



Mobile Network R&D Test-bed

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1. SK Telecom R&D Test-bed

SK Telecom has about ten R&D Testbeds for the continuity of MNO Biz. Competitiveness, long term business development for new growth engines and successful Global Biz.

[Main R&D Test-bed]



15F	WCDMA Test-bed
13F	BCN Test-bed
	New Tech. Zone
	IAM , repeater show room
11F	Platform Test-bed
10F	TD-SCDMA Test-bed
	WiBro Test-bed
4F	IAM Test-bed
1F	CDMA Test-bed

[R&D Strategy and Test-bed]

- With the improvement of short term and local MNO Biz competitive R&D systems, SKT will have long term and Global Biz. Competitive R&D systems



MNO Biz. Competitiveness

- Network/Platform testbed for the continuity of MNO Biz. Technology Leadership and the improvement of Global MNO Biz leadership
 - WCDMA , CDMA, WiBro, TD-SCDMA Test-bed and Platform Test-bed

Enlargement of R&D domain

- With the Service technology Leadership, developing new service innovation enablers ; User-Centric fields - ISF Lab, IAM Lab
- Finance, Commerce Convergence enabler : Ubiquitous Service fields – New technology development Zone

2. The goals of each R&D Test-bed

[MNO Biz. competitiveness]	[long term core technology & Global Capability]
<p>WCDMA Test-bed</p> <p>Samsung, LG/Nortel WCDMA system's functional test & new code interoperability test for the WCDMA network's technical competitiveness</p>	<p>TD-SCDMA Test-bed</p> <p>Cooperation with Chinese Government for the entry into the various China market</p>
<p>WiBro Test-bed</p> <p>test & developing for the stability of interface between each node of WiBro systems for commercial network</p>	<p>BcN Test-bed</p> <p>development of killer application and stable service for BcN network</p>
<p>CDMA Test-bed</p> <p>a perfect tabloid of commercial network for new features and services interoperability testbed for CDMA 3G network, even for business partners</p>	<p>Digital Home Network</p> <p>for a commercial service of digital home system, applied services test & development like "Pet care"</p>
<p>Q center</p> <p>development of system for an automatic/detail network quality test which is based on handsets</p>	<p>ISF Test-bed</p> <p>based on the understanding of Customers, new value creation as an Information Company</p>

3. CDMA2000 1X/EV-DO Testbed

A perfect tabloid of SKT commercial network of CDMA 3G including IMS domain and VT network

Test-bed accomplishment (As-Is)

More than 30 business partner's open testbed including Samsung, Telcaware, SKC&C, Starent Networks, n-tels, Xener systems, Time networks, Hurim, U-angel etc.

IOT test for new systems and services

- 【 main result 】**
- PDSN certification project : million U\$ revenue creation (2002)
 - World first VT in CDMA EV-DO network (2001)
 - World first IMS domain commercialize (2003)

Test-bed plan (To-Be)

Vision	<p>New Revenue creation Mecca for CDMA network with Voice supplementary service and Data Service CDMA evolution network testbed</p>
BM	<ul style="list-style-type: none"> ▪ New service and feature test & development ▪ Revenue creation through intangible asset of SKT
Action Plan	<ul style="list-style-type: none"> • Testbed management outsourcing for efficiency • Support a best condition of testbed • Opened and scheduled test plan for BPs

3. CDMA2000 1X/EV-DO Testbed

Test-bed main

【 location 】

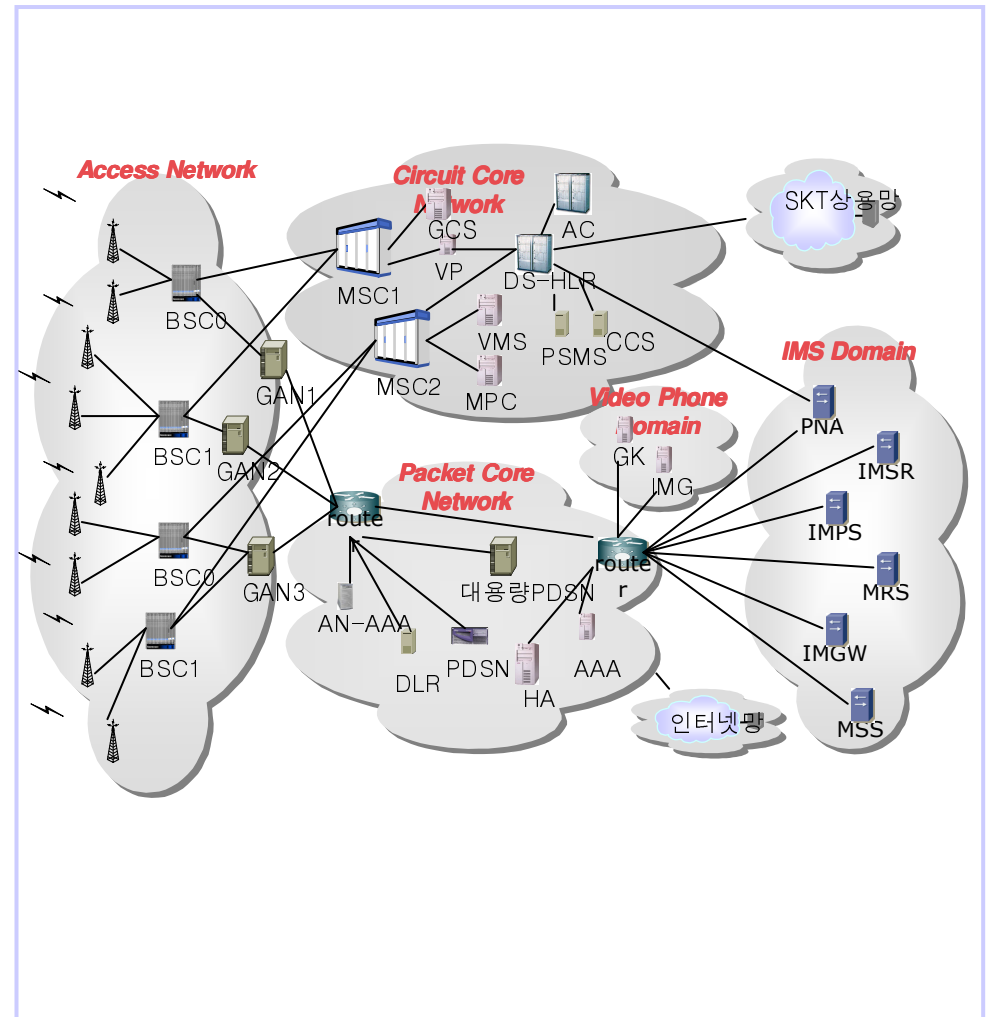
Floor space : 830 square meter

Location : 1st floor

【 systems 】

MSC : 2
BSC : 4
BTS : 7
PDSN : Samsung, Telcaware, Cisco, UTStarcomm 6
AAA : Telcaware, Cisco 3
VT system : 1
Humming Server : 1
IMS System (IMSR, IMGW, MRS, IMPS) : 1 pair
GCS : 1
PSMS, CCS : 1
Gate Keeper, IMG(VT service): 1

Test-bed layout



4. WCDMA Test-bed

enlargement of WCDMA Technical competitiveness through new service and feature test and development

Test-bed accomplishment(As-Is)

【 Biz. Partner and role 】

- Biz Partner : Samsung, LG-nortel
- Main role
 - WCDMA new feature creation
 - RNA new code development
 - System stability test

【 main result 】

- World first 3G WCDMA commercialization
- 3.5G HSDPA commercialization
- New node development for Inter MSC H/O (WTAN)
- World first WCDMA-CDMA H/O technology development

Test-bed plan(To-Be)

Vision

- Enlargement of WCDMA Technical competitiveness

BM

- Plan
 - HSUPA (High Speed Uplink Packet Access)
 - MBMS (Multimedia Broadcasting/Multicasting Service)
 - improvement of BTS architecture

Action Plan

- STP system upgrade
- Test and development power increasing

4. WCDMA Test-bed

Test-bed main

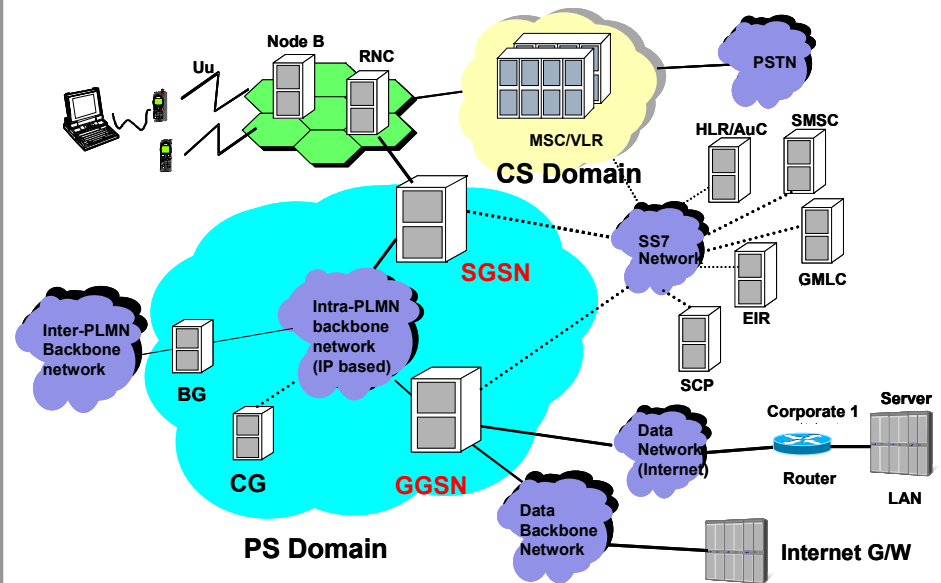
【 location 】

- Floor space : 620 square meter
- Location : 15th floor

【 systems 】

- WTAN(1) : lur H/O between MSC
- RCSI(1) : lur H/O intra MSC
- RNC(2) : Radio Network Controller
- node B(7)
- GGSN(3), SGSN(4), MSC(2), HLR(1)

Test-bed layout



5. TD-SCDMA Test-bed

Based on SK Telecom's 2G/3G Network commercialization and operating experience, TD-SCDMA technology test & service development environment building

Test-bed accomplishment (As-Is)

【 Biz. Partner and role 】

	company	participan	role
RAN & MSC	DTM	7	Test-bed RAN IOT Demonstration handset(DTM/ZTE) IOT
	ZTE	6	
	Samsung	2	MSC/GGSN IOT
Service Platform	SKCC	4	HW and SW
	inoace	25	12 solutions including WAP G/W
handset	Samsung	4	Demonstration handset(VT & Streaming)

【 main result 】

- contract with China for systems(2/11)
- TD-SCDMA Network build(2/15~2/24)
- success of Korean local voice & video telephony (2/25)
- success of VOD(Video on Demand) service through packet network(2/27)
- success of VT between TD-SCDMA and WCDMA(3/1)
- visiting of the prime minister of China and success of VT between Korea and China(4/10)

Test-bed plan(To-Be)

Vision

- raise the possibility of SK group for Chinese new market
- Infra building for new Biz.

BM

- various Biz model creation for TD-SCDMA

Action Plan

- TD-SCDMA Network build, function test & development
- TD-SCDMA Service development
- TD-SCDMA Service Platform development
- TD-SCDMA handset common Platform development

5. TD-SCDMA Test-bed

Test-bed main

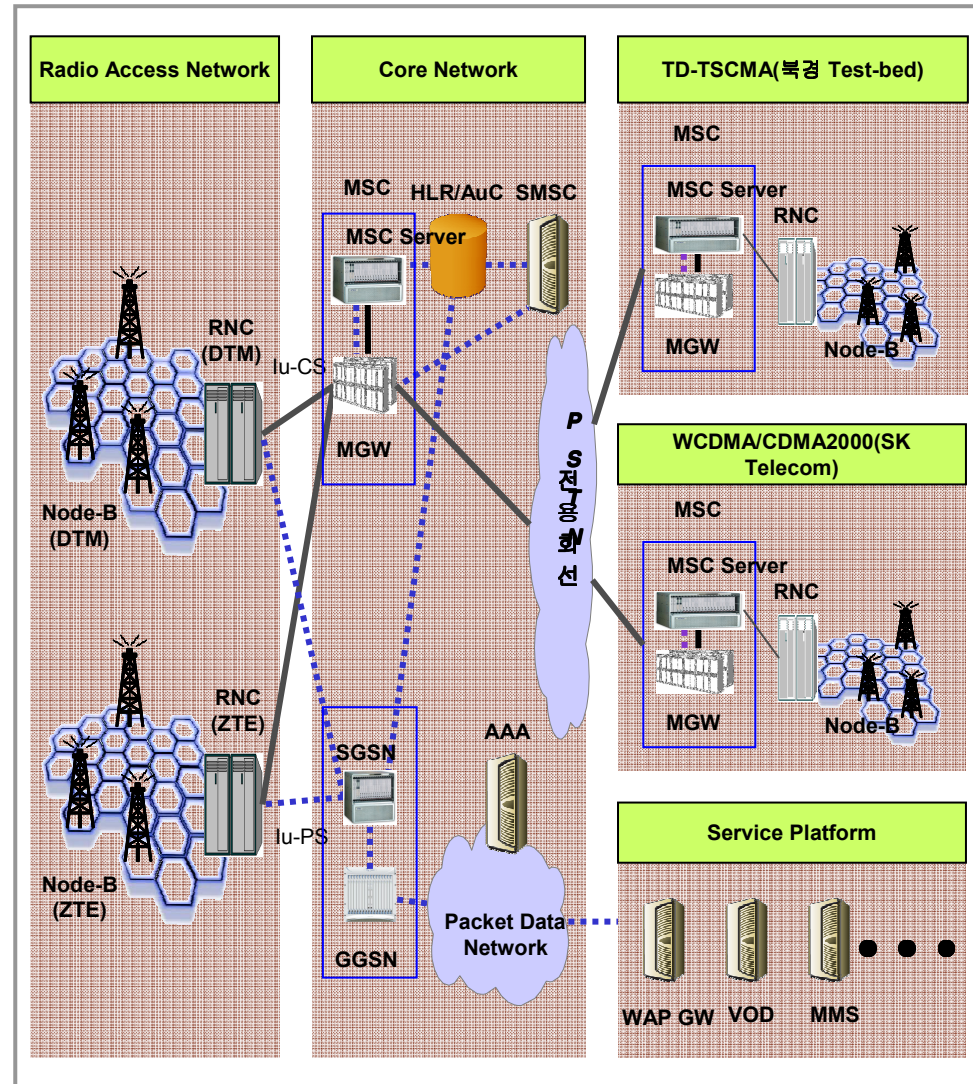
【 location 】

location	company	people	role
10 th floor	SKT	8	Optimization : TD-SCDMA Team(6), CoreNetwork team(2)
	DTM/ZTE	13	Test-bed build & NMS DTM(7)/ZTE(6)
	Samsung	6	handset(4)/Core network(2)
8 th floor	SKT	6	Service development: Solution Team(3) VT: Terminal Team(3)
	Innoace	25	Service platform development(25)
total		58	

【 systems 】

name	System name	Quantity	system
RAN	Node-B	17ea	DTM (10ea) / ZTE (7ea)
	RNC	2ea	DTM (1ea) / ZTE (1ea)
Core Network	MSC	1ea	MSC Server / MGW 1ea (Samsung)
	SGSN/GGSN	1ea	Samsung
	Sub system	1ea	HLR/AuC, SMSC, AAA
Service Platform	Infra.	1ea	WAP GW, Portal, UAPIS, Download, SMS server, UCMS
	Application	1ea	MMS, VOD, Streaming, RES, AMS, u-Payment

Test-bed layout



6. BcN (Broadband Convergence Network) Test-bed

To establish BcN biz model through finding and testing killer BcN trial services

Test-bed accomplishment (As-Is)

【 Biz. Partner / Roles 】

- Biz Partner
 - Telcware, HFR, Entosys, Xener Systems and several service solution vendors
- Roles
 - New service development
 - Service operation and maintenance

【 Major accomplishment 】

- BcN 1st phase service development such as high quality wireline video telephony, multimedia coloring, multimedia lettering, multimedia mask, multimedia sharing, Open API Service, Instant Messaging, Presence, STB
- Video telephony interworking among BcN consortiums (2006)

Test-bed plan (To-Be)

Vision

- The more ubiquitous, the more happy
- Finding BcN Killer service

BM

- Develop new services based on convergent network with trial subscribers
- Proving technical feasibility of new service

Action Plan

- HSUPA demonstration service portal development ('07.2Q)
- Port u-Community service to commercialized Set top box ('07.4Q)
- Interconnecting mobile and wireline video telephony among BcN consortiums ('07.4Q)
- Successful accomplishment of the 2nd BcN phase ('07.4Q)

6. BcN (Broadband Convergence Network) Lab

Test-bed major systems

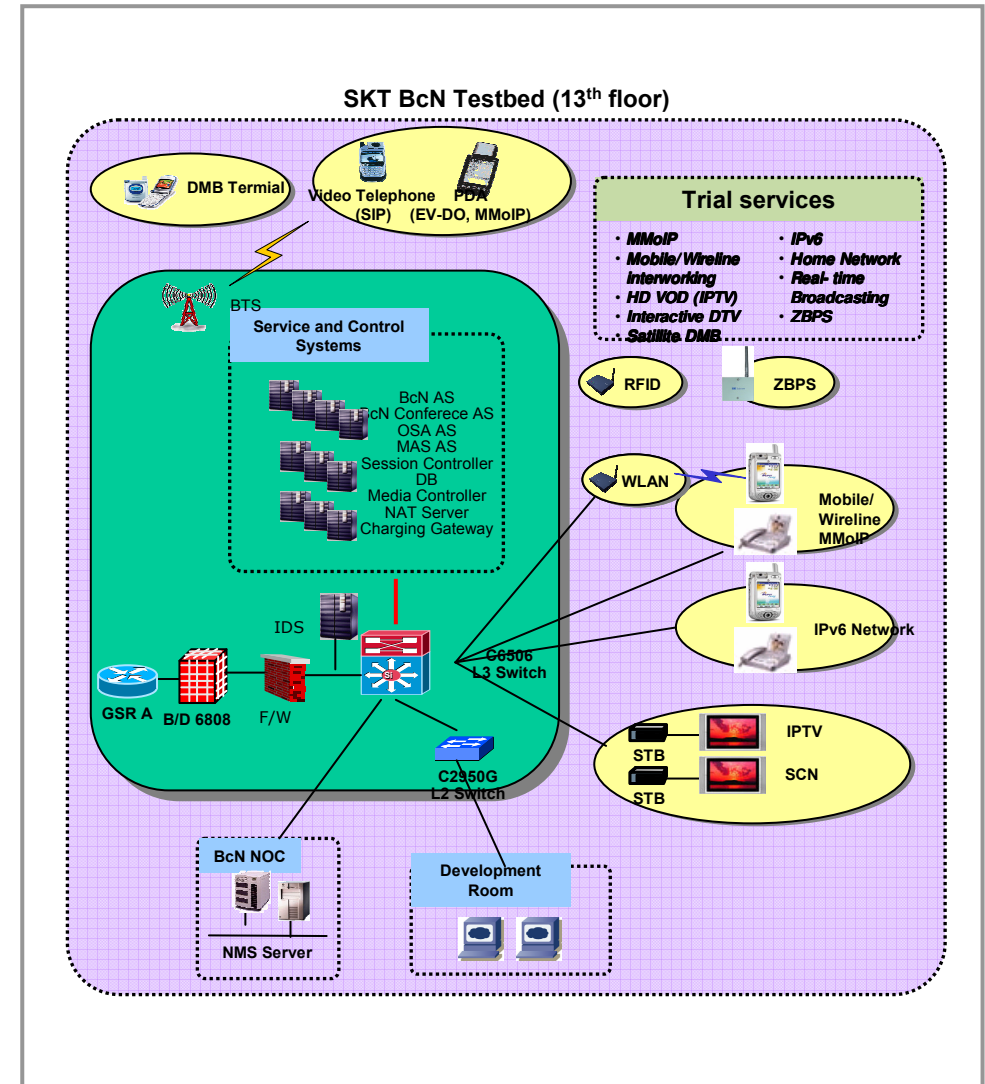
【 Location 】

- Location : Bundang Bd. 13th floor
- BcN services operation room, BcN system room, BcN service development room

【 Systems 】

Name	Function
IAG	NATing / IPSec terminal support
IBC	Interconnect with other BcN Network
U-create	UCC video creation/share platform
IMPS/Community Server	Messaging/Presence/Community Service
BcN MSS	Call session control
MFS	Multimedia sharing/masking AS
3GIP	Multimedia source management
CRBT	Multimedia coloring AS
TiiS	Multimedia lettering AS
Conference	Multimedia conference AS
IMSR	Subscriber management
MMC	Multimedia Mail AS

Test-bed layout



7. IAM (Intelligent Access Network Management System) Lab

Through Field quality/measurement/statistics data of Access Network and operator's knowledge based DB, optimized Network performance and efficiency and development of automatic optimization, and preview with Manual and Automatic Network reconstruction

Test-bed Application Result (As-Is)

【 Biz. Partner And Role 】

- **SKT : optimized Rule, driving knowledge based DB**
- **Biz. Partner : SK C&C, Amisys, Kisan Telecom, Mobigen, Ubi-Star**
 - Field/Network data collection, making DB
 - development of inferring optimized Rule
 - development of Automatic Re-configuration air network
 - development of ERS(Emergency Restoration Service system)
 - development of Cell Planning, estimation tool of electric wave

【 Main Result 】

- **Applying IAM Coverage optimized Solution in 5 areas**
 - application period : `06.6 ~ 8
 - Coverage improvement effect : 0.3% ~ 3.5% ↑ (satisfied basis : Ec/Io less than -10dB)
 - Throughput improvement : 25 kbps ↑ (706 kbps → 731 kbps)
- **Application of Ho Chi Minh Network in Vietnam**
 - application period: `06.6 ~ 10
 - 1X coverage: 0.7% improvement (application of 3 part, 9 sector in urban area)
 - EV-DO coverage: 2.3% improvement

Test-bed Application Plan (To-Be)

Vision

- A long term subject on current operation, automatic Cell Configuration Trouble automatic Shooting system construction
- Customer Value Maximization on Quality
- Insuring Technical Leadership with real-time automatic optimized infra-struction

BM

- Providing scientifically systemized application process for improvement of various service quality with Multi-Network and efficient network applying providing applying process

Action Plan

- Expansion to national network : March, 2007 ~ (self-application in Network part)
- Expansion to Vietnam (Ho Chi Minh/Hanoi EV-DO Newtork) : ~ November, 2007 (Network part together)
- development i-Optimizer for WCDMA (Jun, 2007) and stabilization (April, 2007 ~)

7. IAM (Intelligent Access Network Management System) Lab

Test-bed main facilities condition

【 Application condition 】

- Location
 - Demo Room : 13 floor office building in Bundang
 - Development Room : 8 Floor office building in Bundang
- The number of people : 29(5 company including SK C&C)
- Area : 71 m²

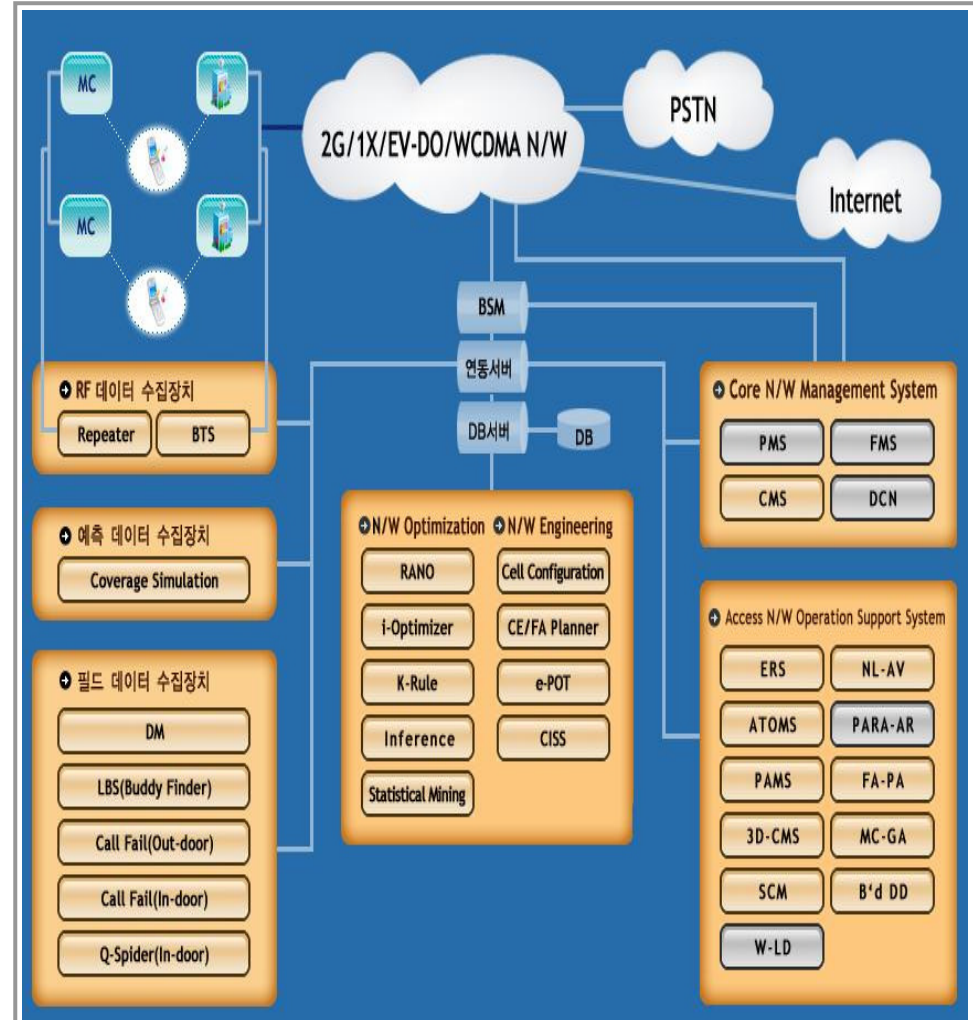
【 Main equipment condition 】

- Notebook PC : 8
- Monitor : 8
- Panel: 6

【 Definition 】

- DM: Diagnosis Monitor
- LBS: Location Based Service
- RANO: Radio Access Network Optimizer
- e-POT: Engineering Performance Optimization Tool
- CISS: Coverage Investment Supporting System
- ERS: Emergency Recovery System
- NL-AV: Neighbor List Automatic Verification
- ATOMS: Access Total Operation & Maintenance System
- PARA-AR: Parameter Automatic Renewal
- 3D-CMS: 3D Customer Management System
- MC-GA: Micro cell Gain Adjust
- SCM: Service Coverage Management
- B'd DD: Board Deletion Detect
- W-LD: WCDMA Load Distribution

Test-bed architecture



8. Home Network Test-bed

Development/inspection of HOMS and home equipment For Digital Home Service commercialization, inspection of application service including Pet-care

Test-bed application result (As-Is)

【 Biz. Partner and role 】

- Lab role : development and inspection of equipment/service relevant to digital home
- Biz Partner
 - TSC Systems : development HOMS, RG and ZigBee based home device
 - Hurim Interactive: development HOMS
 - Mobile Park: development HOMS

【 Main result 】

- *2004~ 2006 digital home exhibit work (700 families in national)*
- *2005 digital home service Pre- commercialization*
- *TTA(2005) registered and progressing ISO international standard*

Test-bed application plan (To-Be)

Vision

- Development HOMS for digital home commercialization in 2007
- Development and inspection of digital home application service

BM

- Implementation of digital home commercial service (May 2007)
 - home security and control service: 5,000 won monthly
 - Pet-care service: 5,000 won monthly
 - Loview service : 3,000 won monthly
 - Marketing

Action Plan

- HOMS development
- Inspection of HOMS and application service
- Development/Inspection of digital home application service

8. Home Network Lab

Test-bed main facilities condition

【 Application condition 】

- Location : 13 floor office building in Bundang
- The number of people : 0
- application
 - development/inspection of HOMS
 - inspection of Home Gateway (RG)
 - development/inspection of various digital home application service

【 Main equipment condition 】

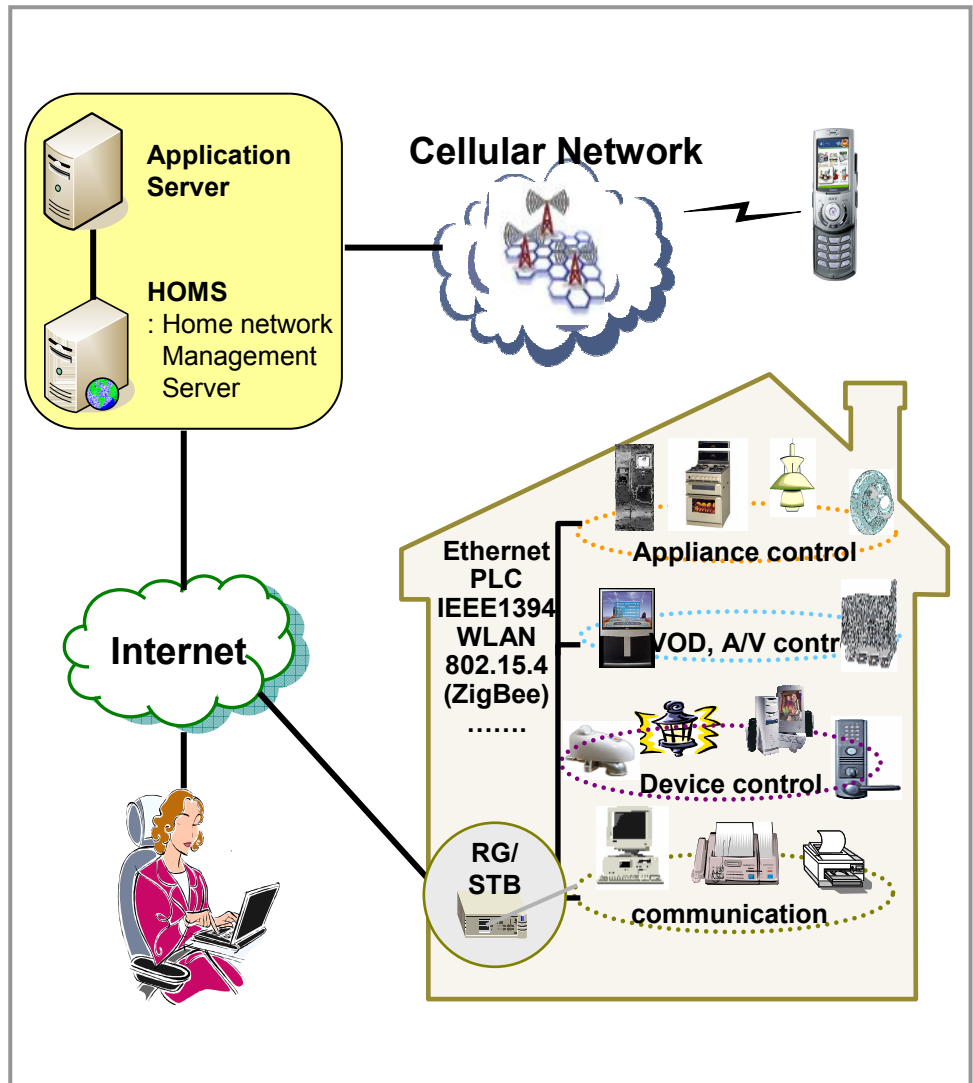
1. HOMS server

- ENTERPRISE250
- SunFireV210
- SunFireV240
- SunFireV240

2. The other equipment

- HP ProLiant DL380.
- Petcare device
- Digital fame
- Home Gateway(RG) 3
- Home device for testing and Appliance

Test-bed architecture



9. WiBro Test-bed

The function and efficiency of System and Feature, providing WiBro system with stable and high quality and reducing cost

Test-bed application result (As-Is)

【 Biz. Partner and role 】

- SKT
 - Service and Network requirement and inspection
 - inspecting new system and feature. Function, efficiency, and interface with commercial network
 - IOT test of Multi-Vendor ME and providing system Eng. Reference
- Vendor
 - Samsung : WiBro RAS, SRAS
 - SKTS : WiBro SRAS

【 Main Result 】

- Samsung WiBro RAS (Jun 2006)
 - PKG 1.0.0 (March 2007)
- Samsung WiBro SRAS (November 2006)
 - reduction of cost : 2006 41억원
- SKTS SRAS
 - test and development in progress

Test-bed application plan (To-Be)

Vision

- Enforcing high quality with WiBro Wave 2 (MIMO/BF) and HARQ

BM

- Test and development commercial WiBro system
- Improvement WiBro system and inspecting new service in technical feasibility

Action Plan

- Samsung WiBro RAS system Upgrade (November 2007)
 - Maximum DL Sector T/P 14% better (12.0Mbps →13.7Mbps)
- Development SKTS WiBro system and Upgrade (November 2007)
- Requirement for WiBro Wave2 (MIMO/BF) system (4Q 2007)

9. WiBro Test-bed

Test-bed main facility condition

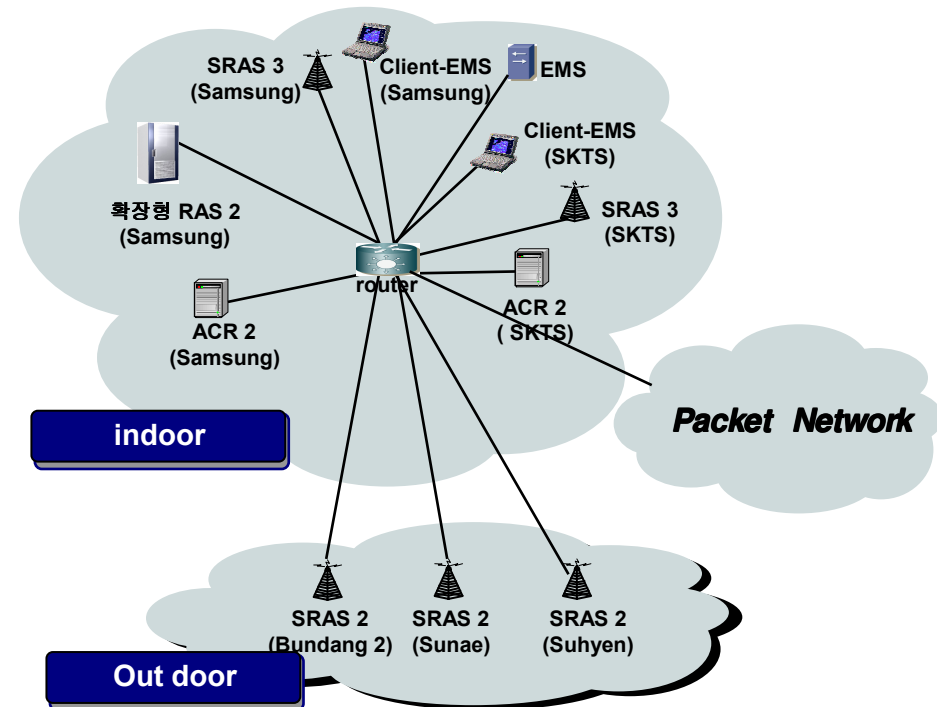
【 Application condition 】

- Test-bed application
 - Location : 10 floor office building in Bundang (136m²)
 - application part : Samsung RAS 5 , SKTS RAS 3
- Field application
 - Location : Bundang (Sunae, Suhyen, Bundang 2 BTS)
 - application part : Samsung, SKTS RAS 1 per BTS

【 Main equipment condition 】

- Samsung WiBro Network
 - Access Network : SRAS 6, RAS 2, ACR 2, EMS 1
 - Core Network : AAA, LMS, CG
- SKTS WiBro Network
 - Access Network : SRAS 6, ACR 2, EMS 1
 - Core Network : AAA, LMS, CG

Test-bed layout



10. 3G Global IOT Test-bed

Test-bed main facilities application

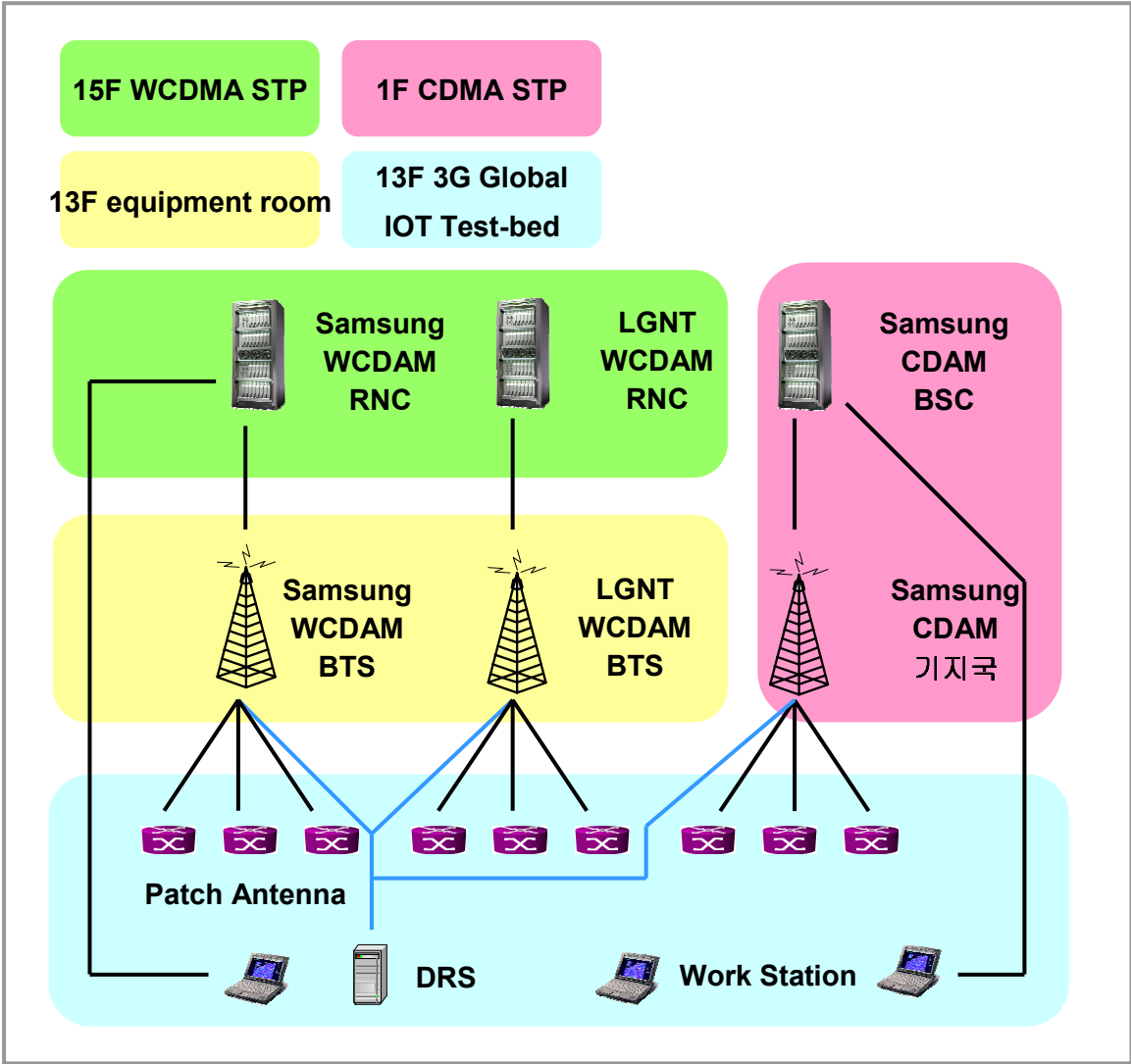
【 Application condition 】

- Location : 13 floor office building in Bundang
- The number of people :
 - SKT : Access Network R&D 1 team 3
- etc :

【 Main equipment condition 】

- Access Network
 - BTS : 2
 - Work Station : 3
 - Patch Antenna : 9
 - DRS (Dynamic Radio Simulator) : 1

Test-bed layout

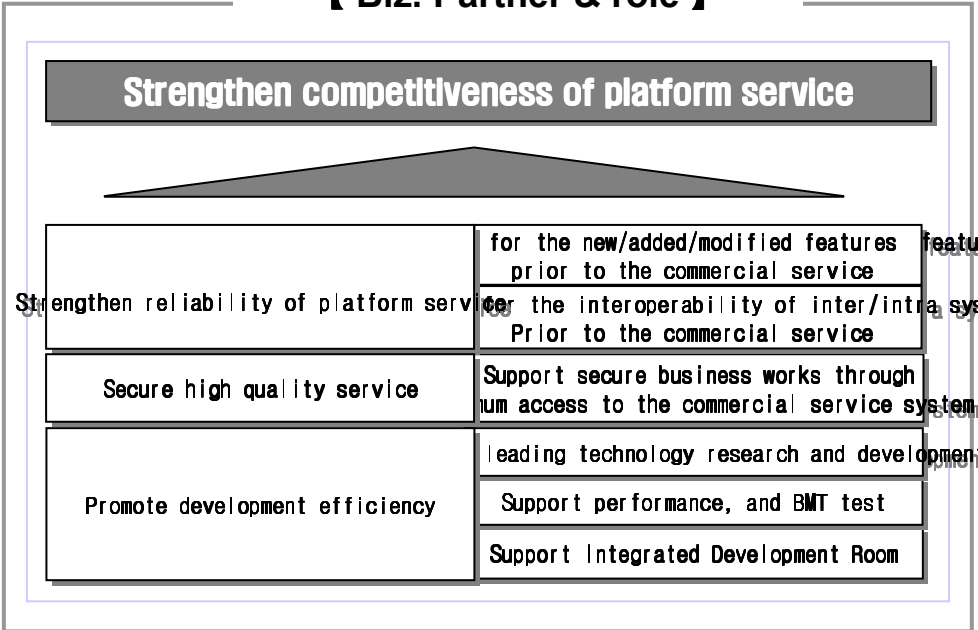


11. Platform Test Test-bed

Strengthen the development competitiveness of Mobile Internet Service by providing high quality platform service through implementation of secure and reliable development, verification and business support works of platform service.

Test-bed application result (As-Is)

【 Biz. Partner & role 】



- ### 【 main result 】
- TIG(Terminal Interface G/W); '06/ 7 ~ 10
 - PMH(Platform Message Hub) ; '06/ 3 ~ 10
 - Mobile ASP(Pocket1) : 2006/ 9 ~ 2007/ 2

Test-bed application plan (To-Be)

