P5G-Indoor ISC-PS1400 User Guide

User Guide

Document Version	v1.0.1
Document Release Date	July 25 2025
Document Number	UG-02040

Document Approval

Document Title	P5G-Indoor ISC-PS1400 User Guide
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Release Date	July 25, 2025
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Approver	

Revision History

Version	Date	Description	Compatible FW version
v1.0.1	2025/7/4	1. [Ch 1.4] Modify certification statement 2. [Ch 3.2.2] Add external antenna port number 3. [Ch 3.4.2.1] Modify n48 external antenna	v1.1.1.7
v1.0.0	2025/6/13	Modify for FW v1.1.1.7	v1.1.1.7
v0.0.1	2025/4/22	Initial version	v1.1.1.5

Contents

1. Foreword

This document is for Pegatron Corporation (hereinafter referred to as Pegatron). The documents of the Business Group 6 - Business Unit 6 - 5G Product Development Center (hereinafter referred to as the 5G Product Development Center). The purpose of this document is to describe the information, installation, configuration and basic operation of the indoor ISC (integrated small cell) PS1400.

1.1 Legal notices

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1.2 Safety statements

1.2.1 Usage safety precautions

Do not use this device where flammables or explosives are stored, for example, in a gas station, oil depot, or chemical plant. Otherwise, explosions or fires may occur. In addition, follow the instructions indicated in text or symbols in area used.

- Place this device on a stable surface.
- Keep this device far from electronic devices that generate strong magnetic or electric fields, such as microwave ovens, satellite dish antennas, or large appliances.
- Place this device in a cool and well-ventilated indoor area. Do not expose the device to direct sunlight.
- Do not use this device in an area under or over temperatures ranging from 0°C to 45°C.
- Do not cover this device. Reserve a minimum space of 10 cm around this device for heat dissipation.
- Before connecting and disconnecting cables, ensure that your hands are dry.
- To avoid electric shock, damage, and fire resulting from short-circuiting, do not use the product if wet, with wet hands, or while holding or drinking any liquids.
- Only insert relevant cables or devices into the ports, do not insert metal or other foreign objects.
- Do not place naked flame sources, such as lighted candles, on this device. Keep this device far from sources of heat and fire, such as a heater or a candle.
- Damage caused by user misuse or not following instructions are not covered by warranty.

⚠ The power supply cord must be plugged into a socket or outlet that is provided with a suitable earth ground.

1.2.2 Electrical safety precautions

Refer all repairs to qualified service personnel. Do not modify any part of this device, as this will void the warranty.

Disconnect the power to this product and return it for service if the following conditions apply:

1. The product does not function after following the operating instructions outlined in this manual.
2. The product has been dropped or impacted and appears physically damaged. Locate the serial number of the product and record this on your registration card for future reference. Also record the MAC address, located on the product sticker.

1.3 Recommendations

1.3.1 Base Station Backup Battery

It is recommended to use an uninterruptible power supply (UPS) battery backup system to ensure a reliable and stable power supply to avoid hardware damage due to a power outage.

1.4 Country safety statements

1.4.1 Taiwan: National Communications Commission (NCC)

- DO NOT ATTEMPT TO INSTALL/SETUP 5G NR O-RU DEVICE YOURSELF. SUCH ACTION MAY VOID THE WARRANTY. THIS DEVICE IS FACTORY TUNED. NO CUSTOMER CALIBRATION OR TUNING IS REQUIRED. PLEASE CONTACT YOUR TECHNICAL SUPPORT FOR INSTALLATION AND INFORMATION ABOUT THE SETTINGS OF YOUR 5G NR O-RU DEVICE.
- 5G NR O-RU IS NOT ALLOWED TO BE DIRECTLY SOLD TO CONSUMERS
- 本器材限使用下列天線:
  - n78:

Brand	Model	Antenna Type	Freq. range (MHz)	Gain (dBi)
M.gear	C1335-510520-A	Dipole	3300 MHz	3.55
			3400 MHz	3.19
			3500 MHz	3.78
			3600 MHz	4.33
			3700 MHz	3.97
			3800 MHz	3.35

  - n79:

Brand	Model	Antenna Type	Freq. range (MHz)	Gain (dBi)
M.gear	C1335-510519-A	Dipole	4400 MHz	6.38
			4500 MHz	6.59
			4600 MHz	6.99
			4700 MHz	6.84
			4800 MHz	6.66
			4900 MHz	6.58
			5000 MHz	6.02

- 本器材須經專業工程人員安裝及設定，始得設置使用，且不得直接販售給一般消費者。
- 電信事業須設置基地臺者設置本基地臺前，應辦理基地臺登錄；已依電信法取得電臺架設許可者，亦同。本基地臺須經本會審驗合格取得電臺執照後，始得使用。
- 4800-4900MHz 供行動寬頻專網於不得干擾合法通信且須忍受合法通信干擾之條件下使用

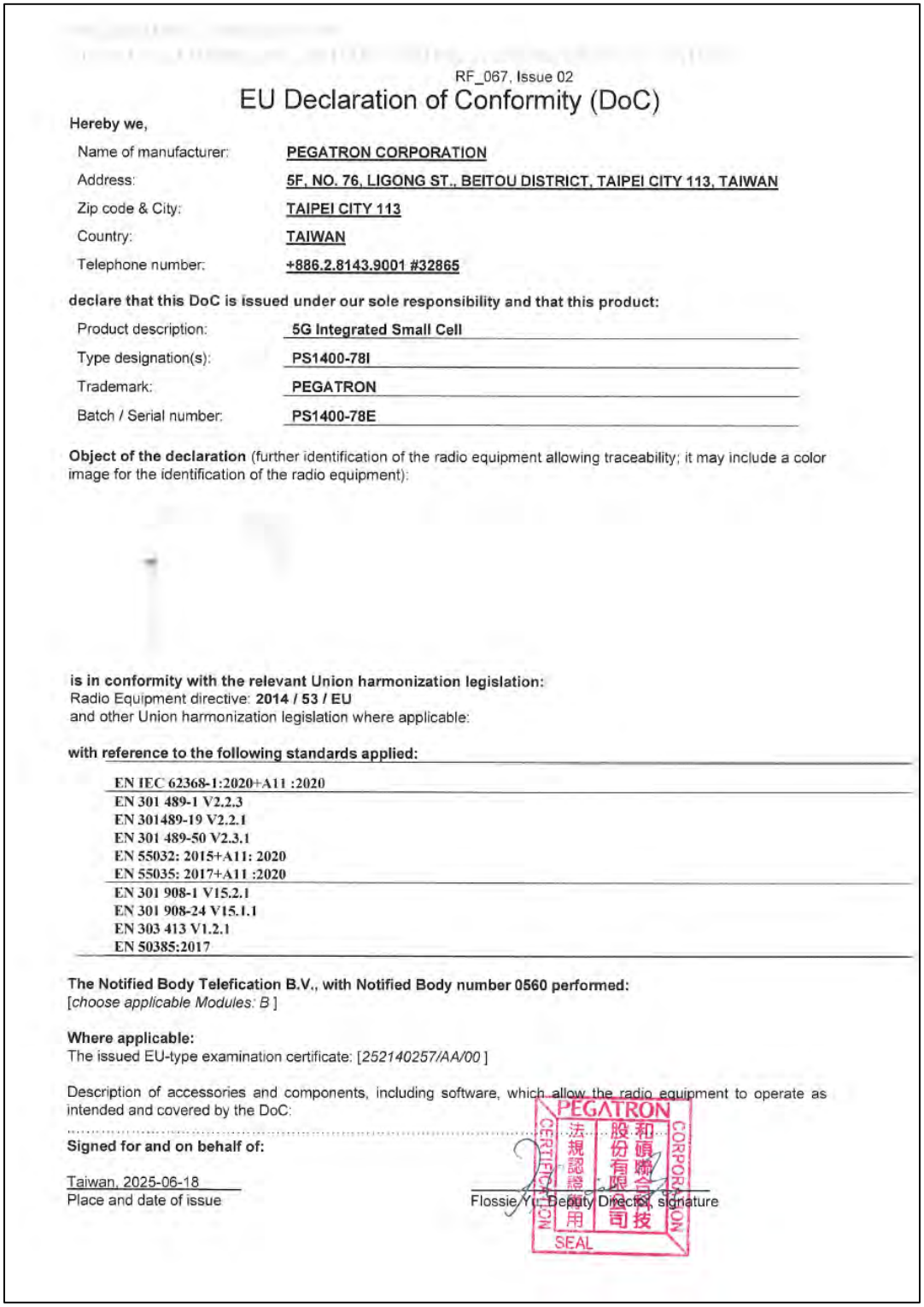
⚠ **警告：為避免電磁干擾，本產品不應安裝或使用於住宅環境。**

1.4.2 UK: Hazardous substance notice

This product does not contain hazardous substances (as defined in UK Control of Substances Hazardous to Health Regulations 1989 and the Dangerous Substances Regulations 1990). At the end of this product's life cycle, the customer should consult with the system integrator to ensure that the product is disposed of in conformance with the relevant regulatory requirements.

1.4.3 Europe: Directive 2014/53/EU

European Council Recommendation 2014/53/EU details basic restrictions and reference levels on human exposure to electromagnetic fields as advised by the ICNIRP. Adherence to these recommended restrictions and reference levels should provide a high level of protection as regards the established health effects that may result from exposure to electromagnetic fields.



RF_067, Issue 02

EU Declaration of Conformity (DoC)

Hereby we,

Name of manufacturer:	PEGATRON CORPORATION
Address:	5F, NO. 76, LIGONG ST., BEITOU DISTRICT, TAIPEI CITY 113, TAIWAN
Zip code & City:	TAIPEI CITY 113
Country:	TAIWAN
Telephone number:	+886.2.8143.9001 #32865

declare that this DoC is issued under our sole responsibility and that this product:

Product description:	5G Integrated Small Cell
Type designation(s):	PS1400-78I
Trademark:	PEGATRON
Batch / Serial number:	PS1400-78E

Object of the declaration (further identification of the radio equipment allowing traceability; it may include a color image for the identification of the radio equipment):

is in conformity with the relevant Union harmonization legislation:
Radio Equipment directive: **2014 / 53 / EU**
and other Union harmonization legislation where applicable:

with reference to the following standards applied:

EN IEC 62368-1:2020+A11 :2020
EN 301 489-1 V2.2.3
EN 301489-19 V2.2.1
EN 301 489-50 V2.3.1
EN 55032: 2015+A11: 2020
EN 55035: 2017+A11 :2020
EN 301 908-1 V15.2.1
EN 301 908-24 V15.1.1
EN 303 413 V1.2.1
EN 50385:2017

The Notified Body Telefication B.V., with Notified Body number 0560 performed:
[*choose applicable Modules: B*]

Where applicable:
The issued EU-type examination certificate: [*252140257/AA/00*]

Description of accessories and components, including software, which allow the radio equipment to operate as intended and covered by the DoC:

Signed for and on behalf of:

Taiwan, 2025-06-18
Place and date of issue

Flossie Yu, Deputy Director, signature

PEGATRON 法規認證用 SEAL 和碩聯合科技股份有限公司 CERTIFICATION CORPORATION

1.4.4 USA: Federal Communications Commission Interference Statement

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.

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.

⚠ FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.
This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

⚠ Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Professional installation instruction:

1. Installation personal

This product is designed for specific application and needs to be installed by a qualified personal who has RF and related rule knowledge. The general user shall not attempt to install or change the setting.

2. Installation location

The product shall be installed at a location where the radiating antenna can be kept 20cm from nearby person in normal operation condition to meet regulatory RF exposure requirement.

3. External antenna

Use only the antennas which have been approved by the applicant. The non-approved antenna(s) may produce unwanted spurious or excessive RF transmitting power which may lead to the violation of FCC limit and is prohibited.

4. Installation procedure

Please refer to user's manual for the detail.

5. Warning

Please carefully select the installation position and make sure that the final output power does not exceed the limit set force in relevant rules. The violation of the rule could lead to serious federal penalty.

WARNING: Changes or modifications made to this device not expressly approved by the manufacturer may void the FCC authorization to operate this device.

2. Introduction

The Pegatron PS1400 is a 5G integrated small cells which are composed of three main components: the Radio Unit (RU), the Distributed Unit (DU), and the Centralized Unit (CU). Each of these components plays a distinct role in ensuring the efficient operation of the 5G network.

2.1 Specifications

Figure 1.1-1 PS1400 Indoor ISC specifications

CE declaration RF power:

Frequency range	Maximum RF transmit power
3400~3800 MHz	30.91 dBm

2.2 Datasheet

Item	Description
Model: PS1400-48E/I	n48 (3.55 – 3.7 GHz)
Model: PS1400-78E/I	n78 (3.3 – 3.8 GHz)
Model: PS1400-79E/I	n79 (4.6 – 4.9 GHz)
5G NR	TDD, 30 KHz SCS
Standard	3GPP Rel16
Chipset	■ NXP LX2160A 16-Core NPU Processor ■ Qualcomm FSM20056 Sub-6 5G Modem Chipset
Tx power	24 dBm per RF antenna port
RAN Architecture	SA, AiO (RU+DU+CU)/Option2
UE capacity (Active/Connected)	64/128 UEs
Max bandwidth	100 MHz (OBW)
Antenna	External/Embedded 4x4 MIMO with 6 dBi gain
GNSS	1x GNSS SMA
Data interface	■ 10 GbE SFP+ (Backhaul) ■ 10 GbE RJ45 (Backhaul)
Synchronization	Supports IEEE 1588 PTPv2, ITU-T G.8275.1, 8275.2 profile, GNSS
M-plane	O1 compliance, NETCONF protocol
Integrity	NIA1, NIA2, NIA3
Encryption	NEA1, NEA2, NEA3
Power supply	IEEE802.3bt PoE++ or DC 12V/5A
Dimensions (H x W x D)	286 x 286 x 91 mm
Power consumption	Less than 65W
Weight	Less than 4.5 kg
Indoor IP rating	IP30
Operating temperatures	0 ~ +45 °C, 5 ~ 95 % RH
Installation mounting	Ceiling / Wall / Pole

2.3 List of package contents

2.3.1 Package contents

Table 2.3.1-1 package content list (Standard)

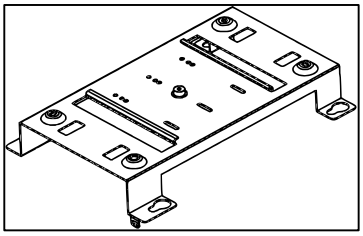
Name of Part	Quantity
PS1400	1

Table 2.3.1-2 package content list (Optional)

Name of Part	Quantity
DC Power adapter	1
POE++ Injector	1
Antenna (Only for external antenna SKU)	4
Mounting bracket	1

2.3.2 Mounting bracket

1. Mounting bracket x1



2. Screw package content list:

Table 2.3.2-1 Screw package content list

Name of Part	Quantity
WMEZ-3V0	4
PCA-2	4
SCREW M3.5*20L	4
SCREW M4*6L	4
SCREW M3*8L	8

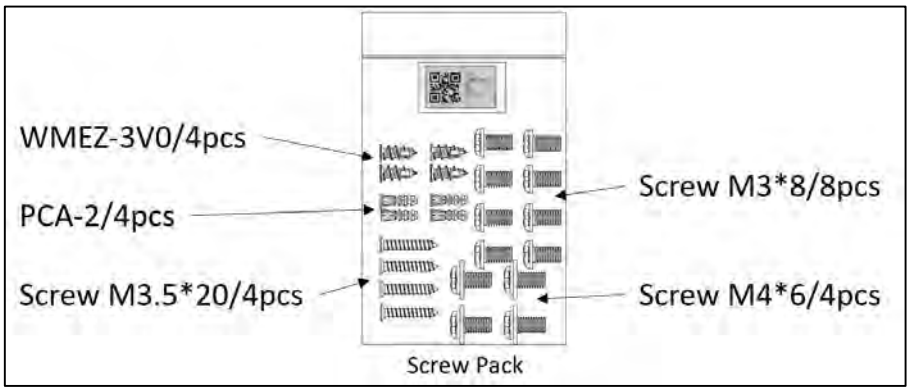


Figure 2.3.2-1: Screw Pack

3. Hardware information

3.1 Form factor

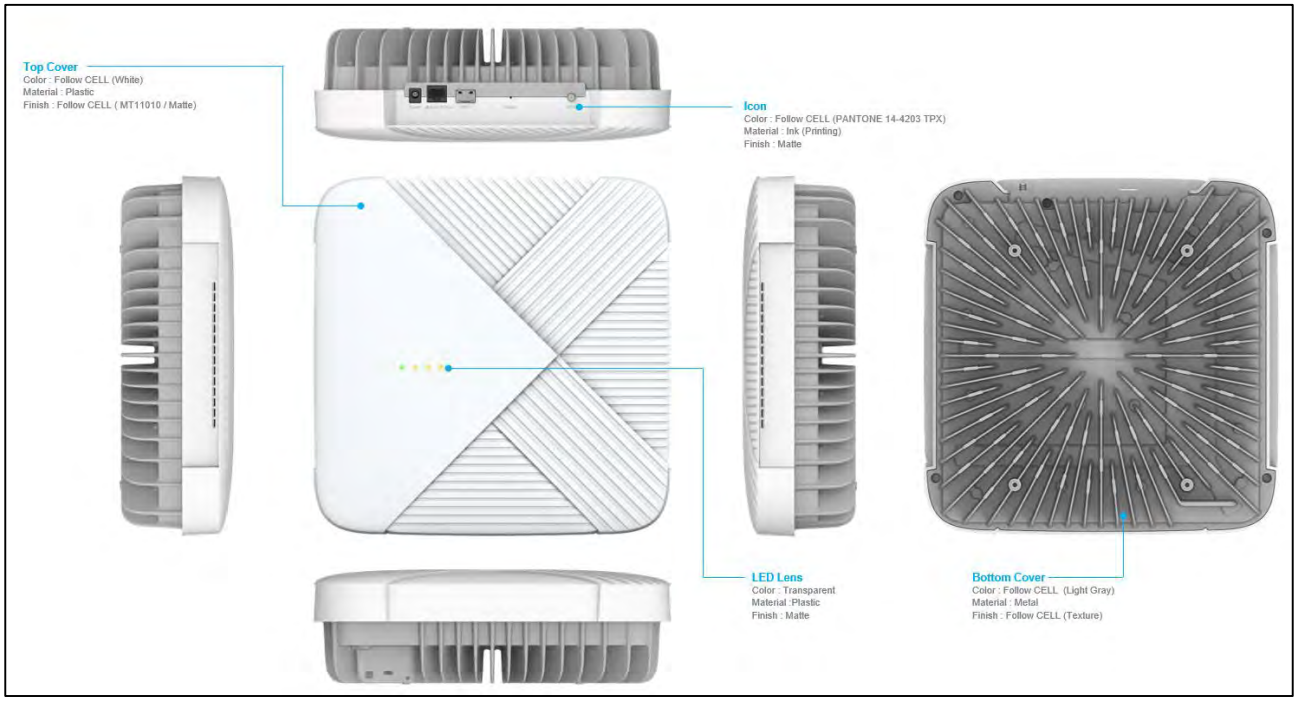


Figure 2.1-1 Form factor.

3.2 Ports and Indicators

3.2.1 Ports

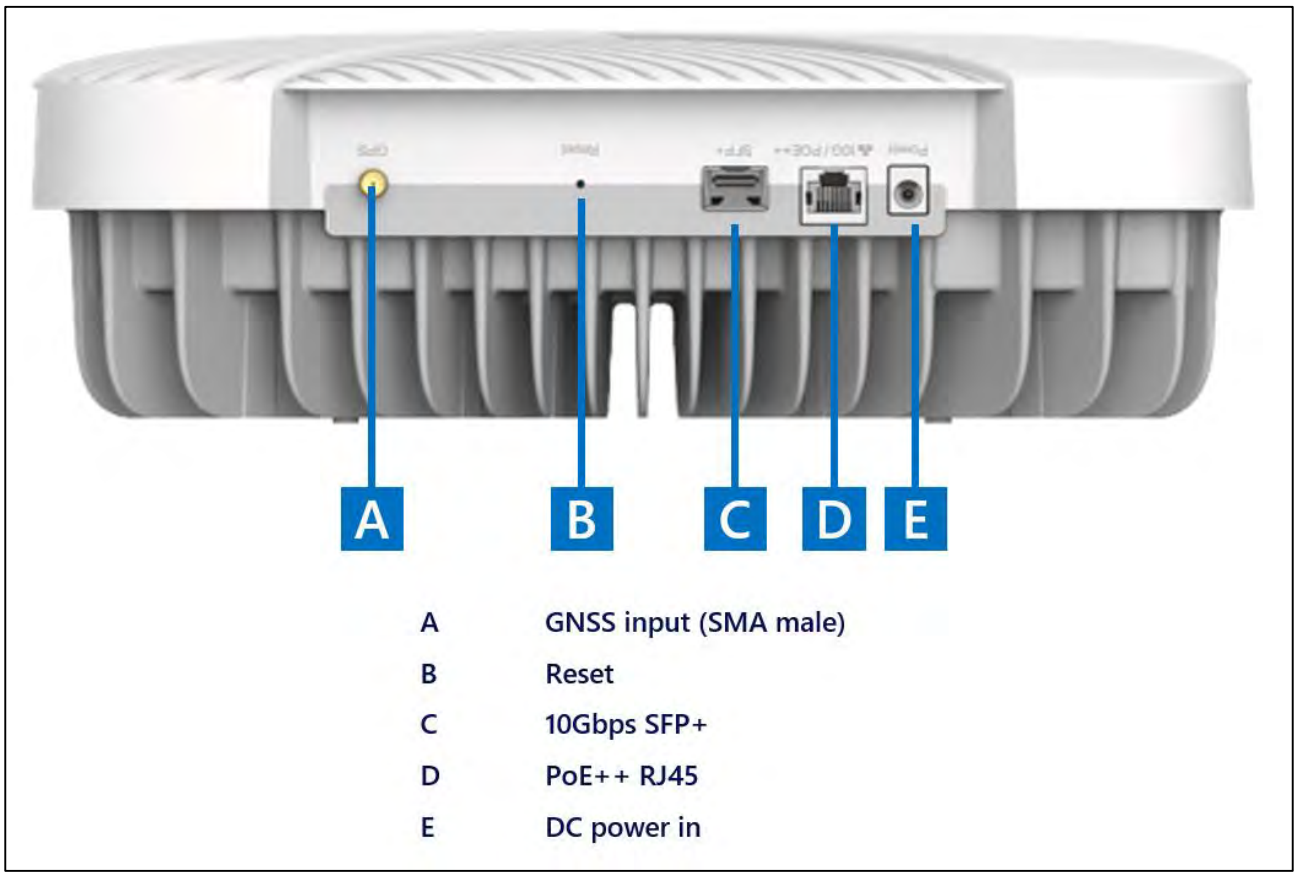


Figure 2.2.2-1 Ports and indicators

A. GNSS input.

B. Reset button.
   - Reboot: click 1 to 5 seconds.
   - Reset to factory: Click longer than 10 seconds.

C. SFP+: 10Gbps
   - Default IP: 192.168.1.11
   - Network interface name: eth1

D. POE++: PoE++ with 10Gbps network function
   - Default IP: 192.168.0.10
   - Network interface name: eth0

E. Power 12V DC input

3.2.2 LED Indicator and Antenna port

Figure 3.2.2-1 LED Indicators and Antenna Port

Index	State	Power	time sync	5g	wan	Note:
0	Power source off	off	off	off		Power off
1	Power source on	green	off	off		Power on
2	Boot Loader fail	green	off	off		System boot
3	Boot Loader pass	green	off	off		System boot
4	Boot Kernel System check fail	green	amber	off		System boot fail
5	Boot Kernel System check pass	green	Green flashing	off		System boot OK
6	Boot FSM/L1 fail	green	amber	off		FSM/L1 bring up Fail
7	Boot FSM/L1 pass	green	Green flashing	off		FSM/L1 bring up Pass
8	Boot GPS/PTP fail	green	amber	off		GPS/PTP Timing Sync fail
9	GPS/PTP Done	green	Green flashing	off		GPS/PTP Timing Sync locked

10	Time sync Locked/Hard sync	green	green	off		Hard Sync Ready (L1/MacE up OK)
11	CU booted fail	green	green	amber		CU Bring up fail
12	CU booted pass	green	green	green flashing		CU Bring up OK
13	5gc connection fail	green	green	amber		CU connect to 5GC failed (Same as CU Bring up fail)
14	5gc connection pass	green	green	green flashing		CU Connect to 5GC OK (Same as CU Bring up OK)
15	DU booted fail or DU Down	green	green	amber flashing		DU Bring up fail (ISC gNB Activation Failed) or DU down
16	DU booted pass	green	green	green		DU Bring up OK (ISC gNB Activated & 5G in service)
17	Ethernet Backahul(WAN port) failed				ambert	WAN port(backhual) failed
18	Ethernet Backhaul(WAN port) Link Up				green	WAN port(Backhaul) Link up connection OK
19	Ethernet Backhaul(WAN port) Link Down				off	WAN port(Backhaul) Link up connection
20	Ethernet TX RX / Cell Transmitting	green	green	green	green flashing	Data I/O trasmiting (UE Data Transmission)
21	FW Upgrading pass	green	green flashing	green flashing	green flashing	FW Uploading in progress
22	FW Upgrading failed	green	amber flashing	amber flashing	amber flashing	FW Upgrading Failed
23	FW Upgrade complete pass	green	green	green	green	FW Upgrading Completed... Preparing to reboot
24	FW Upgrade complete failed	green	amber	amber	amber	FW Upgrading
25	Time sync hold over during operation	green	green/amber alternate	green/amber alternate	green flashing	Time Sync at Hold Over stage during operation
26	Time sync hold over failed	green	amber flashing	amber flashing	green	Time Sync hold over timeout exceed threadshold

3.3 Power supply

3.3.1 DC 12V Power Adapter Recommended Specification

This product is intended to be supplied by a Listed Power Adapter or DC power source marked “L.P.S.” (or” Limited Power Source”), rated 12 Vdc, 5A minimum, Tma = 45 degree C minimum. If need further assistance, please contact Pegatron for further information.

3.3.2 POE++ Recommended Specification

PS1400 supports POE++ as power input. Table 3.4.2-1 and 3.4.2-2 listed recommended POE++ specifications.

⚠ [POE connection] The equipment is to be connected only to PoE networks without routing to the outside plant.

⚠ [POE power source] This product is intended to be supplied by a Listed power supply or PoE connector, output rated 56Vdc, min. 1.61A and compiled LPS. If need further assistance with purchasing the power source, please contact to “PEGATRON” or agency for further information.

3.4 RF Antenna Information

3.4.1 Internal Antenna

3.4.1.1 n48/n78 Internal Antenna Information

Form factors:

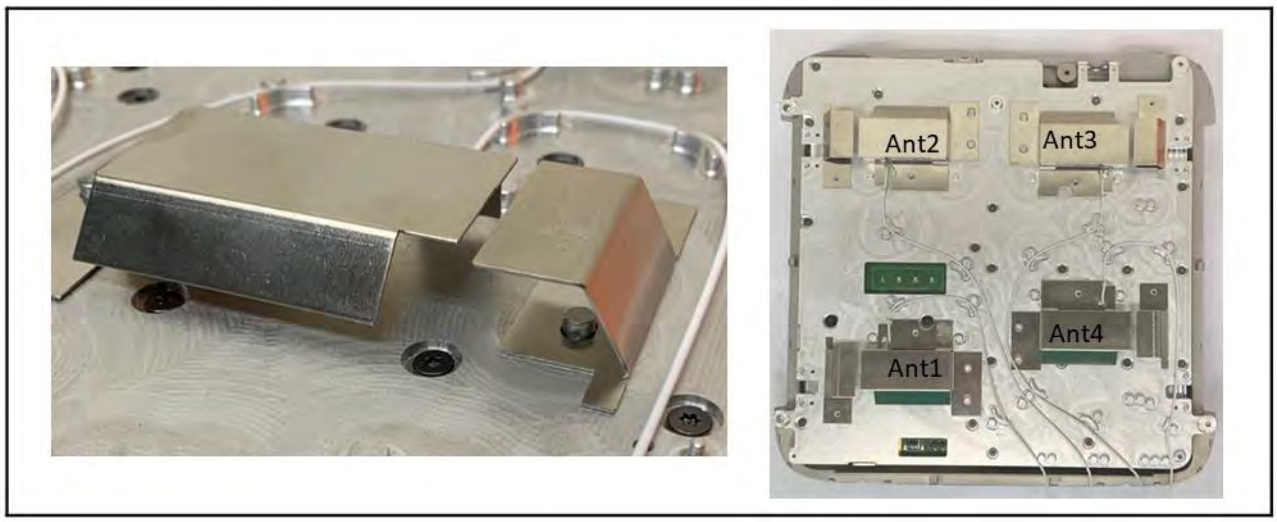


Figure 2.4.1.1-1 n48/n78 Internal Antenna form factor

Specification:

Table 2.4.1.1-1 n48/n78 Internal Antenna specification

Antenna Information	
Frequency	3300~4200 MHz
Antenna type	PIFA
Peak gain	> 6 dBi
Return loss	> 10 dB
Efficiency	> 50%

3.4.2 External Antenna

3.4.2.1 n48/n78 External Antenna Information

Form factor:

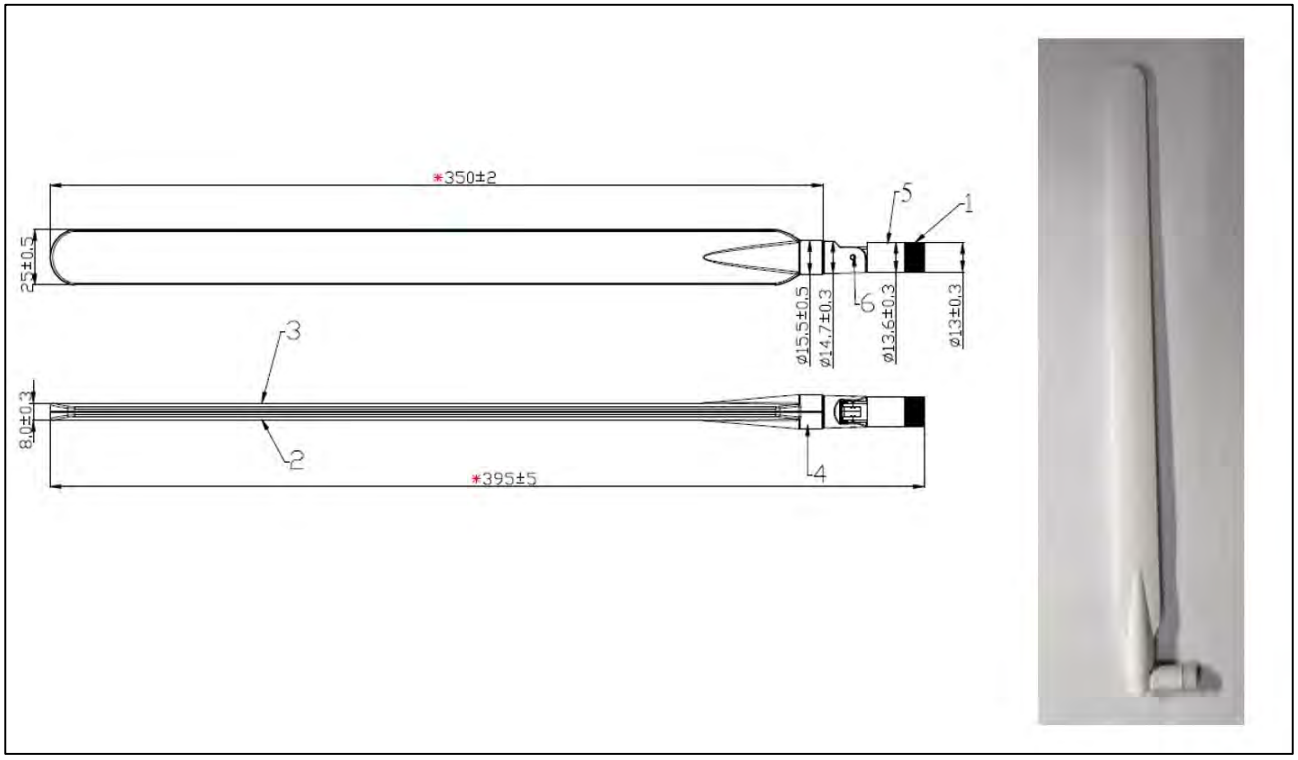


Figure 3.5.2.1-1 n48/n78 External Antenna form factor

Specification:

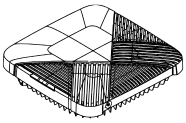
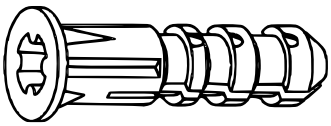
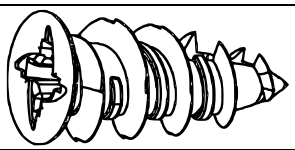
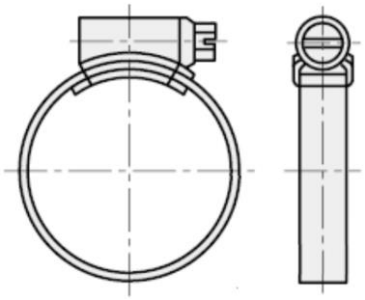
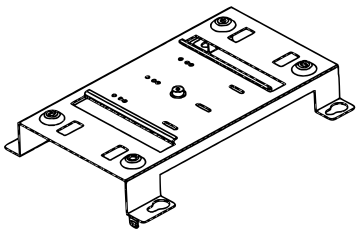
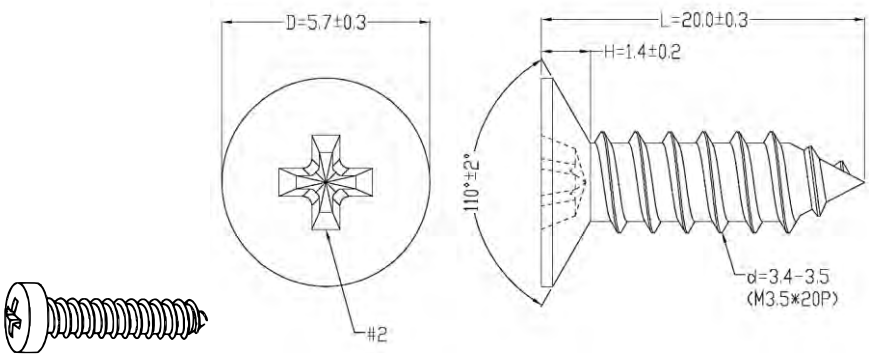
Table 3.5.2.1-1 n48/n78 External Antenna specification

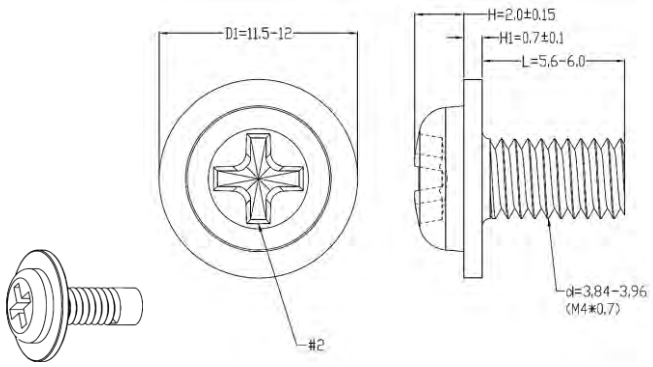
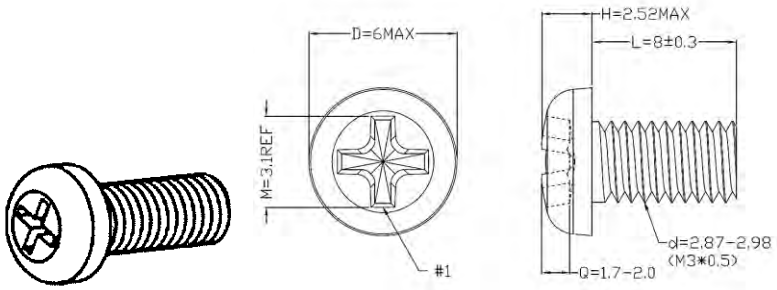
Antenna Information	
Frequency	3300~3800MHz
Antenna type	Dipole
Radiation pattern	Omni-directional
Peak gain	8.4 dBi
Return loss	> 8.99 dB
Efficiency	> -2 dB
Polarization	Linear
Connector	SMA
Antenna size	395x25x13mm
Impedance	Ω

3.5 Hardware installation

3.5.1 Mounting installation

Table 3.6.2-1 Mounting bracket part list

Name of Part	Abridged View
Cell Device	
PCA-2	
WMEZ-3V0	
Steel cable tie (Not included in the package list. Only for pole mount. Please refer to Pole Mount for purchase guideline.)	
Mounting bracket	
SCREW M3.5*20L	

SCREW M4*6L	
SCREW M3*8L	

3.5.1.1 Wall/Ceiling Mount

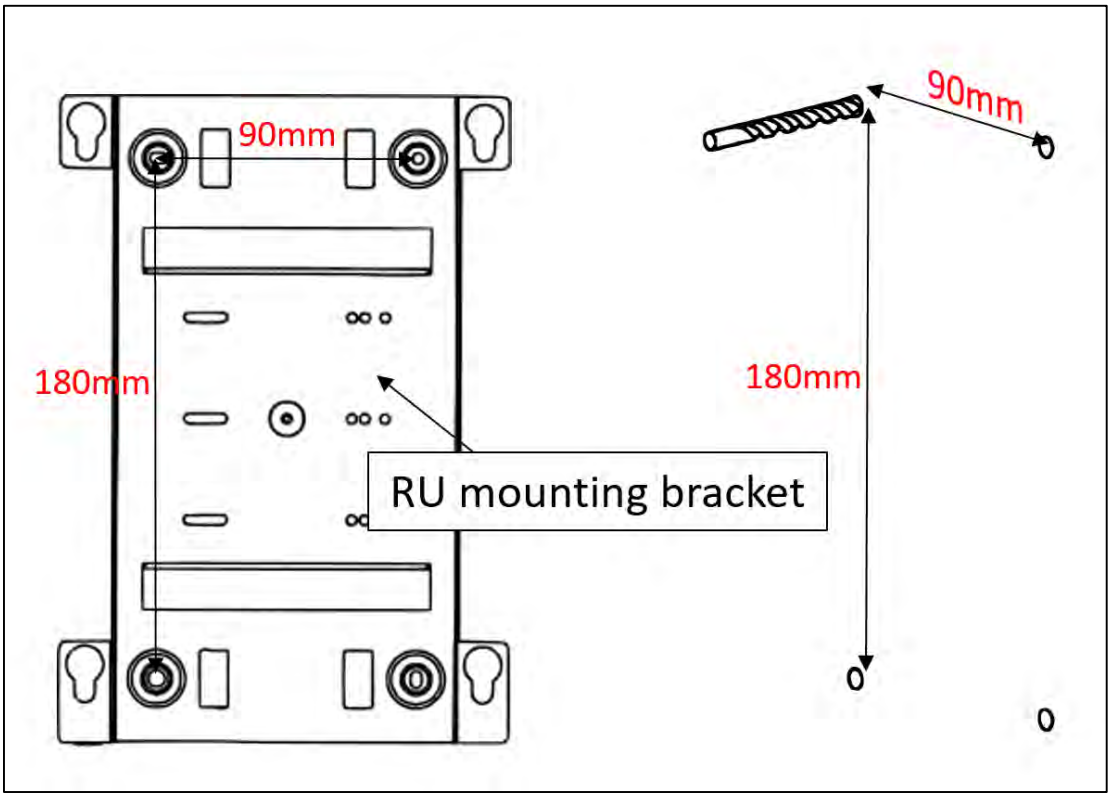
It’s suitable for cement, wood and plaster wall/ceiling.

Table 3.6.2.1-1 Wall/Ceiling mount part list

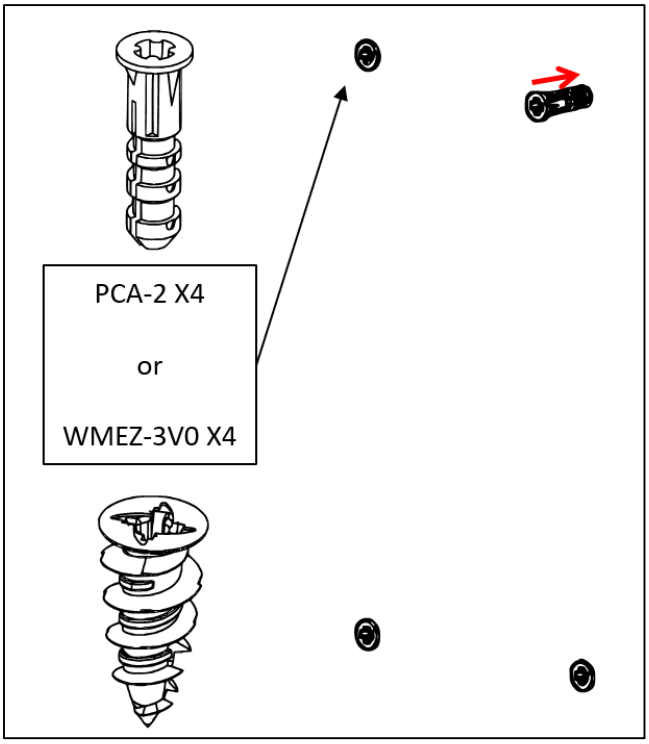
Installation Texture	Name of Part	Quantity
cement wall/ceiling	Cell Device	1
	PCA-2	4
	Mounting bracket	1
	SCREW M3.5*20L	4
	SCREW M4*6L	4
	SCREW M3*8L	2
wood wall/ceiling	Cell Device	1
	Mounting bracket	1
	SCREW M3.5*20L	4
	SCREW M4*6L	4
	SCREW M3*8L	2
plaster wall/ceiling	Cell Device	1
	WMEZ-3V0	4
	Mounting bracket	1
	SCREW M3.5*20L	4
	SCREW M4*6L	4
	SCREW M3*8L	2

Wall/ceiling mount includes Step 1 ~ 6.

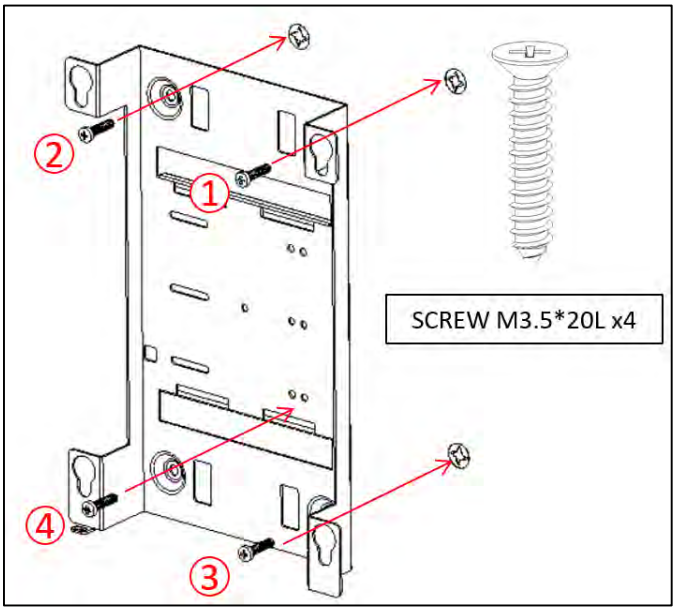
- Step 1: Drill four holes on the wall/ceiling according to the hole position of the mounting bracket.



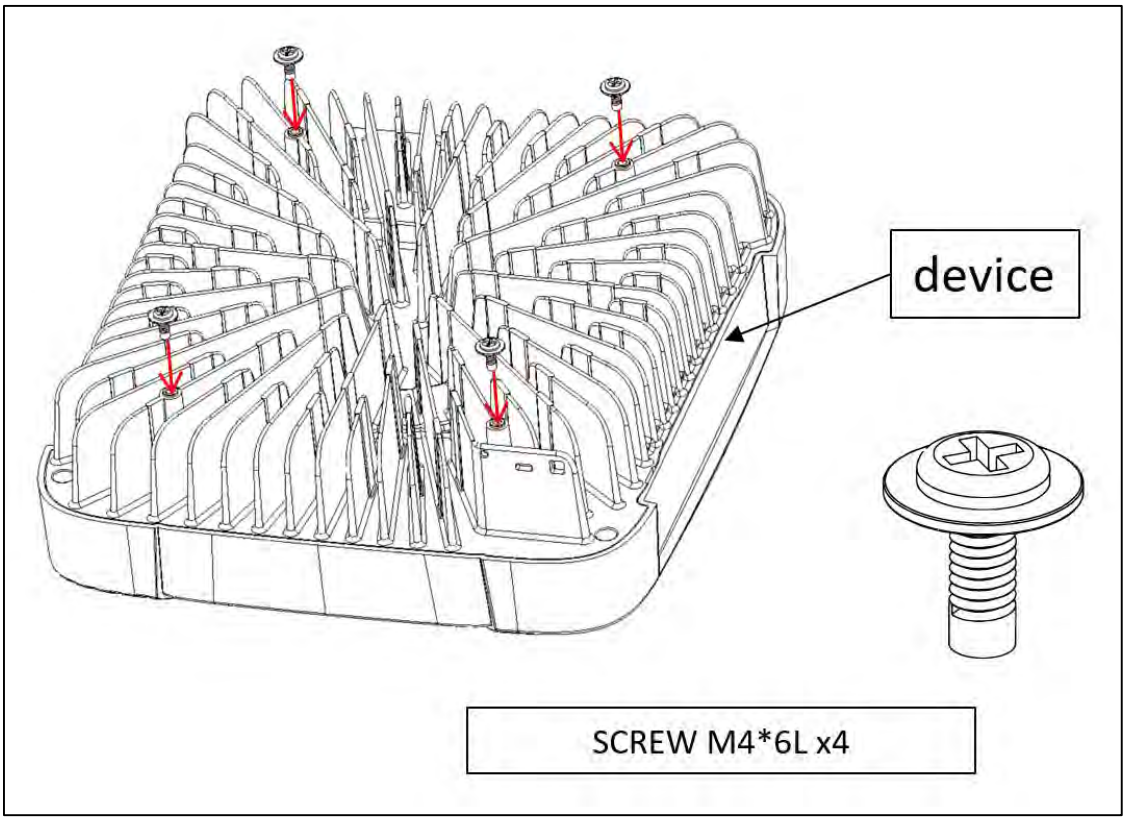
- Step 2: Insert expansion bolt in hole. PCA-2 is used for cement wall/ceiling, WMEZ-3V0 is used for plaster wall/ceiling. If it is installed on wood wall/ceiling, please start operation directly from STEP 3.



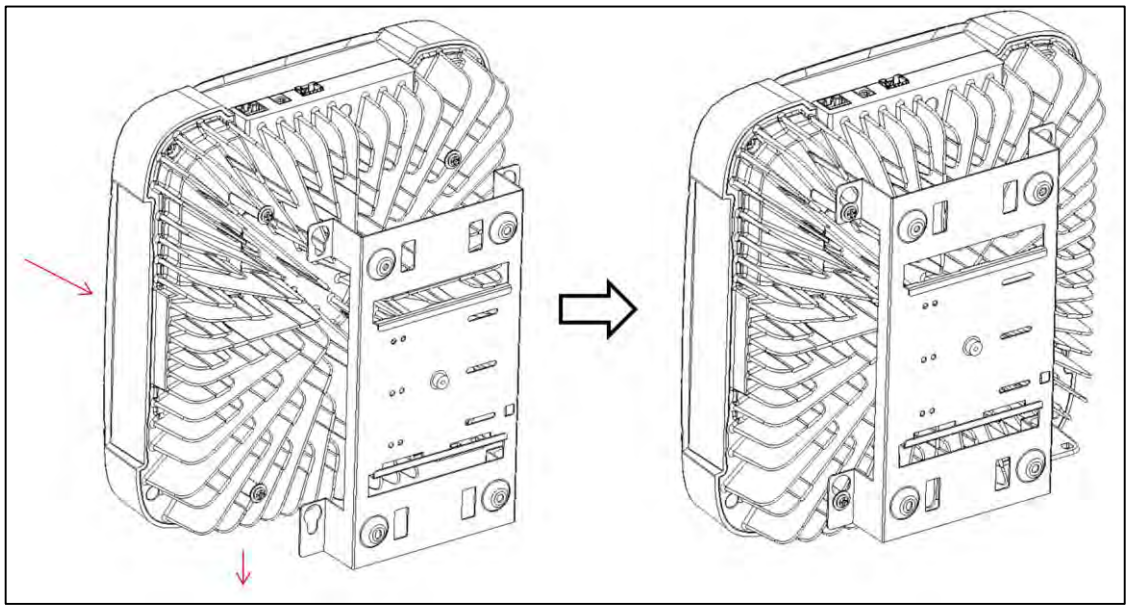
- Step 3: The screws go through the holes of the mounting bracket and lock into the expansion bolts in the order 1~4. If it is installed on wood wall/ceiling, please screw the screws directly into the wall/ceiling.



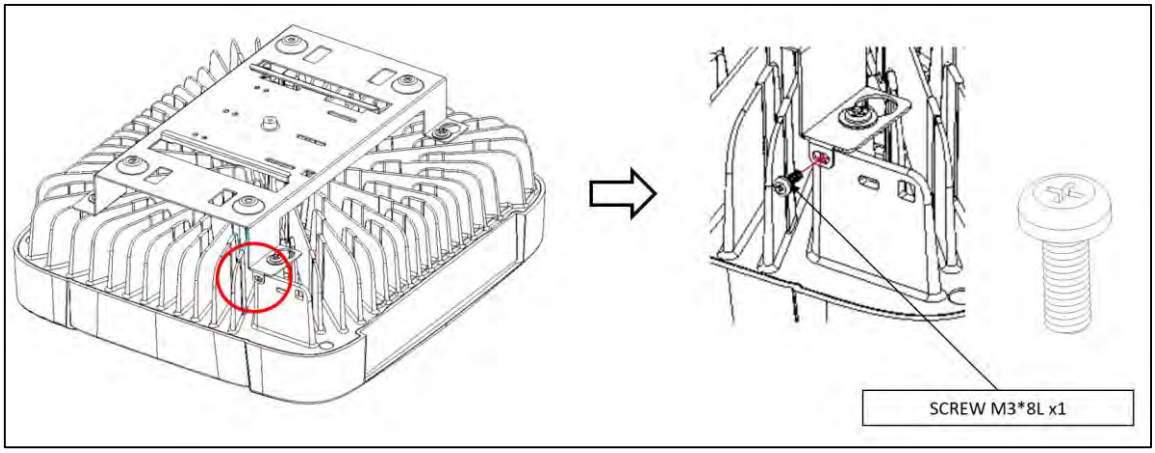
- Step 4: Flip the device to the back and lock the four M4x6 screws.



- Step 5: The four screws on the device correspond to the four holes on the mounting bracket, go through and fasten them down, pay attention to the direction of the holes.

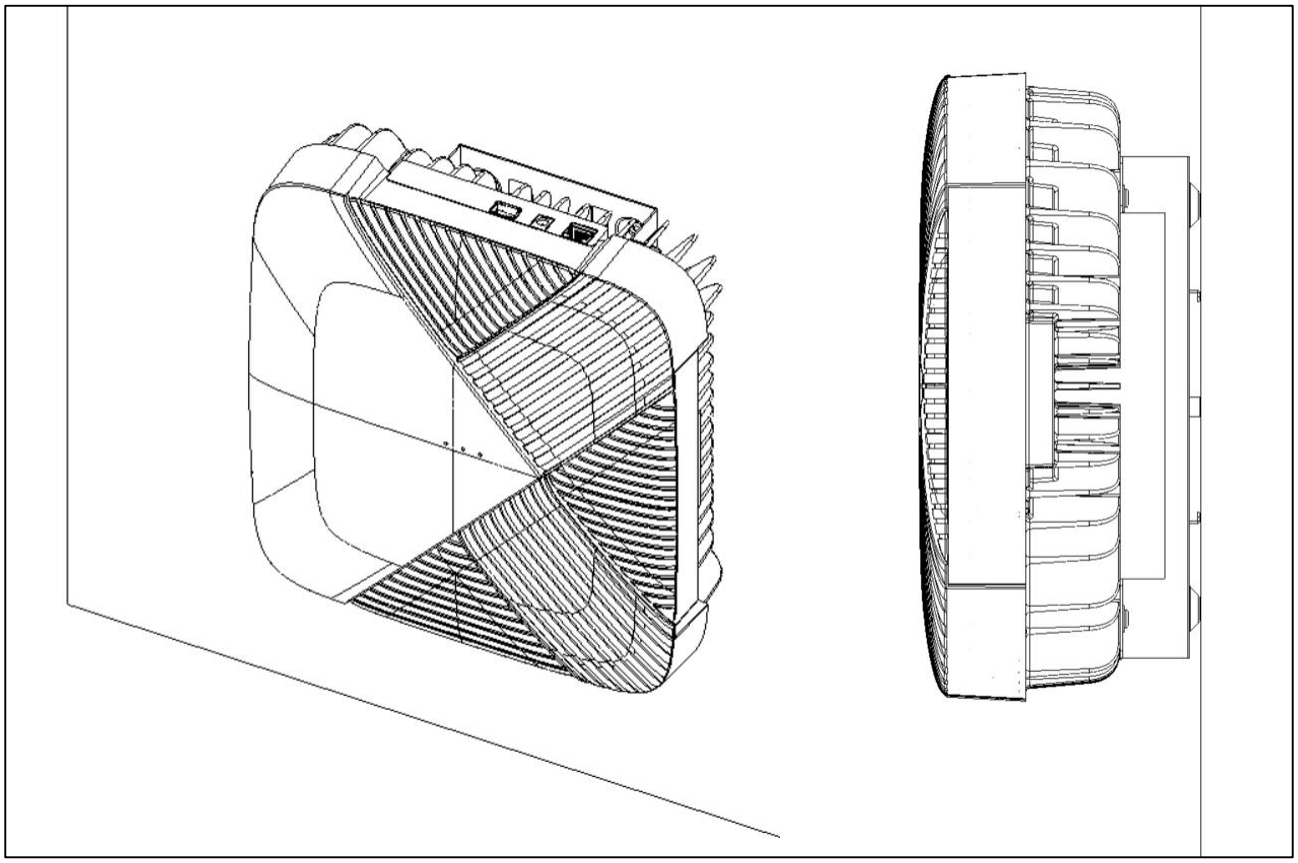


- Step 6: Fasten the screw to fix the device and the mounting bracket.

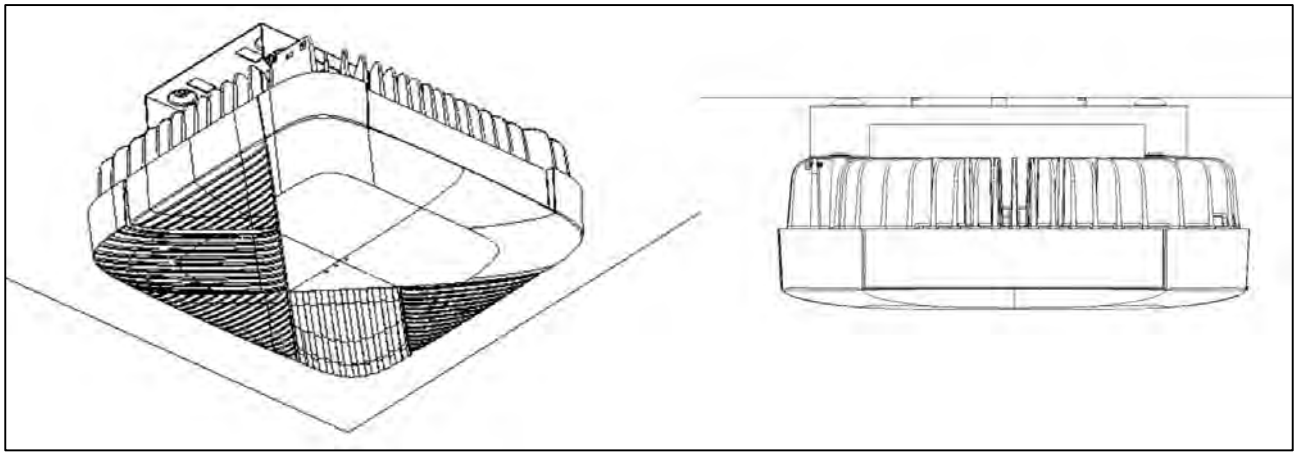


Completed display:

Wall mount



Ceiling mount



3.5.1.2 Pole Mount

Table 3.6.2.4-1 Pole mount part list

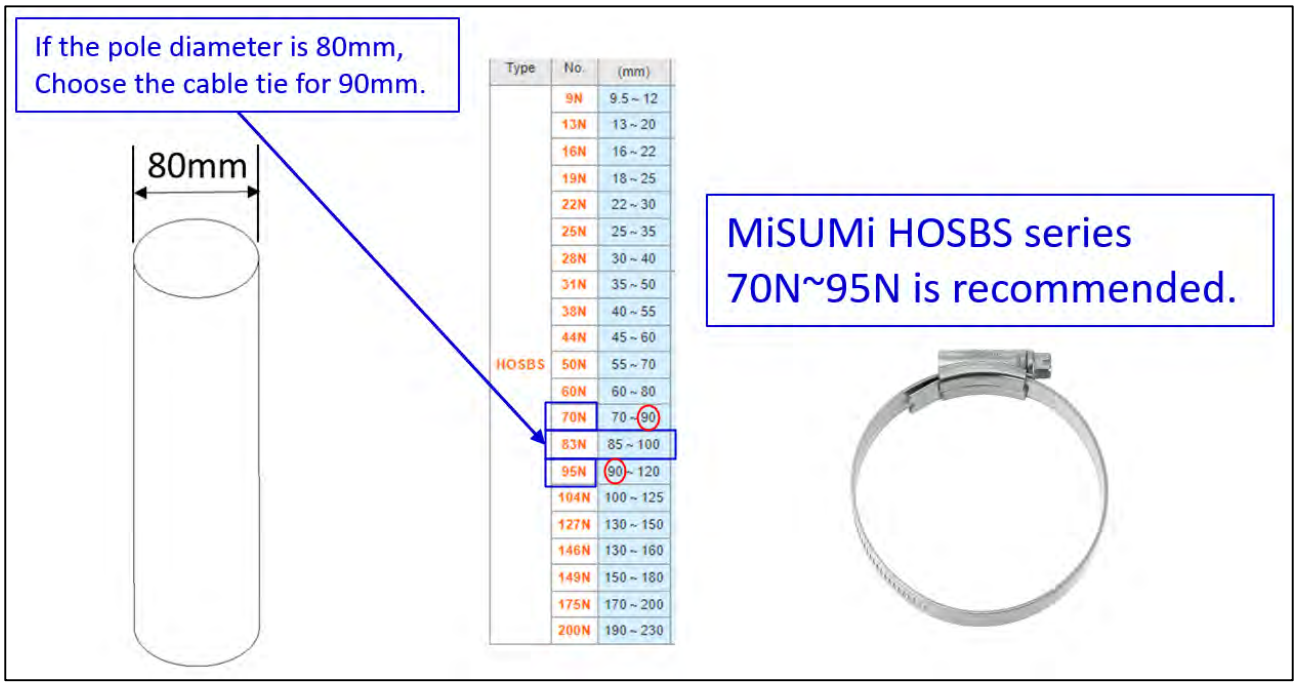
Installation Texture	Name of Part	Quantity
Pole mount	Cell Device	1
	Steel cable tie (Not included in the package list.)	2
	RU Mounting CELL	1
	SCREW M3*8L	2
	SCREW M4*6L	4

Note: Pegatron does not provide the steel cable ties, users will need to purchase by themselfs.

Available rod diameters are based on the applicable diameter for steel ties - 10mm.

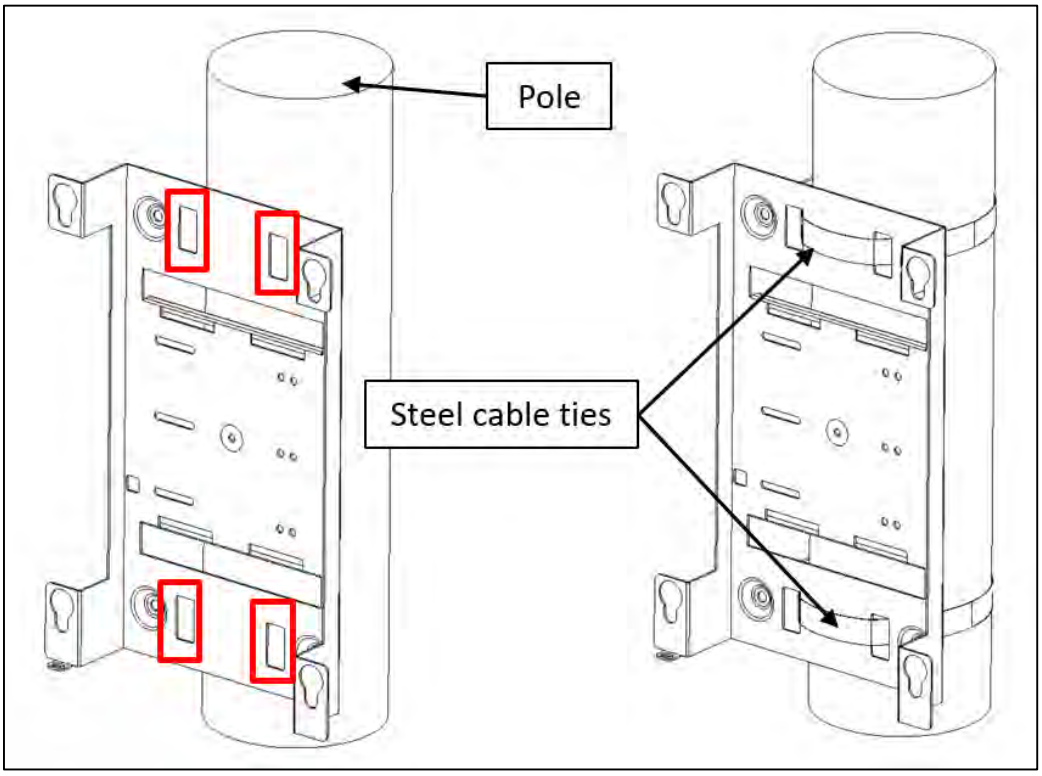
For example:

If the pole diameter is 80mm, users should purchase a steel cable ties that can be used for 90mm pole.

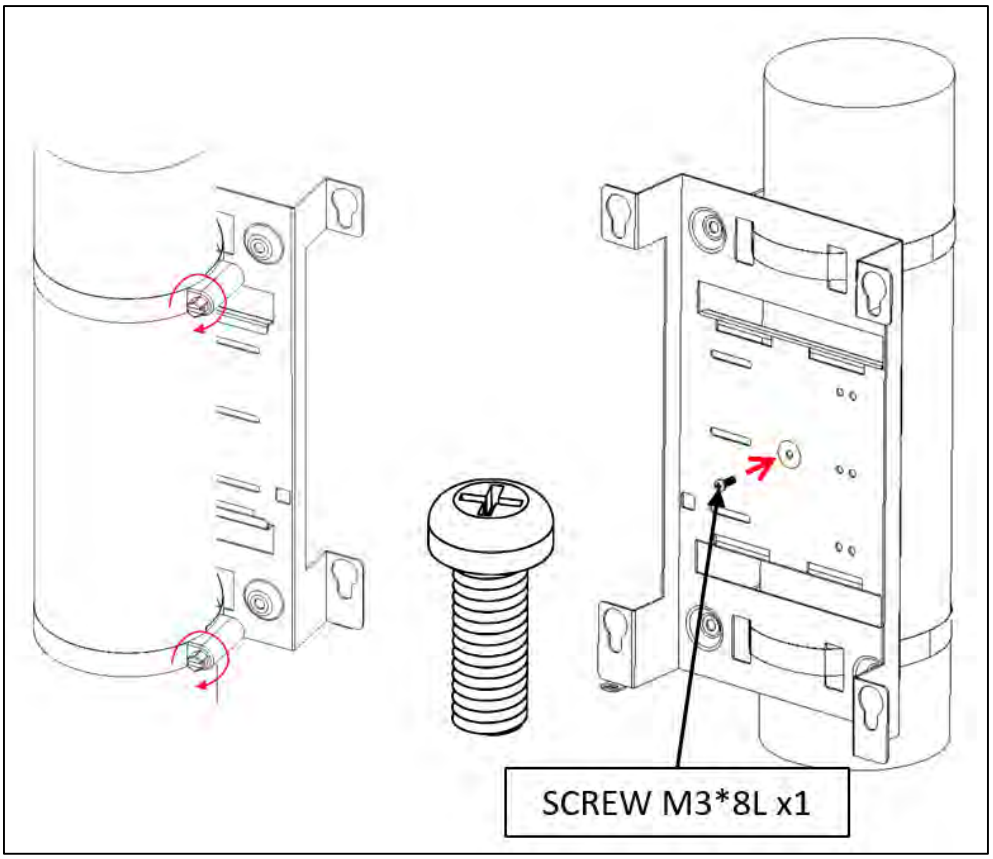


Pole mount includes Step 1~5.

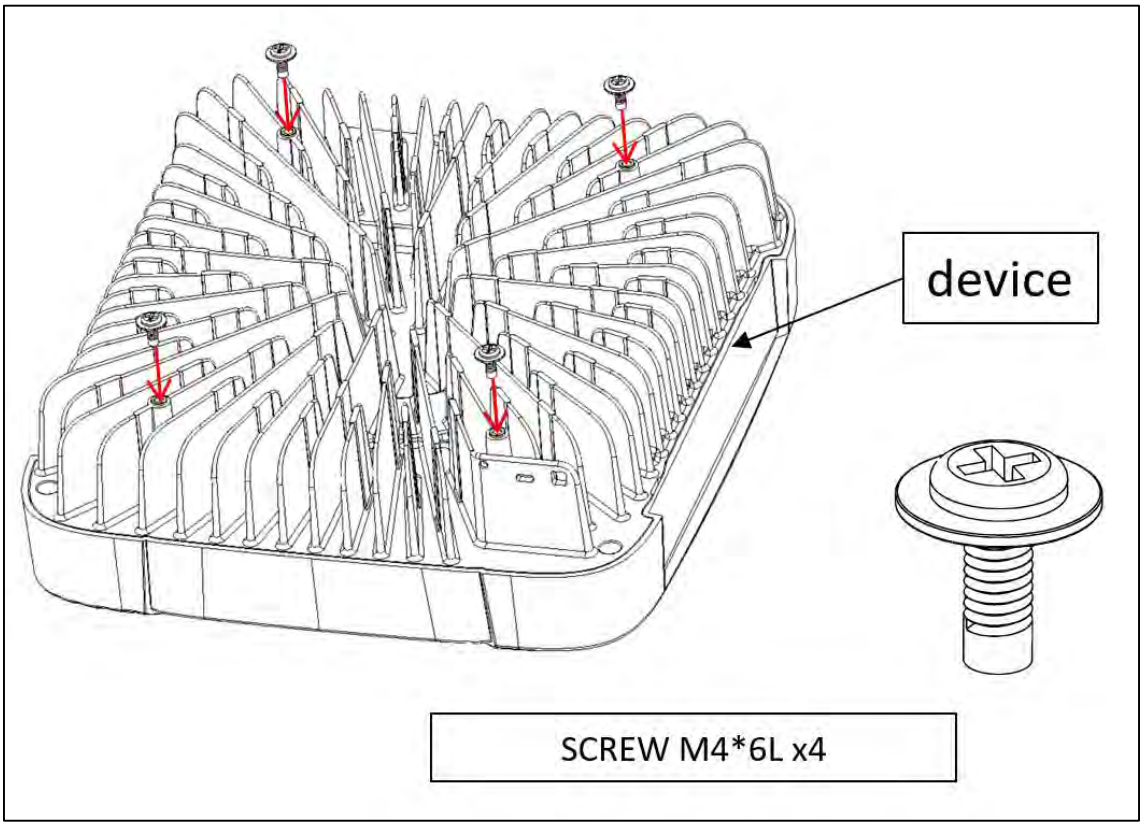
- Step 1: Hold the RU mounting bracket against the pole, and use a steel cable tie through the square hole of the RU mounting bracket, the screws on the steel cable tie are locked tightly, and the RU mounting bracket is fixed to the pole.



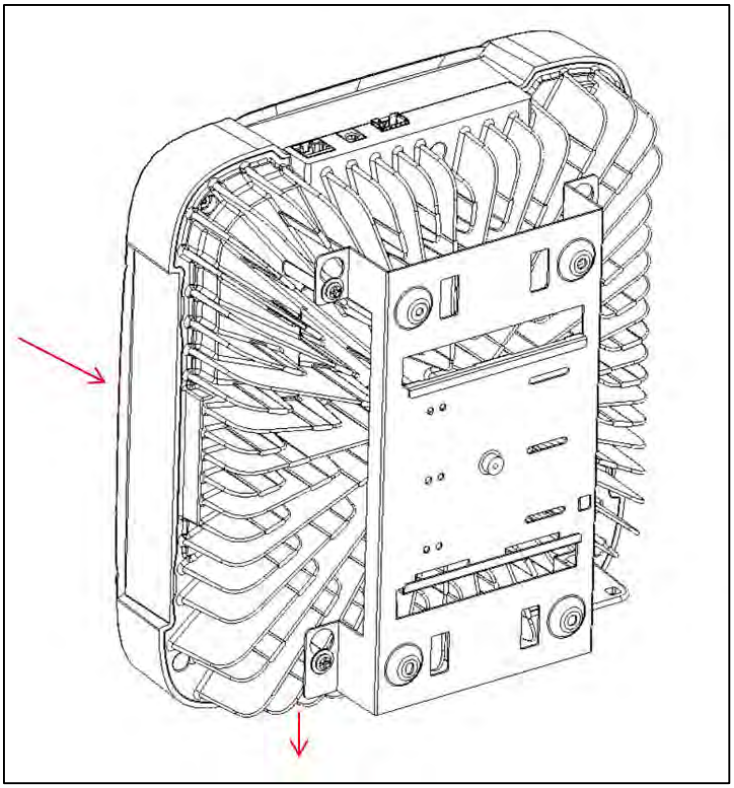
- Step 2: Lock the middle set screw.



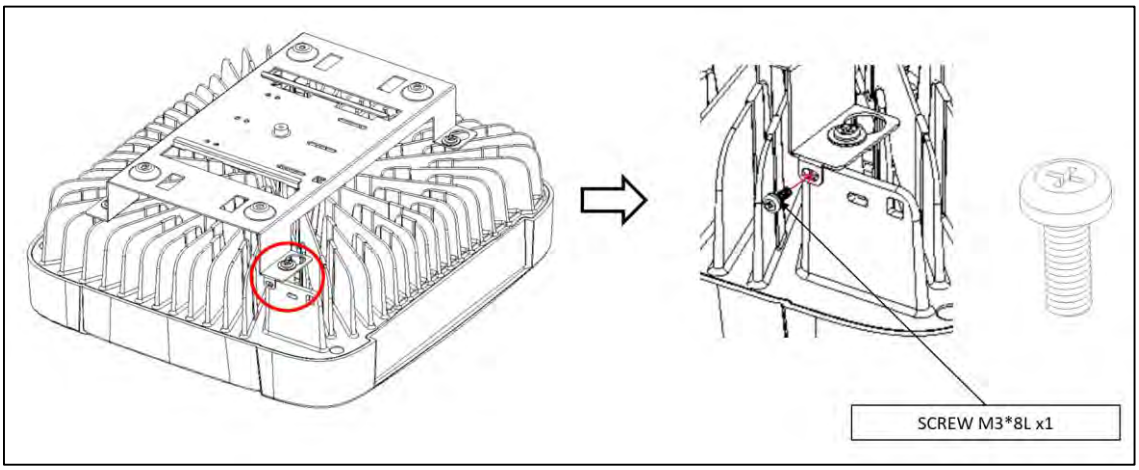
- Step 3: Flip the Device to the back and lock the four m4x6 screws.



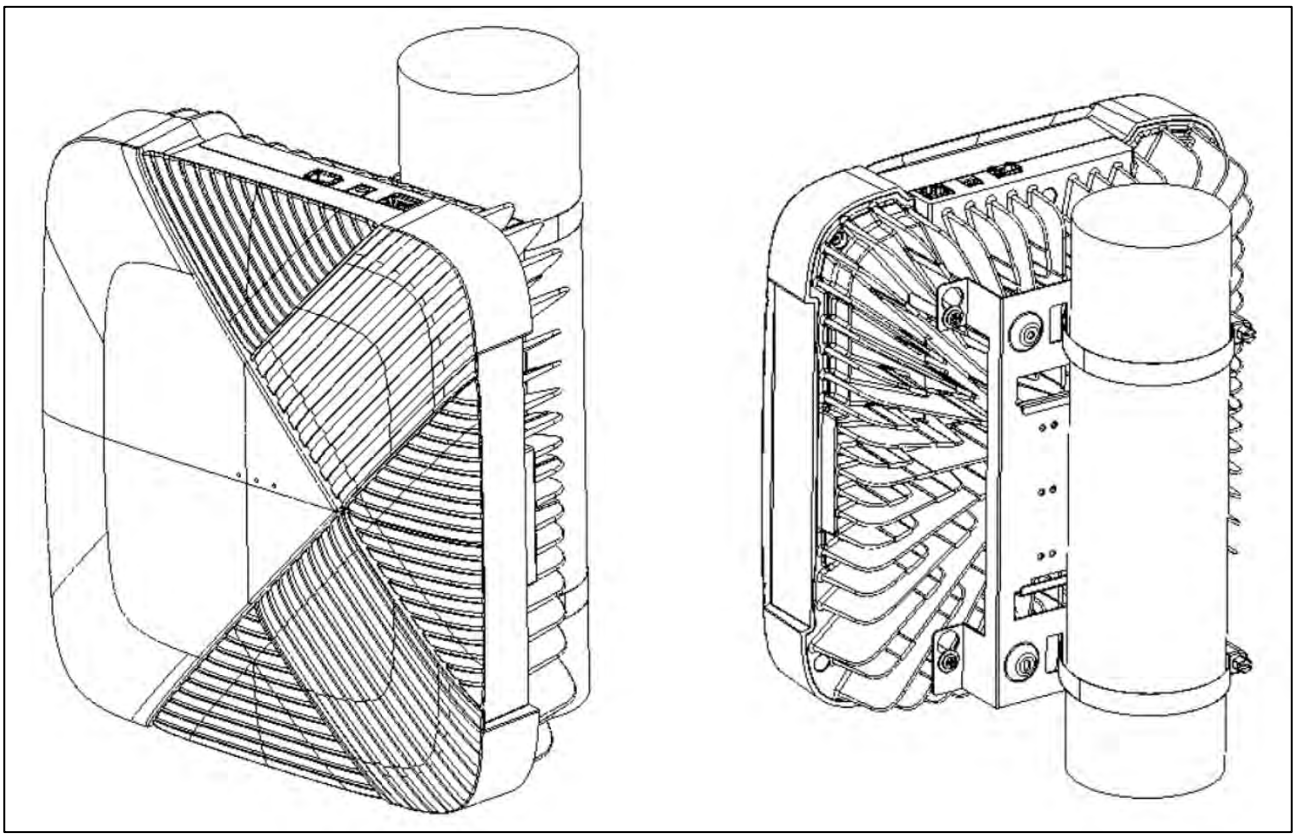
- Step 4: The four screws on the Device, corresponding to the four holes on the RU Mounting bracket, go through and snap down.



- Step 5: Fasten the screw to fix the Device and the RU Mounting bracket.



Complete the display:



4. Getting Started

This section describes guick guideline for access, operating this ISC, including cable connection, networking configuration for access, RAN configuration, status checking, log collection and firmware upgrade.

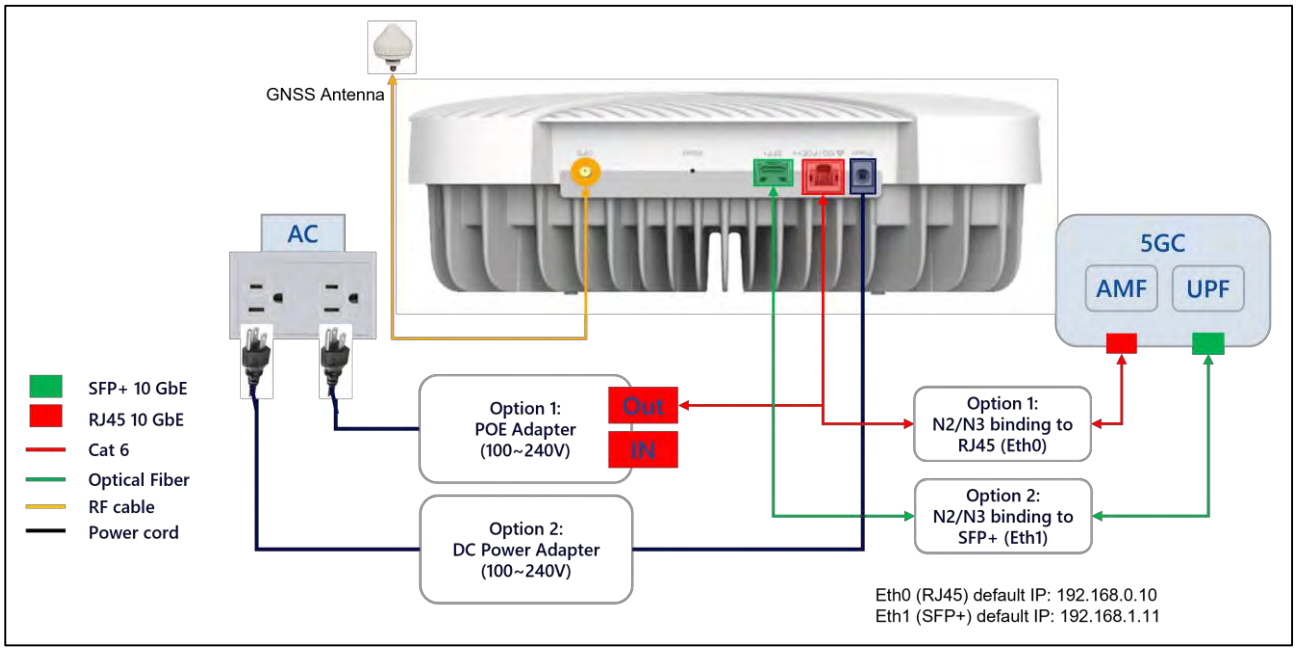


Figure 4-1 Cable connection

4.1 Alternative access connection

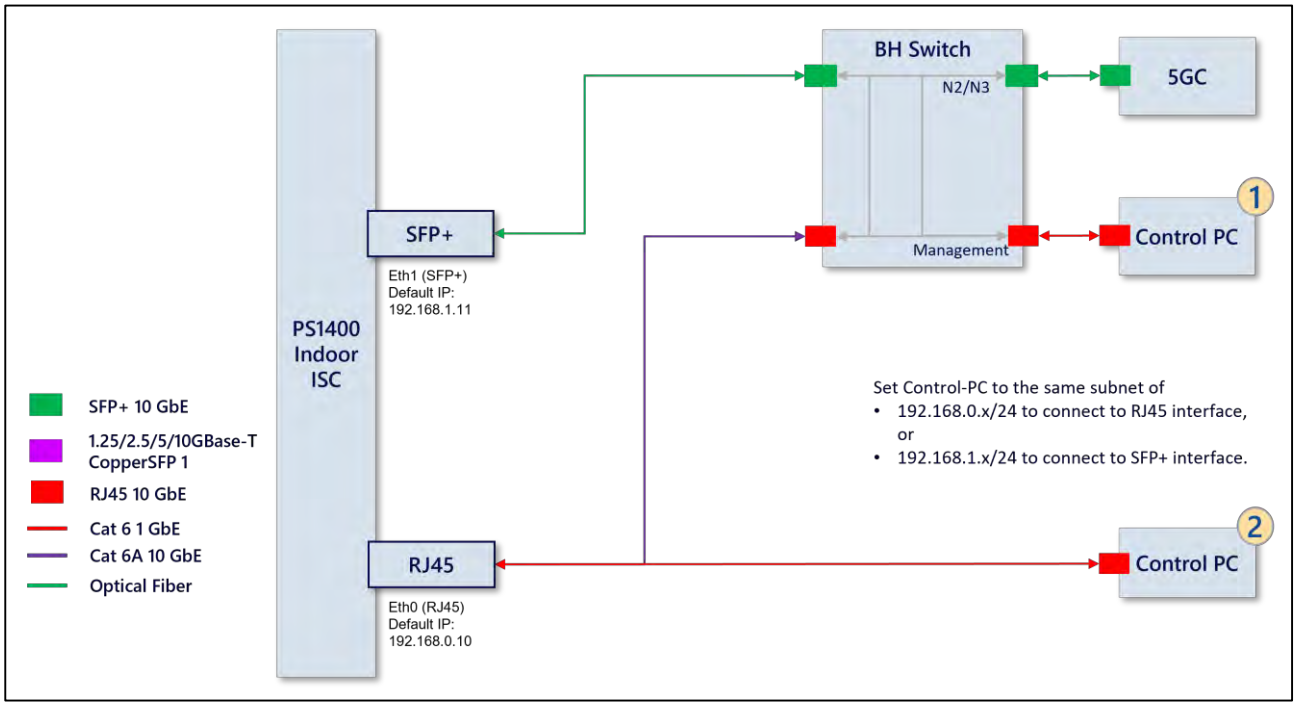


Figure 4.1-1 Alternative access connection

For first time access ISC to provision, configure, there are some different ways to access to ISC:

1. Connect either:
   - Cat 6A 10Gb ethernet cable to RJ45 (eth0), binding N2/N3 to eth0,
   - Optical fiber to SFP+ (eth1), binding N2/N3 to eth1,

   Let N2/N3/Management traffic go through BH Switch. Control-PC configure IP with either 192.168.0.x/24 (connect to RJ45) or 192.168.1.x/24 (connect to SFP+) subnet and access ISC's WebGUI.
2. Connect Cat 6 1Gb ethernet cable to RJ45 (eth0), Control-PC configure IP with 192.168.0.x/24 subnet and access ISC's WebGUI.

4.2 Login

Follow section Alternative access connection, and Login account and password to access ISC.

4.2.1 Login via website

You can use browser in Control PC to open the ISC's website for WebGUI browsing.
Please refer to section Login via Web.

4.3 Configuration

This section lists some necessary configuration when deploy ISC, including N2/N3 network interface, management network interface, timing sync, DU/CU configuration.

4.3.1 Management network configuratioin

ISC contains 2 interface for management access, one of RJ45, another one is SFP+, refer to Network configuratioin to configure it accordingly.

4.3.2 NGC/NGU (N2/N3) network configuratioin

ISC contains 2 interface for backhaul N2/N3 connection, either choose to binding to RJ45 or SFP+, refer to Network configuratioin to configure it accordingly.

4.3.3 Timing synchronization configuration

ISC supports GNSS, PTP, and GNSS+PTP synchronization mode. Refer to section GNSS configuration to configure it accordingly.

4.3.4 System AUTO RUN configuration

The AutoRun configuration will start OAM/DU/CU service automatically once timing synchronization locked. Refer to System configuration for configuration.

4.3.5 DU/CU configuration

DU/CU configurations is XML based file configuration. Refer to OAM configuration for whole XML file configuration. Refer to XML configuration for single object configuration.

4.4 Check status

4.4.1 Network status

Refer to Network status to check physical RJ45 (eth0) and SFP+(eth1) status.

4.4.2 GNSS status

Refer to GNSS status to check timing synchronization status.

4.5 Log collection

Refer to Log to display and archive system log for investigation.

4.6 Firmware upgrade

Since FW v1.1.1.5, introduced single binary file for upgrade, pls refer to below section for upgrade procedure:

- Refer to General upgrade for whole system firmware upgrade, including bootloader, kernel, gNB DU/CU stack.
- Refer to gNB upgrade for DU/CU stack only upgrade.

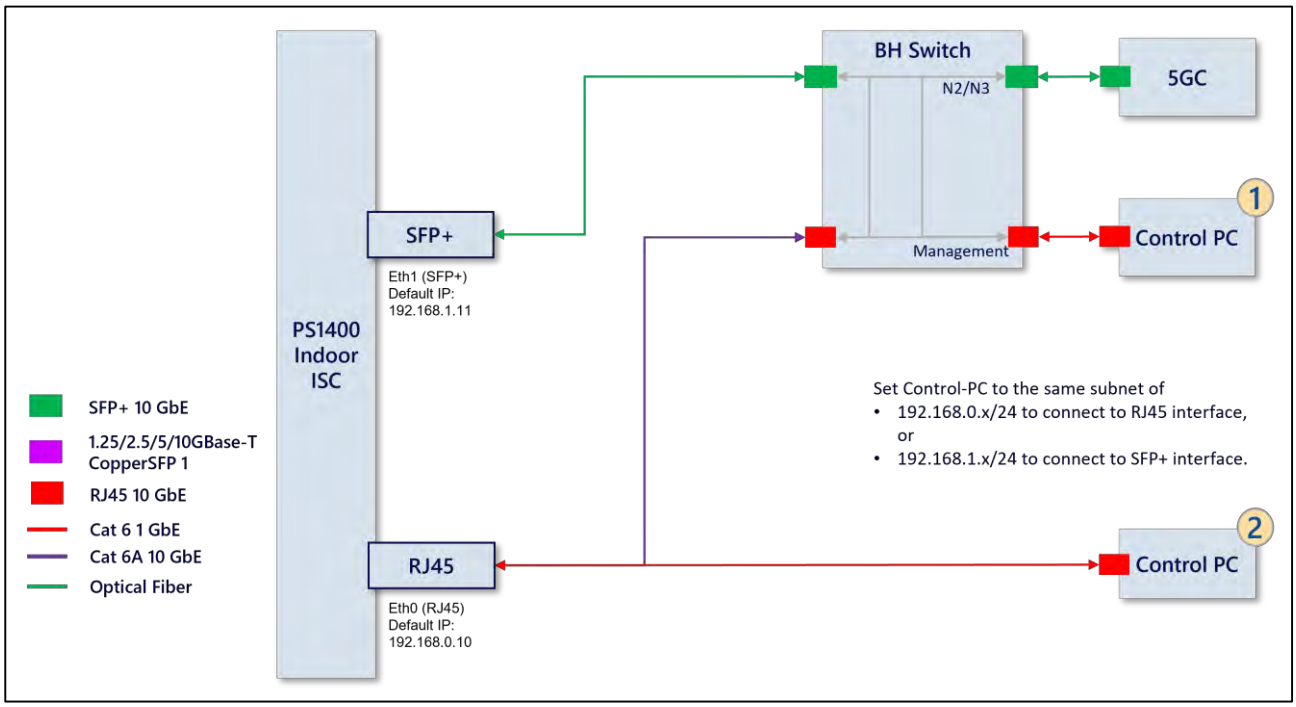
Before FW v1.1.1.5, pls connect to ISC via SSH connection (Pls contact Pegatron FAE for support), using below command to upgrade:

Install FW image to EMMC:

ISC login account/password: *padmin/Xu42K6xJ4*

1. Check current running slot:
   - *"imgSwUpg.sh show"*
2. Copy 3 separated image into ISC:
   - *scp boot_LS_arm64_lts_5.15.tgz padmin@192.168.0.10:/dev/shm*
   - *scp ls-image-main-lx2160apgc.tar.gz padmin@192.168.0.10:/dev/shm*
   - *scp firmware_lx2160apgc_emmcboot.img padmin@192.168.0.10:/dev/shm*
3. Install FW to EMMC:
   - SSH login to ISC
   - *cd /dev/shm*
   - Install to EMMC-1 (If current running slot is 2, then upgrade should choose another slot – EMMC-1)
     - Upgrade System image:
       - *flex-installer.sh -b boot_LS_arm64_lts_5.15.tgz -B2 -r ls-image-main-lx2160apgc.tar.gz -R3 -f firmware_lx2160apgc_emmcboot.img -d /dev/mmcblk1*
     - Upgrade DU/CU image:
       - *flex-installer.sh -r SYSREPO_CUDU_4.6.0_PEGA_1.0.0_HOST_.tar.gz -R5 -d /dev/mmcblk1*
   - Install to EMMC-2 (If current running slot is 1, then upgrade should choose another slot – EMMC-2)
     - Upgrade System image:
       - *flex-installer.sh -b boot_LS_arm64_lts_5.15.tgz -B6 -r ls-image-main-lx2160apgc.tar.gz -R7 -f firmware_lx2160apgc_emmcboot.img -d /dev/mmcblk1*
     - Upgrade DU/CU image:
       - *flex-installer.sh -r SYSREPO_CUDU_4.6.0_PEGA_1.0.0_HOST_.tar.gz -R8 -d /dev/mmcblk1*

5. Web GUI Access



Based on above connection example, WebGUI website is also accessable via browser from Control PC #1/2.

5.1 Login account and password

There are several accounts used for access ISC.

Please refer to below table:

Table 5.1-1 Login account list for FW v1.1.1.5 and older FW.

Type	Account	Password	Permission Description
SSH connection	padmin	Xu42K6xJ4	Super user
WebGUI log in	admin	123	Super user
MPlane Netconf Session connection	N/A	N/A	N/A

Table 5.1-2 Login account list for FW v1.1.1.6 and newer FW.

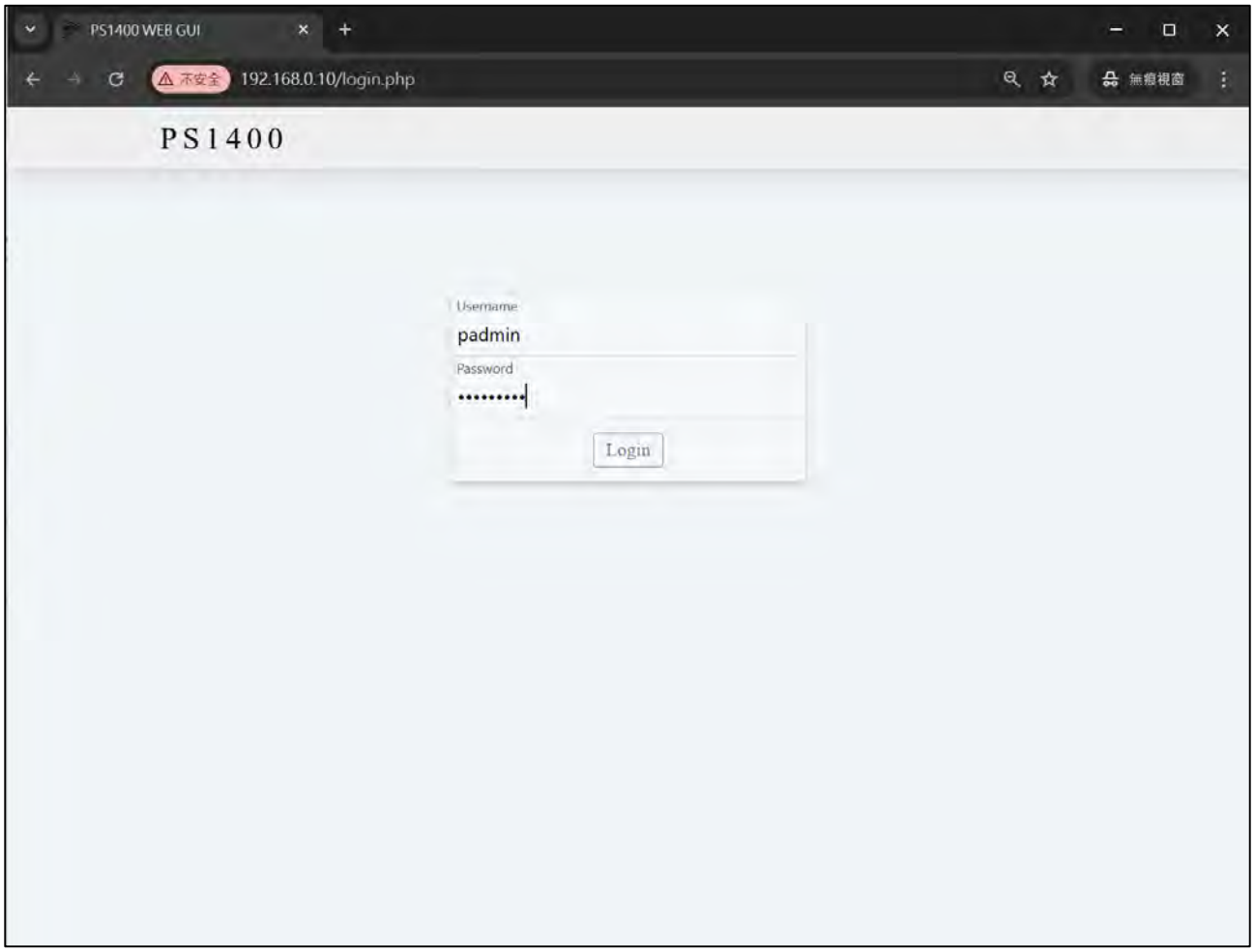
Type	Account	Password	Permission Description
SSH connection	padmin	Pega@2025	Super user
	ruser	Pega#1234	Non sudo user
WebGUI log in	padmin	Pega@2025	Super user
	ruser	Pega#1234	1. No Terminal page 2. Can not upgrade single DU/CU/OAM image.
MPlane Netconf Session connection	root	PEGA@xu42k6xj4	root

5.1.1 Login via website

Any reachable IP can be used to open website, including default SFP+ interface IP (192.168.1.11) and RJ45 interface IP (192.168.0.10).

URL: http://<IP of RU>.

Example: http://192.168.0.10 or http://192.168.1.11



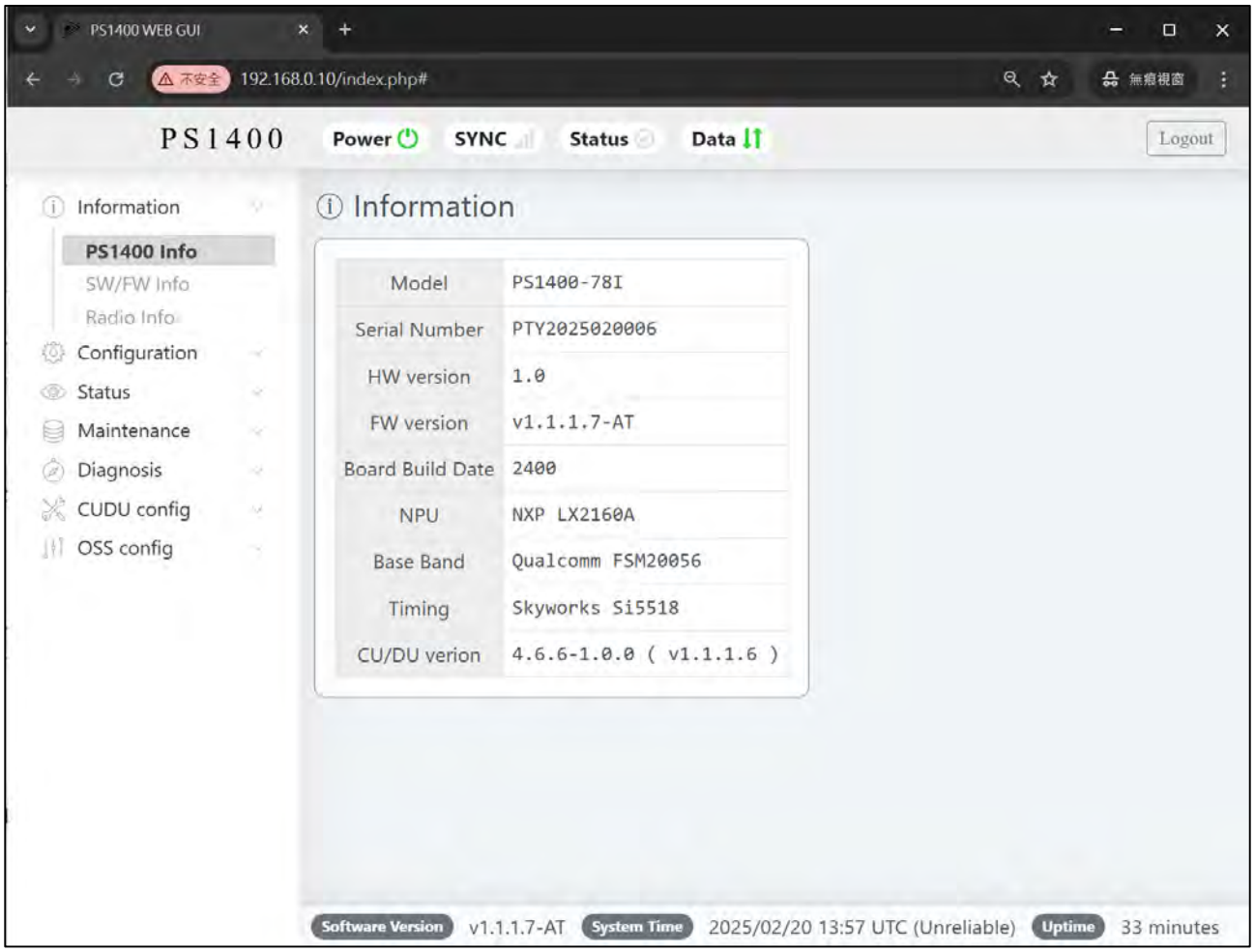
5.2 Information

This section contains below informations:

- PS1400 information
  - Including generic hardware product information.
- Software/Firmware information
  - Including software version information across different swappable slot
- Radio information
  - Including radio information, frequency and bandwidth.

5.2.1 PS1400 information

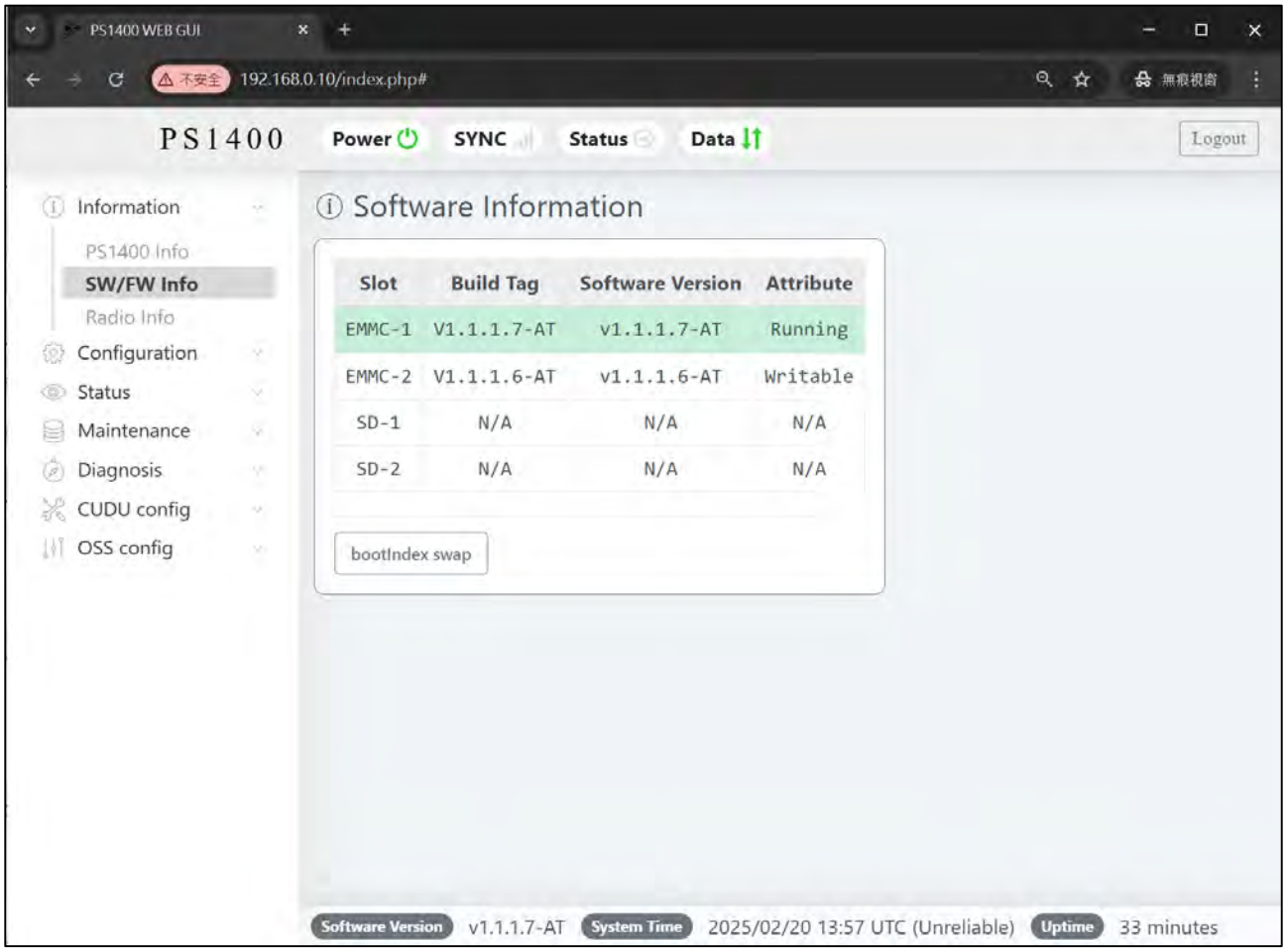
Basic ISC information, including Model name, serial number, hw version, fw version, DU/CU version.



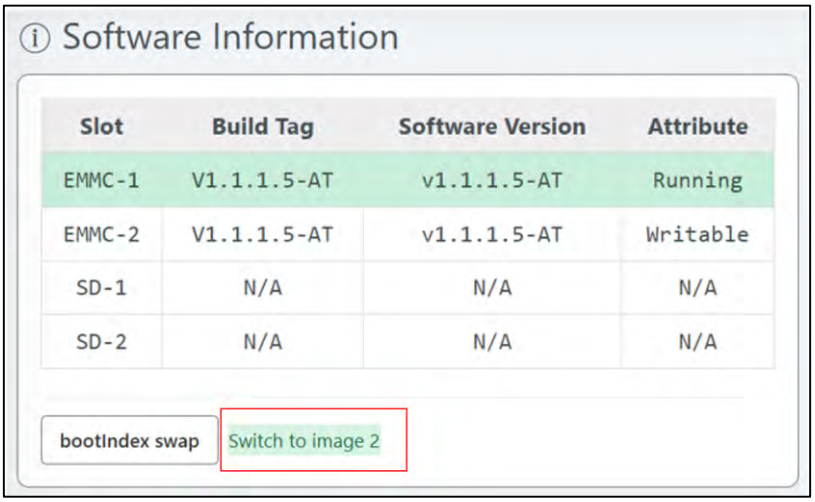
5.2.2 Software/Firmware information

This section displays multiple software slot in ISC, including Running slot, and Writable slot.

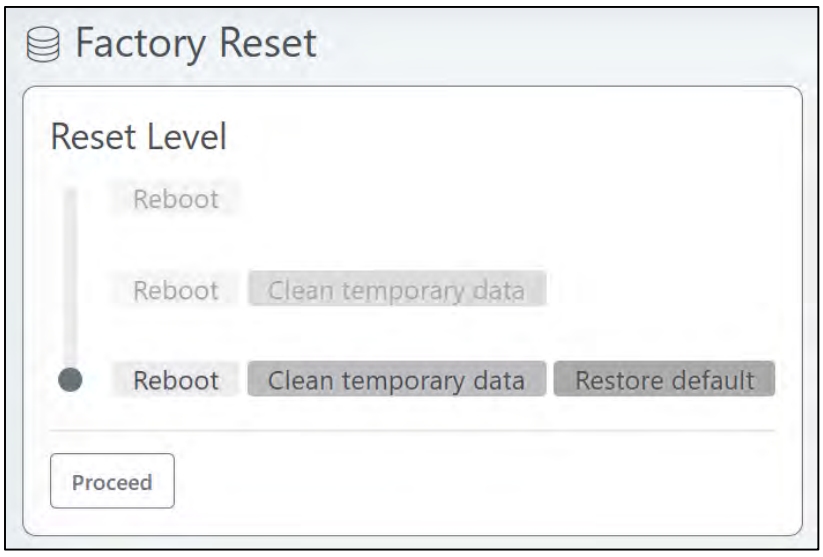
- Running slot – Currently running slot.
- Writable slot – Slot used to upgrade.



To swap software slot, click “boot index swap” button, it will show “Switch to image #”, below example shows it switched from Running slot EMMC-1 to Writable slot EMMC-2, to activate it, need to perform Reboot.

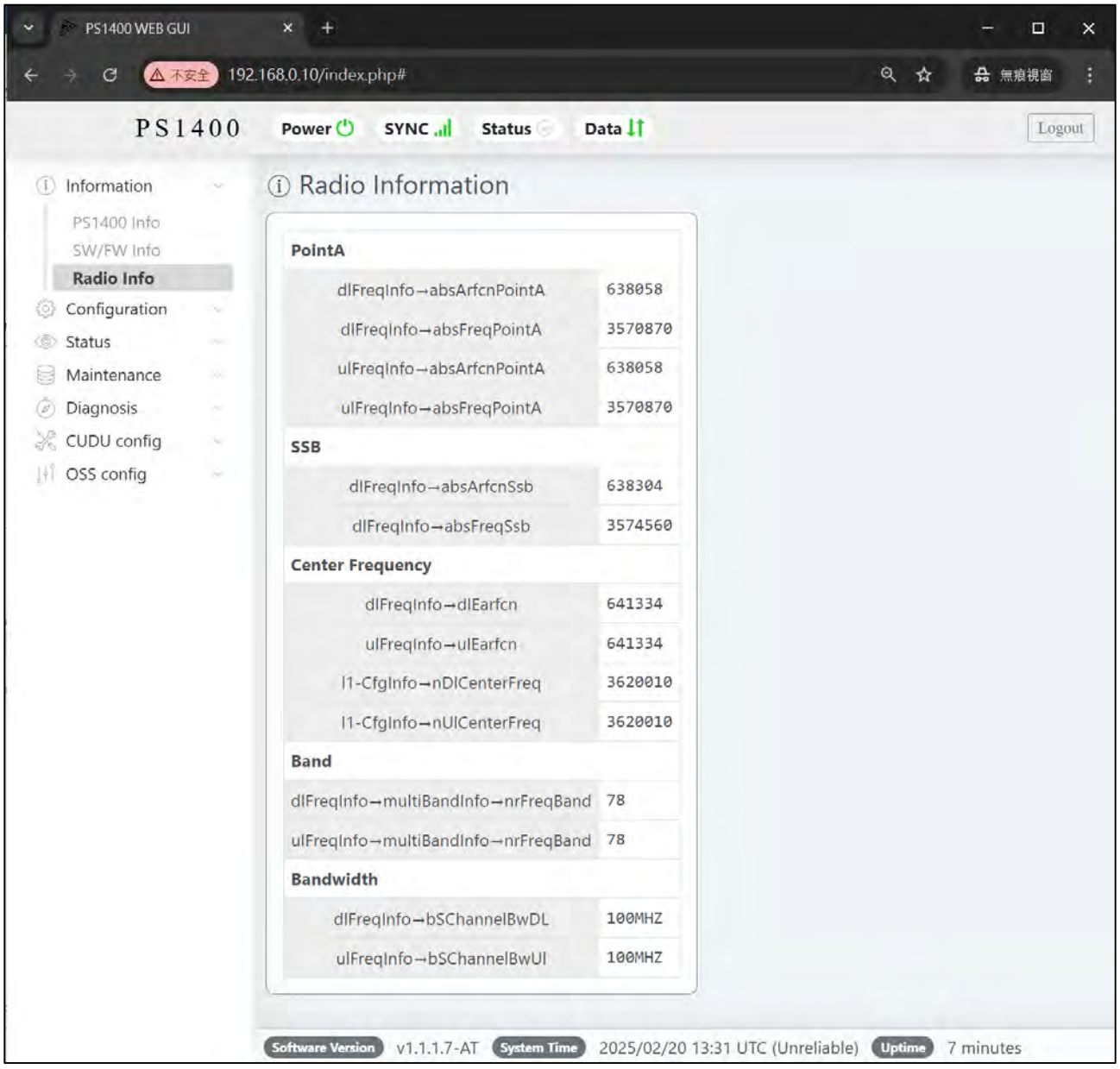


Then refer to section “Factory reset” to perform “Reboot/Clean temporary data/Restore default”:



5.2.3 Radio information

This section including basic radio information, including PointA, SSB, Center Frequency, Band and Bandwidth.

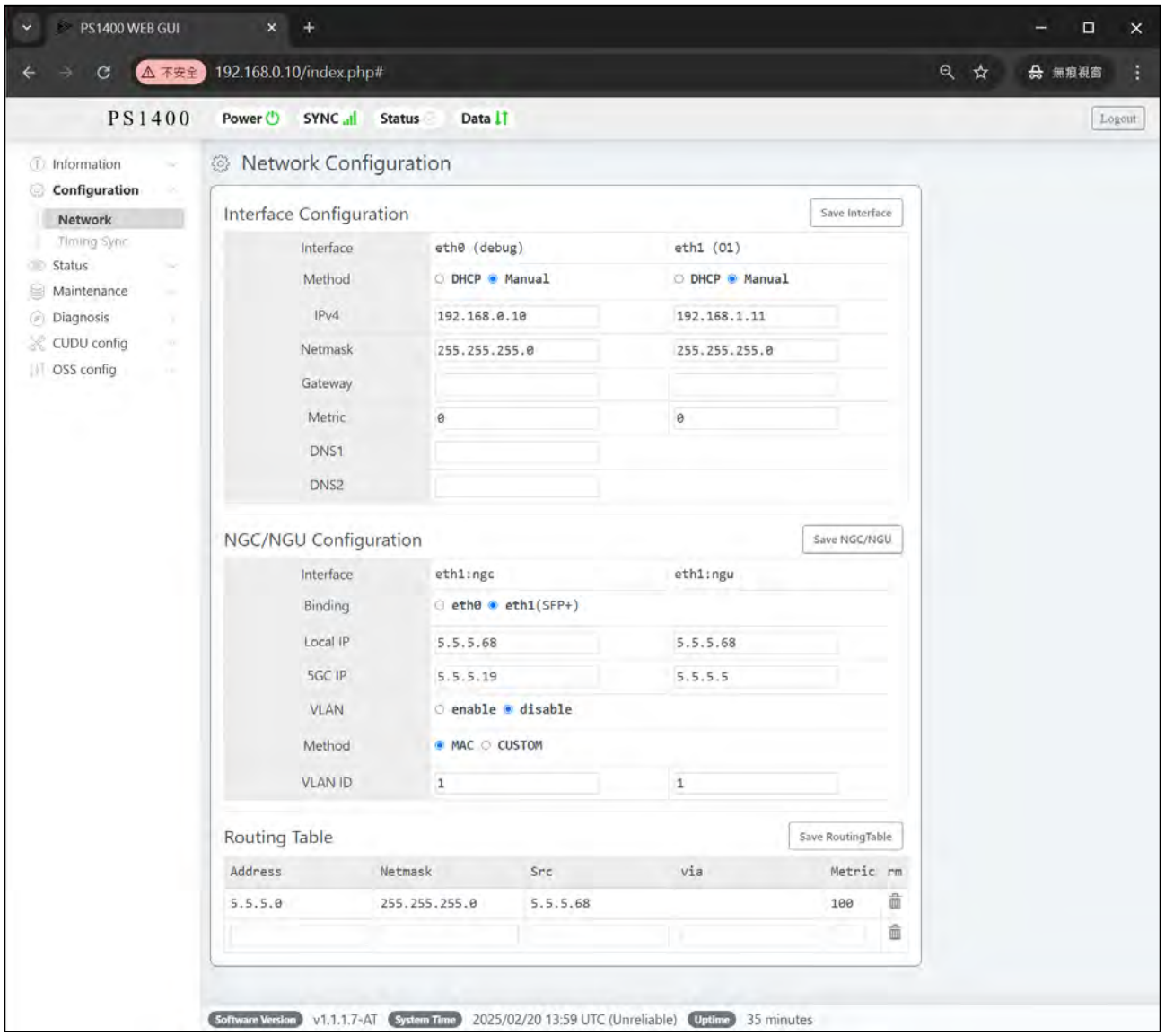


5.3 Configuration

5.3.1 Network configuration

This section including:

- Management network interface IPv4 configuration, either static (Manual) or DHCP mode.
- NGC toward 5GC-AMF, NGU toward 5GC-UPF IPv4 configuration.
  - VLAN is supported since FW v1.1.1.7.
  - Choose binding to eth0 (RJ45) or eth1 (SFP+), need to reboot to apply change.
- Routing Table
  - N2 gateway routing table configuration is supported since FW v1.1.1.7.



5.3.2 Timing synchronization configuration

ISC supports GNSS, PTP G.8275.1 and G.8275.2 profile for timing synchronization. Need to click "**Save**" button and reboot to apply change.

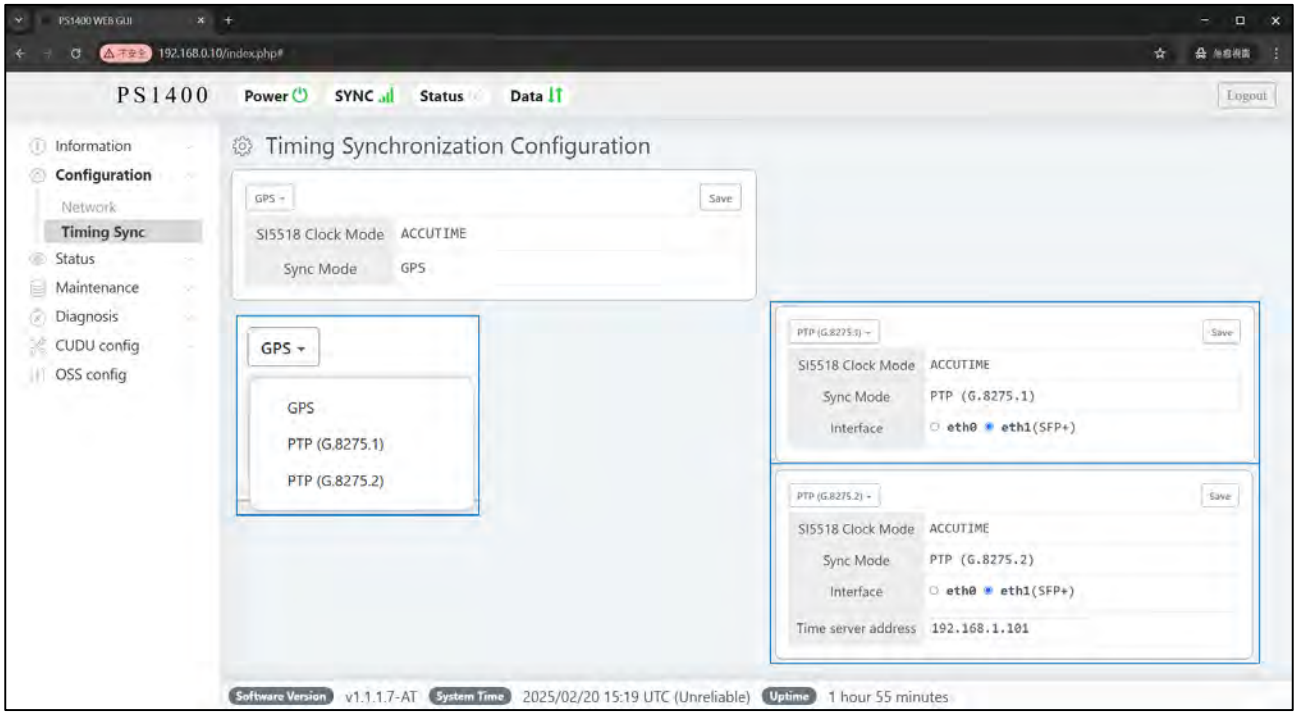


Table 5.3.2-1 PTP default configurations

Parameter	G.8275.1 Profile	G.8275.2 Profile
1-Step, 2-Step	Both supported by default	Both supported by default
sync_interval	-4	-6
delay_req_interval	-4	-6
announce_interval	-3	0
announce_receipt_timeout	3	2
local_priority	128	128
domain number	24	44

5.4 Status

5.4.1 Network status

Check physical eth0 (RJ45) and eth1(SFP+) network status, including:

Interface – show eth0 or eth1

IPv4 – show interface IPv4 address

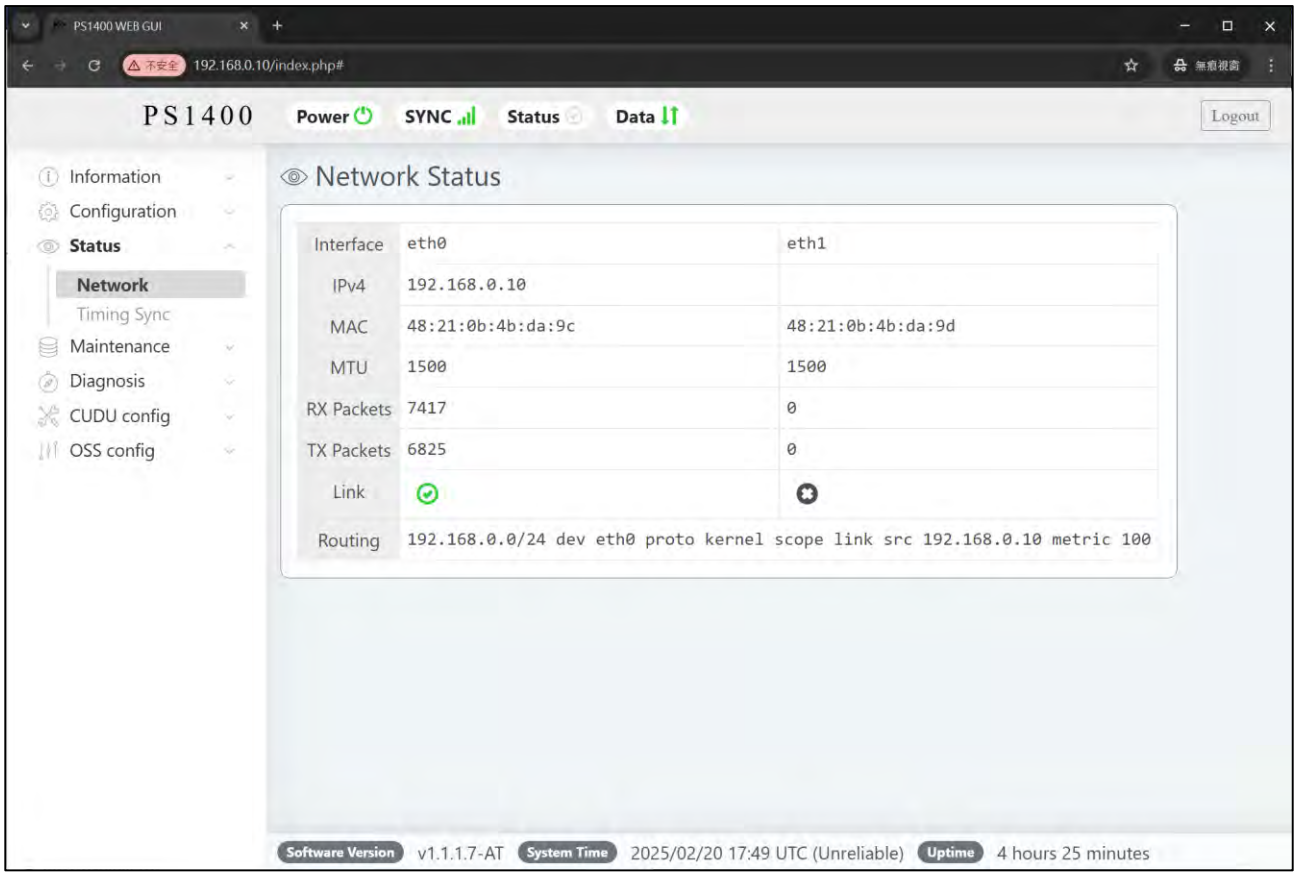
MAC – show interface mac address

MTU - show interface MTU

RX Packets – show interface RX packets

TX Packets – show interface TX packets

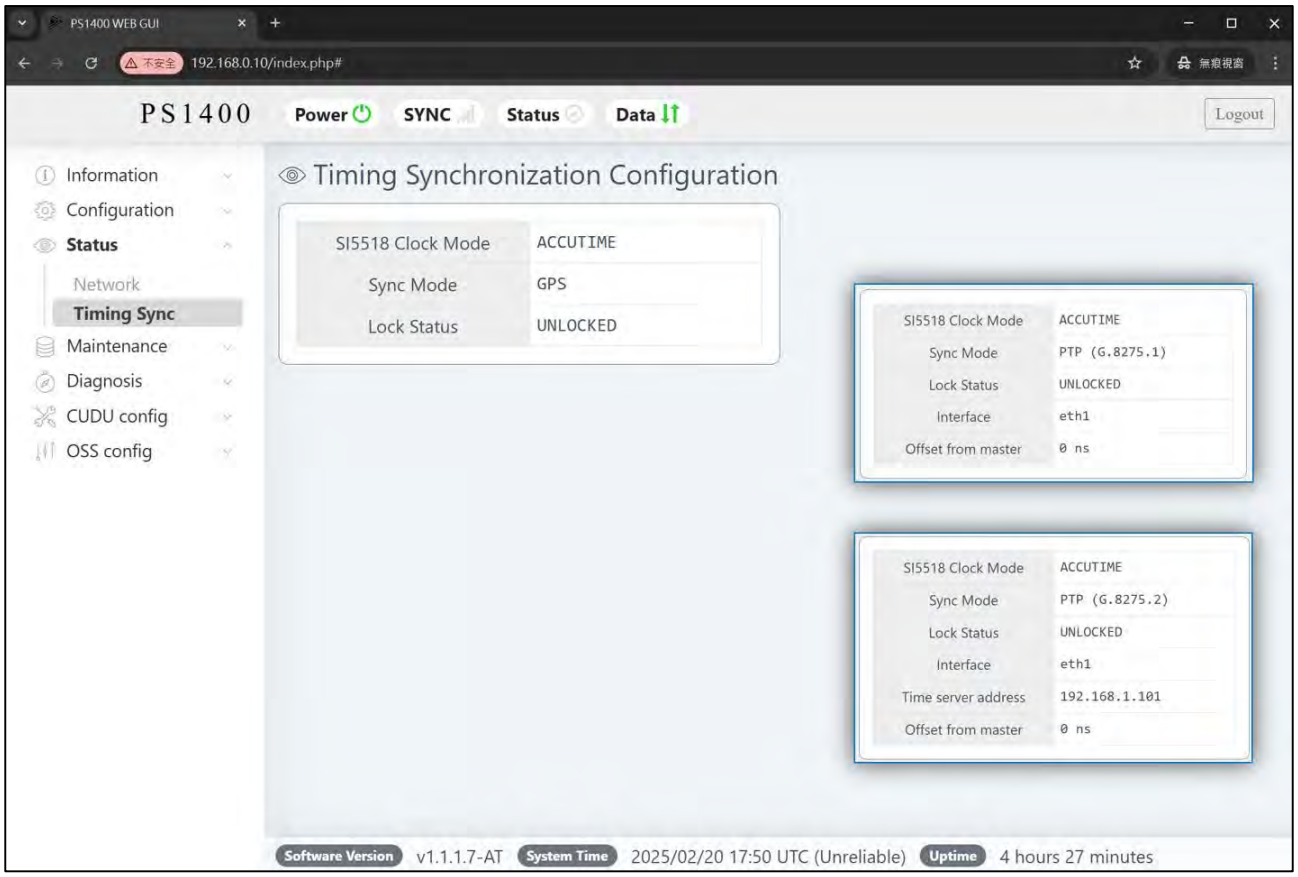
Link – show interface link state



5.4.2 Timing synchronization status

Check timing synchronization status, including:

- GNSS
  - Lock Status
- PTP (G.8275.1)
  - Lock Status
  - Interface name
  - Offset from master
- PTP (G.8275.2)
  - Lock Status
  - Interface name
  - Timer server address
  - Offset from master



5.5 Maintenance

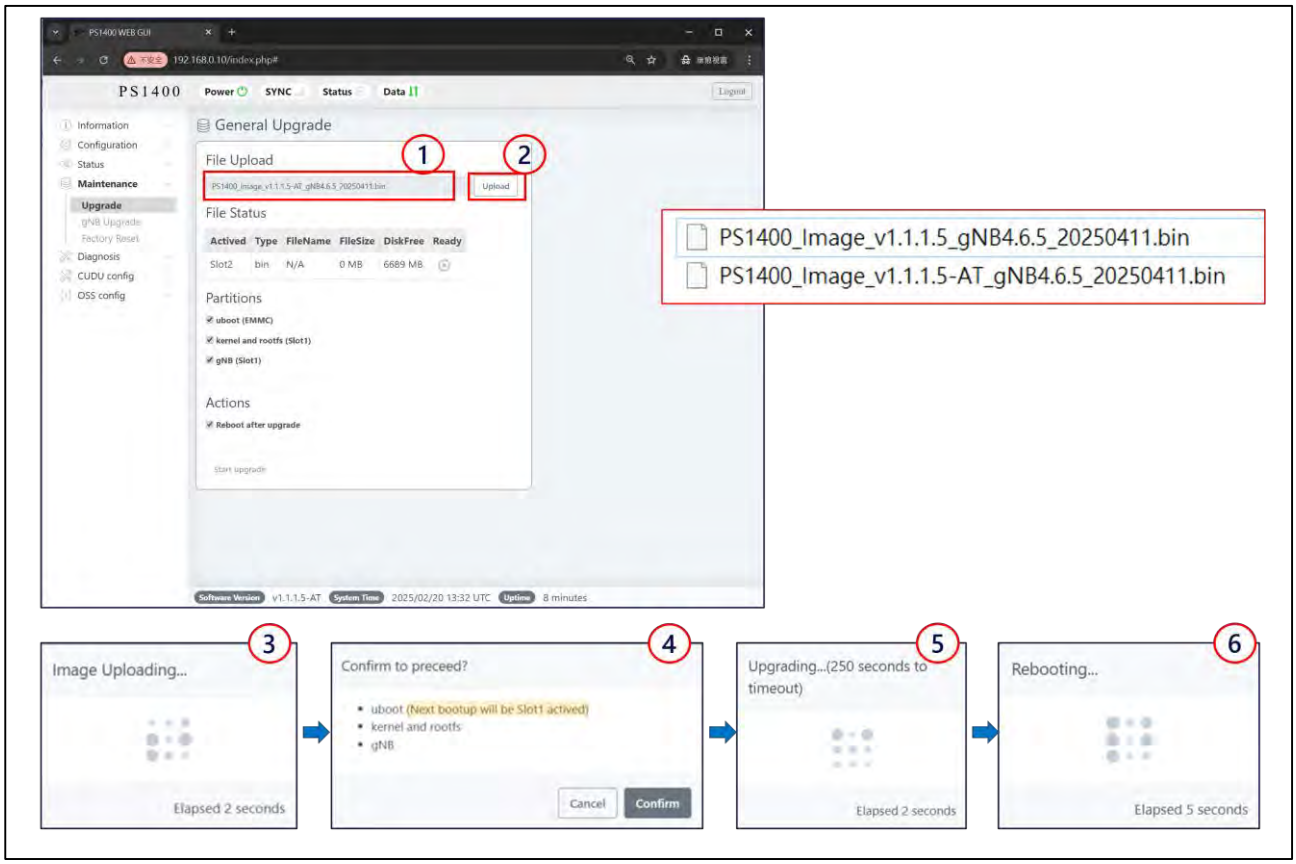
5.5.1 General upgrade

General upgrade is a complete FW upgrade compare to "gNB only upgrade" in next section, including 3 partitions:

- Uboot – Bootloader information, if checked, system will boot from EMMC-1 slot, please refer to section Software/Firmware information to swap to upgraded slot manually.
- Kernel and rootfs – Kernel and file system.
- gNB – DU/CU software stack.

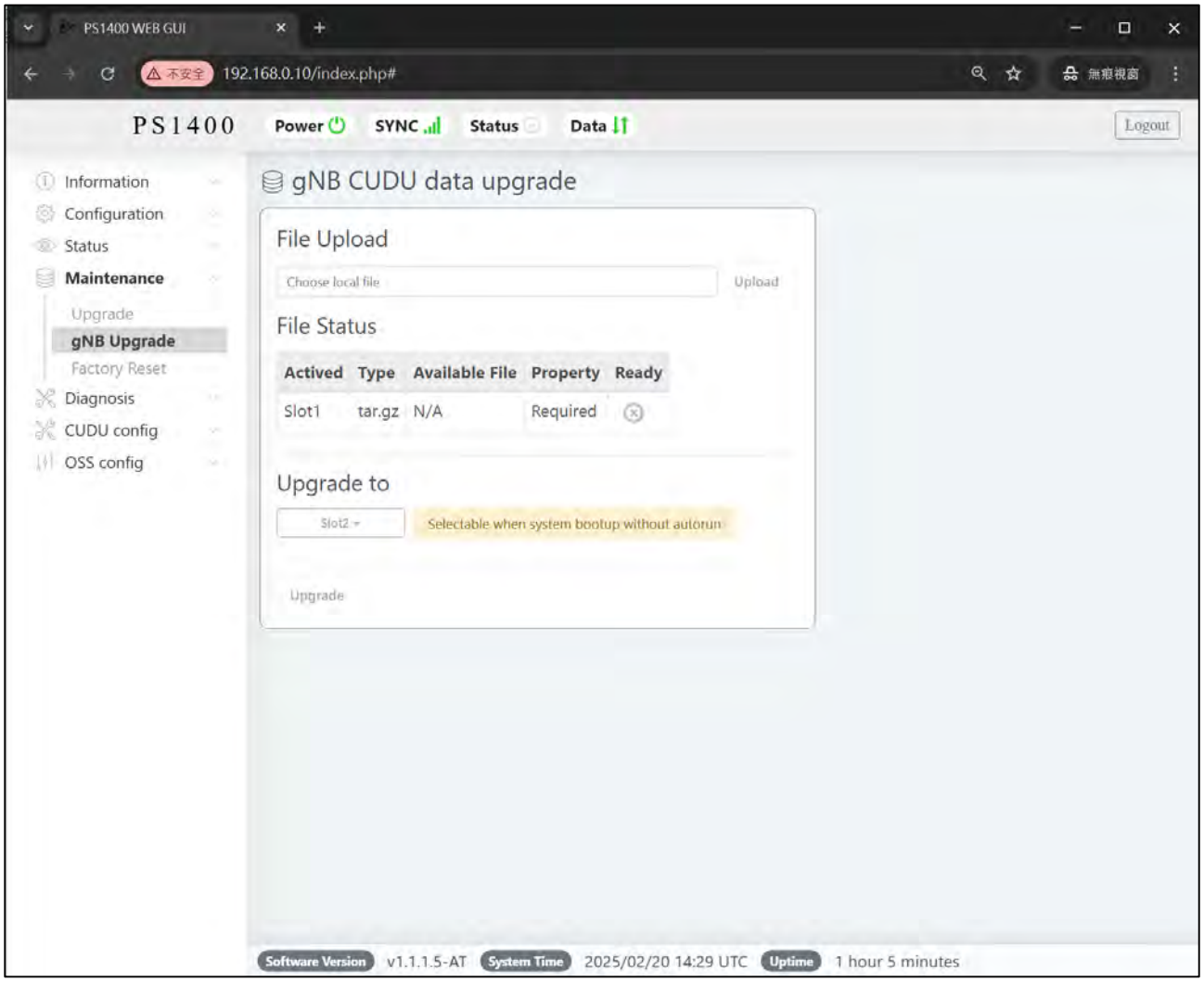
Upgrade steps including:

1. Choose FW .bin file
2. Click upload, it will take few minutes to upload the FW .bin file from your Control-PC to ISC.
3. Image uploading…
4. Checked all 3 partitions, uboot/kernel and rootfs/gNB, then click "Start upgrade".
5. System upgrading… it will take few minutes
6. After upgraded successfully, system will Reboot automatically.



5.5.2 gNB upgrade

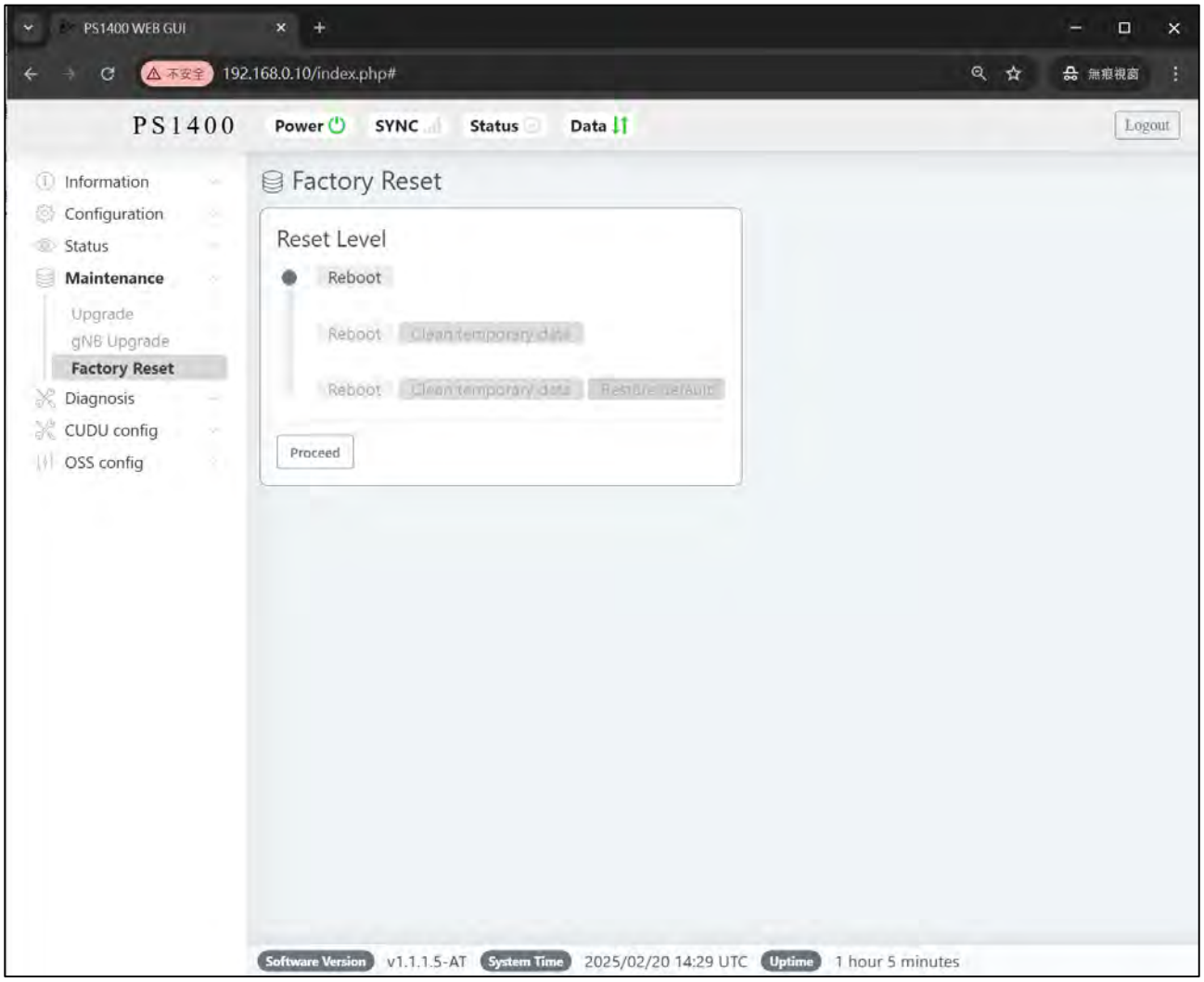
Upgrad DU/CU stack firmware only.



5.5.3 Factory reset

There are three types of factory reset ISC, including:

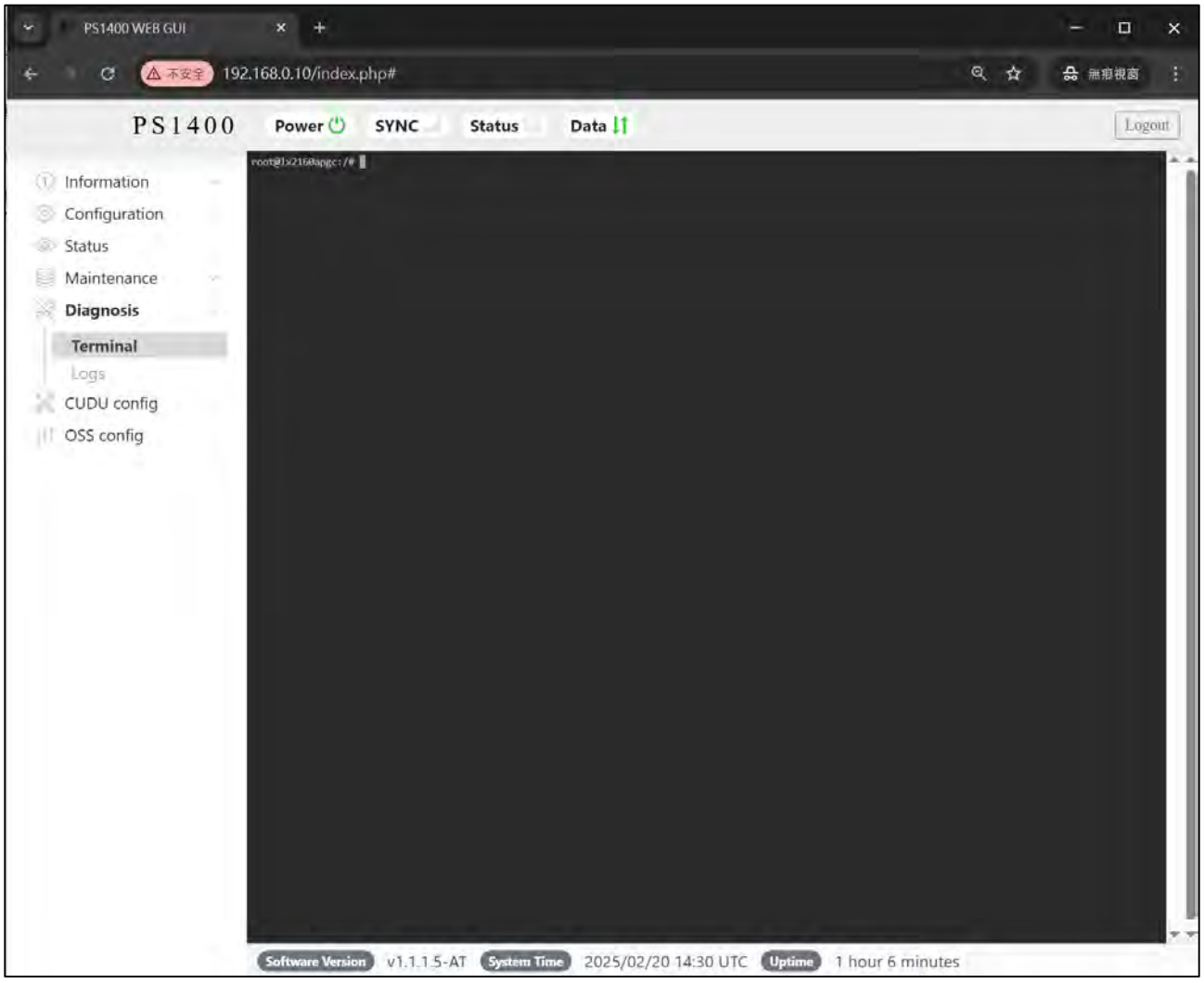
- Reset Level – Reboot – Reboot ISC directly
- Reset Level – Reboot clean temporary data – Reboot ISC and clean logs
- Reset Level – Reboot clean temporary date – Reboot ISC and clean logs and restore default settings



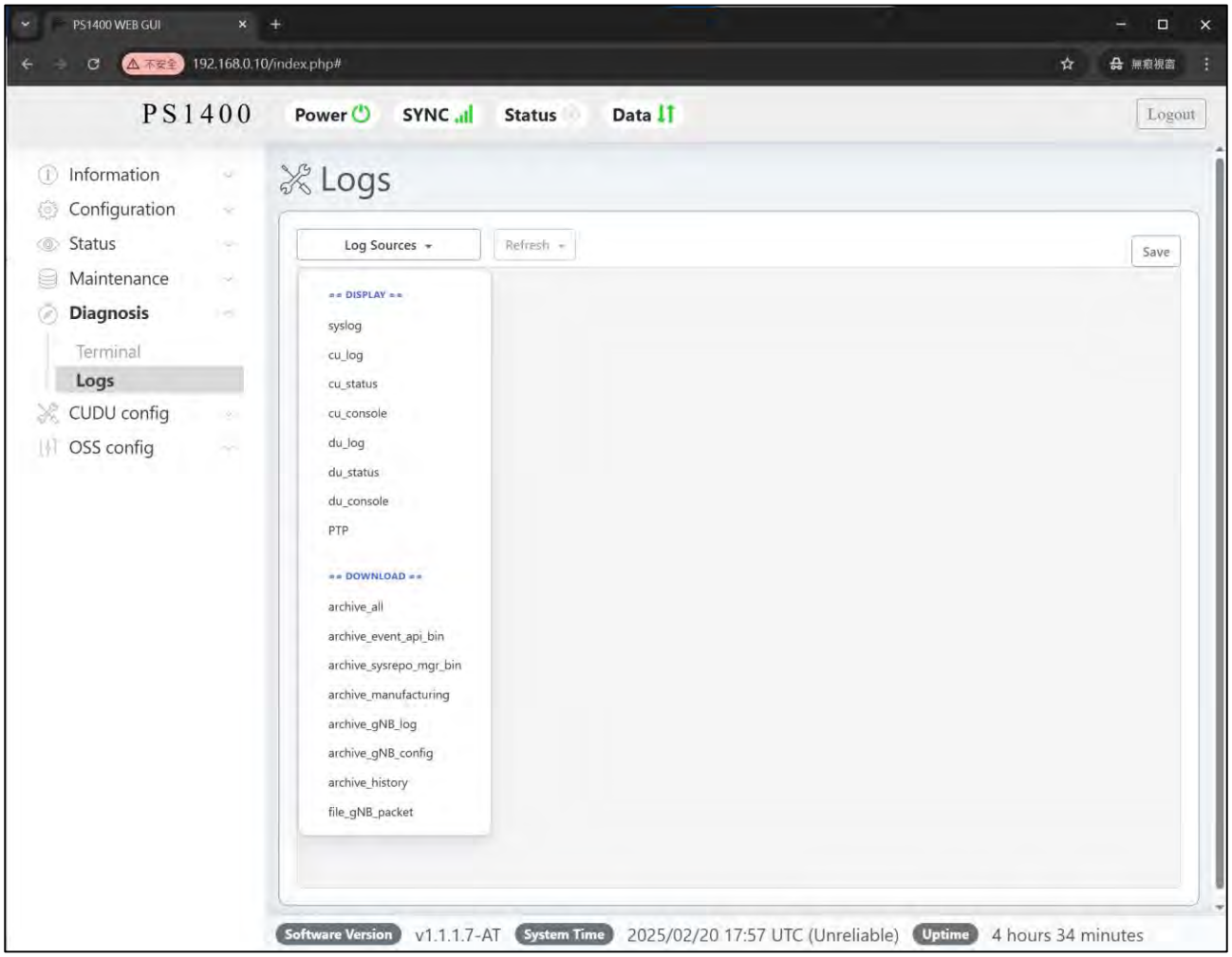
5.6 Diagnosis

5.6.1 Terminal

Only available in DEBUG-type FW image.



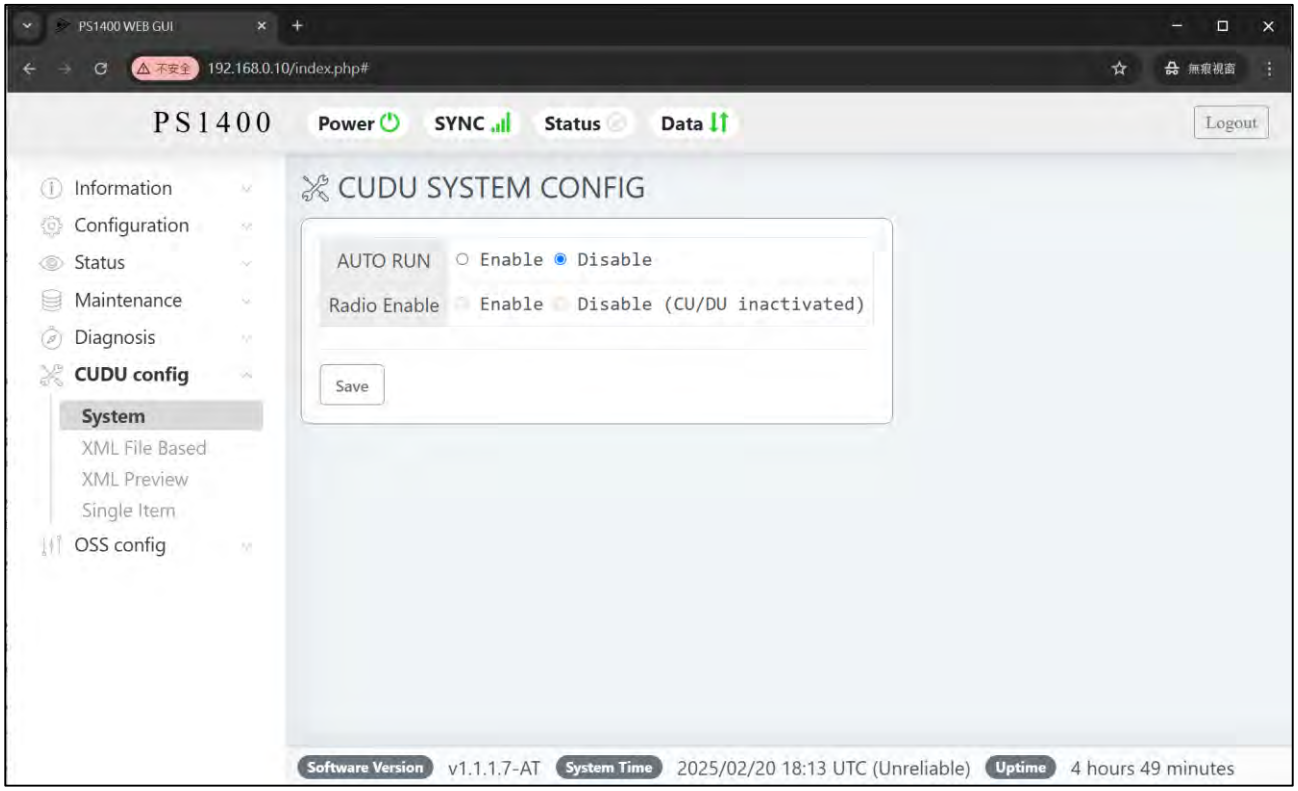
5.6.2 Logs



5.7 CU and DU configurations

5.7.1 System

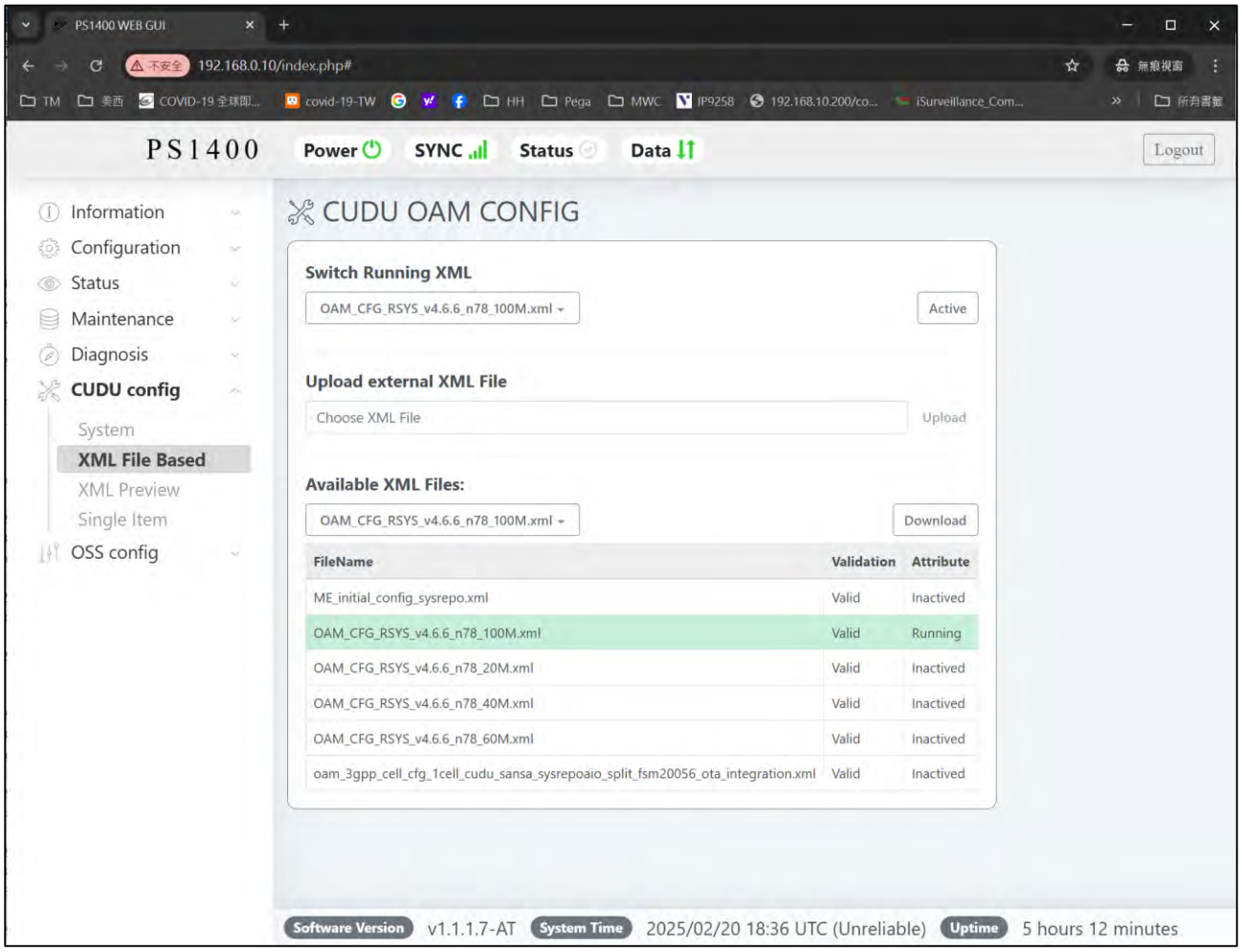
- The AutoRun configuration will start OAM/DU/CU service automatically once timing synchronization locked. (Need to reboot to apply change).
- Radio Enable/Disable allow to turn on/off RF radio dynamically.
  - Only available when CU/DU is activated.



5.7.2 XML file based configuration

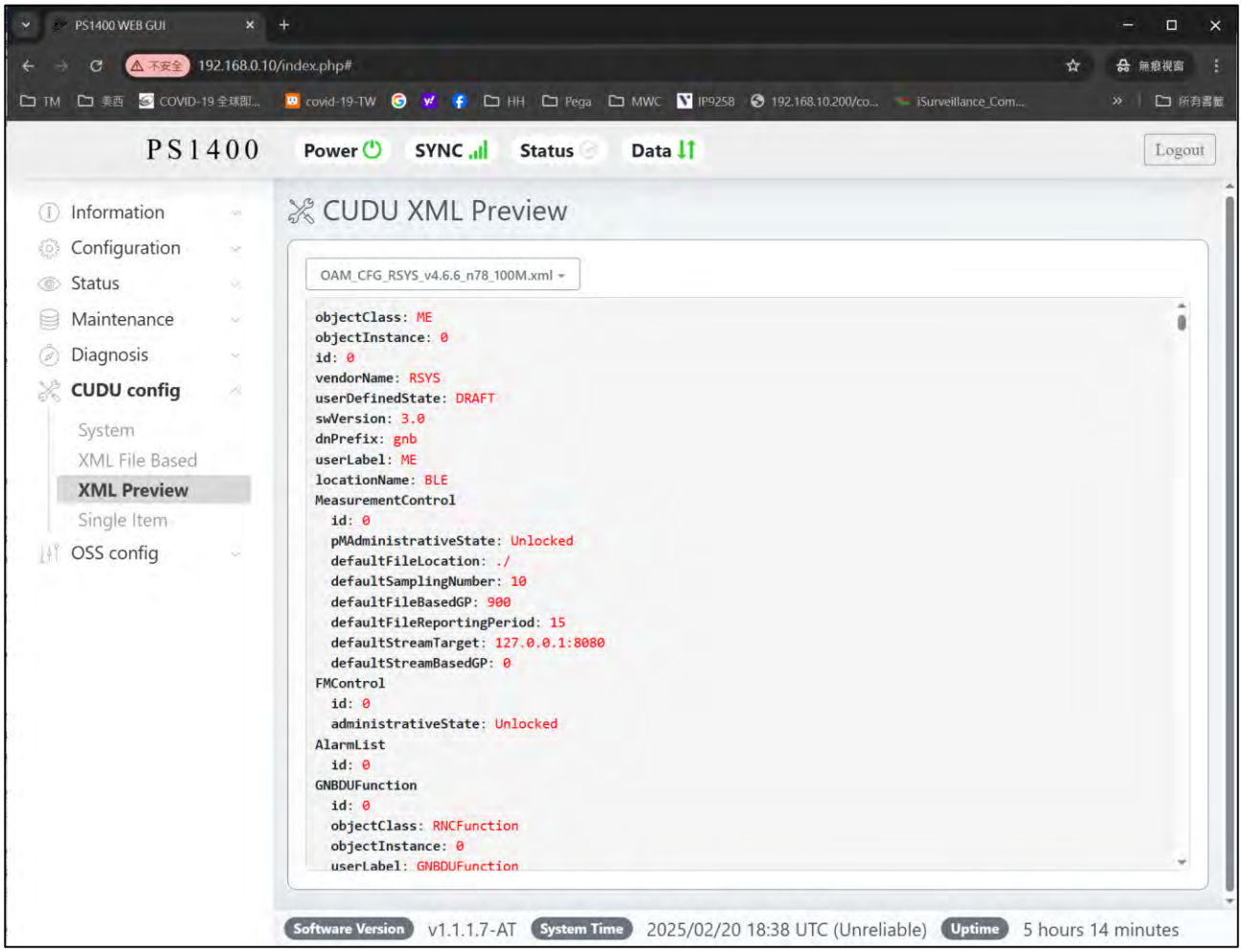
DU/CU configuration is XML file based. In this page, DU/CU configuration will be applied based on whole XML file, user can switch, upload, download XML file.

Switch Running XML – **select** running xml.
Upload external XML File – **upload** external xml to ISC.
Available XML Files – **download** available xml files from ISC.



5.7.3 XML file preview

DU/CU configuration is XML file based. In this page, select specific configuration XML file, and review the whole xml file content.

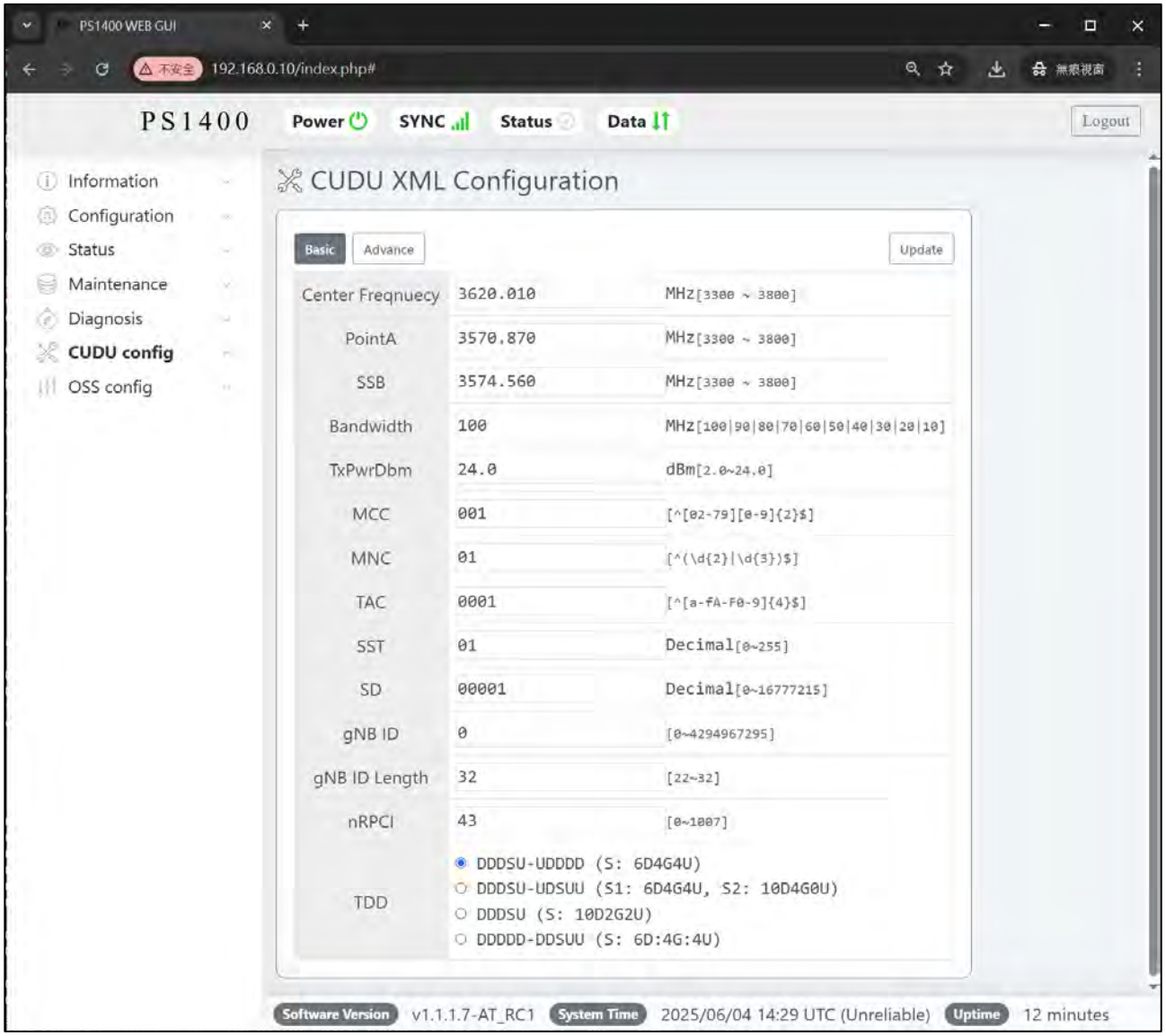


5.7.4 Single item configuration

Different to XML file based configuration, this page provides single item configuration. The contents are showed/applied to running XML file selected in section XML file-based configuration.

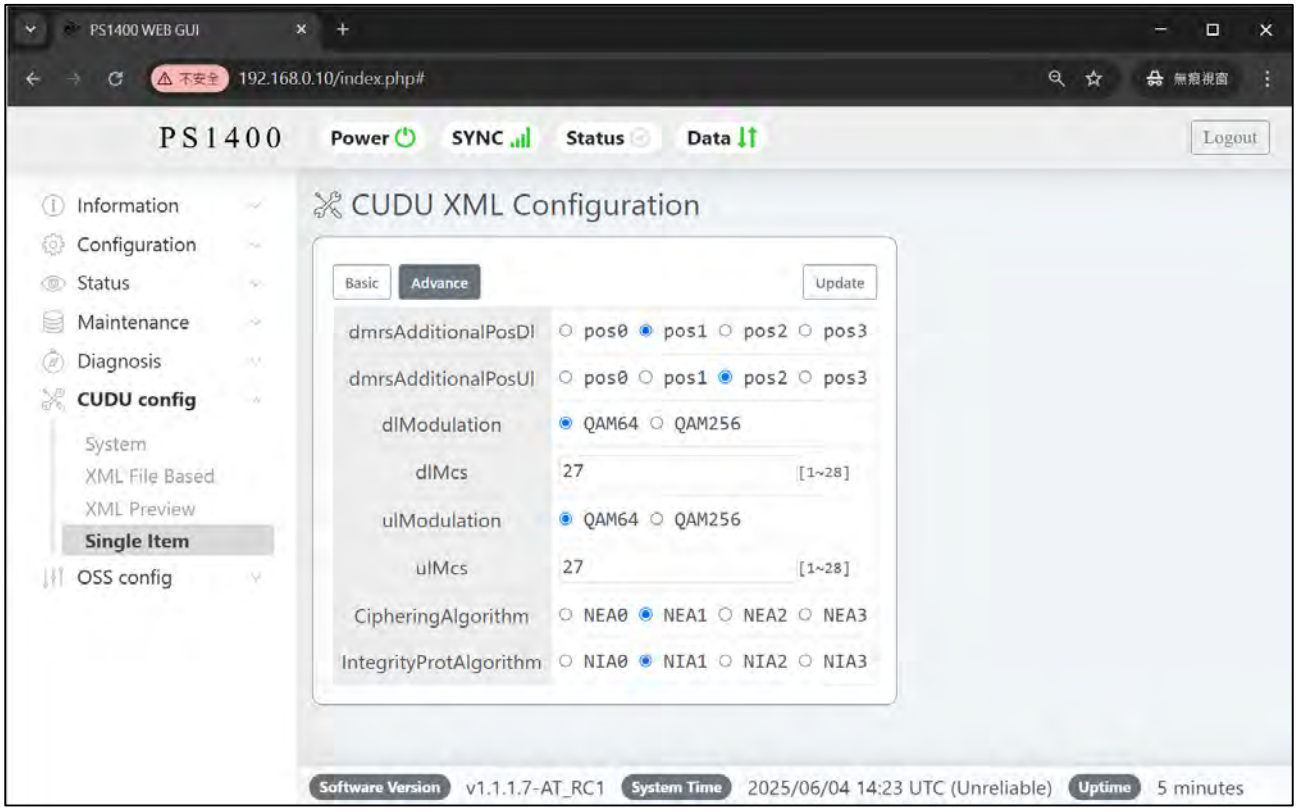
The basic configuration page includes:

- Center frequency
- PointA frequency
- SSB frequency
- Bandwidth
- MCC
- MNC
- TAC
- SST
- SD
- gNB ID
- gNB ID length
- nRPCI
- TDD



The advance configuration page includes:

- DMRS additional position for DL
- DMRS additional position for UL
- Transmit power
- DL MCS
- DL QAM table
- UL MCS
- UL QAM table
- Ciphering Algorithm (NEA)
- Integrity Prot Algorithm (NIA)

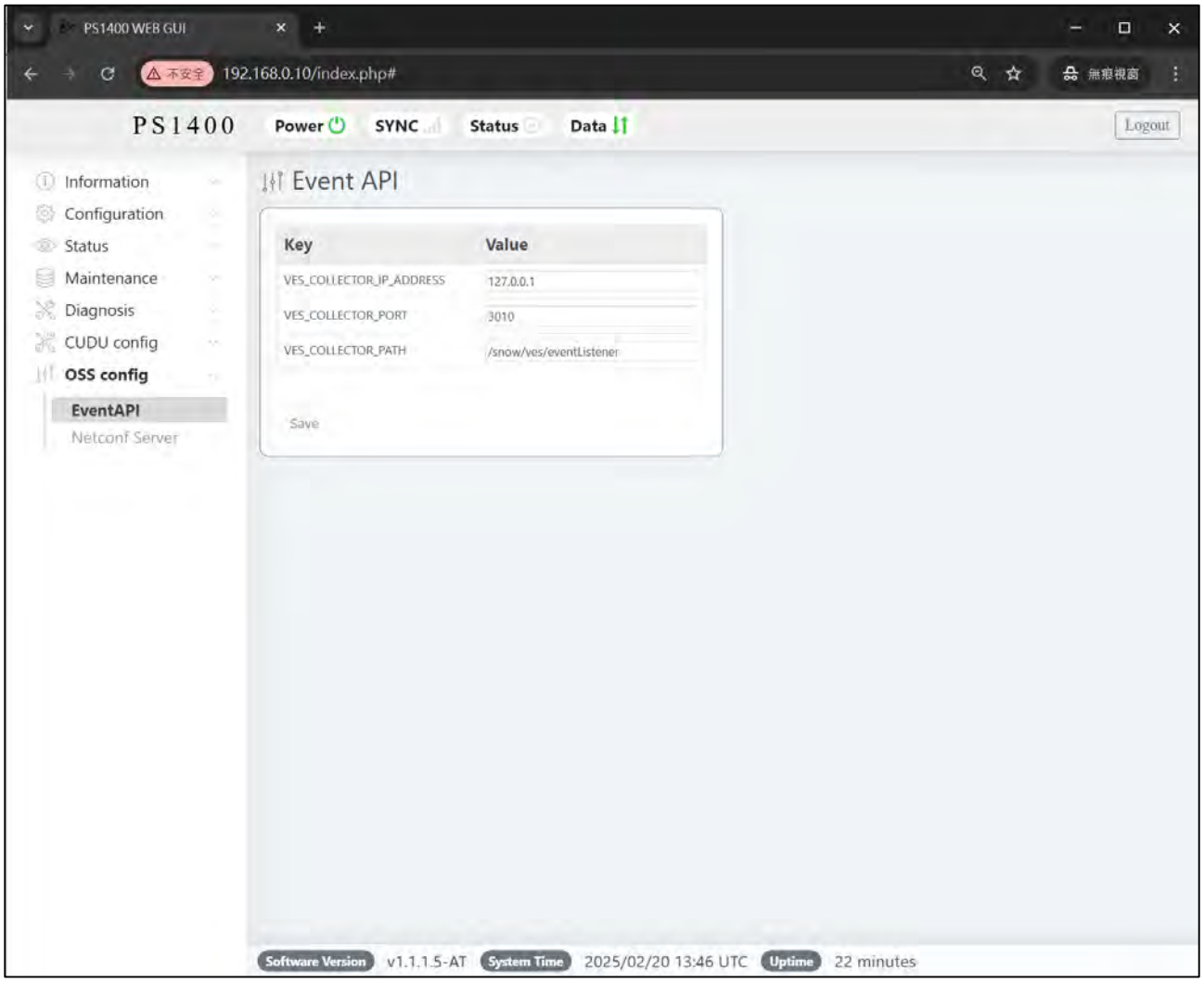


5.8 OSS configurations

5.8.1 Event API

This section includes VES collector's IPv4 address, port and PATH. Once ISC connected to VES collector, ISC will report below messages:

1. PNF Registration
2. Heartbeat
3. Fault notification
4. Performance file ready



5.8.2 Netconf Server

Netconf Server for OAM operations. It's Enable/Disable status is directly associated to "AutoRun" enabled status in section "System",

ISC Netconf Server information:

- IP: Both eth0 and eth1 interface's IPv4 can be connected.
- Port: 832
- Account: root
- Password: PEGA@xu42k6xj4