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History of Revised Versions

Version	Date	Outline
01	Dec. 17, 1996	Established
02	June 7, 2000	Changed all WLL into FWA Clause 1, 2, 3 are changed.

PHS-FWA System: Service of PHS-FWA System

Contents

1. Basic Services

1.1. Bearer Services

Bearer services are supported by FWA system with PHS technologies. FWA subscribers are provided a certain bearer services as same as ordinary PSTN, ISDN and leased line subscribers by operating companies. The following bearer services are currently identified.

For PSTN subscribers at WIF1 and WIF3 with C-IF3.01 interface:
Analog 3.1kHz audio

For PSTN subscribers at WIF2 and WIF3 except C-IF3.01 interface:
(1) Circuit - mode 32kbit/s bearer service for speech information transfer

Transmission function suited for voice communication; 32kbit/s ADPCM CODEC is inserted.

(2) Circuit - mode 32kbit/s bearer service for 3.1kHz audio information transfer

Transmission function suited for 3.1kHz bandwidths communication; 32kbit/s ADPCM CODEC is inserted.

(3) Circuit - mode 64kbit/s bearer service for speech information transfer

Transmission function suited for voice communication; 64kbit/s PCM CODEC is inserted.

(4) Circuit - mode 64kbit/s bearer service for 3.1kHz audio information transfer

Transmission function suited for 3.1kHz bandwidths communication; 64kbit/s PCM CODEC is inserted.

For ISDN subscribers at WIF1, WIF2 and WIF3:
Bearer services provided by the network (ITU-T Recommendation I.230)

For Leased Line subscribers at WIF1, WIF2 and WIF3:
Bearer services provided by the network

Other services at WIF2:
(1) Circuit – mode 32kbit/s unrestricted bearer service for digital data transfer

Transmission function suited for digital data transfer at the WIF2 point; Digital data is transferred with transparency.

(2) Circuit – mode 64kbit/s unrestricted bearer service for digital data transfer

Transmission function suited for digital data transfer at the WIF2 point; Digital data is transferred with transparency.

1.2. Provisioning

PSTN and ISDN services will be provided by pre-arrangement with the FWA service provider and/or PSTN (ISDN) provider.

As an example, the provisioning required in each equipment for PSTN services is shown in TABLE 1-1/C-SV1.00.

1.3. Basic Call Handling

FWA system provides the same function as ordinary telephone network to FWA users. Basic call handling include calls from a FWA user to a PSTN or ISDN user, from a PSTN or ISDN to a FWA user, and from a FWA user to the another FWA user.

1.3.1. Basic Call Handling of PSTN

1.3.1.1. Individual Subscriber

FWA system provides individual subscriber service by connecting ordinary telephone to WSU. Basic call handling of individual subscriber is composed of originating and terminating call handling.

(1) Originating call handling

Originating call is a feature by which a FWA subscriber can make a originating call from TE/WPS; the outgoing call request includes a number identifying the called user. This request is given to the network en bloc including all the required information.

(2) Terminating call handling

Terminating call is a feature by which terminating calls to a FWA subscriber are presented at the terminal address. Termination to the subscriber is realized paging procedure in air interface. Paging is a feature that pages the WSU/WPS in the location registration area based on the stored location information, and determines the cell by the response from the terminal. When several WCSs are equipped within a location registration area, paging to all the WCSs in the area simultaneously can be considered.

1.3.1.2. PBX Subscriber

WLL FWA system provides PBX service by connecting PBX to WSU. There are two types in start signal of PBX; loop start and ground start.

(1) Loop Start

Call setup is transmitted from PBX to network with loop signal. The call handling of originating call and terminating call refer to 1.3.1.1(1) and (2).

(2) Ground Start

Call setup transmitted from PBX to network with ground start signal. The call handling of originating call and terminating call refer to 1.3.1.1(1) and (2).

1.3.1.3. Coin Phone Subscriber

FWA system provides coin phone service by connecting coin phone to WSU. Coin phone service is supported by the transmission of meter pulsing signal. Meter pulsing signal is transferred from PSTN to WLL FWA , and coin collection signal is returned to inform the acknowledge of coin collection.

1.3.2. Basic Call Handling of ISDN

FWA system provides individual subscriber service by connecting TE or NT to WSU. The call handling of originating call and terminating call at the point of WIF1, WIF2 and WIF3 refer to C-IF1.00 series, C-IF2.00 series, and C-IF3.00 series, respectively.

2. Supplementary Services

PHS-FWA subscribers will be provided various services as same as PSTN and ISDN subscribers.

2.1. Supplementary Services of PSTN

2.1.1. Direct Dialing In

Direct Dialing In service is a service to provide a direct call to a user accommodated in PBX. When a call is terminated to the user registered in Direct Dialing In service, Network sends digits information to PBX through dialing -in link. The call is directly terminated to the user without termination to attendant.

2.1.2. CLIP (Calling Line Identification Presentation)

CLIP is a service which present the calling user’s number to the called user. When CLIP is applicable and activated, the network presents the called user with the number of the calling user at call set-up on all terminating calls.

2.1.3. Meter Pulsing Signal Transmission

Meter Pulsing Signal Transmission is the function to transfer charging signal from PSTN to WSU to collect coin. Meter Pulsing Signal Transmission is executed in Coin Phone Service.

2.1.4. Terminating-only Line

Terminating-only Line is the line for terminating calls. Terminating procedure is same as individual call. Originating call is restricted at SN.

2.2. Supplementary Services of ISDN

ISDN subscribers are provided certain supplementary services by operating companies. The service specification is same as the existing ISDN service.

3. Functional Services for Operators

PHS-FWA system provides network operators with convenient network management functions.

3.1. Location Registration

Location Registration is a feature by which the identify of WSU/WPS is registered to WAC. The identify of WSU/WPS is used to deliver calls to the WSU/WPS. This feature is realized within FWA network.

3.2. Authentication

The authentication is a feature by which the validity of WSU/WPS is confirmed. Authentication should be executed at each location registration, originating call and terminating call. When a WSU/WPS requires of the network to access it, the network requests to the WSU/WPS to execute authentication. After the network confirms the validity of the WSU/WPS, it sends the message indicating acknowledgment to the WSU/WPS, and the WSU/WPS is allowed to access the network. This feature is realized within FWA network.

3.3. Interference Avoidance

TCH (Traffic Channel) switching can be switched during conversation to avoid interference in air interface. The default of TCH switching function is described below.

(1) Switching function within carrier within WCS, among carriers present.
(2) No TCH switching function to other WCS.
(3) No CS-ID designation switching function to other WCS.
(4) No re-calling type connection function to other WCS within paging area.
(5) No re-calling type connection function to other WCS among paging areas.
(Note) Re-call type connection function is option.

3.4. Analogue Services for PSTN

3.4.1. Howler Tone Sending

Howler Tone is sent to the user who keeps off-hook more than specified time after the call is competed, and informs ‘long time off hook’ to the user.

3.4.2. Hooking Signal Transmission

Hooking signal from FWA terminal is transferred to PSTN. The examples of PSTN services which are provided by hooking signal transmission are described below.

(1) Call waiting service
(2) Three party call service
(3) Malicious call service
(4) Call transfer service

3.4.3. DTMF Signal Transmission

There are methods in DTMF Signal Transmission; In-channel DTMF tone sending and Out-channel DTMF signal transmission. In-channel DTMF tone is sent from TE connected with WSU. Out-channel DTMF signal is transmitted from WPS.

3.5. Services of Operation

3.5.1. Emergency Call Connection

Emergency Call Connection depends on operator implementation.

3.5.2. Emergency Call Holding

Emergency Call Holding depends on operator implementation.

The list of PSTN services for PHS-FWA is shown in TABLE 1-2/C-SV 1.00.

TABLE 1-1/C-SV1.00 Provisioning for PSTN services

Equipment	System control data	Air channel control data	Subscriber data	Facility data
WSU/WPS	WSU ID Physical/Electrical condition Ringing pattern Timing value(Hooking, Re-answer ...) Metering signal type Emergency call number**	Operator identification code Control carrier Location Registration Information Encryption Key* Encryption	Subscriber Telephone Number DP/DTMF Identification Authentication key	
WCS	WCS ID Scramble code Ringing pattern Emergency call number A-low/μ-low	LCCH profile data Operator identification code Control carrier TCH switching threshold Timing value WSU ID	Authentication key	
WAC	WAC ID		Subscriber Telephone Number WSU ID Contract type Line type Line ID DP/DTMF Identification WCS ID Paging area code	SN protocol type Normalized time slot number Physical time slot number Cch time slot number User port number
SN			Line type Subscriber Telephone number Line equipment number	SN protocol type Cch time slot number Normalized time slot number Physical time slot number User port number

*: Option

TABLE 1-2/C-SV 1.00 PSTN Services of PHS-FWA

Service Type	Features		General
Basic Services	Bearer Services		(1) Circuit-mode 32kbit/s bearer service for speech information transfer. (2) Circuit-mode 32kbit/s bearer service for 3.•kHz audio information transfer. (3) Circuit-mode 64kbit/s bearer service for speech information transfer. (4) Circuit-mode 64kbit/s bearer service for 3.•kHz audio information transfer.
	Provisioning		Provided by pre-arrangement with the PHS-FWA service providers and/or other service providers. The provisioning required in each equipment in TABLE1-2/SV1.00.
	Basic Call Handling	Individual Subscriber	Individual subscriber service by connecting ordinary telephone to WSU.
		PBX Subscriber	PBX service by connecting PBX to WSU.
		Coin Phone Subscriber	Coin phone service by connecting coin phone to WSU.
Supplementary Services	Direct Dial In		Service to provide a direct call to a user accommodated in PBX.
	Calling Number Delivery		Service to the call user which provides the calling user's number to the called user.
	Meter Pulsing Signal Transmission		Service to transfer charging signal from PSTN to WSU to collect coin.
	Receive-only Line		Service to provide the line for terminating call.
Functional Services for operators	Location Registration		Service by which the identify of WSU/WPS is registered to WAC.
	Authentication		Service by which the validity of WSU/WPS is confirmed.
	Interference Avoidance		Service to avoid interference by switching TCH (Traffic Channel).
	Howler Tone Sending		Service to provide howler tone to inform long time off hook to the off-hook user.
	Emergency Call Connection		Service to assign ordinary subscriber channel even if all channels are busy.
	Emergency Call Holding		Service to hold link in emergency call.
	Hooking Signal Transmission		Service to transmit hooking signal from FWA terminal to PSTN.
	DTMF Signal Transmission		Service to transmit DTMF signal from FWA terminal to PSTN.