Bimonthly of the PHS MoU Group

PHS MoU Group News

Vol. 1, No. 3 February 1996

The 2nd Plenary Meeting of the Preparatory Group for PHS MoU Held

On February 5, the 2nd Plenary Meeting of the Preparatory Group for PHS MoU was held at the Toranomon Pastoral in Tokyo participated by 40 members and 4 special members from domestic and overseas businesses and organizations, welcoming Mr. Akira TERASAKI, Director, Land Mobile Communications Division, Telecommunications Bureau of MPT Japan as a guest.

The 2nd Plenary Meeting of the Preparatory Group for PHS MoU held in Tokyo

The meeting, presided by Dr. Hiroshi ISHIKAWA, Chairman of the Preparatory Group for PHS MoU, approved the PHS ID Application Procedure Regulation. Interim reports on activities of working groups were presented by Mr. Masayoshi WAKAO, Chairman of IPR WG, and Mr. Takuo KASHIWAMURA, Chairman of Interface WG.

Mr. Peter K. F. Wong from Hong Kong Telecommunications Ltd. was elected as a member of the Steering Committee of the preparatory group and he made the presentation on preparations for introduction of PHS in Hong Kong.

Approval of PHS ID Application Procedure Regulations

A unique Identification code (ID) is assigned to PHS equipment such as terminals to enable identification of each equipment. A unique PHS Operator ID is assigned to operators, and the Operator ID is written into public cell stations to enable identification of each PHS operator that provides service by using these cell stations.

To ensure the uniqueness of these IDs around the world, it is desirable that the assignment of IDs be done under a unified organization. For that reason, PHS MoU Group makes ID assignment as the unified ID Assignment organization. However, for countries where ID assignment is made by their own organizations according to their law or institutions, PHS MoU Group will coordinate the ID assignment activities with these ID assign-

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Participants at the 2nd Plenary Meeting

ment organizations to prevent overlapping with existing IDs.

PHS MoU Group will assign ID codes to PHS equipment and PHS operators according to these regulations. Until the establishment of PHS MoU Group, the preparatory group will assign ID codes for PHS MoU Group.

Report on IPR WG activities

The basic concepts on conditions for permitting use of PHS essential IPR overseas and their handling methods were examined by the IPR WG with the participation of the owners of the essential IPR, TTC and ARIB.

Although discussions have been held to unify the various opinions, a consensus has not been reached. The WG will adjust the opinions of each owner and summarize them in document form as soon as possible.

Report on Interface WG Activities

The Interface WG summarized the policies for activities geared towards internationalization of the PHS specifications. Based on these policies, three subworking groups (SWGs) were established to study PHS service definitions, network models and interface specifications for the drafting of the PHS MoU specifications, and to conduct research on overseas market trends as well as a study of documentation systems.

1. Study policies of the Interface WG

[1]Purpose

The purpose of the Interface WG activities is to establish open and common network interface specifications in order to facilitate the expansion of international applications for the PHS air interface.

[2] Scope of application

1) PHS (low power or microcell) mobile communication network
2) WLL and cooperation with the cellular mobile communication network :

[3] Issues seen arising in relation to international applications

1) Compatibility with existing networks in each area.
2) Incorporation of new functions.

[4] Principles for drafting specifications (the relationship with ITU-T)

1st principle: Should comply with the ITU-T Standard.

2nd principle: If new specifications are necessary and are not covered by the above standards, such specifications shall be newly established.

2. Situation of the study of Interface WG

(1) Past activities of each SWG

SWG1 : Service specifications and network model

SWG2 : CS-network specifications

SWG3 : Overseas research (market research, documentation system) and PHS MoU documentation system

2) Studying of the drafting of specifications (all the specifications are at the level of the Interface WG specification (draft))

3) Overseas research

To collect information required for drafting the network interface specifications, questionnaires were prepared and surveys conducted in cooperation with regulators, operators and other related organizations in the relevant countries. (Survey results will be reported at a later date.)

ARIB's Standardization Activities

Personal Handy-phone System ARIB Standard (RCR STD-28) Version 2 was approved at the Third Standard Assembly Meeting on December 26, 1995. The following describes the details of the revisions adopted in Version 2.

1. Revisions

A. Standards concerning data communications

A standard necessary for 32 kb/s digital data communications was added along with new information elements and particulars. This standard takes into account connection to fixed networks, such as ISDN, and ensures harmony with the standards prescribed in Version 1 (Revised Version-1) for voice and 3.1 kHz audio transmission services.

B. Standards concerning private-use PHS

The minimum necessary standard for interconnection was formulated while paying maximum respect to the private system standard specified in Version 1. The expression "treated as private reference" in Version 1 was changed to "private standard," and standards that were lacking were newly added.

C. Standards concerning wireless local loop (WLL)

Line standards concerning WLL was added as an appendix, as it will only apply overseas (outside Japan). In principle, the standard is based on the public system standard; differences with the latter standard were added and items were also added to accommodate subscriber and public telephone service.

With a view toward promoting the internationalization of PHS, general items necessary for an international standard were also added.

More specific details of the above-mentioned standards are explained below.

2. Details of Revisions

A. Standards concerning data communications

(1) Bearer service

A standard concerning 32 kb/s unrestricted digital information was added for digital data communications service.

(2) Call control standard

a. A call setup procedure was prescribed for unrestricted digital data, and "lower layer compatibility," "higher layer compatibility" and "repeat indicator" were added as information elements necessary for digital data communications.

b. Procedures were prescribed for confirming call control information in unrestricted digital data communications, for interworking of cell stations and for carrying data on carrier waves.

(3) Conformity with international standards

a. The provision concerning the "coding standard" for call control was changed from the previous national prescribed code (10) to the international prescribed code (00) in order to ensure compatibility with international standards.

b. A country code verification condition was added to the call sign procedure for confirming the connection destination. As a result, a country code coding standard and a message for country code notification were added.

B. Private PHS Standards

(1) Outgoing/incoming calls

En-bloc sending and overlapping sending are now possible. Moreover, besides the ordinary call receiving status, zone paging is now possible to support simultaneous calling of multiple PHS units.

(2) Location registration

A paging area method (resembling the public system standard) using an additional ID domain was newly added. A choice of three methods for configuring the paging area is now possible: fixed paging area based on the system information, fixed paging area using the additional ID, and PS (personal station) specified paging area.

(3) Handover

An object indicator was newly prescribed as a recalling-type handover function for private use. Two methods were prescribed for the authentication procedure at the time a handover is executed.

(4) Optional service

A procedure was prescribed for notification of the hooking signal as a private-use function.

(5) Conformity with international standards

A country code checking was added to the procedure for confirming the connection destination by call sign. So, a country code coding standard and a message for country code notification were added. Moreover, a control frequency standard was added to cover cases where private-use PHS terminals are used overseas.

This provision has been formulated as a common standard with the public system standard.

3. Standard concerning WLL

(1) Limitation on mobility

A handover function was defined as an option in order to simplify the system and also because the fundamental purpose of PHS is the provision of subscriber line service. A specific method for limiting mobility was also prescribed.

(2) Avoidance of asynchronous interference

A method of single frequency independent LCC (Logical Control Channel) was adopted to avoid interference in cases where multiple WLL systems are all asynchronous, and the scope of the parameters was also prescribed.

(3) Extension of CS-PS distance

The revised version allows and prescribes a method for advancing the timing for sending PHS terminal signals in order to secure the distance (3 ~ 5 km) generally required for WLL.

(4) Optional service

Optional service functions were prescribed to accommodate subscriber telephone and public telephone services, including procedures for billing information, non-billing information, circuit testing and hooking.

(5) Conformity with international standards

a. A country code checking condition was added to the procedure for confirming the connection destination by call sign. As a result, a country code coding standard and a message for country code notification were added. Moreover, in order to distinguish a public-use system from a WLL system, separate protocol switches were also prescribed for each system.

b. To avoid competition for frequencies between WLL systems and overseas-oriented private-use systems, the revised version prescribes that the former are to be operated in accordance with the control frequencies for overseas-oriented private-use systems.

PHS Seminar Held in India

The Association of Radio Industries and Businesses (ARIB) organized a two-day PHS seminar in New Delhi on February 1 and 2, to promote the introduction of the Personal Handy-phone System (PHS) in India. The following report presents an outline of the seminar in which this writer participated as a lecturer.

1. Schedule of PHS seminar

- Wed., January 31: 11:00-12:30 Press conference
- Thurs., February 1: 11:00-17:00 Seminar for Department of Telecommunications (DOT)
- Fri., February 2: 9:30-16:00 Seminar for new common carriers (NCCs) and other companies

2. Telecommunications in India today

The trend toward liberalization of telecommunications is also having a definite impact on India also. The Indian government has adopted a policy of allowing the entry of private capital into the cellular telephone and basic telephone service sectors in each region, with the aim of promoting synergism through introduction of the principle of competition.

As an advance move in that direction, private capital has been allowed to enter the cellular telephone service market in four major cities (Delhi, Bombay, Calcutta and Madras) four years ago. NCCs have begun providing

Seminar for Department of Telecommunications (DOT)

cellular telephone service via a GSM system in each major city in the latter half of 1995.

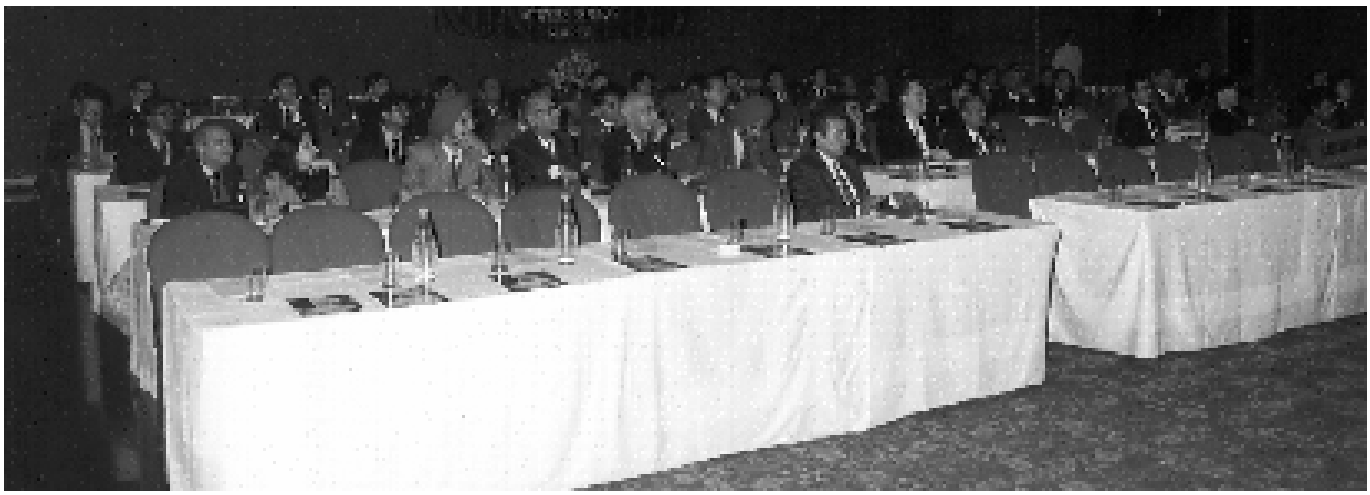
As for full-fledged liberalization of telecommunications, the NCCs that will enter the cellular telephone service for other areas were determined at the end of last year. But the tender for the basic telephone service sector is in confusion just now, and the Supreme Court is now investigating this situation.

3. Seminar for DOT (DOT Headquarters)

There were about 80 DOT officials attending. There was particularly strong interest in applying PHS to wireless local loop (WLL) in the access network. Symbolic of that interest was the fact that a presentation on a PHS-WLL system came first, as desired by Mr. R. K. Takkar, Secretary, Ministry of Communications and Chairman of Telecom Commission.

In the Q&A session after each presentation, there was one question after another about the WLL application of PHS. There appeared to be strong interest in the network technology, including the method of connecting PHS to the existing telephone network and the number of subscribers it could accommodate. There was also much interest in the TDMA/TDD access method of PHS. The eagerness with which questions were asked even during the demonstrations conducted over lunchtime left a lasting impression.

Among the demonstrations and exhibits, Oki Electric Industry Co., Ltd. conducted a live demonstration using a wireless PBX and Matsushita Communication Industrial Co., Ltd. presented a live demonstration of PHS fixed terminals. Nippon Telegraph and Telephone Corp. had an exhibit of PHS terminals while NEC Corp. and Fujitsu Ltd. presented exhibits using panel explanations and catalogs. As might be expected, the live demonstrations were the most popular, as many people enjoyed actually using PHS terminals to conduct a conversation.



Seminar for new common carriers (NCCs)

They all appeared to be surprised at the high speech quality provided through PHS.

4. Seminar for NCCs (Hilton Hotel)

On the day of the seminar a rather dense fog was generated, which caused serious traffic congestion. Nevertheless, the meeting room was filled with 70 attendees, which is another indication of the strong interest in PHS. Everyone listened intently to the presentations and eagerly took notes. Such enthusiasm was very encouraging to the lecturers.

It was impressive that the few questions which were asked focused on the application of PHS to WLL.

The same demonstrations were conducted as at the DOT seminar, with the addition of an exhibit by Fujitsu of a 100-mW cell station (CS). Since the meeting room was quite large, the attendees with working PHS terminals spread out from one end of the room to the other to enjoy conversing with one another. People from the NCCs were strongly impressed with the potential of PHS.

5. Summary

In general, this PHS seminar was highly successful, as evinced by the exceptionally strong interest in PHS-WLL shown by the Indian telecommunications carriers and the attention it was accorded by the local mass media. Nearly all of the representative print media ran articles about the seminar or PHS.

There is a strong need to conduct a field trial in India as soon as possible in order to further impress upon everyone the superiority of PHS. And then the target system should be a PHS-WLL system.

PHS Technology (2)

PHS Terminals

The PHS terminals have to provide four modes of service, that is, public, PBX cordless, home cordless and transceiver (walkie-talkie), and two types of terminals are defined, public use and public with private use. PHS terminals must not only be small and lightweight as public cordless telephones but also operate in various modes such as home cordless phones. The PHS system was designed to save its terminal power consumption to extend standby waiting time and talking time, by limiting its peak & average output power and adopting simple logic in its control process. Furthermore, the system was designed to provide terminals with room to expand their functions and services. Following describes the system design, hardware configuration and the prospect of the PHS terminals.

Design Policy

PHS terminals are designed in line with the following policy.

- Advancing common design of parts and modular configuration, taking into account multiple service models
- Promoting low power consumption
- Adopting user-friendly human-machine interfaces

Since all four modes of service are likely to be mixed on wireless channels, the design parameters of the wireless system must be suitable for all four modes, taking into account interference, disturbances and other potential problems. Moreover, from the standpoint of shared use of resources, the original design of each wireless system should be adapted to the parameters of the public network system, keeping changes to the minimum necessary.

In order to meet diverse user needs efficiently, applicable services should be clearly identified by modelling, and the system interfaces and modules for the system should be designed on the basis of this modelling. Further, the adoption of a modular structure for the system will enable efficient use of development resources.

PHS system parameters have been developed to meet the demand in enabling extraordinarily small and lightweight terminals with extremely lower power consumption compared with those of cellulars. This is realized through adoption of micro cell (100 ~ 500 m radius) for the PHS system enable the lower output power (10 mW average and 80 mW peak) for the terminals as well as for the cell stations (20 mW, 100 mW and 500 mW). Also, the simple logic protocol which has been established for dynamic channel allocation and other control processes by use of dedicated control channel has helped to realize these impressive PHS terminals.

Further, in realization, the use of custom LSIs that allows a reduced part count and a more compact circuit board is effective in achieving smaller and lighter terminals. In order to extend talking time and standby waiting time, a power-saving design is needed, including a slower clock speed during standby and a reduced driving voltage. In consideration of lithium ion battery operation, characterized by its light weight, compact size and high energy density, LSIs that can be driven with around 3 V are used with the aim of achieving power savings.

Efforts should be made to develop user-friendly human-machine interfaces, including appearances of battery charger and terminals as well as additional functions such as abbreviated dialing, directory assistance and modems, keeping in mind the various applications envisioned for PHS terminals and trends toward more compact designs. Personal computer and PDA manufactures are developing products which interface with PHS as well as those which have built-in PHS.

Hardware Configuration

A PHS terminal mainly consists of an antenna, RF unit, modulator, demodulator, TDMA/TDD processing unit, speech quality monitoring unit and speech processing unit, including a 32 kb/s ADPCM codec (Fig. 1).

These components are composed of individual LSIs and are divided into four function blocks: the wireless block (antenna, RF section, modulator and demodulator), channel codec block (TDMA/TDD processing unit), speech codec block (speech processing unit, speaker and microphone) and operation/control block (CPU, keyboard and display). Each block is designed to operate on around 3 V. Moreover, power consumption is reduced by operating the CPU of the operation/control block intermittently during waiting time and also by cutting off power supply to the transmitter and receiver when the terminal is on standby status.

Recent trends and expectations for multimedia terminals

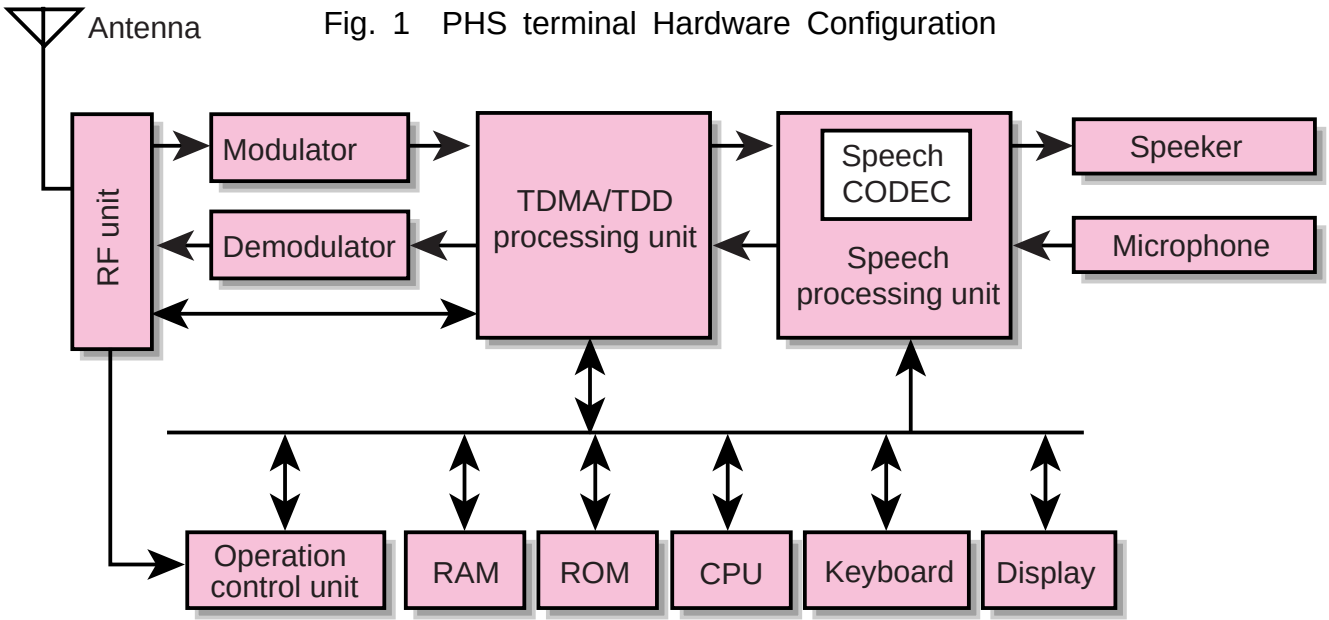
Even at this very first stage of the service, terminals have been successfully developed that offer both portability and operating ease. A compact size has been achieved by using LSIs to form each function block. As a result of reducing the driving voltage and applying power supply control during waiting time, terminals now provide a calling time of around five hours and a continuous standby waiting time of around 400 hours. In the near future, second-generation PHS terminals, which are much smaller, lightweight and multifunctional, are expected to hit the market as a consequence of continuous efforts devoted to developing next-generation terminals.

The Association of Radio Industries and Businesses (ARIB) has formulated a standard concerning the interface (private standard interface) between the private cell stations and PHS terminals for private use, in addition to a standard for the wireless air interface between cell stations and terminals for public use.

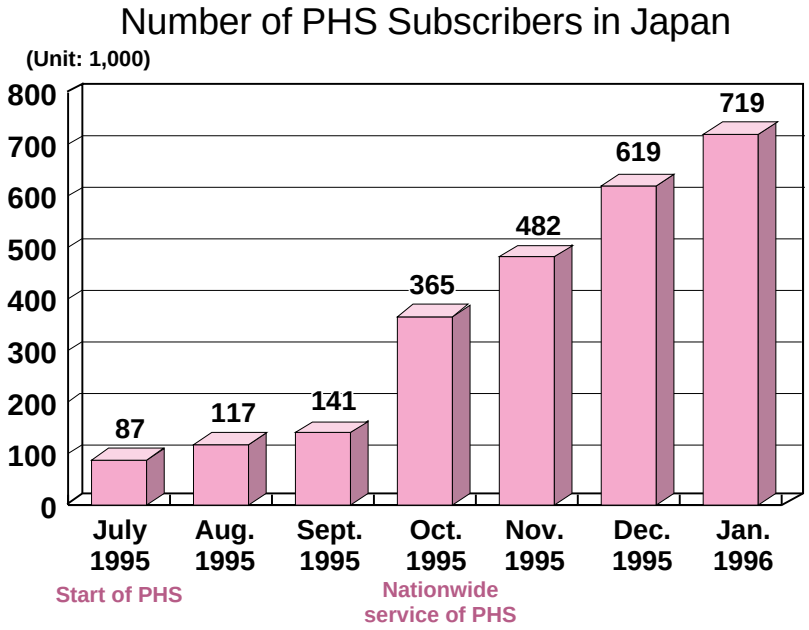
If terminals incorporate this private standard interface, one PHS terminal can provide basic calling functions for making and receiving calls in outdoor, office and home use. This capability is expected to promote further personalization of communications.

PHS terminals are expected to be much more than just inexpensive phones with good speech quality. Because PHS terminals support high-speed digital communications at 32 kb/s over the wireless common air interface, there are large expectations that they will serve as the

Fig. 1 PHS terminal Hardware Configuration



core infrastructure for mobile computing. ARIB has also formulated a standard concerning the 32 kb/s unrestricted digital data communications and the terminals installed with this function are expected to come up in the market within a year. PHS terminals incorporating this function are strongly expected to be used as portable terminals that can transmit data at markedly higher speeds. In private use, such as at home or in the office, PHS terminals could serve as ISDN mobile terminals which support 64 kb/s high-speed data communications by use of two 32 kb/s slots. At present, videophone prototypes using 64 kb/s data communications are already available and practical use of 28.8 kb/s data communications has been proven as the prototype level.



Members of the Preparatory Group for PHS MoU

(As of February 1, 1996)

- ArrayComm, Inc.
- ASTEL TOKYO CORPORATION
- AT&T Japan Ltd.
- Cable and Wireless Japan Ltd.
- CASIO COMPUTER CO., LTD.
- CIRRUS LOGIC K.K.
- DDI Tokyo Pocket Telephone, Inc.
- DSP Communications (JAPAN), INC.
- Fujitsu Limited
- Hitachi, Ltd.
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- Yupiteru Industries Co., Ltd.

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- Radio Equipment Inspection and Certification Institute
- The Telecommunication Technology Committee

Dear readers:

The Editorial Committee of the Preparatory Group for PHS MoU is pleased to have published the third issue of the PHS MoU News. This newsletter includes PHS-related news and information. Your comments and opinions are welcomed. Please feel free to contact us.

We hope this newsletter will contribute to your business.

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