# Aspects of Standardization and Development of RFID technologies

## (Example of Projects on implementation of this technology in the Republic of Korea)

**Workshop**

**IMPLEMENTATION EXPERIENCE OF NETWORK PERFORMANCE PARAMETERS CONTROL SYSTEMS AND GRANTING REQUIRED LEVEL OF SERVICES QUALITY ON THE OPERATOR NETWORKS. SENSOR NETWORKS – AS OPTIMIZATION TOOL FOR VEHICULAR TRAFFIC FLOW**

Moscow

27-29 April 2011

# Content

I. Strategy for USN & RFID Industry

II. Survey for USN & RFID

III. Near Field Communication(NFC)

# Questions ?


## What is the common characteristics of Successful Technology?


# How to Wi-Fi(or wLAN) success?

## Infrastructure

### Internet

- Internet, Infrastructure for Wi-Fi, is widely spread in the world

+

## Technology

### Convenience

- Wi-Fi provides convenience for accessing to Internet

- Infrastructure gives technology powerful market & consumer
- Technology can not survive only with technical advantage in the market(ex: Wibro)
- In contrast, powerful infrastructure can solve technical problems reported at the beginning stage(ex: NFC)

# However, USN & RFID technology

## Infrastructure

### Delicate Infra

- Limited existence market
- Limited cooperation with previous technology(ex: Internet)

+

## Technology

### Not enough to apply

- Poor & limited performance compared to other technology

- Needs powerful infrastructure to make its own market
- Infrastructure can be divided into 2 aspects
  - Infrastructure of its own network or facilities
  - Infrastructure which makes USN & RFID technology merged with other business(ex: Smartphone based Services)

# Strategy to motivate USN & RFID Industry

- 1st stage : Widespread of USN & RFID Infrastructure of its own network of facilities
- 2nd stage : Implementation of basic environment for merging USN & RFID with other business
- 3rd stage : Qualify its conformance, performance for USN & RFID

# Strategy to motivate USN-RFID Industry

- **1st stage : Widespread of USN & RFID Infrastructure of its own network of facilities**
  - **Korean Government implemented various projects in order to promote USN & RFID business**
    - **Pilot testbed for smart grid in jeju island**
    - **Public bike for entire nation**
    - **Ubiquitous City management system for 10 cities**
    - **Harbor Distribution System**
    - **RTLS for searching of missing child**

# Strategy to motivate USN & RFID Industry

- **2nd stage : Implementation of basic environment for merging USN & RFID with other business**
  - **USN & RFID system operate as a stand alone system, generally**
  - **Standardization for interworking between USN & RFID and other network will extend market**

# Strategy to motivate USN & RFID Industry

- **3rd stage : Qualify its conformance, performance for USN & RFID**
  - **Verification & Certification for USN & RFID will increase quality of products**
  - **Customer's demands will be increased as well as growth of reliability, stability, performance, etc**

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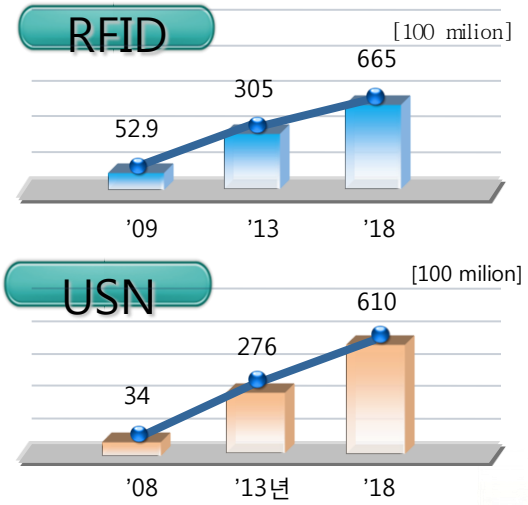
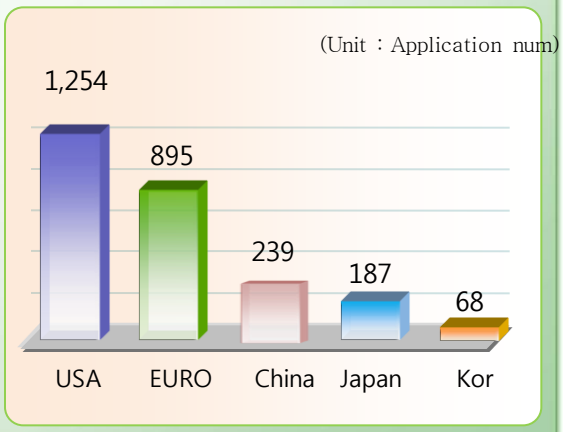
# Trend of USN & RFID

## Total Budget 8.6 million Dollar('08)

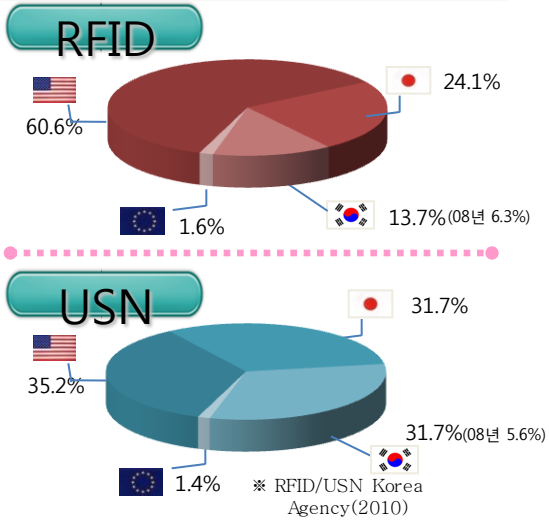
### Budget of World




### RFID Applications




### Status of IRP




USN-RFID Industry growth will be increased rapidly

# Goal of USN & RFID

## RFID/USN World No.3

### 1st Step ('08~'12)

- World Market : 14%
- 33 million dollar
- employment(32,000)

**Market Creation**

- Spread of demand
- Demand for B2C
- Compatible with other Projects
- Support for small size company
- Increase of infra

### 2nd Step ('13~'18)

- World Market 20%
- 211 million dollar
- employment(114,000)

**Standardization**

- High Quality of Servie
- Standardization of RFID/USN for Infra

### 3nd Step ('18~)

- World Market 25%
- 318 million dollar
- employment (214,000)

**Test**

- Development of Test method
- Support Real Field Test bed for verification

# USN-RFID Projects

## 2011

| Division | Title | Institution |
|---|---|---|
| **All Agency** | **Liquor Distribution Management System** | **Nation Tax Service** |
| Harbor Distrib-ution Agency | **Medicine Distribution Management System for Pharmaceutical System** | **Hanmi** |
| | **u-SCM and registered trademark** | **Schoolooks** |
| | **Global out-sourcing for RFID** | **The Basic House** |
| **Part Distrib -ution Agency** | **RFID Collborative Production -SCM Implementation** | **HiTek** |
| | U-SCM for semiconductor | Emco |

# USN-RFID Projects

## 2011

| Division | Title | Institution |
|---|---|---|
| Extended project | u-SCM for Steal management | POSCO |
| | Medicine Distribution Management System for Pharmaceutical System | ILDONG |
| | Medicine Distribution Management System for Pharmaceutical System | UNI |
| | u-SCM for clothing | D&D |
| Verified project | Dynamic RTLS system for Harbor Container localization | CJ-GLS |
| | Smart Green Home for Advanced Metering | Ministry of National Territory |

# Content

I. Strategy for USN & RFID Industry

II. USN & RFID projects in Korea

III. Near Field Communication(NFC)

# NFC

## ◆ Overview

- Communication between eletronic devices
- Published by Philips & sony
- Easy to control & including Security & short range of communication
- Using 13.56MHz frequency
- Very cheap price for implementation
- Mobile

## ◆ NFC vs other technology

| | NFC | RFID | IrDa | Bluetooth |
|---|---|---|---|---|
| Set –up time | <0.1ms | <0.1ms | ~O.5s | ~6 sec |
| Range | Up to 10cm | Up to 3m | Up to 5m | Up to 30m |
| Usability | Human centric<br>Easy, intuitive, fast | Item centric<br>Easy | Data centric<br>Easy | Data centric<br>Medium |
| Selectivity | High, given, security | Partly given | Line of sight | Who are you? |
| Use cases | Pay, get access, share, initiate service, easy set up | Item tracking | Control & exchange data | Network for data exchange, headset |
| Consumer experience | Touch, wave, simply connect | Get information | Easy | Configuration needed |

# NFC

## ◆ Characteristics

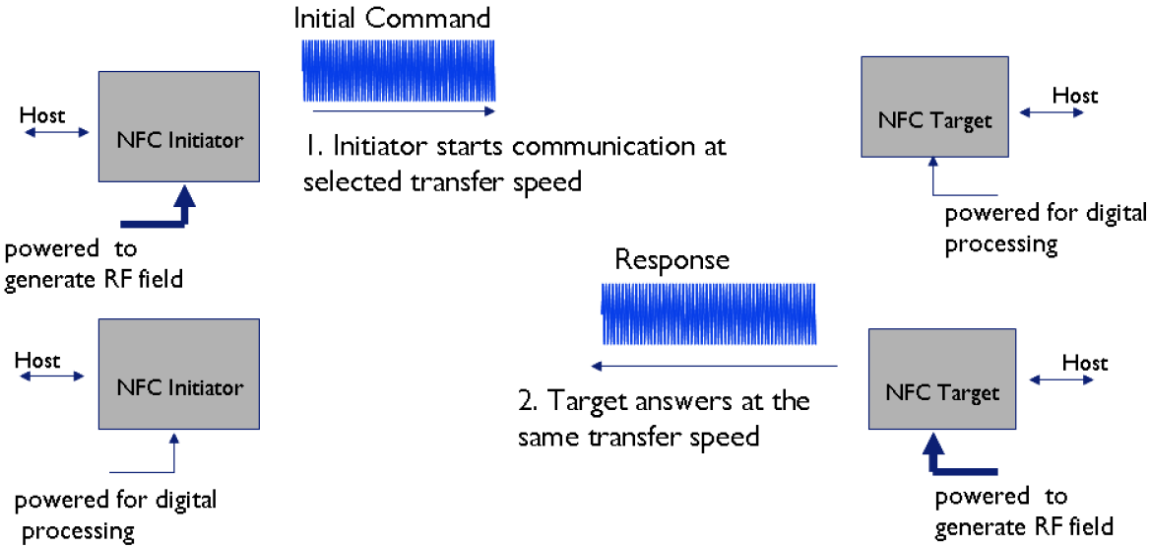
- Short range communication
  - Association & communication only occur when they are almost attached
- Non-battery mode
  - Usually operates with battery power
  - If device become target, then it can be supplied by host's magnetic power
- Data rate
  - 106kbps ~ 424kbps
- Previous Infra business
  - Transit card and Electronic payment system
- Security

## ◆ Differences with HF RFID

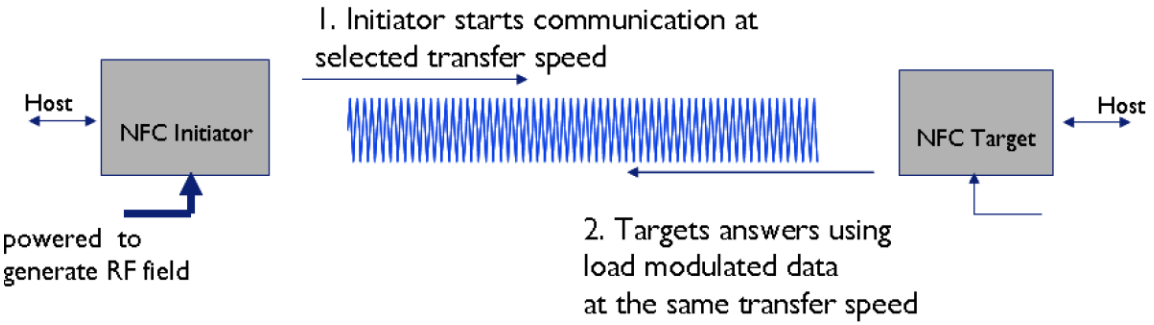
– Active mode
– Peer-to-Peer

# NFC

## Active mode

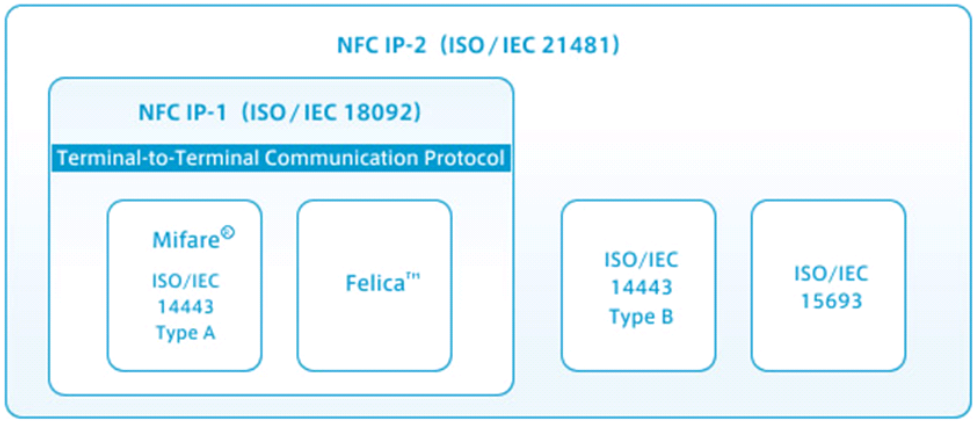



## Passive mode



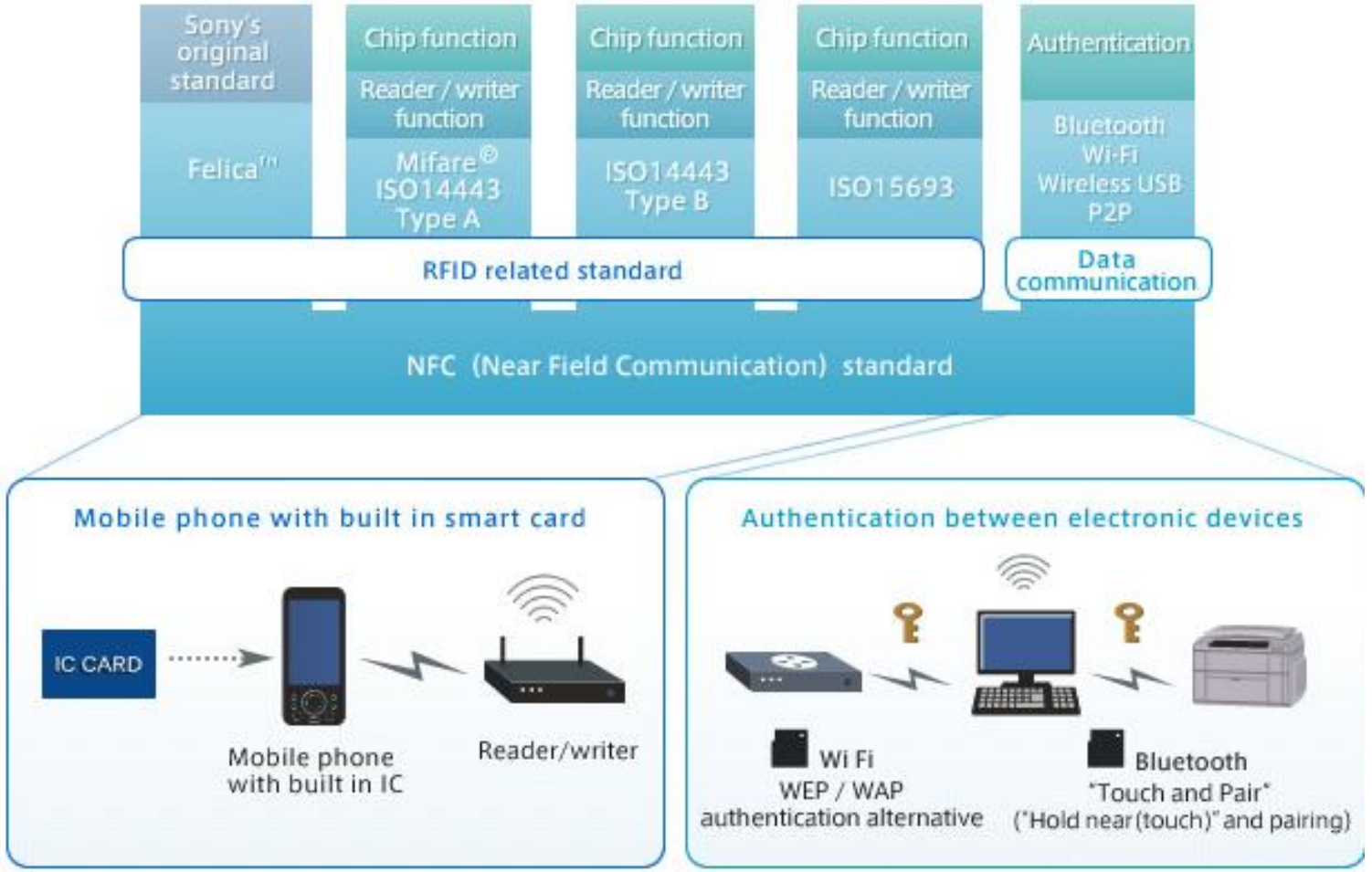
# NFC

- **Standard**
  - Standardized from ISO/IEC, ECMA, ETSI, ITU, NFC Forum
    - ECMA 340 : DEC, 2002 -> ISO/IEC 18092(NFCIP-1) : DEC, 2003
    - ECMA 352 : DEC, 2003 -> ISO/IEC 21481(NFCIP-2) : JAN, 2005
  - NFC Standard Diagram




| Standard | Example of use |
|---|---|
| Mifare® (ISO/IEC 14443 Type A) | IC telephone cards, cigarette cards and other broad range of use in Europe. |
| ISO/IEC 14443 Type B | employee ID, student ID, etc. |
| FeliCa™ | Transport related cards and e-money in Japan such as Suica, Edy, PASMO, ICOCA, "Osaifu-Keitai" (smart mobile wallet) |
| ISO/IEC 15693 | RFID tag for logistics, retailing etc. |

# NFC


Sony's original standard
Felica™
Chip function
Reader / writer function
Mifare® ISO14443 Type A
Chip function
Reader / writer function
ISO14443 Type B
Chip function
Reader / writer function
ISO15693
Authentication
Bluetooth
Wi-Fi
Wireless USB
P2P
RFID related standard
Data communication
NFC (Near Field Communication) standard
Mobile phone with built in smart card
IC CARD
Mobile phone with built in IC
Reader/writer
Authentication between electronic devices
Wi Fi
WEP / WAP
authentication alternative
Bluetooth
"Touch and Pair"
("Hold near (touch)" and pairing)

# NFC

- **Mobile payment**


# NFC

- **Outdoor Media**

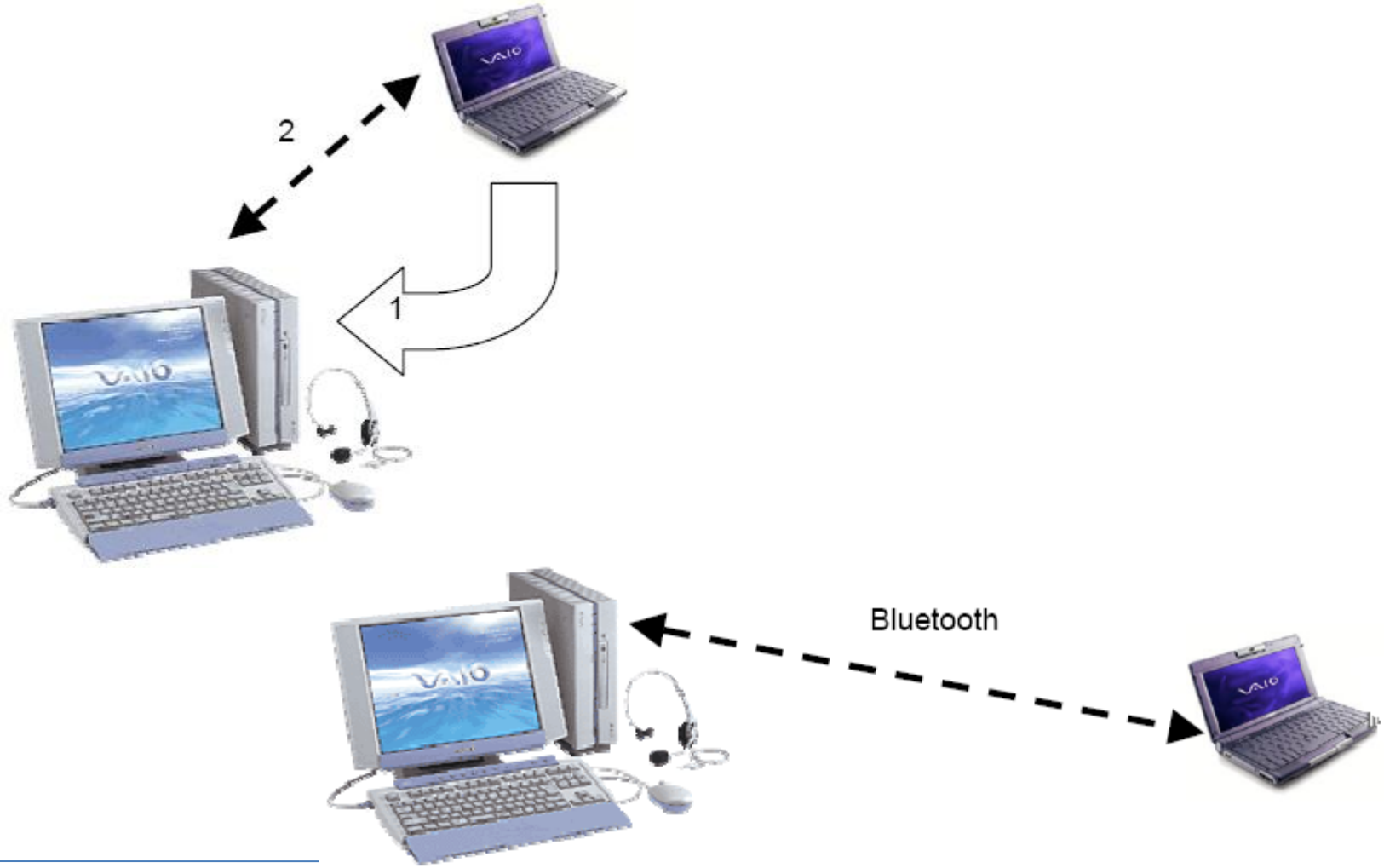

# NFC

- Peer-to-Peer Communication



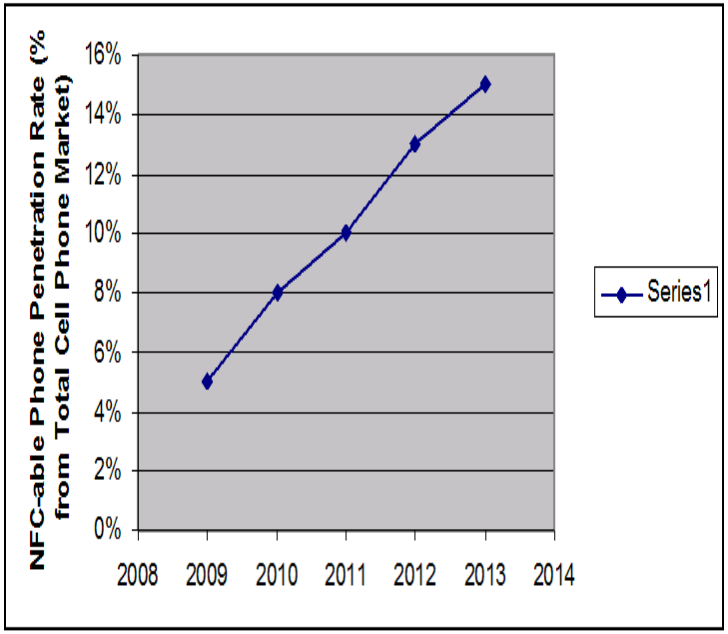
# NFC

- Set up of communication for other

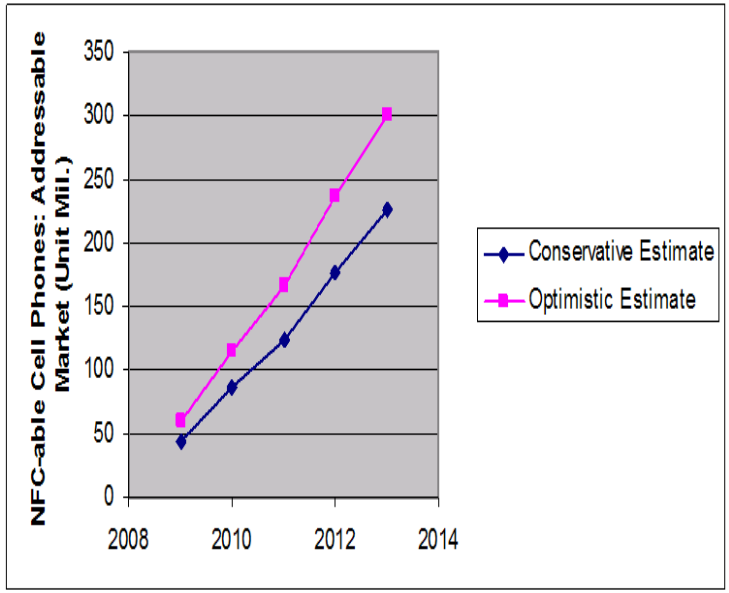


# NFC

- **NFC Market Trend**




| 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| 5% | 8% | 10% | 13% | 15% |

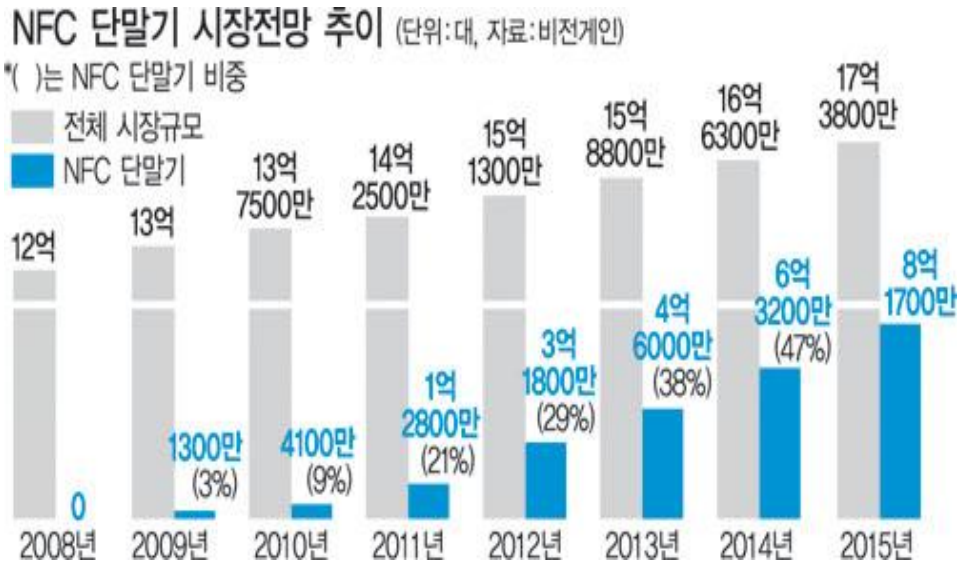



| 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|
| 45 | 86 | 124 | 178 | 225 |
| 60 | 115 | 166 | 237 | 301 |

※ UWB and NearFieldCommunicationsPerfectTogether,Practel,Inc,Jan-09

# NFC

- **NFC Market Trend**
  - **Visiongain(England) says amount of electronic payment with NFC mobile device reach to 145 billion dollar and NFC mobile device will occupy 47% of mobile phone market**
  - **IE Market Research(IEMR) says mobile payment market will increase at 2014 and NFC will occupy 47% of this market**



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