

ワイヤレス インターネット -New Paradigm -

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あらまし Mobile IP を用いた無線 LAN(IEEE802.11)が移動先でのインターネット・アクセス手段として注目されている。

一方、通信セルのカバーエリアが広く、自動車など高速移動中にも、有線回線並の品質で通信ができ、また、通信コストが極めて安く、かつ常時接続を可能とする完全な IP スルー網は見当たらない。

今後のワイヤレス・インターネットは、前者と後者が一対となって初めて、ユーザの要望を満たす現実的な解 (New Paradigm) となる。

本稿は、後者を中心に特に増々、重要となるエンド・ユーザ主導の革新的通信アーキテクチャ (SWIFTCOMM) について述べる。

キーワード IEEE802.11, 高速移動中、通信品質、IP スルー、ワイヤレス インターネット、SWIFTCOMM

Wireless Internet -New Paradigm -

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Abstract A trend of access to the Internet using the wireless LAN (IEEE802.11b) from outside places is beginning to take shape in the business and personal communities. While a totally "IP-Through" based wireless platform with wide cover area, accessibility at vehicular speeds, equivalent quality to wired networks and low price at always-on would not be found.

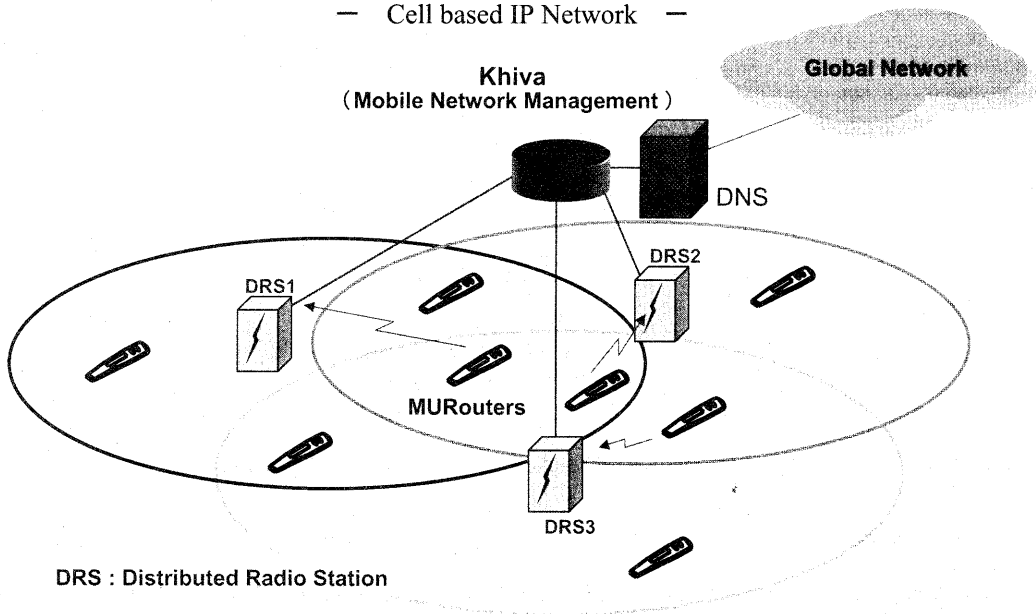
It will be the realistic solution (New Paradigm) to satisfy the end user's demand that the prospective wireless Internet should be enhanced by these two platforms.

An innovative wireless IP Internet architecture (SWIFTCOMM) focused on leading end users will be addressed.

Key words IEEE802.11, Vehicular speeds, Communication quality, IP Through, Wireless Internet, SWIFTCOMM

SWIFTCOMM System Configuration

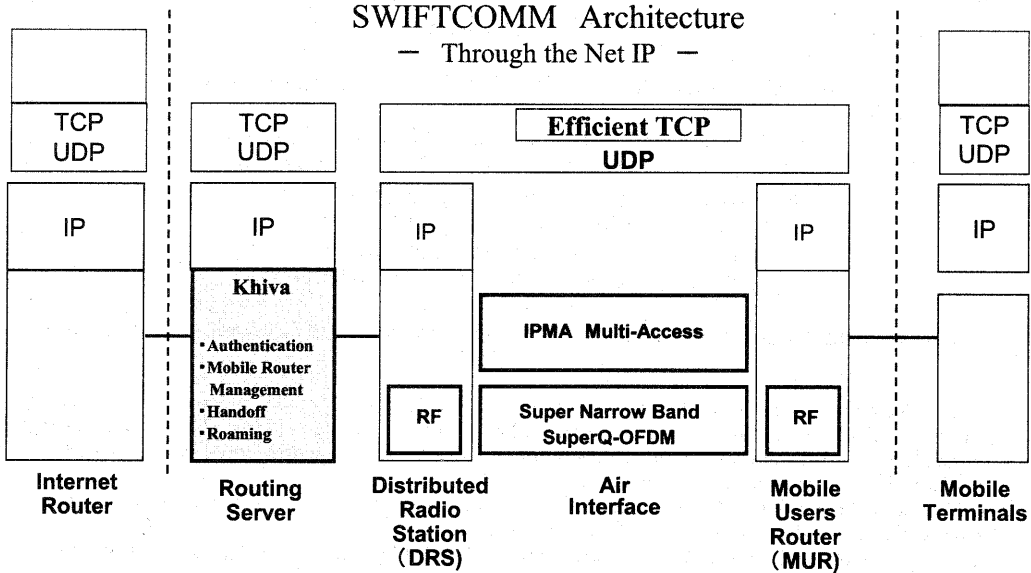
— Cell based IP Network —



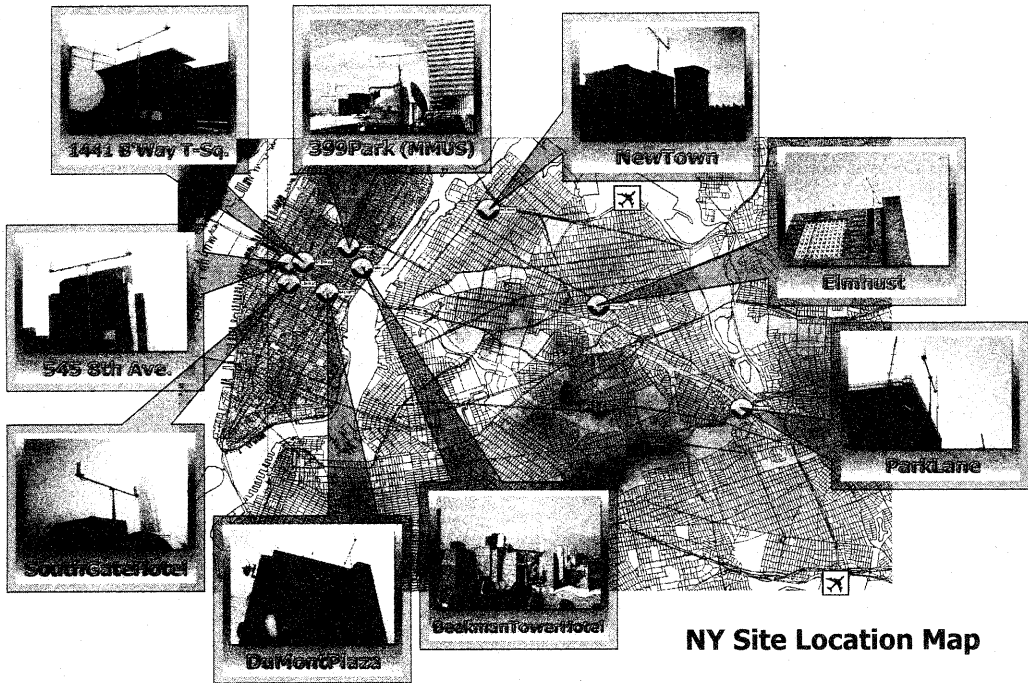
- Handoff management between cells is controlled, as the unique address is not changed, by khiva
- Mobile IP is not applied to the system because of under the improving circumstances
- MUR subjectively selects one of DRS being the best air condition.

SWIFTCOMM Architecture

— Through the Net IP —



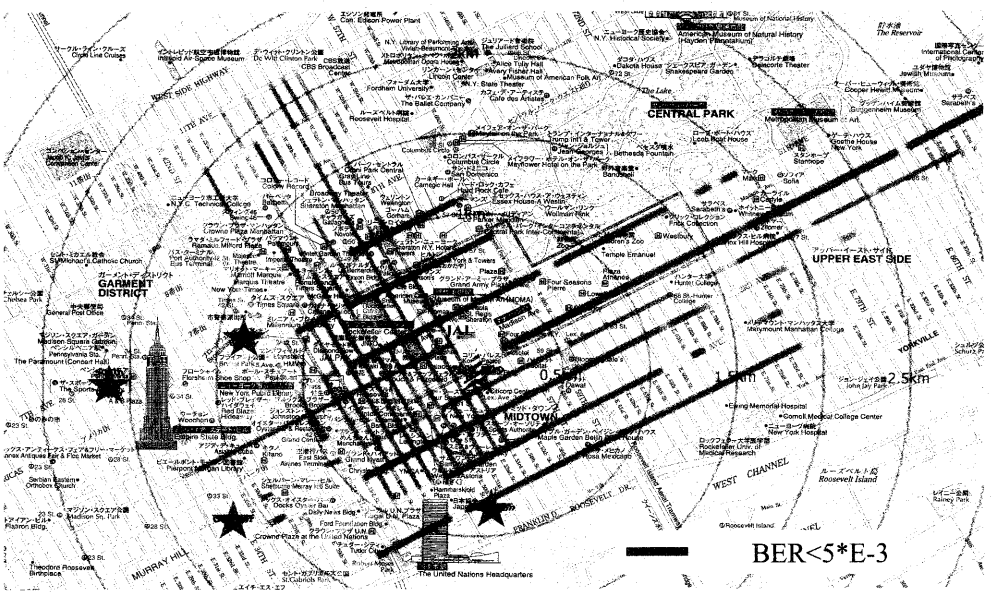
- Each block shows module sets of total core technology
- This technology is flexibly applied to frequency bands, mainly UHF.
- MUR makes users terminal used as a web server without air interface problem.



NY Site Location Map

NY field trial was operated to get the data of the robustness to the multi-pass fading and the steady handoff at high vehicular speeds in the environment of skyscrapers on Nov. 2000.

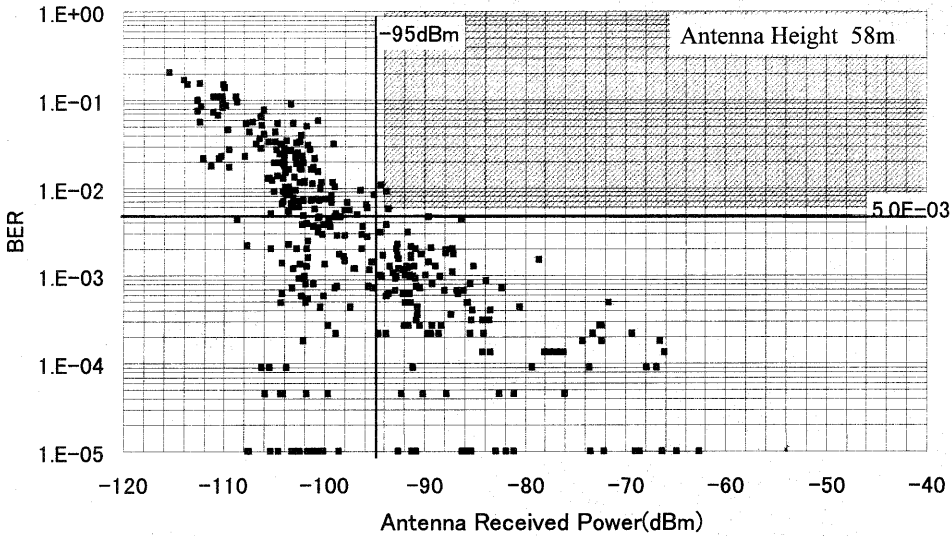
BER on Downlink in NY Field Trial



The radio wave propagation characteristics (450MHz, 6.25KHz/ch) from site(DRS) on the top of the 399 Park Building shows a wide cover area along streets and avenues.

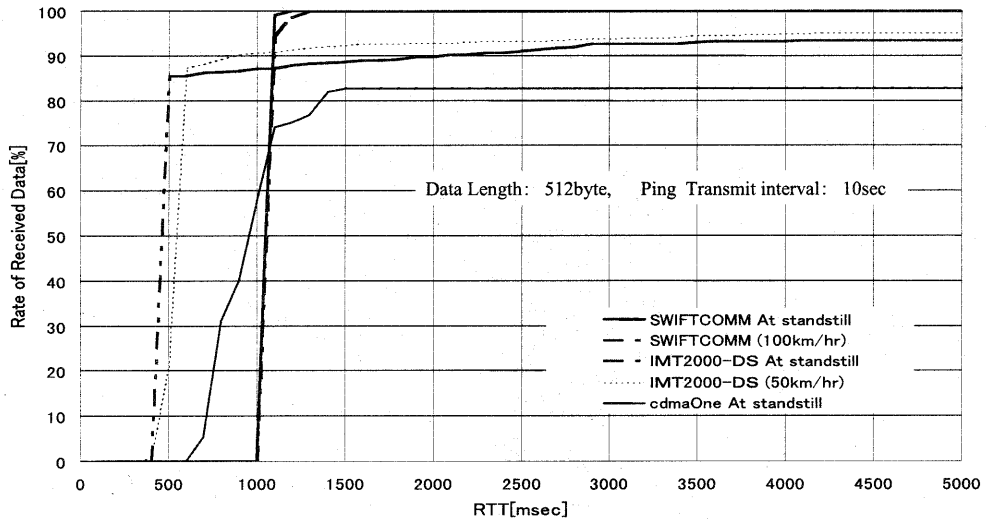
Antenna Received Power vs BER

Prefectural Highway R-60, Northwest district



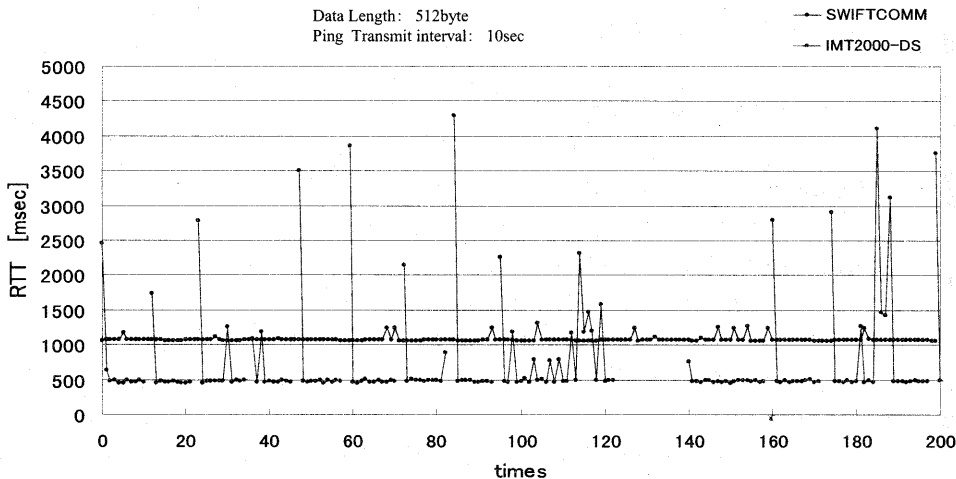
The radio wave propagation characteristics (450MHz, at high vehicular speeds) in Kanazawa on Aug. 2001 is superior more than one figure to the data of Cellular Phones.

Cumulative Frequency of PING Test



The result of SWIFTCOMM instantly reached to the 100% level compared to others.

Response Time Distribution of PING Test

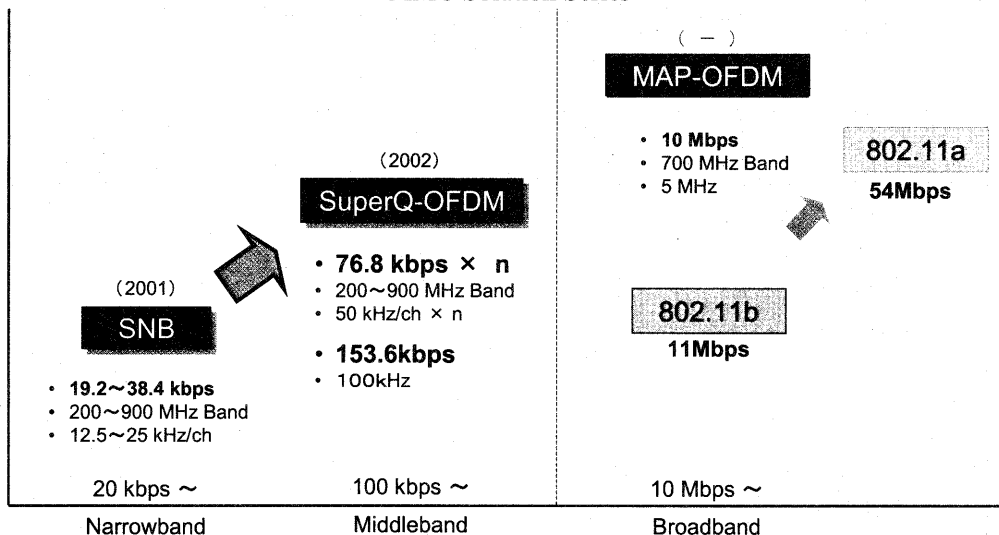


The distribution of response and break time of SWIFTCOMM has equivalent quality to wired networks.

From these two results SWIFTCOMM is suitable to the Internet packet communication required to be error free.

SWIFTCOMM Wireless Core Technology

— MMC Solution Series —








SuperQ-OFDM is a new technology combined two good points of the orthogonality of OFDM and the Super narrow band effect.

A new wireless IP Internet platform consisted of SuperQ-OFDM and 801.11 system will make the "IP Through" based network to satisfy the coming enterprise and personal demands.

Super Q-OFDM

— Core Competence —

- 
Super Narrow Effect
 - Low bit Error (≒Wired access line)
- 
Large coverage Area
 - Radius = 10km (ex. 450MHz)
- 
Frequency Availability
 - OFDM Based
- 
Controlable Multi-Carrier Tech
 - Broad Band OFDM ≠ Super Q-OFDM
 - Channel Band: 12.5k, 25k, 50k, 100k, . . .
 - Data Speed Control
- 
Chip Set
 - Super Narrowband 4 Multi-Carrier LSI

These five items are distinctive characteristics of SuperQ-OFDM.

Super Narrow 4 Multi-Carrier (Chip Set)

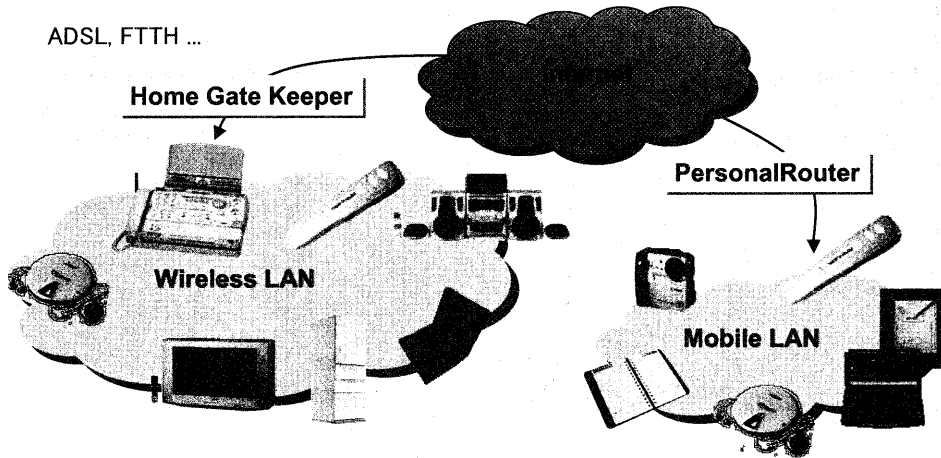
Frequency Band	38.4kbps <small>(6.25KHz x 4Multi-carrier)</small>	76.8kbps <small>(12.5KHz x 4Multi-carrier)</small>	153.6kbps <small>(25KHz x 4Multi-carrier)</small>
400MHz	○	—	—
800MHz	○	○*	—
1.2GHz	○*	○	○*
1.6GHz	—	○	○
2.0GHz	—	○*	○*

* Need of countermeasures for multi-pass fading or Doppler fading

This chip set has the applicability to frequency bands especially UHF, the possibility of high data rate using narrow channel and the frequency availability.

Mobile Users Router™

— PersonalRouter™ —

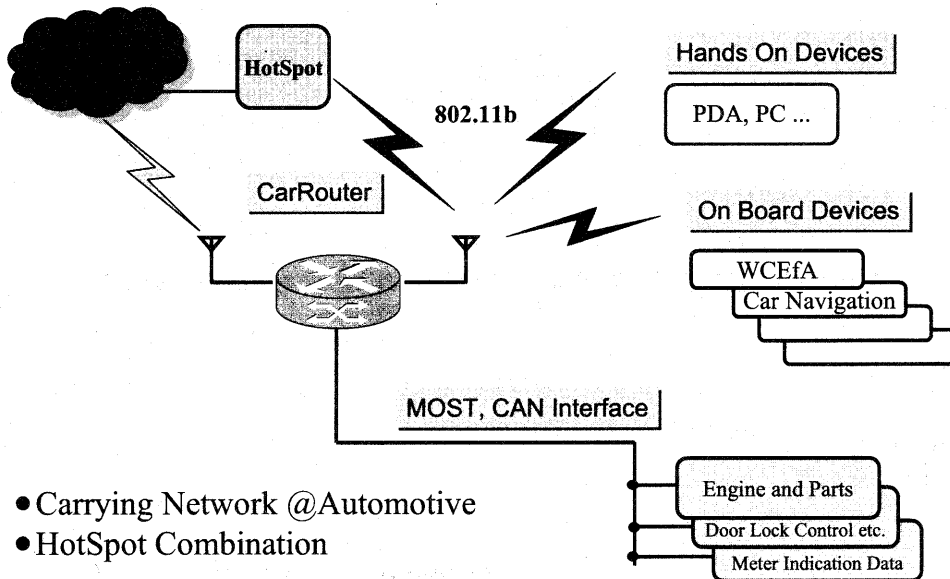


- Carrying Network @Hands
- Home Gate Keeper Combination

The personalRouter is used like carrying one's own networks at hand and gives chances to create new services.

Mobile Users Router™

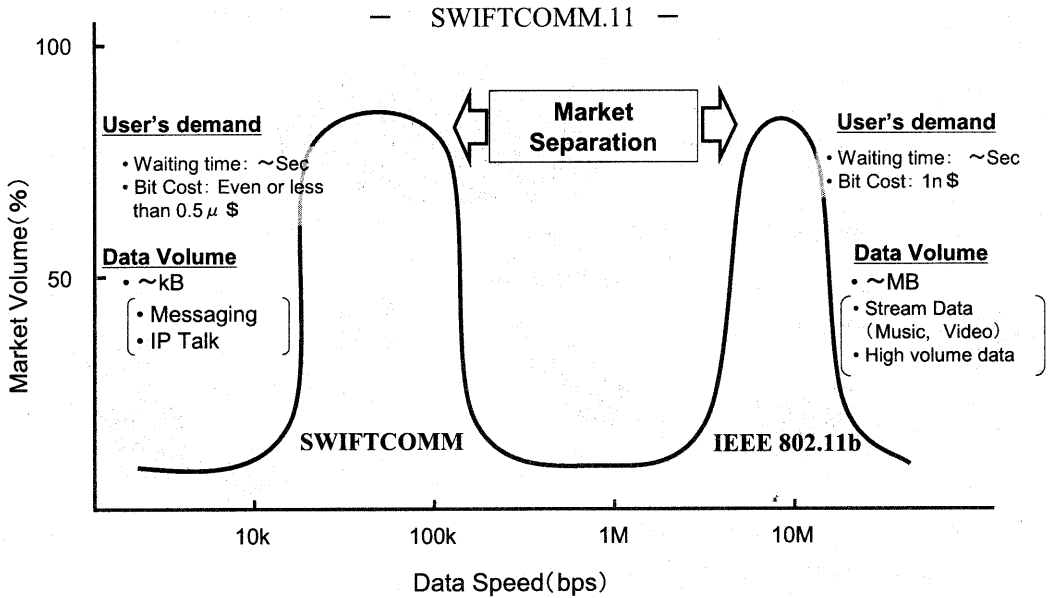
— CarRouter™ —



- Carrying Network @Automotive
- HotSpot Combination

The CarRouter set in a vehicle is used as same as the PersonalRouter and communicates with data stream at hotspots.

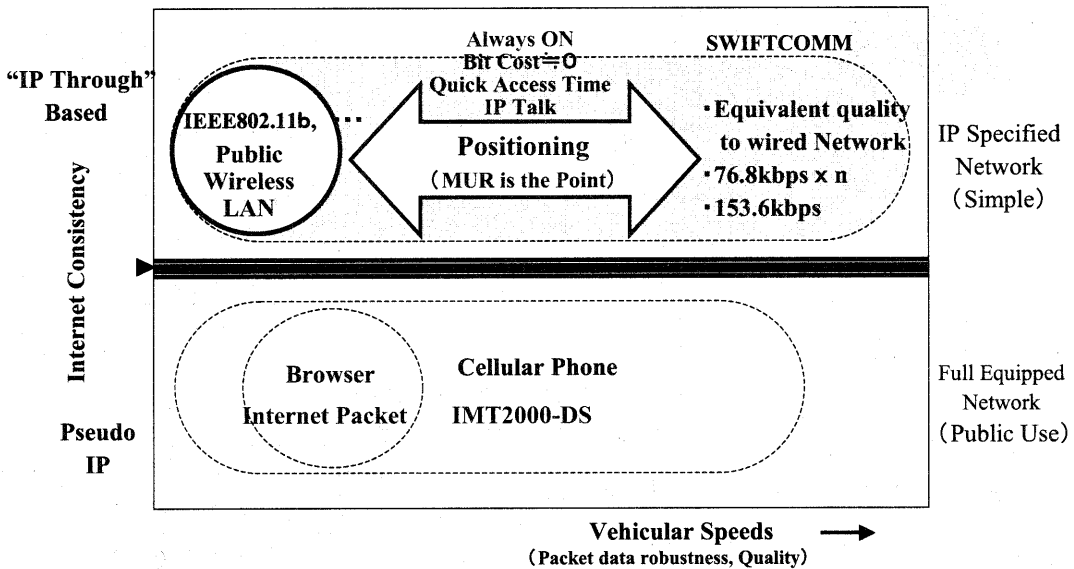
Main Market of Mobile Wireless Internet



• SWIFTCOMM.11 combined SWIFTCOMM with IEEE802.11b provides a reliable authentication system.

New paradigm

— Personal Router & Car Router —



• SWIFTCOMM.11 provides a new “IP Through” based network with wide cover area and accessibility at high vehicular speeds.

This means that a new wireless world with the function of IP Talk, P to P and etc. will be realized and expected to contribute to leading IT industry.