

PW850-GW Operating Manual

Kisan Telecom

2009. 11

FCC WARNING

This equipment generates or uses radio frequency energy. Changes or modifications to this equipment may cause harmful interference unless the modifications are expressly approved in the instruction manual. The user could lose the authority to operate this equipment if an unauthorized change or modification is made.

INFORMATION TO THE USER

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can generate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.*
- Increase the separation between the equipment and receiver.*
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.*
- Consult the dealer for technical assistance.*

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1. Introduction

1.1. General Introduction

As an equipment to clear the shadows inevitably generated among the adjacent cells of WCDMA and GSM, PW850-GW simultaneously supports both WCDMA and GSM and effectively repeats the signals between terminals in dead area and BTS.

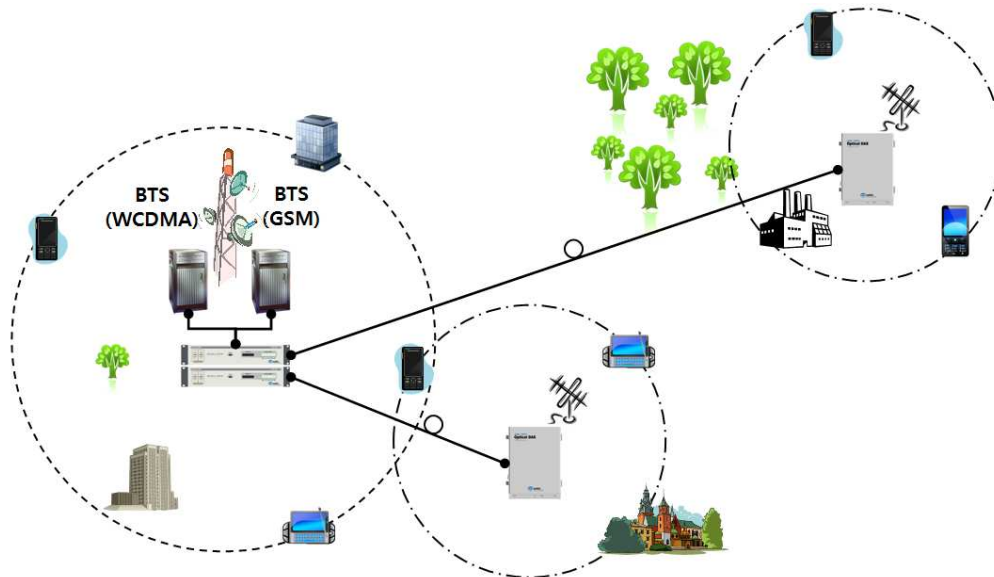
Main purpose of PW850-GW is below:

- The expansion of service coverage
- The enhancement of service quality at the specific areas such as in tunnel or in-building
- The enhancement of signal strength at the places where the signal is weak

2. Network configuration of system

2.1. Network configuration

PW850-GW repeater is an equipment to clear the shadows and fill the gaps existing among the adjacent cells and enhances the quality of services by extending coverage of GSM and WCDMA.



- System configuration
 - DU Capacity: 1 Sector 1 Branch
 - System Connection: Optic cable between DU and RU
 - Optic Wavelength: 1310nm for FWD, 1550nm for RVS
 - Max loss of optic cable (between DU and RU): 1 ~ 4dB

3. System Specifications

3.1. General Specifications

Item	PW850-GW DU	PW850-GW RU
Enclosure Type	2U-Shelf type 19" standard rack mountable In-door use	Cabinet
Dimension (W × H × D mm)	483mm × 88mm × 400mm	450mm × 630mm × 255mm
Weight (kg)	TBD	TBD
Thickness of Enclosure	Front: 3mm Others: 2mm	2mm
Input power	110~120Vac (Tolerance ±10%), 60Hz	110Vac, 60Hz
Power Consumption	TBD	TBD
Power Connector	ID-NO3BEH	MS3106A16-10S
RF In/Out Port	SMA Female, rear side	N Type Female, bottom
Amount of thermal emission (발열량)	TBD	TBD
Optic Connector Type	FC/APC, rear side	FC/APC, bottom
Optic Wavelength	FWD : 1310nm / RVS : 1550nm	
Operating Temperature	-20℃ ~ 45℃	-20℃ ~ 50℃

3.2. System specifications

3.2.1. Frequency allocation



3.2.2. System Specifications

Item	Specification		Remarks
	WCDMA	GSM	
Downlink (Tx)	A-Band for GSM-850	A'', A or A'-Band for GSM-850	cf. 3.2.1
Uplink (Rx)	A-Band for GSM-850	A'', A or A'-Band for GSM-850	
Frequency Stability	0.01PPM		
Number of Channels	1FA	2 CH	
System Delay	5usec max.		
Tx-Rx Isolation	100dB min.		
Impedance	50Ohm		
Band Gain	3dB max.	3dB max.	A + A' + A''
FWD Output Power	37dBm /1FA @ ANT Port	37dBm /1CH @ ANT Port	37dBm/Total
FWD Input Power	-40 ~ -20dBm/FA	-40 ~ -20dBm/Total	
RVS Output Power	0dBm max.	0dBm max.	
RVS Input Power	-60dBm max.	-60dBm max.	
System Gain	72dB	72dB	
FWD Spurious	3GPP, FCC compliant	3GPP, FCC compliant	

RVS Noise Figure	5dB max.	5dB max.	
EVM or Rho	12.5%		
Gain Control Range	DU : 20dB by 1dB Step RU : 20dB by 1dB Step	DU : 20dB by 1dB Step RU : 20dB by 1dB Step	
VSWR	1.5 : 1 max.	1.5 : 1 max.	

4. Mechanical Specifications

4.1. PW850-GW DU

4.1.1. Mechanical Design

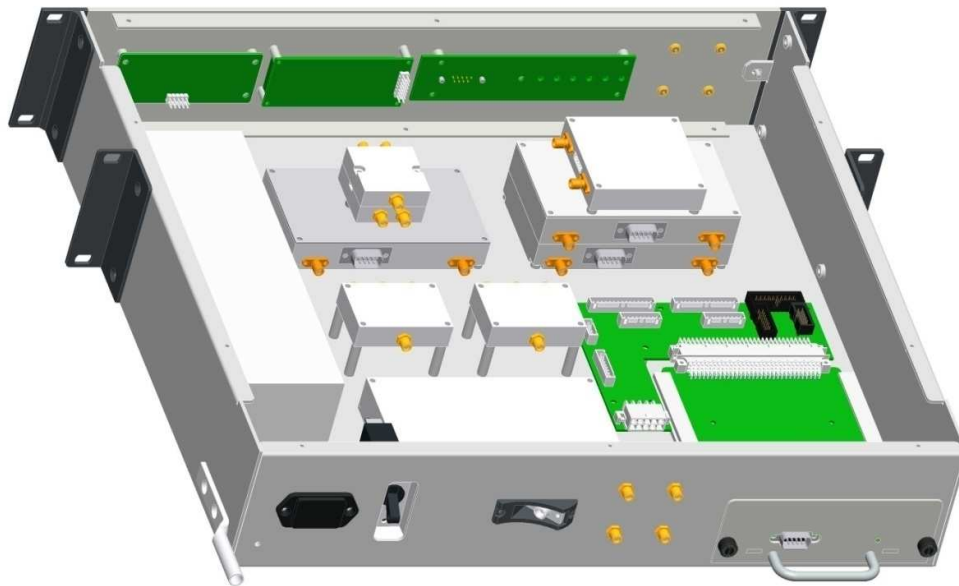
[FRONT]



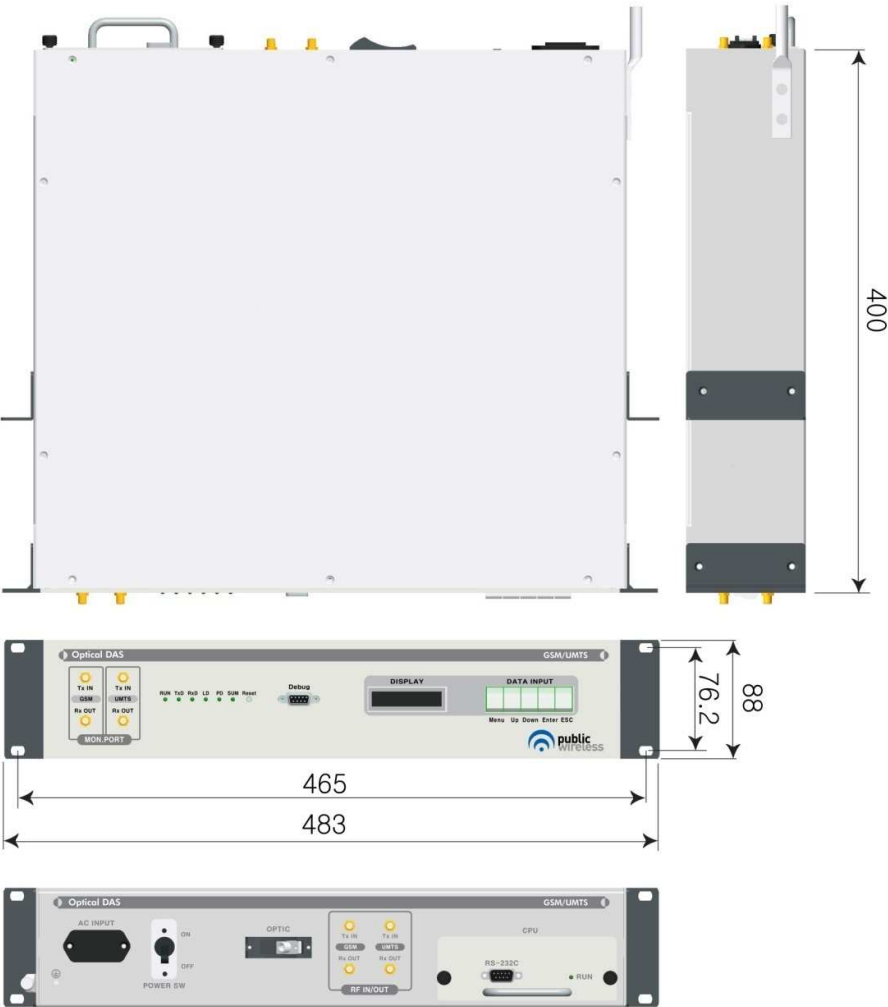
[REAR]



[DU composition]



4.1.2. Dimension



4.1.3. Mechanical specification

No	Items	Specifications
1	Exterior view	1. Shelf attachable type to both INDOOR and OPEN RACK 2. W 19" (483mm) × H 2U (88mm) × D (400mm)
2	Material	Aluminum (AL5052, AL6063) is mainly used for protection from corrosion by external environments.
3	Connector Type	1. Optic I/O: FC/APC at rear side 2. RF I/O: SMA Female at rear side 3. Monitor port: SMA Female at front side
4	Power Input	110-120Vac, 60Hz
5	Ground	14SQ 2Hole ground pipe (right side of shelf) and M4 "O" rug ground (rear side of shelf)
6	Communication Port	9P D-SUB (GUI), front side

4.1.4. Descriptions of PW850-GW DU

[Forward Path]

Once the signal from GSM or WCDMA BTS is approved to the RF input port of DU, at the first step, in the FWD driver module (GSM: DFA-G, WCDMA: DFA-W) the signal is adjusted to the appropriate level and mixed with the modem signal using combiner, then it becomes the input signal to the optic module to be transmitted to RU.

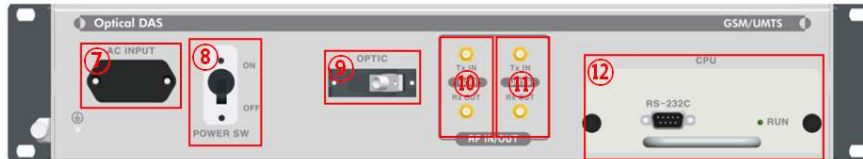
[Reverse Path]

The signal from RU (GSM or WCDMA) is divided into RF and modem signal with combiner. RF signal is changed to appropriate level at RVS driver module (GSM: DRCHS-G, WCDMA: DRCH-W) then it becomes the input signal to the BTS of GSM or WCDMA.

4.1.5. Port Configuration [FRONT]

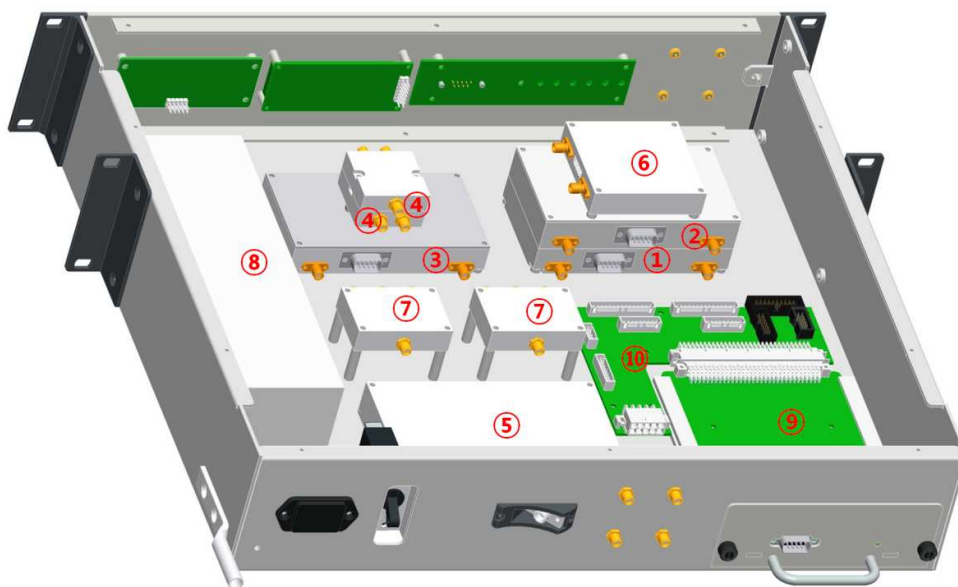


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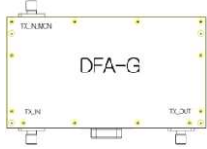
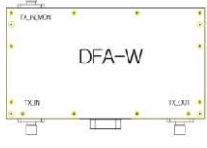
No	Items		Description
1	GSM	TX_MON	Monitor port for DU input from GSM BTS FWD output (-20dB)
		RX_MON	Monitor port for DU output to GSM BTS RVS input (-20dB)
2	WCDMA	TX_MON	Monitor port for DU input from WCDMA BTS output (-20dB)
		RX_MON	Monitor port for DU output to WCDMA BTS input (-20dB)
3	LED	RUN	Green Blinking: CPU run, OFF(Gray): CPU stop
		TxD	Green: data sending to RU, OFF(Gray): no data sending
		RxD	Green: data receiving from RU, OFF(Gray): no data
		LD	Green: Normal, Red: Alarm
		PD	Green: Normal, Red: Alarm
		SUM	Green: Normal, Red: Alarm
		RESET	CPU Reset
4	DEBUG		PC connection port for GUI S/W (9pin D-SUB)
5	DISPLAY		VFD display
6	DATA INPUT		Keypad for control input
7	AC INPUT		External AC power input port
8	Switch		AC110V power ON/OFF switch
9	Optic		FC/APC, optic connector
10	GSM	TRX IN_OUT	DU RF connection port for GSM
11	WCDMA	TRX IN_OUT	DU RF connection port for WCDMA
12	CPU		NMS control board, sliding type

4.1.6. Module Composition



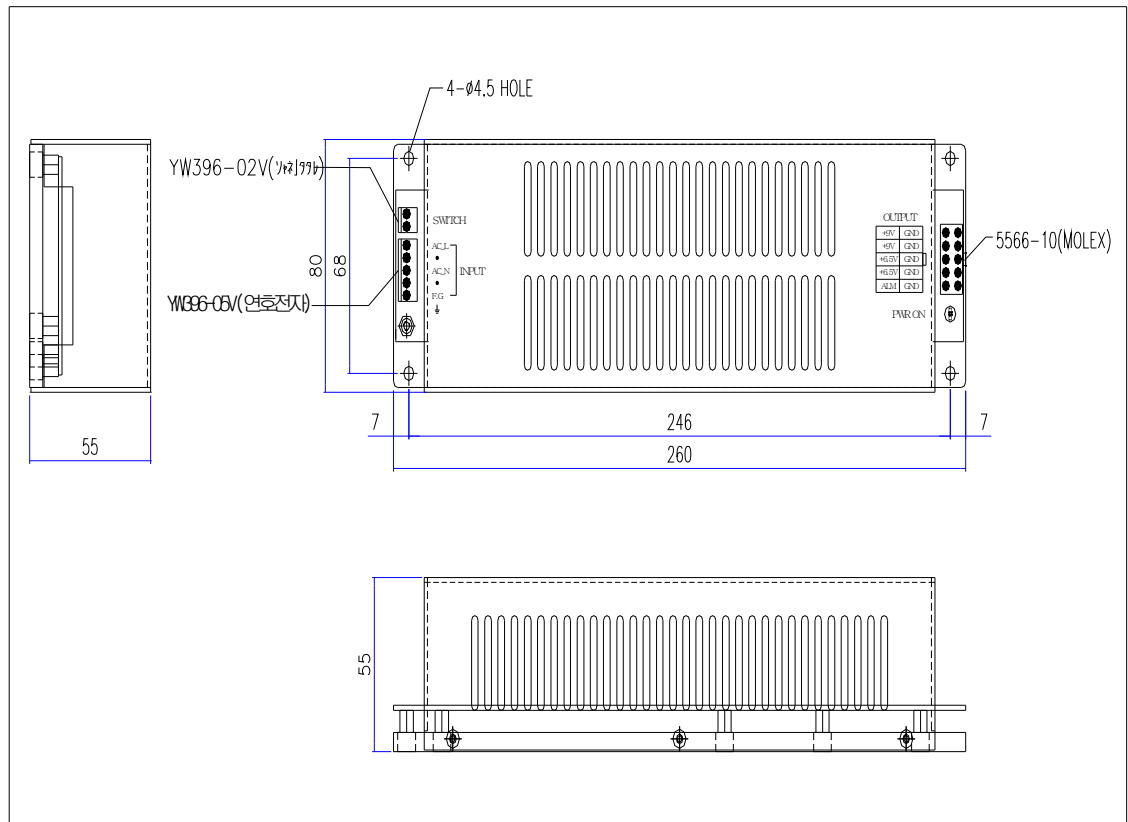
No	Module	Voltage Used	Remarks
①	DU FWD Amp for GSM (DFA-G)	6.5Vdc	
②	DU FWD Amp for WCDMA (DFA-W)	6.5Vdc	
③	DU RVS Amp(DRA-WG)	6.5Vdc	
④	2Way Divider		
⑤	DU Optical Transceiver Unit (DOU)	6.5Vdc	
⑥	FSK Modem	6.5Vdc	
⑦	DU RVS/FWD Combiner for W/G (DRFCOM-WG)		
⑧	PSU		
⑨	NMS Controller	9Vdc	
⑩	Interface BD	6.5Vdc / 9Vdc	

4.1.7 Function of Modules

No	Module	Functions
1		[DFA-G] Checks and controls the forward signal from GSM BTS and support -20dB monitor port of module input.
2		[DFA-W] Checks and controls the forward signal from WCDMA BTS and provides -20dB monitor port of module input.
3		[DRA] Checks the reverse power level from RU, checks and controls the output power to GSM BTS. Provides -20dB monitor port of module output.
4		[2Way Divider] Combines RF and data signal into a signal or divide the combined signal into RF and data signal
5		[DOU] Converts E/O (or O/E) of FWD and RVS signals. Wavelength: TX 1310[nm], RX 1550[nm]
6		[FSK Modem] Data modem for DU and RU communication DU → RU frequency: 360MHz RU → DU frequency: 340MHz
7		[DRFCOM] Combines RF and modem signal into a signal or divides a signal into RF and modem signal.
8		[PSU] Converts AC110V into DC9V and DC6.5V and provide them to each modules in DU
9		[NMS] Monitors/controls the status and configurable items of DU and module in DU
10		[Interface B'D] Provides DC current to modules which are connected to interface B'D and supports a connection port to communicate with NMS B'D.

4.1.8. PSU

PSU converts external AC110V into DC and supplies +9V, +6.5V to each module in DU.
The drawing of PSU is below.



[PSU Capacity]

Output Voltage	Maximum current	Watt
+ 9V	3 A	59.5 W
+ 6.5V	5 A	

[PSU Pin Map]

SWITCH PIN Type: YW396-02V

Pin no.	1	2
Spec.	Switch_IN	Switch_Out

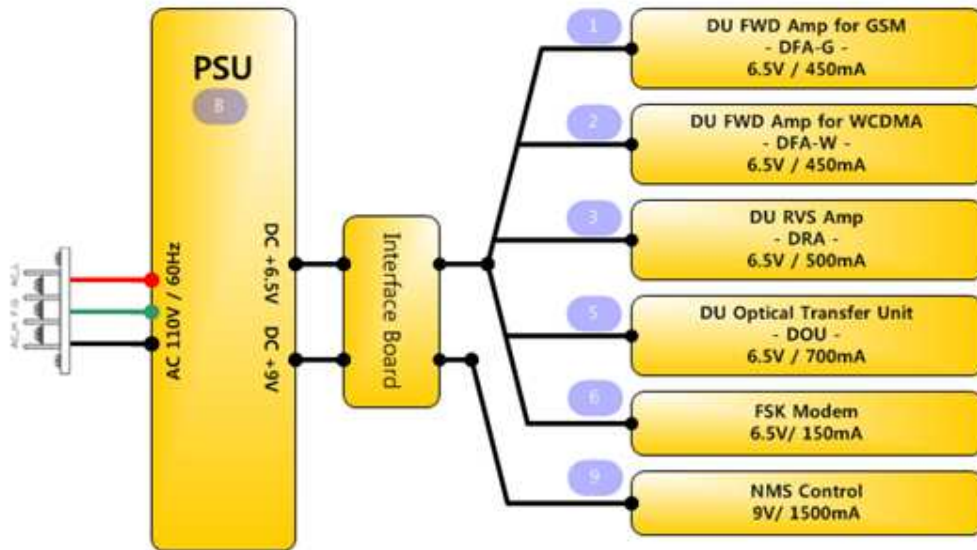
INPUT PIN Type: YW396-05V

Pin no.	1	2	3	4	5
Spec.	AC_L	N.C	AC_N	N.C	F.G

OUTPUT PIN type: 5566-10 (MOLEX)

Pin no.	1	2	3	4	5
Spec.	ALARM	+ 6.5V	+ 6.5V	+ 9V	+ 9V
Pin no.	6	7	8	9	10
Spec.	GND	GND	GND	GND	GND

Circuit Diagram of Power

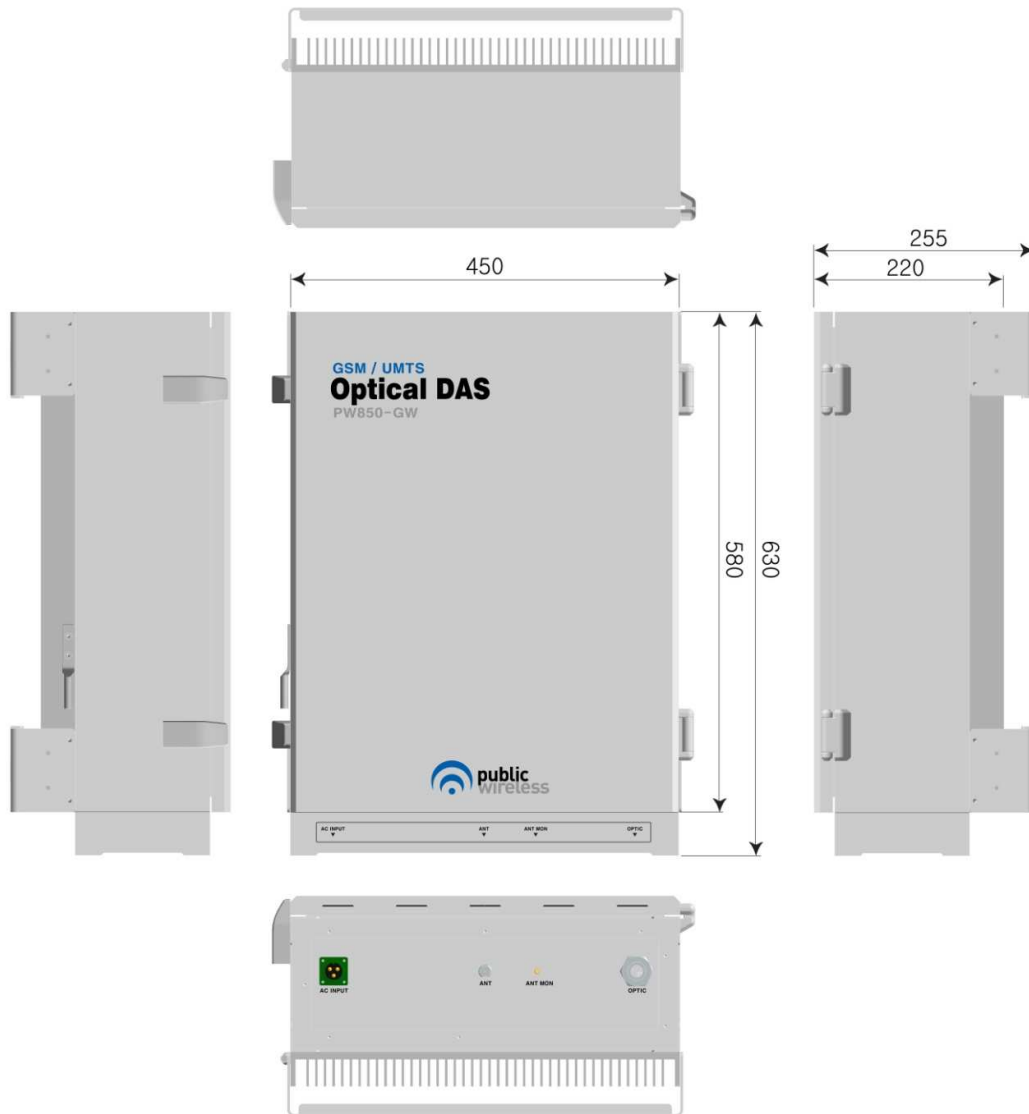


4.2. PW850-GW RU

4.2.1. Mechanical Design



4.2.2. Dimension



4.2.3. Mechanical Specification

No	Item	Description
1	Dimension	W 450mm × H 630mm × D 255mm (plinth included)
2	Method of Cooling	Natural convection (Heat-sink)
3	Method of Door Locking	Two (2) locks on the right side of the front of cabinet (enclosure)
4	Optic I/O	1. inside: FC/APC * Optic cable tray is provided in the inside of cabinet.
5	ANT PORT	1 Port at bottom of cabinet (Connector Type: N Type)
6	Power Input	Power: 110Vac Position: bottom of cabinet Connector: MS3106A 16-10S
7	Ground	2Hole 16SQ at left side of cabinet
8	Waterproof condition	IP54 compliant
9	Major Features	• Easy to maintenance • Pole mountable (i.e., telegraph pole) • Door opening alarm provided • Lamp embedded with automatic On/Off function according to the door opening status • Torque hinge used

4.2.4. Description of PW850-GW RU

[Forward path]

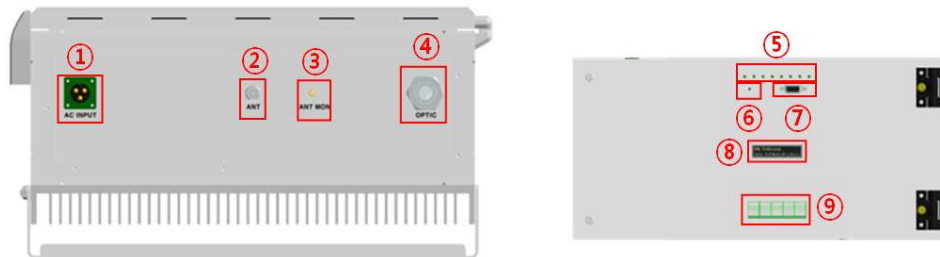
The signal (RF combined with modem signal) approved from DU to optic module is first divided into RF and modem signal at RFAGC-WG module, then the RF signal (GSM/WCDMA) is amplified at Driver Amp module (RFCHS) and the modem signal is finally transferred to CPU through FSK modem.

The RF signal from Driver Amp module (RFCHS) is linearly amplified at HPA, passed through Front-End Filter Unit and finally transmitted through antenna.

[Reverse Path]

GSM and WCDMA signals incoming from antenna are first passed by Front-End Filter Unit, low noise amplified at RRLNA/RRCHS and combined with modem signal at combiner (RRCOM). This combined signal is transmitted to DU through optic module.

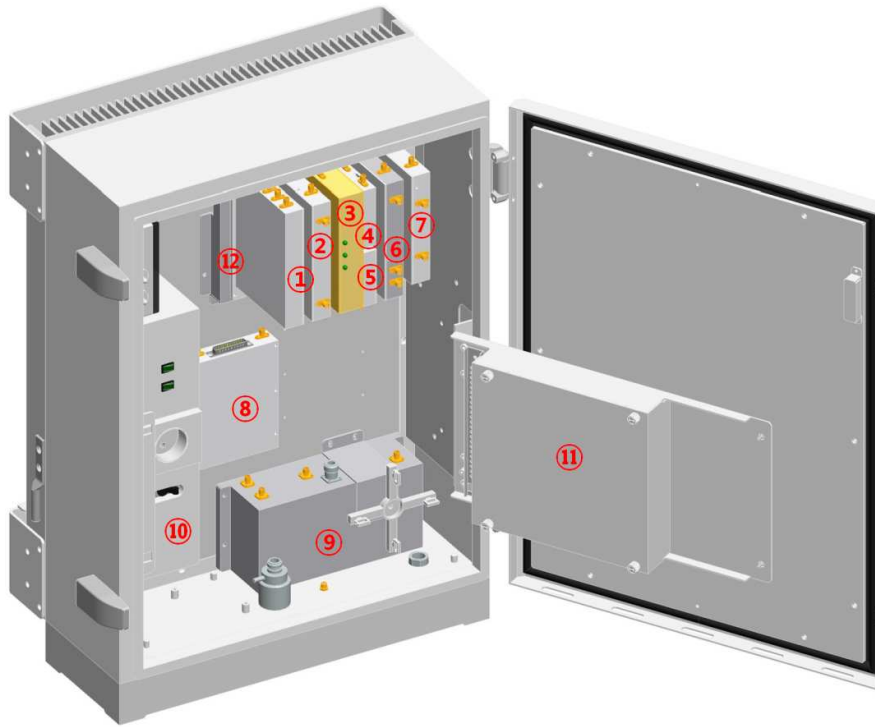
4.2.5. Port Configuration



No	Item	Description
1	POWER	AC 110V
2	ANT	Antenna connection port
3	ANT MON	Front-End Filter Unit 의 출력 대비 -40dB 모니터 포트
4	OPTIC	Optic cable connection hole
5	LED	RUN Green Blinking: CPU run, OFF(Gray): CPU stop
		TxD Green: data sending to DU, OFF(Gray): no data sending

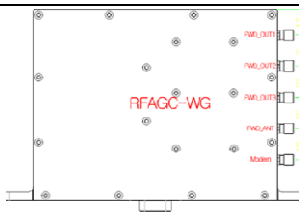
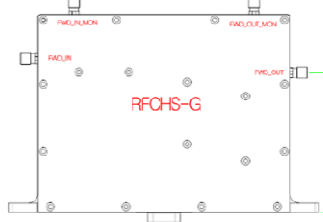
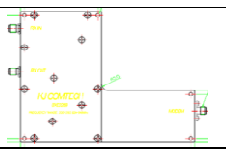
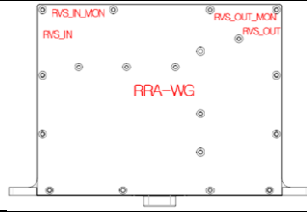
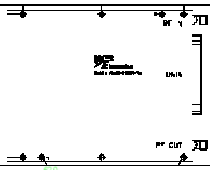
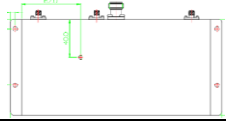
		RxD	Green: data receiving from DU, OFF(Gray): no data receiving
		PSU	Green: PSU normal, Red: PSU Alarm
		HPA1	Green: HPA normal, Red: HPA alarm
		HPA2	Not used
		LD	Green: Normal, Red: Alarm
		PD	Green: Normal, Red: Alarm
6	RESET		NMS Board Hardware Reset
7	DEBUG		Connection port to GUI program (9pin D-SUB)
8	DISPLAY		VFD display system showing version, status, etc.
9	DATA INPUT		Keypad to enter command

4.2.6. Module Composition



No	Module	Voltage Used	Remarks
①	RF FWD AGC for W/G (RFAGC-WG)	6.5Vdc	
②	RF FWD Channel Selector (RFCHS)	6.5Vdc	
③	Slave Optical Transceiver unit (SOU)	6.5Vdc	
④	RF Modem (FSK Modem)	9Vdc	
⑤	RU RVS COM for W/G (RRCOM-WG)		
⑥	RU RVS Channel Selector (RRCHS)	6.5Vdc	
⑦	RU RVS LNA for W/G (RRLNA-WG)	9Vdc	
⑧	HPA	27Vdc	
⑨	Front-End Filter Unit (FE-Duplexer)		
⑩	PSU		
⑪	NMS Controller	9Vdc	
⑫	Interface BD	6.5Vdc / 9Vdc	

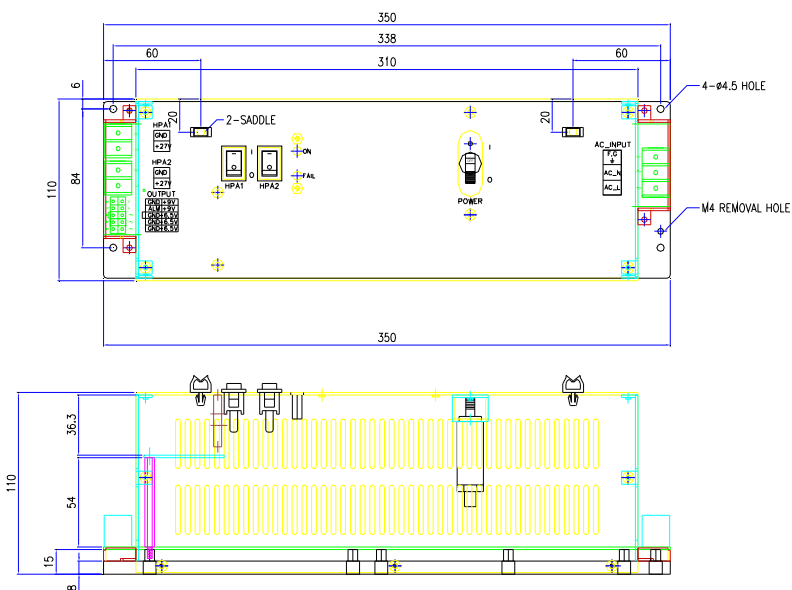
4.2.7. Function of Modules

No	Module	Description
1		[RFAGC-WG] Divides RF signal (GSM and WCDMA) and modem signal
2		[RFCHS-G] Controls the level of GSM FWD output signal and ALC function. Transmits module output to HPA.
3		[SOU] Converts E/O (or O/E) of FWD and RVS signals. Wavelength: TX 1550[nm], RX 1310[nm]
4		[FSK Modem] Data modem for RU and DU communication RU → DU frequency: 340MHz DU → RU frequency: 360MHz
5		[RRCOM-WG] Combines RF and data signal into a signal or divide the combined signal into RF and data signal
6		[RRA-WG] Amplifies RVS signal.
7		[RRLNA-WG] GSM 및 WCDMA 신호의 저 잡음 증폭 모듈로서 출력된 신호에 대해 20dB의 Coupling 값을 갖는다.
8		[HPA] BTS 에서 입력되어 Driving 된 Forward 신호를 8W 증폭 시키는 High Power Amp 이다.
9		[FE-Duplexer] 통과 주파수와 저지 대역 주파수를 가지고 특정 대역만을 통과 시킨다.
10		[PSU] AC 110V를 공급받아 DC 27V, DC 9V, DC 6.5V 을 DU의 각 모듈에 전원을 공급해준다. AC 전원 ON/OFF Switch 와 HPA 전원을 ON/OFF 할 수 있는 +27V Switch가 있다. BTS 에서 입력되어 Driving 된 Forward 신호를 8W 증폭 시키는 High Power Amp 이다.

11		[NMS] Monitors/controls the status and configurable items of RU and module in RU
12		[Interface BD] Provides DC current to modules which are connected to interface B'D and supports a connection port to communicate with NMS B'D.

4.2.8. PSU

PSU converts external AC110V into DC and supplies +27V, +9V and +6.5V to modules in RU. In PSU, there two (2) on/off switches; one is for AC110V, another is for HPA only. The drawing of PSU is below.



[PSU Capacity]

Output Voltage	Maximum Current	Watt
27V	16 A	511
+ 9V	3 A	
+ 6.5V	8 A	

[PSU Pin Map]

AC Input PIN Type: BR-1100-3P

Pin No.	1	2	3
Spec.	FG	AC-N	AC-L

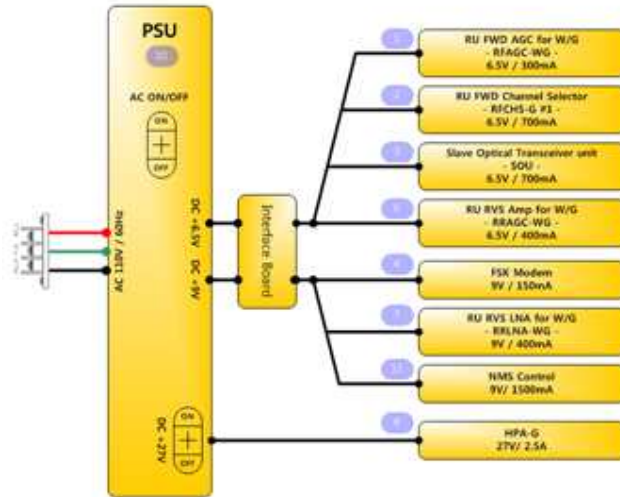
HPA 1, 2 PIN Type: BR-1100-2P

Pin No.	1	2
Spec.	GNS	+ 27

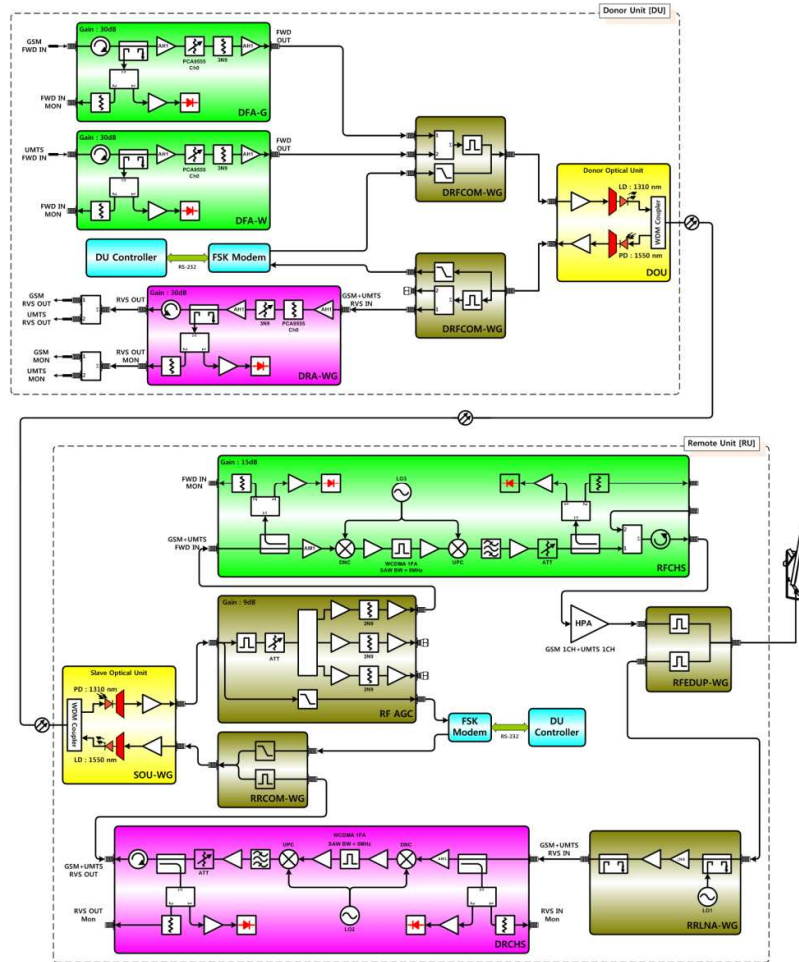
SUB Output PIN Type: 5566-10P (Molex)

Pin No.	1	2	3	4	5
Spec.	+9V	+9V	+6.5V	+6.5V	+6.5V
Pin No.	6	7	8	9	10
Spec.	GND	GND	GND	GND	GND

Circuit Diagram of Power



5. Block Diagram

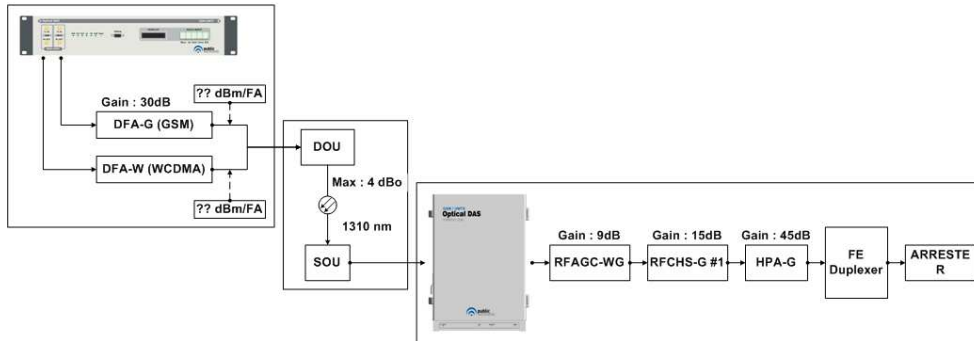


NO	Unit	Detect Module	IN/OUT	Detector Range	비고
1	DU	DFA-G	IN	-5dBm ~ -47dBm	
		DFA-W	IN	-5dBm ~ -47dBm	
		DRCHS	IN	0dBm ~ -25dBm	
		DRCHS	OUT	+10dBm ~ -30dBm	
2	RU	RFCHS	IN	0dBm ~ -25dBm	
		RFCHS	OUT	+10dBm ~ -30dBm	
		HPA	OUT	+20dBm ~ +44dBm	
		RRAGC-WG	IN	-10dBm ~ -50dBm	
		RRAGC-WG	OUT	+10dBm ~ -30dBm	
		DRCHS	IN	-10dBm ~ -50dBm	

6. Level Budget

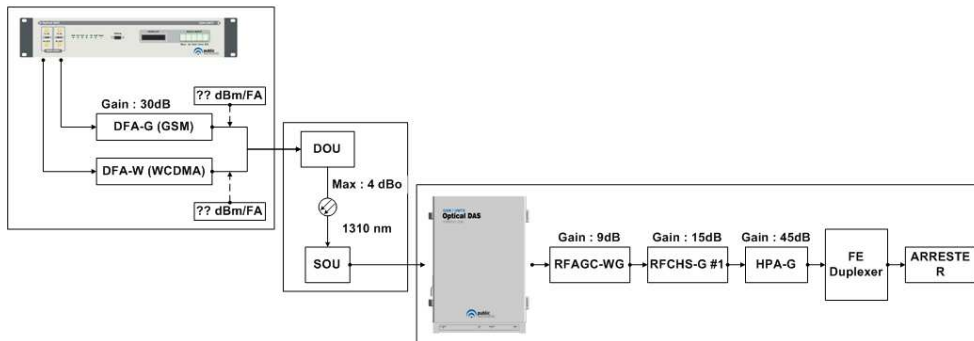
6.1. Forward Path

GSM Input (???MHz ~ ??? MHz)	-?? ~ -?? dBm/FA
WCDMA Input (???MHz ~ ??? MHz)	-?? ~ -?? dBm/FA



6.2. Reverse Path

GSM Input (???MHz ~ ??? MHz)	-?? ~ -?? dBm/FA
WCDMA Input (???MHz ~ ??? MHz)	-?? ~ -?? dBm/FA



7. GUI Program (RptMan)

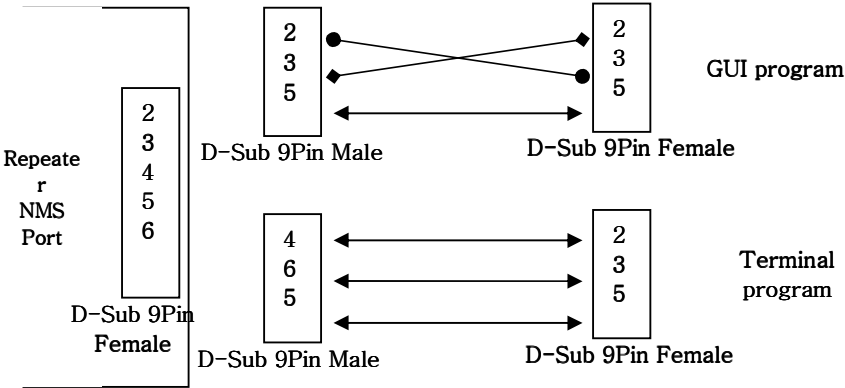
GUI program (RptMan) is a management program for PW850-GW and provides status monitoring and control functions to users.

7.1. System Requirement

- System: Desktop or laptop PC
- OS: Windows XP or later
- Resolution: 1024 × 768 or more
- Connection Cable: 9 pin serial cable (cross type)

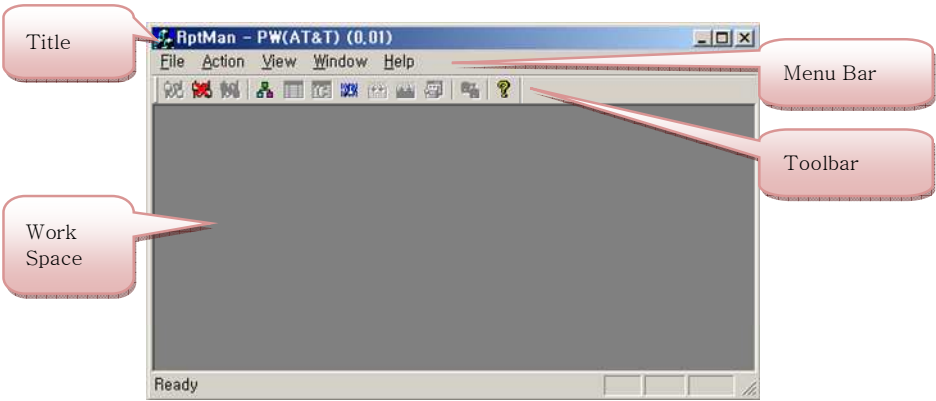
7.2. Cable connection

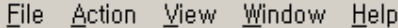
The cable connection between repeater and PC (GUI program) is illustrated below.



The NMS port of repeater provides two (2) ports; one is for GUI and another for debug monitor.

7.3. Screen



Section	Description
Window Title	 Displays the name of management program (GUI), i.e. RptMan Displays the type of equipment which is currently connected to program (DU or RU)
Menu Bar	 File Action View Window Help

	Presents working menu for operators.
Toolbar	 Presents icons (button type) for frequently used command. Icons are activated or disabled as to the status of repeater.
Work Space	Provides the working space of windows or dialogs.

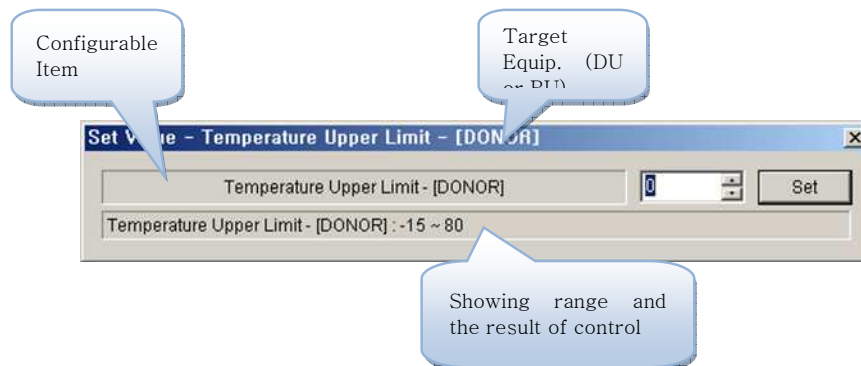
7.4. Status Display

Status of repeater is displayed by LED and values. The meanings are below.

- LED
 - Alarm: ■ / ■ blinking means ALARM, ■ means NORMAL
 - On/Off: ■ ON, ■ OFF
Exception) for HPA, ■ is ON, ■ is OFF
- Value
 - Units are not displayed (omitted).
 - Value displayed in box ()
- Control
 - The shape of mouse cursor is changed to  on controllable item.
 - The texts of controllable LED or values are displayed in BOLD font.

7.5. Control

- Click a control item (button) to popup a control popup dialog.
- Input or click arrow button to enter control value.
- Click “set” button to send control command to repeater.



7.6. Menu

Menu	Sub Menu	Function
File	Connect	Connects GUI and repeater to communicate
	Disconnect	Disconnects GUI and repeater
Action	Power Table	Presents a dialog to manipulate RF power table
	TC Table	Presents a dialog to manipulate temperature compensation table
	Image Compression	Compressed the firmware file (executable file of repeater) to download
	Image Downloader	Downloads compressed firmware file to repeater
	Factory Setting	Sets configured values of repeater back to values of factory settings
	System Action	

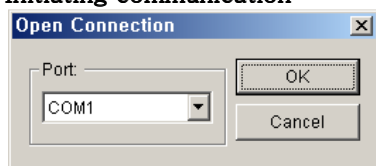
View	Donor Window	Presents DU status window in work space
	Remote Window	Presents RU status window in work space
Window	Cascade	Cascade or tile horizon arrangement of repeater status windows in work space
	Tile Horizon	
	Packet Debug	Presents debug window in work space displaying packets between repeater and GUI program
Help	About RptMan	Displays version of GUI program named RptMan (Repeater Manager)

7.7. Toolbar

ITEM	ICON	Function
Communication Establishment		Establishes RS-232C connection to the repeater, then GUI starts to communicate and status of repeater are polled and displayed.
Communication Disconnection		Disconnects communication with connected repeater. Status of repeater is not updated.
Polling Stop/Resume		Stops or resumes polling action of GUI program. (activated in toggling way)
		
Power Table		Presents a dialog to manipulate RF power table
T/C table		Presents a dialog to manipulate temperature compensation table
Debug Packet		Displays packet data between GUI and repeater like protocol analyzer and it may help debugging of software
Compression of image file		Compresses image file of repeater
Download		Downloads compressed (like zipped) image file to repeater
Help		Shows version information

7.8. Program operation

7.8.1. Initiating communication



Function	Establishment of communication between GUI and repeater	
Method	Click  button in toolbar of GUI program	
Description	Port	Combo box to choice com port (COM1, COM2, ...)
	OK Button	Initiates communication between GUI and repeater, then close this popup window("Open Connection")
	Cancel Button	Cancels communication establishment and close the popup window

7.8.2. Disconnection

Function	Disconnection of GUI and repeater	
Method	Click  button in toolbar of GUI program	
Description	GUI on PC and repeater disconnect communication with each other by this action.	

7.8.3. PW850-GW DU Status Retrieval and Control

The screenshot shows the DONOR software interface with the following sections:

- General:** Version (0.0.0), Mode (00), Type (00).
- Environment:**
 - User Connect: ☐
 - PSU: ☒
 - TMPCUR: 0
 - TMPUPR: 0
- Optic:**
 - LDPWR: 0.0
 - LDLWR: 0.0
 - PDPWR: 0.0
 - PDLWR: 0.0
- DFA-G (GSM Tx):**
 - Use: ☐
 - IN PWR: 0.0
 - IN UPR: 0.0
 - IN LWR: 0.0
 - ATT: 0.0
- DRCHS-G (GSM Rx):**
 - Use: ☐ Path On: ☐
 - OUT PWR: 0.0
 - OUT UPR: 0.0
 - ALC: 0.0
 - ASD: 0.0
 - ATT: 0.0
 - ALC ATT: 0.0
 - PLL: 0.00
- DFA-W (WCDMA Tx):**
 - Use: ☐
 - IN PWR: 0.0
 - IN UPR: 0.0
 - IN LWR: 0.0
 - ATT: 0.0
- DRCHS-W (WCDMA Rx):**
 - Use: ☐ Path On: ☐
 - OUT PWR: 0.0
 - OUT UPR: 0.0
 - ALC: 0.0
 - ASD: 0.0
 - ATT: 0.0
 - ALC ATT: 0.0
 - PLL: 0.00

Group	Description
General Version 0.0.0 Mode 00 Type 00	● Version: Version of firmware ● Mode: Operating mode of repeater ● Type: Type of repeater
Environment ☐ User Connect ☒ PSU TMPCUR 0 ☒ TMPUPR 0	● User Connect: Connection status of COM port of repeater ● PSU: Status of PSU ● TMPCUR: Current temperature of repeater ● TMPUPR: Value/control of upper threshold of temperature (button) and alarm status (LED)
Optic ☒ LDPWR 0.0 ☒ LDLWR 0.0 ☒ PDPWR 0.0 ☒ PDLWR 0.0	● LDPWR: Value of LD power (box) and status of LD (LED) ● LDLWR: Value/control of lower threshold of LD power (button) and lower alarm status of LD power (LED) ● PDPWR: Value of PD power (box) and alarm status of PD (LED) ● PDLWR: Value/control of lower threshold of PD power (button) and lower alarm status (LED)

DFA-G (GSM Tx) ☐ Use ☒ IN PWR 0.0 ☒ IN UPR 0.0 ☒ IN LWR 0.0 ATT 0.0	● USE: Shows and controls the using status of module (green for in use, gray for not in use) ● IN PWR: Input power level (box), alarm status (LED) ● IN UPR: Value/control of upper threshold of input power (button), upper alarm status (LED) ● IN LWR: Value/control of lower threshold of input power (button), lower alarm status (LED) ● ATT: Value/control of attenuation (button)
DRCHS-G (GSM Rx) ☐ Use ☐ Path On ☒ OUT PWR 0.0 ☒ OUT UPR 0.0 ☐ ALC 0.0 ☐ ASD 0.0 00 ATT 0.0 0.0 ALC ATT 0.0 0.0 ☒ PLL 0.00 0.00	● USE: Shows and controls the using status of module (green for in use, gray for not in use) ● OUT PWR: RVS output power (box), alarm status (LED) ● OUT UPR: Value/control of upper threshold of RVS output power (button) and alarm status (LED) ● ALC: Value/control of level of ALC (button) and effective operating status of ALC function (LED) ● ATT: Value/control of the attenuation (buttons) for adjusting RVS level ● ALC ATT: Value of attenuation automatically operated by ALC function (boxes) ● PLL: Control the setting value of PLL (buttons) and alarm status (LEDs)
DFA-W (WCDMA Tx) ☐ Use ☒ IN PWR 0.0 ☒ IN UPR 0.0 ☒ IN LWR 0.0 ATT 0.0	● USE: Shows and controls the using status of module (green for in use, gray for not in use) ● IN PWR: Input power level (box), alarm status of input power (LED) ● IN UPR: Value/control of upper threshold of input power (button), upper alarm status (LED) ● IN LWR: Value/control of lower threshold of input power (button), lower alarm status (LED) ● ATT: Value/control of the attenuation (button)

DRCHS-W (WCDMA Rx)

☐ Use
☐ Path On

■ OUT PWR

0.0

■ OUT UPR

0.0

☐ ALC

0.0

☐ ASD

0.0

00

ATT

0.0

ALC ATT

0.0

■ PLL

0.00

- **USE:** Shows and controls the using status of module (green for in use, gray for not in use)
- **OUT PWR:** RVS output power (box), alarm status (LED)
- **OUT UPR:** Value/control of upper threshold of RVS output power (button) and alarm status (LED)
- **ALC:** Value/control of level of ALC (button) and effective operating status of ALC function (LED)
- **ATT:** Value/control of the attenuation (buttons) for adjusting RVS level
- **ALC ATT:** Value of attenuation automatically operated by ALC function (boxes)
- **PLL:** Control the setting value of PLL (button) and alarm status (LED)

7.8.4. PW850-GW RU Status Retrieval and Control

REMOTE

General

Version: 0.0.0
Mode: 00
Type: 00

Environment

☐ User Connect
☒ PSU ☒ DOOR
TMPCUR: 0
☒ TMPUPR: 0

Optic

☒ LDPWR: 0.0
☒ LDLWR: 0.0
☒ PDPWR: 0.0
☒ PDLWR: 0.0

RFCHS-G0 (GSM Tx)

☐ Use ☐ Path On
IN PWR: 0.0
OUT PWR: 0.0
☐ ALC: 0.0
ATT: 0.0
ALC ATT: 0.0
☒ PLL: 0.00

RFCHS-G1 (GSM Tx)

☐ Use ☐ Path On
IN PWR: 0.0
OUT PWR: 0.0
☐ ALC: 0.0
ATT: 0.0
ALC ATT: 0.0
☒ PLL: 0.00

RFCHS-W (WCDMA Tx)

☐ Use ☐ Path On
IN PWR: 0.0
OUT PWR: 0.0
☐ ALC: 0.0
ATT: 0.0
ALC ATT: 0.0
☒ PLL: 0.00

HPA-G (GSM)

☐ Use ☒ On/Off
☒ OVPWR ☒ VSWR
☒ OVTMP ☒ High Sig
OUT PWR: 0.0
☒ OUT UPR: 0.0
☒ OUT LWR: 0.0
☐ ASD: 0.0
00

HPA-W (WCDMA+GSM)

☐ Use ☒ On/Off
☒ OVPWR ☒ VSWR
☒ OVTMP ☒ High Sig
OUT PWR: 0.0
☒ OUT UPR: 0.0
☒ OUT LWR: 0.0
☐ ASD: 0.0
00

RRA (Rx Drive AMP)

IN PWR: 0.0
OUT PWR: 0.0
ATT: 0.0

LNA

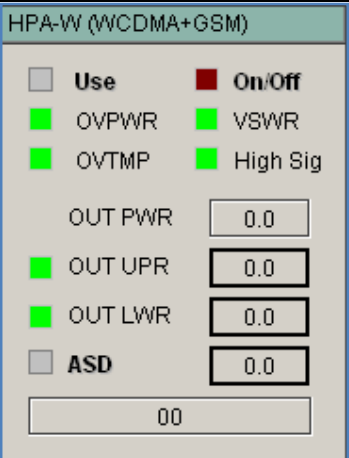
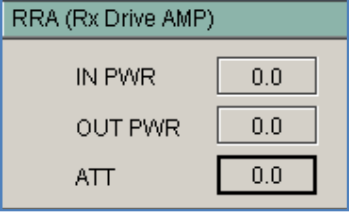
☐ Pilot PWR: 0.0

RFAGC (Optic Loss)

ATT: 0.0

Group	Description
General Version: 0.0.0 Mode: 00 Type: 00	● Version: Version of firmware ● Mode: Operating mode of repeater ● Type: Type of repeater
Environment ☐ User Connect ☒ PSU ☒ DOOR TMPCUR: 0 ☒ TMPUPR: 0	● User Connect: Connection status of COM port of repeater ● PSU: Status of PSU ● TMPCUR: Current temperature of repeater ● TMPUPR: Value/control of upper threshold of temperature (button) and alarm status (LED)
Optic ☒ LDPWR: 0.0 ☒ LDLWR: 0.0 ☒ PDPWR: 0.0 ☒ PDLWR: 0.0	● LDPWR: Value of LD power (box) and status of LD (LED) ● LDLWR: Value/control of lower threshold of LD power (button) and lower alarm status of LD power (LED) ● PDPWR: Value of PD power (box) and status of PD (LED) ● PDLWR: Value/control of lower threshold of PD power (button) and lower alarm status (LED)

RFCHS-G0 (GSM Tx) ☐ Use ☐ Path On IN PWR 0.0 OUT PWR 0.0 ☐ ALC 0.0 ATT 0.0 ALC ATT 0.0 ☒ PLL 0.00	● USE: Shows and controls the using status of module (green for in use, gray for not in use) ● IN PWR: Input power level (box), alarm status (LED) ● OUT PWR: Output power level (box), alarm status (LED) ● ALC: Value/control of level of ALC (button) and effective operating status of ALC function (LED) ● ATT: Value/control of the attenuation (buttons) for adjusting FWD level ● ALC ATT: Value of attenuation automatically operated by ALC function (box) ● PLL: Control the setting value of PLL (button) and alarm status (LED)
RFCHS-G1 (GSM Tx) ☐ Use ☐ Path On IN PWR 0.0 OUT PWR 0.0 ☐ ALC 0.0 ATT 0.0 ALC ATT 0.0 ☒ PLL 0.00	● USE: Shows and controls the using status of module (green for in use, gray for not in use) ● IN PWR: Input power level (box), alarm status (LED) ● OUT UPR: Output power level (box), alarm status (LED) ● ALC: Value/control of level of ALC (button) and effective operating status of ALC function (LED) ● ATT: Value/control of the attenuation (button) for adjusting FWD level ● ALC ATT: Value of attenuation automatically operated by ALC function (box) ● PLL: Control the setting value of PLL (button) and alarm status (LED)
RFCHS-W (WCDMA Tx) ☐ Use ☐ Path On IN PWR 0.0 OUT PWR 0.0 ☐ ALC 0.0 ATT 0.0 ALC ATT 0.0 ☒ PLL 0.00	● USE: Shows and controls the using status of module (green for in use, gray for not in use) ● IN PWR: Input power level (box), alarm status (LED) ● OUT UPR: Output power level (box), alarm status (LED) ● ALC: Value/control of level of ALC (button) and effective operating status of ALC function (LED) ● ATT: Value/control of the attenuation (button) for adjusting FWD level ● ALC ATT: Value of attenuation automatically operated by ALC function (box) ● PLL: Control the setting value of PLL (button) and alarm status (LED)

 HPA-W (WCDMA+GSM) ☐ Use ☒ On/Off ☒ OVPWR ☒ VSWR ☒ OVTMP ☒ High Sig OUT PWR 0.0 ☒ OUT UPR 0.0 ☒ OUT LWR 0.0 ☐ ASD 0.0 00	● On/Off: Status/control the operation state of HPA ● OVPWR: Alarm status of HPA Over-Power (LED) ● VSWR: Alarm status of HPA VSWR (LED) ● OVTMP: Alarm status of HPA Over-temperature ● OUT PWR: Output power level of HPA (box) ● OUT UPR: Value/control of upper threshold of HPA output power (button), alarm status (LED) ● OUT LWR: Value/control of lower threshold of HPA output power (button), alarm status (LED) ● ASD(Auto Shutdown): ASD level (button), e running status of function (LED)
 RRA (Rx Drive AMP) IN PWR 0.0 OUT PWR 0.0 ATT 0.0	● IN PWR: status value displaying input power level of RF signal ● OUT PWR: status value displaying output level of RF signal ● ATT: both status value displaying present gain and configurable item to change attenuation value (RRA)
 RFAGC (Optic Loss) ATT 0.0	● ATT: both status value displaying present gain and configurable item to change attenuation value (RFAGC)

7.8.5. Setting of Tables Values

In the equipments, RF power and temperature compensation tables are kept in the non-volatile memory and are initially configured in the factory. To avoid harmful damages to the equipment, unauthorized modifications of values are strictly forbidden.

7.8.6. Firmware Download

Download of firmware is normally required when functional upgrade is needed or when bug or erroneous actions of firmware are fixed.

Downloading improper images (executable file of repeater CPU) may cause seriously harmful damages to equipment. **To avoid this, it is needed to pay much attention to the sequence of downloading below.**

Appendix A Initial setting values (Factory Setting)

Category		Value	Remarks
DU	DFA-W ATT	30dB	
	DFA-G ATT	30dB	
	DRA ATT	30dB	
	ALC	OFF	
	Shut Down	ON	
	ALC Level	-40dBm	
	Shut Down Level	-30dBm	
	Input Level	-40 ~ -10dBm	
RU	RFAGC ATT	30dB	
	RFCHS ATT	30dB	
	RRCHS ATT	20dB	
	ALC	OFF	
	Shut Down	ON	
	ALC Level	37dBm	
	Shut Down Level	39dBm	
Optic	LD High Level	8dBm	
	LD Low Level	3dBm	
	PD High level	7dBm	
	PD Low Level	-4dBm	