~54Mbps	~70Mbps	30Mbps	7mbps	14.4Mbps
Avg data rate	1Mbps	~7Mbps	1Mbps	205~512Kbps (channel for movie)	~500Kbps
mobility	fixed	fixed	~60Km/h	~300Km/h	~300Km/h
terminal	Desktop PC , laptop PC, PDA	laptop PC, PDA ,	laptop PC, PDA, Mobile phone	Mobile phone, Exclusive terminal	Mobile phone
Service	High speed wireless internet	High speed wireless internet	High speed wireless internet	Broadcasting, cinema	Voice, wireless internet
Handoff	not	Not yet	Support	Support	support
Cell coverage	50~100m	~7Km	~1Km	~1Km	~3~4Km
Base station price	200000 ~500000 KRW	N/A	130 million KRW	40million KRW	200million KRW

multi mode terminal

Technical roadmap (1)

- HPI (High-speed Portable internet) Project

Purpose	developing WiBro equipment
Period	2003~2005
Who	ETRI, Samsung electronics, KT, KTF, SK Telecom, Hanaro Telecom
Fund	Samsung electronics(\$25M), KT, KTF,SKT, Hanaro Telecom(\$11M)

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About 30 researchers in Samsung Electronics have joined to make technology specification and to design a system.

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Both ETRI and Samsung Electronics developed each of system and shared their research work. demonstrated WiBro commercial version in November

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Plan to develop WiBro commercial version

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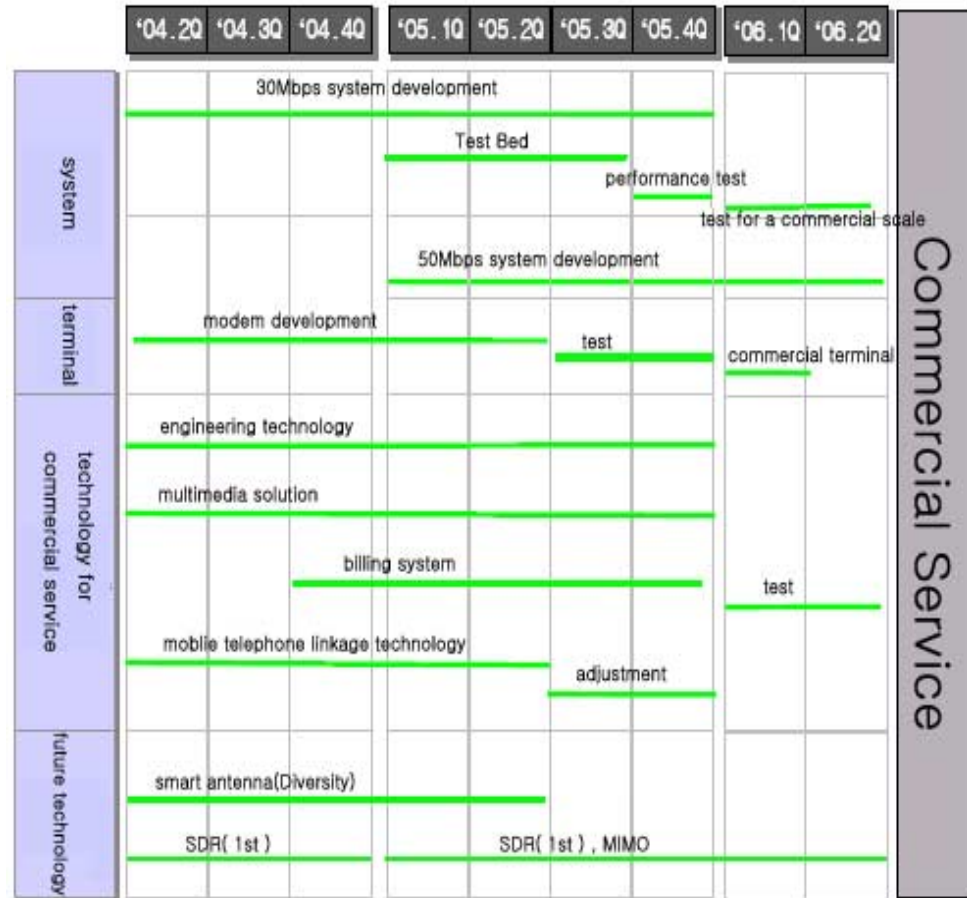
Expect to one-chip solution which can afford WiBro transmission and reception functions for various types of terminals after 2007.

Technical roadmap (2)

Technology development

System/ terminal	<ul style="list-style-type: none"> • System development with ETRI and device manufacturer • Building WiBro testbed, performance test • OFDM optical repeater, TDD RF repeater • portable internet terminal
Basic tech for business	<ul style="list-style-type: none"> • engineering technology <ul style="list-style-type: none"> • 2.3GHz model, radio interference test tool • cell planning tool, NMS <ul style="list-style-type: none"> • Portable Multimedia solution • Multicast, VOD • Performance test system <ul style="list-style-type: none"> • Traffic modeling, system level QoS
Future technology	<ul style="list-style-type: none"> • Portable internet core technology <ul style="list-style-type: none"> • OFDM, Smart antenna, MIMO

Technology Roadmap



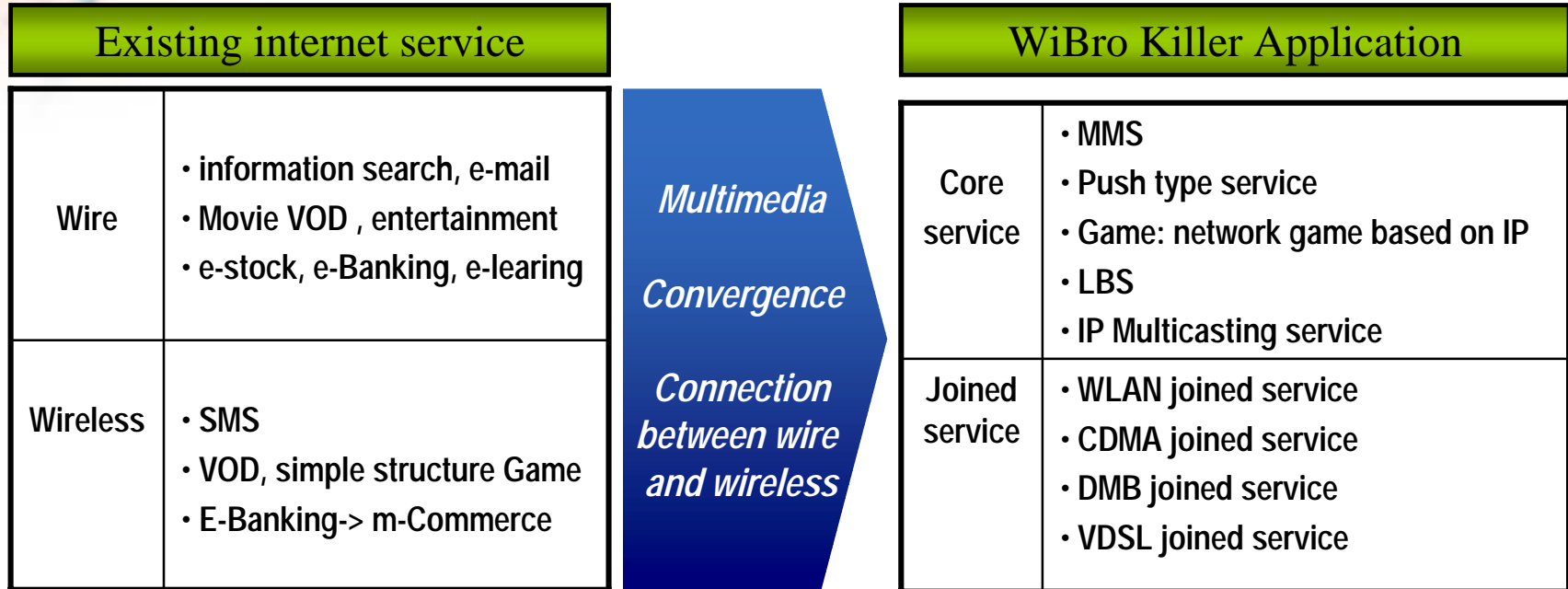
Service plan (1)

- **Apply License : Nov. 2004, Applied KT,SK Telecom, HanaroTelecom**
(All applicants could be select to the WiBro providers if they satisfies the requirements)
- **Hearing from regulator : Jan. 2005.01.14**
- **Examination and Announcement the result: Feb. 20 . 2005**

	Focus	Weakness	Strength	Main service
KT	<ul style="list-style-type: none"> ▶ Creation of bundling service with fixed line and wireless 	<ul style="list-style-type: none"> ▶ Contents business 	<ul style="list-style-type: none"> ▶ convergence of network ▶ SI service for firm customer ▶ Experience ADSL,WLAN service 	<ul style="list-style-type: none"> ▶ Lap-top computer and PDA phone ▶ Bundling with fixed line, Terrestrial DMB, ADSL and WLAN
SK Telecom	<ul style="list-style-type: none"> ▶ Enlargement of convergence service based on wireless service 	<ul style="list-style-type: none"> ▶ No experience of fixed line service 	<ul style="list-style-type: none"> ▶ firmness of existing user of mobile service ▶ First mover of satellite DMB ▶ Marketing & contents 	<ul style="list-style-type: none"> ▶ WiBro is complementary service for HSDPA ▶ Handset and PDA phone ▶ Bundling with HSDPA and satellite DMB
Hanaro Telecom	<ul style="list-style-type: none"> ▶ Improvement of the value of the firm 	<ul style="list-style-type: none"> ▶ No compete value chain ▶ Lack of experience of mobile service ▶ Not enough capability of investment 	<ul style="list-style-type: none"> ▶ Experience of ADSL 	<ul style="list-style-type: none"> ▶ Lap-top computer and PDA phone ▶ Bundling with fixed line, Terrestrial DMB, ADSL and WLAN

Service plan (2)

- WiBro Service Vision of Korea Telecom









Service plan (3)

- WiBro Service vision of SKT
 - Phase deployment of application service for WiBro

	Phase 1	Phase 2	Phase 3
VOD	VOD Service	Personalized VOD Service	Location based VOD Service
Game	Migration of fixed env. game	Network Game	Virtual Reality Game
News	Personalized News	Real-time Personalized News	Location based Real-time Personalized News
Shopping	Video Shopping	Personalized Shopping	Location based Shopping
Online Education	Video Education	Interactive Education	Customized Education

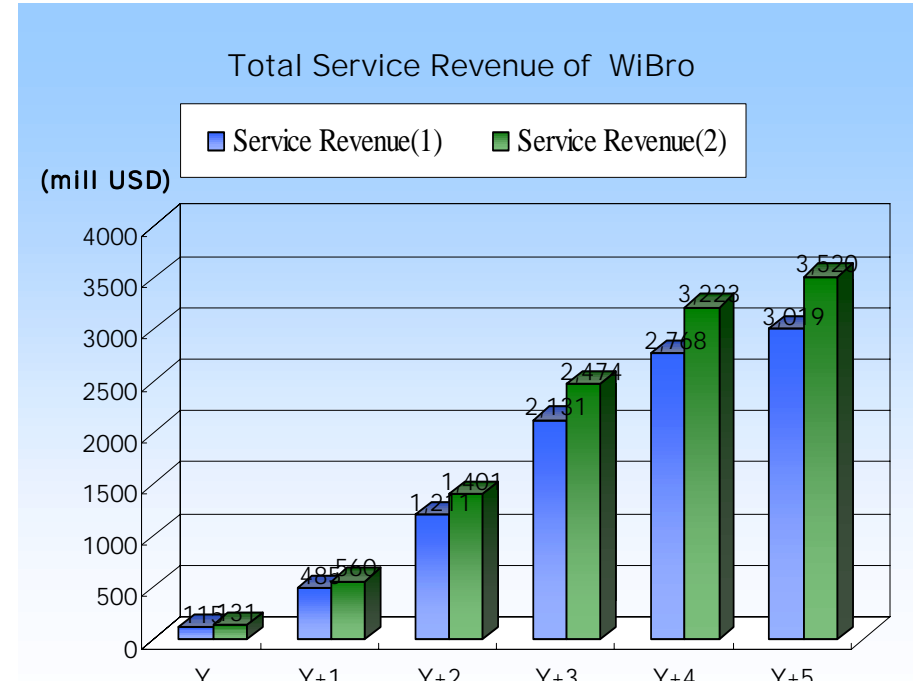
Service plan (4)

- Main target terminal is handset type which is most preferred type of the user
- PDA and card type for laptop provided for needs of the user

type	category	terminals	Features
Mobile terminals	Handset		Support multimedia
	Smart phone		Full feature phone General O/S
	PDA		Built-in WiBro modem
	Laptop/HPC		Built-in WiBro modem
Additional terminals	Wireless modem		Laptop/PDA PCMCIA, SD card type
	Fixed type		Telematics

Market potential of WiBro (1)

- Expected subscriber : Max 9.5 mil. user after Y+10 year
- Expected total market size : \$ 3.2 ~ 3.7 bill. at Y+5 year
- Risk Factor : Competition with W-CDMA or DMB



WiBro Regulatory Policy (1)

License Policy

- Government allows the license to three providers which have competitiveness to encourage the investment and the service of the WiBro
- After three year, if total subscribers of WiBro , the regulators induce MVNO in WiBro service to enhance effective competition of the market in the future
- Spectrum license fee is about \$10~ \$12 bill. for seven years for every provider (tentative)
- Encourage sharing of base stations and roaming among WiBro carriers to reduce over-investment and to increase efficiency

Future Plan

- Receive proposal for license : Nov. 2004.
- Examination & selection : Feb. 20. 2005 (Recently Done)
- Development commercial system: End of 2005
- Commercial service : the first half of 2006

Conclusion

- WiBro is the first wireless broadband service in the world using 2.3 GHz band.
 - Provide 1Mbps data rate with low speed movement(60Km/h)
- New type of wireless service complements fixed broadband internet and 3G wireless service.
 - User can access plain internet website in mobile environment with low price
 - Various types of bundling strategies exist



Thank you!

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