

**ATTACHMENT E.**

**- USER MANUAL -**

**INFORMATION TO USER :**

NOTE: 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 his own expense.

**CAUTION**

Changes or modifications not expressly approved  
by the manufacturer responsible for compliance  
could void the user's authority to operate the equipment

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## 1. SUMMARY

iDEN repeater is located in blanket / shadow area of insider of building to transmit iDEN800MHz, iDEN900MHz BTS signal simultaneously.

There are two types of RF Repeater for iDEN band as each 15dBm, and 25dBm output power in system 65dB Gain, and 30dBm output power in system 80dB Gain.

This User Manual is the Repeater having 65dBGain / +25dBm output power.

Bandwidth

- Downlink 851MHz~869MHz, Uplink 806MHz~824MHz (18MHz Band)
- Downlink 862MHz~869MHz, Uplink 817MHz~824MHz (7MHz Band)

To avoid paging signal interference at 940MHz side, IF Converter shift SAW filter edge by 200KHz, 400KHz. (TX Edge only, not whole bandwidth).

Also, This Repeater is equipped for Output power control by AGC/ALC, Gain Control by Attenuator adjustment, Remote Control by using Web UI and Remote Firmware Up-grade.

### Abbreviation

PAM: POWER AMPLIFIER MODULE

LNA: LOW NOISE AMPLIFIER

AGC: AUTO GAIN CONTROL

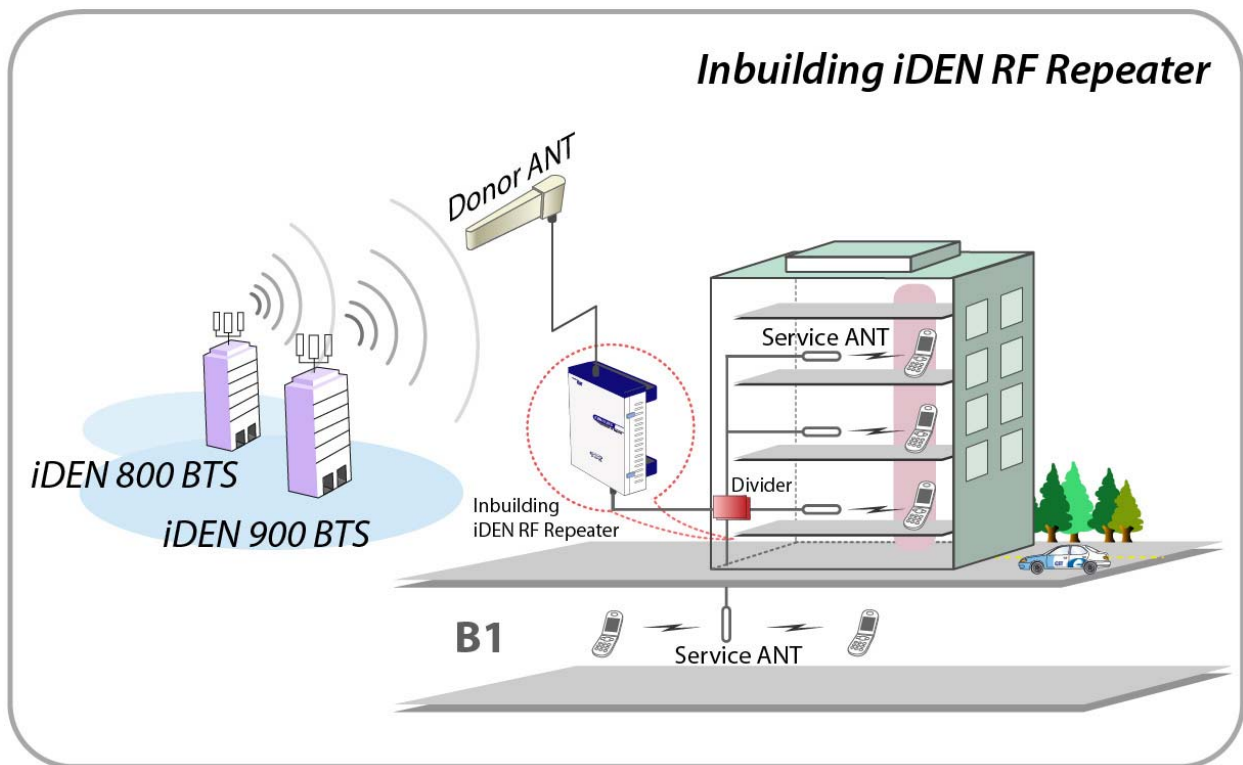
ALC: AUTO LIMIT CONTROL

## 2. SYSTEM STRUCTURE

### 2.1 Network structure for iDEN 25dBm RF Repeater

Below picture shows a Network structure for iDEN In-building RF Repeater in a real site. Donor ANT takes a position on the direction to BTS which be linked, and Server ANT is available to be located in designated area for service by using RF cable deployments and dividers as blow.

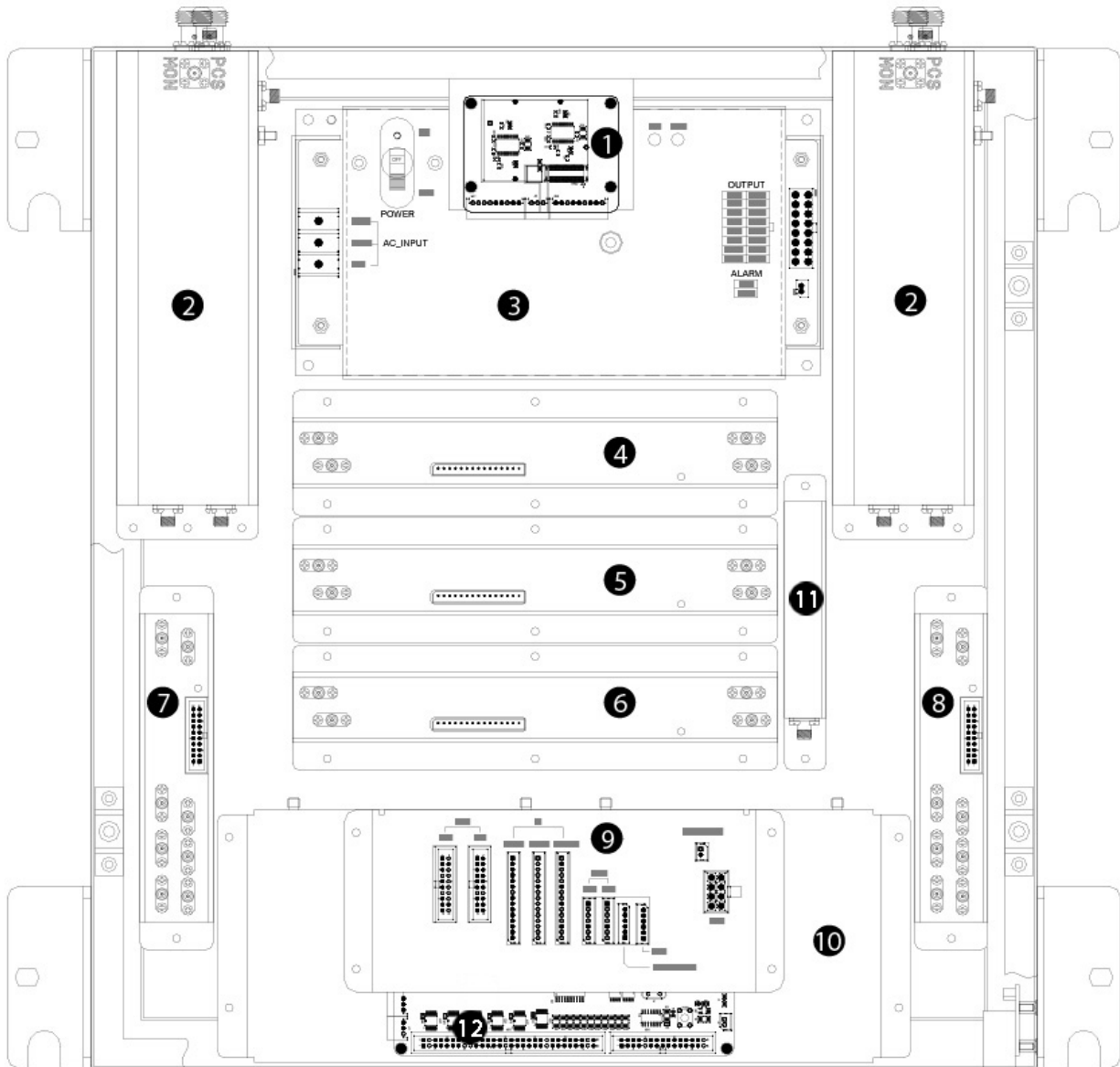
One thing that we consider is Path losses between Repeater port and ANT in case of dividing by dividers and RF cables. They should be equally managed.



<Pic.1> iDEN In-building Repeater Service Organization

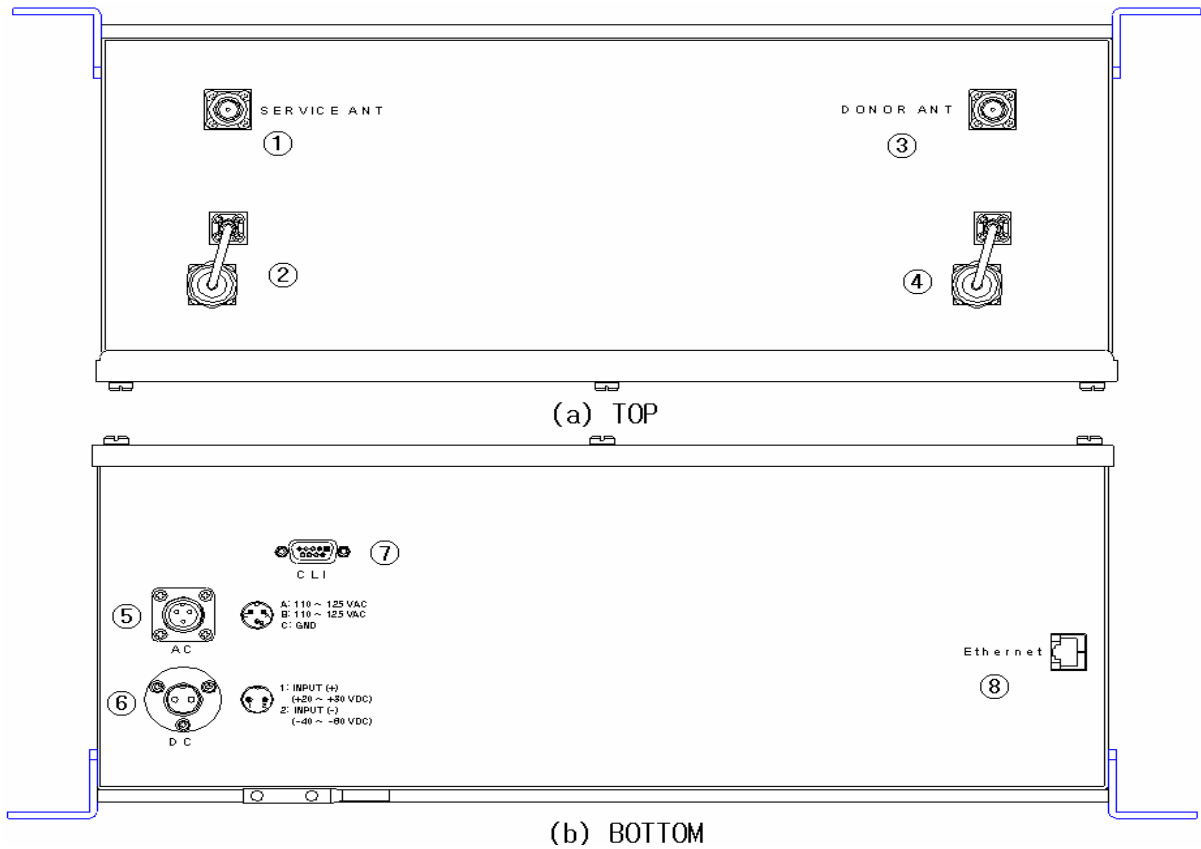
## 2.2 System Design and Operation

### 2.2.1 System design



NO.	PART	NO.	PART
①	MODEM MODULE	⑦	RVS LAN MODULE
②	CAVITY FILTER MODULE	⑧	FWD LAN MODULE
③	PSU MODULE	⑨	I'O BOARD MODULE
④	7M IF CONVERTER MODULE	⑩	POWER AMPLIFIER MODULE
⑤	18M IF CONVERTER MODULE	⑪	WAVE MONITORING MODULE
⑥	5M IF CONVERTER MODULE	⑫	NMS MODULE

<Pic.2> iDEN 25dBm internal design



NO.	PORT	NO.	PORT
①	SERVICE ANT PORT	⑤	AC POWER PORT
②	SERVICE ANT TERM	⑥	DC POWER PORT
③	DONOR ANT PORT	⑦	MONITOR PORT
④	DONOR ANT TERM	⑧	ETHERNET PORT

<Pic.3> iDEN 25dBm PORT design

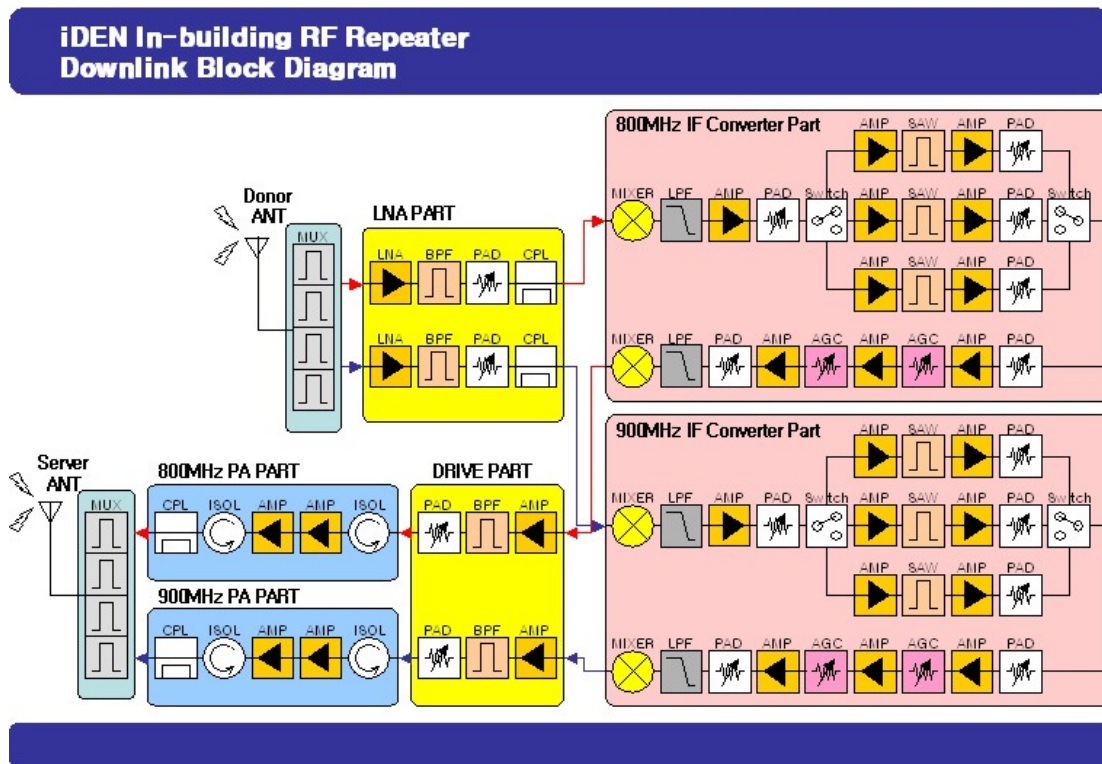
**2.2.2 Downlink Path**

There are four (4) parts of downlink Block in iDEN In-building RF Repeater.

- Filter part for Multiplex four (4) bands as each 800MHz and 900MHz TX/RX in Front End of Donor/Server
- LNA part of Donor/Service path to process signals of 800MHz and 900MHz bands.

- If Converter part having several bands of SAW Filter paths to adjust Band Edge of high frequency as 200KHz and 400KHz each. In case of 800MHz band, extra Switching Filters equipped to individually select 18MHz and 7MHz
- Power Amplifier part for power amplifier and Level Monitoring/VSWR monitoring to adjust desirable output power of Repeater

Downlink frequency contains lots of signals such as Paging signal, DCS etc through Donor ANT. So Out band signals should be minimized by SAW filters having excellent Roll off characteristics for the best optimized operation.



<Pic.4> iDEN In-building RF Repeater Downlink Block Diagram

**2.2.3 Uplink Path**

Uplink Block of iDEN In-building RF Repeater is separated as four (4) parts.

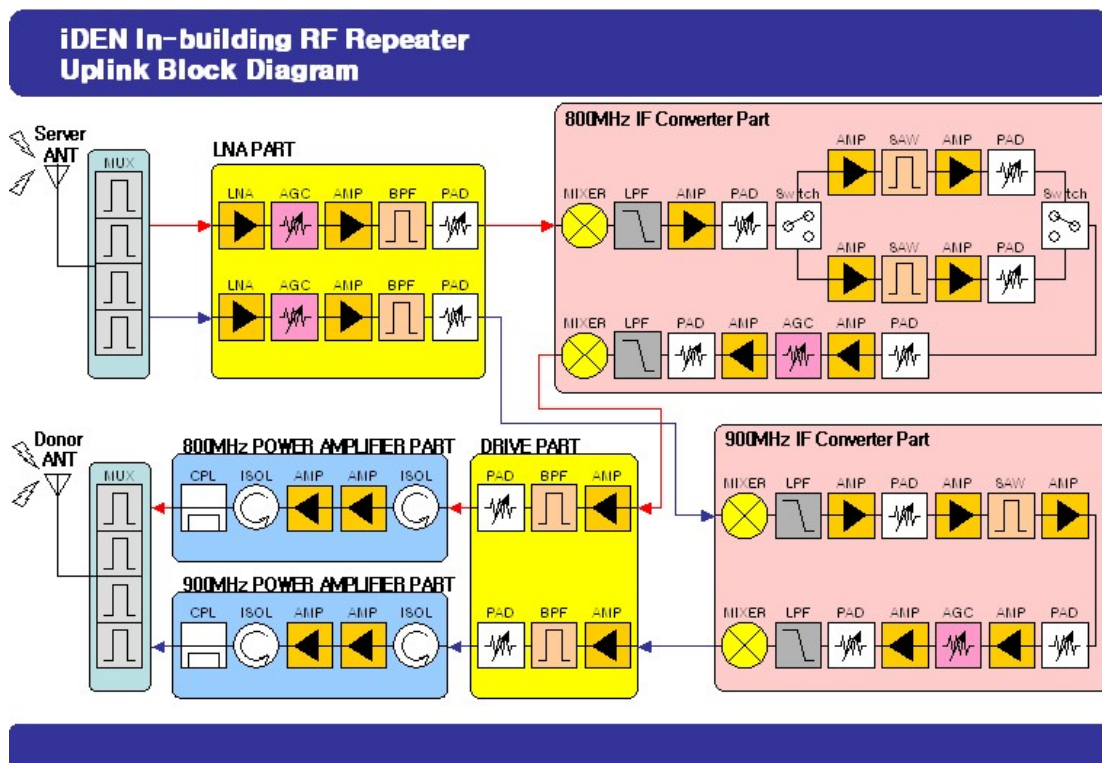
- Filter part for Multiplex four (4) bands as each 800MHz and 900MHz TX/RX in Front End



of Donor/Server

- LNA Part of two(2) paths for processing 800MHz and 900MHz signals
- 800MHz IF Converter part and 900MHz IF Converter part of 5MHz band having Switching filter parts for selecting each 18MHz and 7MHz.
- Power Amplifier part for power amplifier and Level Monitoring/VSWR monitoring to adjust desirable output power of Repeater

800MHz IF Converter part is designed to select single path, and it can be minimizing signal interference between paths, and power consumption according to controls of electric power in each SAW Filter part.



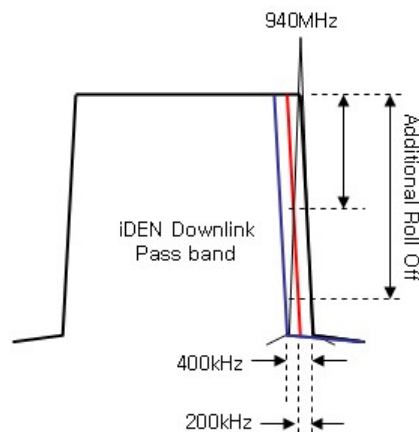
<Pic.5> iDEN In-building RF Repeater Uplink Block Diagram

**2.2.4 Adjustable Band Edge functional circuit configuration**

In case of IDEN using the bandwidth of 800MHz and 900MHz, many of Out of Band Signals is input via Donor ANT Outdoor. The most worried signal among them is Paging Signal.

Commercial Paging Signal of 929MHz~932MHz, 940MHz~941MHz, having the strength of Max. -15dBm, is to be inputted into Donor ANT. Among this two kind of Paging Signal Band, 929MHz~932MHz bandwidth is possible for sufficient Rejection via SAW Filter, But 940MHz~941MHz is difficult to gain big decreasing volume even if use SAW Filter because Band Edge is as close as to be folded to 935MHz~940MHz of being the frequency of iDEN900MHz Downlink.

To prepare for this environment, Down Link of iDEN Repeater is designed to have additional Roll Off characteristic by decreasing band of SAW Filter in the station adjacent to paging signal, for it having the function of Adjust Band Edge that can decrease c of high frequency by 200 kHz, 400 kHz each.



<Pic.6> Additional Roll off through Adjust Band Edge

### 3. SPECIFICATIONS

#### 3.1 System specifications

Characteristic			Specification	
Frequency Range	Forward	800MHz	18 MHz BAND	851~869 MHz
			17.8 MHz BAND	851~868.8 MHz
			17.6 MHz BAND	851~868.6MHz
			7 MHz BAND	862~869 MHz
			6.8 MHz BAND	862~868.8 MHz
			6.6 MHz BAND	862~868.6MHz
	Reverse	900MHz	5 MHz BAND	935~940MHz
			4.8 MHz BAND	935~939.8MHz
			4.6 MHz BAND	935~939.6MHz
		800MHz	18 MHz BAND	806~824 MHz
			7 MHz BAND	817~824 MHz
			900MHz	5 MHz BAND
System Group Delay			< 8 $\mu$ S	
Characteristic Impedance			50 ohm	
VSWR			Max.1.5 : 1	
Input Power Range			-43 ~ -18dBm (FWD, RVS common)	
Gain Range			40dB ~ 65 dB	
Noise Figure			< 5 dB @ Max Gain <12 dB @Min Gain	
Gain Adjustment Step(Accuracy)			1dB( $\pm$ 0.5dB)	

Pass Band Ripple		2.5dB(±1.25dB)
Maximum Output Power		316.2mW / 25dBm @ Composite Power 800MHz:22dBm, 900 MHz:22dBm
Spurious Emissions		< -13dBm
IF Frequency		FWD: 70 MHz, RVS: 70 MHz
Adjacent Channel Power	@CH offset 25 KHz	> 50 dBm @ Degradation of 3dB for eight iDEN carriers
	@CH offset 50 KHz	> 55 dBm @ Degradation of 3dB for eight iDEN carriers
	@CH offset 500 KHz	> 55 dBm @ Degradation of 3dB for eight iDEN carriers
	@CH offset 1MHz	> 55 dBm @ Degradation of 3dB for eight iDEN carriers
	@CH offset 2 MHz	> 55 dBm @ Degradation of 3dB for eight iDEN carriers
Adjust Band Edge	@ 869 MHz	868.8MHz/868.6MHz
	@ 940 MHz	939.8MHz/939.6MHz
Band Select		Local Shift & RF Switching
Roll Offs		> 50dBc

### 3.2 Electrical and Environment Specifications

Items	specification
Size(mm) / Type	16(W)*18(L)*7(H) / Inch
Power	AC 120V 60Hz 3.0A
Temperature / Weight	0℃ ~ +50℃/20.6kg
Connector TYPE	N Type Female

### 3.3 Functions

Parameter	Specification
Gain Control	<ul style="list-style-type: none"> <li>Adjustable DL and UL Gain range 40~65dB</li> <li>Display default Gain and current Gain function</li> </ul>
AGC Auto Gain Control	<ul style="list-style-type: none"> <li>It always operates in Downlink AGC ON status</li> <li>To maintain same Downlink output power despite flexible input signal strength.</li> </ul>

	<ul style="list-style-type: none"> <li>• To add or subtract Attenuation level referring to AGC Power Limit level.</li> </ul>
ALC Auto Limit Control	<ul style="list-style-type: none"> <li>• To limit output power as far as default range</li> <li>• Set up via GUI</li> <li>• Automatic Gain decrement when output power of repeater is higher than default level</li> <li>• Automatic Gain recovery when output power of repeater is reduced.</li> <li>• Shutdown when output power is higher than default level in Minimum Gain</li> <li>• Automatic Recovery Algorithm conversion after Shutdown status</li> </ul>
Band Select	<ul style="list-style-type: none"> <li>• In case of 800MHz FWD Band, it enables User to select one of 18MHz, 17.8MHz, 17.6MHz/ 7MHz, 6.8MHz, and 6.6MHz according to GUI setting.</li> <li>• In case of 900MHz FWD Band, it enables User to select one of 5MHz, 4.8MHz, 4.6MHz according to GUI setting.</li> <li>• In case of 800MHz RVS Band, it enables User to select one of 18MHz/ 7MHz according to GUI setting.</li> <li>• In case of 900MHz RVS Band, it enables User to select 5MHz according to GUI setting.</li> </ul>
Band Edge Adjust	<ul style="list-style-type: none"> <li>• To shift Band edge of DL high frequency side by 200kHz, 400kHz step</li> </ul>
Power Monitoring Function	<ul style="list-style-type: none"> <li>• Monitoring repeater's output level</li> </ul>
Oscillation Check	<ul style="list-style-type: none"> <li>• Isolation Check in initial set up or Reset</li> <li>• Monitoring Oscillation comparing to minimum/maximum Noise Floor level</li> <li>• When Oscillation occurred, repeater attempts to stabilize Isolation through Gain control function.</li> <li>• Shutdown repeater when Oscillation still goes in Minimum Gain</li> <li>• Automatic Recovery Algorithm conversion after Shutdown status</li> </ul>
DL Input control	<ul style="list-style-type: none"> <li>• Monitoring Donor ANT input power of DL</li> </ul>
Automatic Recovery	<ul style="list-style-type: none"> <li>• When in repeater shutdown, it periodically recovers output power of repeater then monitors alarming</li> </ul>
Security	<ul style="list-style-type: none"> <li>• Support HTTPS for Web Browser security</li> <li>• User authentication through User ID and Password</li> </ul>
Temperature control	<ul style="list-style-type: none"> <li>• Monitoring temperature of repeater</li> <li>• Maximum and minimum set up is possible. Shutdown in over temperature</li> <li>• Automatic recovery after temperature becomes normal. (Hysteresis 10degree)</li> </ul>
VSWR Monitoring	<ul style="list-style-type: none"> <li>• Monitoring VSWR of Donor ANT Port (Every one and half minute)</li> </ul>

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	<ul style="list-style-type: none"><li>• Reporting VSWR Alarm and Shutdown when the rate is 3:1</li><li>• Automatic Recovery Algorithm conversion after Shutdown status</li></ul>
IP address report via E-mail	<ul style="list-style-type: none"><li>• When in PPP reconnection, E-mail which includes HTML to connect to newly assigned IP Address, reports to operator.</li></ul>
DHCP Client	<ul style="list-style-type: none"><li>• Automatic IP assignment</li></ul>
DHCP Server	<ul style="list-style-type: none"><li>• Server function for automatic IP assignment</li></ul>
Web GUI	<ul style="list-style-type: none"><li>• Remote and local user browser support through Web Browser</li></ul>
SNMP Agent	<ul style="list-style-type: none"><li>• NMS report via SNMPv2 Trap</li></ul>
LED Display	<ul style="list-style-type: none"><li>• LED displays power and operation status on front side of repeater system.</li><li>• DL input and output signal level is verified by LED bar.</li></ul>

## 4. SET UP

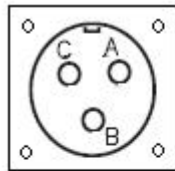
### 4.1 System Set up

#### 4.1.1 Constitution (based on 1 SET)

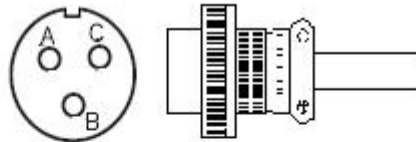
Parameter	Item	Quantity
Major accessory	iDEN 25dBm repeater	1 EA
Additional components	Main power input Cable	1 EA
	Mountable Bracket	1 EA
	Fixable Screw	1 SET
User Manual	Manual	1 EA

#### 4.1.2 Notice

- 1) System Power check: Major electricity is AC110V, therefore please input electricity after power verification.



Wall Mount Receptacle

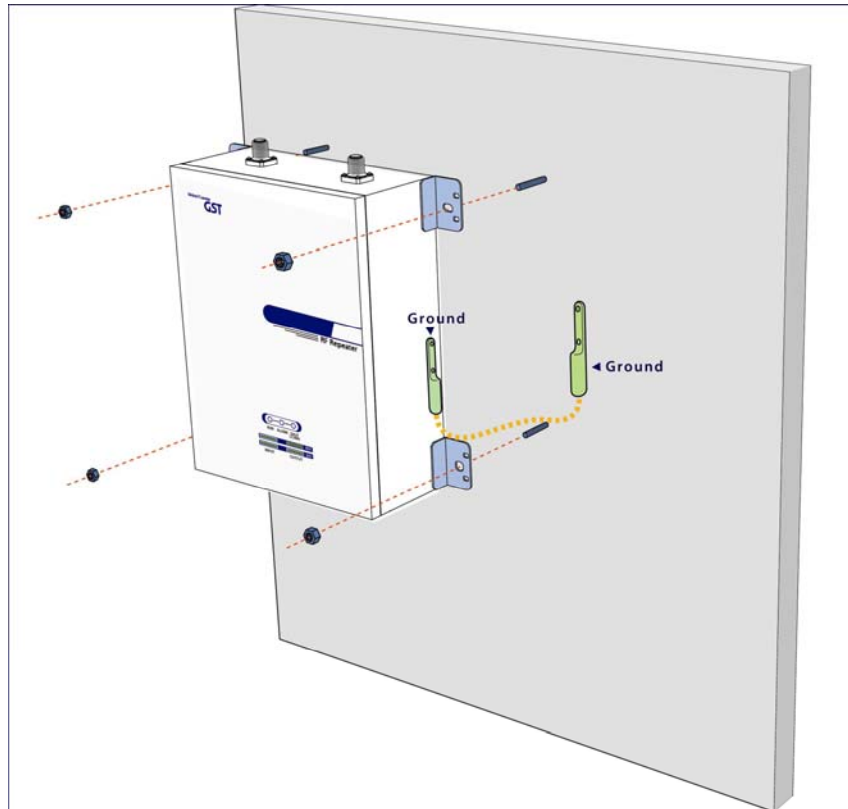


AC Plug

A: AC 110V
B: AC 110V
C: GND

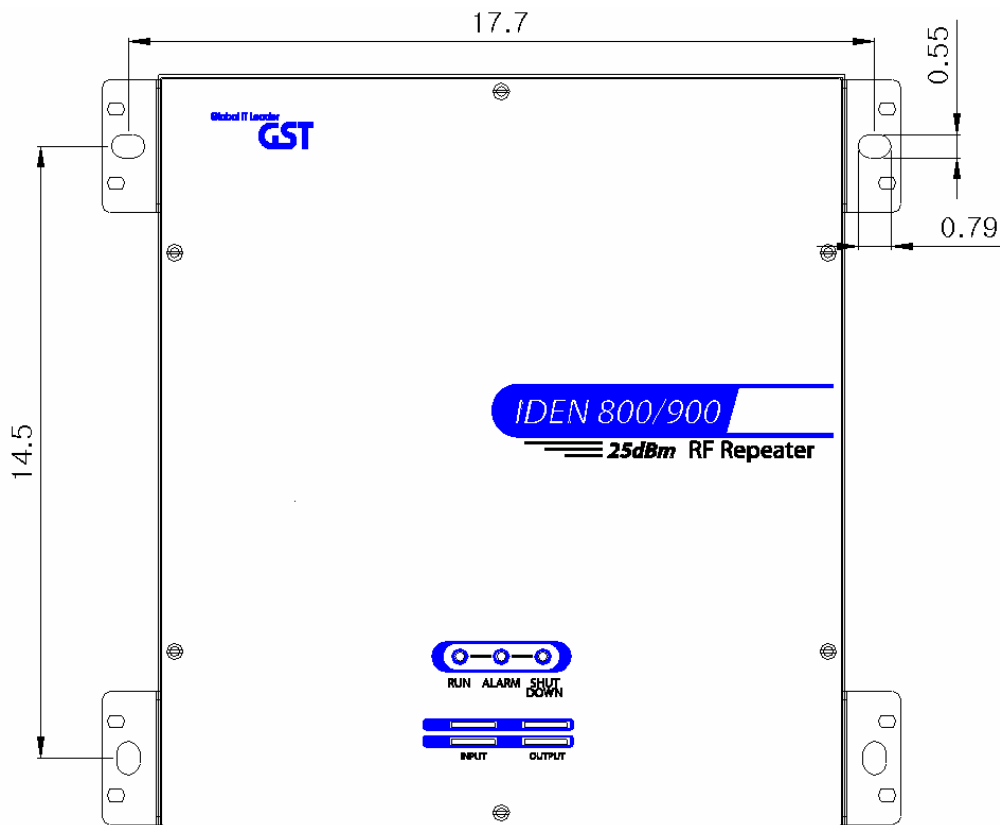
<Pic.7> MS 3100 A 10SL-3 (Wall Mount Receptacle) & MS3010 A 10SL-3(Plug)

- 2) Input condition optimization: DL input condition of iDEN is -43 ~ -18dBm.
- 3) Isolation check between DONOR/SERVICE ANT: Isolation condition of this equipment is 80dBc (Gain+ 15dB) in iDEN. User should check its condition before installation.
- 4) This equipment is basically wall mountable installation.



<Pic.8> Wall mounted iDEN In-building RF Repeater





**<Pic.9> Hole sizes of iDEN In-building RF Repeater**

**4.1.3 System set up**

- 1) Once aforementioned process is done, open for service get ready.
- 2) For grounding, there is a grounding terminal in main power supply side and the grounding terminal on a site and unit should be connected same.
- 3) System installation work is basically performed more than two people and should be careful for unexpected accident.

**4.1.4 Open for service**

- 1) Check points before open
  - a. Verification of system installation status  
Electricity, In/out antenna, coaxial cable connection, equipment mounts status.
  - b. Verification of system accessories  
User should check whole necessary accessories.
  - c. Check receipt signal level  
User should check whether receipt environmental condition is in accordance with system specification, so that system operation will be optimized.
- 2) Check points after open

a. Check by external LED

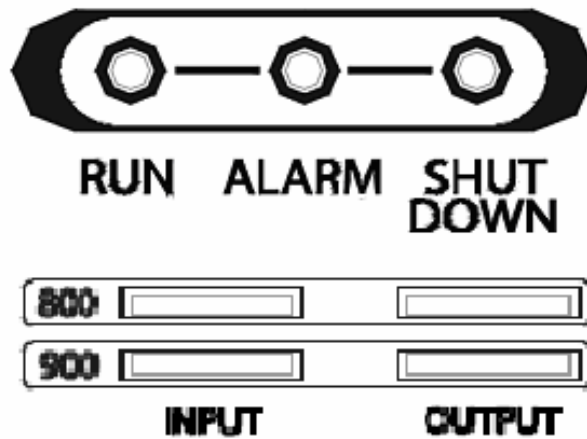
- ① RUN: Green light ON (Off: Green light off)
- ② ALARM: Green light in normal status, Red light in alarming
- ③ SHUT DOWN: Green light in normal status, Red light in Shutdown
- ④ iDEN

Number of LED bar on front side of repeater will show input signal level.

- 43 dBm~38dBm: LED 1bar
- 37dBm~-33dBm: LED 2 bars
- 32dBm~-28dBm: LED 3 bars
- 27dBm~-23dBm: LED 4 bars
- Up than -22dBm: LED 5 bars

Number of LED bar in output power side will show output power signal level.

- +0dBm~+4dBm: LED 1bar
- +5dBm~+9dBm: LED 2bars
- +10dBm~+14dBm: LED 3bars
- +15dBm~+19dBm: LED 4bars
- Up than +20dBm: LED 5bars



<Pic.10> iDEN In-building RF Repeater front LED

b. Verification via Debug Program

User should check operation status of repeater system via Debug Program.

c. Verification of operation status

User should verify following status with Output monitoring terminal, which is provided by

Spectrum Analyzer.

- Output power generation status, system spurious emission characteristics.

d. Verification of signal quality and strength in service area

User should verify signal strength and quality of in-service coverage area by using cell phone or other terminal.

e. Verification of upper-level NMS operation status

## **4.2 Troubleshooting**

In case, abnormal operation is detected, user should check abnormal parts via remote accessible function or field debug, then conduct repair after turn it off.

### **4.2.1 Necessary Testing and Measuring equipment**

- a. RF Power Meter: 10Watt Max, 50ohm
- b. Signal Generator: 3GHz
- c. Spectrum Analyzer: 3GHz
- d. Multi Meter

### **4.2.2 Notice**

- a. Trouble shooting should be performed with drastic knowledge basis.
- b. Unsure parts should not be disassembled.
- c. When in trouble shooting, technician should use attenuator to check output side**

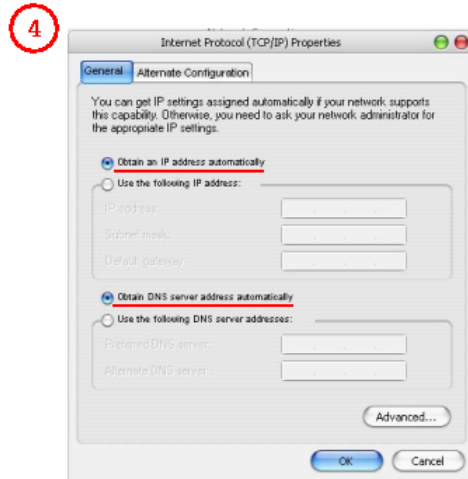
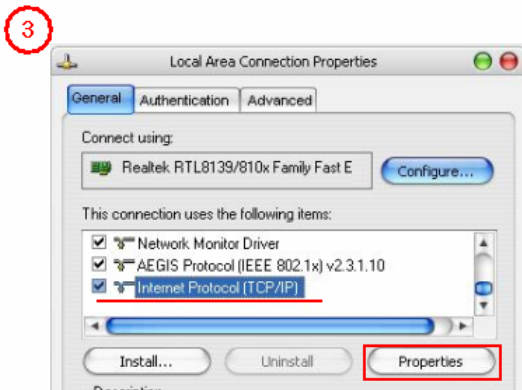
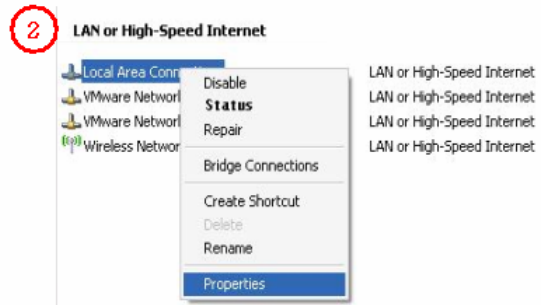
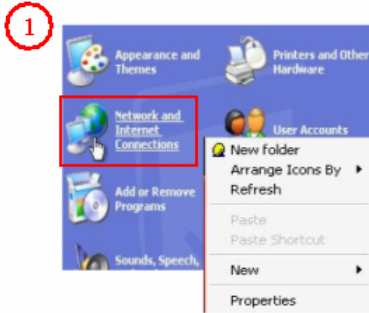
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## **5. WEB USER INTERFACE**

### **5.1 IP Address verification and Explorer setting**

#### **5.1.1 IP Address verification**

- (1) Start->Control Panel->Network Connections
- (2) Double-click Local Area Connections at LAN or High Speed internet
- (3) Click Internet Protocol (TCP/IP) at General tap and click Properties.
- (4) Apply automatic IP address assignment at local connection

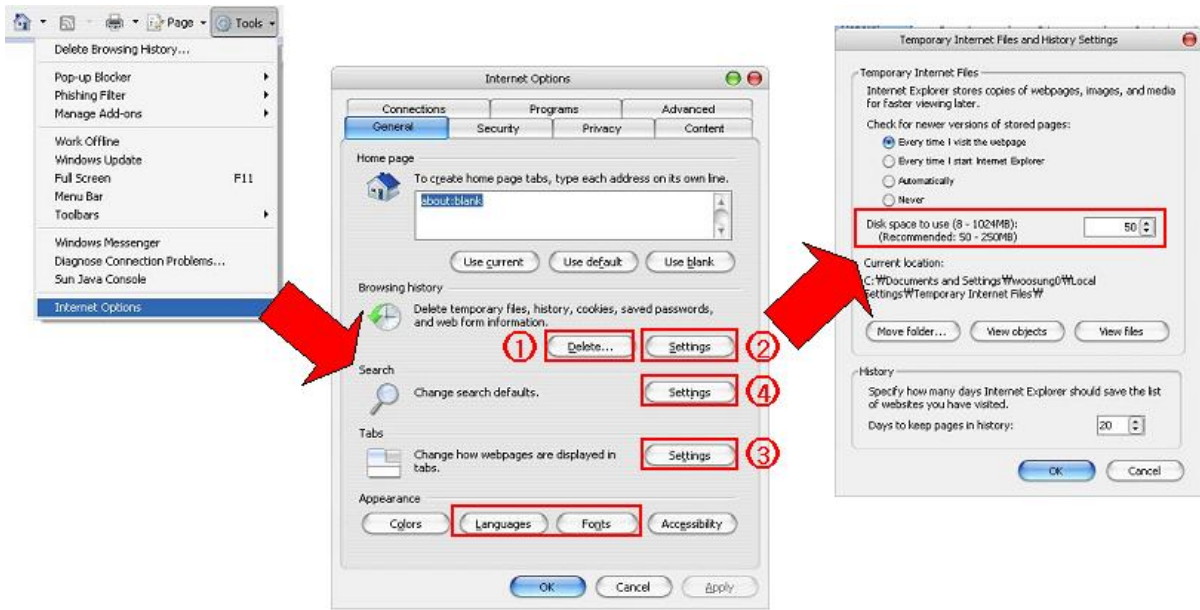


(5) Verify assigned IP address at local connection.  
 (Unless IP address is not assigned, please click repair.)



**5.1.2 Explorer option setting**

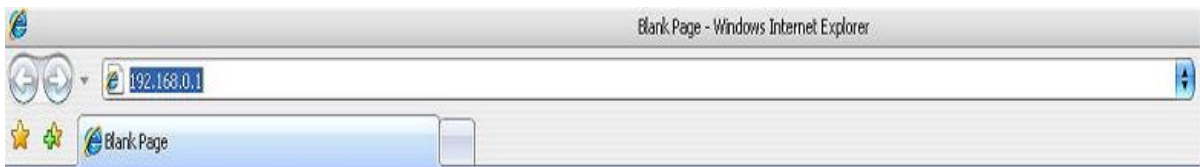
- Proceed step by step as indicated in below. All files and records should be removed.
- Set up mode will be displayed after (2) click.
- Please proceed along following set up mode screen shot.



**5.2 Web UI**

**5.2.1 Web UI connection**

- Input desirable IP address.
- Default Use Name and Password for Web UI is 'admin'.



**5.2.2 Link menu**

- Following screen shot is located left-top side of main menu and those are linked to relative

window.

▶ Logout
▶ Status
▶ RF Configuration
▶ Alarm Configuration
▶ Communications Configuration
▶ User Management
▶ Logs
▶ Sub System / Mailing List
▶ Troubleshooting
▶ Remote Software Upgrade
▶ System Reset

1. Logout
2. Status : It displays current status of Repeater
3. RF Configuration : It can control Repeater parameters
4. Alarm Configuration : It displays arising alarms
5. Communication Configuration : It displays communication mode in connection with Repeater
6. User Management : User addition and deletion
7. Logs : History data for setting & controls, each route
8. Sub System/Mailing List : Mailing List
9. Troubleshooting : Q&A
10. Remote Software Upgrade : Software upgrade
11. System Reset : Reset

## 5.3 Web UI control

### 5.3.1 Status

- Currently setting level check at this menu tap.

▶ Logout
▶ Status
▶ RF Configuration
▶ Alarm Configuration
▶ Communications Configuration
▶ User Management
▶ Logs
▶ Sub System / Mailing List
▶ Troubleshooting
▶ Remote Software Upgrade
▶ System Reset

RF Status			
IDEN 800		IDEN 900	
Downlink Output Power	0.0 dBm	Downlink Output Power	0.0 dBm
Uplink Output Power	0.0 dBm	Uplink Output Power	0.0 dBm
Downlink Attenuation	5.0 dB	Downlink Attenuation	5.0 dB
Uplink Attenuation	5.0 dB	Uplink Attenuation	5.0 dB
AGC Downlink Limit	3.0 dBm	AGC Downlink Limit	3.0 dB
ALC Uplink Limit	4.0 dBm	ALC Uplink Limit	4.0 dBm
ALC Downlink Limit	1.0 dBm	ALC Downlink Limit	1.0 dBm
AGC Control	OFF	AGC Control	OFF
ALC Control	OFF	ALC Control	OFF
Gain Balance Control	OFF	Gain Balance Control	OFF
Temperature	33.5 deg C	Temperature Limit	20.0 deg C
Downlink HPA	OFF	Isolation Control	OFF
Uplink HPA	OFF		
Band Select Status			
IDEN 800 Selected Band :	18MHz	IDEN 800 RSSI :	-15.0 dBm
IDEN 900 Selected Band :	5MHz	IDEN 900 RSSI :	-15.0 dBm

### 5.3.2 RF Configuration

- Setting level can be changed at this menu tap.

- (1) Level change
- (2) Click Apply button

- ▶ Logout
- ▶ Status
- ▶ **RF Configuration**
- ▶ Alarm Configuration
- ▶ Communications Configuration
- ▶ User Management
- ▶ Logs
- ▶ Sub System / Mailing List
- ▶ Troubleshooting
- ▶ Remote Software Upgrade
- ▶ System Reset

RF Configuration					
IDEN 800MHz			IDEN 900MHz		
AGC Downlink Limit	3.0	dBm	AGC Downlink Limit	3.0	dBm
ALC Uplink Limit	4.0	dBm	ALC Uplink Limit	4.0	dBm
ALC Downlink Limit	1.0	dBm	ALC Downlink Limit	1.0	dBm
Downlink ATT	5.0	dB	Downlink ATT	5.0	dB
Uplink ATT	5.0	dB	Uplink ATT	5.0	dB
AGC Control	OFF		AGC Control	OFF	
ALC Control	OFF		ALC Control	OFF	
Gain Balance Control	OFF		Gain Balance Control	OFF	
Downlink HPA	OFF		Uplink HPA	OFF	
Temperature Offset	3		Temperature Limit	20	
Isolation Control	OFF				
Bandwidth Select Control					
IDEN 800MHz			IDEN 900MHz		
Band width :	18	MHz	Band width :	5	MHz
<input type="button" value="Apply"/>					

**5.3.3 Alarm Configuration**

- (1) On/Off function for entire alarm report
- (2) Alarm status
- (3) On/Off function for individual alarm category
- (4) Alarm SNMP Mapping
- User may set and change its level per it field condition and click apply button.

- ▶ Logout
- ▶ Status
- ▶ RF Configuration
- ▶ **Alarm Configuration**
- ▶ Communications Configuration
- ▶ User Management
- ▶ Logs
- ▶ Sub System / Mailing List
- ▶ Troubleshooting
- ▶ Remote Software Upgrade
- ▶ System Reset

Report Alarms	ON				
List of alarms:					
Number	Name	State	Active	SNMP Mapping	Last Triggered
1	IDEN800 oscillationalarm	Normal	Enable	RF Power	
2	IDEN800 Uplink oscillationalarm	Normal	Enable	RF Power	
3	IDEN800 Downlink over-input alarm	Alarm	Enable	RF Power	01/01/1970 00:00:18
4	IDEN800 Downlink over-input alarm	Alarm	Enable	RF Power	01/01/1970 00:00:18
5	IDEN800 Downlink over-input alarm	Alarm	Enable	RF Power	01/01/1970 00:00:18
20	IDEN800 Dc matter/Current alarm	Normal	Enable	RF Power	
21	Downlink LNA alarm	Alarm	Enable	RF Power	01/01/1970 00:00:18
22	Uplink LNA alarm	Alarm	Enable	RF Power	01/01/1970 00:00:18
23	Temperaturelimit alarm	Alarm	Enable	RF Power	01/01/1970 00:00:18
<input type="button" value="Apply"/>					

**5.3.4 Communication Configuration**

- This provides all necessary information related to network
- To provide relative information about DHCP and modem

**5.3.5 User Management**

- Add and Remove user, Assigning accessibility
  - (1) User Registration: Click Register after input required information
  - (2) User Removal: Click Delete upon click of user name you wish to remove.
  - (3) Super User: Accessible to all kinds of information path
    - Read/Write: Accessible to all kinds of information path except for User management path.
    - Read: Checking status only. No control



### 5.3.6 Logs

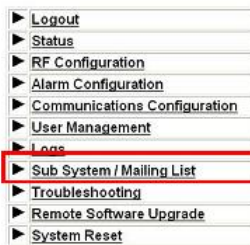
- All users' access record will be saved as a log.



Date & Time	User	Operation	Description
1/3/1996 - 7:26:41	admin	Login	Login
1/3/1996 - 23:45:3	admin	Login	Login
1/3/1996 - 23:45:10	admin	logs	Checked
1/3/1996 - 23:45:18	admin	Status	Checked
1/3/1996 - 23:45:21	admin	RF Configuration	Checked
1/3/1996 - 23:45:24	admin	logs	Checked
1/3/1996 - 23:45:30	admin	RF Configuration	Checked
1/3/1996 - 23:45:33	admin	Status	Checked
1/3/1996 - 23:45:38	admin	RF Configuration	Checked

### 5.3.7 Sub System/Mailing List

- Set up e-mail address the place you wish to receive alarm.



Mailing List		
E-mail	Mail Server	Manager E-mail
1		empty
2		empty
3	empty	empty
4		empty

Sub Systems	
Repeater ID	Link
None local system	None local system
Apply	

### 5.3.8. Troubleshooting

Following is a trouble shooting table, which is frequently occurred to repeater and treatment method.



STATE	CAUSE	ACTION	Remark
<b>STATUS LED Display turned off</b>	1. Cable in power supply connecting is being cut 2. Defective LED Display	Checking cable connection	
<b>No signal from Repeater</b>	1. Cable inside of the repeater is being cut. 2. Defective Coaxial cable 3. When in shutdown	1. Should check power cable connection in power supply part of the repeater 2. Change the Coaxial cable.	
<b>Repeater Shut-Down</b>	Power supply DC matter/ Current Alarm	1. Power supply change	
	Downlink over-input alarm	1. Checking input level 2. Unit replacement when input level is normal	
	VSWR alarm	1. Reset (on/off) 2. Checking Service ANT connection 3. Unit replacement	
	Uplink Oscillation alarm	1. Checking setup level 2. Reset 3. Setting Factory mode 4. Unit replacement	
<b>Replaceable unit alarming</b>	CH2 Module alarm	1. Checking LED on IF2 Module 2. Unit replacement	
	CH3 Module alarm	1. Checking LED on IF3 Module 2. Unit replacement	
	Downlink PAM	1. Checking LED on Power AMP Module 2. Unit replacement	
	Uplink PAM	1. Checking LED on Power AMP Module 2. Unit replacement	

### 5.3.9 Remote Software Upgrade

- Upload repeater operation program.

**IDEN System**

Time:  Date:

Repeater ID:

SN:

**Remote Software Upgrade**

File Name:

File Size:

### 5.3.10 System Reset

- Reset repeater.

