

# **RU4460 User Guide V1.0**

CONFIDENTIAL DOCUMENTS

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# User Guide

## 0. Preface

### 0.1. Safety Instructions

- 1) **Grounding:**The access unit and extension unit of the device are equipped with protective grounding terminals. During installation, yellow-green grounding wires should be used to ensure a reliable connection to the building's protective earth. Grounding braided straps may also be used. The antenna and feeder cables must be properly grounded.
- 2) **Power Supply:**The device supports DC 48V power supply or AC 220V (198–240V) power supply. Please ensure that the DC power source is within the device's required range of DC 36–60V. The grounding terminal of the device must be reliably connected to the building's protective earth.
- 3) **Electric Shock Protection:**Touching the internal power module of the device is dangerous. Live operation is strictly prohibited to prevent electric shock.
- 4) **Optical Module:**The optical module supports hot-swapping, but the fiber optic connector must not be pointed at any part of the human body during insertion or removal.
- 5) **Surge Protection:**

The built-in surge protector of this product is mainly designed to protect against induced lightning and switching overvoltage. It cannot protect against direct lightning strikes.

  - In areas with frequent lightning activity, it is recommended to install a primary surge protector (10/350  $\mu$ s waveform) at the building's main distribution panel, and a secondary surge protector (8/20  $\mu$ s waveform) at the distribution cabinet or in front of the device to form a layered protection system.
  - The surge protection components are single-use devices and may fail after exposure to high-energy lightning strikes. Regular inspection is recommended, especially after lightning events.
  - If the device is installed in open or elevated locations (such as rooftops), additional external lightning protection measures (e.g., lightning rods) must be implemented.

### 0.2. Warning Marks

The warning labels on the system enclosure and within the system must be kept clean, legible, and clearly identifiable.

### 0.3. Electrostatic Protection

1. Avoid allowing clothing or hands to come into contact with PCBs, electronic components, and conductive surfaces of parts whenever possible. If handling of PCBs, components, or conductive parts is necessary, proper anti-static precautions must be taken, such as wearing anti-static gloves or using anti-static bags. Electrostatic discharge (ESD) may damage the equipment.

## 1.1. Standard

Protection rating complies with IP67.

RF performance complies with 3GPP standards.

## System Overview

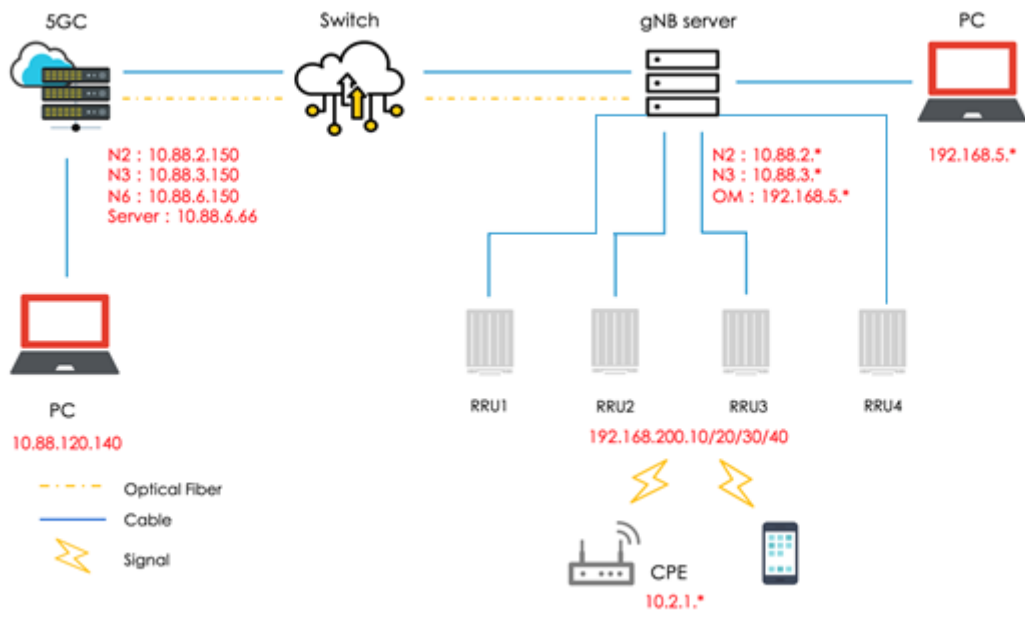
Band	type
3700-3800	nCELL-RU4460-R428N17878B-M

BBU Software Version	5GNR_ax.tdd.fr1.2.2.3.462_r50381_m361_V3.3
RRU Software Version	iDAS_DRRU_R528_D0.3.B13S_B7C7_20230410

### 1.2. Technical Specifications

No.	ITEM	
	Work frenquce	3700-3800 MHz
1	Pout Range	45.5-47dBm
2	Pout	-1dB/+0.5dB
3	ACPR(1 carrier)	≤-45dBc
4	SE	9 kHz~150 kHz@1 kHz ≤-36dBm 150 kHz~30 MHz@10 kHz ≤-36dBm 30 MHz ~ 1 GHz@100 kHz ≤-36dBm 1G-(F_low-40MHz)@1 MHz ≤-30dBm (F_high+40MHz)-12.75GHz@1 MHz ≤-30dBm 12.75 GHz - 26 GHz@1 MHz ≤-30dBm
5	SEM	0.05MHz≤f_offset≤5.05MHz@≤-16~-23dBm/100kHz 5.05MHz≤f_offset≤10.05 MHz@≤-23dBm/100kHz 10.05MHz≤f_offset≤f_offsetmax@≤-25dBm/100kHz
6	SWR	≤1.8
7	Sensity	≤-95.6dBm

### 1.3. System Framework



The network configuration is provided for reference purposes only.

CONFIDENTIAL DRAFT



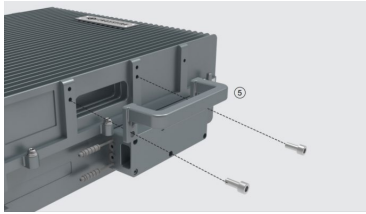
## 2. Installation and Connections

### 2.1. Installation Method

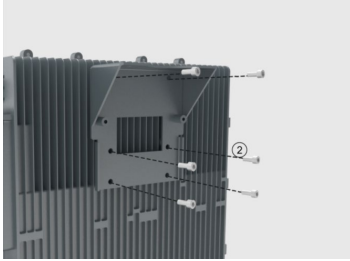
#### ➤ Back on the Wall

The installation accessories designed during the equipment installation are shown in the following figure, and are combined according to the installation scenario.

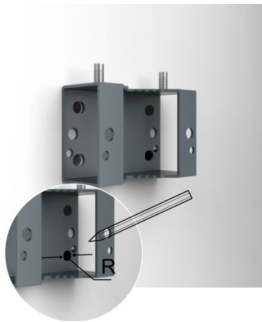
sCELL-RU4460 Accessories List		① Nut M10	② Screw M6×14	③ Flat Washer M10	④ Spring Washer M10
					
⑤ Handle	⑥ Expansion Bolt M10×90		⑦ Optical Transceiver Optical Transceiver		
					
⑧ HPRU Mounting Bracket I	⑨ HPRU Mounting Bracket II		⑩ Nut M12		
					
⑪ Flat Washer M12	⑫ Spring Washer M12		⑬ Bolt M12		
					
⑭ DC Power Lead 2m	⑮ Ground Wire 2m				
					



**Step 1:** Using a T5 wrench, secure the handle to the side of the device with M6\*14 screws



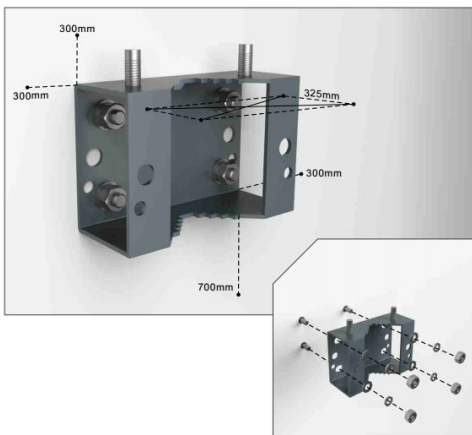
**Step 2:** Using a T5 wrench, secure the Type I bracket to the back of the device with M6\*14 screws



**Step 3:** Mark the location of the drill hole on the mounting bracket II. Note: R=13mm

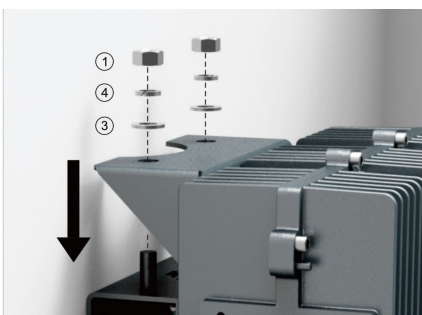


**Step 4:** drill 4 holes in the marked position. Note: H=70mm



**Step 5:** Attach pins, expansion bolts or something similar to the wall and bracket II to the wall

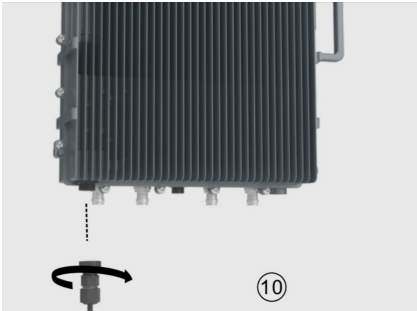
Tip: Use bracket II as a reference to control the separation distance of each device before hanging and locking the device.



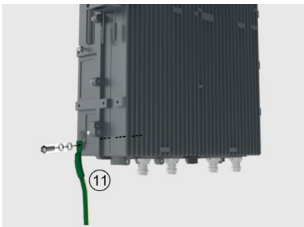
**Step 6:** Hang the device on the mounting bracket II and secure with the M10 nut



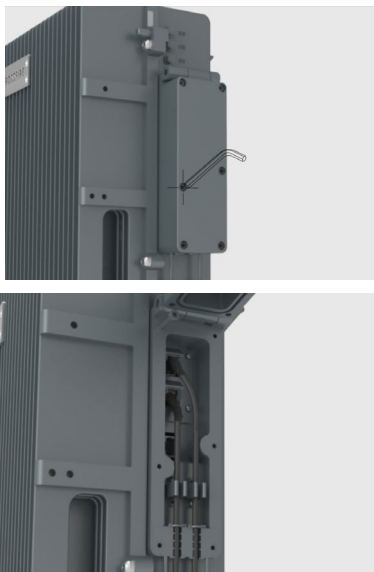
**Step 7:** Fixed the mounting bracket I and the mounting bracket II with the M6\*14 screws



**Step 8:** Connect and tighten the ground cable on the left side of the equipment

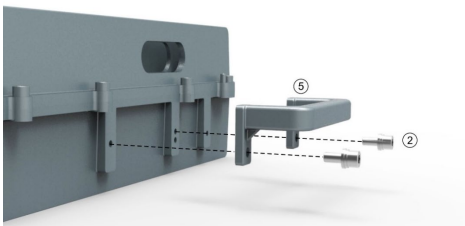


**Step 9:** Connect and tighten the ground wire to the left side of the RU4460

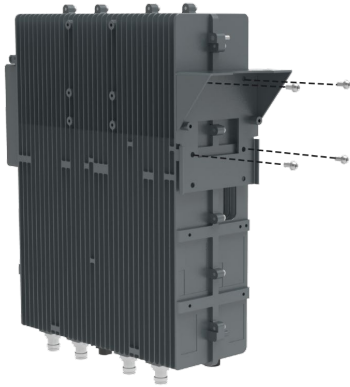


**Step 10:** Open the chassis on the right side of the RU4460 and connect to the SFP optical module

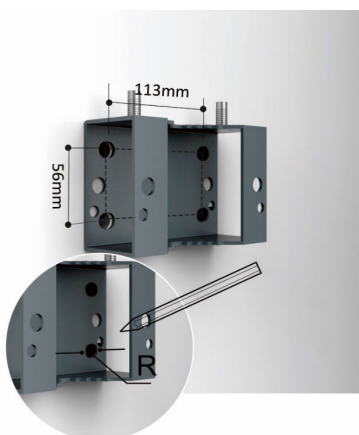
➤ **Side on the Wall**



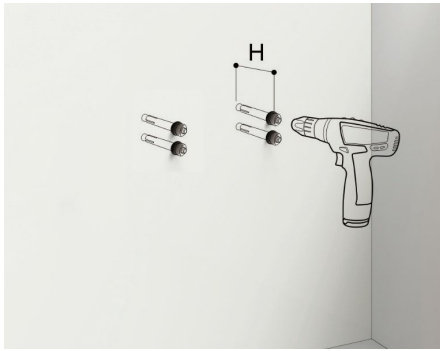
**Step 1:** Using a T5 wrench, secure the handle to the side of the device with M6\*14 screws



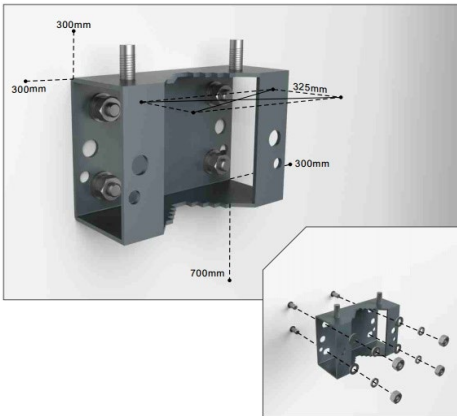
**Step 2:** Using a T5 wrench, secure the type I bracket to the left side of the device with M6\*14 screws



**Step 3:** Mark the location of the drill hole on the mounting bracket II. Note: R=13mm



**Step 4:** drill 4 holes in the marked position. Note: H=70mm



**Step 5:** Attach the pins, expansion bolts or something similar to the wall and the bracket II to the wall.

Tip: Use bracket II as a reference to control the separation distance of each device before hanging and locking the device.



**Step 6:** Hang the device on the mounting bracket II and secure with the M10 nut



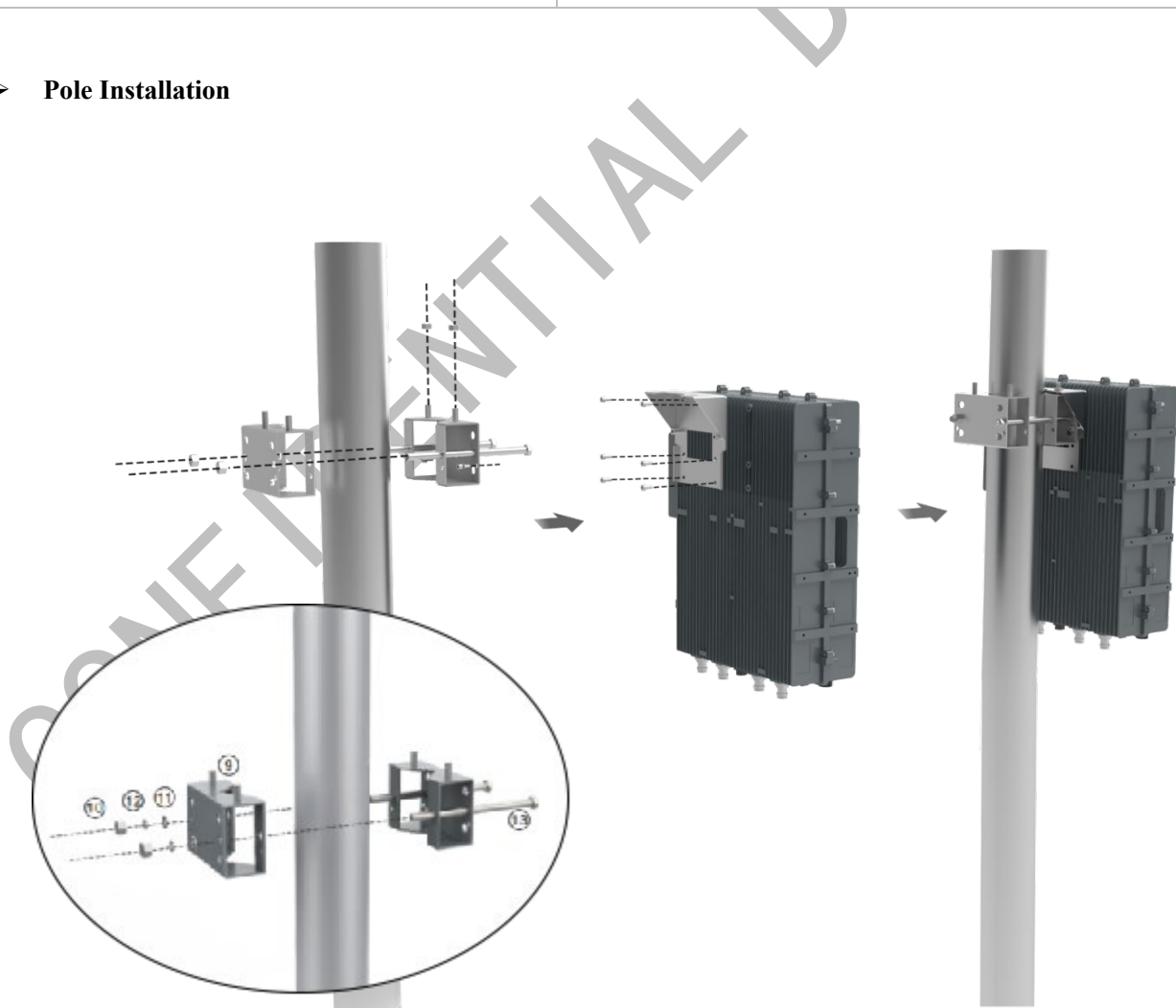
**Step 7:** Fixed the mounting bracket I and the mounting bracket II with the M6\*14 screws



**Step 8:** Open the chassis on the right side of the RU4460 and connect to the SFP optical module



➤ **Pole Installation**



**Step 1:** Install the handle and bracket I to the back of the device.

**Step 2:** Install the bracket II and Bracket III to the pole.

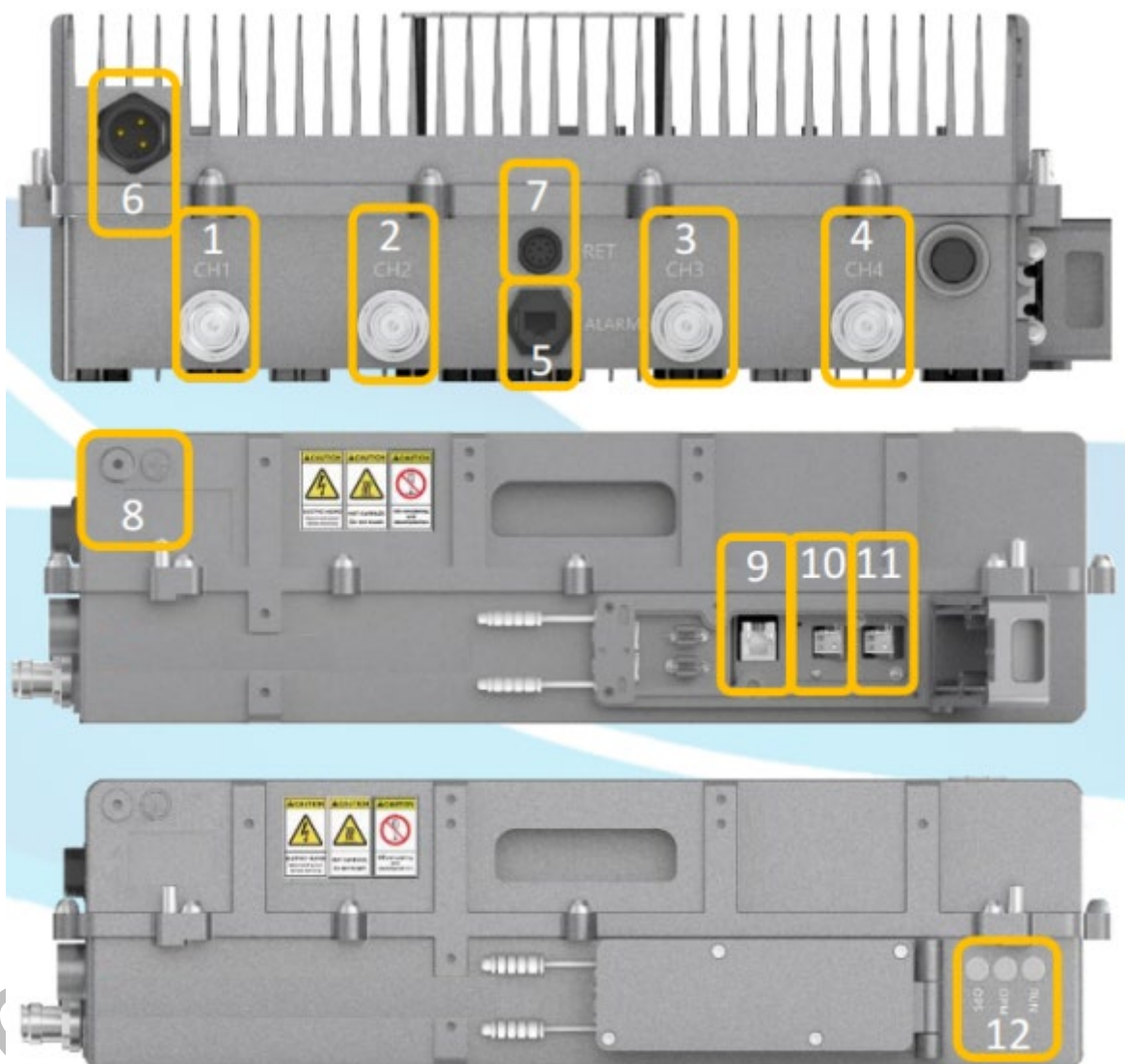
**Step 3:** Hang the equipment on the mounting bracket and secure with the M10 nut

**Step 4:** Install the power cord and ground wires.

Additional accessories are required to install the poles, and are purchased separately.

*Note: The diameter of Pole shall not be over 110mm or less than 55mm.*

## 2.2. Device Interfaces





**Diagram of the RRU**

NO.	Silk mark	interface specification
1	CH1	RF output port 1
2	CH2	RF output port 2
3	CH3	RF output port

4	CH4	RF output port 4
5	Alarm	External alarm port
6	PWR	Power interface
7	RET	Active power supply port
8	GND	ground connectio
9	WAN	internet access
10	OPS	Access from the optical port-optical module
11	OPM	Main light mouth
12	OPS/OPM/STATUS	LED pilot lamp

**Note:**

1.1.1.1 RRU is equipped with a pair of HG Tech / Finisar optical modules, and optical modules must be used as a pair as the following table suggests.

Brand	One End of Fiber	Another End of Fiber	Remark
HG Tech	MBS-1C41-27 (blue)	MBS-1C41-33 (purple)	
Finisar (optional)	FTLX2072D327 (grey)	FTLX2072D333 (green)	

### 3. RU4460 Access

#### 3.1. Access via Debug Port





a) Move file “iptables.sh” to BBU root directory.

Select SSH2, Port22, Account: root Password: root123

Name	Size	Changed	Rights	Owner
5g.identity	1 KB	12/31/2021 9:30:06 AM	rw-r--r--	root
5GNR_2.2.0.ax_215_r44793_20220104_231007.pkg	67,274 KB	1/18/2022 8:14:11 PM	rw-rwxrwx	root
5GNR_2.2.2.ax_170_r44793_20211129_181814.pkg	55,679 KB	11/29/2021 6:18:26 PM	rw-rwxrwx	root
5GNR_ax.tdd.frl.2.2.0_229_r44793_20220118_231026.pkg	67,268 KB	2/17/2022 10:54:12 AM	rw-rwxrwx	root
5GNR_ax.tdd.frl.2.2.0_600229_r47086_20220228_092956.pkg	78,215 KB	3/1/2022 3:26:00 AM	rw-r--r-x	root
adlk-fru	61 KB	11/11/2020 11:29:00 AM	rw-r--r--	root
anaconda-ks.cfg	6 KB	3/23/2021 9:50:26 PM	rw-r-----	root
cfg-4-0831.sh	1 KB	10/12/2021 6:06:16 PM	rw-r--r--	root
confdb_v2.xml	335 KB	1/9/2000 1:50:29 AM	rw-r--r--	root
fgfc_prj_top.bin	12,117 KB	9/9/2021 3:53:59 PM	rw-r--r--	root
fgfc_prj_top.bit	12,117 KB	9/9/2021 3:53:59 PM	rw-r--r--	root
fpga_cfg_H.sh	1 KB	8/10/2021 12:48:39 PM	rw-r--r--	root
fpga_cfg_Lsh	1 KB	8/10/2021 12:48:39 PM	rw-r--r--	root
iptables.sh	1 KB	1/13/2022 10:23:56 AM	rw-rwxrwx	root
original-ks.cfg	6 KB	3/23/2021 9:50:26 PM	rw-r-----	root
playback_v1.1.tar.gz	499,230 KB	5/27/2021 10:35:20 PM	rw-rwxrwx	root
ptp4l-master.cfg	3 KB	10/14/2021 11:36:44 AM	rw-r--r--	root
qep-fh.tar.gz	3,526 KB	9/14/2021 10:45:18 AM	rw-r--r--	root
root@	12,117 KB	1/12/2022 2:30:36 PM	rw-r--r--	root
SNB123456789.identity	1 KB	2/10/2022 3:46:24 PM	rw-r--r--	root
sw_install.sh	1 KB	3/1/2022 3:26:02 AM	rw-r--r-x	root
Yafullash	744 KB	10/22/2020 9:56:08 AM	rw-r--r-x	root

b) Script execution permission

```
# chmod 777 iptables.sh
```

c) Run the scripts

```
#!/iptables.sh
```

d) Run “route\_config\_5g\_bbu” Script as administrator.

```
# route add 192.168.200.0 mask 255.255.255.0 192.168.5.100 -p
```

Note: in the script, the IP 192.168.5.100 should be modified.

For example, if the maintenance IP of BBU is 192.168.17.131, then need to change the script to:

```
#route add 192.168.200.0 mask 255.255.255.0 192.168.17.131 -p
```

e) Check if the script is successful

```
# route print
```

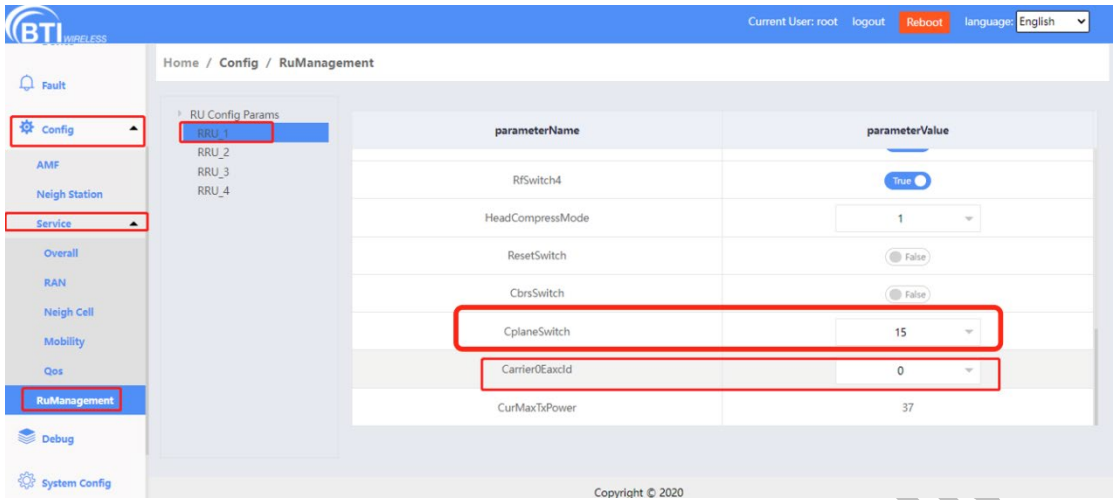
```
Interface List
24...00 95 69 07 c6 bd .....Microsoft Virtual WiFi Miniport Adapter
13...34 17 eb d8 f8 eb .....Intel(R) Ethernet Connection I217-LM
11...00 95 69 07 c6 bc .....802.11 USB Wireless LAN Card
1 .....Software Loopback Interface 1
12...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter
23...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter #2
28...00 00 00 00 00 00 00 e0 Microsoft ISATAP Adapter #3

IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
-----
127.0.0.0                  255.0.0.0       On-link         127.0.0.1        306
127.0.0.1                  255.255.255.255 On-link         127.0.0.1        306
127.255.255.255           255.255.255.255 On-link         127.0.0.1        306
192.168.5.0                255.255.255.0   On-link         192.168.5.111   266
192.168.5.111             255.255.255.255 On-link         192.168.5.111   266
192.168.5.255             255.255.255.255 On-link         192.168.5.111   266
192.168.200.0             255.255.255.0   192.168.5.100  192.168.5.111   11
224.0.0.0                  240.0.0.0       On-link         127.0.0.1        306
224.0.0.0                  240.0.0.0       On-link         192.168.5.111   266
255.255.255.255           255.255.255.255 On-link         127.0.0.1        306
255.255.255.255           255.255.255.255 On-link         192.168.5.111   266
=====
Persistent Routes:
Network Address            Netmask          Gateway Address  Metric
-----
192.168.200.0             255.255.255.0   192.168.5.100   1
```

## Step 2: BBU Side Configuration

Path: Home/Config/Service/RuManagement

Example: The RRU is connected to the BBU optical port 1, the Carrier0EaxcId should be set to 0.



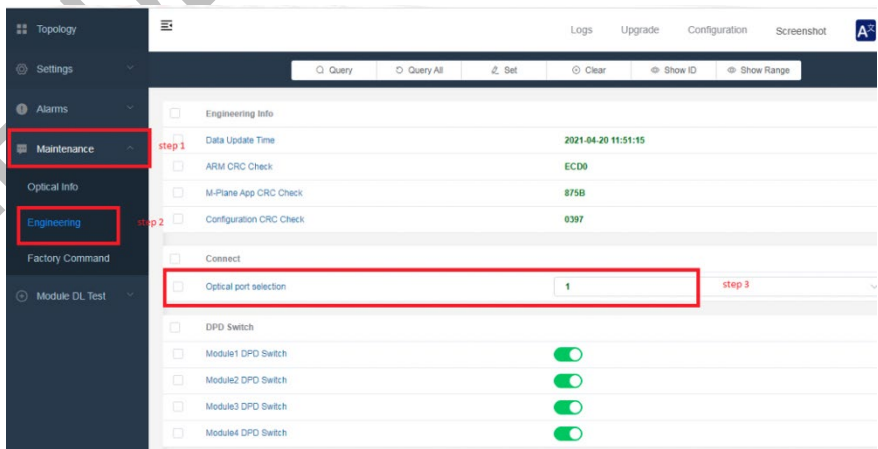
**Step 3: RRU Side Configuration**

Path: Maintenance/Engineering/Connect/Option Port Selection

a) Select optical port

If the RRU is connected to the optical port 1 of accelerator card, optical port selection on RRU GUI should be configured to 1.

Accelerator Card Port	Optical port selection
1	1
2	2
3	3
4	4

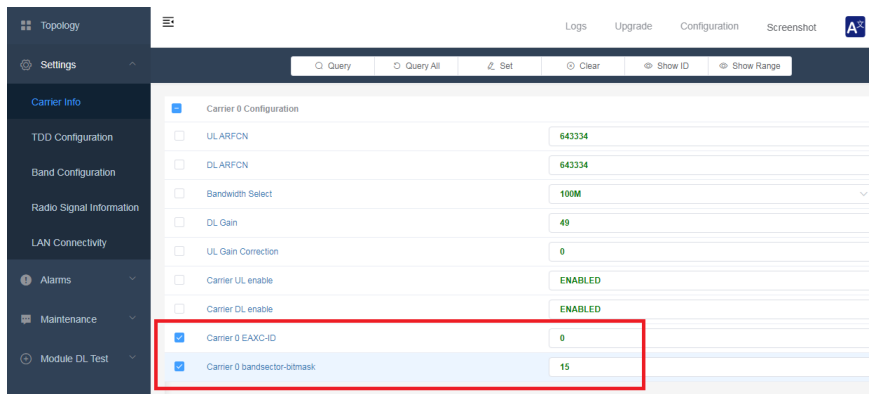


b) Set Carrier 0 EAXC-ID and Carrier 0 bandsector-bitmask.

Carrier 0 EAXC-ID is 0 by default. The parameter should be configured based on the accelerator card port that the RRU is connected to. Following is the mapping table. Path: Settings/Carrier Info/Carrier 0 configuration

Accelerator Card Port	Carrier 0 EAXC-ID
1	0
2	1
3	2
4	3

Carrier 0 bandsector-bitmask should be changed to 15.

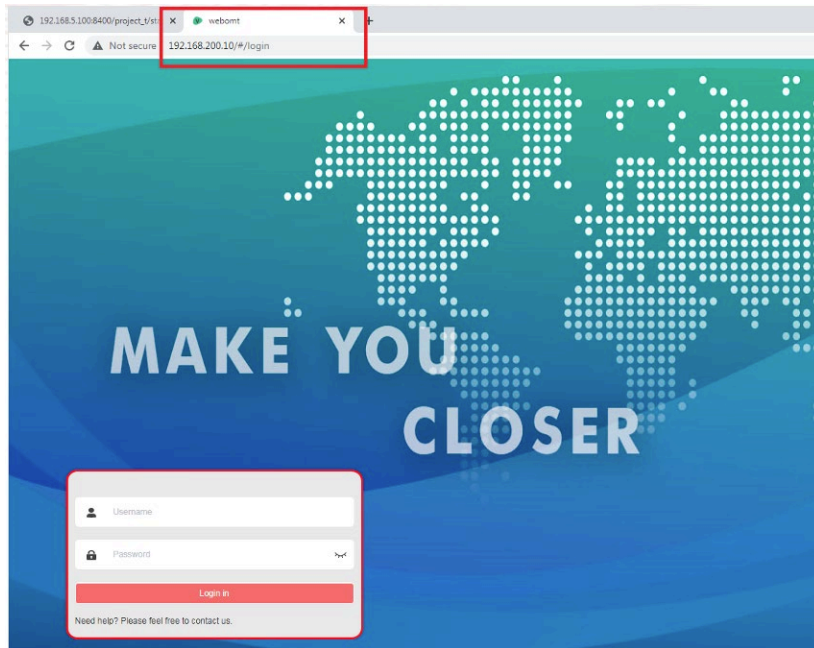


**Step 4: visit RU4460 via BBU.**

After finishing the above steps, it is reliable to visit RRU via BBU.

Accelerator Card Ports and RRU IPs' mapping relationship is shown as follow.

Port	IPs
1	192.168.200.10
2	192.168.200.20
3	192.168.200.30
4	192.168.200.40

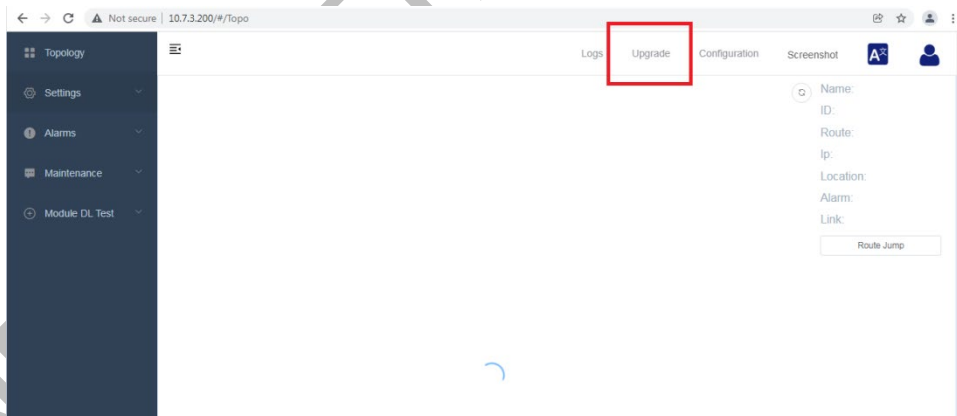


*Note:*

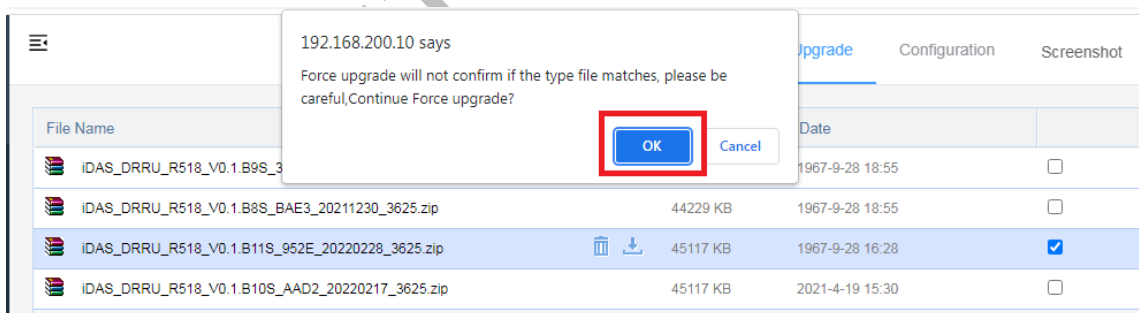
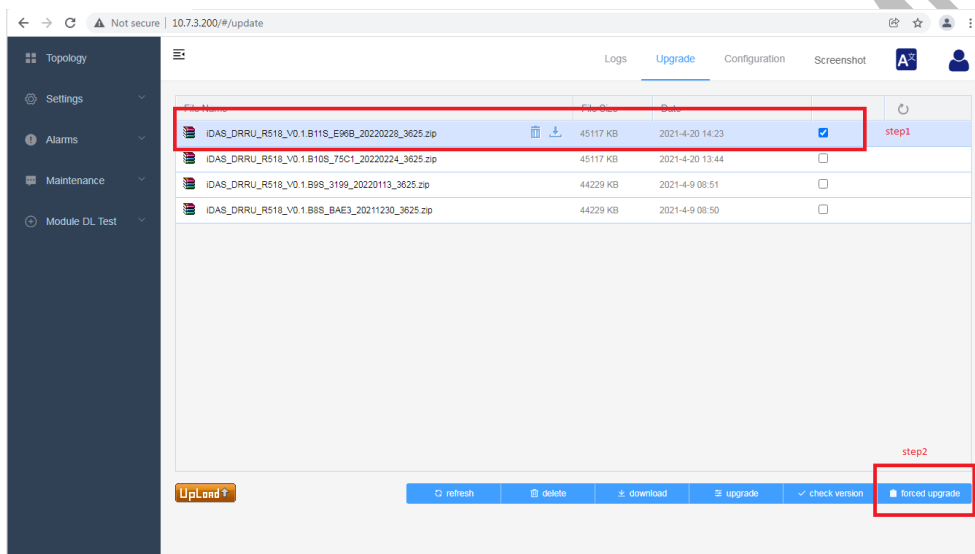
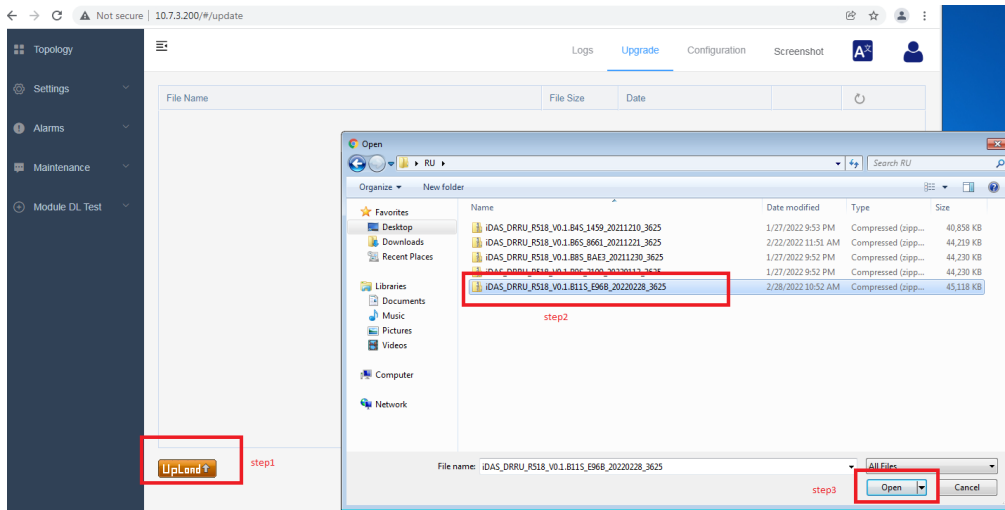
- a. The RRU script iptables.sh should be re-executed if accessing RRU from BBU fails after the RRU upgrade.
- b. Repeat **chapter 3.3.2 Step1 preparation** once the BBU gets a power cycle.

### 3.3. Local Upgrade

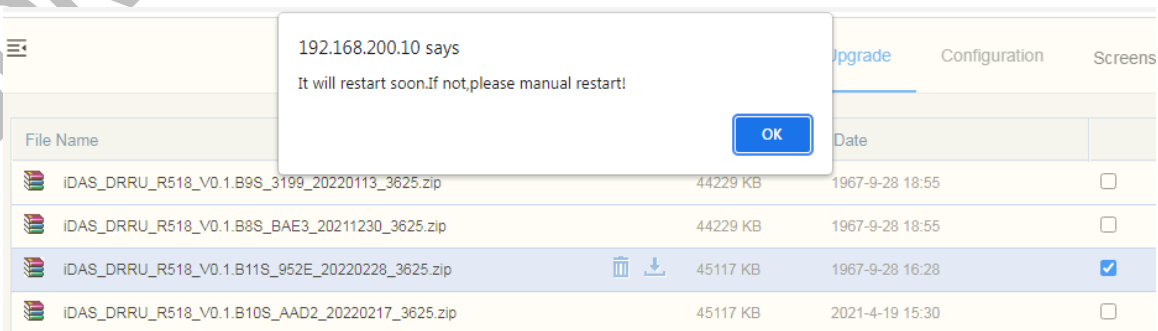
**Step1** Click upgrade to enter the upgrade interface, click Upload to upload the RRU upgrade package from local to the RRU system.



**Step2** Select the target upgrade package and click forced upgrade. (Password: iDas)

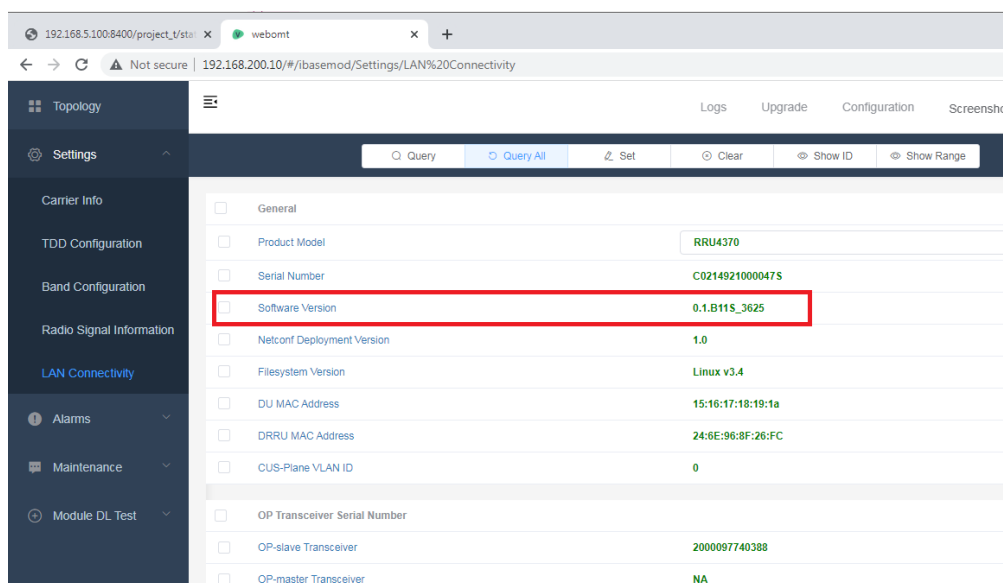


Step3 pop-up prompt and click OK



Step4 After upgrading succeed, RRU will automatically restart and after restart will enter this interface.

## Step5 Check the Software version



## 4. Device Maintenance

### Common Parameter Check

Parameter Name	Normal Range
Downlink Carrier Baseband Power	-12 dBm (fixed 4-stream full traffic) /-18 dBm (adaptive full traffic) /-24 dBm (no terminal access)
Channel X Baseband Power	Consistent with the downlink carrier baseband power.
Output Power	45.5dBm-47dBm
VSWR	<1.8
PTP Status	Green

## 5. Equipment handling and recycling



The above symbols indicate that your products must be separated from household waste in accordance with local laws and regulations. When you need to remove equipment under certain circumstances, such as upgrading, replacing or scrapping equipment, we conduct separate recycling programs or work with government-approved agencies to collect, treat, recycle and dispose of discarded electrical and electronic equipment, batteries and packaging. We encourage all

customers and end users to make responsible decisions when handling products. When handling your products and/or their batteries, separate collection and recycling will help conserve natural resources, and you are helping to ensure that they are neither incinerated nor sent to landfills, thereby minimizing potential negative impacts on human health and the environment.

Please take attention that changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 590cm between the radiator & your body.

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