

# NOTCHCELL

## Operation Manual

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SMD-014-PMB210(V1.0)

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## Revision History

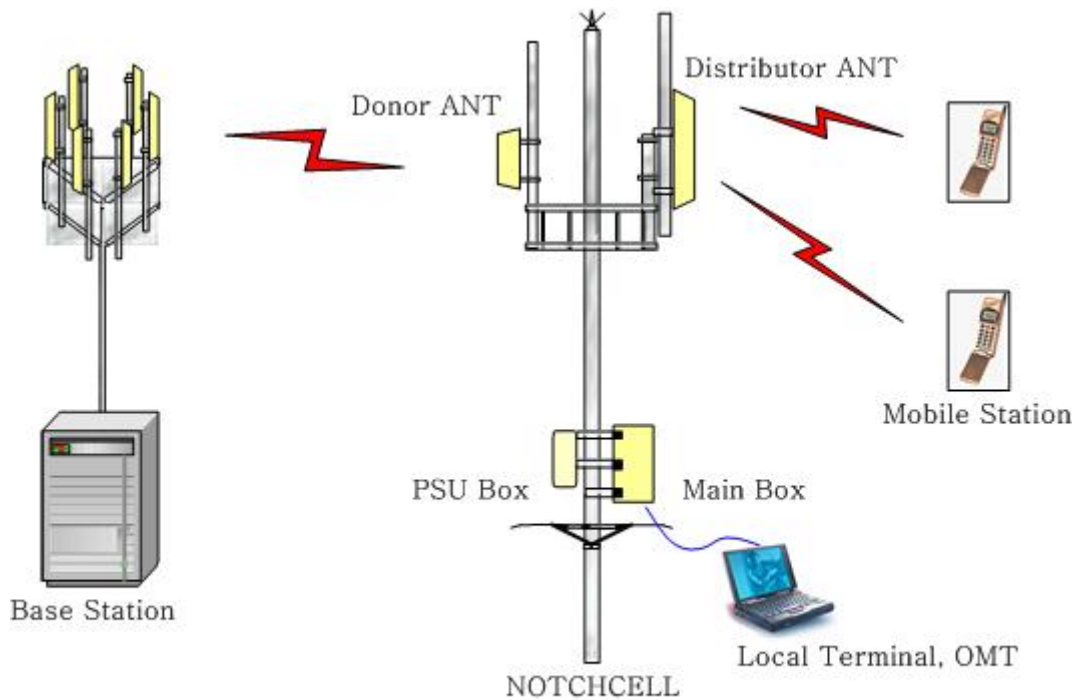
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# 1. Overview



[Figure 1-1] LGE NOTCHCELL Repeater

LGE NOTCHCELL repeaters are used to fill out uncovered areas in CDMA mobile systems, such as base station fringe areas, road tunnels, business and industrial buildings, etc.

A NOTCHCELL repeater receives signals from a base station, amplifies and retransmits the signals to mobile stations. Also it receives, amplifies and retransmits signals in the opposite direction. Both directions are served simultaneously.

To be able to receive and transmit signals in both directions, the repeater is connected to a donor antenna directed towards the base station and to a distributor antenna directed towards the area to be covered.

Control of the repeaters is performed using a desktop or notebook loaded with the LGE OMT, Operation and Maintenance Terminal, which can communicate with the repeaters either

locally or remotely via wireless data modem. Remote operation can be performed either via CDMA net. To be able to control many LGE NOTCHCELL repeaters in common, there is a Sprint EMS center.

## 2. Specifications

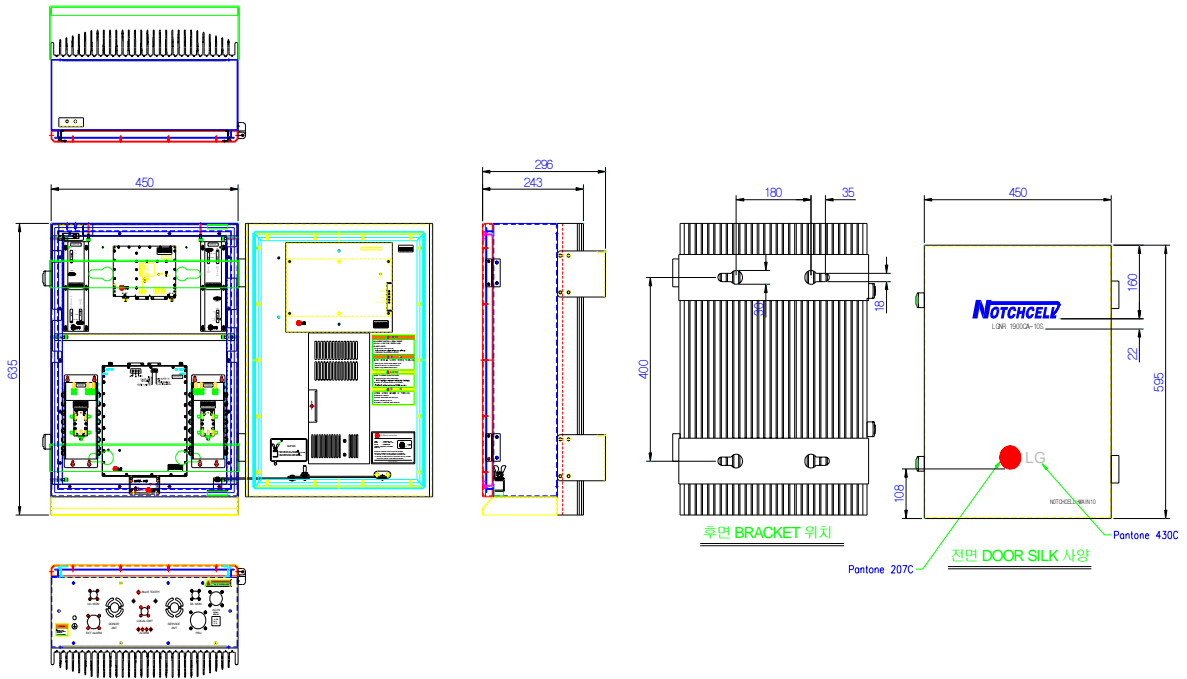
### 2.1 Specificat

Description	Specification
Frequency	Bands A, B, D, or E
Output Power (DL)	+40dBm/carrier for 1 carrier, +37dBm/carrier for 2 carriers +34dBm/carrier for 4 carriers, +29.5dBm/carrier for 11 carriers.
Output Power (UL)	+25dBm/carrier for 1 carrier, +22dBm/carrier for 2 carriers +19dBm/carrier for 4 carriers, +14.5dBm/carrier for 11 carriers
Input Power (DL)	-55 ~ -30dBm/carrier for 1 carrier -65 ~ -40dBm/carrier for 11 carriers
Input Power (UL)	-70 ~ -45dBm/carrier for 1 carrier -80 ~ -55dBm/carrier for 11 carriers,
Filter Bandwidth	5MHz for Bands D or E 15MHz for Bands A or B
In band Flatness	1dB max in each 1.25MHz channel 2dB max in each PCS block
Noise Figure	4dB max at max gain 8dB max at min gain
Maximum Input without damage	+10dBm
VSWR (Pin/Pout port)	1.5:1 max
Input Impedance	50 ohms

Description	Specification
Gain Range	70 dB to 95 dB
Gain steps	1dB
Signal Delay	5usec max
Power	110VAC +/-20%, 50/60Hz+/-5%
Alarm & Status	Synthesizer, LNA, Power Amplifier, Output power, RSSI, PSU, Battery, Door
Interface	RS-232 and wireless modem
Control	Gain, Auto Level Control, Power Amplifier On/Off, Software Shutdown, Alarm masking
Cooling	Air convection
Temperature	Operating: -40 to +55 °C Storage: -40 to +85 °C
Size	Main Box: 450(W) X 635(H) X 243(D) mm PSU Box: 450(W) X 334(H) X 265(D) mm
Weight	Main Box: 95lbs. (43kg) PSU Box: 55lbs. (25kg)
Weather Resistance	NEMA 4X (IP65)
Wind Pressure	60m/s
Connector	RF Type N female Monitoring Type SMA female Control MS connector AC Power MS connector



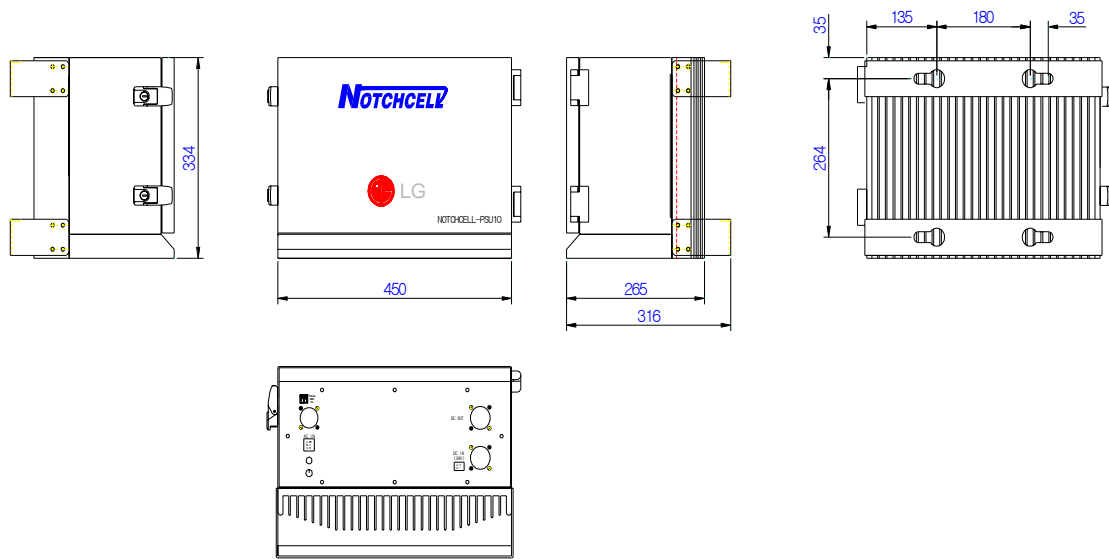
## 2.1.1 Main Box



[Figure 2-1] Main box

Item	Specification	Remarks
RF connector	N-female	
Size	450(W) X 635(H) X 243(D) mm	
Weight	Less than 43Kg	

## 2.1.2 PSU box



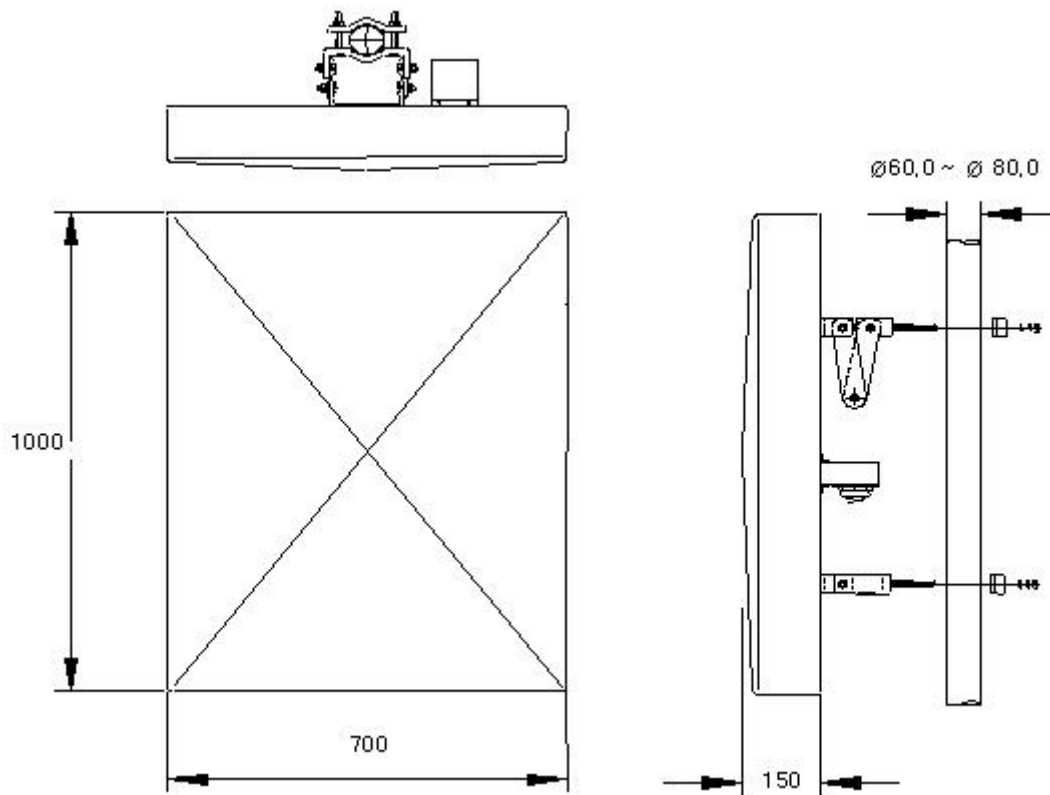
[Figure 2-2] PSU box

Item	Specification	Remarks
Size	450(W) X 334(H) X 265(D) mm	
Weight	Less than 25Kg	

## 2.2 Antenna

Description	Specification
Frequency	1850~1910MHz, 1930~1990MHz
VSWR	1.5:1 max
Gain	17dBd±1
Front-To-Back-Ratio	45dB min
Front-To-first Side Ratio	13dB min
Impedance	50 ohms
Polarization	Vertical
Available Power	200W max
Connector	7/16" DIN female
Waterproof	NEMA4X (IP65)
Wind Pressure	60m/s
Isolation (Donor to Distributor)	100dB min
Horizontal HPBW	
Donor Antenna	20±3°
Distributor Antenna	45±5°
Vertical HPBW	
Donor Antenna	20±3°
Distributor Antenna	8±2°
Size	
Donor Antenna	700(W) x 1000(H) x 150(D) mm
Distributor Antenna	310(W) x 1500(H) x 120(D) mm
Weight	
Donor Antenna	44lbs. (20kg)
Distributor Antenna	38lbs. (17kg)

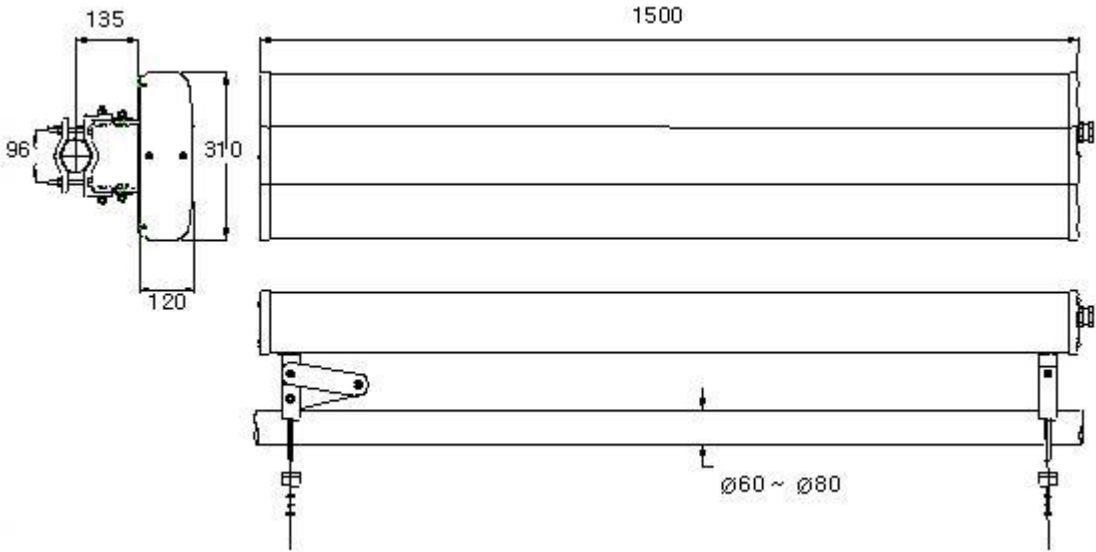
## 2.2.1 Donor Antenna



[Figure 2-3] Donor antenna

Item	Specification	Remarks
RF connector	7/16" DIN-female	
Size	700(W)×1000(H)×150(D) mm	
Weight	Less than 20kg	

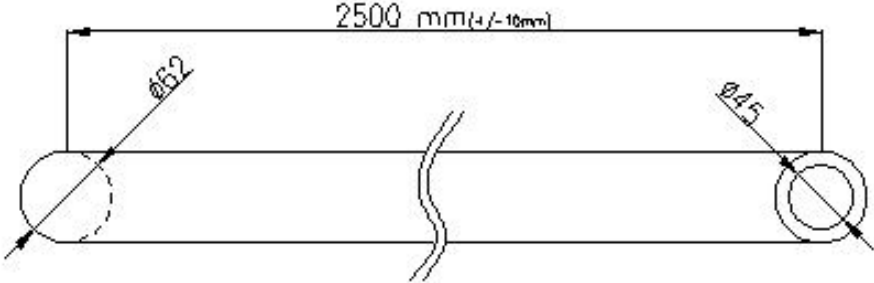
### 2.2.2 Distributor Antenna



[Figure 2-4] Distributor antenna

Item	Specification	Remarks
RF connector	7/16" DIN-female	
Size	310(W)×1500(D)×120(H) mm	
Weight	Less than 17kg	

**2.2.3 Mount Pole**



[Figure 2-5] Mount pole

Item	Specification	Remarks
Length	2500 mm	
Weight	Less than 6kg	

## 3. Installation

### 3.1 General

#### 3.1.1 Overview

This standard provides a reasonable and efficient installation method for the NOTCHCELL repeater in consideration of site conditions and particularity of the installation process.

#### 3.1.2 Structure

- Technical specifications: Description on the configuration and standard for Repeater (Main Box, PSU Box) specifications and Antenna (Donor antenna, Distributor antenna, Mount pole).
- Installation of Repeater & Antenna: Description on the installation method of Repeater and Antenna

#### 3.1.3 Scope of application

- This standard presents all sorts of information on the repeater and the installation standard for the reasonable and efficient construction as well as the smooth process.
- This standard presents general technical conditions for power supplies, groundings, and other execution designs.
- This standard presents the installation of equipments, construction and details to be considered under the site conditions.
- All construction works must be performed in conformity to this standard, but are subject to the site conditions.

#### 3.1.4 Safety management

##### Objective

This safety regulation defines the requirements for eliminating dangerous causes and preventing accidents in workers' conducting their duties at the site.

##### Scope of application

Site representatives, safety managers or site supervisors are responsible for safety of the site workers and the public. They shall take the full measures to prevent possible accidents.

## General

- 1) Each and every worker is responsible in the end for his/her own safety. He/she shall observe the safety regulations, and shall receive clear direction from the site representative for any special cases not specified in the safety regulations.
- 2) Safety training and preliminary actions shall be taken before the work.
- 3) Supervisors shall explain the process and the precautions, and assure that the workers understand the followings.
  - Purpose and scope of the work
  - Duty of each worker
  - Procedure and method of the work
- 4) Precautions
  - All workers must secure the safety first and carry out the construction in observance of the safety regulations.
  - All workers must progress the construction in orderly and scrupulous manner in consideration of work process and situation.
  - Do not drink, smoke, act imprudently or make jokes during the work.
  - Make clear signals during the work.
  - Be careful not to fall off from height. And never drop or throw materials or tools.
  - Each worker shall to his/her duty of safety management, and takes immediate action if any danger is found.
- 5) Dress and equipments.
  - Be sure to wear a safety helmet during the work.
  - Do not wear slippery shoes.
  - Do not take off clothes or shoes during the work.
  - Do not wear gloves while working with a rotary machine.
  - Do not put in the pockets such tools as knives and screwdrivers.
- 6) Cautions at work
  - Check the surroundings of the site, and remove any danger before the work.
  - Do not force the workers to perform outdoor work in bad weather.
  - Be prepared with first aid medicine and the plan to contact hospitals in preparation for unexpected accidents.
  - In the storage area, make sure of securing emergency passages to exit and of the easy access to fire fighting equipments.
  - Keep the material in a safe place in consideration of the maximum weight.



## **Installation**

- Pre-examine the danger that may occur during the work.
- Make sure of the location of exits and fire fighting equipments.
- Observe the non-smoking instruction.
- Always keep the work site tidy and clean.
- Check the cleaning status, any cause of fire, and locks after the work.

## **Installing cables**

- Do not drag the cables too fast or with excessive force at the installation.
- Wind/unwind the cables with enough curvature to prevent damage.
- Make a precise connection between the ends of the cables at the installation.
- Be careful not to have the cables entangled at the installation or removal of the cables.
- When installing the cables over the power cable, be sure to apply insulating cover.

## **Others**

- Fix the ladder firmly when working on it for a long time.
- Place warning signs at least 5m before the construction site.
- Set the traffic control point at the jammed road.
- Do not step or sit on the cables or other breakable facilities during the work.
- Be careful not to receive electric shock during the work.

## 3.2 Installing information

### 3.2.1 Installation site

#### Right-of-way

- The repeater shall be installed in the location owned or leased by the carrier.
- If the repeater is installed on the roof, spaces for the installation must be considered.

#### Conditions for the Installation space

Installation of the cabinet requires the following spaces.

##### 1) Roof

- Do not install the cabinet near heavy equipments or water tanks for load distribution.
- Establishes the Cabinet in order for the good air circulation of the rear side.
- Make sure there is a passage for the equipments to carry the cabinet.

##### 2) Field

- Select the installation location on a higher ground level to prevent the cabinet from being inundated.
- Install the cabinet at a distance of at least 5m from the stream or the river.
- Make sure there is a passage and parking space for vehicle to carry the cabinet.
- Install the cabinet in where there is no obstacle visually and physically.
- Make sure to level the slope when installing on a slope in a mountain area.

#### Precautions

Check the followings before installing the cabinet.

##### 1) Roof

- Avoid the location in which any accidental or intentional damage may occur.
- Do not install the cabinet on the weak slab.
- Do not install the cabinet on the building with the seriously damaged wall.

##### 2) Field

- Do not install the cabinet on poor ground, sandy soil, or muddy ground.
- Do not install the cabinet in a ditch, river, or frequently flooded area.
- Do not install the cabinet on any locations that are easily frozen.
- Do not install the cabinet near the road.
- Make sure to installation after securing safety facilities if installing it near the road.
- Do not install the cabinet in damp and humid areas.
- Take proper measures against salt when installing the cabinet in the coast.

## Carrying and loading

- Be careful not to cause any accident when loading the cabinet or carrying it to the installation site and not to be damaged when handling it.
- To prevent corrosion, carry the cabinet in silver vinyl or a wooden box.
- Warning: To prevent all possible damage, do not unpack the box until the cabinet is carried to the installation location.
- Do not load excessive material on the top or cover of the packing.

### 3.2.2 Installing support

The NOTCHCELL repeater can be installed on a roof, an electric pole, or a large steel tower.

See the standard of the constructor for the installation on the steel tower or the electric pole.

### 3.3 Installing the repeater & Antenna

The installation methods of the repeater vary depending on the types of support (steel tower), location, and demand of the carrier. This standard specifies the general supporting methods and is subject to the types of support.



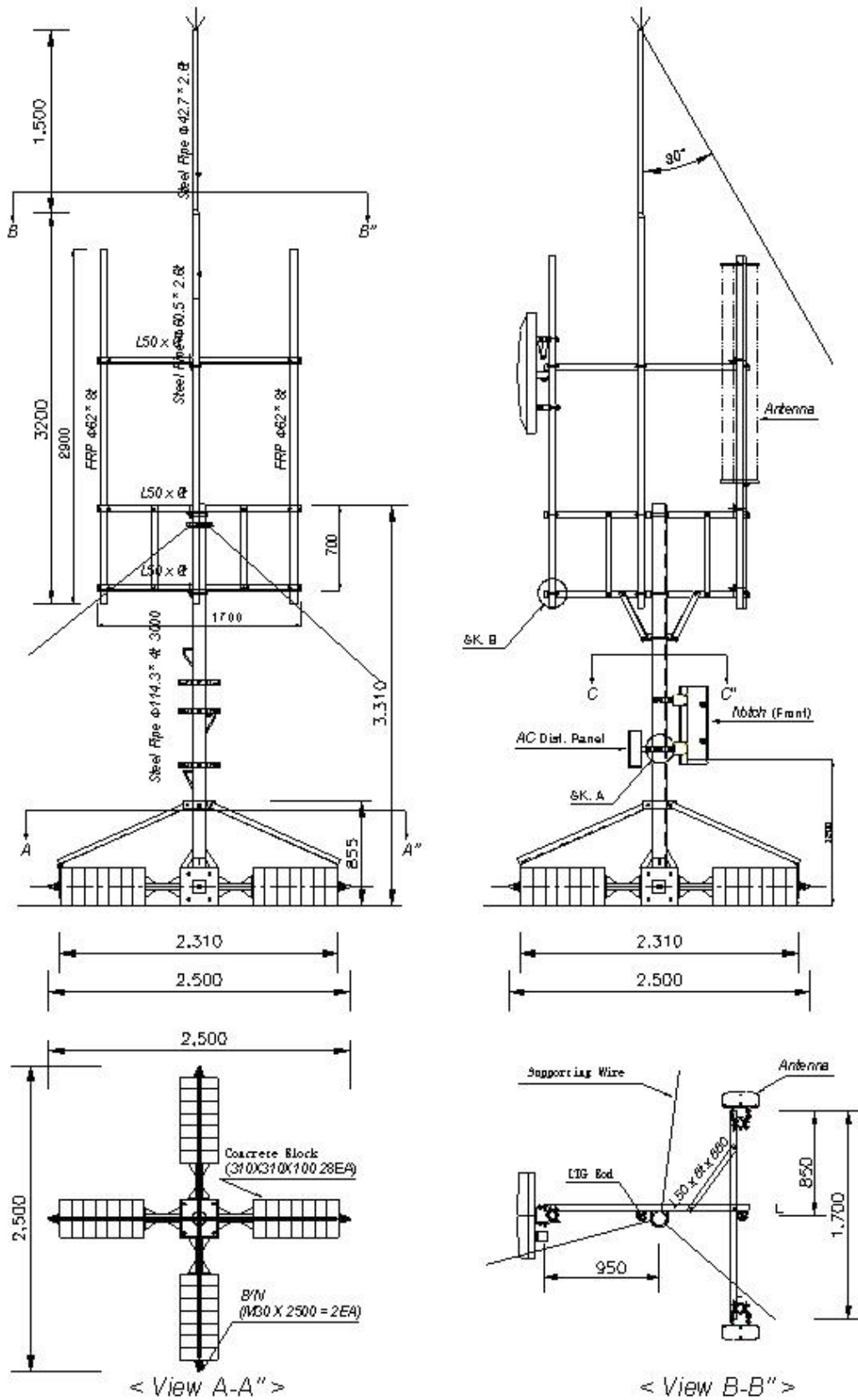
[Figure 3-1] Definition of assemblies (ex. electric pole)

### **3.3.1 General**

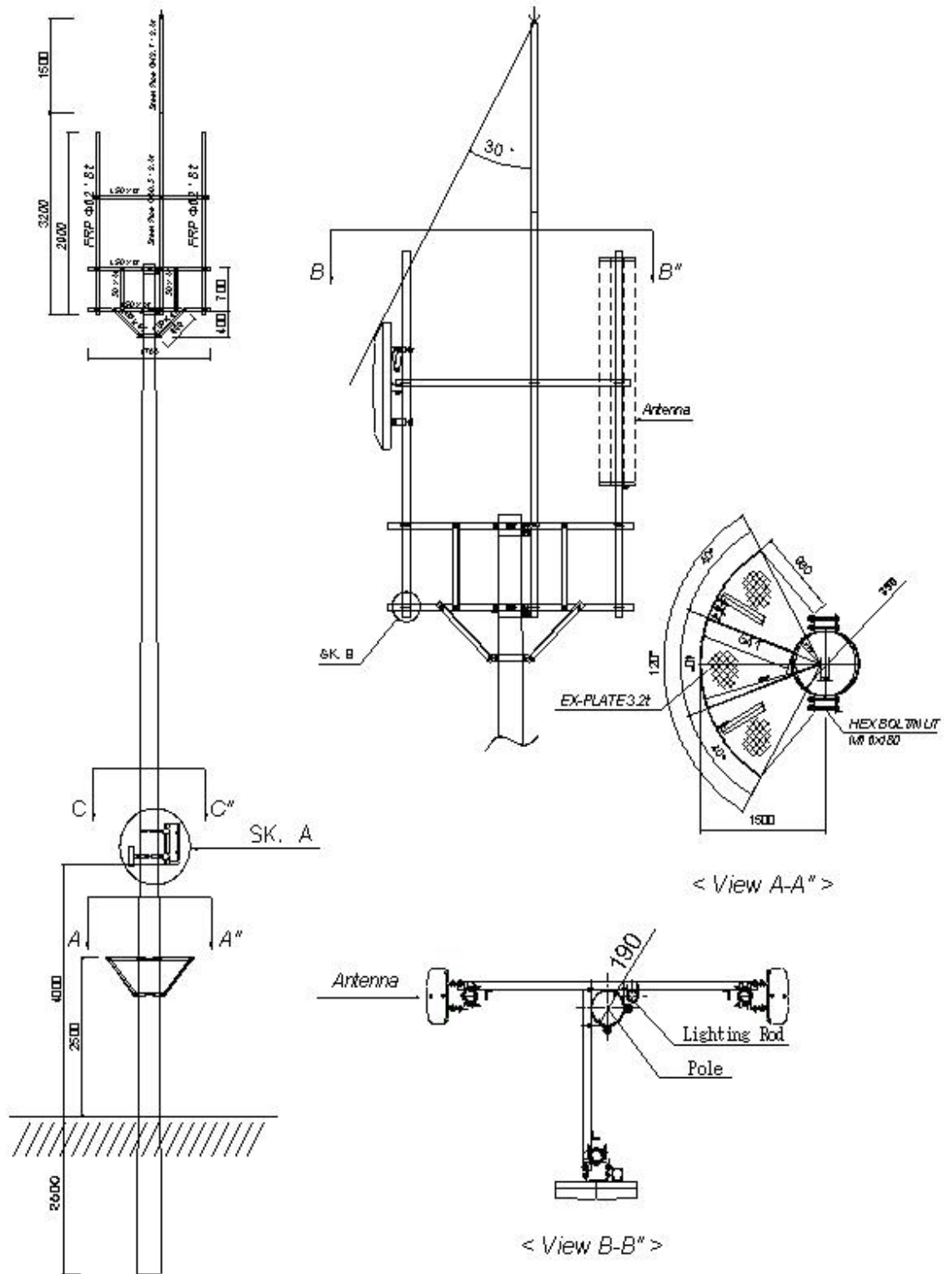
- Check the level of ground when installing the repeater.
- Check if there is enough space for maintenance.
- If required, install branches to secure the safety of the steel tower.
- Fasteners must be melted and zinc plated.
- Use two nuts for a bolt to prevent the connection from becoming loose.
- If the repeater is installed too high, set up the safety scaffold.

### **3.3.2 Installing band**

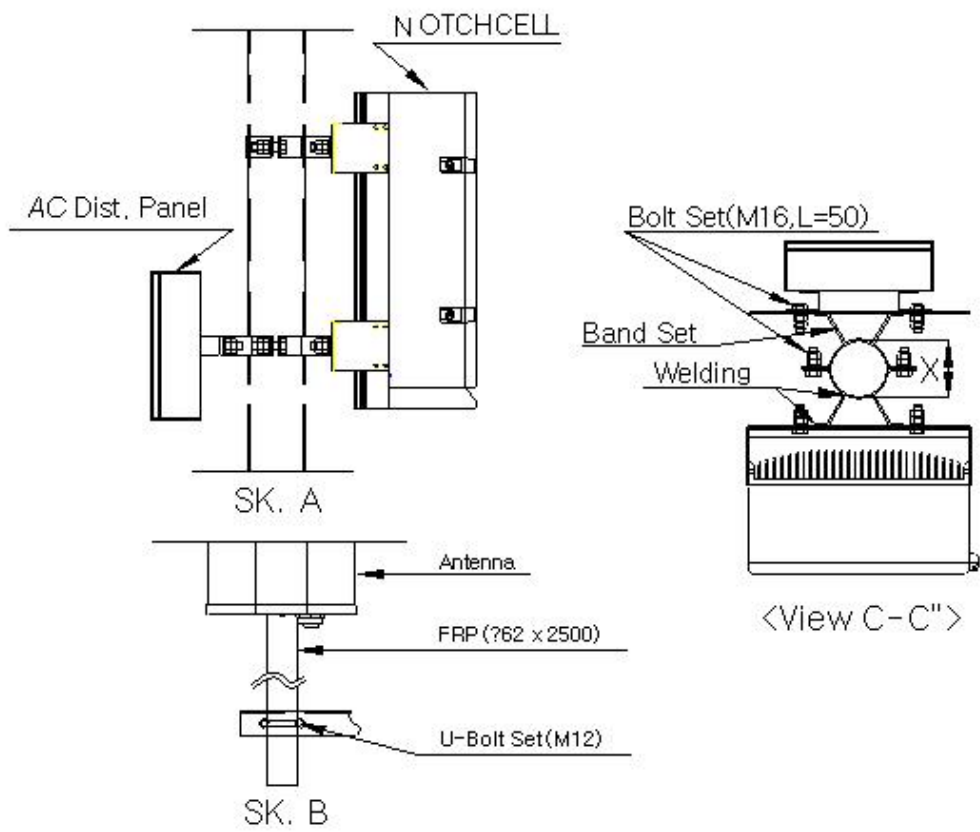
- When installing the repeater on a cylindrical support such as steel pipe and steel pole, manufacture and install the band in accordance with the size of the support.
- When installing the repeater on the roof, the standard height to the bottom of the repeater shall be 1.2m.
- Install the AC distribution panel near the repeater or in the rear of the repeater.



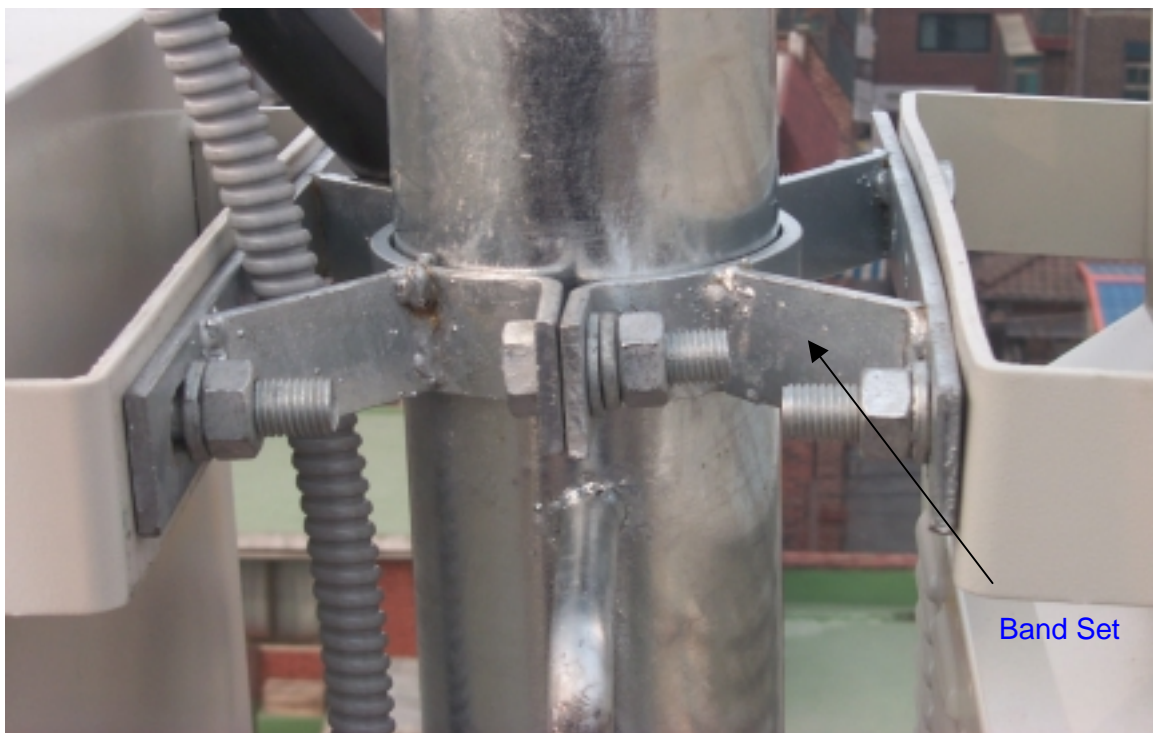
[Figure 3-2] Band installation diagram 1 (steel tower type)



[Figure 3-3] Band installation diagram 2 (electric pole type)



[Figure 3-4] Band installation diagram 3 (location of cabinet)

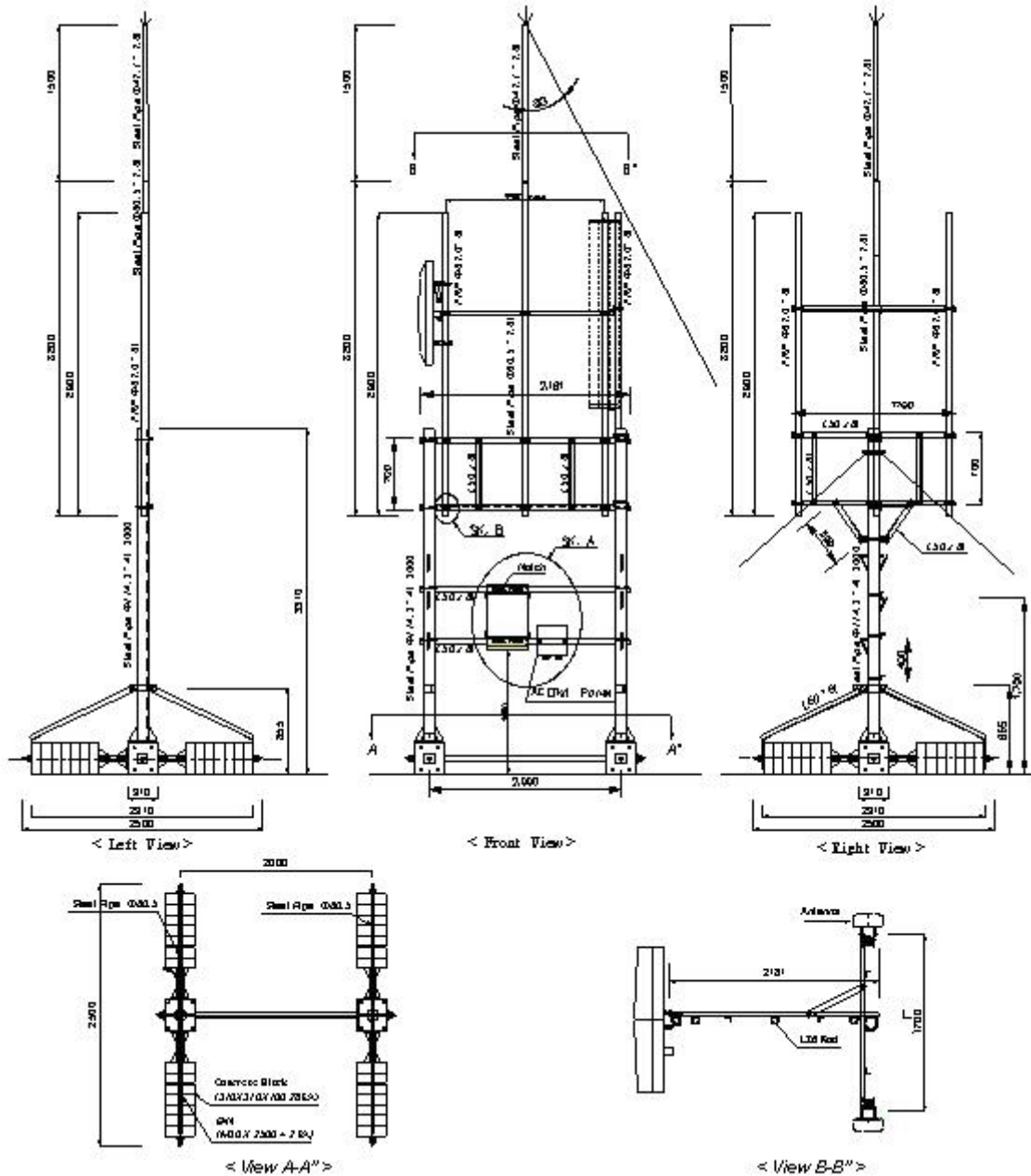


[Figure 3-5] Band set

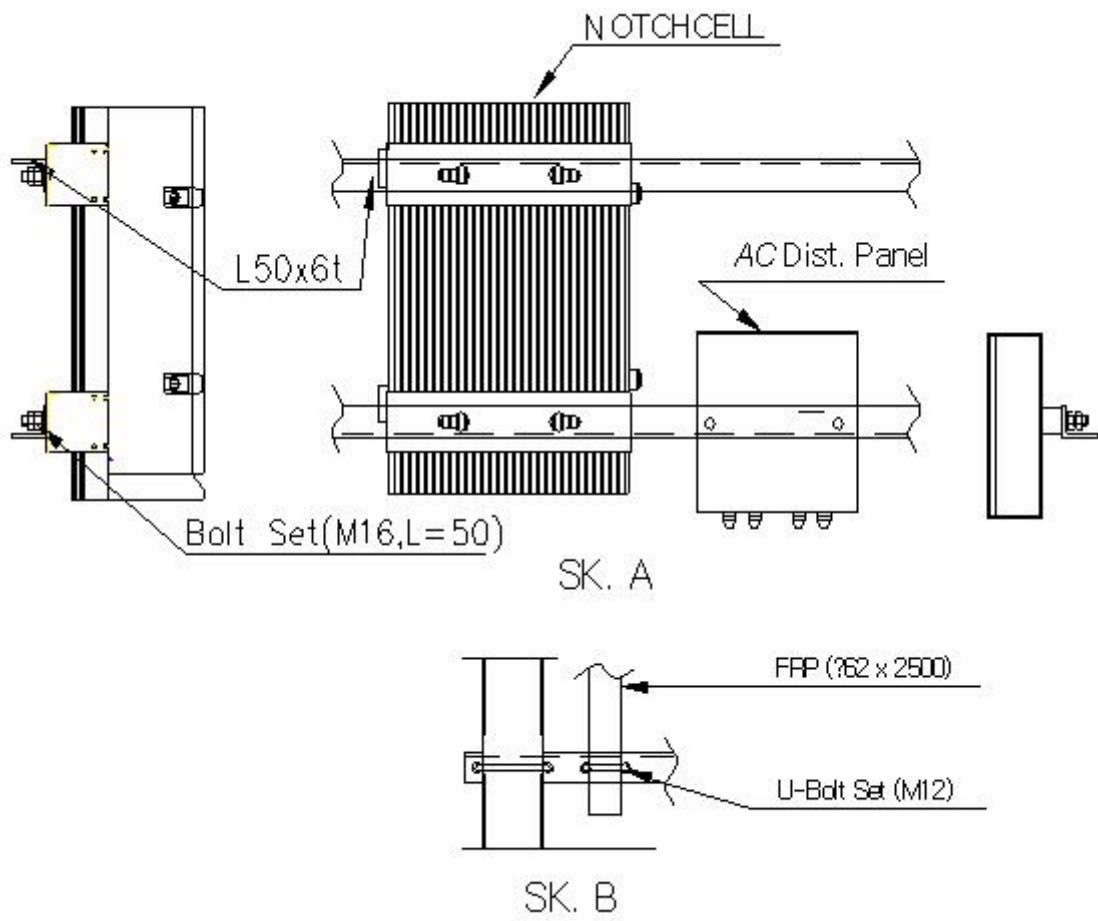


## Installing L-Type angle

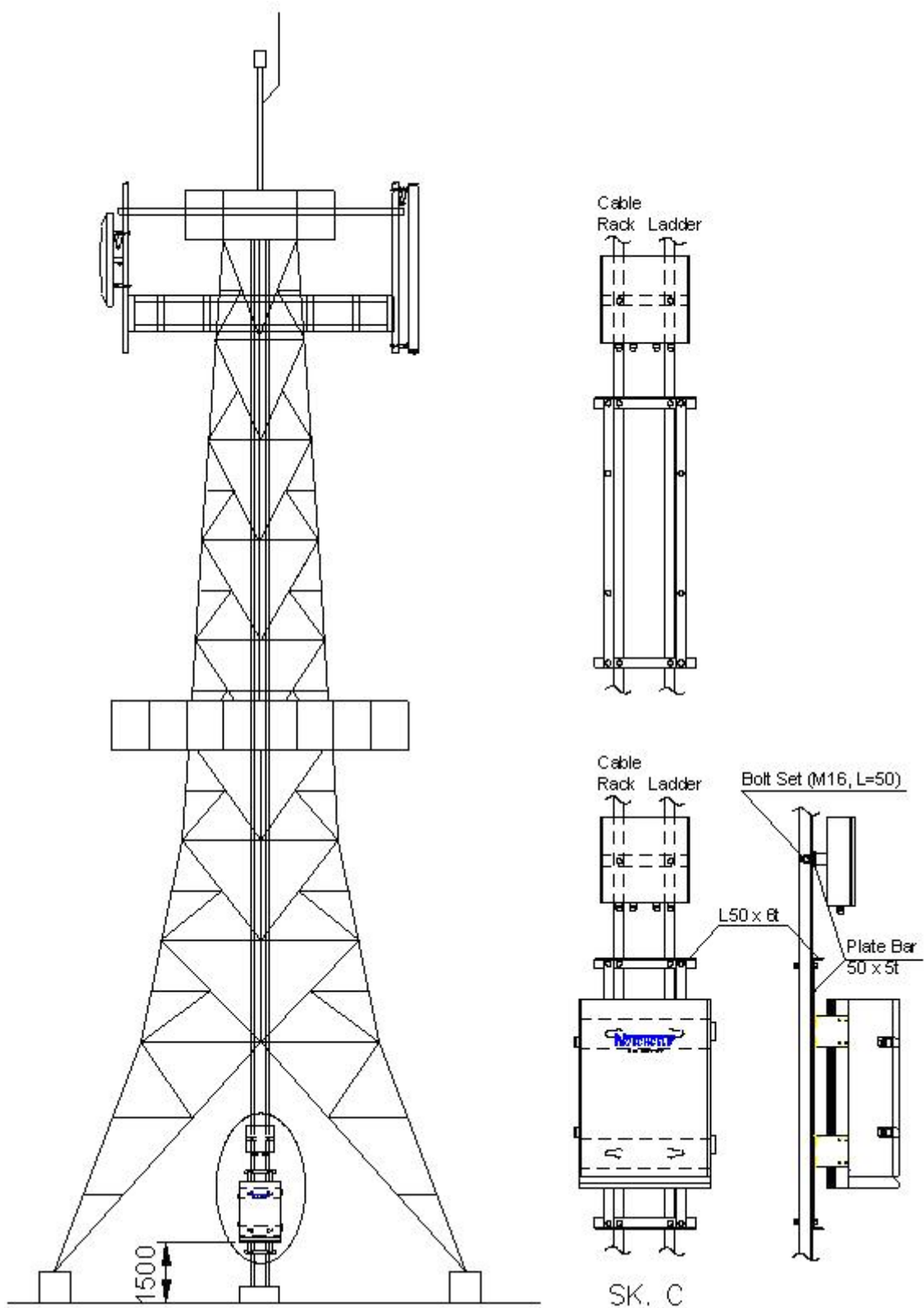
- The AC distribution panel shall be, in principle, on the left of the repeater.
- When installing the repeater on the roof, the standard height to the bottom of the repeater shall be 1.2m, and 4m when on a field.



[Figure 3-6] L-Type installation diagram 1 (steel tower type)



[Figure 3-7] L-Type installation diagram 2 (location of cabinet)



[Figure 3-8] L-Type installation diagram 3 (steel tower type)

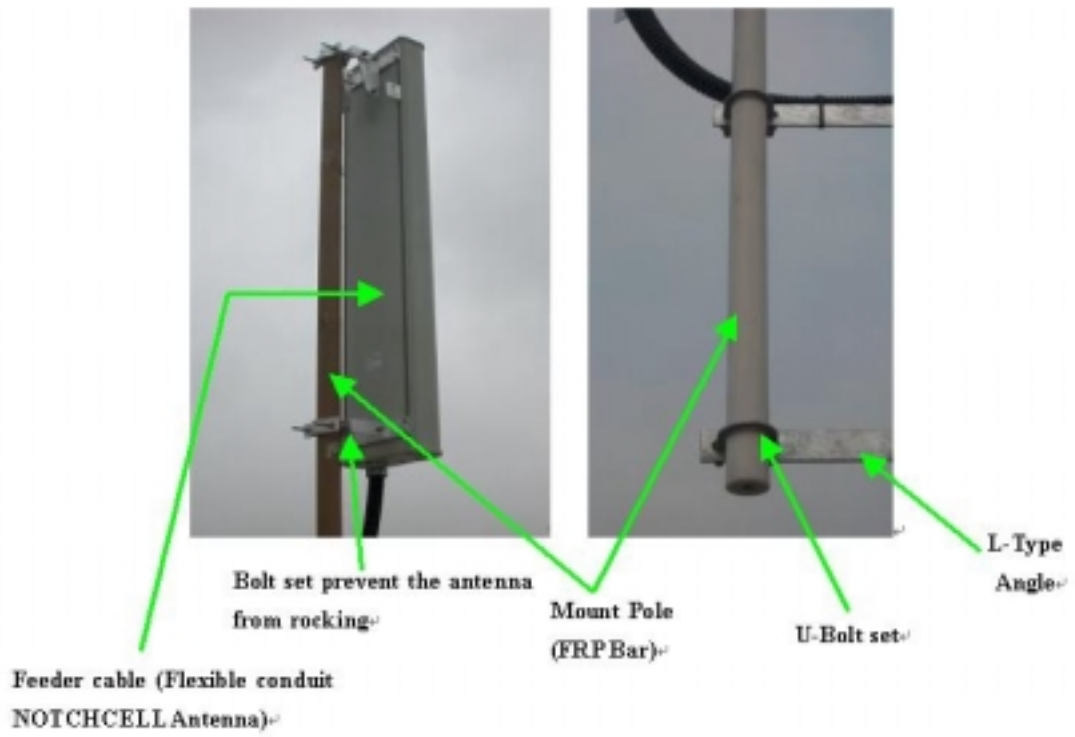
### 3.3.3 Installing Antenna

#### Precautions

- Antenna is a precise material. Make sure of no damage or deformation on it through the careful installation.
- Do not apply excessive force nor work in a hurry.
- The retainers shall be zinc plated.
- Set the accurate direction of the antenna with the transit when setting up antenna support and its installation direction.
- Select the location where radiating or receiving the radio wave from the antenna is not disturbed by neighboring buildings or other topographical features or where bad influences can be excluded.
- Select the location where the antenna is electrically isolated enough from spurious wave or high voltage cable that may block the radio wave radiation or reception.
- Load generated by the Antenna must be evenly distributed on the steel tower. It must be also applied on the main material of the steel tower.
- Each Antenna supporting bar must be fixed under the safety angle (60° ) of lighting rod.

#### Installing Antenna

- Fix the Antenna firmly to stand against external impact and wind.
- For isolation, FRP ( $\Phi$  62x2500) shall be used as the Antenna fixing bar.
- The Antenna shall be installed at a distance of minimum 1.5m from the Donor Antenna and the Distributor Antenna.
- Fix the Donor and Distributor antenna-fixing bar (FRP) onto at least 3 spots on the steel tower with the U- Bolt

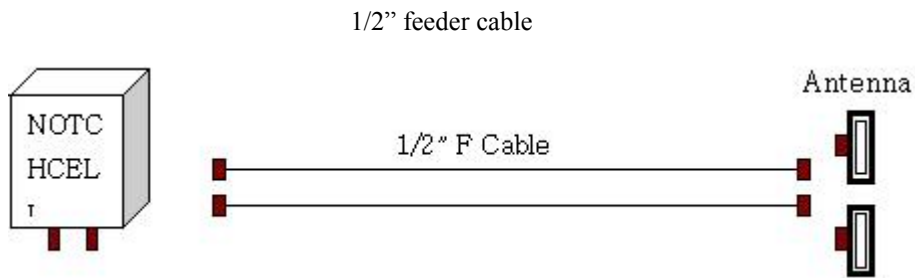


[Figure 3-9] Antenna Installation

### 3.3.4 Installing the feeder cable

#### Installing the feeder cable

- 1) Connection between the antenna and the repeater
  - Use two NOTCHCELL Antennas.
  - Install a pair of 1/2" cable from the arrestor on the bottom of the repeater cabinet to the Antenna.
  - The Standard of feeder cable between the Antenna and the repeater shall be conformed to that of the carrier.
  - The Connector for the feeder cable and the connector for the 36mm Flexible Conduit End Cap are installed on the bottom of the repeater and the NOTCHCELL Antenna.
  
- 2) Connecting the feeder cable connector



[Figure 3-10] 1/2" Feeder Cable Diagram

[Table 3-1] Example of Connectors for 1/2" feeder cable

Item		ARRESTER	1/2" F Cable		Antenna
Connector	Type	N-Female	N-Male	Din-Male	Din-Female
	Q'ty	-	2	2	-
Feeder cable	Type	-	1/2" F Cable		-
	Q'ty	-	2		-

### 3) Cautions in the installation of the feeder cable

- Install the cable in the shortest distance, if possible, between the Antenna and the repeater.
- The selected cable path must not affect the appearance of the building or the station.
- When installing the repeater in a general building, select the cable path in which the feeder cable is not damaged by outsiders or other factors.
- Select the feeder cable path with less curves and attach the feeder cable tag.
- The VSWR in the power feeder must not higher than the standard at the completion of the work.
- Do not use the damaged feeder cable.

### 4) Installing/ tying the feeder cable

The installation of the feeder cable is sensitive to the bend radius and humidity.

Therefore, the following regulations shall be observed.

- Maintain the minimum bend radius. (Higher than the standard presented by the manufacturers)
- he cable must not be entangled.
- Do not apply excessive force to the feeder cable to prevent bent insulated conductors or dug coverings.
- The outer connecting part of the connector must be waterproof.
- Tie the cable at every 50cm.
- Tie the cables firmly so that they shall not be affected by external impact.
- Use the bending machine if required to bend the cable.
- Cut the feeder cable with a hacksaw and clean out the cut area.

### 5) Feeder cable connector

The followings shall be observed at the assembly of the feeder cable connector.

- Cut the feeder cable carefully to prevent the inflow of water, steel and lead strip, or dust.
- Clean the connector and the gasket connector to keep airtight.
- Do not apply excessive force nor work in a hurry.
- Avoid connection work at the time of rain. If it is unavoidable, be careful to prevent the inflow of rain to the connecting part of the feeder cable connector.
- Install the 1/2" feeder cable by inserting it into the shield cable and 36mm flexible conduit. In case of the 7/8"feeder cable, install the cable only.

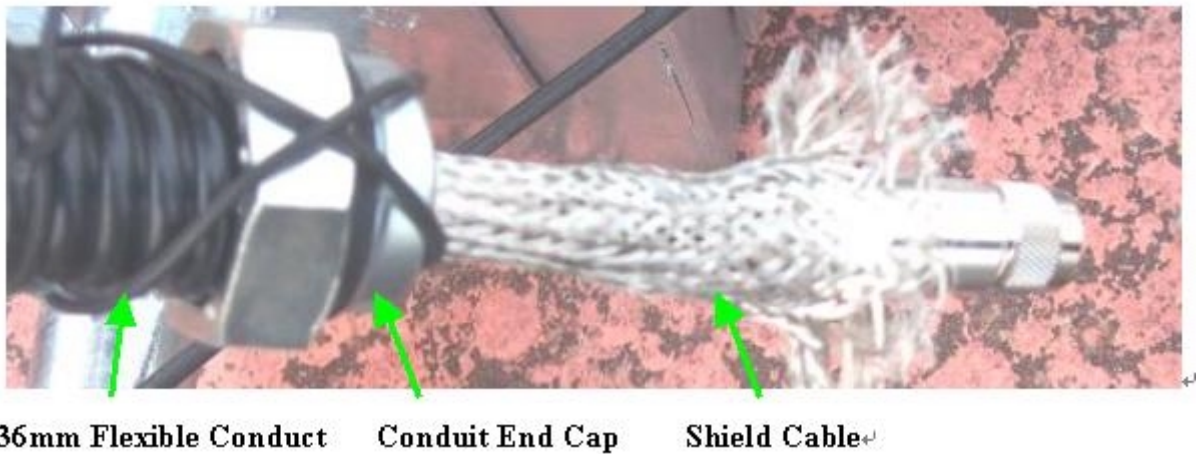
The installation of the 1/2" feeder cable is as follows

- Cut the 1/2"feeder cable, Shield cable and 38mm Flexible Conduit in a necessary length.  
Insert 1/2"feeder cable into the Shield cable, and then assemble the connectors at both ends.
- Compress the Shield cable on the Antenna side with the Heat Shrink Tube.



[Figure 3-11] Shield Cable and Connector

Assemble the Conduit End Cap (repeater accessory) at both ends of 36mm Flexible Conduit.  
 Insert the assembled 1/2" feeder cable (shield cable) into the 36mm Flexible Conduit.



[Figure 3-12] Feeder Cable at Repeater Side

After installing and tying the cable, connect the connector to the bottom of the antenna and then apply the Conduit End Cap.

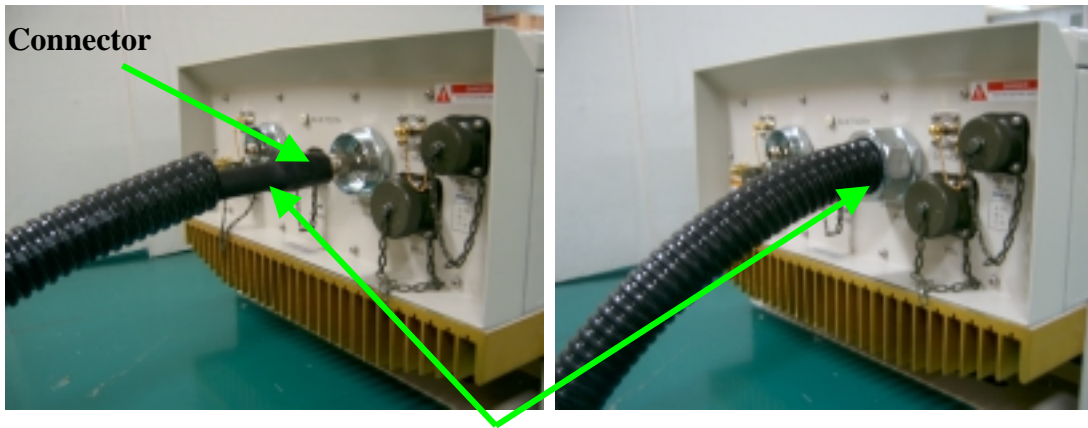


[Figure 3-13] Connector on the Antenna Side



Compress the Shield cable on the repeater with the heat shrink tube.

Connect the feeder cable connector to the arrester onto the bottom of the repeater, and then apply the Conduit End Cap.



### Conduit End Cap

[Figure 3-14] Installing the connector on the repeater side

## 3.3.5 Grounding

Three types of grounding are applied - system grounding, arrester grounding, and steel tower grounding.

The arrester and the fixing studs are installed on the bottom of the repeater.

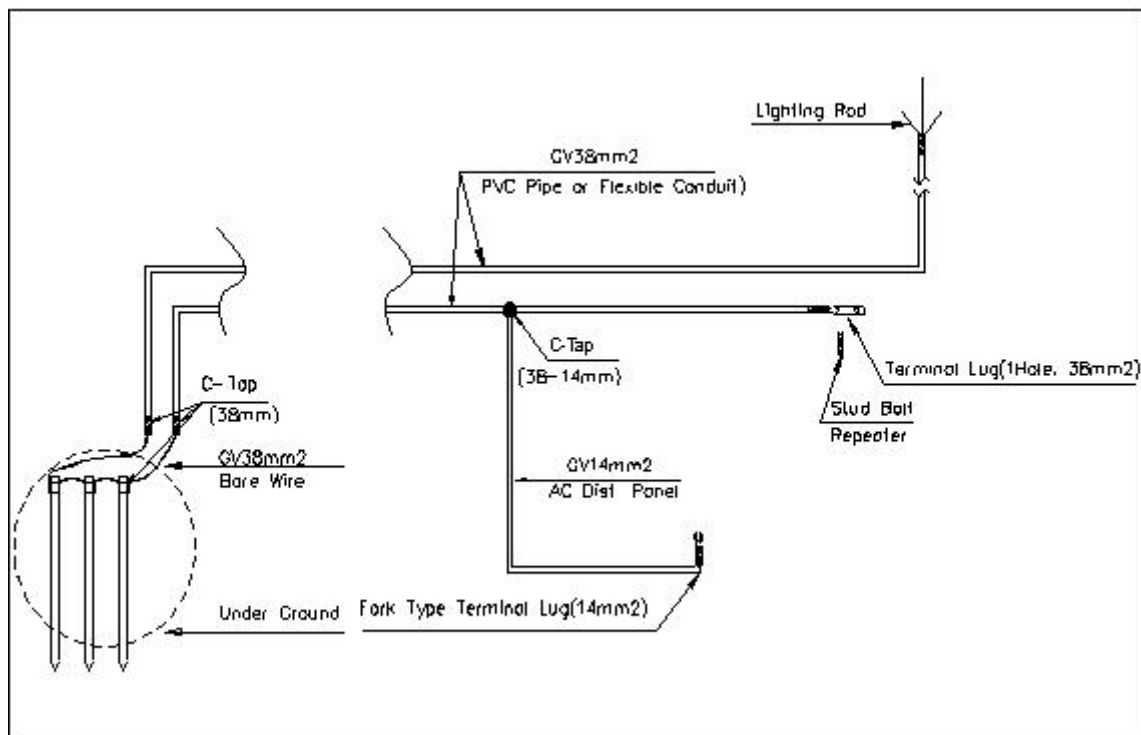
The steel tower grounding and arrester grounding shall be in conformity to the standard of the steel tower manufacturer.

### General

- Use the GV cable for the grounding.
- Branch point shall be finished with C-tap and the heat shrink tube. When branching off outside, make sure to prevent the inflow of rain.
- Grounding shall be, in principle, connected from the Under Ground grounding.
- Install the grounding cable with PVC Flexile Pipe and Flexible Conduits for the external protection.

## System grounding

- The Under Ground shall be made with up to 3 ground bars or with ground resistance of 20Ω or lower.
- After excavating the ground to 70Cm from the surface, cast the ground bars at a distance of at least 3m between one another.
- Connect the ground bars to the PVC Pipe with Bare Wire(38mm<sup>2</sup>) and C-Tap.
- Connect GV 38mm<sup>2</sup> x 1C to the stud on the bottom of the cabinet with the underground bar.
- Use the 1 Hole Terminal Lugs, and finish with the Green Shrink Tube.
- For the arrester grounding of the steel tower, connect GV 38mm<sup>2</sup> x 1C from the Under Ground



[Figure 3-15] Ground Cable Diagram

## AC distribution panel grounding

For Surge Protector ground of the AC distribution panel, connect GV 14mm<sup>2</sup> cable to the repeater cabinet grounding cable (GV 38mm<sup>2</sup>), branching it off with C-Tap (38-14mm).

Connect to the ground Terminal Block in the AC distribution panel with the Fork Type Terminal Lug.

### 3.3.6 Installing AC power cable

#### AC distribution panel

Install the AC distribution panel on the steel tower to supply AC power to PSU Box.

1) AC distribution panel specification

The AC distribution panel consists of a Breaker (30A), a Surge-Protector (40KA), a two - hole outlet, and terminal blocks.

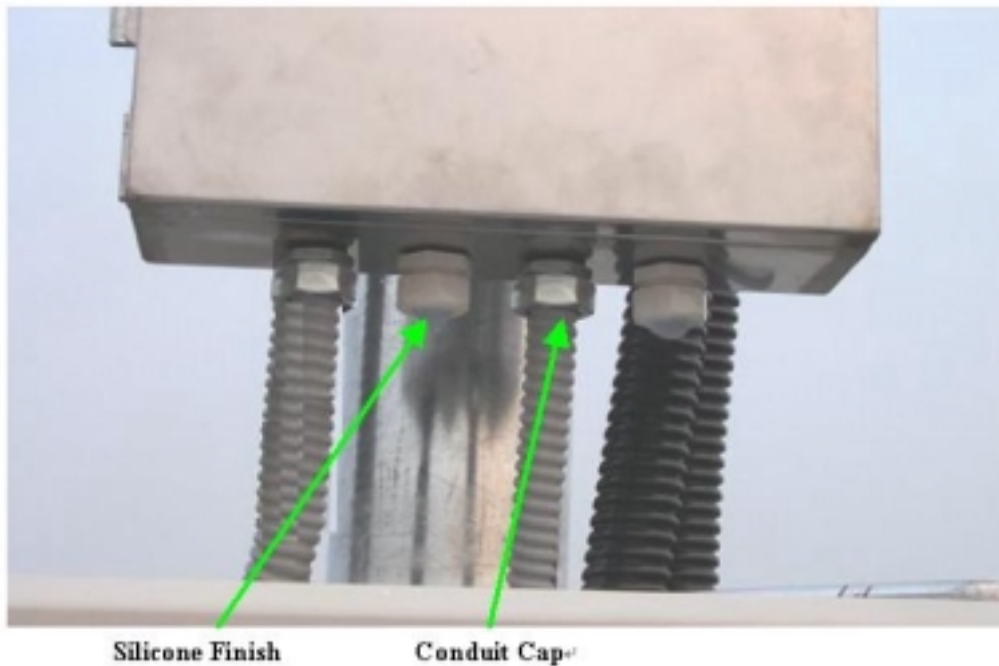
The cabinet shall be waterproof and equipped with cable bushings on the bottom.



[Figure 3-16] AC Distribution Panel Diagram

## Installing AC power cable

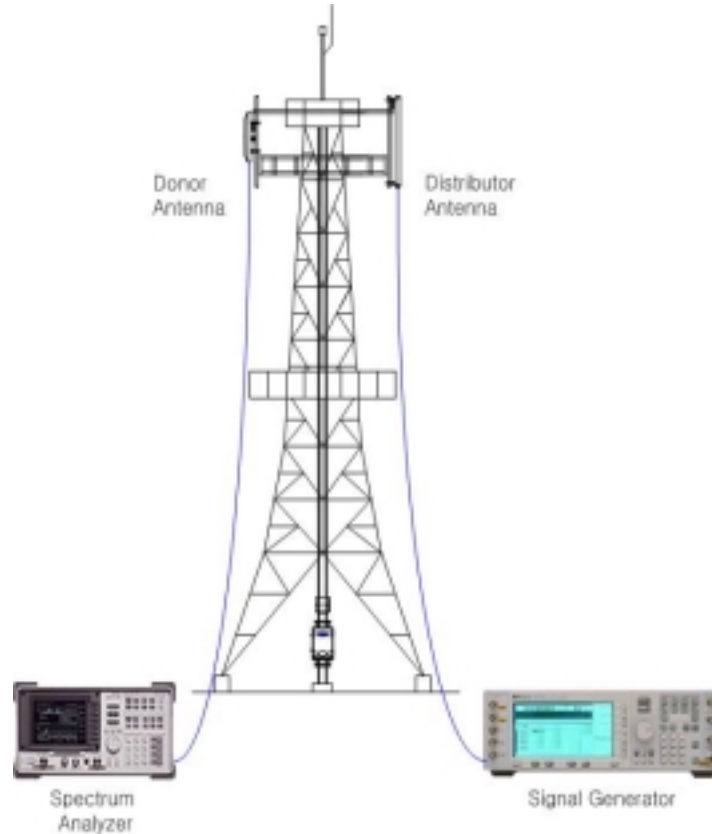
- Connect the CV 5.5mm<sup>2</sup> ~ CV 22mm<sup>2</sup> x 2C power cable from the accumulative wattmeter to the AC distribution panel with the Ring Type Terminal Lugs and Flexible Conduits.
- Use the Fork Type Terminal Lugs when connecting the AC power cable.
- No cable will have contact points inside the conduit, and distribution/connection shall be allowed only in the AC distribution panel.
- Use 22mm flexible conduit when installing the power cable.
- Fix the conduit firmly on the wall or the ground with Saddle.
- Fill up the vacant cable busing holes on the AC distribution panel with silicon.
- Fit the end of the flexible conduits with the conduit caps or by taping.
- All the Flexible Conduits must be sealed tight.



[Figure 3-17] Flexible Conduit End Fitting

## 4. Operation

### 4.1 Isolation test procedure of Antenna



[Figure 4-1] Isolation test

- 1) Set-up the equipment as shown in [Figure 4-1] Isolation test
- 2) Set up the analyzer for the highest possible sensitivity (more than  $-100\text{dBm}$ ) for  $0\text{dBm}$  source-power.
- 3) Set the analyzer to 'peak search mode'.
- 4) After calibrated cable loss between Measurement Equip and Antenna, set the output-power of the generator to  $0\text{ dBm}$ .
- 5) Turn on Signal Generator Output
- 6) Measure the Antenna Isolation, using spectrum analyzer. The minimum isolation is the highest value of the curve (excepting carriers transmitted by surrounding BS).
- 7) Change measurement-ports to check for the opposite direction by repeating the measurement procedure.
- 8) Repeat the test for the opposite path of the repeater. Step (1) to (7).

Isolation per carrier frequency is worse value.

### 4.1.1 Power-up sequence

- 1) Confirm whether LGE NOTCHCELL Repeater was linked normally with Donor Antenna and Distributor Antenna or not.
- 2) Confirm whether Main box and PSU box's AC input and DC connection cable were connected normally.
- 3) Turn AC input switch of PSU Box interior on.
- 4) Confirm whether various LED (AC Fail, DC Fail, and BATT . Fail)s of PSU box interior are normally. (Normal: Yellow, abnormal: RED)  
Only, BATT. Fail LED does normal action in following condition.
  - PSU box's DC IN Connector has to be linked to Battery.
  - BATT . Switch has to be established by ON.
- 5) Confirm state of ARCU board's POWER, RUN, WNMC, GUI, OPERATING LED of Main box interior.
- 6) POWER: When +5V is powered ARCU board, Yellow LED is lighted.
- 7) RUN: When ARCU board's CPU acts normally, Yellow LED twinkles.
- 8) WNMC: When send and receive Data between ARCU and ARIU's Modem, Red LED twinkles.
- 9) GUI: When receive Data from ARCU board in monitoring PC, Yellow LED twinkles.
- 10) OPERATING: Orange LED twinkles by 1 second cycle after normal booting of ARCU board.

### 4.1.2 Repeater control application

- 1) Execute LGE NOTCHCELL's Local GUI program "SPCS gui.exe".
- 2) Connect Local OMT port and PC's data communication port using communication cable (MS 10SL \_3 pin to D-sub \_9 pin type).
- 3) After Local GUI does Logging, confirm whether data communication between Repeater and PC is normal.
- 4) Confirm whether Downlink path's RSSI satisfies dynamic range (- 55dBm ~ - 30dBm).
- 5) When set Downlink path's maximum output and maximum gains, consider and decide RSSI and antenna isolation.

Also, Repeater's maximum gains establishment considers 15 dBs Margin in isolation of antenna.

$$\text{Repeater's maximum gain} = \text{Antenna isolation} - 15\text{dB (Margin)}$$

- 6) After decide Downlink path's output and gains according to user's request, do DL PA toggle switch enable in Local GUI's control window.
- 7) When inspect Downlink path's output waveform, inspect using Monitoring port (SMA-Female type) on Main box's right side lower column.

- 8) When set Uplink path's maximum output and maximum gains, consider and decide RSSI and antenna isolation.

Also, Repeater's maximum gains establishment considers 15 dBs Margin in isolation of antenna.

$$\text{Repeater's maximum gain} = \text{Antenna isolation} - 15\text{dB (Margin)}$$

But, in the case of Uplink path, when set output and gains because it is no fixed input level, set on the basis of Noise level.

**Up Link Gain = 113 [dBm]**

$$\begin{aligned} &+ \text{BS\_ Noise Level [dBm]} \\ &- \text{Repeater\_Feeder cable loss [dB]} \\ &- \text{Donor ant. Gain [dBd]} \\ &- \text{Path Loss [dB]} \\ &- \text{BS\_Ant. Gain [dBd]} \\ &- \text{BS\_Feeder cable loss [dB]} \end{aligned}$$

$$\text{Air Loss (dB)} = 20\log(1/\lambda) + 20\log(4\pi) + 20\log(d)$$

Only, preceding formula recommends to apply in Line of site section of BS and Repeater.

However, can be different from noise level and theoretical arithmetic level by change of RF environment.

- 9) When inspect Uplink path's output waveform, inspect using Monitoring port (SMA-Female type) on Main box's left side lower column.
- 10) In Local GUI's control window, consider site situation about items below and establish properly.
- Parameters to act Alarm that correspond to each input/output
  - Parameters to act ALC function
  - Parameters to act Shutdown function
- 11) After input each setting value in Local GUI's control window, moving by monitor window, confirm alarm's existence and nonexistence.
- 12) Erase alarm that happen at setup process in Local GUI's History window.

## **NOTCHCELL Operation Manual**

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