

# **i-DEN RF REPEATER USER MANUAL**

**Version 1.0**

**2007**



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## 1. Overview

iDEN (Integrated Digital Enhanced Network) repeater is an OTA type of repeater based on RF signal boosting to enhance in-building coverage using frequency bandwidths operated by iDEN system.

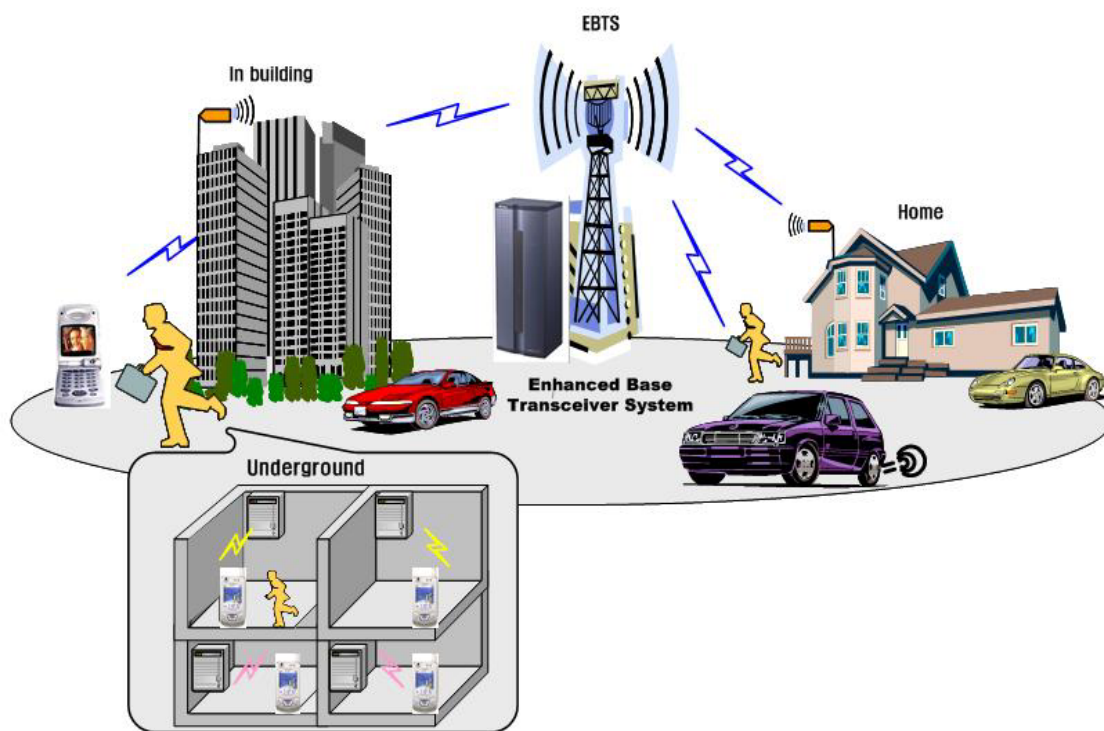
iDEN repeater amplifies received EBTS(Enhanced Base Transceiver System) OTA signal and relays it to fill an in-building coverage. The amplified signal can be distributed by repeaters installed in various poor coverage where telecommunication service can not be provided such as buildings, homes and in-building parking lots..

It is designed to be flexibly applicable for every frequency in iDEN spectrum bandwidth with excellent selectivity capabilities of frequency in broad range for Down Link and Up Link service through one UP/DOWN Converter and minimizes interference of other signals. For stable service of repeater installed in the field iDEN (Integrated Digital Enhanced Network) repeater controller has two management functions; the local repeater management function to continuously manage and control the repeater and remote repeater management function to remotely inspect and control through intensive inspection system.

iDEN (Integrated Digital Enhanced Network) repeater is interlocked with iDEN repeater intensive inspection system using modem.

The basic structure of iDEN repeater is supported by one input Port and one output Port. The inner section of repeater composes of One-Module of DL(Down Link) Converter and UL(Up Link) Converter, PSU(Power Supply Unit), Multiplexer, Controller, and PAU(Power Amplifier Unit) in order to achieve optimized size and high effectiveness.

All modules except PAU are commonly used for cost effective operation. For instance replacement of PAU enables change of repeater output.



< Fig. 1 > Configuration of iDEN Network



## 2. Components

### 2.1 Packing List

No	Description	quantity	Remark
1	iDEN Repeater	1	
2	AC Power Cable	1	
3	Ground Cable	1	
4	Bolts to fix the holder	4	
5	Key	2	
6	CD	1	Manual

<Table 1 > Packing List



< Fig. 2 > Components of iDEN Repeater

## 2.2 System Quick View



< Fig. 3 > Front & Back View of iDEN Repeater



< Fig. 4 > Side View of iDEN Repeater



< Fig. 5 > Bottom View of iDEN Repeater

### 2.3 Warning and Hazards



**WARNING! ELECTRIC SHOCK**

**Danger of electric shock!**

**Switch off while( it is ) maintained and inspected!**



**WARNING! EXPOSURE TO RF**

**Working with the repeater while in operation, may expose the technician to RF electromagnetic fields that exceed FCC rules for human exposure.**

**Visit the FCC website at [www.fcc.gov/oet/rfsafety](http://www.fcc.gov/oet/rfsafety) to learn more about the effects of exposure to RF electromagnetic fields.**

## **RF EXPOSURE & ANTENNA PLACEMENT**

**Actual separation distance is determined upon gain of antenna used.**

**Please maintain a minimum safe distance of at least 20 cm while operating near the donor and the service antennas. Also, the donor antenna needs to be mounted outdoors on a permanent structure.**

## **FCC STATEMENT**

**This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.**

**Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.**

### **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.**

### 3. Features and Specification

#### 3.1 Electrical Specification

Item		Specification	Remark
Frequency Range	800MHz	Downlink : 851~874MHz (Ability to switch 862~869 MHz) Uplink : 806~824MHz (Ability to switch 817~824 MHz)	25kHz Step
	900MHz	Downlink : 935~940MHz Uplink : 896~901MHz	25kHz Step
Amplifier Gain / Output Power per Channel		65dB / 15dBm	iDEN(65/15)
		65dB / 25dBm	iDEN(65/25)
		80dB / 30dBm	iDEN(80/30)
Input Level		-25 ~ -50dBm / Total	iDEN(65/15)
		-15 ~ -40dBm / Total	iDEN(65/25)
		-20 ~ -50dBm / Total	iDEN(80/30)
Ripple		2.5 dB p-p	
Gain Control Range		25 dB(1dB/Step±0.5dB or less)	iDEN(65/15),(65/25)
		30 dB(1dB/Step±0.5dB or less)	iDEN(80/30)
Roll offs		Over Δ65dBc	@Band Edge± 500 KHz
Downlink Adjacent Power	1 carrier	25KHz : 50dBc 50KHz : 55dBc 500KHz : 55dBc 1MHz, 2MHz : 55dBc	
	8carriers	25KHz : 47dBc 50KHz : 52dBc 500KHz : 52dBc 1MHz, 2MHz : 52dBc	
Out of band paging carrier rejection		929~932MHz(3MHz), 940~941MHz(1MHz) Input : -15dBm ~ +5dBm	
900MHz Inter modulation		1870~1880MHz/-105dBm	900MHz only
Spurious RF Emission		-13dBm or less	
Propagation Delay		8us or less	
Noise Figure		5dB or less	@Gain 65dB(Uplink)
		12dB or less	@Gain 40dB(Uplink)
VSWR		1.5 : 1	
Input/output connector		N-Type (Female)	

Input/output impedance	50Ω	
Power	108 ~ 127 VAC, 60Hz	Option -40 to -60VDC 20 to 30 VDC

&lt;Table 2 &gt; System Features

### 3.2 Mechanical Specification

Item	Specification	
Cabinet	Indoor Type	
RF Connector Type(IN/OUT)	N-Type Female	
Dimension (H*W*D)	390*326*190 mm	iDEN(65/15)
	390*326*210 mm	iDEN(65/25)
	390*326*240 mm	iDEN(80/30)
Weight	18.5Kg	iDEN(65/15)
	20.0Kg	iDEN(65/25)
	21.5Kg	iDEN(80/30)

&lt;Table 3 &gt; Figure and Function

### 3.3 Environmental Specification

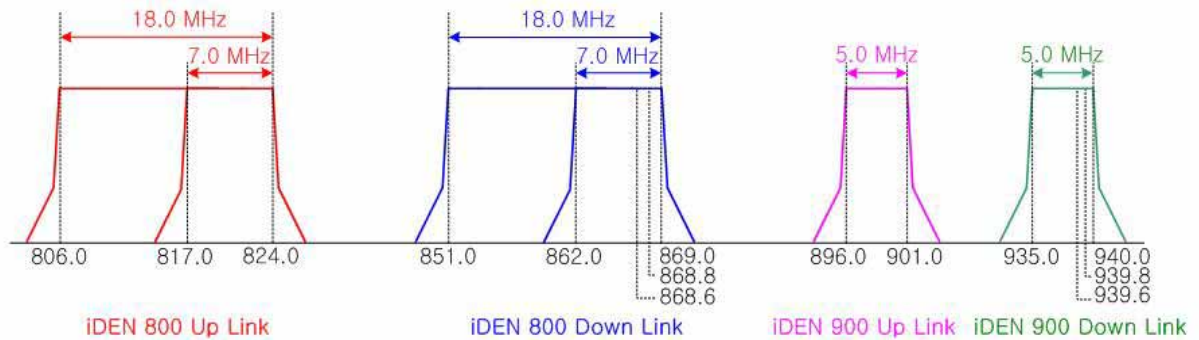
Item	Specification	Remark
Working temperature/ working humidity	-10 ~ 50 / 5 % ~ 95%	Temperature and humidity around cabinets
Power	108 ~ 127 VAC, 60Hz	Option -40 to -60VDC 20 to 30 VDC

&lt; Table 4 &gt; Environmental specifications

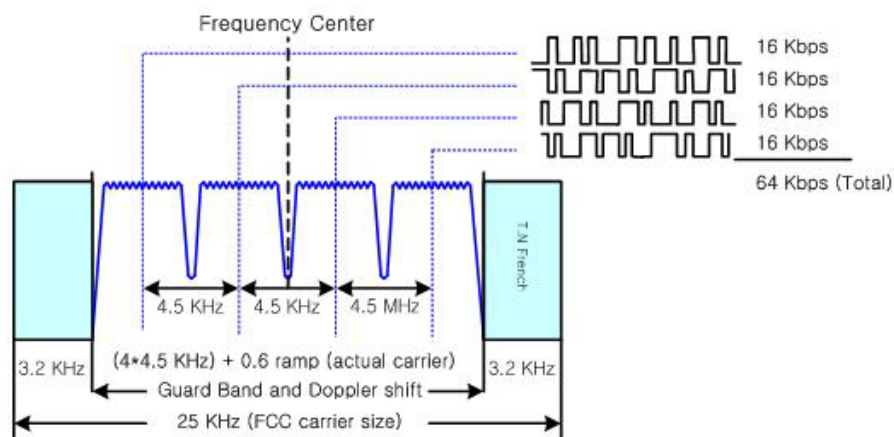
### 3.4 Operational Frequencies

Item		Specification	Remark
Down Link	800 MHz	851 ~ 869 MHz	25kHz Step
		862 ~ 869 MHz	25kHz Step
	900 MHz	935 ~ 940 MHz	25kHz Step
Up Link	800 MHz	806 ~ 824 MHz	25kHz Step
		817 ~ 824 MHz	25kHz Step
	900 MHz	896 ~ 901 MHz	25kHz Step

< Table 5 > iDEN Frequency



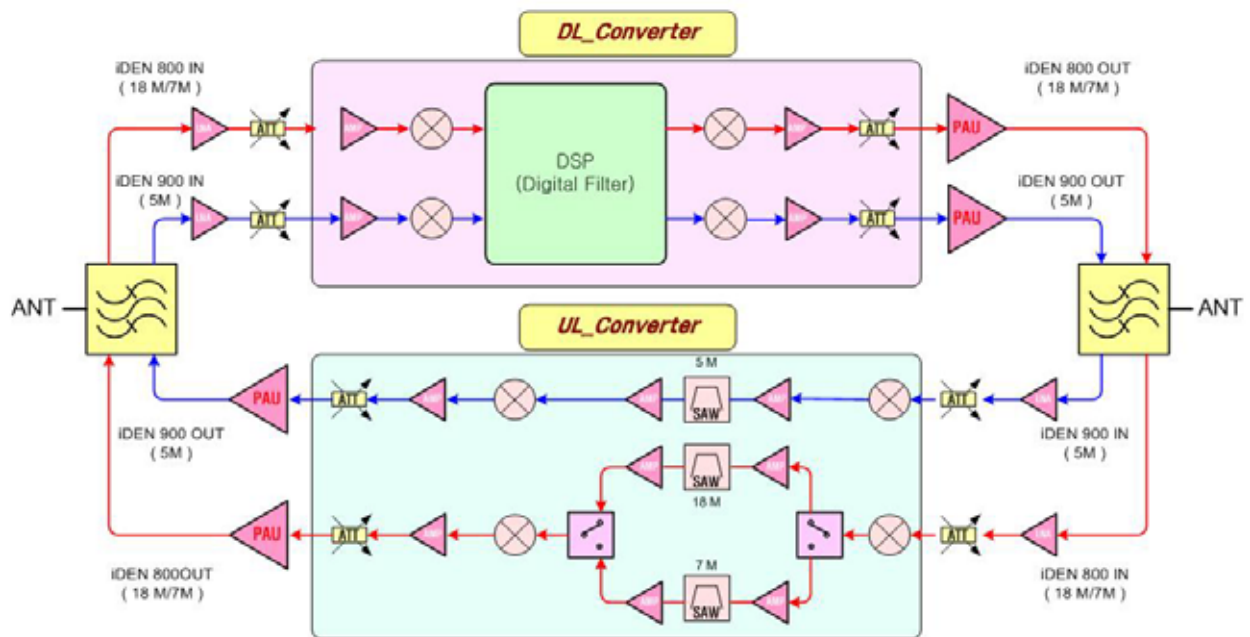
< Fig. 6 > iDEN Frequency



< Fig. 7 > Features of iDEN Carrier

## 4. System Block Diagram

### 4.1 Block Diagram



< Fig. 8 > Block Diagram

### 4.2 Block Diagram description

A cavity type of filter is linked with Donor ANT and Service ANT of iDEN repeater, which selectively passes the operating spectrum bandwidth between the received EBTS signal and terminal signal.

Up/Down Converter Module consists of Down converter, Up converter and Digital Filter of variable bandwidth from Filter to PAU input between Down link and Up link of iDEN repeater. And to handle two bandwidths of 900 MHz and 800MHz the same paired structure is deployed.

Up/Down Converter of Down Link converts EBTS signal input through LNA part to IF frequency(62.5MHz), which feeds into A/D conversion to send it to Digital Filter..

Digital filter is deployed to achieve excellent roll off characteristics ,minimize the impact of other signal by notching adjacent bandwidths and other interfering signal, removes spurious and improves degree of signal separation.

In addition, Up link unlike Down link converts Terminal's RF signal input through LNA to IF



frequency(70MHz) to take roll off nature equivalent to that of SAW Filter, minimizes the impact of other signals by suppressing the adjacent signals to remove spurious and to improve degree of separation.

PAU amplifies iDEN signal at proper output level with the module at the final end to pass through Multiplexer to emit via antenna.

## 5. System Overview

### 5.1 Configuration and Features of System

Modules comprising iDEN (Integrated Digital Enhanced Network) Repeater is arranged for operators and technicians to utilize them effectively.

iDEN RF Repeater's basic structure is wall mount, and if required it is constructed to be installed on 19 inch Rack. And the grounding terminal is attached to the bottom of the repeater..

iDEN RF repeater consists of PSU(Power Supply Unit), Controller, Up / Down Converter, PAU(Power Amplifier Unit), Multiplexer and Isolation Check.



< Fig. 9 > Internal Construction of iDEN Repeater



< Fig. 10 > Bottom View of iDEN RF Repeater

#### 5.1.1 PSU (Power Supply Unit)

AC power source is converted through A/D and D/D to feed stable current to each devices having active elements, which adopts industrial equivalent or above level of parts. It is highly robust physical structure and satisfies all required electrical specification.

Operating power ranges from AC 108- to 127V input and it converts to DC 3.8V, DC 7V, DC 12V and DC 27V for use.

#### 5.1.2 Controller

The controller consists of RCB(RF Control Board) and NCB(Network Control Board) to monitor and control the state of each module of iDEN repeater.

RCB(RF Control Board) is linked to GUI through DEBUG port to collect status information and control modules.ller.

NCB(Network Control Board) enables high-level NMS(Ethernet) communication through RJ-45 port to monitor and control the state. It has LED to display the state in the front panel of NCB' to easily identify any malfunction of Module.

Since the controller is run by exchangeable batteries, when exchanged in a wrong form, it may explode and used batteries must be safely disposed.

#### Caution

Improper replacement of batteries can bring about risk of explosion.

Dispose of used batteries according to manufacturer's instructions.



#### (1) LED

- |                  |  |
|------------------|--|
| a. RF POWER      | : On alarming Red light, On normal running Green LED                     |
| b. RSSI          | : On alarming Red light, On normal running Green LED                     |
| c. VSWR          | : On alarming Red light, On normal running Green LED                     |
| d. OVER TEMP     | : On alarming Red light, On normal running Green LED                     |
| e. UNDER CURRENT | : On alarming Red light, On normal running Green LED                     |
| f. POWER         | : On power admitted Green light, On normal communication Green blinking. |
| h. RESET         | : Controller Reset Button  |
| i. TXD           | : On Data transmitting with Web GUI connected Green blinking             |
| j. RXD           | : On Data receiving with Web GUI connected Green blinking                |

#### 5.1.3 Up / Down Converter

Up/Down Converter consists of Down converter, Up converter and Digital Filter of variable bandwidth from Filter to PAU input between Down link and Up link of iDEN repeater. And to handle two bands of 900M band and 800M band a paired structure is applied.

Up/Down Converter of Down Link converts EBTS signal input through LNA part to IF frequency(62.5MHz), which feeds into A/D conversion to send it to Digital Filter..

Digital filter is deployed to achieve excellent roll off characteristics ,minimize the impact of other signal by notching adjacent bandwidths and other interfering signal, removes spurious and improves degree of signal separation.

In addition, Up link unlike Down link converts Terminal's RF signal input through LNA to IF frequency(70MHz) to take roll off nature equivalent to that of SAW Filter, minimizes the impact of other signals by suppressing the adjacent signals to remove spurious and to improve degree

of separation.

Insertion of band passing filter in front end of Mixer restrains local signal from leaking into Input stage. Mixer adopts parts with the feature of high IP3 to minimize IMD component of system, maintain linearity to minimize impact on the next stage. EBTS signal changed into IF frequency is to be recovered into the original frequency through Up Converter.

Local step for IF conversion is designed to minimize phase noises in order not to reduce quality( $\rho$  value) of waveform that can take place during the conversion process of signals.

RF Block of Down Link Up/Down Converter as Down Link Gain Control Block phase performs AGC and ALC functions to protect devices on over-input of iDEN RF Repeater, and the user may turn On/Off the functions with automatic compensation function for gains depending on the temperature variation of the system.

#### 5.1.4 Multiplexer

A cavity type of filter is linked to Donor ANT of iDEN Repeater, which selectively passes the operating bandwidths among signals of EBTS received from antenna whereas other bandwidths are rejected for the operating bandwidth to be served. which only can be input into LNA end after achieving enough Isolation between Down Link and Up Link. And Up Link operates to minimize Spurious power occurred in PAU.

#### 5.1.5 PAU(Power Amplifier Unit)

PAU deploys parts with reliability and durability of higher P1dB value considering spurious characteristics. It monitors output levels at all times by linking to control part. So when main problem happens, it reports to upper level and if required by the user PAU can be switched On/Off.

Down Link PAU amplifies iDEN signal to proper output level and supply controller with VSWR information of output port and output level.

Also it detects its own operating temperature and supply controller with information on device failure to check normal operation state of module.

#### 5.1.6 Cabinet

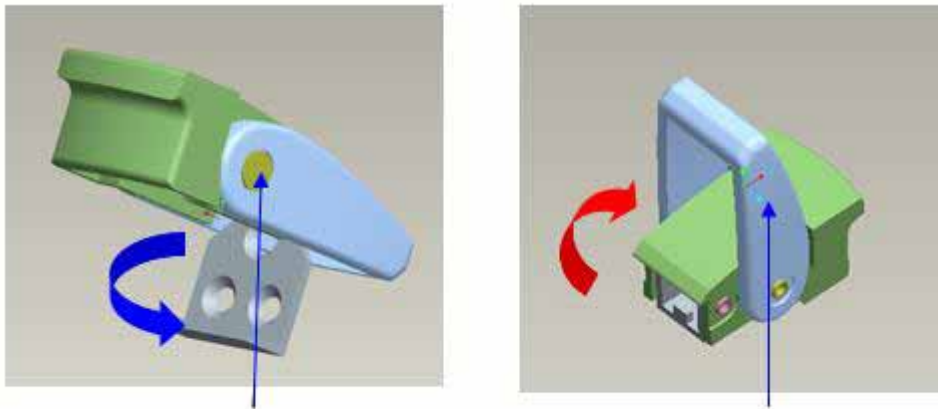
Cabinet of Repeater has die-casting structure enabling modules to be installed inside of door panel to enhance implementation efficiency and minimize the size of cabinet.

Heat fin size of repeater is calculated upon the output level to show an excellent heat dissipation effect .

(1) Latch

Latch is well sealed and locked to secure safety in which it can play a major role in preventing moisture and vibration.

With automatic lift function of Head, door can be easily opened and closed. Minimized gap of shafts of Latch prevents shaking.



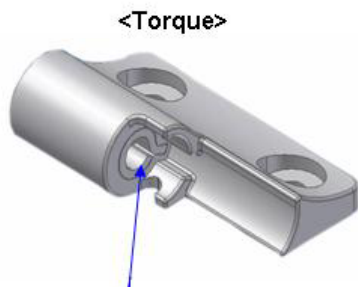
**Strengthening Shaft hardness and recess**

**Automatic lift function of Head**

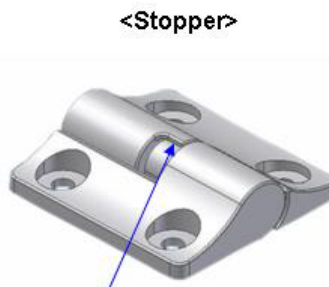
**< Fig. 11 > Latch Structure**

(2) Hinge

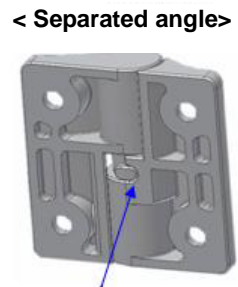
On assembling and maintaining cabinet it is designed to consider convenience and rapidity for its opening and closing, and it has 3 merits such as Torque, Stopper and Separation Angle function.



**Torque function realization**



**A stopper function when opening cabinets**



**Separation when opening cabinets**

&lt; Fig. 12 &gt; Hinge Functions

## A. Torque Function

It prevents sudden door opening or closing considering the operator's safety when assembling and operating.

## B. Stopper Function

It keeps sudden door opening from damaging cabinet on maintaining after assembling and set up. The additional design for opening has double safety structure for stopping function.

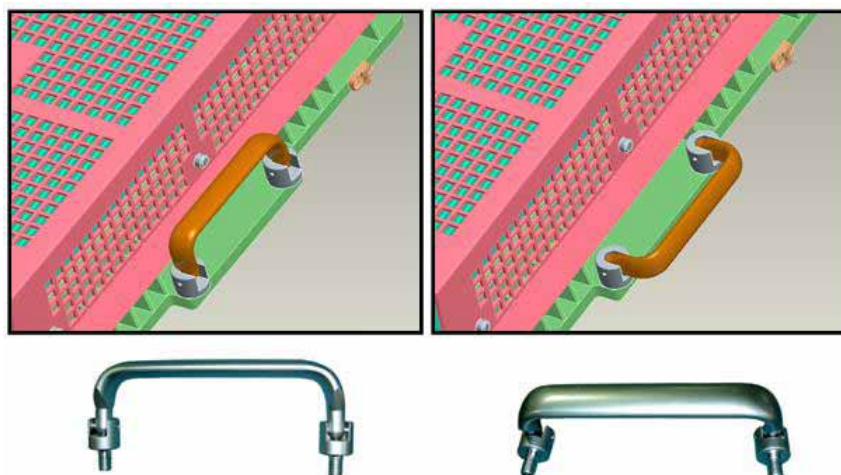
## C. Separation Angle Function

Attached Notch to the center bottom of Hinge keeps separation on closing, and as opening in a certain angle (about 20-30 degree) Door and Body part of Cabinet may be separated.

## (3) Swing Handle

On carrying the cabinet a folding type of Handle is designed for safety and convenience, and it has a fine view because it can be folded inward.

When Door of Cabinet is open, closed or moved, it is convenient to be reversely lifted for use. A rigid material for Handle is applied for delivery safety considering the weight of equipment.



&lt; Fig. 13 &gt; Swing Handle Function

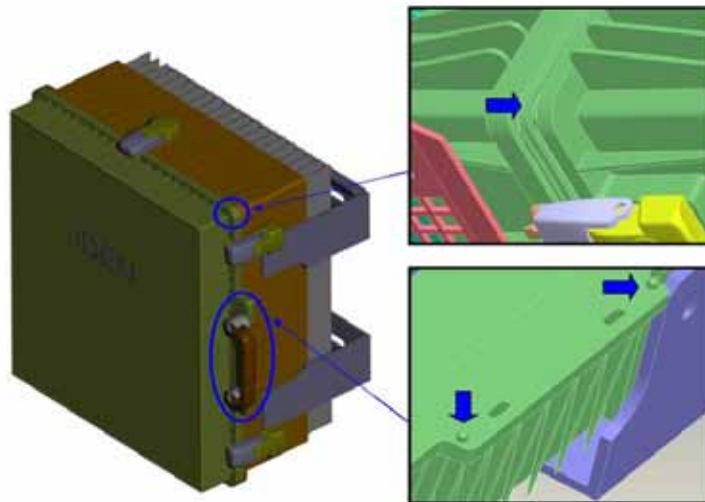
## (4) Wrench Prevention Sill



It is put on Door part, which prevents cabinet of repeater from wrenching because of vibration and external environment after set up.

#### (5) Guide

To keep from wrenching between cabinets after assembling it has Guide function. At the same time contact area extension of Door and Body part of Cabinet enhances heat transmission effect.



< Fig. 14 > Guide for Wrench Prevention

## 5.2 Additional Functions

### 5.2.1 ALC Function

The function is for stable operation of repeater and base station to keep output of repeater from exceeding pre set limit.

#### A. Procedure

- a. Switch ON/OFF ALC function set up through GUI.
- b. When Down Link output value is more than set up level or less than 1dB, correct the difference.
- c. When Up Link output value is more than set up level or less than iDEN 1dB, correct the difference.
- d. Monitor output value of Down Link and Up Link every second.

#### B. Notes

- a. Down Link and Up link operates independently.



- b. On oscillation check mode, it does not operate.

### 5.2.2 Shutdown Function

When output of repeater exceeds set up limit, it is to function Shutdown for stable protection.

- A. Procedure.
  - a. Operate when output value of Down Link and Up Link is 3dB(iDEN Shutdown Level) over ALC set up limit.
  - b. Monitor output for 5 seconds to find that 5 second output is operational condition. Then do PAU OFF to perform the first Shutdown.
  - c. Perform PAU ON for 5 seconds after Shutdown.
  - d. Monitor output for 4 seconds again after waiting for stable output for 1 second.
  - e. Perform c, d and e 3 times.
  - f. After 3<sup>rd</sup> PAU ON standby time is 30 minutes. With Shutdown condition afterward, perform complete Shutdown state.
  - g. On complete Shutdown state the user should directly switch the repeater OFF or ON, or set up PAU ON to recover from the complete Shutdown state.
- B. Notes
  - a. Do not operate when ALC Operation set up is OFF.
  - b. Down Link and Up Link operate independently.

### 5.2.3 Oscillation Check Function

- A. Procedure
  - a. Switch ON/OFF oscillation check function with GUI.
  - b. Check 798 ~ 799MHz range through channel scan.
  - c. Change frequency up to 798 ~ 799MHz by 30KHz to measure oscillation detect value.
  - d. Find the minimum and maximum value from values measured from c.
- B. Notes
  - a. Do not operate while channel scan is in operation.
  - b. When ALC is operating, gain correction value should not exceed ALC set up level.
  - c. When Up Link ALC operation is OFF, link Down Link Gain to operate.

### 5.2.4 Oscillation Shutdown Function

#### A. Procedure

- a. Operate when oscillation attenuation is over 30dB.
- b. Switch all PAU OFF and start alarming.
- c. Return PAU to original state after 10 seconds to perform oscillation check function.
- d. On continuous Shutdown condition, try 3 times to enter complete Shutdown state afterward.
- e. On complete Shutdown state the user should directly switch the repeater OFF or ON, or set up PAU ON to come out of complete Shutdown state.

#### B. Notes

- a. Operate when oscillation check function is ON only.

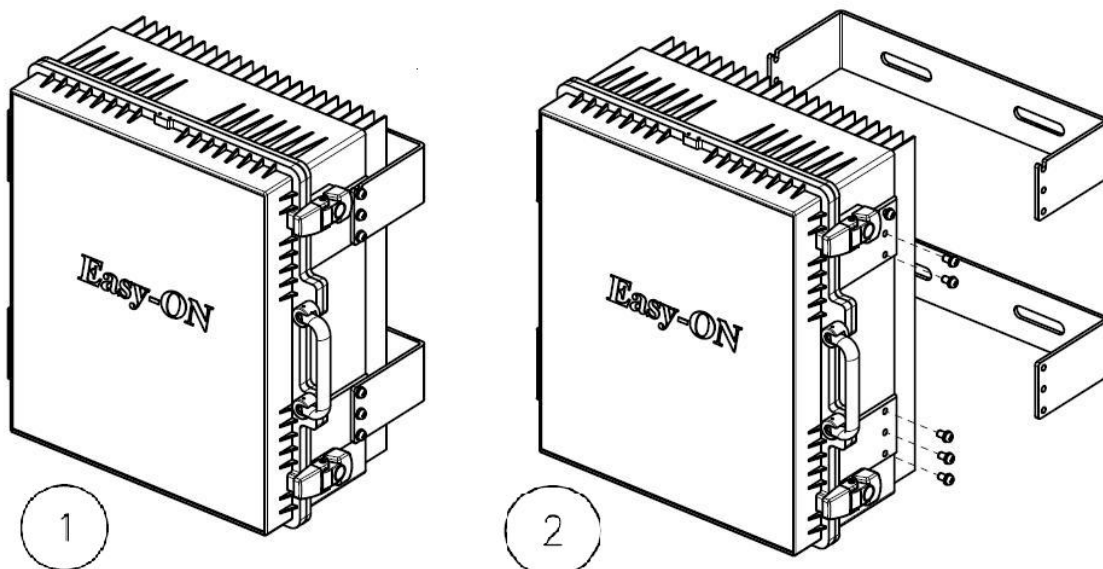
## 6. System Installation guide

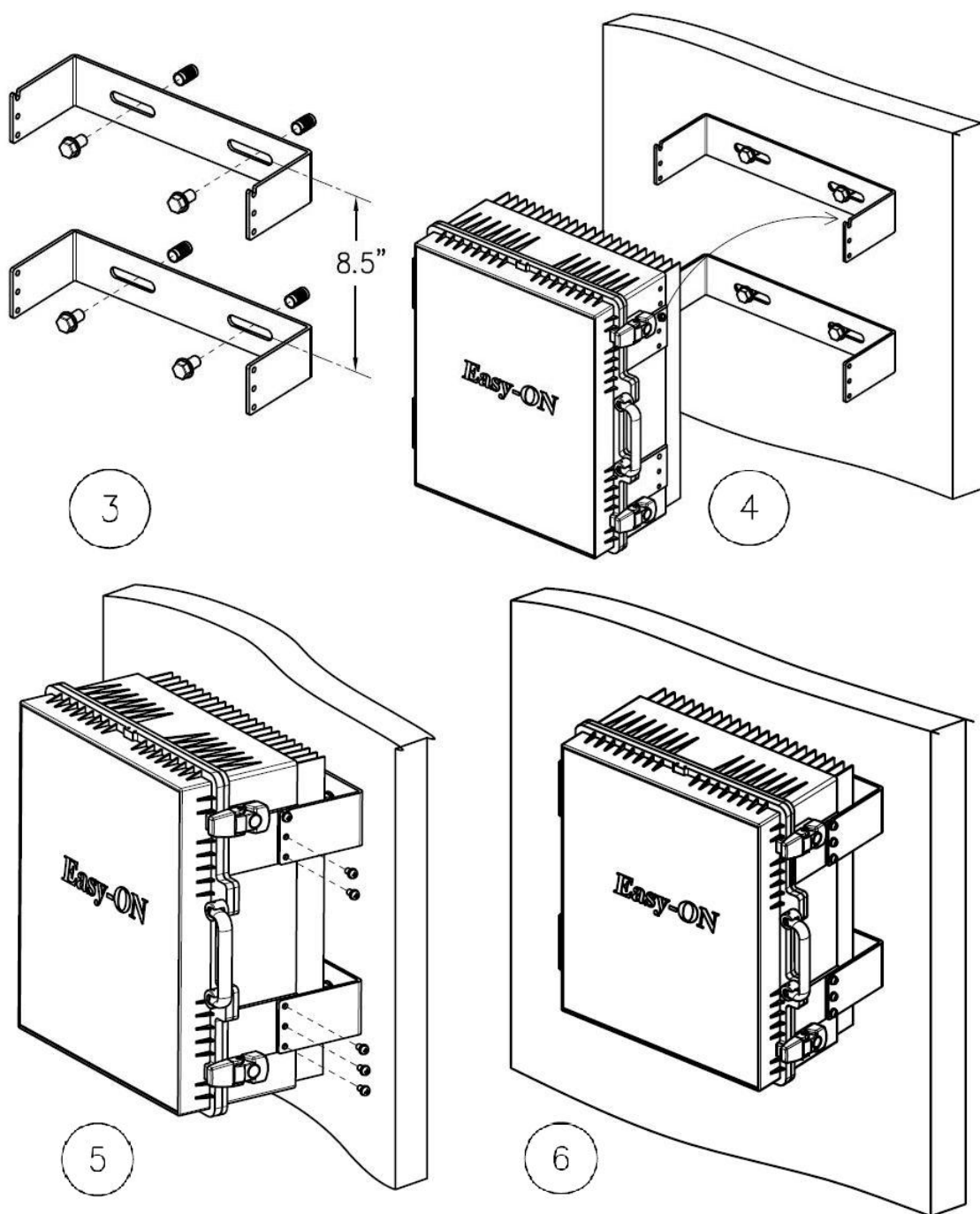
Cabinet of Repeater is die-casting structure, in which it basically supports wall-mount installation and if required it can be installed at 19 inch Rack.

Holder of Repeater has 4 Wall Mount Holes, which needs to be installed safely enough to sustain the weight of repeater on wall-mount installation.

The procedure for wall-mount installation is as follows;

- (1) Take Repeater out of package.
- (2) Check the components of repeater to remove 12 screws assembled to bracket from the repeater.(6 per side).
- (3) Use 4 anchor bolts to fix bracket to the wall.
- (4) Check if bracket is safely installed to the wall.
- (5) Wall-mount Bracket has 2 Guard screws. Lightly attach the repeater to 2 Guard screws then fix the other screw safely.
- (6) Check if it is installed safely and firmly.



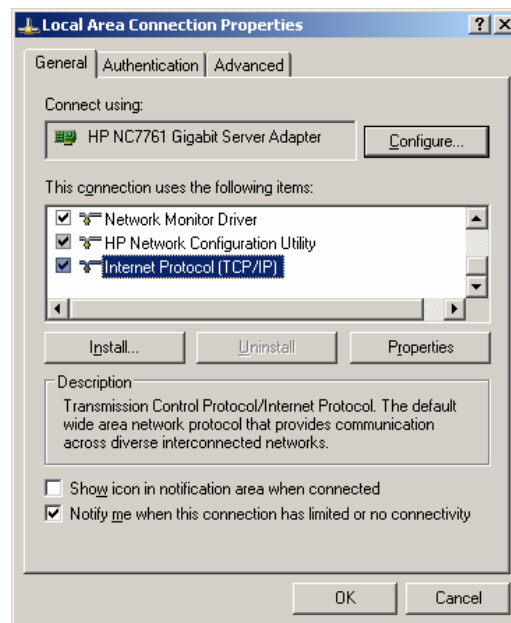


< Fig. 15 > Mounting Sequence of the iDEN Repeater

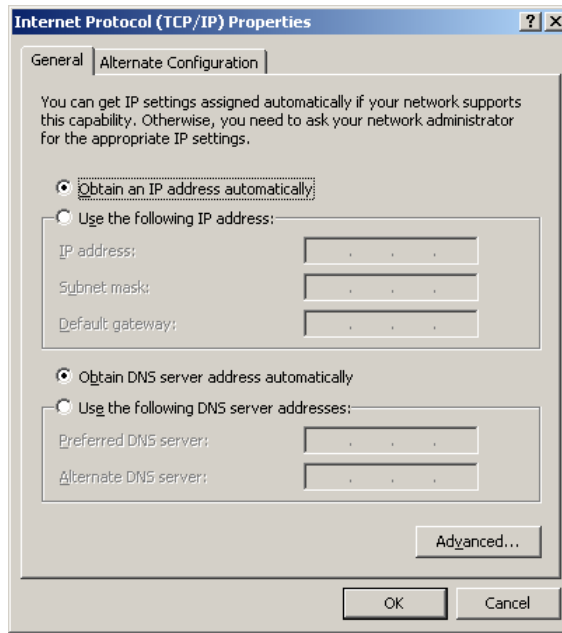
## 7. Web GUI Installation guide

### 7.1 Program Setup

- (1) The Ethernet Ports of Repeater and Laptop are linked through LAN Cable.
- (2) Cross Cable is used for LAN Cable.
- (3) When selecting the following picture, IP is automatically assigned to Laptop computer from the repeater.

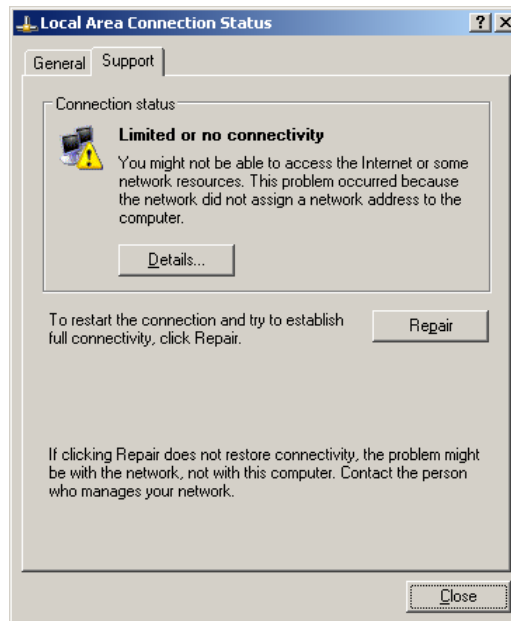


< Fig. 16 > Local Area Connection Properties

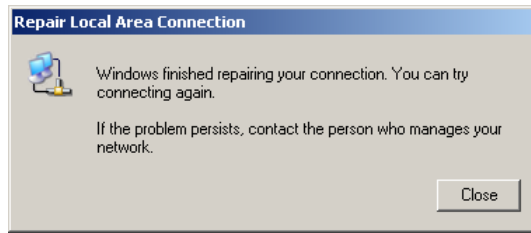


< Fig. 17 > Internet Protocol(TCP/IP) Properties

(4) When network is not linked in a certain time, select Repair on Support window to recover IP.



< Fig. 18 > Local Area Connection State-1



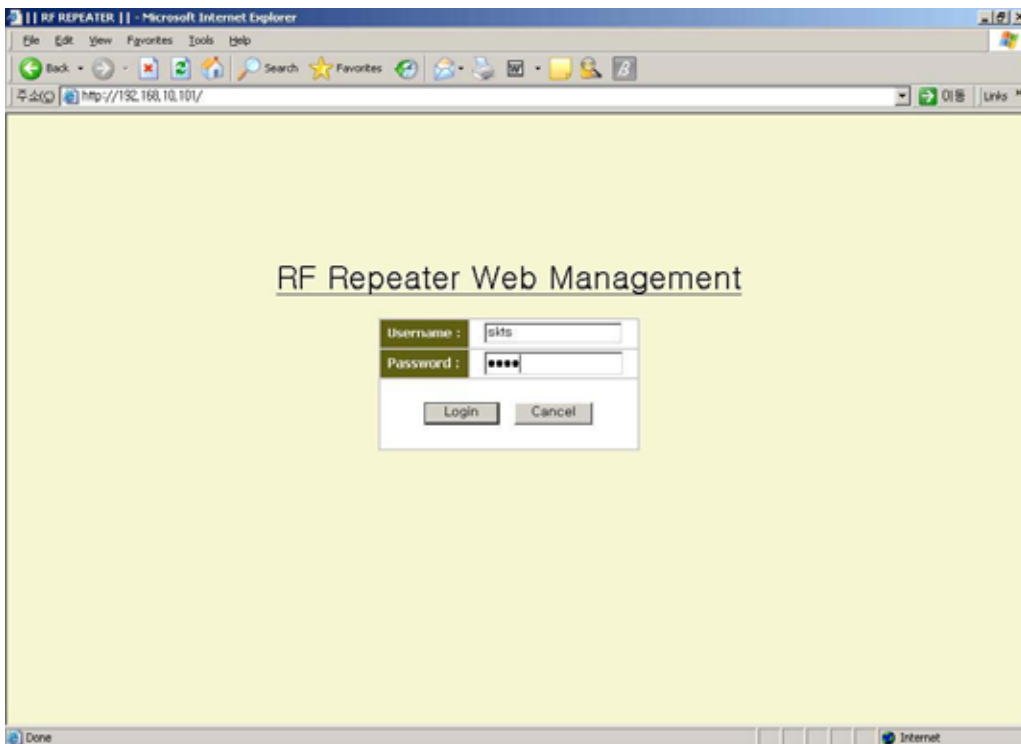
< Fig. 19 > Local Area Connection State-2

## 7.2 Web GUI Connection

- ( 1 ) Input connection address on address window of Internet Explorer to access.
- ( 2 ) The Connection address set up as the repeater is released is as follows;

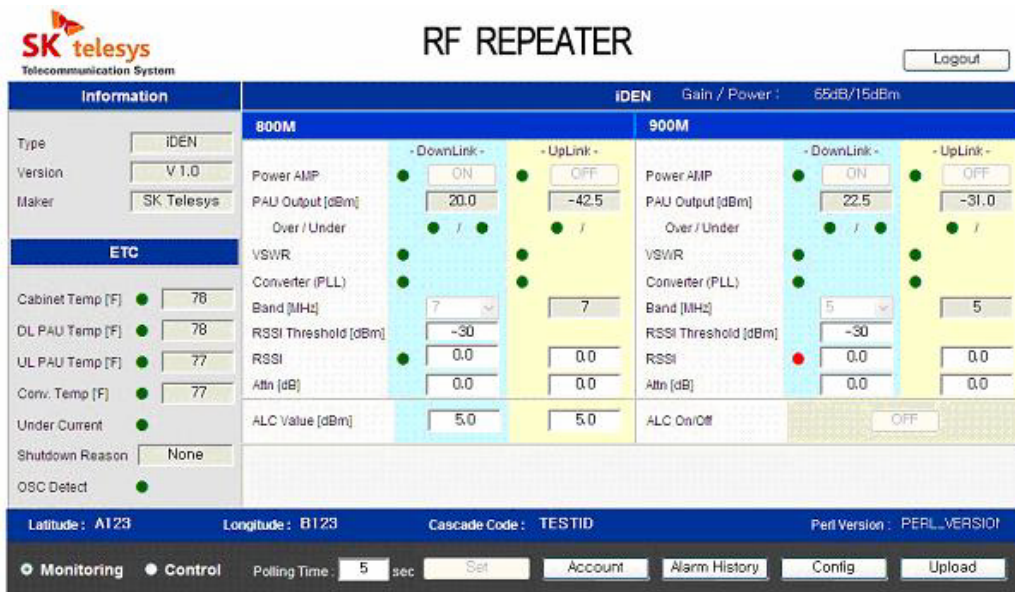
<http://192.168.10.101/>

When linked to the repeater, input Username and Password on Login screen as follows to click [Login].



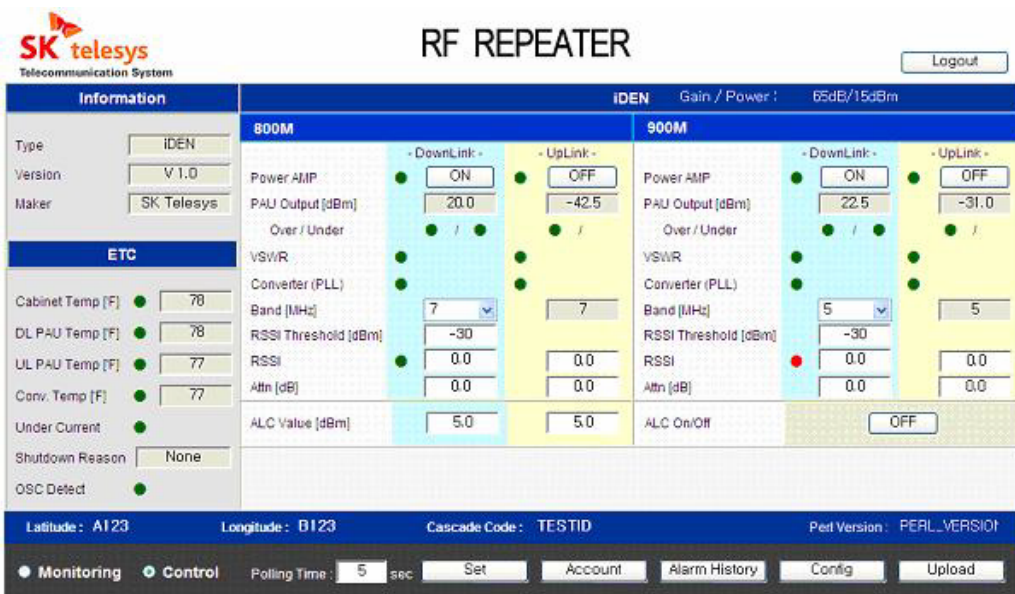
< Fig. 20 > Web GUI Initial Screen

- ( 3 ) Default Username & Password set up as the repeater is released are **skts** & **skts** .
- ( 4 ) As linked to Web GUI, the following screen appears.



< Fig. 21 > Monitoring Screen of iDEN Repeater State

- (5) After connected, read the state from repeater system and updates on screen.
- (6) When selecting Control at bottom of connection screen, it stops Polling and activates Set Button and controllable items to change into control mode to alter set up value.



< Fig. 22 > Control Screen of iDEN Repeater State

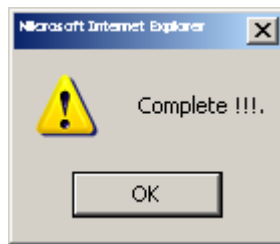


(7) On changing set up value when the input range set by items is exceeded, warning window appears to return to the earlier value.



< Fig. 23 > Input Range Excess Message

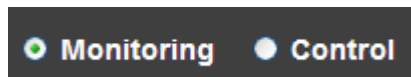
(8) After changing set up value, press Set button to transmit the changed data. When set up is completed, the message appears.



< Fig. 24 > Set Up Completion Message

### 7.3 Monitor/Control of Web GUI State

When you can select Mode Select at bottom of main screen of Web GUI, it follows, monitors and controls the operation repeater.

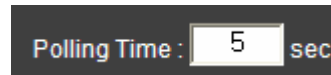


< Fig. 25> Mode Select

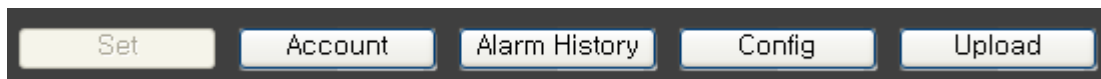
- (1) When selecting Monitoring Mode, it monitors the present state of repeater system.
- (2) When selection Control Mode, it stops Updating of repeater system and changes into controllable Mode.
- (3) The basic Mode after connecting is Monitoring Mode, and after controlling repeater on

Control Mode it automatically changes into Monitoring Mode.

As for Monitoring Mode it is Polling period to update the state from system. It may input between minimum 5 up to 60 seconds.



< Fig. 25 > Polling Time



< Fig. 26 > Function Button

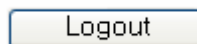
**Set :** It activates on Control Mode. After changing set up value take down the control on system to change state.

**Account :** Manages User's information.

**Alarm History :** May show Alarm History Data on system.

**Config :** Reads and changes the parameter value affecting system connection.

**Upload :** Upload system program.



< Fig. 27 > Logout

Ends the present connection.

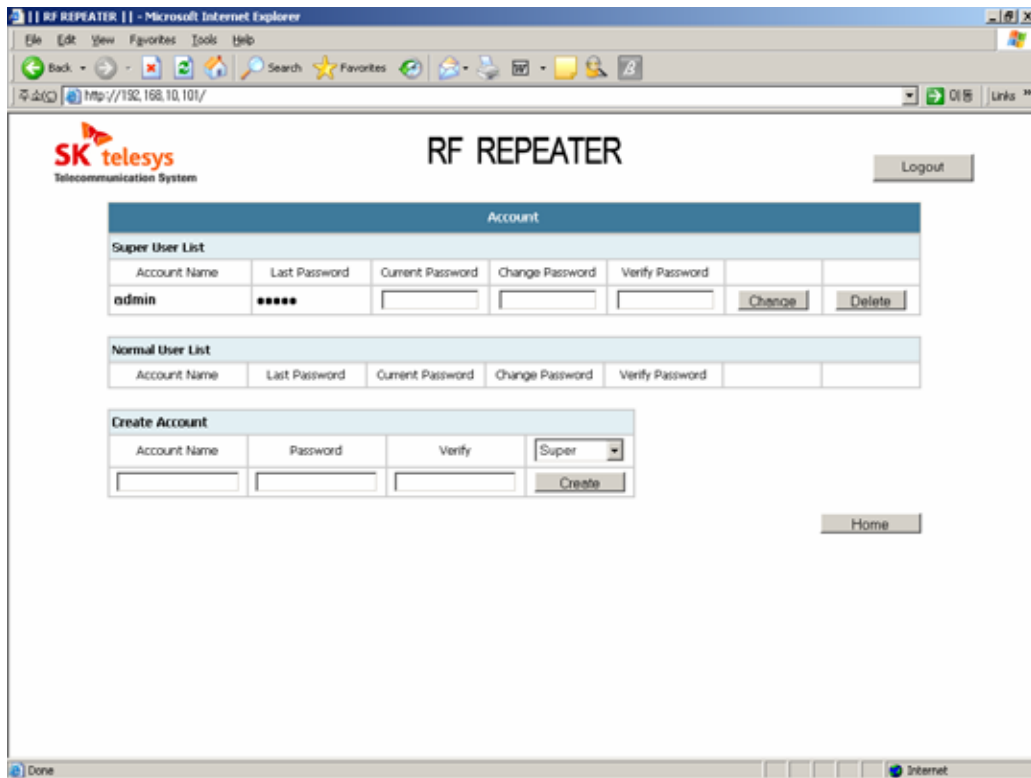
### 7.3.1 Account

It can register or delete the users accessible to Use Management page, and the grade of user is divided into Super user and Normal user.

Total maximum number of users available for registration is 4 for super user and 25 for normal user.

On shipment the Default Super User name & Password of repeater are **skts** & **skts** .

As pressing Home button it returns to the main screen.



< Fig. 28 > Account Page

### 7.3.2 User Registration

Select the right of User to register on Create Account Block at the bottom of Page, input User Name and Password to be registered as new and press Create Button to register.



< Fig. 29 > User Registration

### 7.3.3 Delete and Change of User

Delete of User is Super User’s unique right. Press Delete button on the right of User List Block to delete. Delete of Super User Name is possible only with input of Current Password. Delete of Normal User is just available by pressing Delete button.

To change Password press Change button to apply after new Password input.

Account Name	Last Password	Current Password	Change Password	Verify Password		
admin	*****	<input type="text"/>	<input type="text"/>	<input type="text"/>	Change	Delete

< Fig. 30 > Deletion and Change of User

### 7.3.4 Alarm History

Alarm details stored in system can be seen, which shows the occurrence time of alarm, its occurrence and release.

Alarm History can be seen up to Index 50.

**RF REPEATER**

Logout

Alarm History			
Index	Time	Alarm Name	Alarm Status
1	2007/5/14 15:56:43	CDMA DownLink PLL Lock 1	Fail
1	2007/5/14 15:56:43	CDMA UpLink PLL Lock 1	Fail
2	2007/5/14 15:54:59	CDMA DownLink PLL Lock 2	Normal
2	2007/5/14 15:54:59	CDMA UpLink PLL Lock 2	Normal
3	2007/5/14 15:52:50	CDMA DownLink PLL Lock 1	Normal
3	2007/5/14 15:52:50	CDMA DownLink PLL Lock 3	Normal
3	2007/5/14 15:52:50	CDMA UpLink PLL Lock 1	Normal
3	2007/5/14 15:52:50	CDMA UpLink PLL Lock 3	Normal
4	2007/5/14 15:39:16	CDMA DownLink PLL Lock 1	Fail
4	2007/5/14 15:39:16	CDMA DownLink PLL Lock 2	Fail
4	2007/5/14 15:39:16	CDMA DownLink PLL Lock 3	Fail
4	2007/5/14 15:39:16	CDMA DownLink PLL Lock 4	Fail
4	2007/5/14 15:39:16	CDMA UpLink PLL Lock 1	Fail
4	2007/5/14 15:39:16	CDMA UpLink PLL Lock 2	Fail
4	2007/5/14 15:39:16	CDMA UpLink PLL Lock 3	Fail
4	2007/5/14 15:39:16	CDMA UpLink PLL Lock 4	Fail
6	2007/5/12 0:15:36	CDMA UpLink Conv.	Fail
6	2007/5/12 0:15:36	Under Current	Normal
8	2007/5/12 0:3:56	CDMA DownLink RSSI	Normal
9	2007/5/12 0:1:37	CDMA DownLink PLL Lock 4	Normal
9	2007/5/12 0:1:37	CDMA UpLink PLL Lock 4	Normal

Delete

Home

< Fig. 31 > Alarm History

Press Delete button at the bottom to delete alarm details stored, and the deleted alarm details can not be restored.

Press Home button to return to main screen.

### 7.3.5 Config

It shows basic connection information required to connection and system configuration, and the initial set up value on shipment is as follows;

The screenshot shows the 'RF REPEATER' configuration interface. It includes a 'Logout' button in the top right and the 'SK telesys Telecommunication System' logo in the top left. The main configuration area is divided into several sections:

- Ethernet Configuration:**
  - IP Address: 192 . 168 . 10 . 101
  - Subnet Mask: 255 . 255 . 255 . 0
  - Default Gateway: 192 . 168 . 10 . 1
  - Primary DNS Server: 0 . 0 . 0 . 0
  - Secondary DNS Server: 0 . 0 . 0 . 0
- DHCP Server Configuration:**
  - Enable Server:
  - Lease Area: 192 . 168 . 10 . 10 . 192 . 168 . 10 . 50
- SNMP Configuration:**
  - Site ID (Cascade Code): SKTS
  - Sprint Server IP Address: [ ] . [ ] . [ ] . [ ]
  - Latitude: [ ]
  - Longitude: [ ]
  - Trap/Inform Community: public
  - Heartbeat duration time (min): 30
- RTC Configuration:**
  - Date (month/day/year): 05 / 30 / 2007
  - Time (hour:min:sec): 13 : 54 : 18

At the bottom of the configuration area, there are 'Set' and 'Cancel' buttons, and a 'Home' button in the bottom right corner.

< Fig. 32 > Construction Information of System

### 7.3.6 Up Load

Upload Page is necessary to Upgrade the system program.

The screenshot shows the 'RF REPEATER' upload interface. It includes a 'Logout' button in the top right and the 'SK telesys Telecommunication System' logo in the top left. The main area is titled 'UPLOAD' and contains the following fields:

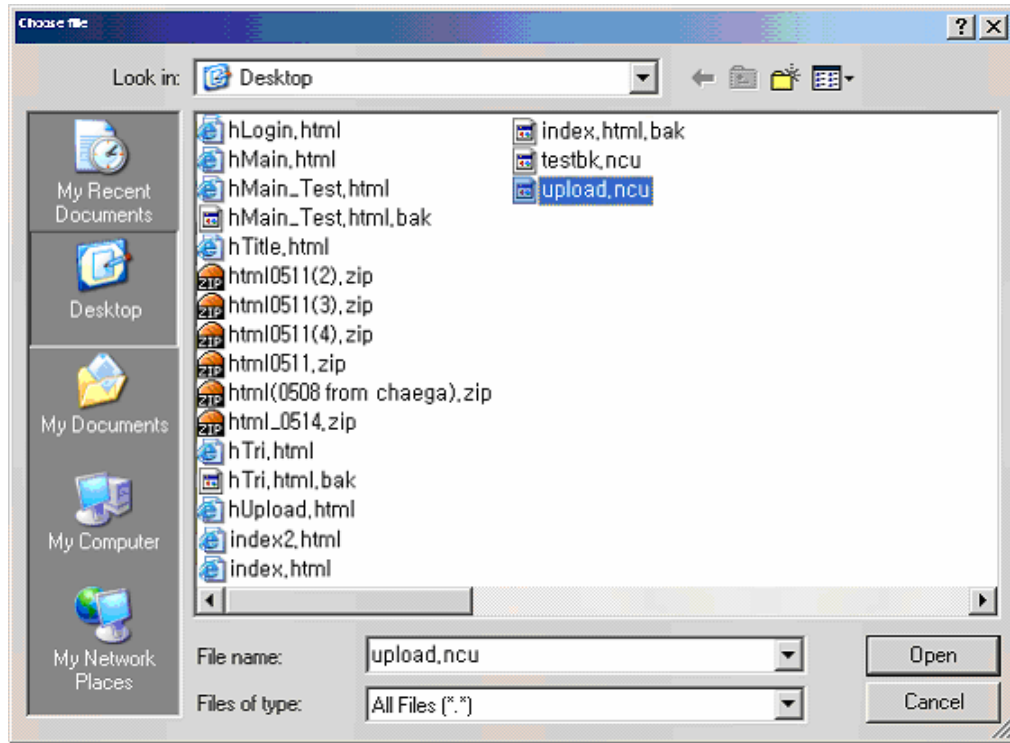
- Upload File Name:** A text input field with a 'Browse...' button and an 'Upload' button.
- Key Value:** A text input field.
- Status:** A text area containing the message: 'Select the appropriate file and press the Upload button.'

A 'Home' button is located at the bottom right of the page.

< Fig. 33 > Upload Page

Click [Search] button to select the file for Uploading on Popup window.

Controller of repeater comprises Network Control Board and Repeater Control Board, and each Board's Upload file is divided into SKTSNCB\_vxx.ncu and SKTSRCB\_x\_vx.x.xx.rcu.



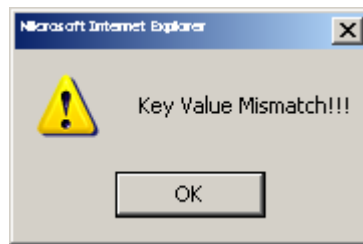
< Fig. 34 > File Selection

UPLOAD	
Upload File Name	C:\WPProject_Web\WTSEX1100\HTML\Wupload.ncu <input type="button" value="Browse..."/> <input type="button" value="Upload"/>
Key Value	<input type="text" value="4E4F"/>
Status	<input type="text" value="Select the appropriate file and press the Upload button"/>

< Fig. 35 >Upload Arrangement

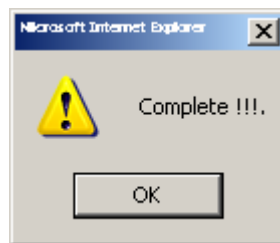
As the selected file path is seen, input Key Value provided and press Upload button to Upgrade system.

If Key Value is different by files and inaccurate, Upload is impossible.



< Fig. 36 > Key Value Error

On completion of Upload, the following message appears and system is automatically rebooted. On rebuttoning connection is not available, after rebooted normal connection is available.



< Fig. 37 > Upload Completion

## 8. Maintenance Guide

### 8.1 Confirmation of System Components

For normal operation of equipment the following should be confirmed on installation.

- A. Confirm whether the repeater's exterior would be deformed by damaged package of repeater on delivery.
- B. Confirm that the components of equipment as in the packing list and that the location for installation satisfies temperature and humidity for operation of equipment defined in the product specification.
- C. Confirm the input signal condition of equipment defined in the product specification.
- D. Confirm that the state of cable and connector is good.
- E. Confirm that the state of bracket of repeater is good.

### 8.2 Cautions on System Installation

In order for dangerous events not to occur on installation of repeater, the provided guidance should be followed.

Especially, the power cord of this repeater is of an eternal connection type, so an easily accessible power interruption device should be installed in the indoor wiring, and there should be an easily accessible socket-outlet near the repeater.

Order	Description	Cautions
1	Donor ANT welding and feeder installation. Service ANT or LCX equipped	<ul style="list-style-type: none"> <li>• Cable should be installed without exterior damage.</li> <li>• Protect connection parts like connector with insulation tape to prevent humidity.</li> <li>• Install feeder to minimize environment influence.</li> </ul>
2	Installation of Antenna for Donor	<ul style="list-style-type: none"> <li>• Strongly fixed for local wind velocity to prevent antenna's direction from bending after installation</li> </ul>
3	Power cable and RF cable arrangement	<ul style="list-style-type: none"> <li>• Prevent cable from damaging by crooking or stretching.</li> </ul>



## 9. System Set Up and Inspection

### 9.1 Items to be checked for Opening

- A. Confirm AC 108 ~ 127 VAC common use power and power cable.
- B. Check if Donor RF input signal from exterior is at normal level.

**Caution**

When system operates without input signal confirmed, over-input may cause serious damage on amplifying devices because of saturation of output. Therefore, after checking input signal level by equipment and ALC ON state(on shipment ALC ON), operate equipment.

- C. Put 108 ~ 127 VAC into power connector of equipment to switch ON.
- D. Check Alarm LED blinking state of GUI or Repeater's front board through lap top.
- E. When it is judged that Down Link RF input signal from exterior is normal, switch OFF the Repeater to connect ANT feed and Service ANT to Input/Output Port of Repeater and switch ON again.

**Caution**

Conclude carefully lest Down Link and Up Link Port be reversed.

### 9.2 Items to be check after opening

- A. Check Alarm LED blinking of repeater to confirm abnormality.
- B. Confirm RF input/output value's normality with GUI.
- C. About 10 minutes after switching ON the repeater measure Down Link and Up Link Output Spurious feature of repeater by using spectrum analyzer of Coupling terminal to confirm normality of operation.
- D. After normal operation of repeater measure calling quality of service area by terminal or measurer to optimize wave environment to see if wave shade area or calling inability area is present comparing to the before opening condition.

### 9.3 Failure and Inspection

#### 9.3.1 Inspection of Repeater

On routine or emergency service of repeater the following orders should be taken to check its failure.

- A. Check RF input/output level and LED of repeater using Web GUI. On routine service check calling quality with terminal or measurement equipment, or on emergency service the following should be taken even if RF input/out level of repeater on Web GUI is normal.
- B. Connect link spectrum analyzer to test terminal of repeater to confirm output state.
- C. Use Coupling port to check output value.
- D. Check if the output value of repeater obtained by harmonic analyzer conforms to actual out put value of repeater.
- E. Check input level of repeater when the output value of repeater obtained by spectrum analyzer does not conforms to actual output value of repeater.
- F. When input level is not the same as the one on installation time showing distinct difference, check antenna connection points and feeder installation state.
- G. If the output value of repeater is abnormal as comparing input level to operation gains of repeater, switch ON/OFF the repeater to check the output state with spectrum analyzer. On severe failure immediately replace with spare parts to recover to the normal service.

### 9.3.2 Facility Inspection

On routine Inspection and service failure the following parts and items are needed to be inspected.

Inspection Parts	Inspection Items	Remark
Donor Antenna & Service Antenna	Inspect the malfunction of Antenna's welding, received signal's intensity of donor antenna and RSSI value.	
Feeder, Leakage Coaxial Cable	Inspect whether feeder or leakage coaxial cable may be cut or damaged.	
Connector, Distributor	Inspect whether connector's linking part or cable may be flooded, or whether each linking part is firmly fastened.	
Power Incoming Part	Confirm that common terminal box for 108 ~ 127 VAC is not leaked.	

## 10 . Warranty and Repair Policy

### 10.1 General Warranty

This product carries a Standard Warranty period of five (5) years unless indicated otherwise on the package or in the acknowledgment of the purchase order.

### 10.2 Limitations of Warranty

Your exclusive remedy for any defective product is limited to the repair or replacement of the defective product. SK Telesys Corp. may elect which remedy or combination of remedies to provide in its sole discretion. SK Telesys Corp. shall have a reasonable time after determining that a defective product exists to repair or replace the problem unit. SK Telesys Corp. warranty applies to repaired or replaced products for the balance of the applicable period of the original warranty or ninety days from the date of shipment of a repaired or replaced product, whichever is longer.

### 10.3 Limitation of Damages

The liability for any defective product shall in no event exceed the purchase price for the defective product.

### 10.4 No Consequential Damages

SK Telesys Corp. has no liability for general, consequential, incidental or special damages.

### 10.5 Additional Limitation on Warranty

SK Telesys Corp. standard warranty does not cover products which have been received improperly packaged, altered, or physically damaged. For example, broken warranty seal, labels exhibiting tampering, physically abused SK Telesys Corp. Proprietary Document Page 27 of 31 iDEN RF Repeater User Manual enclosure, broken pins on connectors, any modifications made without SK Telesys Corp. authorization, will void all warranty.

## 10.6 Return Material Authorization (RMA)

No product may be returned directly to SK Telesys Corp. without first getting an approval from SK Telesys Corp. If it is determined that the product may be defective, you will be given an RMA number and instructions in how to return the product. An unauthorized return, i.e., one for which an RMA number has not been issued, will be returned to you at your expense. Authorized returns are to be shipped to the address on the RMA in an approved shipping container. You will be given our courier information. It is suggested that the original box and packaging materials should be kept if an occasion arises where a defective product needs to be shipped back to SK Telesys Corp. To request an RMA, please call 1-888-758-7002 or send an email to [service@sktelesys.com](mailto:service@sktelesys.com).

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