

## 1. Overview

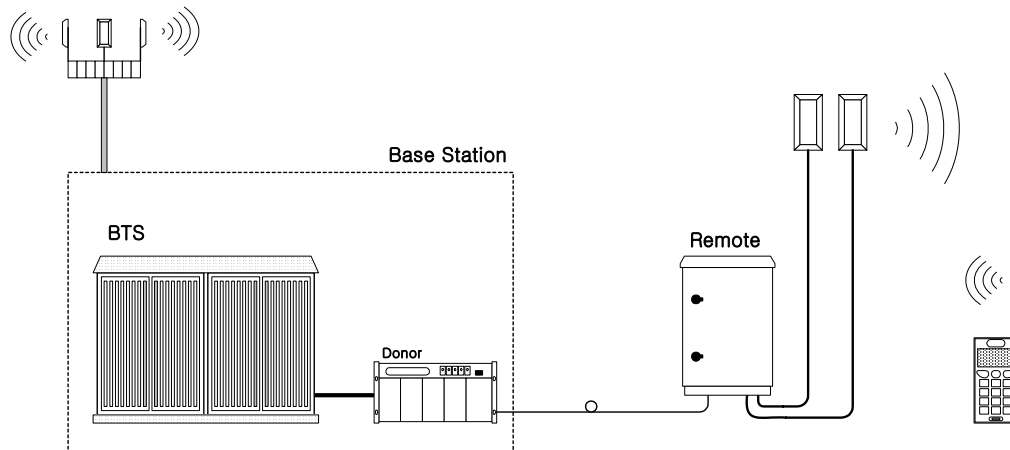


Figure 1. System Configuration

Optic repeater is a type of BTS sub-systems. It is designed to cover the radio-shadowed areas that could be occurred by obstructions among base stations. The system provides high quality communication at reasonable cost by adopting high technologies. For example, the system adopted WDM that multiplexes UL and DL signals onto a single fiber cable, so that the system can be installed at low cost and maintained with ease.

## 2. Major Advantages

### A. REMOTE

1) It is easy to install and maintain the system, because it is designed as small size, light weight, and low power consumption.

2) It is reliable by adopting water and moisture resistant structure.

3) Remote control

Operation, maintenance, and repair is easy by using the system that provides alarm and information on the Gain Control of Remote Cell, output level control, power on/off, internal temperature monitoring, and problems concerning optic module. Remote control can be performed by RF modem so that operation and maintenance personal can use it easily. And it was designed to operate with comprehensive network management system.

4) Transmission and Receiving with 1 Core Optic Fiber

It use WDM which enables 2 wave-length (Forward: 1550nm, Reverse: 1510nm) to

simultaneously be transmitted and received through 1 Core Optic Fiber

5) Optic AGC (Automatic Gain Control): It is regularly keeping the loss between optic sections.

6) ALC (Automatic Limit Control): It makes to limit the level of output power less than the regular level.

## B. DONOR

1) It is easy to install and maintain the system, because it is designed as small size, light weight, and low power consumption.

2) Donor shelf is designed to mount into 19" shelf and also, can be mounted into the enclosure that is following the IP65 standard.

3) Control

Operation, maintenance, and repair is easy by using the system that provides alarm and information on the Gain Control of Donor Unit, output level control and problems concerning optic module. Remote control can be performed by RF modem so that operation and maintenance personal can use it easily. And it was designed to operate with comprehensive network management system.

4) Transmission and Receiving with 1 Core Optic Fiber

It use WDM which enables 2 wave-length(Forward:1550nm, Reverse:1510nm) to simultaneously be transmitted and received through 1 Core Optic Fiber

5) Optic AGC(Automatic Gain Control) : It is regularly keeping the loss between optic sections.

### 3. The name and function of each module

#### A. REMOTE

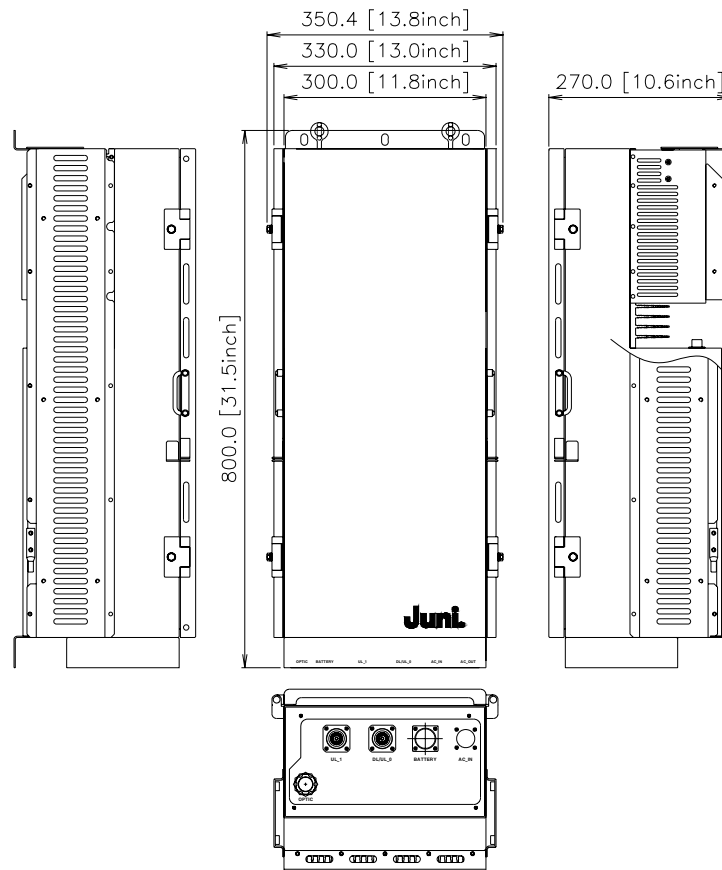


Figure 2. A plan of Remote

#### 3.1 Interior Module

##### ① Optic

It changes the optic signal (from Donor) into RF signal and RF signal (from Remote) into optic signal.

##### ② DL\_UL Drive

The module changes the level of a signal on DL path into the desired level. It has a variable attenuator. The antenna output level on DL path is adjustable by the attenuator.

It amplifies the level of a signal on UL0 path.

It amplifies the level of a signal on UL1 path after down-conversion.

##### ③ UL\_SAW Drive

It contains saw filters for band selection.

##### ④ Local & Modem Drive

It generates local signals for band selection on UL paths.

It performs FSK modulation and demodulation for communication between Donor and Remote.

⑤ LPA (30Watts)

It is amplified into high output power for transmitting the Down Link signal to antenna.

⑥ LNA

It amplifies signals from antenna for achieving good characteristics of noise figure.

⑦ Cavity filter

It deletes useless signals except band that is used for service. DL/UL signals are already distinguished at part of Antenna.

Regarding Up Link Path, It deletes signals except band that is used for service.

⑧ PSU

It changes the input power (50~88VAC) into DC+ 27V, DC+ 15V and DC+ 7V for operating each module.

⑨ RSM (Remote Status Monitoring)

It manages the communication of Donor and controls alarm signal and all sorts of control.

### 3.2 Other parts

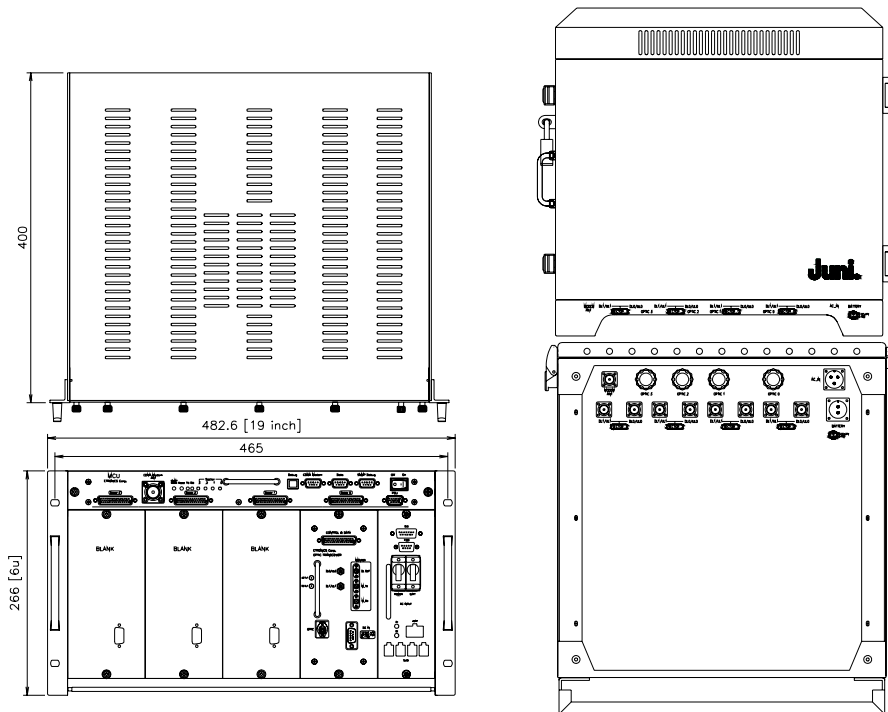
① RF Connector : 7/16 DIN Female

② Power Cable : Power Feeder 625 JCAT 3R Coaxial Cable

③ Optic Adapter : Sam-Hwa KFBG #16 (Waterproof, UL certified, the quality of the material SUS)-using SUNFLEX pipe

④ Bracket : The bracket is used for mounting the repeater on the wall.

## B. DONOR



- Donor Shelf -

- Donor Enclosure -

### 3.3 Interior Module

#### ① optic

It changes the optic signal (from Remote) into RF signal and RF signal (from Donor) into optic signal.

#### ② DL Drive

This module changes the forward signal into optimum level and has attenuation for setting the input level of optic module. It contains saw filters for band selection.

It contains FSK modem for communication with remote.

#### ③ UL Drive

It amplifies the output signal of optic module for getting optimum level. There is a function of attenuator for module gain control and setting the gain between optic sections regularly.

#### ④ Local Drive

This module makes local signal for Reverse diversity path.

It up-converts of UL1 path.

It generates local signals for band selection on DL paths.

⑤ Wireless Modem & control board

They make the signal for communicating the upper systems. The communication is for receiving and sending the alarm and control signals. Also, the data including the information of product is communicating with MCU.

⑥ PSU

It changes the input power (110~230VAC) into DC+ 27V, DC+ 15, and DC+ 7V for operating each module.

⑦ MCU

It has a computer interface. The operator can monitor several kinds of alarms and control the system by using the connected computer.

### 3.4 Other parts

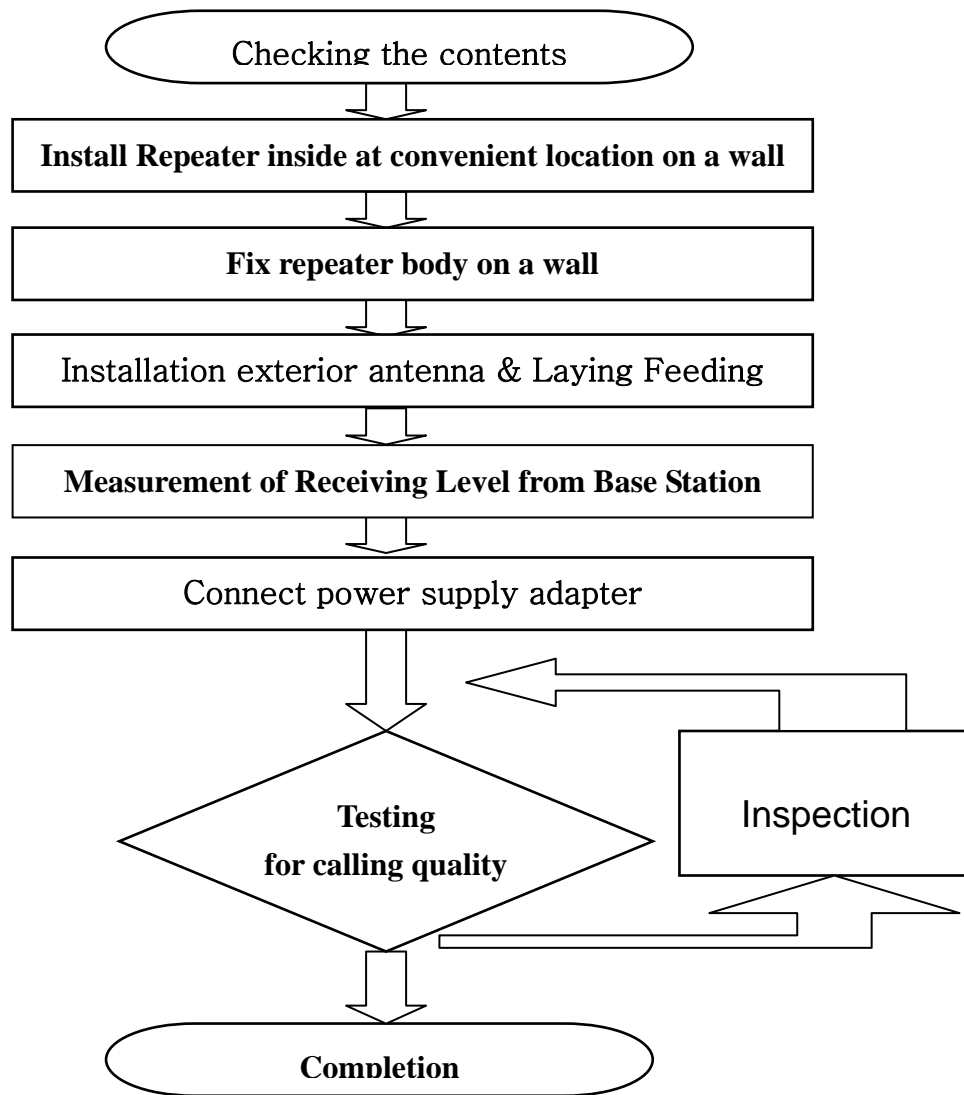
① RF connector: N female (Donor enclosure), SMA female (Donor shelf)

② Optic adapter: FC/ APC type

③ Bracket (Enclosure): The bracket is used for mounting the repeater on the wall.

## 4. How to install the system

Typical Installation Instructions



- A. Checking the contents
- B. Put the repeater at the place where to install it
- C. Install Repeater inside at convenient location on a wall
- D. Installation exterior antenna & Laying Feeding cables
- E. Measurement of receiving level from base station
  - i. Connect feeding cable, which has been connected with directional antenna for base station, with input of spectrum analyzer.
  - ii. Set measurement environment of Frequency, Span, BW and Amplitude, etc of the spectrum analyzer.

iii. Verify Channel Power value of input signal.

F. Connect to RF Cable

G. Connect power supply adapter

Caution: Should check the input power whether 50~88VAC.(For Remote)

Caution: Should check the input power whether 110~230VAC.(For Donor)

H. Testing for calling qualities

## 5. User Attention

1) Do not open the case of repeater

2) Do not excessive pressure to Repeater.

3) Please use a rated voltage.

4) The repeater must have been installed considering environmental factor.

## 6. Troubleshooting

1) The PSU LED

Causes	Action
Power cable of the power supply unit has not been connected.	Check connection of power system
Failure of the LED	Checking the items of alarm LED

2) The repeater transmits no signal

Causes	Action
Coaxial cable connecting the repeater and measuring system is defective	Replace coaxial cable or power detector module
Power system of interior of the repeater has not been connected.	Check power connection of module of interior of the repeater



## 7. Specifications

### 7.1 General System Electrical Specifications

Characteristic	Specification
Frequency	DL: 1930.625 ~ 1989.375MHz UL: 1850.625 ~ 1909.375MHz
Frequency bandwidth	58.75 MHz (DL/UL)
Channel bandwidth and spacing	Applying to CDMA Frequency Assignment
System time delay	5 $\mu$ s_max
Characteristic impedance	50 ohm

### 7.2 DL Path specifications(Remote)

	Remote	Donor
Input power range	-34 ~ -24dBm/total	-3 ~ +7dBm/Total
Gain	61~77dB	-2dB
Gain control step	0.5dB	0.5dB
Maximum output power	43dBm/total	+5dBm/Total
Output VSWR	1.5:1	1.5:1
Ripple	3dB max	2dB max

### 7.3 UL Path specifications

	Remote	Donor
Input Power	-55 dBm max	0dBm max
Gain	+55dB	-25 ~ 0dB
Input VSWR	1.5:1	0.5dB
OIP3	25dBm max	1.5:1
Ripple	3dB max	25dBm max

### 7.4 Mechanical Specifications

	Remote	Donor
Output/Input connector	7/16 DIN Female	N Female
Input AC power	50~88VAC	110~230VAC
Dimensions (W*H*D)	13.8*31.5*10.6(inch)	482.6*266*400(mm)
Weight	79lbs Max	36lbs max

#### WARNING

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.