

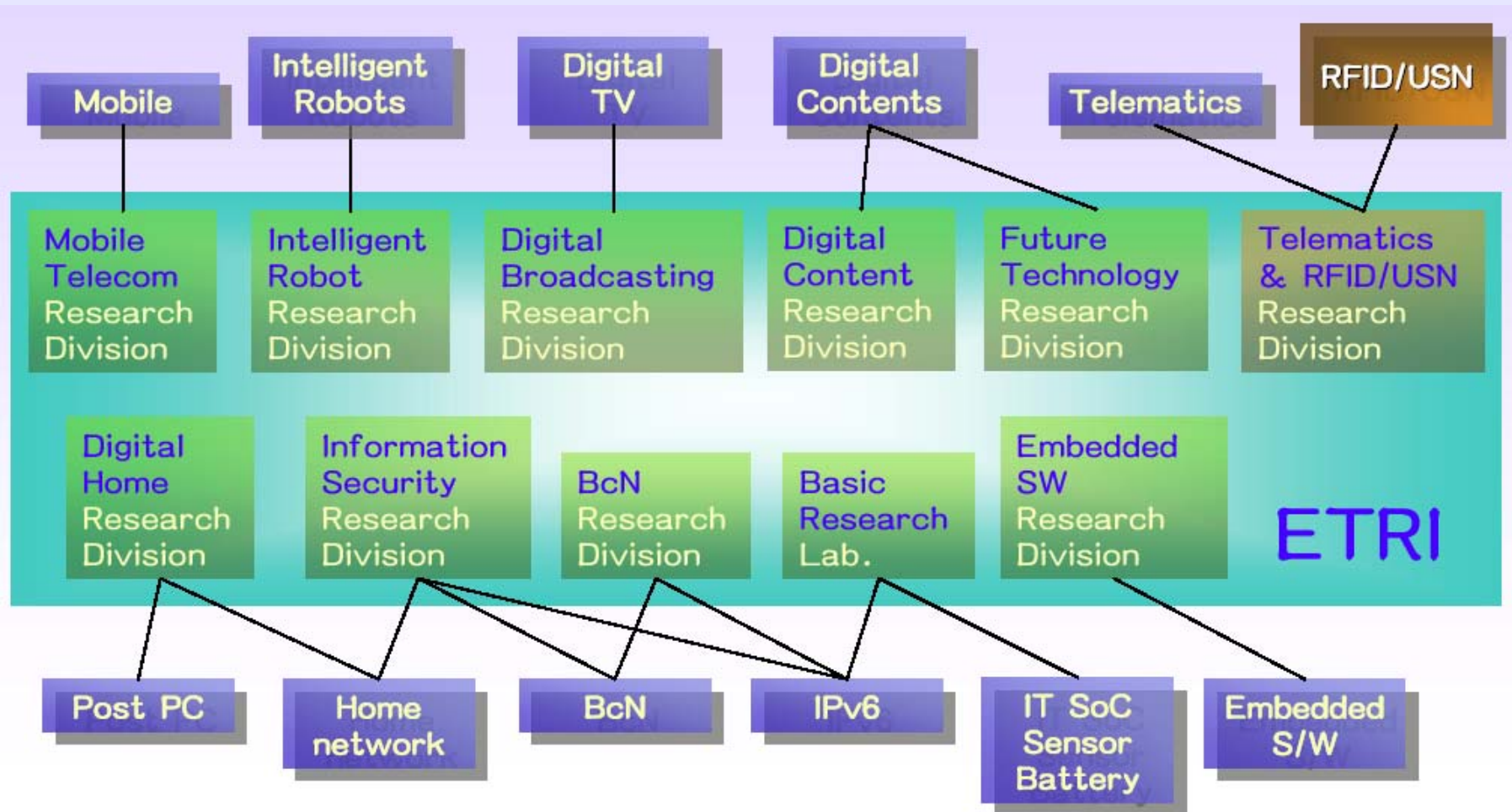
RFID/USN Technology in Korea

6. April. 2005.

RFID/USN Research Group

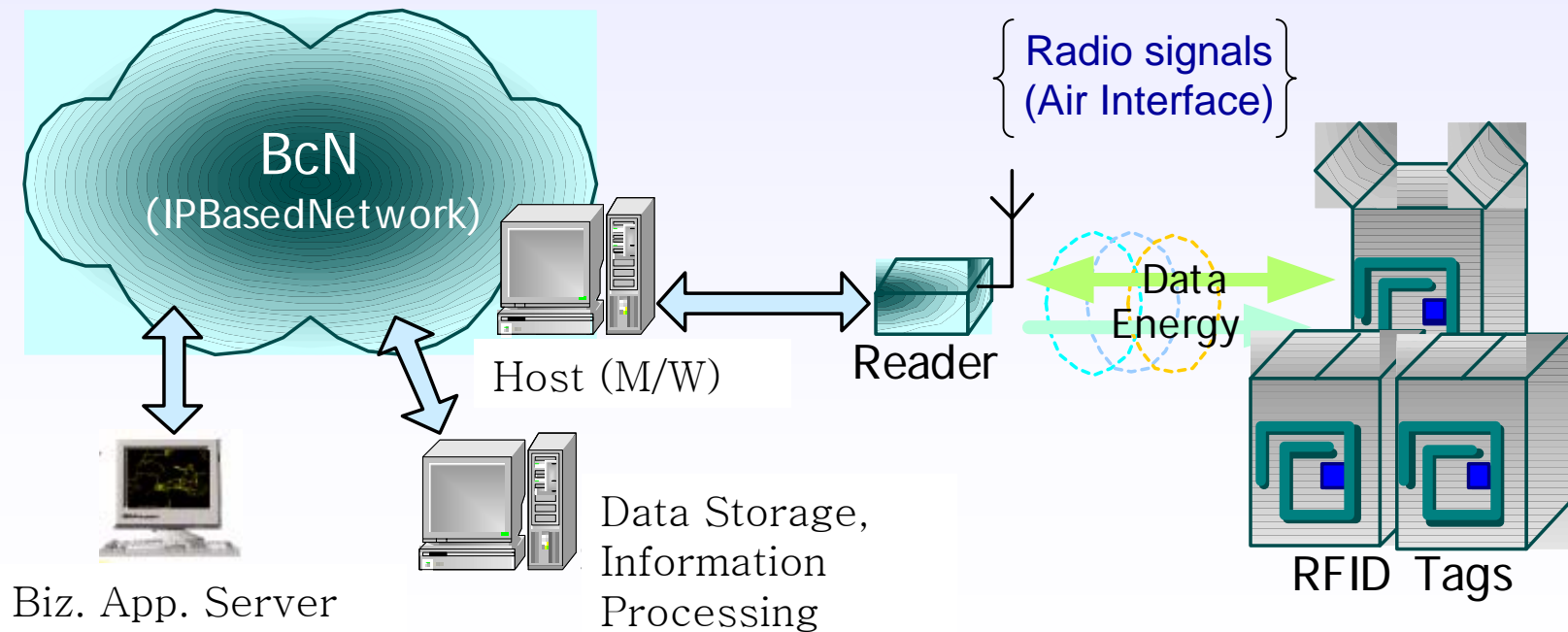
ETRI towards u-IT Korea

- ETRI is devoting to R&D on ubiquitous IT



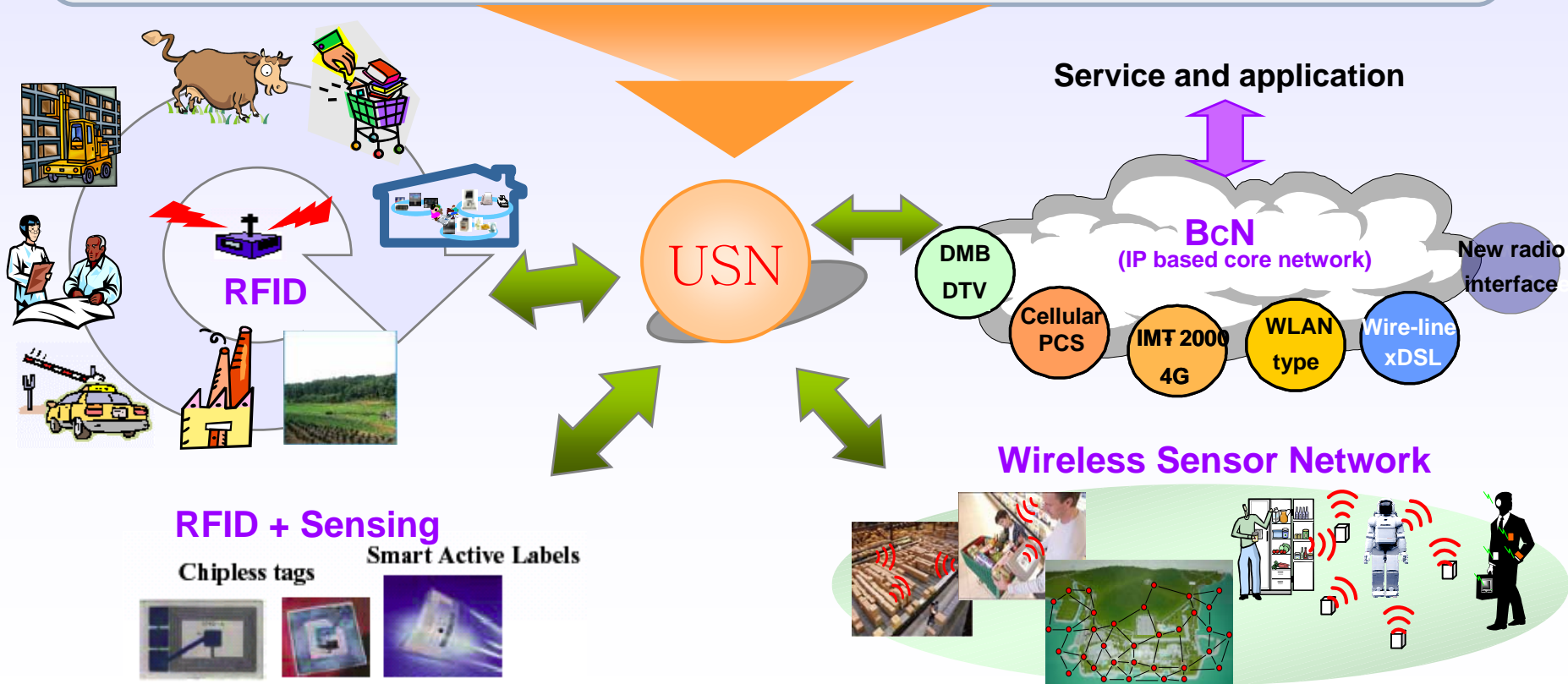
Radio Frequency IDentification

- Transferring of data and power, using contact-less technology
- Complementing limitations of barcode and other AIDC devices



USN Concept in Korea

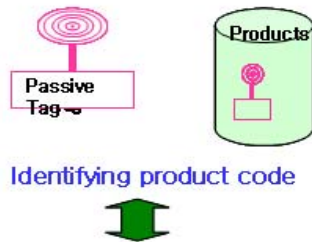
- **U**BIQUITOUS - Everywhere, everything with RFID tags
- **S**ENSOR - Sensing ID and environmental information
- **N**ETWORK - Real time management via network



USN above RFID

Read Only RFID → Read/Write RFID → Sensing USN → Networking USN

1st Step:
Read only (~2004)



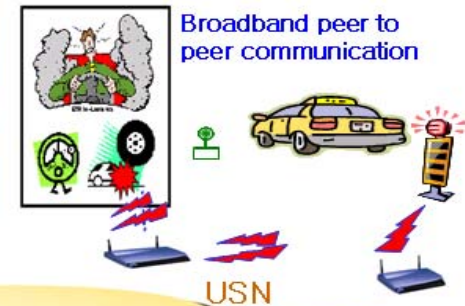
2nd Step :
Read & Write (~2005)



3rd Step :
Sensing (~2006)

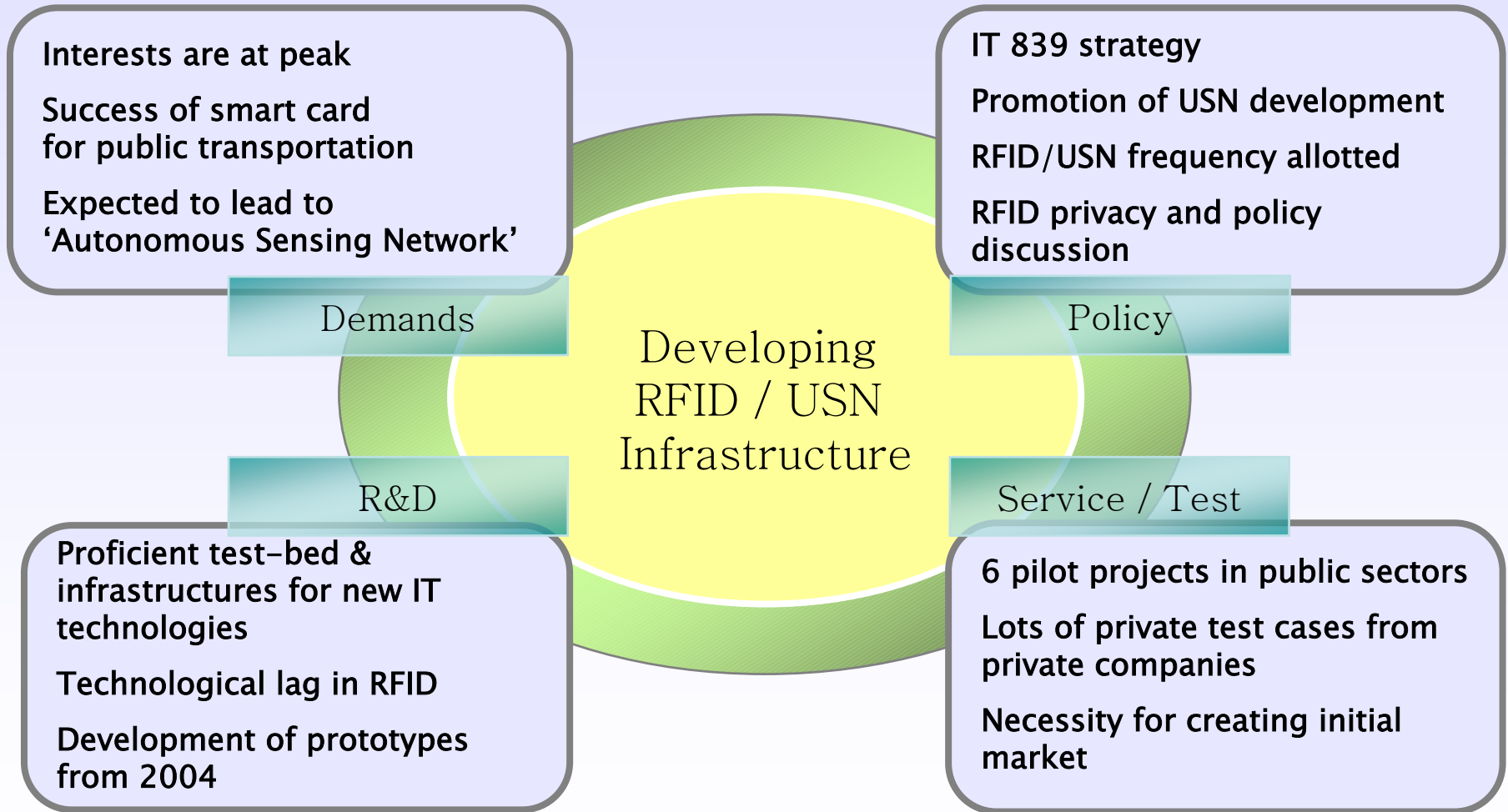


4th Step :
Communicating (~2008)

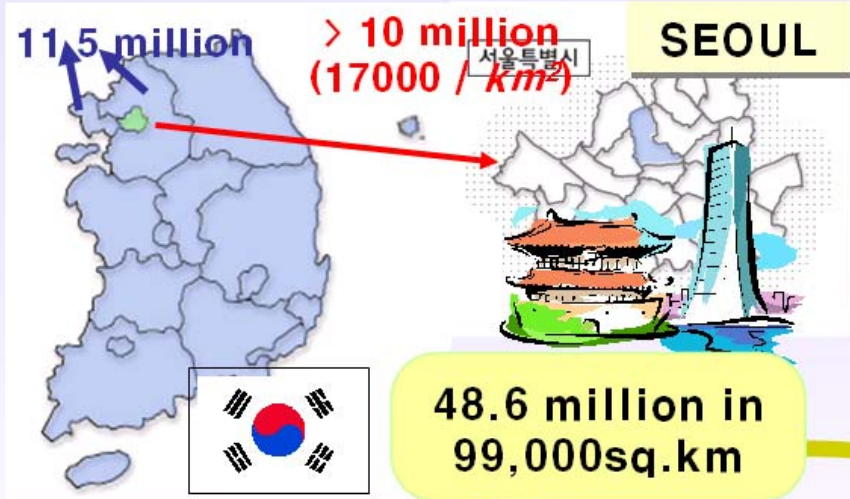


Area	Description	Category
RFID ('04~'07)	Wireless recognition technology of objects' information/record	<ul style="list-style-type: none"> ▪ Tag (Chip) and Reader ▪ RFID Middleware and Service ▪ RFID System Engineering
USN ('04~'08)	Wireless Sensor Networking with collecting physical/environmental information including objects	<ul style="list-style-type: none"> ▪ Sensor node and networking ▪ USN middleware and Service ▪ Context-Awareness / Algorithms ▪ USN System Engineering
Infrastructure ('04~'08)	Inter-networking RFID/USN with wired/wireless network and related techniques	<ul style="list-style-type: none"> ▪ Standards and Identifiers, Policies ▪ Network Integration (IPv6, BcN) ▪ Practical Applications, Test-bed

RFID/USN Strategy



IT & Korea



IT Adoptors

Internet User
> 30 million

Broadband high-speed
Service 12 million

> 36 million uses
Mobile Phones

Public Transportation Service
Seoul 7.1 million / a day



RFID Frequency

Newly Allotted Frequency for RFID/USN in 2004

~ 135kHz
(ISO 18000-2)

13.56MHz
(ISO 18000-3)
(ISO 7816, 14443)

433.67MHz ~ 434.17 MHz
(ISO 18000-7)

908.5 MHz ~ 914 MHz
(ISO 18000-6)
[4W EIRP, FHSS/LBT]



Access Control



Smart Card



Inventory



Container



Tire Pressure Sensor



Logistics / Distribution

Low

Data Read Rate

High

Robust

Noise / Environment

Sensitive

Large

Tag Size

Small

Must consider

Material, Tag/Antenna Orientation, Tag/Antenna Shape, Tag/Antenna Numbers, Dead Zones, Power, Antenna Efficiency, Product Package, Label, Geometry, ...

RFID Pilot Projects in Public Sector



Public
Procurement
Service



대한민국 국방부

Ministry of National Defense



산업자원부

Ministry of Commerce, Industry and Energy



NATIONAL
VETERINARY
RESEARCH &
QUARANTINE SERVICE



KAC 한국공항공사

KOREA AIRPORTS CORPORATION



해양수산부

- Government Procurement Management using RFID
 - Public Procurement Service (2004.9~2005.5)
- Ammunition Management using RFID
 - Ministry of National Defense (2004.9~2005.4)
- Import-Export Logistics Infra using RFID
 - Ministry of Commerce, Industry and Energy (2004.9~2005.4)
- Import Beef Tracing Service using RFID
 - National Veterinary Research and Quarantine Service (2004.9~2005.4)
- Airport Baggage Tracking System using RFID
 - Korea Airports Corporation (2004.9~2005.4)
- RFID based Harbor Logistics Efficiency Improvement
 - Ministry of Maritime Affairs & Fisheries (2004.12~2005.8)

With Successful Implementation

**Building Initial
RFID Market and
Infrastructure**

**Verifying the
Results of
RFID R&D**

**Expanding RFID-
applicable Area**

**Standardizing
Platforms among
Pilot Projects**

RFID Test Cases in Private Sector

Wholesale & Retail



Parking Meter



Integrated ID Card



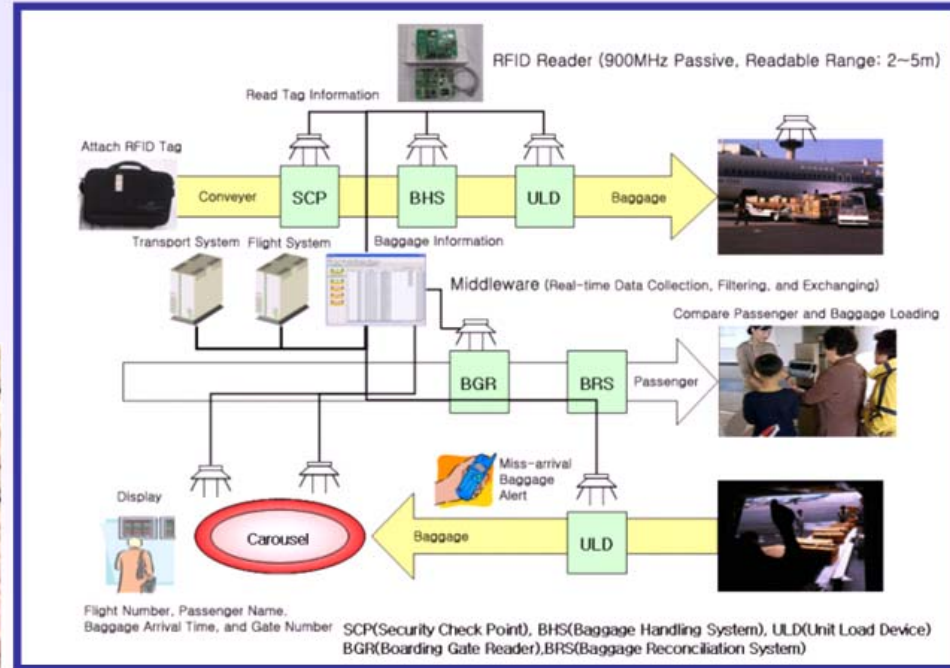
Patient ID



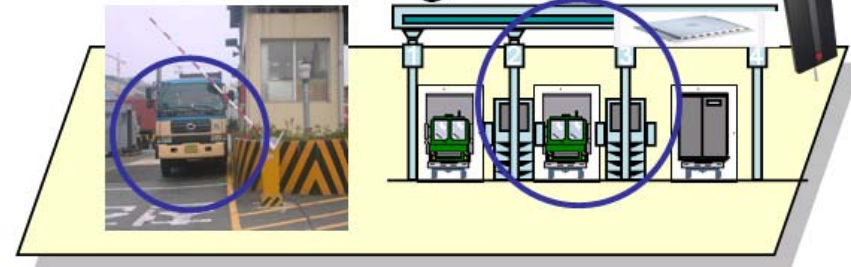
Medicine ID



Aviation Baggage Management

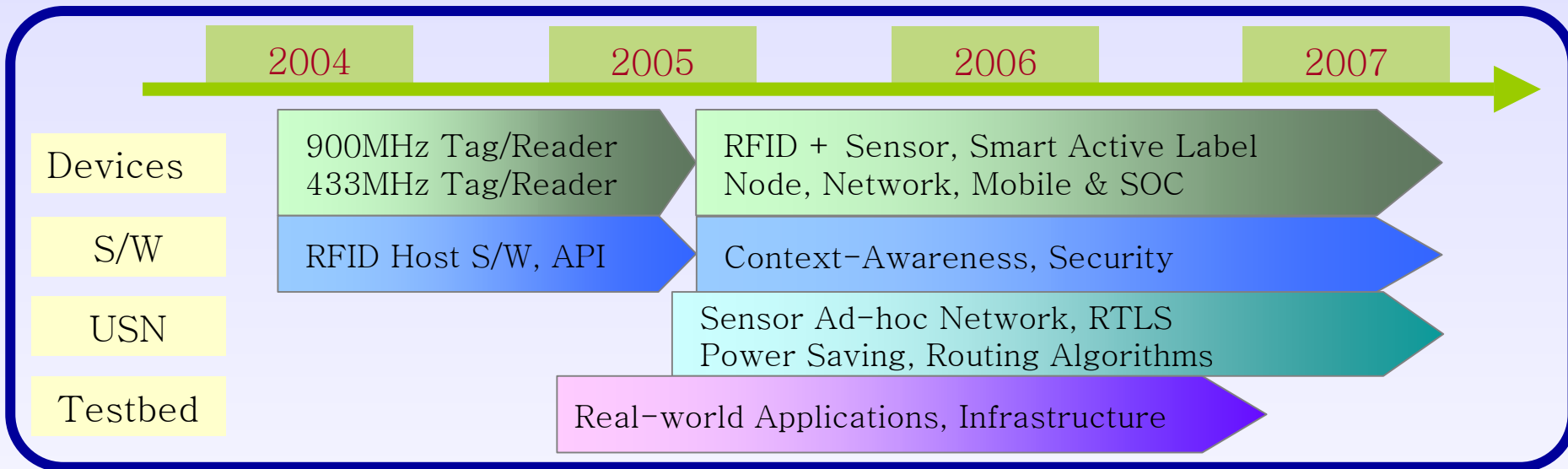


Yard Gate Management



Patient/Medicine Control

RFID/USN @ ETRI

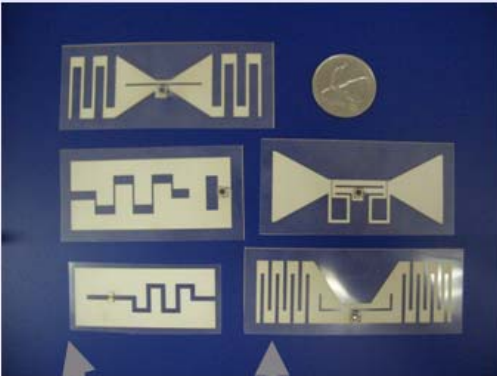


RFID/USN Research Group

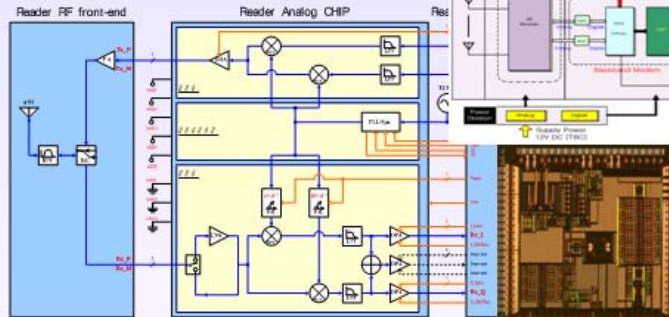
2005

- 1. 900MHz Reader Technology
- 2. 433MHz Reader Technology
- 3. Mobile RFID Technology
 - 2006 3Q : Design & Prototype
 - 2006 4Q : Test service
- 4. RFID Applications

*Korea Association of RFID/USN**Korea USN Center, USN Forum**Telecommunications Technology
Association - RFID/USN PG**Mobile RFID Forum*



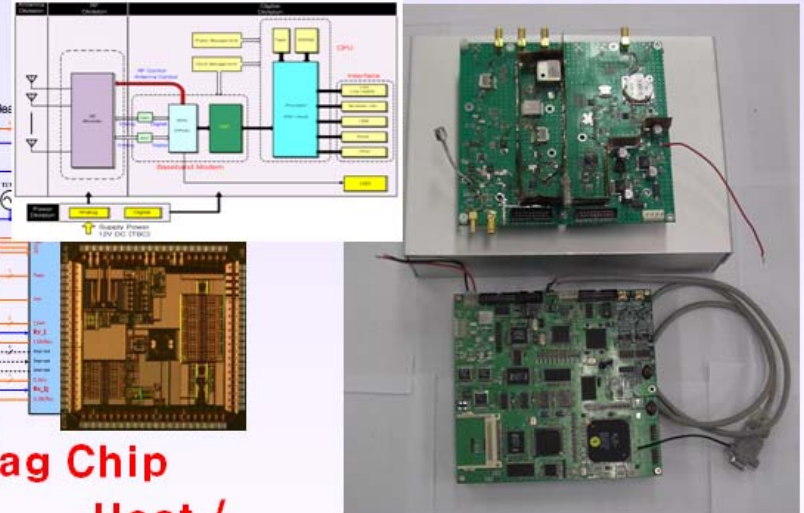
900MHz Tag Antennas



900MHz Reader/Tag Chip

Host / Middleware

900MHz Reader



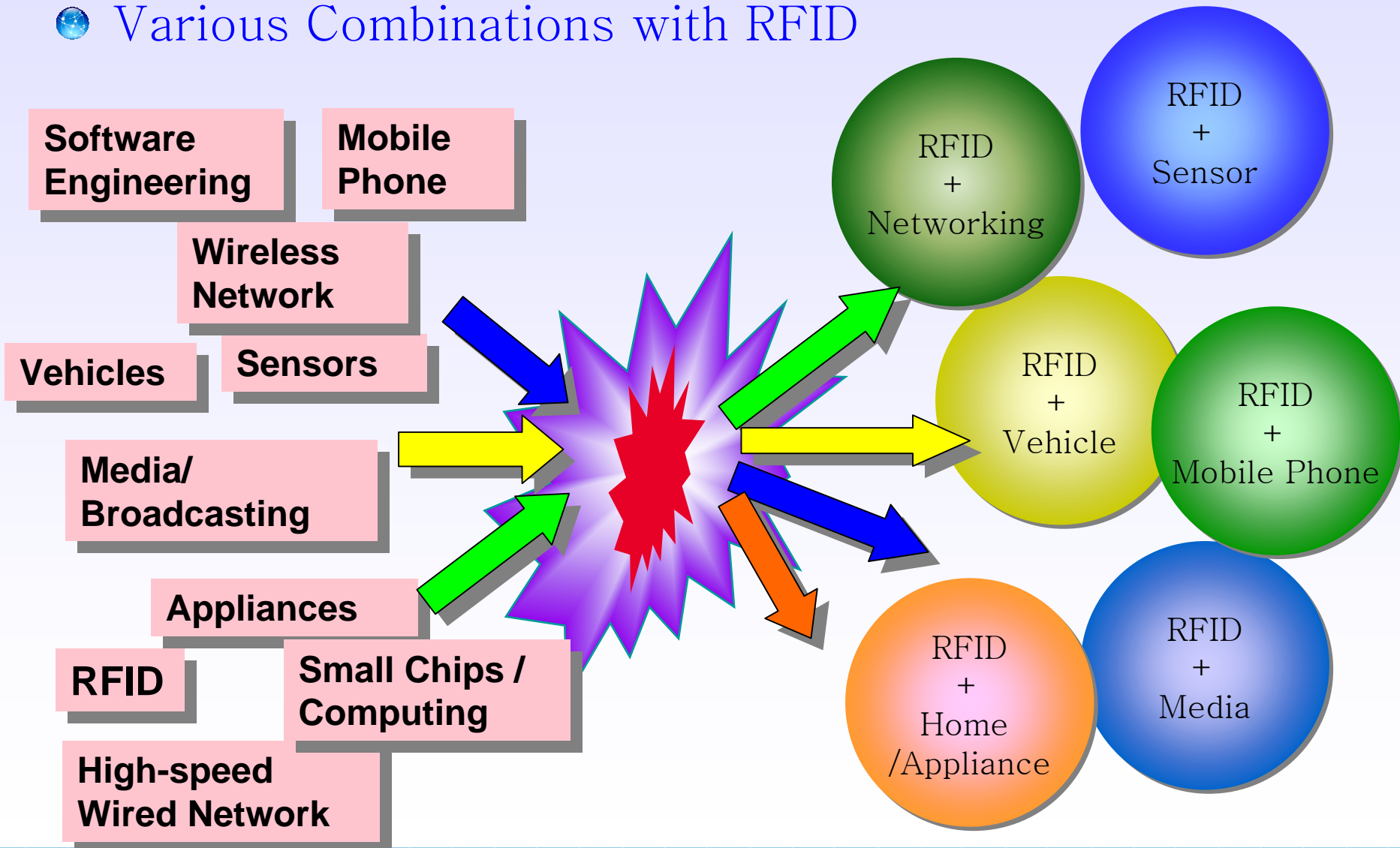
RFIC Monitor

Reader IO State | Reader Connection State Monitor | Report Buffer Monitor

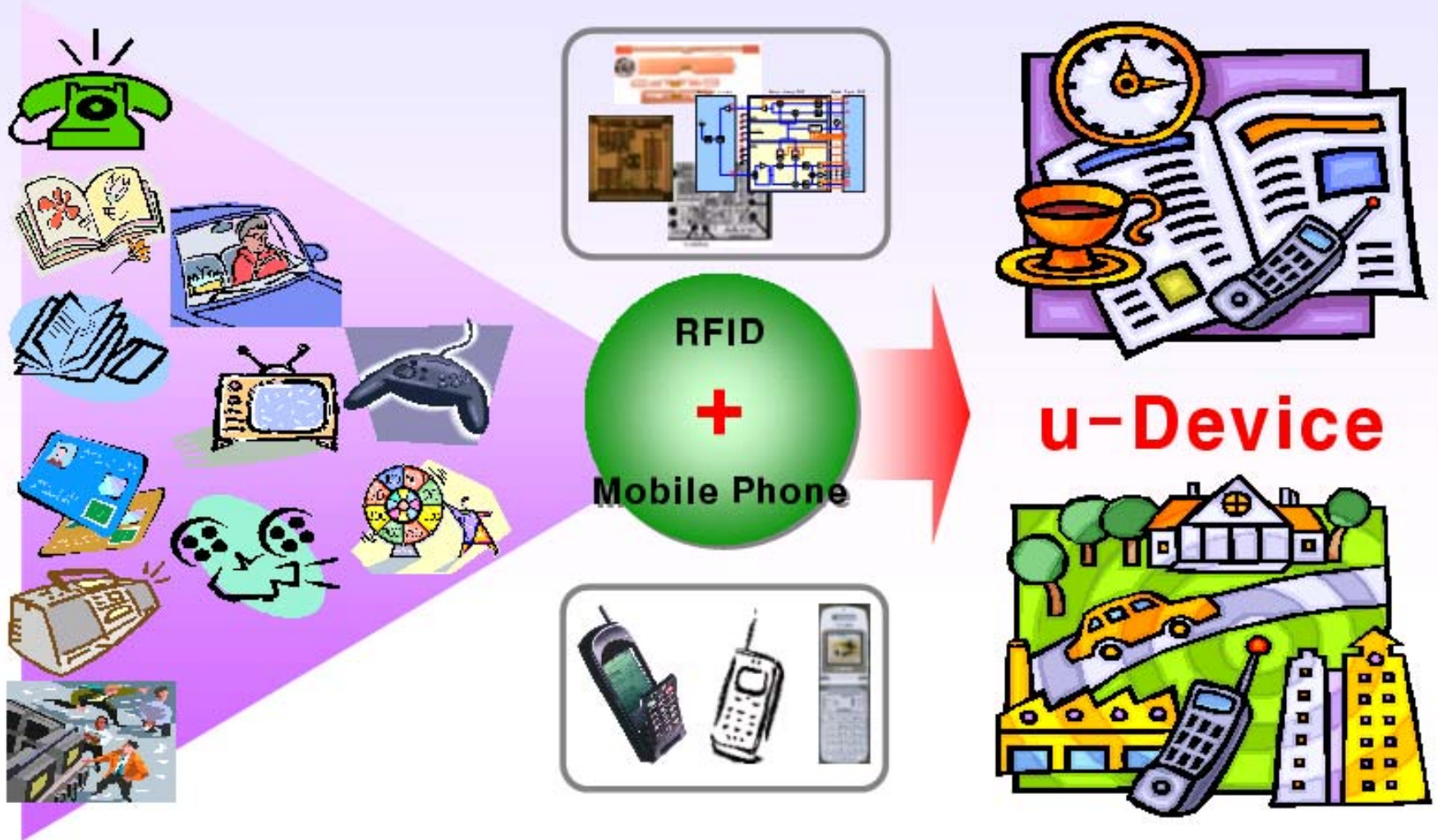
No	readerID	groupID	arriveTime	tagID	observed	observedDate	eventType	discTime
1	1	ipgrsnc_1	2004.10.08 16:43:33.131	8000800545803125			TagSeen	2004.10.08 00:00
2	1	ipgrsnc_1	2004.10.08 16:43:33.131	80008005456657360			TagSeen	2004.10.08 00:00
3	1	ipgrsnc_1	2004.10.08 16:43:33.131	80008005456657133			TagSeen	2004.10.08 00:00
4	1	ipgrsnc_1	2004.10.08 16:43:33.131	80008005456657106			TagSeen	2004.10.08 00:00
5	1	ipgrsnc_1	2004.10.08 16:43:33.131	80008005456657022			TagSeen	2004.10.08 00:00
6	1	ipgrsnc_1	2004.10.08 16:43:33.131	8000800545471413			TagSeen	2004.10.08 00:00
7	1	ipgrsnc_1	2004.10.08 16:43:33.131	8000800545471382			TagSeen	2004.10.08 00:00
8	1	ipgrsnc_1	2004.10.08 16:43:33.131	8000800545471137			TagSeen	2004.10.08 00:00
9	1	ipgrsnc_1	2004.10.08 16:43:33.131	8000800545471047			TagSeen	2004.10.08 00:00
10	1	ipgrsnc_1	2004.10.08 16:43:33.131	8000800545471030			TagSeen	2004.10.08 00:00
11	1	ipgrsnc_1	2004.10.08 16:43:34.493	8000800545803125			TagSeen	2004.10.08 00:00
12	1	ipgrsnc_1	2004.10.08 16:43:34.493	80008005456657360			TagSeen	2004.10.08 00:00
13	1	ipgrsnc_1	2004.10.08 16:43:34.493	80008005456657106			TagSeen	2004.10.08 00:00
14	1	ipgrsnc_1	2004.10.08 16:43:34.493	80008005456657022			TagSeen	2004.10.08 00:00
15	1	ipgrsnc_1	2004.10.08 16:43:34.493	80008005456657133			TagSeen	2004.10.08 00:00
16	1	ipgrsnc_1	2004.10.08 16:43:34.493	8000800545471413			TagSeen	2004.10.08 00:00
17	1	ipgrsnc_1	2004.10.08 16:43:34.493	8000800545471382			TagSeen	2004.10.08 00:00
18	1	ipgrsnc_1	2004.10.08 16:43:34.493	8000800545471137			TagSeen	2004.10.08 00:00
19	1	ipgrsnc_1	2004.10.08 16:43:34.493	8000800545471047			TagSeen	2004.10.08 00:00
20	1	ipgrsnc_1	2004.10.08 16:43:34.493	8000800545471030			TagSeen	2004.10.08 00:00
21	1	ipgrsnc_1	2004.10.08 16:43:35.835	8000800545803125			TagSeen	2004.10.08 00:00
22	1	ipgrsnc_1	2004.10.08 16:43:35.835	80008005456657360			TagSeen	2004.10.08 00:00
23	1	ipgrsnc_1	2004.10.08 16:43:35.835	80008005456657106			TagSeen	2004.10.08 00:00
24	1	ipgrsnc_1	2004.10.08 16:43:35.835	80008005456657022			TagSeen	2004.10.08 00:00
25	1	ipgrsnc_1	2004.10.08 16:43:35.835	80008005456657133			TagSeen	2004.10.08 00:00
26	1	ipgrsnc_1	2004.10.08 16:43:35.835	8000800545471413			TagSeen	2004.10.08 00:00
27	1	ipgrsnc_1	2004.10.08 16:43:35.835	8000800545471382			TagSeen	2004.10.08 00:00
28	1	ipgrsnc_1	2004.10.08 16:43:35.835	8000800545471137			TagSeen	2004.10.08 00:00
29	1	ipgrsnc_1	2004.10.08 16:43:42.244	8000800545471413			TagSeen	2004.10.08 00:00
30	1	ipgrsnc_1	2004.10.08 16:43:35.835	8000800545471382			TagSeen	2004.10.08 00:00
31	1	ipgrsnc_1	2004.10.08 16:43:35.835	8000800545471137			TagSeen	2004.10.08 00:00
32	1	ipgrsnc_1	2004.10.08 16:43:42.244	8000800545471047			TagSeen	2004.10.08 00:00
33	1	ipgrsnc_1	2004.10.08 16:43:35.835	8000800545471030			TagSeen	2004.10.08 00:00

433MHz Active Reader & Tag

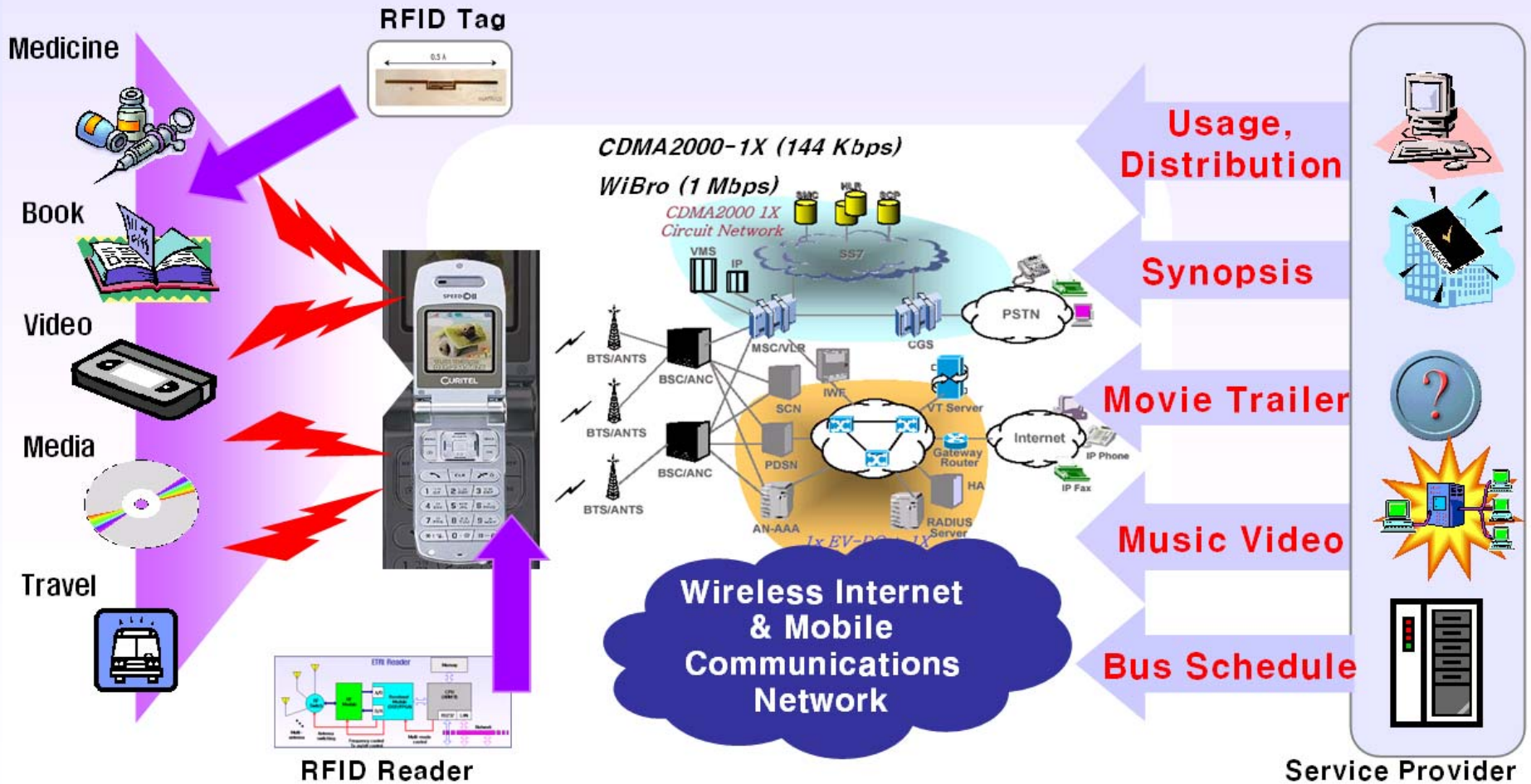
Various Combinations with RFID



● Evolution of Mobile Phone



Ex) Information Providing Services



Thank you

Q&A

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