1. What is RFID/USN?

**RFID**  
(Radio Frequency Identification)  
- Tag storing ID on item, reader reads it by electromagnetic wave  
- remote Identification

**USN**  
(Ubiquitous Sensor Network)  
- Environmental information recognition · analysis using sensors  
- various smart service provision

* Components: Tag, Reader, Service(SW)

* Sensor node, network, service(including S/W)

Similarity in information recognition
- RFID: Fixed information(ID) recognition  
- USN: varying data(location, temperature, etc.) acquisition · analysis
RFID, Fallen-off flowers before blooming?

RFID initially introduced in 2004, slowly progressed in 8 years

Barcode
- Barcode in Korea: 1988
- Popularized in 12 years

Cellular Phone
- 1st mobile communication service in 1984
- Popularized in 14 years
2. RFID Industrial Status

Rapid growth of domestic RFID market is forecasted due to a development of technology and an extension of application areas.

World market

<table>
<thead>
<tr>
<th>Year</th>
<th>(unit: 100 Mill. USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>'06</td>
<td>2.77</td>
</tr>
<tr>
<td>'10</td>
<td>5.63</td>
</tr>
<tr>
<td>'14</td>
<td>10.37</td>
</tr>
</tbody>
</table>

※ ID TecheX 2011

Domestic Market

<table>
<thead>
<tr>
<th>Year</th>
<th>(unit: 100 Mill. USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>'06</td>
<td>0.21</td>
</tr>
<tr>
<td>'10</td>
<td>0.59</td>
</tr>
<tr>
<td>'14</td>
<td>2.99</td>
</tr>
</tbody>
</table>

※ ETRI Estimation based on the report of RFID/USN Status

Domestic industrial status

- 320 RFID companies
- Role sharing of Big and small-medium companies
  - Big company: General purpose tag
  - Small-medium companies: Special purpose tag and reader

Domestic RFID market status

- tag (188.1Bil.): 29%
- reader (163.3Bil.): 26%
- service (86.5Bil.): 31%
- others (196.1Bil.): 14%
3. USN Market Status

**USN Market: similar to previous year, but grow rapidly**

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**World Market**

(单位: 100亿USD)

- '08: 23.1
- '10: 49
- '14: 163.3

(*) ETRI Estimation

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**Domestic Market**

(单位: 100亿USD)

- '08: 0.67
- '10: 1.1
- '14: 9.6

(*) ETRI Estimation based on the report of RFID/USN Status

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**Domestic Industry Status**

- USN companies: 78
- Main parts such as sensors rely on imports
RFID/USN Achievements
1. RFID Achievements

RFID Diffusion Support

- Intensive support on promising areas: Pharmacy, Liquor
- Creation of annual tag demand up to 130 mil., leading to ₩60 tag

### Tag Demand

- **1,300% Tag Demand Increase**
- **10 Mil.** → **130 Mil.**

- **'08**
- **'10**

### Tag Price

- **₩200** → **₩60**
- **70% Tag Price Decrease**

- **'08**
- **'10**

**Tags**

- ILDONG
- Hanmi

**Claims**

- 11년 기준 8,000만개 수요 창출
  ('09~'11, 106억원)
- 12년 기준 2,900만개 수요 창출
  ('09~'12, 115억원)
- 시범사업
  - 의류, 식품, 면배, 가전, 자동차 등
  - 시범사업 추진
  - 2,500만개 수요 창출
    ('08~'11, 207억원)
1. RFID Achievements

RFID Technology Development

- Improvement and Localization of RFID Device, Original technology development of Mobile RFID
- Inducing markdown of RFID device and leading international standardization

### RFID Reader Price

<table>
<thead>
<tr>
<th>Reader</th>
<th>2008</th>
<th>Present</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Reader</td>
<td>₩ 300 Mil.</td>
<td>₩ 180 Mil.</td>
<td>(X-code)</td>
</tr>
<tr>
<td>(Foreign Brand)</td>
<td>(Domestic Brand)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>portable Reader</td>
<td>₩ 270 Mil.</td>
<td>₩ 200 Mil.</td>
<td>(ATID 870)</td>
</tr>
<tr>
<td>(Foreign Brand)</td>
<td>(Domestic Brand)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Mobile RFID Standardization

1. RFID Achievements

**RFID Infrastructure**

- RFID market creation by enhancing and/or enacting a law
  - Pharmacy · Liquor · Procurement: Legislation of RFID Tagging and system reformation

**Liquor**
- Phased compulsory RFID tagging on liquor (National enforcement from Oct. 2012)

**Procurement**
- Compulsory tagging on procured items (Feb. 2008)

**Pharmacy**
- Compulsory RFID tagging barcode on drugs (2013)
- Continuation of tax deduction: 7% of investment of RFID adopting company (2013)
2. USN Achievements

- Localization of core technologies: USN sensors, communication modules
  - Technology gap decrease: from 3~4 years to less than 2 years

**Core technology**

- Standard ZigBee chips
  - Localization

- USN communication technology resistant to interference
  - 1 channel (existing) (IEEE 802.15.4)
  - 16 channels (standard adoption) (IEEE 802.15.4e)

**Level of USN technology**

- USN S/W products (2010)
- The current level of 86% compared to the U.S.
  - 92% level expected in 2012
Large demand field pilot projects conducting such as energy, industry facilities, growth environment.
Vision and Project Strategy
RFID Project Strategy

- Demand creation in 7 major areas
- Technical solution for constraints
- Smart phone as RFID reader
- Diffusing basis of law and system

USN Project Strategy

- Identification of strategic USN applied services
- Convergence Technology Development
- Sustainable USN ecosystem

RFID/USN in our daily life

Vision
RFID Diffusion Strategy
1. RFID Diffusion Strategy

Large-scale demand creation in 7 major areas

- Selection of focus project → Creation of large-scale demand

7 Leading Industry

- Liquor
- Food
- Fashion
- Home Appliance
- Parcel
- Car
- Pharmacy

Support Plan

- Liquor (2008~2012)
- Drug (2009~2013)
- Food (2012~2014)
- Fashion (2012~2014)
- Home Appliance (After 2013)
- Parcel (After 2013)
- Car (After 2013)
1. RFID Diffusion Strategy

Large-scale demand creation in 7 major areas

- Selection of focus project ➔ Creation of large-scale demand

7 Leading Industry

- Liquor
- Food
- Pharmacy
- Fashion
- Home Appliance
- Parcel
- Car

Support plan of 2012

- **Target**
  - National health: Fresh food & dietary supplement
  - Fashion, distribution center, etc

- **Schedule**
  - Project Notice: 16 Jan.~15 Feb. (30 days)
  - Selection of demand company: end of Feb.
  - Project plan modification: Begin of March
1. RFID Diffusion Strategy

Smart phone as reader ➝ “Into Daily routine”

- Dual RFID reader development (2011~2013) & Embedding in Smart phone (2014) ➝ RFID adoption into daily life

900MHz

- Genuine verification of liquor
- Drug distribution information

NFC

- Mobile payment
- e-Bill
1. RFID Diffusion Strategy

Technical solutions for constraints

- High cost of Tag → Low cost tag development and diffusion (₩30, 2011~2013)
- Read rate of Tag → Field-oriented technology development

Low Cost Tag

- (Chip) $₩28$ → $₩7$
- (Tag) $₩29$ → $₩11$

Tag Read Rate

- (Variable Beam Antenna) 98% (Present) → 99.9% (2012)
- (Metal Tag) 1.5m (Present) → $\geq 2.5$m (2012)
1. RFID Diffusion Strategy

**RFID Infrastructure**
- Alignment of RFID infrastructure for voluntary RFID adoption:
  - Enhancement of law and system, Standardization, Technology verification

**Law & System**
- RFID tagging on medical instruments and waste appliances
  - *In treaty with related ministries*

**Standard**
- Standardization: RFID identifiers, tagging position and method, information exchange

**Consulting**
- Consultation of RFID adoption for voluntary companies
USN Activation Strategy
1. USN Activation Strategy

**Strategic USN-applied service Identification**

**Strategic field identification**

- Life-friendly personalized service
  - Healthcare, Home Security, Safety·LBS
- Major Industrial Convergence

**Private Joint Forum Configuration (‘12.1)**

- 5 Field Start Projects identification and development
  - Enterprise Demand, Level of Technology, Ripple Effects
  - Technology development and business models suggestion
1. USN Activation Strategy

- 5 Start Projects R&D strategy establishment
- Core technologies · Integrated platform development for personalized services
  - Smartphone-connected technology, easy installable sensor devices

USN-equipped Smartphone

- Plant status analysis
- Disease/pest management
- Flowers/plants information DB and server

Research Inst./Univ.

- Personal health information server
- Remote diagnosis and treatment

Medical Center

- Wind speed/direction
- CO2
- DUST
- Pesticide remains
- PH
- Sunlight
- Temperature, altitude
- Humidity

Outdoor, house, Flower management

Flower management

Remote diagnosis and treatment

Diseases/pest management

Flowers/plants information DB

Research Inst./Univ.

Personal health information server
1. USN Activation Strategy

Sustainable USN ecosystem Establishment

- Legal system establishment for 5 Start Projects
- Large scale sensing and network testbed establishment

Legal System

- Fire-Environment Safety standards
  * Related ministries cooperation promotion

TestBed

- Leading projects selection
- Technical and feasibility verification
“Smart Dust”