PHS MoU Document
B-IW1.01-03-TS

Title:	Public Personal Handy-Phone System : Interworking between public PHS wireless access part operating at bit rates up to 64 kbit/s and 64 kbit/s-based ISDN part of public PHS network
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History of Revised Versions

Version	Date	Outline
01	July 11,1997	Established
02	Dec. 19, 1997	Glossary and abbreviations are aligned with A-GN1.00 (Glossary and Abbreviations).
03	July 31, 1998	Enhancement of 64 kbit/s unrestricted bearer service at the aspect of interworking.

Public Personal Handy-Phone System:
Interworking between public PHS wireless access part operating at bit rates up to 64 kbit/s and 64 kbit/s-based ISDN part of public PHS network

< Summary >

1. Relation with International Standards

This specification specifies interworking arrangements between a public PHS wireless access part operating at bit rates up to 64 kbit/s and a 64 kbit/s-based public PHS ISDN part based on ITU-T Recommendation I.525.

2. Differences to/from ITU-T Recommendations

The following specifications have been deleted from or added to ITU-T Recommendation I.525.

(1) The descriptions related to B-ISDN are deleted.

(2) The descriptions related to Packet Mode Service are deleted.

(3) The following terms used in ITU-T Recommendation I.525 shall be replaced with those of this specification as shown in the table below.

Table Summary-1/B-IW1.01 Differences from ITU-T Recommendation I.525

ITU-T Recommendation I.525 terminology	This specification terminology
ISDN, 64 kbit/s based ISDN	(64 kbit/s based) public PHS ISDN part
Networks operating at bit rates of less than 64 kbit/s, Networks which operate at bit rates of less than 64 kbit/s, <64 kbit/s network etc.	public PHS wireless access part (operating at bit rates up to 64 kbit/s)

In other words, when the terms in the left column of above table are used in the referred part of ITU-T Recommendation I.525 text, those shall be replaced by the terms in the right column of above table.

(4) Descriptions for defining two parts of a public PHS network (i.e., a public PHS wireless access part operating at bit rates up to 64 kbit/s and a 64 kbit/s-based public PHS ISDN part) are added to main body. Annex A and Annex B of ITU-T Recommendation I.525 were merged to form Annex B of this specification for describing interworking arrangements between two parts of

public PHS network. And a new Annex was added. Detailed explanations are shown in the table below.

(5) Descriptions for interworking arrangement between public PHS wireless part operating at 64kbit/s and public PHS ISDN part are added.

Table Summary-2/B-IW1.01 Differences from ITU-T Recommendation I.525

1. General	This specification defines a public PHS wireless access part and a 64 kbit/s based public PHS ISDN part.
2. Scope	Descriptions about circuit mode service usable for unrestricted data up to 64kbit/s (more than 32kbit/s) are added.
B.1 General	Texts are modified in order to describe two parts of public PHS network (i.e. a public PHS wireless access part operating at bit rates up to 64 kbit/s and a 64 kbit/s-based public PHS ISDN part).
B.2 Scope	
B.3.1 Interworking configuration	A figure which is based on A.1/I.525 was added.
B.3.2 Key characteristics	Common items of TABLE A.1/I.525 and TABLE B.1/I.525 are specified. Information transfer capability for 64 kbit/s unrestricted data service is added to TABLE B.1/I.525.
B.3.3 Service suitable for interworking	Based on the frame-work of B.3.3, the descriptions of A.3.3 of ITU-T Recommendation I.525 are added. Items which are corresponded to TABLE A.2/I.525 are not included. Descriptions about circuit mode 64 kbit/s, 8KHz structured bearer service are added.
B.3.4.1 Interworking between signalling systems	Texts are modified for describing on IF1 and IF2.
B.3.4.2 Interworking for speech	Descriptions about 3.1 kHz audio are added and descriptions about Echo canceller are deleted. Descriptions about enabling of a speech transcoder in case of public PS to public PS connection are added.
B.3.4.3 Interworking for data	Descriptions about provision of voice-band data service and low bit-rate data are added in subclause B.3.4.3.1. Descriptions about interworking arrangements for 64 kbit/s unrestricted data service is added as subclause B.3.4.3.2.
B.3.4.4 Supplementary services	Specifications are described based on subclause

(2) B-IW1.01-03-TS

	B.3.4.4

3. References

ITU-T Recommendations: I.525 (1996), G.96x series, V.110, X.30
PHS MoU Documents: B-IF1.xx, B-IF2.xx, IF3.xx series

4. Items for Further Study

None

Public Personal Handy-Phone System:
Interworking between public PHS wireless access part operating at bit rates up to 64 kbit/s and 64 kbit/s-based ISDN part of public PHS network

Contents

1. General

1.1 Objectives of this document

This document specifies the interworking arrangements between a public PHS wireless access part operating at bit rates up to 64 kbit/s and 64 kbit/s-based public PHS ISDN part in the public PHS network.

In the text of this specification, the public PHS network is separated into two parts. One is the 64 kbit/s-based “public PHS ISDN part” which is a part of public PHS network including SCP and PSC and having IF2 for the connection with a public PHS wireless access part. The other is the “Public PHS wireless access part”. In case of CS type1. a public PHS wireless access part includes public CSs. In case of CS type2. a public PHS wireless access part includes public CSs and SCP-A. In both type. a public PHS wireless access part two types of interfaces: IF1 for the connection to public PSs and IF2 for the connection to a public PHS ISDN part. The transmission rate of the public PHS wireless access part is up to 64 kbit/s.

2. Scope of this document

The purpose of this Specification is to describe the interworking arrangements between the public PHS wireless access part and the public PHS ISDN part in the public PHS network. In this specification, following services are described for interworking.

- circuit mode service usable for speech information transfer;
- circuit mode service usable for 3.1 kHz audio information transfer;
- circuit mode service usable for 32 kbit/s unrestricted data;
- circuit mode service usable for 64 kbit/s unrestricted data;

The scope of this specification is only the services terminated to public PSs. Packet mode service is not described because services terminated to public CSs are out of the scope.

3. Principles

The public PHS wireless part shall follow internationally agreed 64 kbit/s based ISDN interface standards for interconnecting with the public PHS ISDN part. In particular, they shall ensure time slot sequence integrity of the information conveyed in a 64 kbit/s channel at the interworking point. Any adaption and interworking functions to standard ISDN interfaces will be provided within the public PHS wireless access part if necessary.

4. Interworking configurations

4.1 General interworking configuration

Figure 4-1/B-IW1.01 shows the general reference configuration for interworking. The interworking function at the point of the network interface includes speed, 3.1 kHz audio signal transcoding and unrestricted data rate adapting. It is provided in the IWF.

Figure 4-1/B-IW1.01 General configuration for interworking between a public PHS wireless access part and a public PHS ISDN part

4.2 Interworking configurations using V5.1/5.2 interfaces

Interworking between a public PHS wireless access part operating at bit rates less then 64 kbit/s/equal to and a 64 kbit/s-based public PHS ISDN part of the public PHS network can be provided using V5 interface (V5.1 or V5.2). Figure 4-2/B-IW1.01 shows general interworking configurations between a public PHS wireless access part and a public PHS ISDN part using V5 interface.

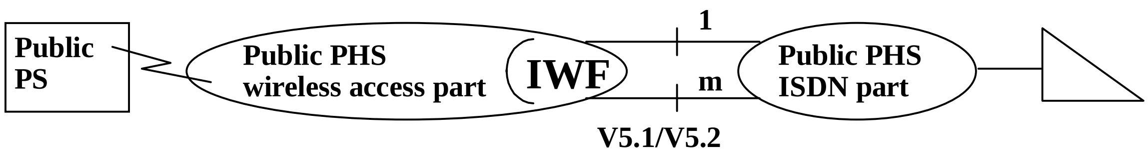

Figure 4-2/B-IW1.01 General V5 interworking configurations between a public PHS wireless access part and a public PHS ISDN part

5. Examples of applications

Annex B describes an interworking between a public PHS wireless access part and a public PHS ISDN part of the public PHS network.

Annex A GLOSSARY and ABBREVIATIONS (Normative)

Glossary

A

B

C

D

E

F

G

H

I

Interworking functions (IWFs) ITU-T

Functions which include the conversion of physical and electrical states and the mapping of protocols.

J

K

L

M

N

O

P

public Cell Station (public CS) ARIB

The public cell station carries out mobile radio communication with personal station on land using public standard.

public Personal Station (public PS) ARIB

The personal station, as a subscriber communication terminal, is used to make land mobile radio communications to either personal station or cell station.

*Public PHS ISDN part PHS MoU

A part of the public PHS network including SCP and PSC and having IF2 for the connection to a public PHS wireless access part.

*Public PHS wireless access part PHS MoU

A part of the public PHS network. In case of CS type1, a public PHS wireless access part includes public CSs. In case of CS type2, a public PHS wireless access part includes public CSs and SCP-A. In both type, a public PHS wireless access part has two types of interfaces: IF1 for the connection to public PSs and IF2 for the connection to a public PHS ISDN part.

Q

R

S

T

U

V

V5.1 ITU-T

A 2048 kbit/s interface, which does not support a concentration function, defined by ITU-T Recommendation G.964 for the connection of an Access Network (AN) to a Local Exchange (LE) for the support of such access types as analogue, ISDN basic access applications and semi-permanent connections.

V5.2 ITU-T

A set of 2048 kbit/s interfaces up to sixteen, which inherently supports a concentration function, defined by ITU-T Recommendation G.965 for the connection of an Access Network (AN) to a Local Exchange (LE) for the support of such access types as analogue, ISDN basic/primary access applications and semi-permanent connections.

W

X

Y

Z

Abbreviations

CS	Cell Station
ISDN	Integrated Services Digital Network
IWF	Interworking Function
PCM	Pulse Code Modulation
PHS	Personal Handy-Phone System
PS	Personal Station
PSC	PHS Switching Center
SCP	Service Control Point
UDI	Unrestricted Digital Information

Annex B • Network interworking between public PHS wireless access part operating at bit rates up to 64 kbit/s and 64 kbit/s-based ISDN part of public PHS network (Normative)

B.1 General

A public PHS network consists of two parts: a wireless access part and an ISDN part. In a public PHS wireless access part users are provided with digital user network access capabilities at 32 or 64 kbit/s for efficient radio frequency use, whereas a public PHS ISDN part provides 64 kbit/s based digital switching services.

B.2 Scope

The purpose of this annex is to describe the general arrangements for interworking between a public PHS wireless access part and a public PHS ISDN part.

B.3 Interworking configuration and network characteristics

B.3.1 Interworking configuration

See Figure B1/B-IW1.01.

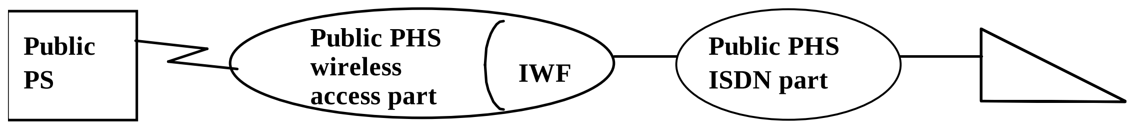

Figure B1/B-IW1.01 General configuration for interworking between a public PHS ISDN part and a public PHS wireless access part

B.3.2 Key public PHS wireless access part and ISDN part characteristics and related interworking functions

Table B1/B-IW1.01 identifies the key characteristics of a public PHS wireless access part and an ISDN part, indicating possible interworking functions to accommodate dissimilar characteristics.

B.3.3 Services suitable for public PHS wireless access part - ISDN part interworking

B.3.3.1 Services suitable for calls from public PHS wireless access part to ISDN part

i) circuit-mode 32 kbit/s, 8 kHz structured bearer service, usable for speech information transfer;

ii) circuit-mode 32 kbit/s, 8 kHz structured bearer service, usable for 3.1 kHz audio information transfer;

Table B1/B-IW1.01 Key public PHS wireless access part and ISDN part characteristics and possible interworking functions required

	Wireless access part	IWF	ISDN part
Subscriber interface	Digital	-	Digital
User-network signalling	Out-band	Signal mapping	Out-band
Signalling specification	Specification IF1	Signal mapping	Specification IF2 and IF3
Information transfer mode	Circuit	Circuit connection based on 64 kbit/s	Circuit
Information transfer capability	Low rate speech	Transcoding	Speech based on 64 kbit/s PCM
	3.1 kHz audio	Transcoding	3.1 kHz audio based on 64 kbit/s PCM
	Low bit-rate data (32 kbit/s UDI)	Rate adapting	64 kbit/s UDI
	64 kbit/s UDI	Multiplexing and Rate adapting	64 kbit/s UDI

• • •iii) circuit-mode 32 kbit/s unrestricted, 8 kHz structured bearer service (see Note 1).
• • •iv) circuit-mode 64 kbit/s unrestricted, 8 kHz structured bearer service (see Note 2).

NOTE 1 - The user rate and the intermediate rate shall be less than or equal to 32 kbit/s for the low bit-rate data transfer service.

NOTE 2 - The user rate and the intermediate rate shall be less than or equal to 64 kbit/s (higher than 32 kbit/s) for the low bit-rate data transfer service.

B.3.3.2 ISDN bearer services suitable for calls from public PHS ISDN part to wireless access part

i) circuit-mode 64 kbit/s, 8 kHz structured bearer service, usable for speech information transfer;
ii) circuit-mode 64 kbit/s, 8 kHz structured bearer service, usable for 3.1 kHz audio information transfer;
iii) circuit-mode 64 kbit/s unrestricted, 8 kHz structured bearer service (see Note).

NOTE - In case that the low bit-rate data is selected in a PHS wireless access part, the user rate and the intermediate rate shall be less than or equal to 32 kbit/s, and the ITU-T V.110/X.30 rate adaption shall be selected for the user information layer 1 protocol when a call terminates through the low bit-rate data transfer service in a public PHS wireless access part.

B.3.4 Functional requirement for public PHS wireless access part -ISDN part interworking

B.3.4.1 Interworking between signalling systems

The interworking functions between IF1 and IF2 are provided by the IWF in a public PHS wireless access part.

B.3.4.2 Interworking for speech and 3.1 kHz audio information

The IWF in a public PHS wireless access part has a transcoder to convert between the low bit-rate speech coding in a public PHS wireless access part and the standard 64 kbit/s coding in a public PHS ISDN part (see Figure B2/B-IW1.01).

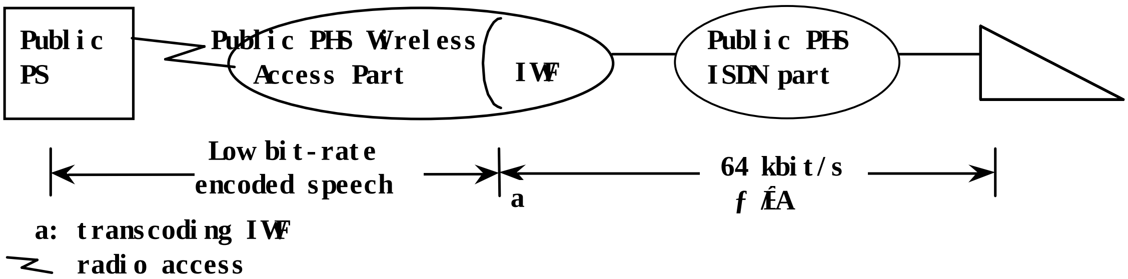

Figure B2/B-IW1.01 General configuration for interworking between a public PHS ISDN part and a public PHS wireless access part showing transcoding IWF

In the case where there is public PHS wireless access part access at both ends of a connection, and both public PHS wireless access parts are of the same type, the speech transcoders shall be enabled in each IWF. This case is illustrated in Figure B3/B-IW1.01.

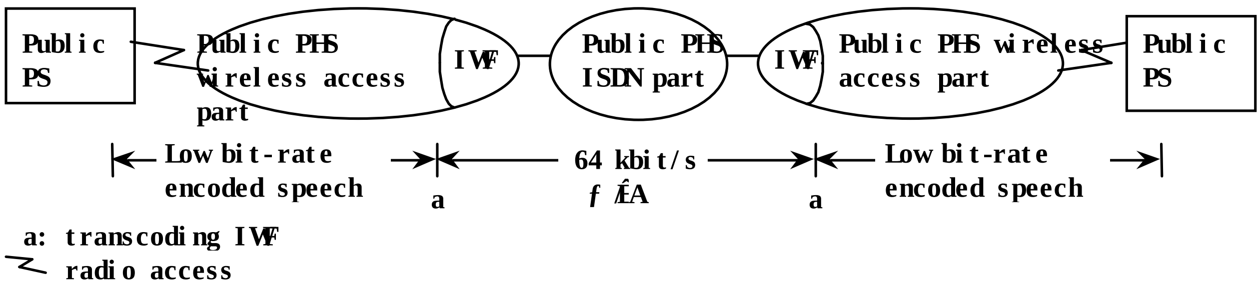

Figure B3/B-IW1.01 General configuration for interworking between a public PHS ISDN part and a public PHS wireless access parts both ends of the connection

B.3.4.3 Interworking for data

B.3.4.3.1 Voice-band data and low bit-rate data

The voice coding of public PHS wireless access parts can pass voice-band data. When the voice-band data transmission is required, the IWF in a public PHS wireless access part shall enable a transcoder to convert between the low bit-rate speech coding in public PHS wireless access part and the standard 64 kbit/s coding in public PHS ISDN part (see Figure B2/B-IW1.01).

When circuit mode 32 kbit/s data transmission is required, the voice codec must be bypassed. The mechanism for transmission across the public PHS ISDN part shall be for the low bit-rate of the public PHS wireless access part (e.g. 32 kbit/s) to be rate-adapted to 64 kbit/s by the IWF. This is illustrated in Figure B4/B-IW1.01.

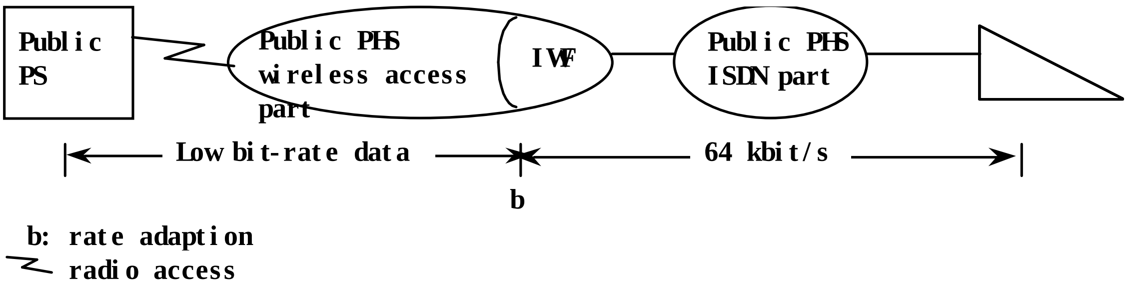

Figure B4/B-IW1.01 General configuration for interworking between a public PHS ISDN part and a public PHS wireless access part for low bit-rate data

B.3.4.3.2 64 kbit/s unrestricted data

When circuit mode 64 kbit/s data transmission is required, the IWF in a public PHS wireless access part shall multiplex two streams of PHS 32 kbit/s data channel into a 64 kbit/s B-channel in a public PHS ISDN part. The voice codec must be bypassed.

The mechanism of the IWF for 64 kbit/s unrestricted shall be followed by B-IF1.01. This is illustrated in Figure B5/B-IW1.01.

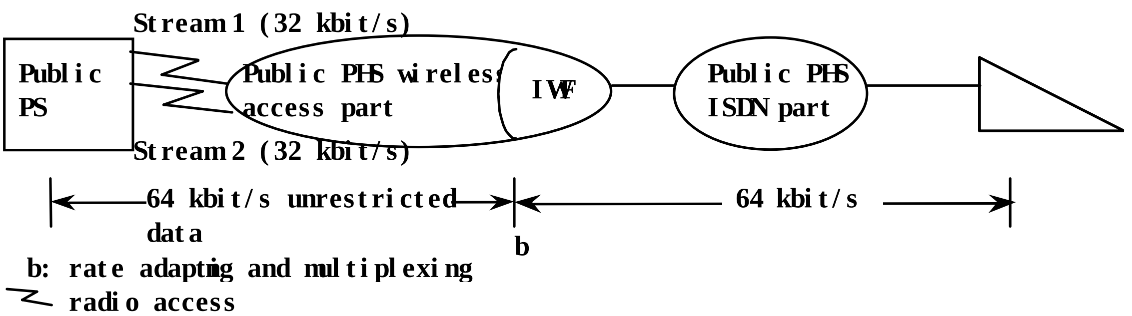

Figure B5/B-IW1.01 General configuration for interworking between a public PHS ISDN part and a public PHS wireless access part for 64 kbit/s unrestricted data

B.3.4.4 Supplementary service interworking

A public PHS wireless access part may be provided with similar or identical supplementary services to those in the ISDN part, but with some differences resulting from:

- moving from one mobile switching exchange area to another;
- roaming to another network offering the same public PHS wireless access part capability.

Frequently, the supplementary services will be required to operate across networks, and interworking between a public PHS wireless access part and the ISDN part requires interworking of signalling, notification and indications. Additionally, procedure compatibility may sometimes need to be assured before interworking of a supplementary service can be allowed.