The Final Destination of Broadband, WiBro Service Plan

2005.11

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KT SI BU ITS Team
I. Brief Introduction Of KT (1/3)

- Business Domain

- Local / Long Distance / Int’l Call
  - Telephone Information
  - VoIP

- High-Speed Internet
  - KORNET
  - Dial-up

- Data
  - Individual Solution
  - Corporate Solution

- Mobile
  - Mobile Services
  - Satellite

- Internet Access
  - Leased Circuits
  - ATM
  - VPN
  - Inforneret
  - Global Pass

- Internet Applications

- Others
  - Telegram
  - Telex
Average 31% growth per year

Prospect of worldwide mobile data

Growing-up of mobile data

Prospect of domestic mobile data

- Growth of mobile data usage worldwide
- More bandwidth per user
Broadband market

- Total broadband subscriber
- KT subscriber
- Broadband household penetration

Wireless broadband market

What’s the next big thing?

Continue to grow in residential broadband and expand into wireless broadband
“WiBro service means high speed wireless internet service which is available anytime, anywhere using portable terminal in stationary or even in mobile environment.”

**WiBro: Wireless Broadband**

- **Stationary or Mobile Environment**
- **Any time, Any where**
- **High Data Rate**
- **Low Tariff**

- **Nomadic**
- **Vehicular Mobility**
- **Seamless Service** even in outdoors such as street, park and etc.
- **1+ Mbps User Data Rate (Day 1)**
- **Higher Data Rate (Future)**
- **Low CAPEX**
- **Roaming with WLAN and CDMA**
II. Overview Of WiBro (2/6)

- Evolution of the Technology
  - Wired Internet: IEEE802.3(LAN) → IEEE802.11(WLAN) → IEEE802.16(WiBro)
  - Cellular Network: 1G (Analog) → 2G (Digital) → 3G (IMT-2000) → 3.5G (HSDPA)

- WiBro is a ‘last mile’ extension of the wired Internet.
II. Overview Of WiBro (3/6)

- Positioning

<table>
<thead>
<tr>
<th>Item</th>
<th>WiBro</th>
<th>High Speed DSL</th>
<th>WLAN</th>
<th>Mobile Com.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Area</td>
<td>Outdoor/Indoor</td>
<td>Indoor</td>
<td>Indoor (Hotspot)</td>
<td>Outdoor/ Indoor</td>
</tr>
<tr>
<td>Data Rate</td>
<td>High Speed</td>
<td>Ultra High Speed</td>
<td>Very High Speed</td>
<td>Med/ Low speed</td>
</tr>
<tr>
<td>Mobility</td>
<td>High</td>
<td>No</td>
<td>Low</td>
<td>Very high</td>
</tr>
<tr>
<td>Contents</td>
<td>Wired/Wireless Contents</td>
<td>Wired</td>
<td>Wired/ Wireless</td>
<td>Wireless</td>
</tr>
<tr>
<td>Tariff</td>
<td>Relatively Low</td>
<td>Relatively Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Terminal</td>
<td>Smart phone, PDA, Notebook etc.</td>
<td>Desktop, Notebook</td>
<td>PDA, Notebook</td>
<td>Cellular phone, PDA</td>
</tr>
</tbody>
</table>
## II. Overview of WiBro (4/6)

### Performance

<table>
<thead>
<tr>
<th>Item</th>
<th>WiBro</th>
<th>W-CDMA R4</th>
<th>W-CDMA R5 (HSDPA)</th>
<th>CDMA 2000 1x EV-DO</th>
<th>CDMA 2000 1x EV-DO Rev.A (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplex</td>
<td>TDD</td>
<td>FDD</td>
<td>FDD</td>
<td>FDD</td>
<td>FDD</td>
</tr>
<tr>
<td>Multiple Access</td>
<td>OFDMA</td>
<td>CDMA</td>
<td>CDMA</td>
<td>CDMA</td>
<td>CDMA</td>
</tr>
<tr>
<td>Bandwidth (FA)</td>
<td>10MHz</td>
<td>5MHz x 2</td>
<td>5MHz x 2</td>
<td>1.25MHz x 2</td>
<td>1.25MHz x 2</td>
</tr>
<tr>
<td>Frequency</td>
<td>2.3~2.4GHz</td>
<td>UL:1.94<del>1.98/DL:2.13</del>2.17GHz</td>
<td>800MHz/1.8GHz</td>
<td>800MHz/1.8GHz</td>
<td></td>
</tr>
<tr>
<td>Max. Data Rate (1FA 1sector)</td>
<td>DL</td>
<td>18.432 Mbps</td>
<td>2 Mbps</td>
<td>13.976 Mbps</td>
<td>2.4576 Mbps</td>
</tr>
<tr>
<td></td>
<td>UL</td>
<td>6.144 Mbps/User</td>
<td>2 Mbps/User</td>
<td>2 Mbps/User</td>
<td>153.6 kbps/User</td>
</tr>
<tr>
<td>Average Throughput (1FA 1sector)</td>
<td>DL</td>
<td>5.95 Mbps</td>
<td>1.04 Mbps</td>
<td>5 Mbps</td>
<td>850 kbps</td>
</tr>
<tr>
<td></td>
<td>UL</td>
<td>1.53 Mbps</td>
<td>1.21 Mbps</td>
<td>1.5 Mbps</td>
<td>266.1 kbps</td>
</tr>
<tr>
<td>Standardization</td>
<td>802.16-2004/Cor1, 802.16e (2005.9)</td>
<td>2001.3</td>
<td>2002.6</td>
<td>2000.10</td>
<td>2004.2</td>
</tr>
<tr>
<td>Network Deployment</td>
<td>yr. 2006</td>
<td>Seoul Area</td>
<td>yr. 2006</td>
<td>Operating</td>
<td>yr. 2005</td>
</tr>
</tbody>
</table>

(*) In Revision A, the performance of 1x EV-DO is increased to that of 1x EV-DV.
II. Overview of WiBro (5/6)

- Application Services

**Automobile Service**
- Personal Info
- DVC
- PC
- Telephone
- TV
- STB
- Game
- Audio
- DVD

**Home**
- TV
- STB
- Game
- Audio
- DVD

**Mobile**
- SD
- MMC
- SIM

**Office**
- Infra Info
- IC Card

**Outdoor**
- Map Info
- Digital Contents

**Shop**
- E Tower

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Seamless, Ubiquitous Experience
II. Overview of WiBro (6/6)

- Service Requirement

Service Class

- Interactive Service (Best-efforts)
  - Web Browsing, Interactive Game, etc.
- Streaming Service (rtPS: Real Time Polling Service)
  - VoD, MPEG, etc.
- Background service (nrtPS: Non Real Time Polling Service)
  - FTP, E-MAIL, SMS, multicast/broadcast, MMS, Push etc.
- Real Time Service (UGS: Unsolicited Grant Service)
  - VoIP

Requirements for Service

- Provide high speed internet access for outdoor users with xDSL data rate
- Maximize the usage over the allocated spectrum
- Maximize the spectral efficiency
- Extend service coverage
- Reduce the cost per bit
- Low power consumption of MS
- Faster handoff
TTA has begun WiBro Standardization since June 2003.

- Establishment of 2 Working Groups and 2 Ad Hoc
- WiBro Standardization Activities & Timeline is as follows.

**TTA : Telecommunications Technology Association in Korea**

**Phase I Standardization for WiBro has been completed.**

- **3Q 2003**
  - Definition of Service/ System Requirements

- **4Q 2003**
  - Preparation of the Draft Standard
    - Definition of major system parameters
    - Definition of items/criteria/conditions for Evaluation
    - Collection and Evaluation of Baseline Proposals
    - Selection of Baseline Proposals

- **1Q 2004**
  - Completion of Draft Standard

- **2Q 2004**
  - Approval and Notification of Standard

**Phase II Standardization for advanced WiBro is in progress.**

- **3Q 2004 - 2Q 2005**
  - Harmonization with IEEE 802.16e
  - Approval and Notification of New Standard including performance enhanced technologies such as MIMO, smart antenna etc.
### III. Standardization (2/6)

#### Major System Requirement

<table>
<thead>
<tr>
<th>Feature</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duplexing</td>
<td>TDD</td>
</tr>
<tr>
<td>Multiple Access</td>
<td>OFDMA</td>
</tr>
<tr>
<td>Channel BW</td>
<td>10 [MHz]</td>
</tr>
</tbody>
</table>

#### Radio Access Requirement

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Reuse Factor</td>
<td>1</td>
</tr>
<tr>
<td>Mobility</td>
<td>≤ 60 [Km/h]</td>
</tr>
<tr>
<td>Service Coverage</td>
<td>≤ 1 [Km]</td>
</tr>
</tbody>
</table>
| Spectral Efficiency [bps/Hz/cell(sector)] | Max. DL / UL = 6 / 2  
                                      | Aver. DL / UL = 2 / 1              |
| Handoff                             | ≤ 150 [ms]                         |
| Throughput (per user)               | Max. DL / UL = 3 / 1 [Mbps]        
                                      | Min. DL / UL = 512 / 128 [Kbps]    |
III. Standardization (3/6)

Reference Model

- PSS (Portable Subscriber Station)
  - Wireless access
  - IP mobility, Terminal/ User authentication
  - Multicast service, Other network interworking

- RAS (Radio Access Station)
  - Wireless Access
  - Radio resource management/ Control
  - Handoff support
  - QoS support, Downlink Multicast

- ACR (Access Control Router)
  - IP routing and Mobility management
  - Authentication/ Security
  - QoS, IP Multicast, Billing support
  - Handoff control between RASs

- Core Network
  - Authentication, Billing
  - IP Mobility support
  - Other network interworking
IEEE 802.16 Evolution

- **802.16-2001** (10–66GHz)
- **802.16a** (2–11GHz)
- **802.16d**
- Revised Amendment
- **802.16e** (mobility)

**Flowchart**

- **Fixed**
  - 802.16-2001
    - MAC
    - PHY (drop)
  - 802.16a
    - MAC +
    - new PHY
  - 802.16d
    - MAC ++
    - new PHY +

- **Mobile**
  - 802.16-2001
  - 802.16a
  - 802.16d
  - 802.16e (mobility)
IEEE 802.16d
- Revision to 802.16, 802.16a, 802.16c
- Licensed bands, 2~11GHz
- Non line of sight (Practical)
- Lower component cost
  - Good for residential and small-business
- 30Mbps in 10MHz BW

IEEE 802.16e
- Amendment to 802.16a/c/d
- Licensed bands, 2~6GHz
- Non line of sight
- Support vehicular mobility
- Main concern on handoff and sleeping mode

IEEE 802.16-2004/ Cor1 and 802.16e are scheduled to approve Sep. 22. 2005.
Korea decided IEEE 802.16-2004 and 802.16e as WiBro Baseline Standard. (Jul. 2004)

**Phase I**
- 2004.6
- 802.16-2004 and 802.16e
- • OFDMA/TDD
  • 1024 FFT, BW: 10MHz

**Phase I Rev.**
- 2004.12
- • PHY Harmonization
  • MAC Harmonization

**Phase II**
- 2004.4Q ~
- • Enhanced PHY/MAC
  • AAS, MIMO, LDPC, H-ARQ
- • IOT Profile
  - Profile statement (2005.1Q)
  - Spec Work (2005.2Q)
  - Completion of Spec (2005.4Q)

**IEEE 802.16e**
- Issue 802.16e/D5a
  - 2004.12
- Issue 802.16e/D8
  - 2005.5
- Issue 802.16e/D10
  - 2005.8
- IEEE-SA Standard Board Approval
  - 2005.9.22
**WiBro system should satisfy IEEE 802.16-2004, IEEE 802.16e D3 above standard and 5 performance criteria**

- Min data rate under 60km/h condition in cell edge: 512kbps (DL), 128kbps (UL)
- Bandwidth: above 9MHz
- Roaming between WiBro operators
- Frequency reuse factor: 1
- Duplex: TDD including Tx/Rx time slot synchronization between WiBro operators

**Spectrum allocation for WiBro service**
IV. WiBro Technology (2/6)

-TDD/OFDM in detail

<table>
<thead>
<tr>
<th>Item</th>
<th>FDD</th>
<th>TDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guard Band</td>
<td>Min 20~30MHz is needed</td>
<td>Not Required</td>
</tr>
<tr>
<td>Symbol Rate</td>
<td>$R_s$</td>
<td>2 $R_s$</td>
</tr>
<tr>
<td>Power Amplifier</td>
<td>-</td>
<td>Max 3dB additional power is needed for the same coverage as FDD system</td>
</tr>
<tr>
<td>Composition of channel</td>
<td>Paired band</td>
<td>Non paired band</td>
</tr>
<tr>
<td>Tx/Rx timing</td>
<td>Not Required</td>
<td>Tx/Rx timing synchronization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Inter-cell synchronization should be required for the prevention of TDD inherent interference</td>
</tr>
<tr>
<td>Cell radius</td>
<td>Tx power</td>
<td>Tx power + Guard Time + PA ramp-up</td>
</tr>
<tr>
<td></td>
<td>Macro cell available</td>
<td>Micro cell and Pico cell</td>
</tr>
<tr>
<td>Channel reciprocity</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>
IV. WiBro Technology (3/6)

- TDD/OFDM in detail

**OFDM-TDMA/FDMA/CDMA, Frequency hopping OFDMA**

**Pros**
- Frequency Diversity Gain
- Inter-cell Interference Reduction

**Cons**
- Difficulty in finding good hopping pattern for channel condition
IV. WiBro Technology (4/6)

- Key Features

- RF Frequency: 2.3GHz
- Multiple Access/ Duplexing: OFDMA/ TDD
- Frame length: 5 msec
- Bandwidth: scalable from 1.25MHz to 20MHz
- Flexible subchannelization for band selection and diversity
- Fast AMC (Adaptive Modulation and Coding) subchannel based on uplink CQI (Channel Quality Indicator)
- Full diversity subchannel by multiple symbol grouping
- Cell differentiation with different PN sequences
- Pilot tone based downlink and uplink
- Separate ranging channel time slot
- More efficient channel code: convolutional (or block) turbo code
- H-ARQ in the downlink and uplink
- Modulation level: QPSK, 16QAM, 64QAM
- Optional AAS (Adaptive Antenna System) support
## IV. WiBro Technology (5/6)

### System Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel spacing</td>
<td>9 MHz</td>
</tr>
<tr>
<td>Effective bandwidth</td>
<td>8.75 MHz</td>
</tr>
<tr>
<td>Number of used tones</td>
<td>864 out of 1,024</td>
</tr>
<tr>
<td>Number of data tones</td>
<td>768</td>
</tr>
<tr>
<td>Number of pilot tones</td>
<td>96</td>
</tr>
<tr>
<td>Tone spacing</td>
<td>9.765625 kHz</td>
</tr>
<tr>
<td>Ratio of cyclic prefix time to basic OFDM symbol time</td>
<td>1/8</td>
</tr>
<tr>
<td>Basic OFDMA symbol time</td>
<td>102.4 μs</td>
</tr>
<tr>
<td>Cyclic prefix time</td>
<td>12.8 μs</td>
</tr>
<tr>
<td>OFDMA symbol time</td>
<td>115.2 μs</td>
</tr>
<tr>
<td>TDD frame length</td>
<td>5 ms</td>
</tr>
<tr>
<td>Number of symbols in a frame</td>
<td>42</td>
</tr>
<tr>
<td>TTG+RTG</td>
<td>161.6 μs</td>
</tr>
</tbody>
</table>
IV. WiBro Technology (6/6)

- KT WiBro Testbed

- WiBro Testbed
  - RAS:
    - Central (중앙)
    - Nam-Dae-Moon (남대문)
    - Su-Ha (수하)
    - City-Hall Station (시청역)
    - Gwang-Wha-Moon (광화문)
  - ACR:
    - Central (중앙)
Wireless broadband market will keep growing
- **Domestic:** In 2011, about 9 million users (KISDI)
- **Overseas:** In 2008, mobile broadband market will be the 40% of broadband market
Potential target users: Young generation (age 10-40), business professionals, students, etc.
Internet usage pattern: Web surfing & download (40%), email (20%), game (17%), etc.
Preferred services: email > game > web surfing > messenger
Preferred user devices: PDA (42%), laptop (36%), and other devices (<10%).

User’s needs

Preferred device

<table>
<thead>
<tr>
<th>Device</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDA</td>
<td>42.1%</td>
</tr>
<tr>
<td>Laptop</td>
<td>36.3%</td>
</tr>
<tr>
<td>Handheld PC</td>
<td>9.3%</td>
</tr>
<tr>
<td>Smart phone</td>
<td>8.7%</td>
</tr>
<tr>
<td>Cell phone</td>
<td>3.5%</td>
</tr>
</tbody>
</table>

Preferred service

<table>
<thead>
<tr>
<th>Service</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>email</td>
<td>59.5%</td>
</tr>
<tr>
<td>game</td>
<td>56.7%</td>
</tr>
<tr>
<td>Web</td>
<td>50.6%</td>
</tr>
<tr>
<td>MMS messenger</td>
<td>30.2%</td>
</tr>
<tr>
<td>PDA</td>
<td>28.6%</td>
</tr>
</tbody>
</table>

Preferred location

- School/work: 55%
- Bus/subway: 31%
- Streets: 31%
- Indoor: 13%
- Business trip: 13%
Creating a strong value-chain with an open IP transport architecture.
- Creating synergy with the conventional services by optimizing the service positioning (Win-Win)
- Aside from the individual users, create business models for enterprises and public sectors.
- Networking of the individual, enterprise, and public sector will create synergy.
Develop killer application model for multimedia/convergence
- Emphasizing the strong points for high speed internet
- Combining with existing service to expand customer’s feasibility and maximize revenue generation

### Existing Service
- **Information:** Information search, e-mail, etc.
- **Entertainment:** Movie VOD, etc.
- **Other usage:** e-Stock, e-Banking, e-Learning

- **Short Message Service (SMS)**
- **Entertainment:** VOD, games
- **m-Commerce:** e-Banking, etc.

### WiBro Killer App.

#### Evolution
- **Multimedia**
- **Fixed/wireless convergence**

#### Core Service
- **MMS (Multimedia Messaging Service)**
- **Push-type service**
  - Group video chat, Ad & coupon service
- **Game:** IP based various network games
- **LBS (Location Based Service)**
- **IP Multicasting service**
  - High-Quality VOD, broadcasting, movie

#### Combination Service
- **WiFi combined service**
- **CDMA combined service**
- **DMB combined service**

#### Service Model
- Application of core technology of KT’s existing infrastructure
- Fixed (demand mobility) + Wireless (demand broadband)
  → Combined Service

- Existing fixed/wireless contents + various internet services
  → Multimedia, 3D, upgrade by solution-combined production
Contents Development and Management Strategy

- Utilize KT’s conventional portal services to develop Multi-Purpose Portals
- Utilize KT Group’s contents: KTF(Fimm/MagicN), KTH(Paran), KDB
- Utilize KTH’s MCP: Strengthen CP Relations
- Develop CP Management System: CP Selection, Support, Evaluation

- Contents Development

- Collaborate with HomeN/HomeMedia/NESPOT for Contents Development (Video/Music/Game etc.)
- Collaborate with FIMM/MagicN/Paran/KDB for sharing contents
- Out-sourcing for WiBro-customized Contents Development

- Video
- Music
- Game
- Education
- News
- LBS
- Commerce

Contents Sourcing & CP Management

MCP (KTH)

Contents Supply
CP Management
Utilize KT’s state of art premium back bone and optical access network
Low cost and efficient network

WiBro Network Architecture

V. Business Plan (6/10)

- Network Planning

※ RAS: Radio Access Station, ACR: Access Control Router, BcN: Broadband Convergence Network,
HA: Home Agent

- Stage1: Seoul, metropolitan (10)
- Stage2: Metro, major cities (20)
- Stage3: Minor cities (54)

Wireless Network Integration

- 2G/3G: Voice-oriented, wide-area, narrow-band
- WiBro: Urban cities
- WiFi: Hot-Spot
V. Business Plan (8/10)

- WiBro Systems

Production Schedule

<table>
<thead>
<tr>
<th></th>
<th>RAS (Base Station)</th>
<th>PSS (Mobile Station)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor</td>
<td>Samsung, LG, POSDATA</td>
<td>Samsung, POSDATA, Orthotron, RunCom</td>
</tr>
<tr>
<td>Schedule</td>
<td>End of 2005</td>
<td>End of 2005 ~2006</td>
</tr>
</tbody>
</table>

2005.11 Busan APEC : City-wide WiBro Demonstration
V. Business Plan (9/10)

Terminal roadmap

- User Equipments

WiBro only
- PCMCIA’s
- Embedded modem’s
- PDA’s

DBDM
- WiBro + Wi-Fi
- WiBro + CDMA
- WiBro + DMB

TBTM
- WiBro + Wi-Fi + DMB
- WiBro + CDMA + DMB

Customized one chip
- Personal/business
- Convergence
- Application specific

Early stage

Growing stage

Matured stage
WiBro demonstration during Busan APEC Summit

- Date: 2005. 11.12~20
- Guest: APEC participants (15,000 VIPs: Political leaders, CEOs, Press, etc.)
- Service Area: Bexco convention center, Dong-bak Island, Hae-Woon-Dae Hotel
- Demo Services
  - High-speed Wireless Internet Access, World News, APEC News
  - Real-time Mobile Multimedia, Messaging, Chatting and Internet Broadcast

**<Deployed Systems>**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACR</td>
<td>2</td>
</tr>
<tr>
<td>RAS</td>
<td>10</td>
</tr>
<tr>
<td>Repeater</td>
<td>9</td>
</tr>
<tr>
<td>EMS</td>
<td>1</td>
</tr>
<tr>
<td>PDA</td>
<td>200</td>
</tr>
<tr>
<td>Tablet PC</td>
<td>100</td>
</tr>
<tr>
<td>Laptop</td>
<td>100</td>
</tr>
<tr>
<td>PCMCIA</td>
<td>600</td>
</tr>
</tbody>
</table>

* Subject to change

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Demo Area
In order to communicate probe data or information between Bus and Traffic Management Center, Wireless & Mobile Technology must be applied.

**Fixed Line**
- PSTN Modem, ADSL
- Coaxial cable
- Optical Fiber Cable

**Wireless**
- RF Beacon [Unlicensed Radio, UHF Band, 4800 bps]
- Wireless Data Network [Band Width 2Mhz, 9600 bps]
- DSRC (Dedicated Short Range Communications)
- Wireless LAN
- WiBro (Wireless Broadband) : Coming on February 2006

**Mobile**
- TRS (Trunked Radio System) : Not Applied yet
- CDMA
- HSDPA (High Speed Downlink Packet Access) : Coming on April 2006
### Wireless Communication Technologies Applied to BIS/BMS

- Leasing wireless network costs more than building a private wireless network in long term. Therefore many cities prefer building a private wireless network in BIS/BMS.
- Most of leased networks are wireless data network since it cost less to build other type of wireless network.

#### The Operation Type of Wireless Network in Korea

- **Private, 13 cities, 65%**
- **Leased, 6 cities, 30%**
- **Leased+Private, 1 city, 5%**

#### The Ratio of Wireless Technologies applied to ATPS(BIS/BMS)

<table>
<thead>
<tr>
<th>Type of Wireless</th>
<th>No. of cities</th>
<th>No. of buses</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDMA</td>
<td>1</td>
<td>231</td>
</tr>
<tr>
<td>DSRC</td>
<td>2</td>
<td>967</td>
</tr>
<tr>
<td>RF Beacon</td>
<td>11</td>
<td>1,614</td>
</tr>
<tr>
<td>Wireless Data Network</td>
<td>5</td>
<td>9,716</td>
</tr>
<tr>
<td>WLAN+CDMA</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>12,578</strong></td>
</tr>
</tbody>
</table>
Major Requests from local autonomous entities for BIS/BMS in Korea
- Service Coverage: Limited area → Wide area (nation-wide) & All area
- 2-way Communication (download, upload)
- Data Rate: Limited data Speed (under 10 Kbps) → High Speed (over 1 Mbps)
- Real Time Response: Minimize Time Lag & Time Delay
- Ensuring stability in BIS/BMS Services
- Low Costs of Construction & Operating BMS/BIS
- Availability for additional ITS Service (ATIS, etc) & Other Personal Service (Telematics, etc)

Expected Outcome from WiBro

- portability & mobility
- nation-wide coverage
- high speed
- inter-activity
- price competitiveness
Thank you!

Worldwide Scale Economy

Investment

WiBro

Manufacturing & operating

Relaxed regulation

Policy

WiMAX

Extensive network & terminal expertise

Technology

Partnership

Mutual cooperative partnership