

PWDB-GW User Manual

Kisan Telecom

Content

| | |
|---|----|
| 1. Introduction | 5 |
| 1.1. General Introduction | 5 |
| 2. Network configuration of system | 5 |
| 2.1. Network configuration | 5 |
| 3. System Specifications | 6 |
| 3.1. General Specifications | 6 |
| 3.2. System specifications | 7 |
| 3.2.1. System Specifications | 7 |
| 4. Mechanical Specifications | 8 |
| 4.1. PWDB-GWMHU | 8 |
| 4.1.1. Mechanical Design | 8 |
| 4.1.2. Dimension | 10 |
| 4.1.3. Mechanical specification | 11 |
| 4.1.4. Descriptions of PWDB-GW MHU | 11 |
| 4.1.5. Port Configuration | 12 |
| 4.1.6. Module Composition | 14 |
| 4.1.7. Function of modules | 15 |
| 4.1.8. PSU | 16 |
| 4.2. PWDB-GW RU | 18 |
| 4.2.1. Mechanical Design | 18 |
| 4.2.2. Dimension | 19 |
| ⇒ RU System picture and Size → 510(H) X 300(W) X 316.5(D) mm | 19 |
| 4.2.3. Mechanical Specification | 19 |
| 4.2.4. Description of PWDB-GWRU | 20 |
| 4.2.5. Port Configuration | 21 |
| 4.2.6. Module Composition | 22 |
| 4.2.7. Function of Modules | 23 |
| 5. Block Diagram | 26 |
| 6. Administration Program (RptMan1900) | 27 |
| 6.1. System Requirement | 27 |
| 6.2. Cable connection | 27 |
| 6.3. Screen | 28 |
| 6.4. Status Display | 28 |

| | |
|---|----|
| 6.4. Status Display | 28 |
| 6.5. Control Policy..... | 29 |
| 6.6. Menu | 29 |
| 6.7. Toolbar..... | 30 |
| 6.8. Program operation | 31 |
| 6.8.1. Initiating communication | 31 |
| 6.8.2. Disconnection..... | 31 |
| 6.8.3. PWDB-GWMHU Status Retrieval and Control..... | 32 |
| 6.8.4. PWDB-GRU Status Retrieval and Control..... | 34 |
| 6.8.5. Firmware download | 37 |
| 6.9. Additional features | 38 |
| 6.9.1. ASD (Auto Shutdown) Function | 38 |
| 6.9.2. ALC (Auto Level Control) Function..... | 39 |
| Appendix A Factory setting value for each equipment..... | 40 |

IMPORTANT NOTE:

FCC RF Radiation Exposure Statement:

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

1. Introduction

1.1. General Introduction

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

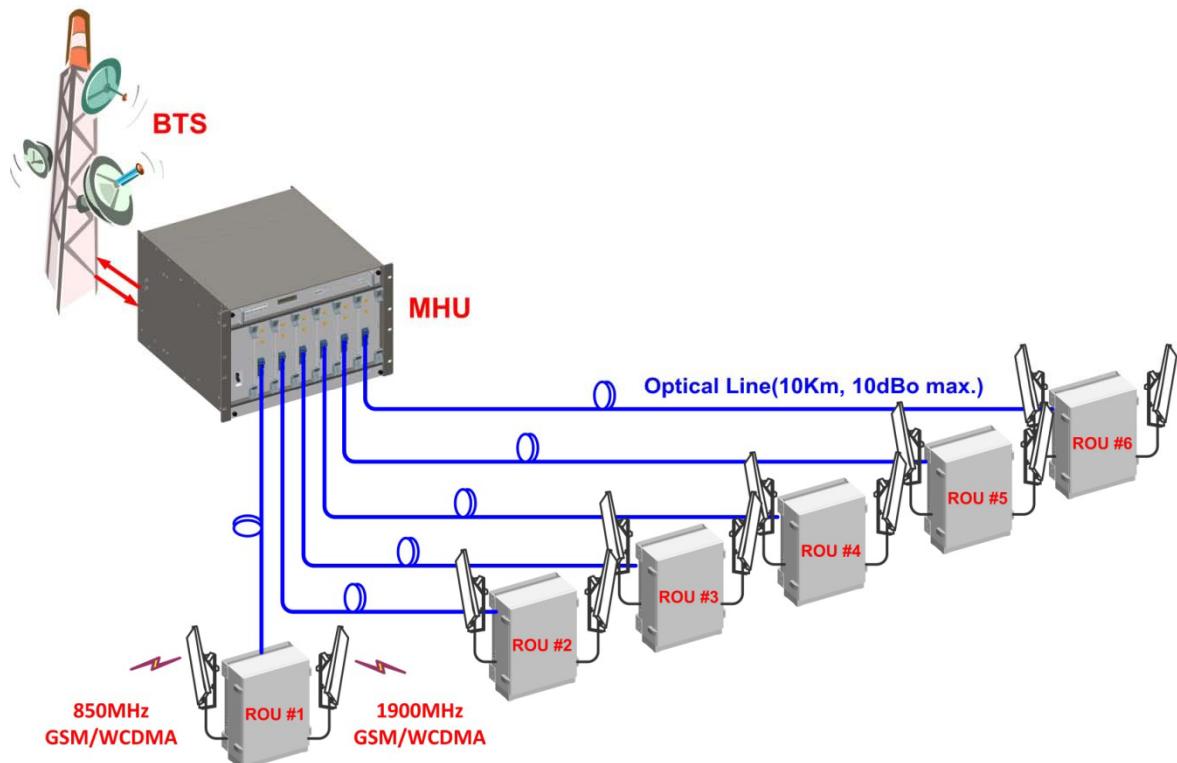
The main objectives of PWDB-GW are as follows:

- 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

PWDB-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 WCDMA and GSM.



The above architecture is for the case when the MHU is co-located with BTS (GSM or

WCDMA), and the service is provided remotely.

⇒ **System configuration**

- MHU Capacity: 1 Optical Branch/DOU and 6 DOU/MHU (6 Optical Branch/MHU)
- System Connection: Optic cable between MHU and RU
- Optic Wavelength: 1310nm for FWD, 1550nm for RVS
- Max loss of optic cable (between MHU and RU): 2 ~ 10dBo

3. System Specifications

3.1. General Specifications

| Item | PWDB-GW MHU | | PWDB-GW RU |
|-----------------------|---|------------------------------|------------------------------|
| Enclosure Type | 7U-Shelf type 19" standard rack mountable In-door use | | Cabinet |
| Dimension (mm) | W × H × D | 19"(482.4) X 310(7U) X 450mm | 510(H) X 300(W) X 316.5(D)mm |
| | Weight | 15.5Kg | 33Kg |
| Power Supply | 110-120Vac (Tolerance ±10%), 60Hz | | 110Vac, 60Hz |
| Power Connector | ID-NO3BEH | | MS3106A16-10S |
| RF In/Out Port | SMA Female, rear side | | N Type Female, bottom side |
| Optic Connector Type | FC/APC, front side | | FC/APC, bottom side |
| Optic Wavelength | FWD: 1310nm / RVS: 1550nm | | |
| Operating Temperature | -5°C ~ 40°C | | -5°C ~ 50°C |

⇒ **Environmental requirement**

The repeater RU shall be operated in the temperature range of -5°C ~ 50°C

3.2. System specifications

3.2.1. System Specifications

| Item | Specification | | Remarks |
|---------------------|--|-----------------------|-------------|
| DL Frequency Range | Contiguous 25MHz Bandwidth in 1930 ~ 1990MHz Contiguous 25MHz Bandwidth of 869 ~ 894MHz | | |
| Uplink | Optical Communication | | |
| Frequency Stability | 0.02PPM | | |
| Mode | GSM and WCDMA | | |
| System Delay | DL: 8usec max. UL: 5usec max. | | |
| Tx-Rx Isolation | 100dB min. @Between RU Tx ANT and MHU Rx Output | | |
| Impedance | 50 Ohm | | |
| Pass-Band Ripple | 3dB max. | | 25MHz BW |
| FWD Input Power | -10 ~ 0dBm/total, -5dBm/total is recommended | | |
| FWD Output Power | 40dBm /total for 1900MHz RU ANT Port 40dBm /total for 850MHz RU ANT Port | | |
| RVS Input Power | -60dBm/total max. at RU each ANT Port | | |
| RVS Output Power | -20dBm/total max. at MHU each Rx Output Port | | |
| System Gain | FWD: 50dB max. | RVS: 40dB max. | |
| FWD Spurious | Comply to 3GPP2, FCC regulation | | |
| RVS Noise Figure | 5dB max. @ 40dB Gain | | Max. Gain |
| Gain Control Range | FWD: 20dB by 1dB Step | RVS: 20dB by 1dB Step | RU OLC Gain |
| VSWR | 1.5 : 1 max. @ All input/output ports | | |
| Optical Wavelength | FWD: 1310nm | RVS: 1550nm | |
| RF I/O Connector | DU: SMA Female | RU: N-type Female | |

4. Mechanical Specifications

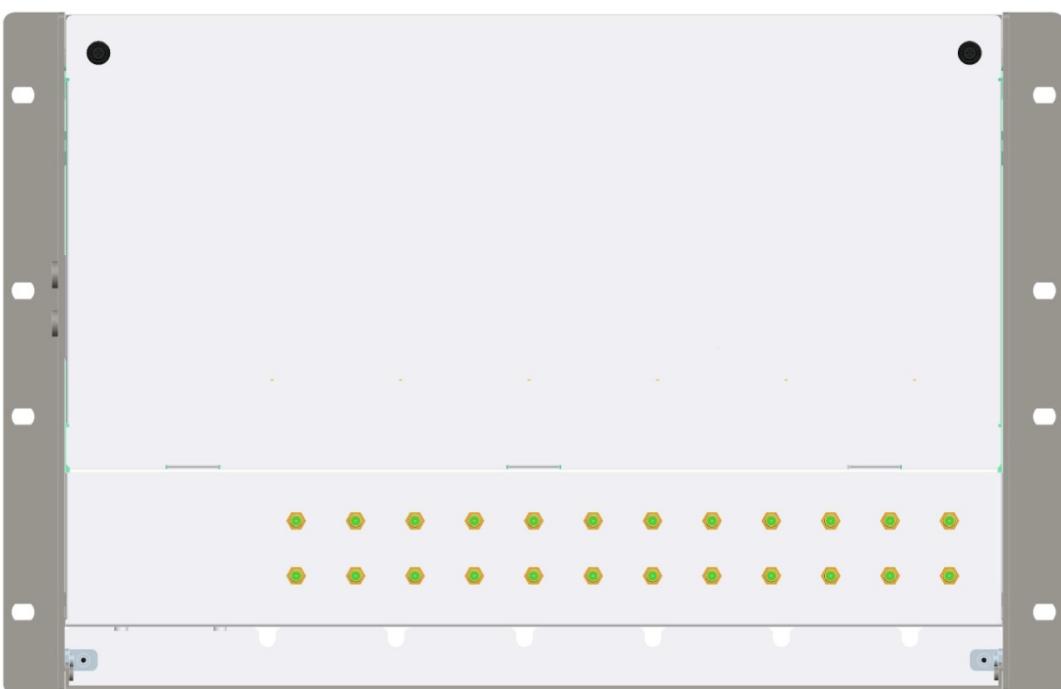
4.1. PWDB-GWMHU

4.1.1. Mechanical Design

[FRONT]



[REAR]



[MHU Figure]



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"(482.4) X H 310(7U) X D 450mm 3. Weight: 15.5 Kg (1DOU included) |
| 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 front side 2. RF I/O: SMA Female at rear side 3. Monitor port: SMA Female at front side |
| 4 | Power Input | 1. Power: 110-120Vac, 60Hz 2. Connector: IN-NO3BEH |
| 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 PWDB-GW MHU

[Forward Path]

The signal from GSM or WCDMA BTS is fed to the RF input port of MHU rear side. Initially, in the MHU RVS/FWD COMbiner(MRFCOM) module, the input signal power level is measured and combined with the modem signal(360MHz), and it becomes the input signal to the optic module to be transmitted to RU.

[Reverse Path]

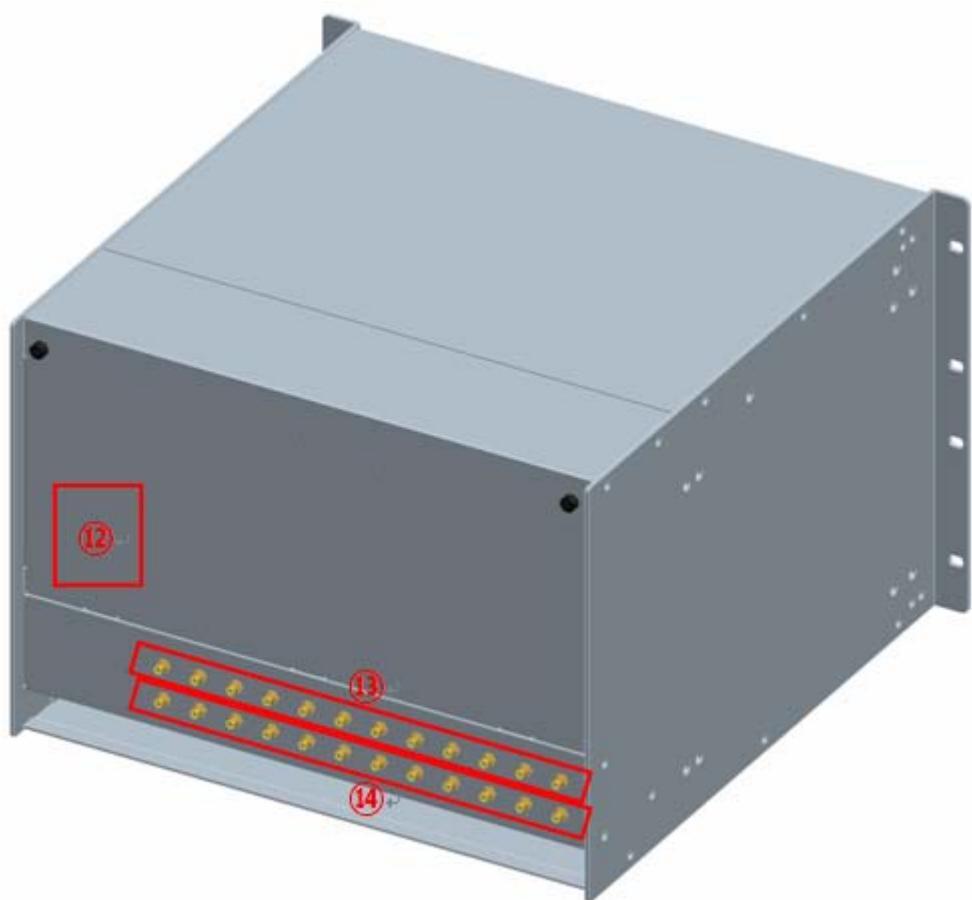
The WCDMA or GSM RVS signal input from RU through the optic module is divided into RF and modem signal, and RF RVS signal level is measured by the MRFCOM module, which becomes the input signal to the BTS of GSM or WCDMA.

4.1.5. Port Configuration

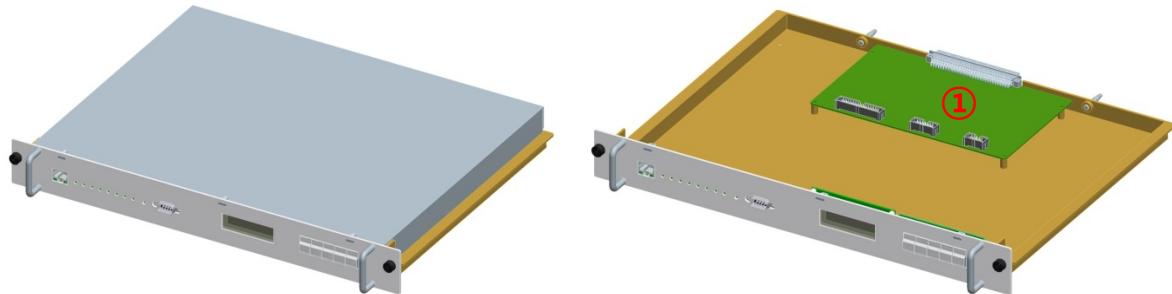


| No | Items | | Description |
|----|--------------|-------|---|
| 1 | TX_MON | | Monitor port for MHU FWD input signal from BTS (-20dB) |
| 2 | RX_MON | | Monitor port for MHU RVS output signal to BTS (-20dB) |
| 3 | LED1 | RUN | Green Blinking: CPU run, OFF(Gray): CPU stop |
| | | ALM | Summary Alarm of MHU, Green: Normal, Red: Alarm |
| | | RU1 | The status of communication with RU1, Green: Normal, Red: Alarm |
| | | RU2 | The status of communication with RU2, Green: Normal, Red: Alarm |
| | | RU3 | The status of communication with RU3, Green: Normal, Red: Alarm |
| | | RU4 | The status of communication with RU4, Green: Normal, Red: Alarm |
| | | RU5 | The status of communication with RU5, Green: Normal, Red: Alarm |
| | | RU6 | The status of communication with RU6, Green: Normal, Red: Alarm |
| | | RESET | NMS board HW Reset |
| 4 | DEBUG | | PC connection port for GUI S/W (9pin D-SUB) |
| 5 | DISPLAY | | Key pad input display |
| 6 | DATA INPUT | | Equipment status/check, control data input |
| 7 | Power Switch | | AC110V power ON/OFF switch |

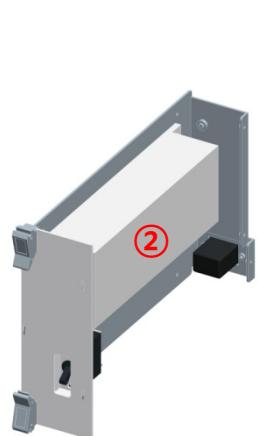
| | | |
|----|-----------------|---|
| 8 | Optic Connector | FC/APC, optic connector |
| 9 | LED2 | PWR DC power supply status of the DOU Card |
| | | LD LD Alarm, Green: Normal, Red: Alarm |
| | | PD PD Alarm, Green: Normal, Red: Alarm |
| 10 | RJ45(Master) | Connection port to the master for the NOC |
| 11 | NMS board | Sliding type |
| 12 | AC INPUT | External AC power input port (rear part) |
| 13 | Tx IN | MHU FWD RF connection port from BTS (rear part) |
| 14 | Rx OUT | MHU RVS RF connection port to BTS (rear part) |



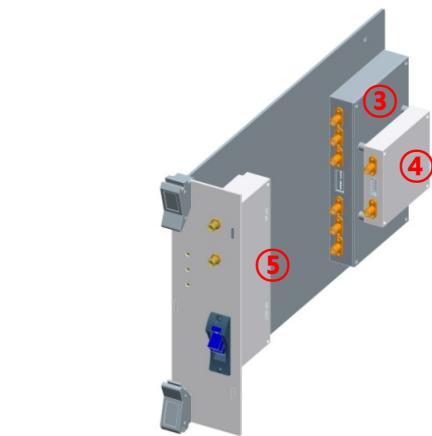
4.1.6. Module Composition



[NMS UNIT]



[PSU]



[DOU]

| No | Module | Voltage Used | Remarks |
|----|------------------------------------|--------------|---------|
| ① | MHU NMS Controller | 9Vdc | |
| ② | MHU PSU(Power Supply Unit) | 9Vdc/6.5Vdc | |
| ③ | MRF COM(MHU RVS FWD Combiner) | 6.5Vdc | |
| ④ | MHU FSK Modem | 9Vdc | |
| ⑤ | MHU Optical Transceiver Unit (DOU) | 6.5Vdc | |

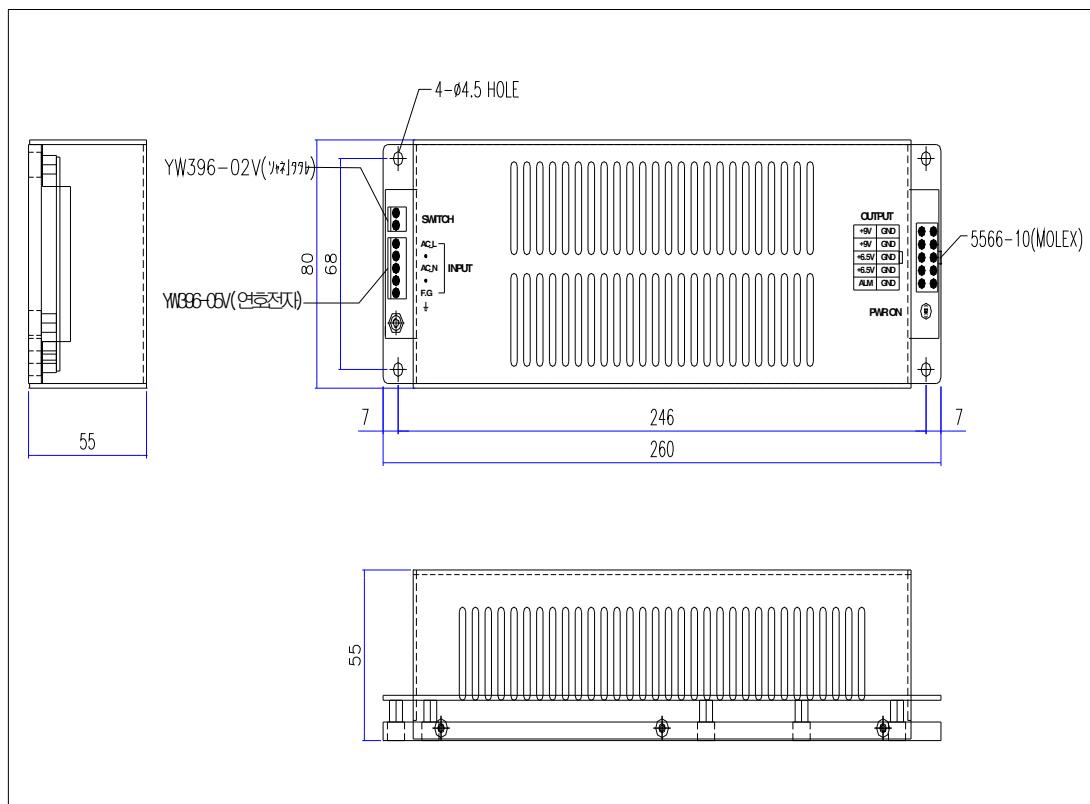
4.1.7. Function of modules

| No | Module | Functions |
|----|--------|---|
| 1 | | <p>[MHU NMS Controller] Monitors/controls the status and configurable items of each module in MHU</p> |
| 2 | | <p>[PSU] Converts AC110V into DC9V and DC6.5V, and provide them to each module in MHU</p> |
| 3 | | <p>[MRFCOM] Detect the FWD/RVS RF signal power level of input/output ports of the MHU. Also provide the connection pin to NMS controller and FSK modem. This module combines/divides the RF signal and FSK modem signal, and this module has -20dB monitor port for Tx input/Rx output.</p> |
| 4 | | <p>[FSK Modem] Data modem for MHU and RU communication MHU → RU frequency: 360MHz RU → MHU frequency: 340MHz</p> |
| 5 | | <p>[DOU] Converts E/O(or O/E) the FWD and RVS signals. Wavelength: Tx 1310[nm], Rx 1550[nm]</p> |

4.1.8. PSU

PSU converts external AC110V into DC and supplies +9V, +6.5V to each module in MHU.

The drawing of PSU is as follows.



[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 |

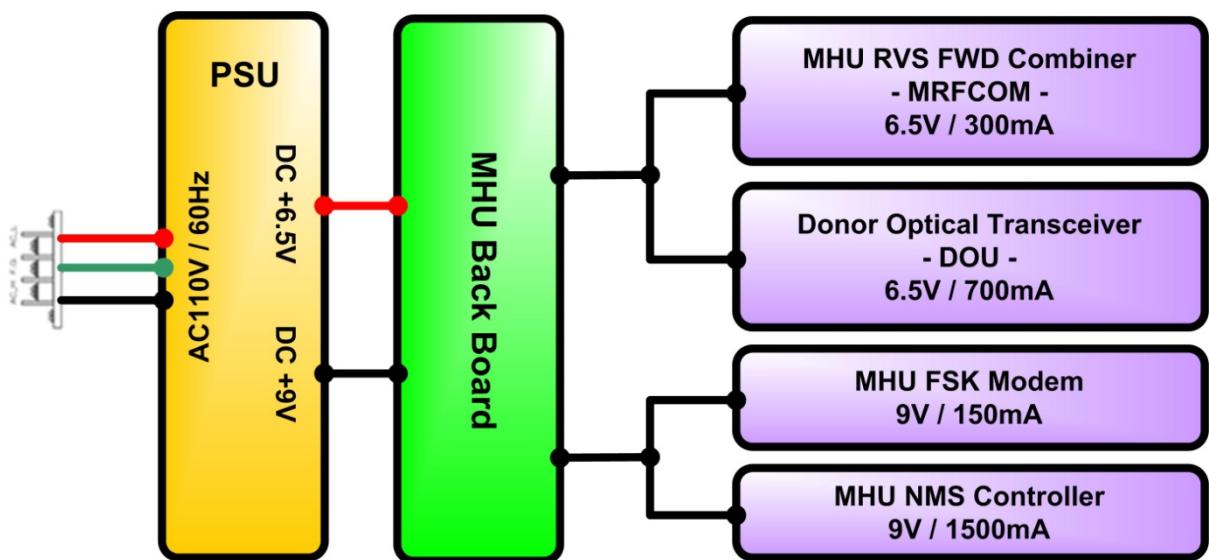
INPUT PIN Type: YW396-05V

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

OUTPUT PIN type: 5566-10 (MOLEX)

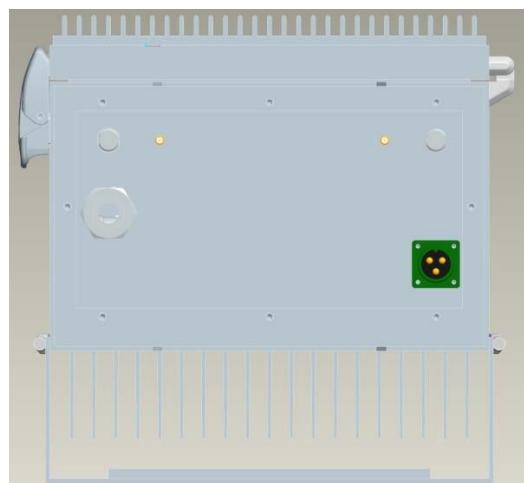
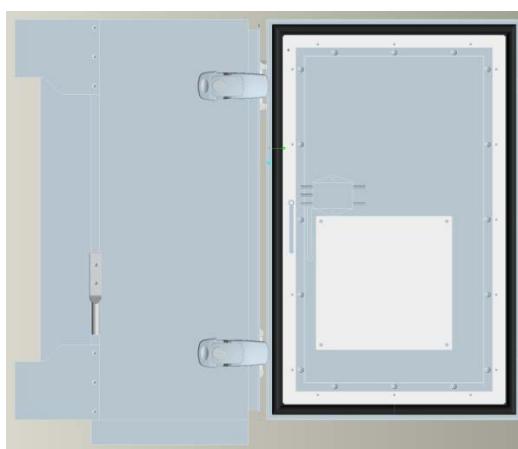
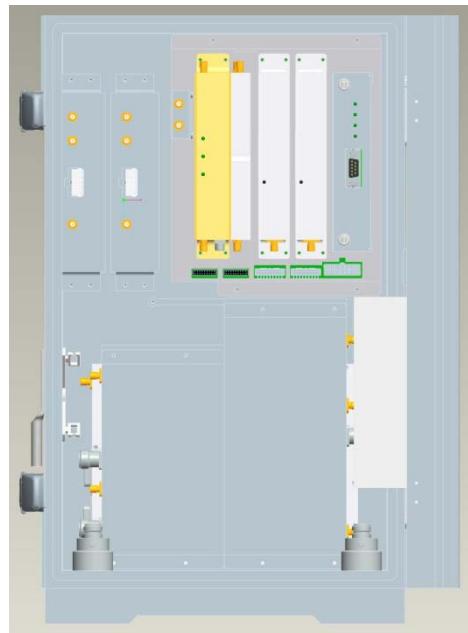
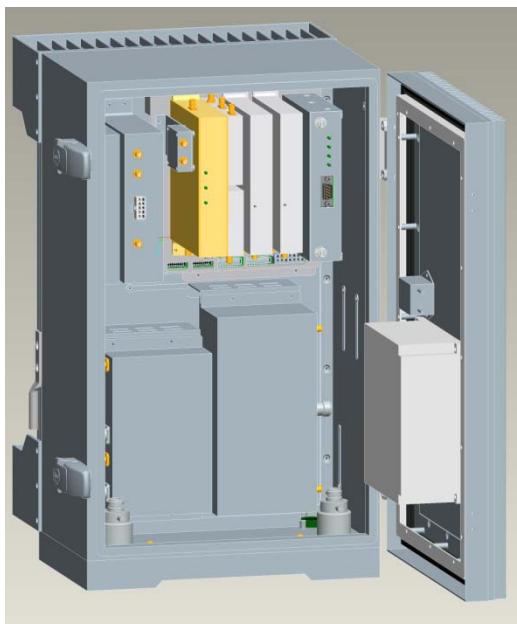
| Pin no. | 1 | 2 | 3 | 4 | 5 |
|---------|-------|-------|-------|-----|-----|
| Spec. | ALARM | +6.5V | +6.5V | +9V | +9V |
| Pin no. | 6 | 7 | 8 | 9 | 10 |
| Spec. | GND | GND | GND | GND | GND |

Circuit Diagram of Power Diagram



4.2. PWDB-GW RU

4.2.1. Mechanical Design



4.2.2. Dimension

⇒ RU System picture and Size → 510(H) X 300(W) X 316.5(D) mm



4.2.3. Mechanical Specification

| No | Item | Description |
|----|----------------------|---|
| 1 | Dimension & Weight | <ol style="list-style-type: none"> Dimension: 510(H) X 300(W) X 316.5(D) mm (plinth included) Weight: 33Kg |
| 2 | Method of Cooling | Natural convection (Heat-sink) |
| 3 | Door Locking Type | Two locks on the left side of the front of cabinet |
| 4 | Optic Connector | <ol style="list-style-type: none"> Position: Cabinet inside Connector type: FC/APC <p>* Optic cable tray is provided inside of cabinet.</p> |
| 5 | ANT PORT | <ol style="list-style-type: none"> located at the bottom side of cabinet Connector Type: N Type Female |
| 6 | Power Input | <ol style="list-style-type: none"> Power: 110VAC/60Hz Position: bottom side of cabinet Connector: MS3106A 16-10S |
| 7 | Ground | 2Hole 16SQ at the left and right side of cabinet |
| 8 | Waterproof condition | IP65 compliant |
| 9 | Misc. Features | <ol style="list-style-type: none"> Easy to maintain Pole mountable (i.e., telegraph pole) Lamp embedded with automatic On/Off function according to the door opening status Torque hinge used |

4.2.4. Description of PWDB-GWRU

[Forward path]

The RF and modem signal sent from optic module of MHU is first divided into RF and modem signal at Divider in RU, then the CDMA RF signal is amplified and filtered at the RFBS module and the modem signal is conveyed to CPU of NMS controller through FSK modem.

The CDMA RF signal input from the RFBS module is linearly amplified up to high power level on HPA, passed through the Front-End Filter Unit, and finally transmitted through an antenna.

[Reverse Path]

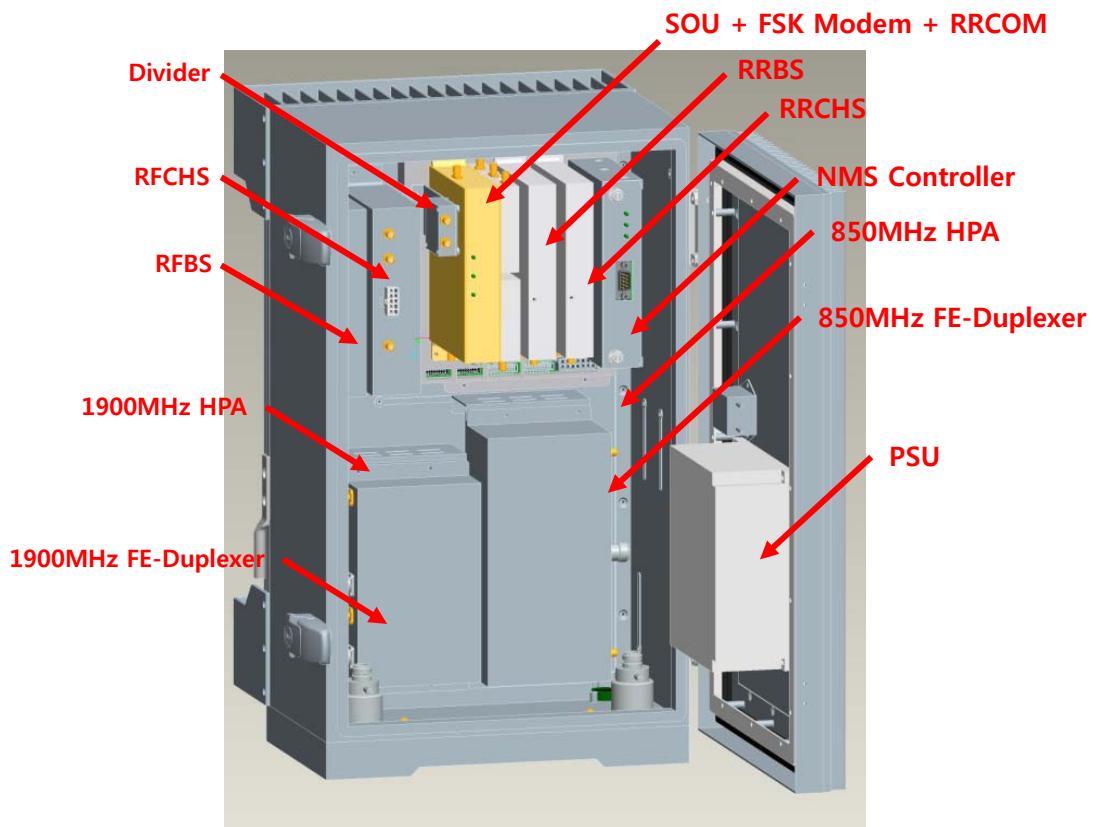
CDMA Rx signals incoming from an antenna are first passed by the Front-End Filter Unit, amplified on a low noise and high gain performance and filtered on RRLNA/RRBS, and combined with modem signal at combiner(RRCOM). The combined signal is transmitted to MHU through the optic module.

4.2.5. Port Configuration



| No | Item | Description |
|----|----------------------|--|
| 1 | AC INLET | AC 110V Power Cable Connection |
| 2 | 1900MHz ANT Port | 1900MHz Band ANT RF Cable Port |
| 3 | 850MHz ANT Port | 850MHz Band ANT RF Cable Port |
| 4 | 1900MHz Monitor Port | Monitor port coupled by -40dB compared to the output power of the 1900MHz ANT Port |
| 5 | 850MHz Monitor Port | Monitor port coupled by -40dB compared to the output power of the 850MHz ANT Port |
| 6 | Optical Cable INLET | Optic cable connection hole |

4.2.6. Module Composition

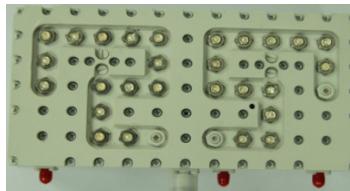
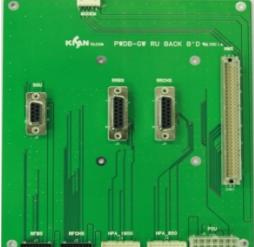


⇒ Module operational voltage table

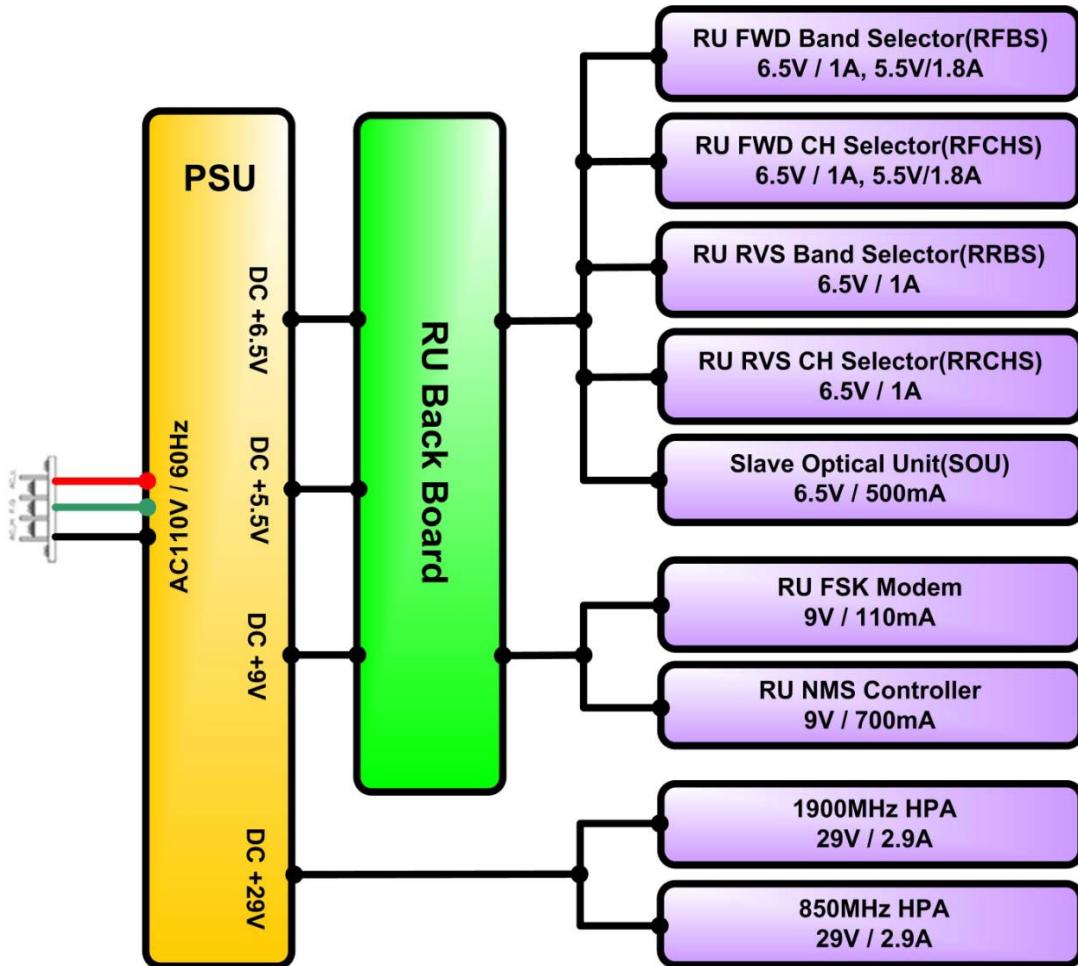
| No | Module | Voltage Used | Remarks |
|----|--|---------------|---------|
| 1 | Divider | | |
| 2 | RF FWD Band Selector for 1900MHz (RFBS) | 6.5Vdc | |
| 3 | RF FWD Channel Selector for 850MHz (RFCHS) | 6.5Vdc | |
| 4 | Slave Optical Transceiver Unit (SOU) | 6.5Vdc | |
| 5 | RF Modem (FSK Modem) | 9Vdc | |
| 6 | RU RVS COM for Signal combing (RRCOM) | | |
| 7 | RU RVS Band Selector for 1900MHz (RRBS) | 6.5Vdc | |
| 8 | RU RVS Band Selector for 850MHz (RRCHS) | 6.5Vdc | |
| 9 | HPA for 1900MHz | 29Vdc | |
| 10 | HPA for 850MHz | 29Vdc | |
| 11 | FE-Duplexer(Front-End Filter Unit) for 1900MHz | | |
| 12 | FE-Duplexer(Front-End Filter Unit) for 850MHz | | |
| 10 | PSU | 110Vac | |
| 11 | NMS Controller | 9Vdc | |
| 12 | Back Board Ass'y | 6.5Vdc / 9Vdc | |

4.2.7. Function of Modules

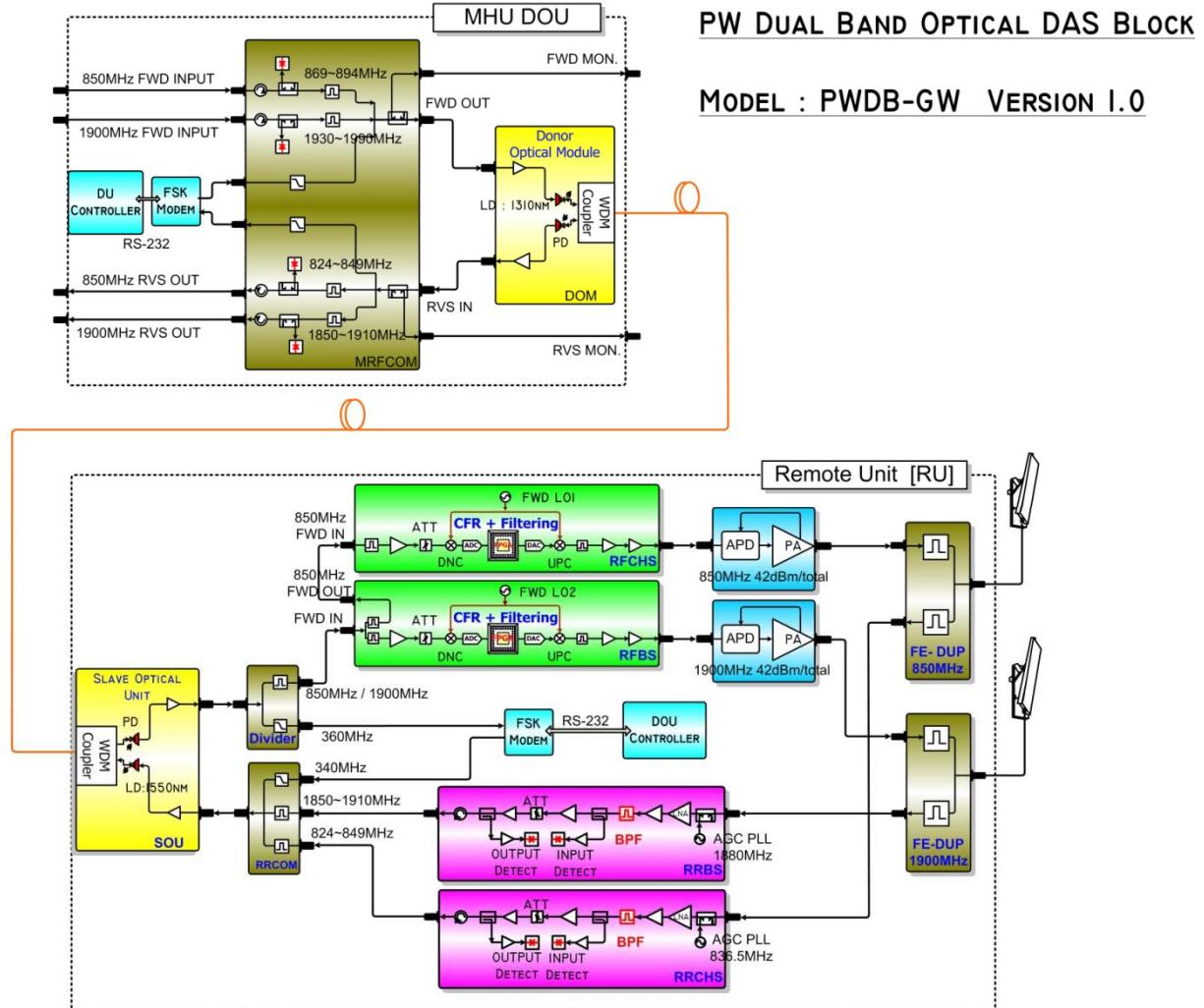
| No | Module | Description |
|----|--------|--|
| 1 | | <p>[Divider] Divides RF signal to CDMA signal and modem signal, and sent to RFBS and FSK modem.</p> |
| 2 | | <p>[RFBS] Controls the gain of 1900MHz FWD path, filtered FWD band, control the crust factor of RF signal, and perform the ALC function. The module output is sent to 1900MHz HPA.</p> |
| 3 | | <p>[RFCHS] Controls the gain of 850MHz FWD path, filtered FWD band, control the crust factor of RF signal, and perform the ALC function. The module output is sent to 850MHz HPA.</p> |
| 3 | | <p>[SOU] Converts E/O (or O/E) of FWD and RVS signals. Wavelength: TX 1550[nm], RX 1310[nm]</p> |
| 4 | | <p>[FSK Modem] Data modem for RU and MHU communication RU → MHU frequency: 340MHz MHU → RU frequency: 360MHz</p> |
| 5 | | <p>[RRCOM] Combines RVS 850MHz signal, 1900MHz signal and Modem signal, and provides the combined signal to optical module in order to convert E/O.</p> |
| 6 | | <p>[RRBS] Amplifies RVS 1900MHz signal by low noise high gain, filtering the desirable band and control the RVS path gain of RU.</p> |
| 6 | | <p>[RRCHS] Amplifies RVS 850MHz signal by low noise high gain, filtering the desirable band and control the RVS path gain of RU.</p> |

| | | |
|----|---|---|
| 8 |  | <p>[1900MHz HPA] 16Watt(42dBm) High power amplifier that amplifies the RU 1900MHz signal by linearizer and send to RU ANT through the 1900MHz FE-Duplexer.</p> |
| 8 |  | <p>[850MHz HPA] 16Watt(42dBm) High power amplifier that amplifies the RU 850MHz signal by linearizer and send to RU ANT through the 850MHz FE-Duplexer.</p> |
| |  | <p>[1900MHz FE-Duplexer] Front end duplexer that passes through 1900MHz desired FWD and RVS frequency bands.</p> |
| 9 |  | <p>[850MHz FE-Duplexer] Front end duplexer that passes through 850MHz desired FWD and RVS frequency bands.</p> |
| 10 |  | <p>[PSU] Converts AC 110V to DC 29V / 9V / 6.5V / 5.5V, and distributes the voltages to each modules. It has RU AC power on/off switch.</p> |
| 11 |  | <p>[NMS Controller] Monitors the status of RU each module, and controls the configurable items of the RU modules.</p> |
| 12 |  | <p>[Interface BD] Provides operating voltage and monitor/control signal to modules which are connected to interface B'D, and supports a connection port to communicate with NMS B'D.</p> |

⇒ Circuit Diagram of Power



5. Block Diagram



6. Administration Program (RptMan1900)

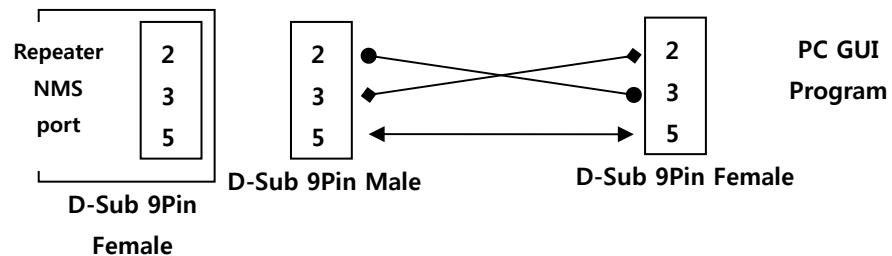
Administration program (RptMan1900) is a management program for PWDB-GW and provides status monitoring and control functions to users.

6.1. System Requirement

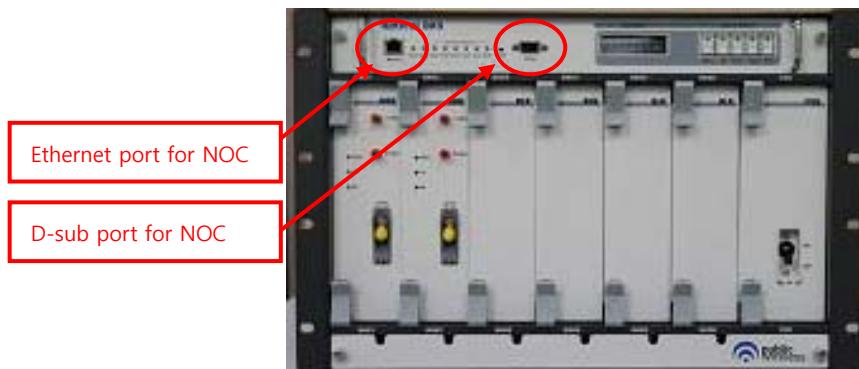
- ⇒ System: Desktop or laptop PC
- ⇒ OS: Windows XP or later version
- ⇒ Resolution: 1024 × 768 or more
- ⇒ Connection Cable: 9 pin serial cable (cross type)

6.2. Cable connection

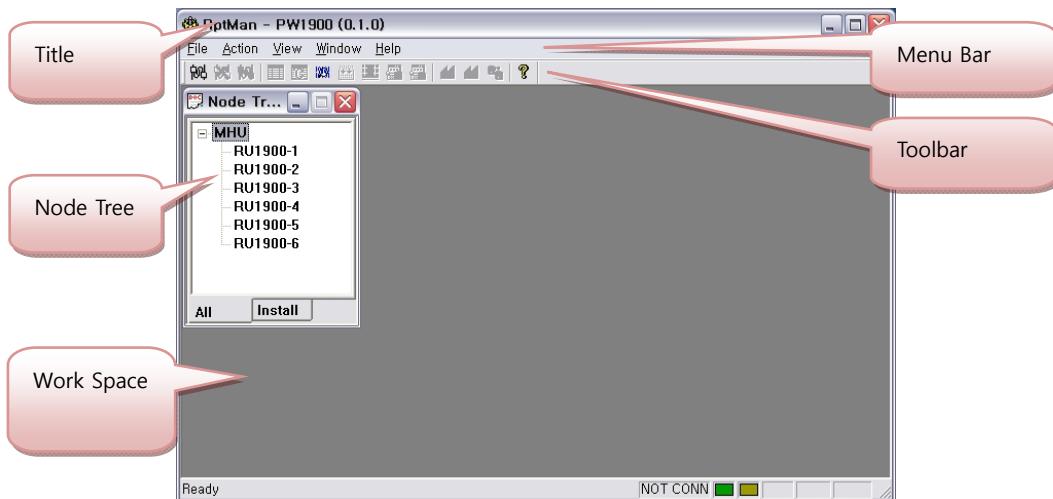
The cable connection between repeater and PC (GUI program) is illustrated below.



The NMS port of repeater MHU provides two (2) ports; one is D-sub port for GUI and another is Ethernet port for NOC(Network Operating Center).



6.3. Screen



| Section | Description |
|--------------|---|
| Window Title |  Displays the name of management program (GUI), i.e. RptMan-PW1900. Displays the type of equipment which is currently connected to program (MHU or RU). |
| Menu Bar |  Presents working menu for operators. It is associated with tool icons, which can activate the tool bar menus. |
| Toolbar |  Presents icons (button type) for frequently used command. User friendly icons are used. Icons are activated or disabled as to the status of repeater. |
| Work Space | Status information and control function are provided with a block diagram view of MHU and RU. Provides the working space of windows or dialogs. |

6.4. Status Display

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

→ LED

- Alarm:  /  blinking means ALARM,  means NORMAL
- On/Off:  ON,  OFF

Exception) for HPA,  is ON,  is OFF

⇒ **Value**

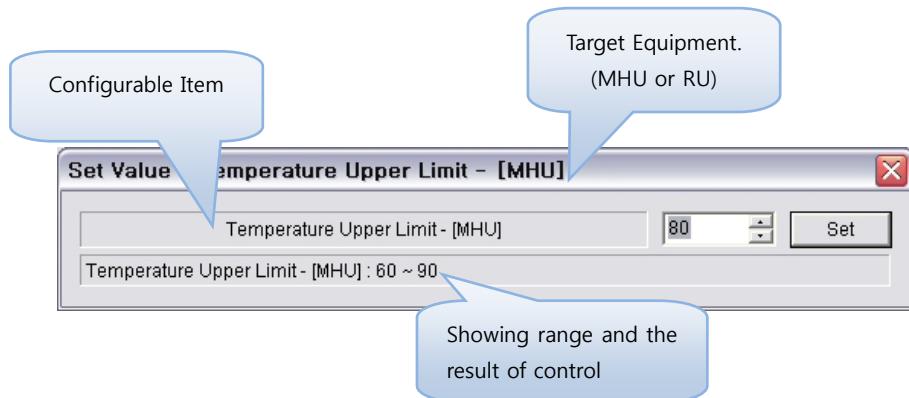
- Units are not displayed (omitted).
- Value displayed in box ()

⇒ **Control**

- The shape of mouse cursor is changed to  on controllable item.
- The texts of controllable LED or values are displayed in **BOLD** font.

6.5. Control Policy

- ⇒ System parameter is controlled one at a time.
- ⇒ Click a control item (button) to popup a control popup dialog.



- ⇒ Once a dialog popup window is opened, it stays there for repeated control.

6.6. Menu

| Menu | Sub Menu | Function |
|--------|-------------------|--|
| File | Connect | Connects GUI and repeater to communicate |
| | Disconnect | Disconnects GUI and repeater |
| | Exit | Finishes admin program. |
| 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 |
| | Gain Setting | Tx: set ATT to have 35dBm remote ANT output. |

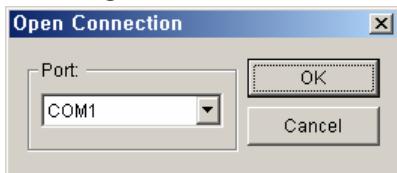
| | | |
|--------|------------------|---|
| | | Rx: set ATT to have 40dB of Rx total gain from RU to MHU including optical loss. |
| View | MHU Window | Presents MHU status window in work space |
| | Remote Window | Presents RU status window in work space |
| Window | Cascade | Cascade or tile horizon 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 RptMan1900 | Displays version of GUI program named RptMan (Repeater Manager) |

6.7. 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 |
| Gain Setting | | TX: set ATT to have 35dBm of output at the RU ANT Port RX: set ATT to have 40dB gain of Rx path → Tx/Rx Gain setting function carry out Tx/Rx gain including optical loss compensation automatically. |
| MHU Download | | Download MHU firmware files to a designated equipment. |
| Remote Download | | Download RU firmware files. |
| MHU Factory Setting | | Initialize MHU parameters to factory setting. values |
| RU Factory Setting | | Initialize RU parameters to factory setting values. |
| Help | | Shows version information |

6.8. Program operation

6.8.1. Initiating communication

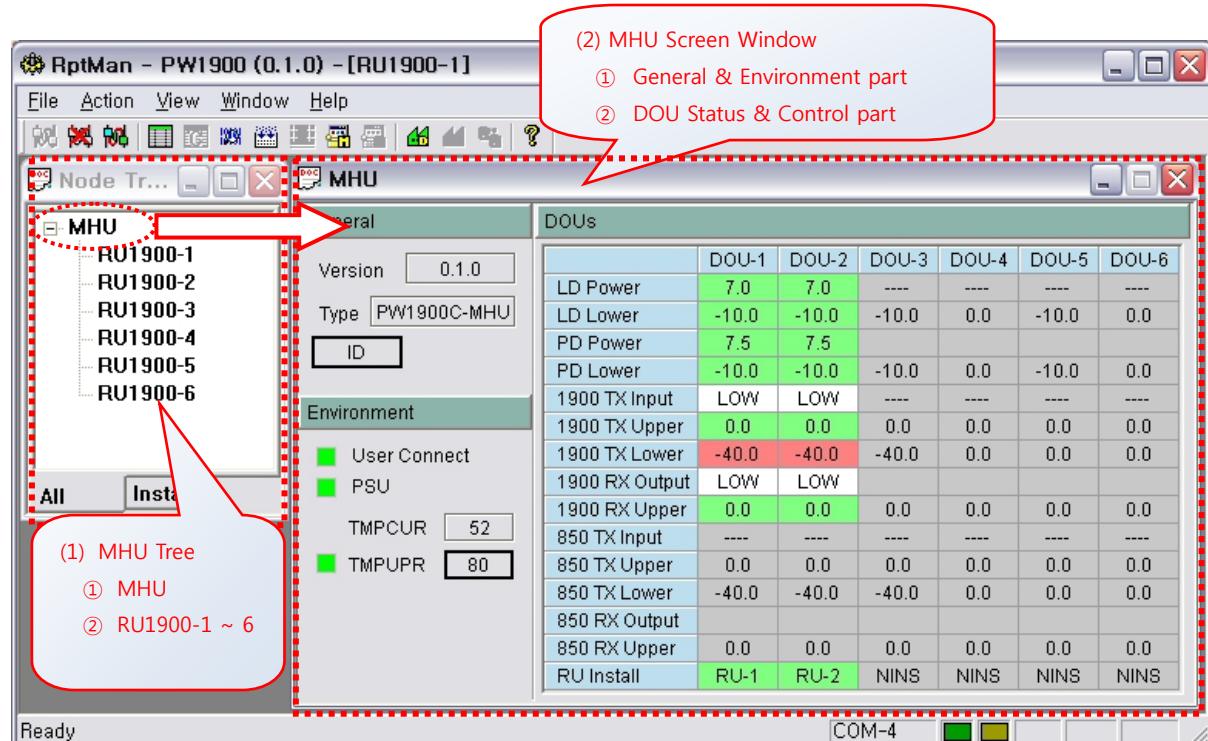


| | | |
|-------------|--|--|
| Function | Establishment of communication between GUI and repeater | |
| Method | Click  button in toolbar of GUI program | |
| Description | Port | Combo box to choice com port (COM1, COM2, ...) |
| | OK Button | Initiates communication between GUI and repeater, then close this popup window("Open Connection") When communication port is establish correctly, you can see the communication status by the icon blinking of  (right-bottom side of the main screen) |
| | Cancel Button | Cancels communication establishment and close the popup window |

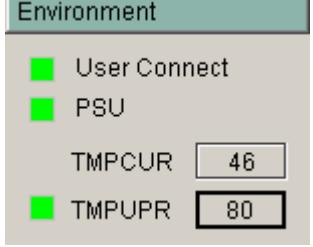
6.8.2. Disconnection

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

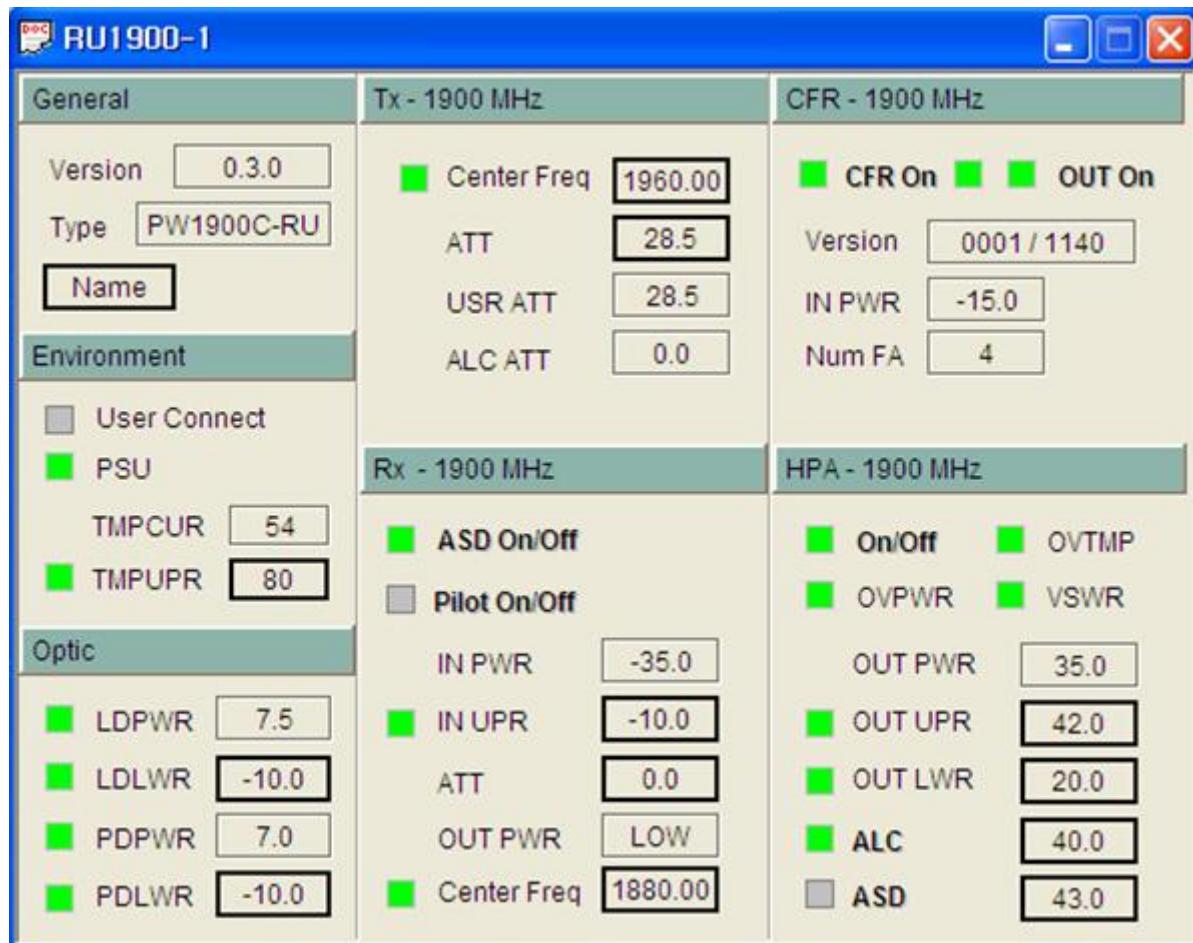
6.8.3. PWDB-GWMHU Status Retrieval and Control



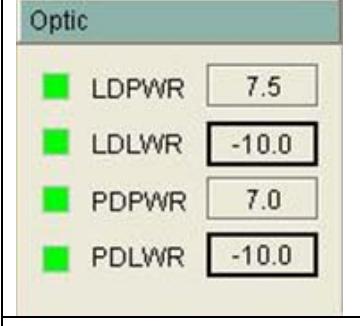
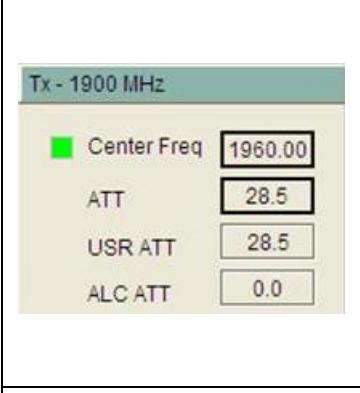
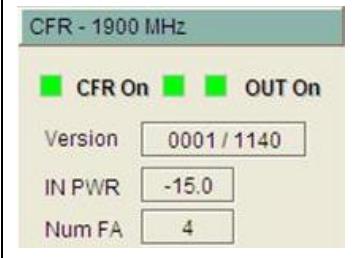
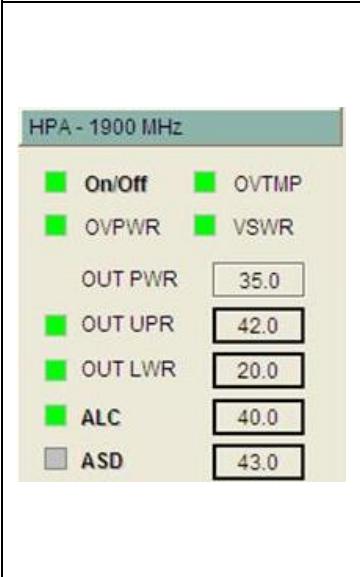
| Group | Description |
|--|---|
| General Version 0.1.0 Type PW1900C-MHU ID | ⇨ Version: Version of firmware ⇨ Type: Repeater unit type ⇨ ID: ID of MHU for the communication |

| <p>Environment</p>  | <ul style="list-style-type: none"> ⇒ User Connect: Connection status of COM port of repeater ⇒ PSU: Status of PSU ⇒ TMPCUR: Current temperature of the equipment ⇒ TMPUPR: set the upper threshold value of temperature (button) and alarm status (LED) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|-------|-------|-------|-------|-------|-------|----------|-----|-----|-----|-----|-----|-----|----------|-------|-------|-------|-----|-------|-----|----------|-----|-----|--|--|--|--|----------|-------|-------|-------|-----|-------|-----|---------------|-----|-----|-----|-----|-----|-----|---------------|-----|-----|-----|-----|-----|-----|---------------|-------|-------|-------|-----|-----|-----|----------------|-----|-----|--|--|--|--|---------------|-----|-----|-----|-----|-----|-----|--------------|-----|-----|-----|-----|-----|-----|--------------|-----|-----|-----|-----|-----|-----|--------------|-------|-------|-------|-----|-----|-----|---------------|--|--|--|--|--|--|--------------|-----|-----|-----|-----|-----|-----|------------|------|------|------|------|------|------|---|
| <p>DOUs</p> <table border="1" data-bbox="192 631 695 1096"> <thead> <tr> <th></th> <th>DOU-1</th> <th>DOU-2</th> <th>DOU-3</th> <th>DOU-4</th> <th>DOU-5</th> <th>DOU-6</th> </tr> </thead> <tbody> <tr> <td>LD Power</td> <td>7.0</td> <td>7.0</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> </tr> <tr> <td>LD Lower</td> <td>-10.0</td> <td>-10.0</td> <td>-10.0</td> <td>0.0</td> <td>-10.0</td> <td>0.0</td> </tr> <tr> <td>PD Power</td> <td>7.5</td> <td>7.5</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>PD Lower</td> <td>-10.0</td> <td>-10.0</td> <td>-10.0</td> <td>0.0</td> <td>-10.0</td> <td>0.0</td> </tr> <tr> <td>1900 Tx Input</td> <td>LOW</td> <td>LOW</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> </tr> <tr> <td>1900 Tx Upper</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td>1900 Tx Lower</td> <td>-40.0</td> <td>-40.0</td> <td>-40.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td>1900 Rx Output</td> <td>LOW</td> <td>LOW</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1900 RX Upper</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td>850 TX Input</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> <td>---</td> </tr> <tr> <td>850 TX Upper</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td>850 TX Lower</td> <td>-40.0</td> <td>-40.0</td> <td>-40.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td>850 RX Output</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>850 RX Upper</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> <td>0.0</td> </tr> <tr> <td>RU Install</td> <td>RU-1</td> <td>RU-2</td> <td>NINS</td> <td>NINS</td> <td>NINS</td> <td>NINS</td> </tr> </tbody> </table> | | DOU-1 | DOU-2 | DOU-3 | DOU-4 | DOU-5 | DOU-6 | LD Power | 7.0 | 7.0 | --- | --- | --- | --- | LD Lower | -10.0 | -10.0 | -10.0 | 0.0 | -10.0 | 0.0 | PD Power | 7.5 | 7.5 | | | | | PD Lower | -10.0 | -10.0 | -10.0 | 0.0 | -10.0 | 0.0 | 1900 Tx Input | LOW | LOW | --- | --- | --- | --- | 1900 Tx Upper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1900 Tx Lower | -40.0 | -40.0 | -40.0 | 0.0 | 0.0 | 0.0 | 1900 Rx Output | LOW | LOW | | | | | 1900 RX Upper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 850 TX Input | --- | --- | --- | --- | --- | --- | 850 TX Upper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 850 TX Lower | -40.0 | -40.0 | -40.0 | 0.0 | 0.0 | 0.0 | 850 RX Output | | | | | | | 850 RX Upper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | RU Install | RU-1 | RU-2 | NINS | NINS | NINS | NINS | <ul style="list-style-type: none"> ⇒ LD Power: Transmitted optical power level to RU ⇒ LD Lower: Lower limit level of the LD power ⇒ PD Power: Received optical power level from RU ⇒ PD Lower: Lower limit level of the PD power ⇒ 1900 Tx Input: Tx level input from 1900MHz BTS ⇒ 1900 Tx Upper: Upper limit of Tx input level ⇒ 1900 Tx Lower: Lower limit of Tx input level ⇒ 1900 Rx output: Rx level output to 1900MHz BTS ⇒ 1900 Rx Upper: Upper limit of Rx output level ⇒ 850 Tx Input: Tx level input from 850MHz BTS ⇒ 850 Tx Upper: Upper limit of Tx input level ⇒ 850 Tx Lower: Lower limit of Tx input level ⇒ 850 Rx output: Rx level output to 850MHz BTS ⇒ 850 Rx Upper: Upper limit of Rx output level ⇒ RU install: display the RU installation status |
| | DOU-1 | DOU-2 | DOU-3 | DOU-4 | DOU-5 | DOU-6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LD Power | 7.0 | 7.0 | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LD Lower | -10.0 | -10.0 | -10.0 | 0.0 | -10.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PD Power | 7.5 | 7.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PD Lower | -10.0 | -10.0 | -10.0 | 0.0 | -10.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1900 Tx Input | LOW | LOW | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1900 Tx Upper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1900 Tx Lower | -40.0 | -40.0 | -40.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1900 Rx Output | LOW | LOW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1900 RX Upper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 850 TX Input | --- | --- | --- | --- | --- | --- | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 850 TX Upper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 850 TX Lower | -40.0 | -40.0 | -40.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 850 RX Output | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 850 RX Upper | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| RU Install | RU-1 | RU-2 | NINS | NINS | NINS | NINS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

6.8.4. PWDB-GWRU Status Retrieval and Control



| Group | Description | | | | | | | | | | |
|--|-------------|--|--------------|-------|------|------------|--------|----|---|----|---|
| <table border="1"> <thead> <tr> <th colspan="2">General</th> </tr> </thead> <tbody> <tr> <td>Version</td> <td>0.3.0</td> </tr> <tr> <td>Type</td> <td>PW1900C-RU</td> </tr> <tr> <td>Name</td> <td></td> </tr> </tbody> </table> | General | | Version | 0.3.0 | Type | PW1900C-RU | Name | | <p>⇒ Version: Version of firmware</p> <p>⇒ Type: Type of repeater</p> <p>⇒ Name: Name of repeater RU</p> | | |
| General | | | | | | | | | | | |
| Version | 0.3.0 | | | | | | | | | | |
| Type | PW1900C-RU | | | | | | | | | | |
| Name | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th colspan="2">Environment</th> </tr> </thead> <tbody> <tr> <td>User Connect</td> <td></td> </tr> <tr> <td>PSU</td> <td></td> </tr> <tr> <td>TMPCUR</td> <td>48</td> </tr> <tr> <td>TMPUPR</td> <td>80</td> </tr> </tbody> </table> | Environment | | User Connect | | PSU | | TMPCUR | 48 | TMPUPR | 80 | <p>⇒ User Connect: Connection status of COM port of repeater</p> <p>⇒ PSU: Status of PSU</p> <p>⇒ TMPCUR: Current temperature of repeater RU</p> <p>⇒ TMPUPR: Value/control of upper threshold of temperature (button) and alarm status (LED)</p> |
| Environment | | | | | | | | | | | |
| User Connect | | | | | | | | | | | |
| PSU | | | | | | | | | | | |
| TMPCUR | 48 | | | | | | | | | | |
| TMPUPR | 80 | | | | | | | | | | |

| | |
|---|---|
|  | <ul style="list-style-type: none"> ⇒ 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) |
|  | <ul style="list-style-type: none"> ⇒ Center Freq: Set the FWD Center frequency value, and shows PLL alarm status ⇒ ATT: Set ATT to control FWD gain, and shows it's value. Displayed ATT value = USR ATT + ALC ATT ⇒ USR ATT: When ATT is set, USR ATT is set to ALC ATT + (ATT change). ⇒ ALC ATT: It is automatically adjusted by HPA ALC to control FWD gain, and it is set to "0" when ATT is controlled. |
|  | <ul style="list-style-type: none"> ⇒ CFR On: Crest factor reduction function On/Off ⇒ OUT On: Output signal On/Off control function of RFBS ⇒ Version: S/W and Image version of CFR Board in RFBS ⇒ INPWR: FWD RF input power at ADC point of RFBS ⇒ Num FA: Currently operating the number of FA |
|  | <ul style="list-style-type: none"> ⇒ On/Off: Status/control the operation state of HPA ⇒ OVTMP: Alarm status of HPA Over-temperature ⇒ OVPWR: Alarm status of HPA Over-Power ⇒ VSWR: Alarm status of HPA VSWR ⇒ OUT PWR: Output power level of HPA(box) ⇒ OUT UPR: Display/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) ⇒ ALC: Set ALC level for HPA output, and shows ALC status. ⇒ ASD(Auto Shutdown): ASD level(button), and running status of function(LED). |

| | |
|--|---|
| | <ul style="list-style-type: none"> ⇒ ASD On/Off: When input upper threshold alarm is occurs, set ASD activation, and shows its status. ⇒ Pilot On/Off: Set CW signal generation, and shows its status. It is used for RVS gain setting. ⇒ IN PWR: RVS input power value of RRBS ⇒ IN UPR: Set RVS input upper threshold, and shows the alarm status of input upper threshold RVS. ⇒ OUTPWR: RVS RF output power of RRBS ⇒ ATT: Set ATT to control RVS gain, and shows it's value. ⇒ Center Freq: Set the RVS Center frequency value, and shows PLL alarm status |
|--|---|

6.8.5. 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.

Download takes the following steps.

- ① Convert firmware source file (*.bin) to a downloadable file format.

Main menu: Action → Image Compression, toolbar: 

- ② Open a pop-up window showing the status of the target equipment for firmware download.

Method 1) Main menu View → Select Donor Windows or Remote Windows

Method 2) In Block View Dialog window, select Donor Windows or Remote Windows

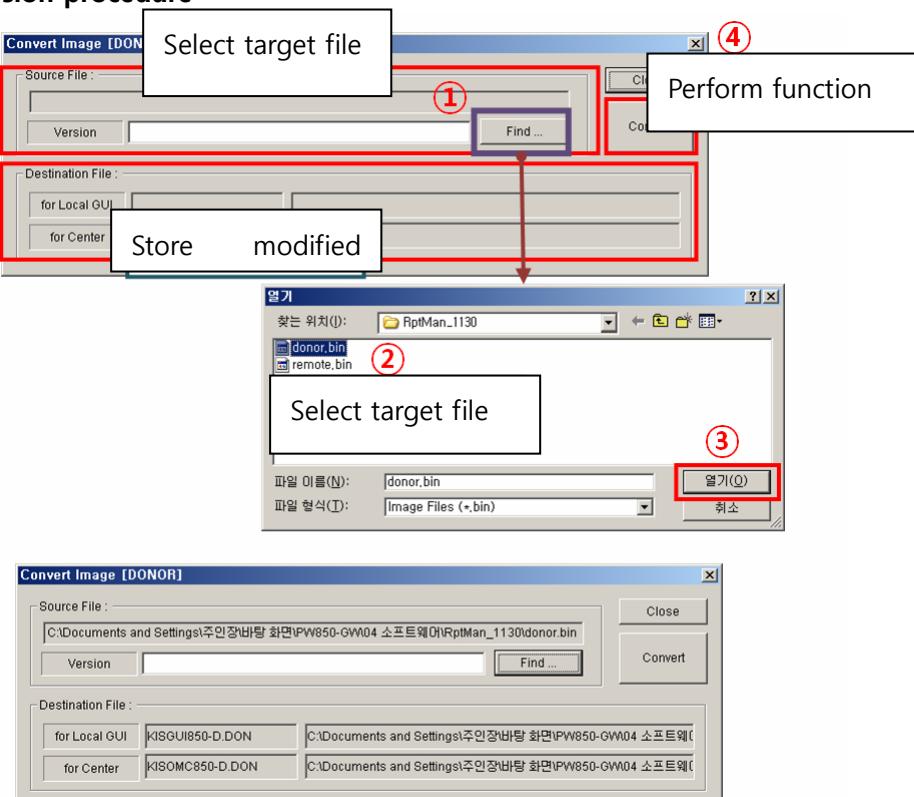
- ③ Download firmware to the target equipment.

Method 1) Main menu Action → select Image Download menu

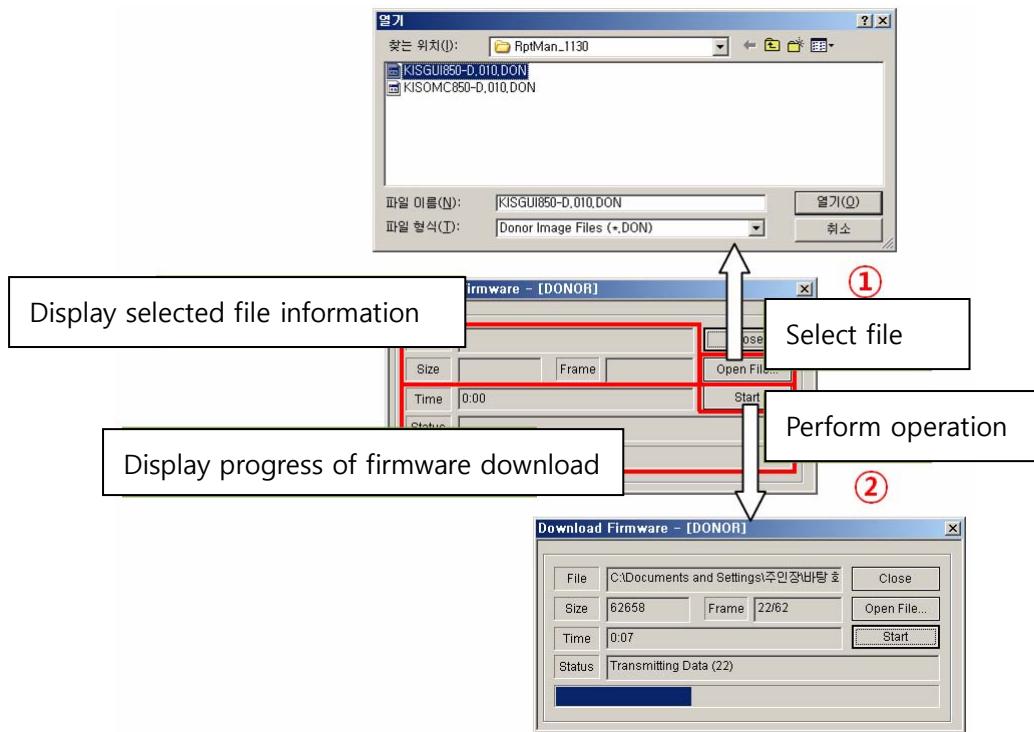
Method 2) In toolbar, select  for MHU, and select  for RU

After that, download firmware after selecting the firmware file for the target equipment.

File conversion procedure



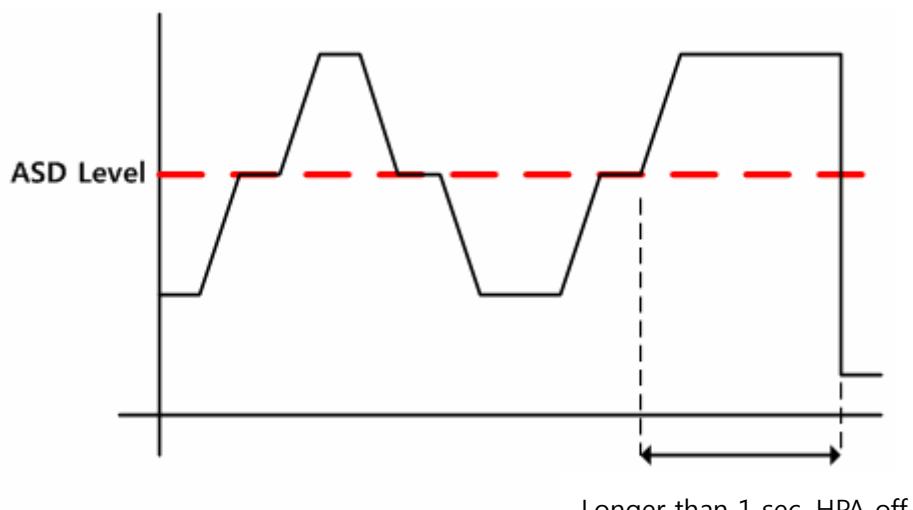
Download procedure



6.9. Additional features

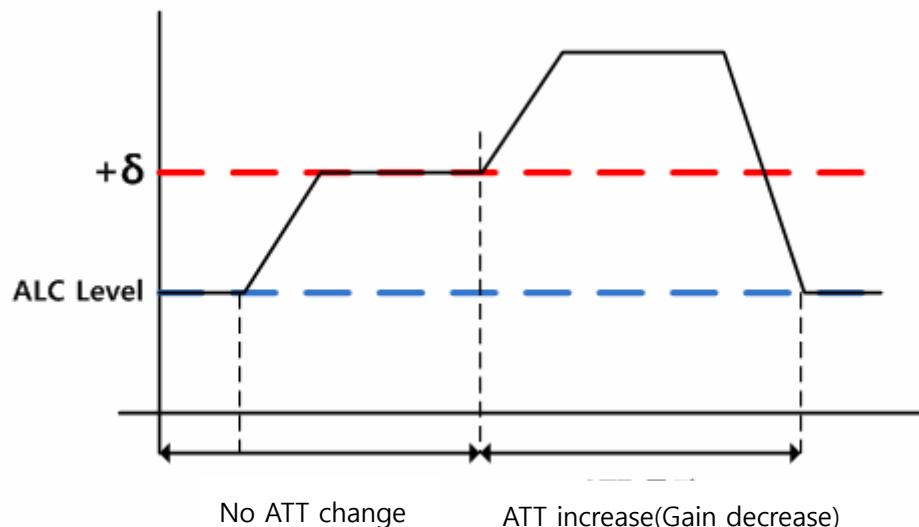
6.9.1. ASD (Auto Shutdown) Function

1. If the power level is above the shut down level for longer than 1 second, turn off HPA.
2. During shut down state, monitor RFCHS output power. If the level is below 5dB from shut down level, turn on HPA automatically.
3. Monitor HPA output power in normal operation, and monitor RFCHS output power during shut down.



6.9.2. ALC (Auto Level Control) Function

1. If the power level reaches the ALC level, prevent to increase more than ALC level by using ATT control.
2. By memorizing the existing ATT value, the ATT value before ALC can be reused even when the power is reduced.



Appendix A Factory setting value for each equipment

| MHU | | RU | |
|------------------------|-------|--------------|-------|
| Item | Value | Item | Value |
| MHU TEMP UPR | 80 | RU TEMP UPR | 80 |
| 1900/850MHz Tx IN UPR | -10 | RFBS ATT | 30 |
| 1900/850MHz Tx IN LWR | -20 | Hidden ATT | - |
| 1900/850MHz Rx OUT UPR | -10 | PLL | - |
| Optic LD LWR | 0 | RFAGC ATT | 30 |
| Optic PD LWR | -10 | HPA On/off | Off |
| | | HPA OUT UPR | 42 |
| | | HPA OUT LWR | 20 |
| | | ALC Level | 40 |
| | | ALC On/Off | ON |
| | | ASD Level | 43 |
| | | ASD On/Off | ON |
| | | RRBS ASD | ON |
| | | RRBS IN UPR | -10 |
| | | RRBS ATT | 30 |
| | | RRBS PLL | - |
| | | Optic LD LWR | 0 |
| | | Optic PD LWR | -10 |