# 5G NR Small Cell
# NR xCell 46116A
# User Guide

**ASKEY COMPUTER CORPORATION**
**April 2023**

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Security Information

For the safety of installation engineers and to protect the equipment from damage, please read all safety warnings carefully. If you have any questions about these warnings, please contact the Askey support team before installing or powering up the base station.

Declaration of Conformity

Hereby, Askey declares that the radio equipment type NR xCell 46116A is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address:
https://askeycloud.askey.com/owncloud/index.php/s/ZA8LBnW6WvQenPo

# Federal Communication 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.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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.

**FOR MOBILE DEVICE USAGE (>20cm/low power)**

**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.**

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# Chapter 1 Introduction

## 1.1 Brief Introduction

This user Guide introduces the Askey 5G NR indoor small cell NR xCell 46116A for Enterprise, which supports N48 (3.55~3.7GHz)/N77 (3.7~4.0GHz) band. Meeting the demand for indoor connectivity, it is an ideal and powerful solution to deliver a superior network access experience. This super and compact small cell has integrated baseband and radio into a single product, which can support external antenna and help break installation barriers. The NR xCell 46116A Small Cell is part of the carrier-grade, end-to-end Askey Small Cells solution that is definitely suitable for various scenarios, such as smart buildings, factories, hospitals, shopping malls, elevators, underground parking etc.

*Figure 1. Askey 5G NR Indoor Small Cell NR xCell 46116A*

## 1.2 Specification

*Table 1. NR xCell 46116A General Specification*

| Item | Description |
|---|---|
| Band | N48(3.55~3.7GHz)<br>N77(3.7~4.0GHz) |
| Bandwidth | N48 : 10/20/30/40 MHz<br>N77 : 40/50/60/70/80/90/100MHz |
| Max. TX Power | N48: EIRP < 30dBm<br>N77: 24dBm |
| Antenna | Internal/External 2x2 MIMO |
| LED | 1 LED |
| Backhaul | 10G SFP+/2.5G WAN |

| | |
|---|---|
| Power Supply | DC 12V/POE++ |
| Power Consumption | 40W |
| Active Users | 16~32 |
| Data Rates | 700Mbps/100 Mbps |
| Installation | Wall /Ceiling/Pole mount |
| IP Grade | IP50 |
| Dimensions | W250 x H250 x D65mm |
| Weight | <2.5kG |
| Operating Temperature | -5℃ – 50℃ |
| Operating Humidity | 90% maximum, non-condensing |

# 1.3 What's in The Box

The Askey NR xCell 46116A box contains:

- NR xCell 46116A
- Power Adapter
- GPS antenna

The following optional items are available:

- Ethernet cable (Optional)
- Mounting Accessories (Optional)
- SFP+ module(Optional)

*Table 2. List of Items in The Box*

| Items | Qty | Description | Picture |
|---|---|---|---|
| 1. Askey Small Cell NR xCell 46116A | 1 | The Askey 5G NR indoor small cell NR xCell 46116A. Please check the label to make sure you have received the correct base station |  |
| 2. Power Adapter | 1 | Length: 2.6m |  |
| 3. GPS antenna | 1 | Length: 7m |  |
| 4. Ethernet cable (Optional) | 1 | |  |
| 5. Mounting Accessories (Optional) | 1 | Optional, 3 types for wall mount, ceiling mount, and pole mount, please refer to 2.4 for more details | |

| | | | |
|---|---|---|---|
| 6. SFP+ module (Optional) | 1 | 10G SFP+, **please note that the highest operating temperature specification of 10G SFP+ module must be workable at minimum 75°C.** | |

# 1.4 IO Interfaces

This section will guide you through the interfaces and functions of NR xCell 46116A.
About the RF Antenna, there are two different scenarios,

- Internal antenna. Using the embedded antennas in the housing (Default mode).
- External antenna. If you would like to use the external antennas, you need to connect the external antennas into the ANT1 & ANT2 port, which are SMA connector. There is the description about the operation function of antenna switching in Section 3.5.3 **RF Antenna**. Users can directly operate in the web UI to switch to the external antenna they want to use.

About Synchronization, there are two different scenarios,

- With GPS. The GPS antenna is required for the automated setup process and search for the GPS signal for synchronization.
- Without GPS. In this scenario, you must have the grand master and BC Switch for synchronization rather than GPS, so in this scenario the GPS is not necessary.

NR xCell 46116A has a single multicolored LED used to indicate the device connectivity status. Please review Section 2.3 LED status for the LED guide when attempting to troubleshoot the solution.

*Figure 2. IO Interfaces*


*Table 3. NR xCell 46116A IO Interface*

| Item | Description |
|---|---|
| SFP+ | The SFP+ port allows you to connect a fiber to establish communication between NR xCell 46116A and switch/router. |
| RESET | The Reset allows you to reset the device to factory defaults. |
| GPS | The GPS antenna port provides access to a SMA Female interface for the external GPS antenna cable. When GM/BC switch is used, no GPS is |

| | |
|---|---|
| | needed to connect. |
| 1PPS | Output the PPS synchronization signal. |
| DBG | The DBG port is used for debug. |
| WAN | The WAN port allows you to connect an Ethernet cable to establish communication between NR xCell 46116A and switch/router. |
| DC IN | The 12V DC Power port is used to power NR xCell 46116A when connected to the AC power adaptor. Use only the provided power adapter, as using any other power adapter may damage NR xCell 46116A |
| ANT1 | ANT1 for External 3.3-5GHz 5G antenna connection |
| ANT2 | ANT2 for External 3.3-5GHz 5G antenna connection |

The equipment is to be connected only to PoE networks without routing to the outside plant

The equipment with a GPS function has not been evaluated for "life-safety" and "non-life-safety" applications.

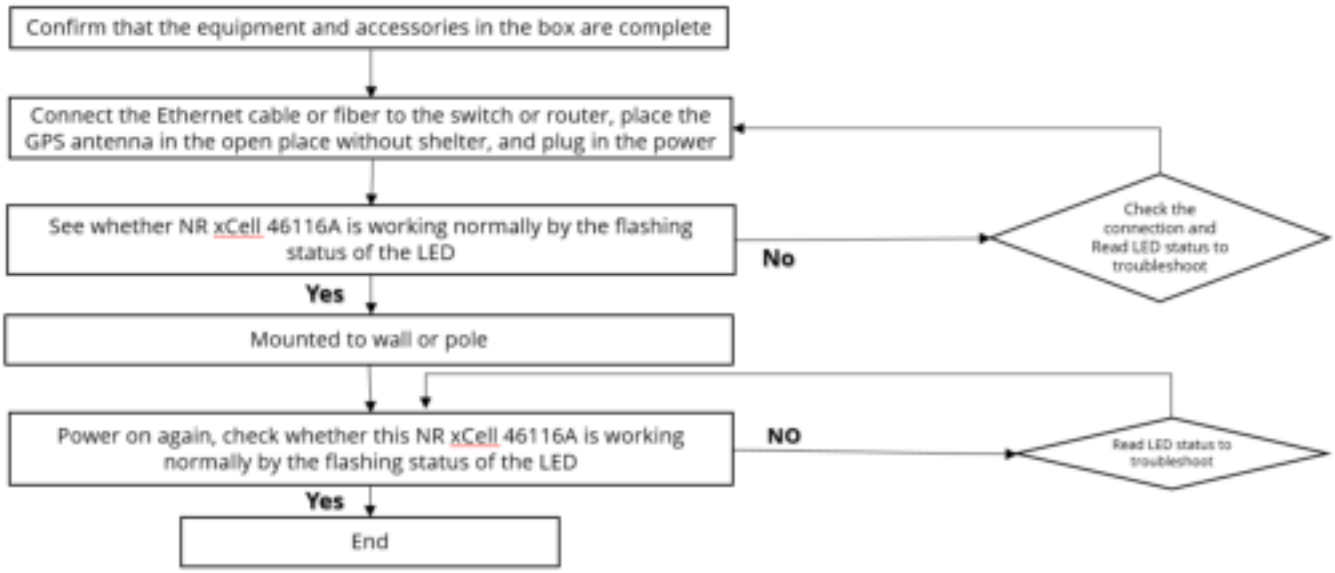
External antenna ports ANT1/ANT2 are disabled via software for this model and is not modifiable by any third-party / end-user

# Chapter 2 Setup

## 2.1 Setup Procedure

This part outlines the procedures needed to set up NR xCell 46116A.

*Figure 3. Setup Procedure*




## 2.2 Cable Connection

Connect the Ethernet cable, power cable and GPS antenna correctly.

- **Indoor GPS antenna**

1. Turn off NR xCell 46116A.
2. Connect the provided Indoor GPS antenna cable to GPS port on the NR xCell 46116A.
3. Place the antenna near a window where the GPS signal is stronger.
4. Turn on the NR xCell 46116A to allow the detection of an available GPS signal.

Noted:

- If using PTP sync solution. there is no need to connect the GPS antenna to the NR xCell 46116A.
- If using fiber transmission. 10G SFP+ module and fiber are needed. **Please note that the highest operating temperature specification of 10G SFP+ module must be workable at minimum 75°C., otherwise the device will be down.**

*Figure 4. Cable Connection*


## 2.3 LED Status

After all the connections are connected and the NR xCell 46116A is powered on, please check the status of LED on the device. The LED will flash according to the LED description provided in Table 4.

If the NR xCell 46116A is operating as expected, continue to Section 2.4. If the NR xCell 46116A is not functioning properly and you have to carefully check all steps.

*Table 4. LED Status Overview*

| Item | Description | LED | User instruction |
|---|---|---|---|
| **1** | Power On | **Solid Red** | |
| **2** | Network is initializing | **Blue Blink (Light on for 3 seconds, light off for 3 seconds)** | 1. The small cell is acquiring IP address, please wait.<br>2. If the LED stays at this stage for more than 5 mins, please check the Ethernet cable is firmly connected at both ends, and the switch, router, or internet gateway is turned on. |
| **3** | GPS Sync Progressing | **Green Blink (Light on for 1 seconds, light off for 3 seconds)** | 1. The small cell is syncing and acquiring GPS signal, please wait.<br>2. If the LED stays at this stage for more than 10 mins, the small cell has failed to acquire minimally required GPS signal, please try to move your GPS antenna closer to the window.<br>3. If the issue persists, please call Customer Service.<br>**Note**: First GPS sync lock may take 45 minutes |
| **4** | OAM Configuring | **Blue Blink (Light on for 1 seconds, light off for 3 seconds)** | 1. The network management server is provisioning the small cell, please wait.<br>2. If the LED stays at this stage for more than 10 minutes, the small cell has not received all required or correct provisioning parameters from HeMS. Please try reboot your device again.<br>3. If the issue persists, please call Customer Service. |
| **5** | 5G Service is initializing | **Blue Blink (Light on for 1 seconds, light off for 1 seconds)** | 1. The small cell is syncing with 5G network, please wait.<br>2. If the LED stays at this stage for more than 10 minutes, the small cell is still trying to connect to HeNB Gateway, please check the LAN/ firewall setting or contact your network administrator.<br>3. If the issue persists, please call Customer Service. |
| **6** | 5G Service Ready | **Solid Blue** | 5G service is ready in the small cell. |
| **7** | 5G Service In Progress | **Green Blink (Light on for 1 seconds, light off for 1 seconds)** | UE is connecting to 5G small cell, service is in progress. |

| | | | |
|---|---|---|---|
| **8** | Overheating | **Red Blink (Light on for 3 seconds, light off for 3 seconds)** | The small cell is overheating, please place this device in a cool area where the temperature is between 23~122 degrees Fahrenheit. |
| **9** | Software Upgrade | **Fast Blue Blink** | We are upgrading the software in the small cell, please wait. |
| **10** | GPS no signal | **Red Blink (Light on for 1 seconds, light off for 1 seconds)** | 1. The small cell has tried to acquire GPS signal for 10 minutes, but failed to acquire minimally required GPS signal. Please try to move your GPS antenna closer to the window.<br>2. If the issue persists, please call Customer Service. |

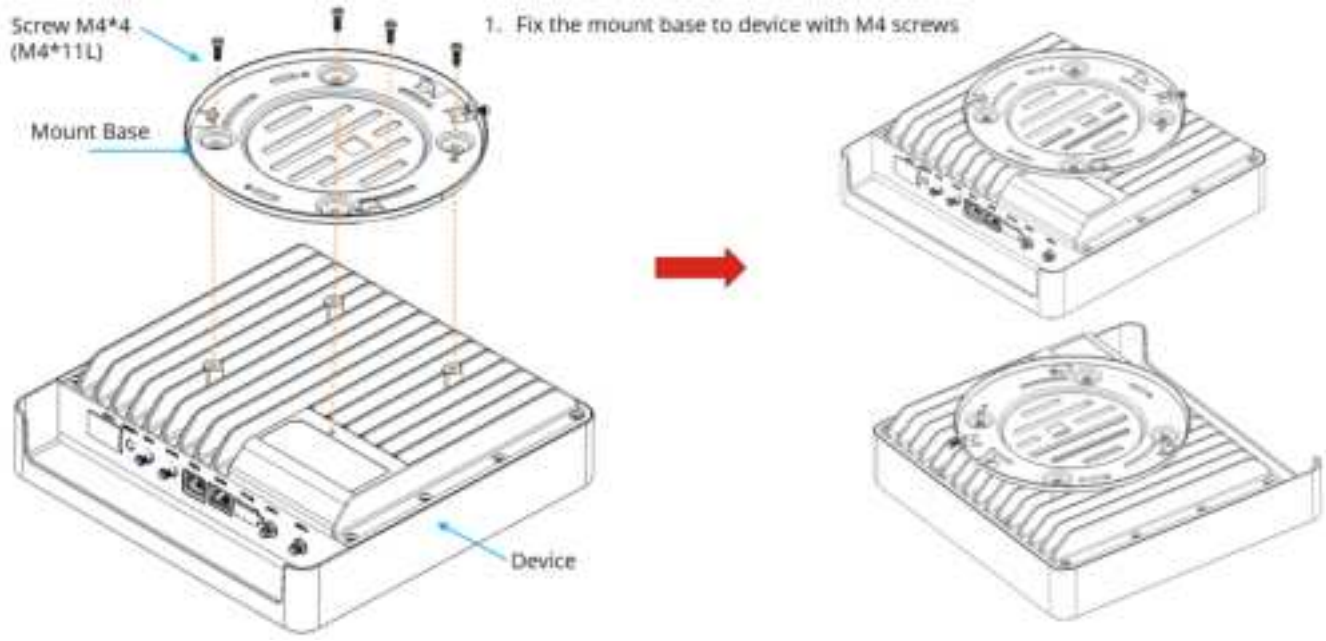
# 2.4 Installation

There are mainly 3 ways for NR xCell 46116A installation - wall mount, ceiling mount and pole mount. This section will guide you through all the installation ways for NR xCell 46116A.

## 2.4.1 Preparation: Fix the mount base to NR xCell 46116A

No matter which mount installation method you choose, the first step is to fix the mount base to NR xCell 46116A with M4 screw*4, as shown in the figure 5.

*Figure 5. Fix the Mount Base to NR xCell 46116A*




## 2.4.2 Wall Mount

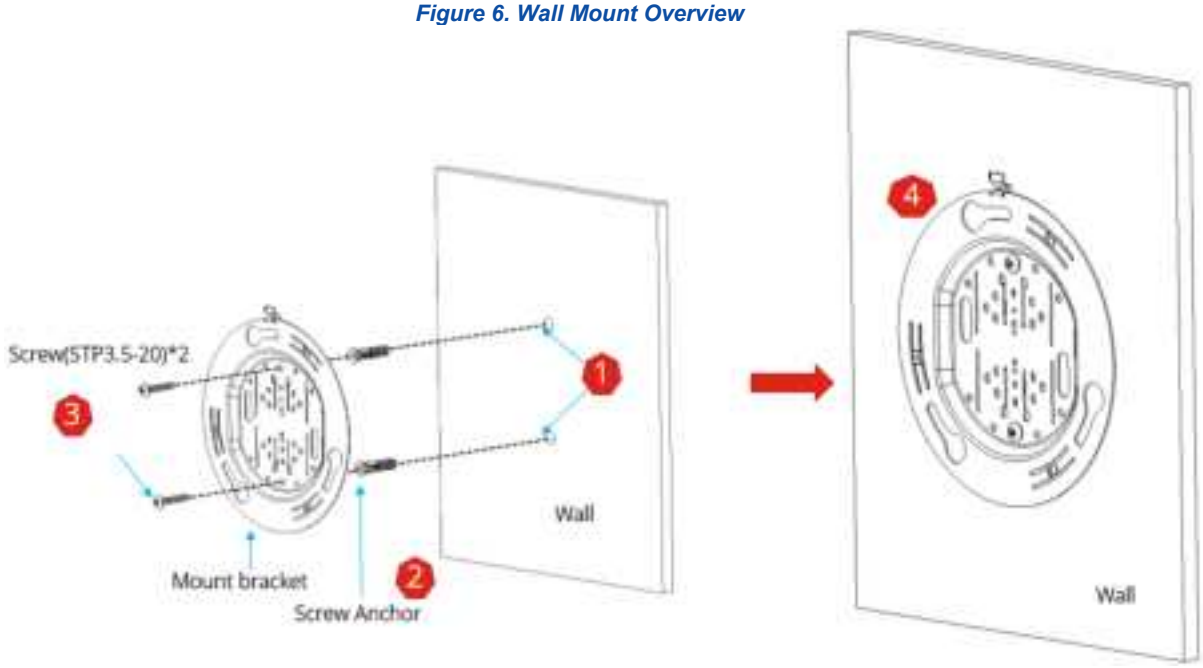
*Table 5. List of Items for Wall Mount*

| Items | Qty | Description | Picture |
|---|---|---|---|
| 1. Mount base | 1 | Fix the mount base to NR xCell 46116A with M4 screw*4 |  |
| 2. Mount bracket | 1 | Fixed to the wall, used with the mount base to fix the NR xCell 46116A |  |
| 3. Screw anchor | 2 | To fix the screws (STP3.5-20) |  |
| 4. M4 Screw(M4*0.7*11L) | 4 | To fix the mount base to NR xCell 46116A |  |
| 5. Screw(STP3.5-20) | 2 | To fix the mount bracket to the wall |  |

Installation steps,

1. Place the mount bracket on the wall. Mark and drill 2 screw holes on the wall.
2. Use a tool to insert 2 screw anchors into the drilled holes on the wall.
3. Align the inserted screw anchors and the screw holes of the bracket. Fix the bracket to the wall by fastening 2 screws(STP3.5-20).
4. End.

*Figure 6. Wall Mount Overview*




## 2.4.3 Ceiling Mount

Only 3 widths of T bar are supported, 15mm, 24mm & 38mm.

*Figure 7. T Bar Width*

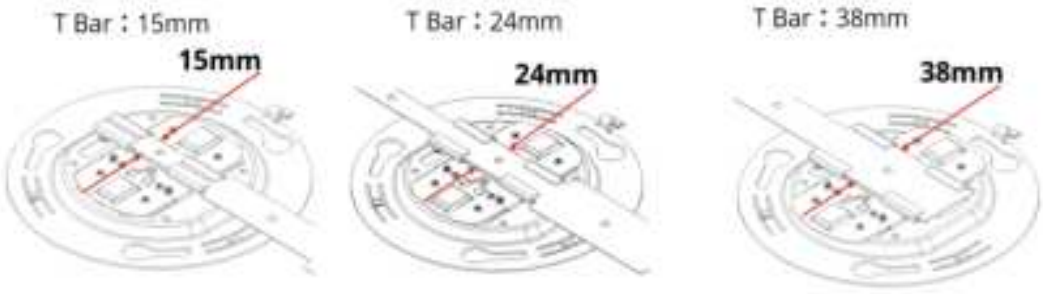


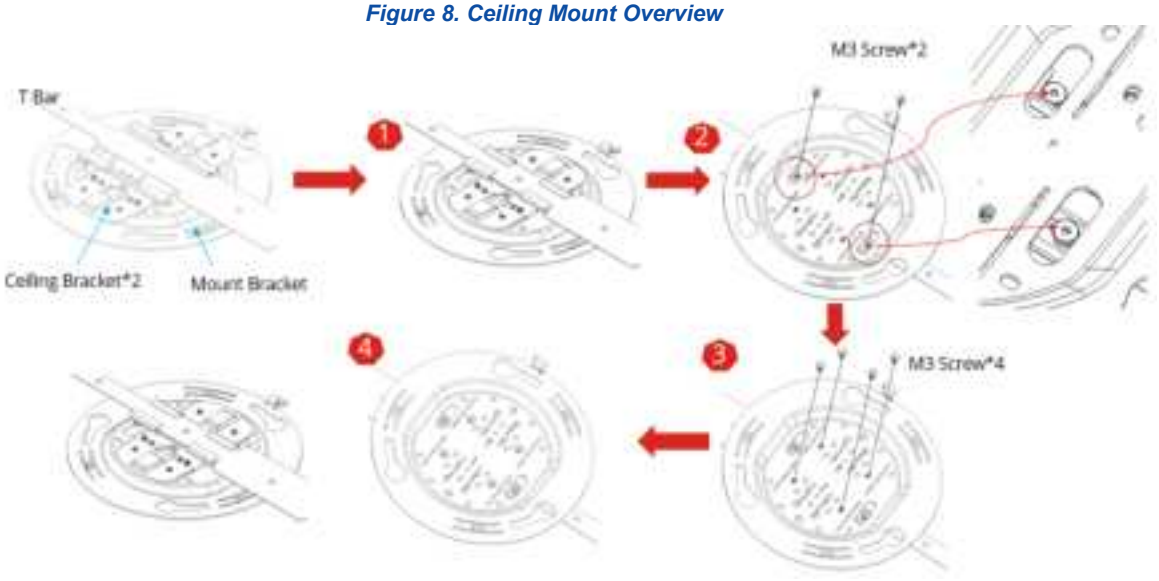

*Table 6 List of Items for Ceiling Mount*

| Items | Qty | Description | Picture |
|---|---|---|---|
| 1. Mount base | 1 | Fix the mount base to NR xCell 46116A with M4 screw*4 |  |
| 2. Mount bracket | 1 | Fixed to the T bar, used with the mount base to fix the NR xCell 46116A |  |
| 3. Ceiling bracket | 2 | To fix T bar & mount bracket |  |
| 4. M3 Screw | 6 | To fix the ceiling bracket | |
| 5. M4 Screw | 4 | To fix the mount base to NR xCell 46116A |  |

Installation steps,

1. Adjust the Ceiling Bracket*2 to fit the width of the T Bar.
2. Fastening M3 screws*2 to fix the Ceiling Bracket on the T Bar.
3. Fastening M3 screws*4 to fix the Ceiling Bracket to the Mount Bracket.
4. End.

*Figure 8. Ceiling Mount Overview*




## 2.4.4 Pole Mount

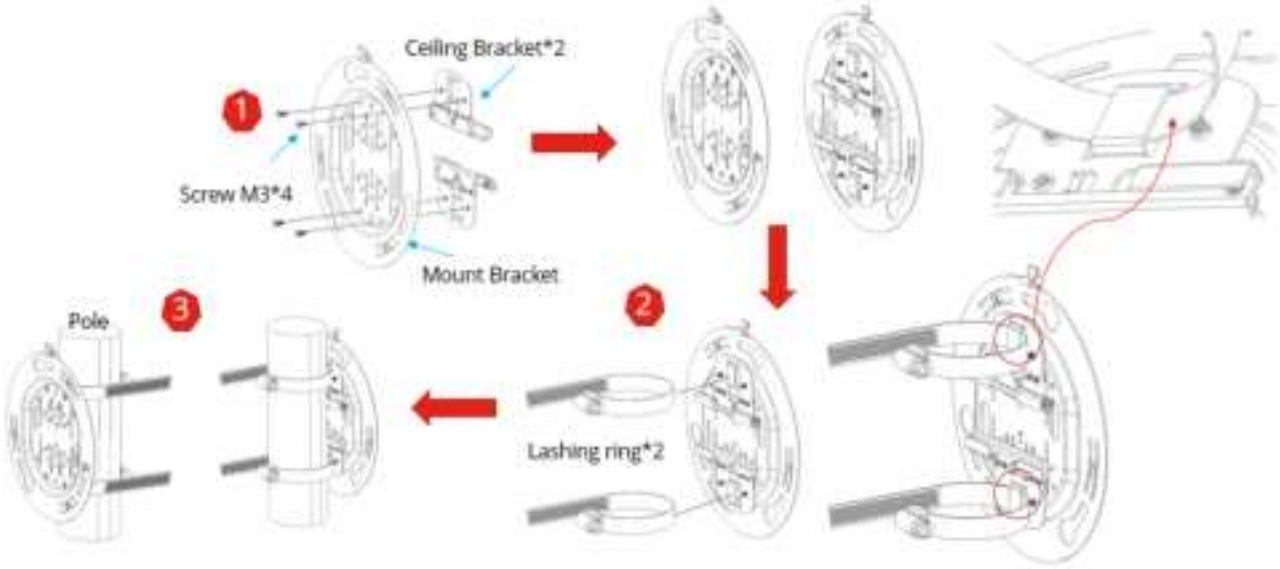
*Table 7. List of Items for Pole Mount*

| Items | Qty | Description | Picture |
|---|---|---|---|
| 1. Mount base | 1 | Fix the mount base to NR xCell 46116A with M4 screw*4 |  |
| 2. Mount bracket | 1 | Used with the mount base to fix the NR xCell 46116A |  |
| 3. Ceiling bracket | 2 | To fix mount bracket & lashing ring |  |
| 4. lashing ring | 2 | Wrapped to a pole |  |
| 5. M3 Screw | 4 | To fix the ceiling bracket to the mount bracket | |
| 6. M4 Screw | 4 | To fix the mount base to NR xCell 46116A |  |

Installation steps,

1. Fastening M3 screws*4 to fix the Ceiling Bracket on the Mount Bracket.
2. Pass the lashing ring *2 through the Ceiling Bracket.
3. The lashing ring wraps around the pole and please lock the lashing ring.
4. End.

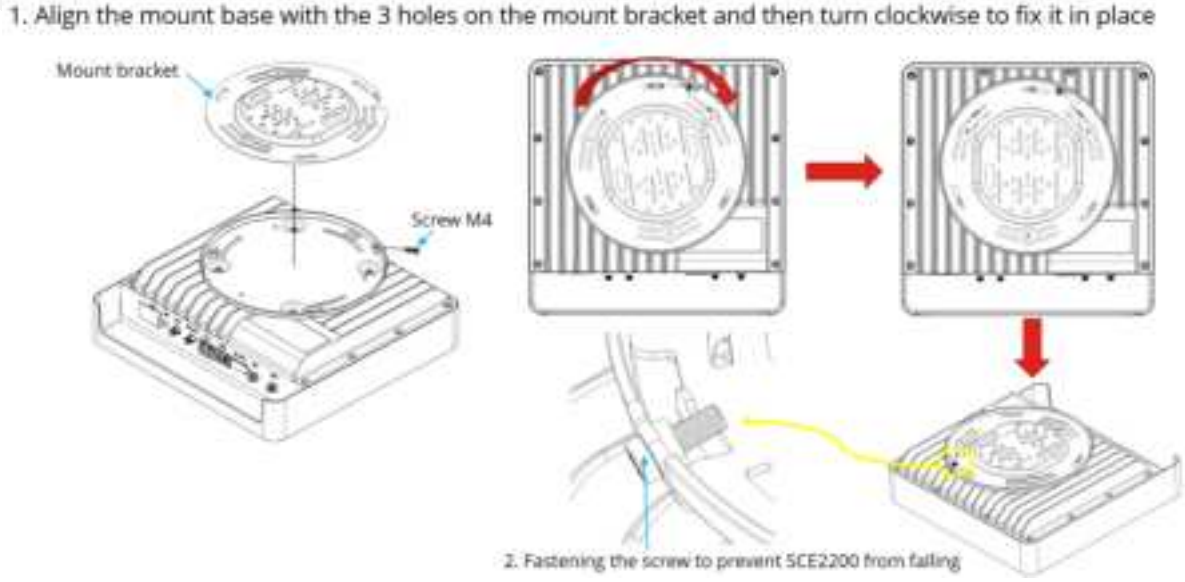
*Figure 9. Pole Mount Overview*




## 2.4.5 Align the mount base and the mount bracket

1. Align the mount base with the 3 holes on the mount bracket and then turn clockwise to fix it in place.
2. Please note to fasten the screw to prevent NR xCell 46116A from falling.

*Figure 10. Align the Mount Base and the Mount Bracket*




## 2.5 Route the Cables

After finishing the installation, please connect various cables to the NR xCell 46116A according to Section 2.2, and route the cables in a standard way to keep them looking good. Power on the NR xCell 46116A again, and check the NR xCell 46116A work properly by the status of LED.

# Chapter 3 The Askey 5G NR Small Cell Admin Website

This section contains detailed information regarding the Askey 5G NR Small Cell Admin Website, where you can see the device status and make changes in the configurations.

To access the Askey 5G NR Small Cell Admin Website by following these steps:

1. Use a PC/NB connected to the same network as the Askey 5G NR Small Cell
2. Open a browser and enter the IPv4 address of the Askey 5G NR Small Cell as the following URL:
   **http://<ip address>**, or
   **https://<ip address>**

The two primary network ports, WAN and SFP+ in the following Figure, are used to connect the Small Cell backhaul. All the default IP addressing modes are DHCP, and you can change to the Static IP mode on the **Settings: Network** page.

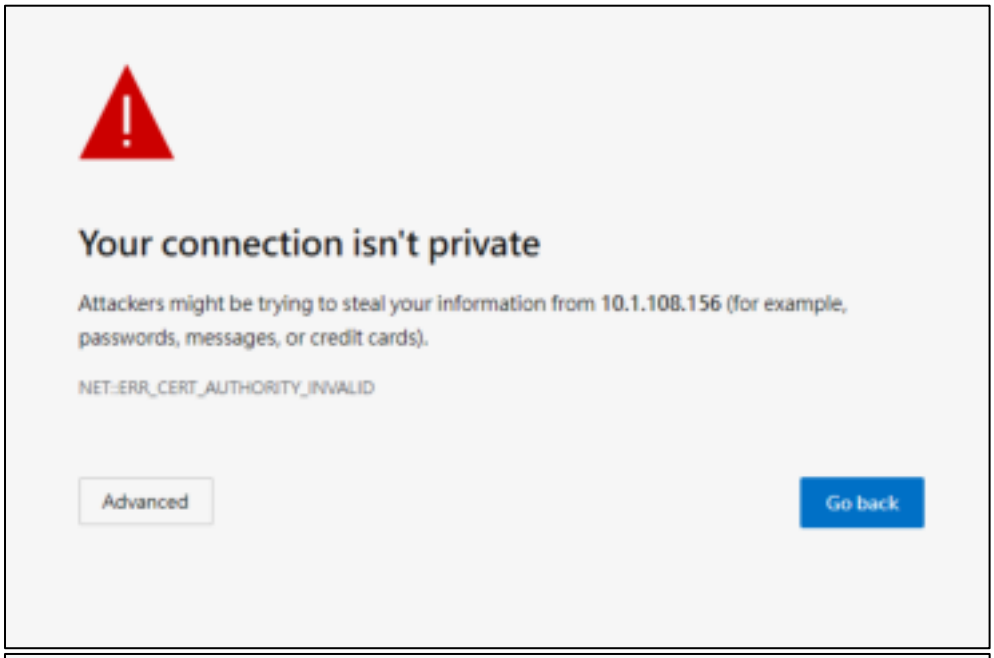
*Figure 11. The Network Interfaces of the Askey 5G NR Small Cell*

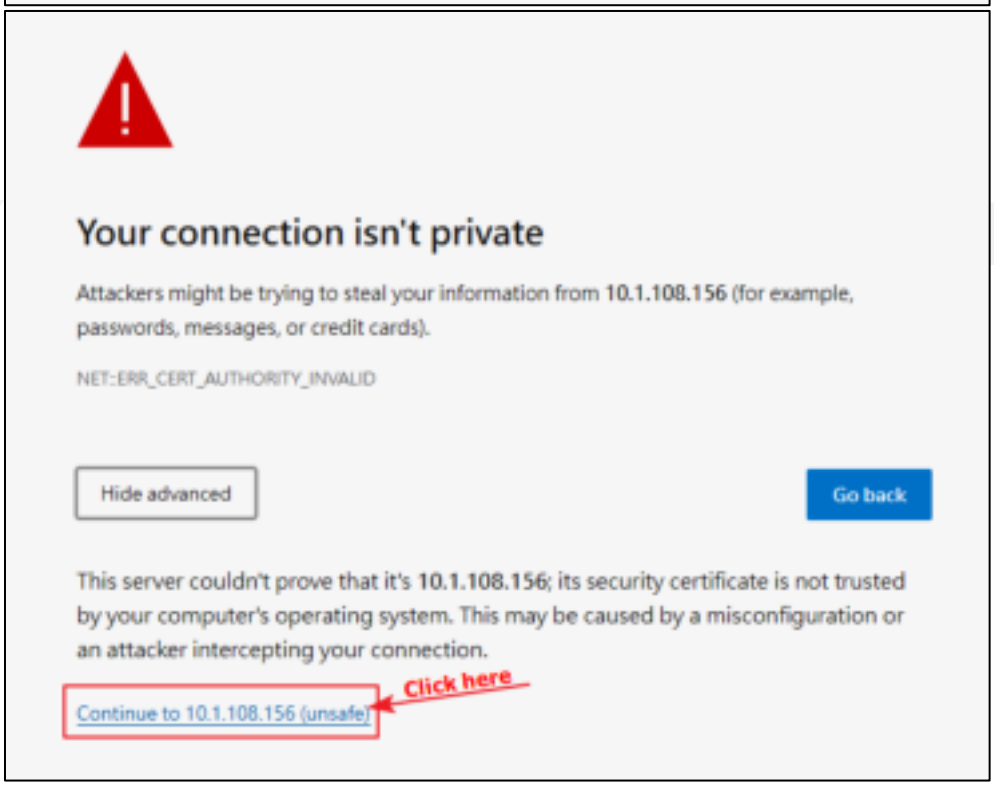

The DBG port is a debug or rescue interface with the default Static IP **192.168.8.100**. You can connect directly to a PC/NB and surf the Admin Web by the URL **http://192.168.8.100** on PC/NB. The network setting of the DBG port could be modified if surfing the Admin Web by the method. But it only supports the Static IP mode starting with **192.168.8.** and doesn't support the gateway and name server.

The IP address of the DBG port will be reset to **192.168.8.100** if performing the factory reset on the Admin Web or holding the RESET button for more than 15 seconds.

The browser might display a warning message for the HTTPS access as the following illustration because the HTTPS server uses a self-signed certificate not signed by the Certificate Chain of Trust. Please click the "Advanced" button and continue surfing the website.

*Figure 12. Access the Askey 5G NR Small Cell Admin Website via HTTPS*



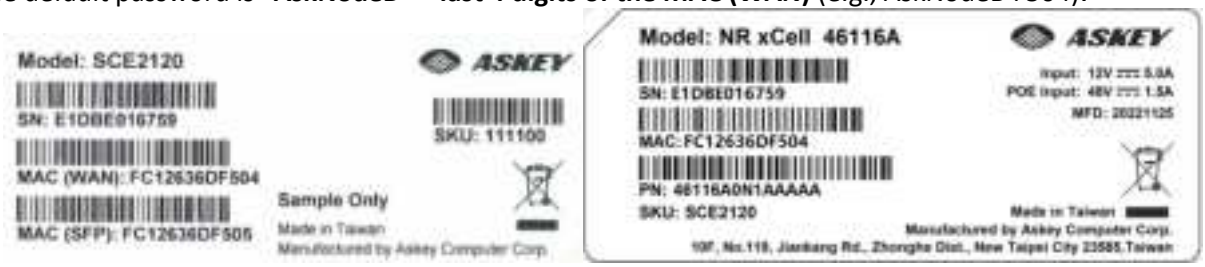



# 3.1 Admin Website Overview

## 3.1.1 Sign In

The homepage of the Admin Website will just be a login form. Please input the default administrator password.

The default password is "**AskNodeB" + last 4 digits of the MAC (WAN)** (e.g., AskNodeB F504).




Sample label Formal label

The password is case-sensitive. Letters in the last four digits of the MAC ID should be **UPPER** case.

*Figure 13. The Askey 5G NR Small Cell Admin Website Sign-In Form*

After the successful login, the Admin Website gives you the device information of the Askey 5G NR Small Cell.

*Figure 14. The Askey 5G NR Small Cell Admin Website Overview*


The page shows basic device information such as the Operational Status, IP Address, MAC address, the software version, the GPS fixed location, and the Map illustration.

The quick reference icons on the upper right of the Welcome page indicate service status, GPS status, number of connected devices, and sign-in status as the following illustrators.

*Figure 15. The Askey 5G NR Small Cell Quick Reference Icons*

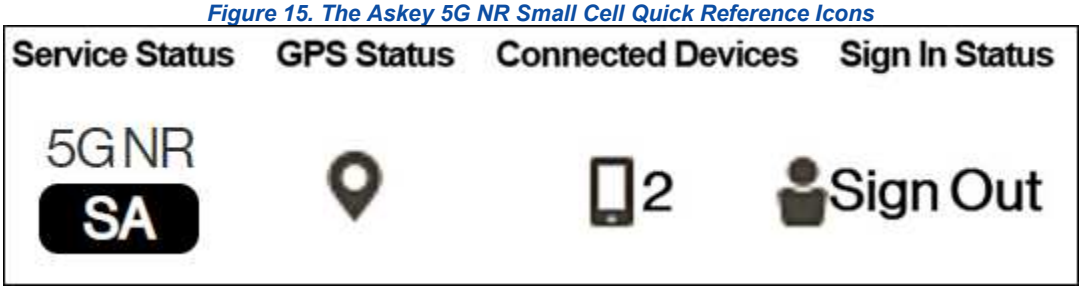



*Figure 16. The Askey 5G NR Small Cell Service Status*

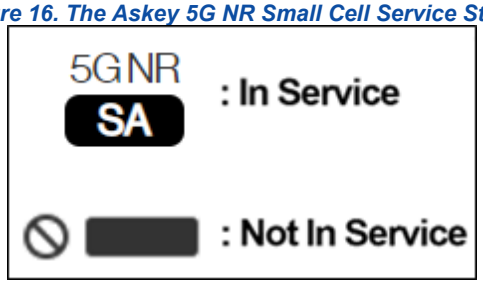
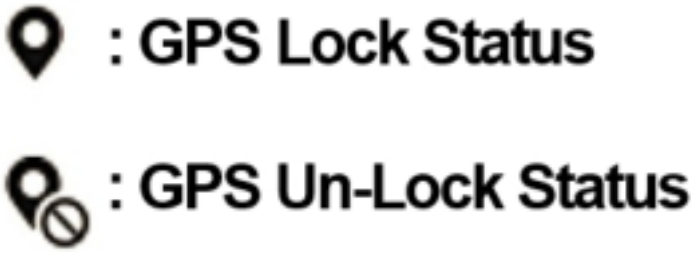



*Figure 17. The Askey 5G NR Small Cell GPS Status*



The GPS coordinates will be displayed at the bottom of the page if the GPS location is acquired. You can click the "**GPS Detail**" link to surf the GPS information page or click the "**Map**" to open the map illustration generated by ©**OpenStreetMap** as the following:

*Figure 18. Map Illustration*

# 3.2 Home

The Homepage provides all the Askey 5G NR Small Cell information.

*Figure 19. The Askey 5G NR Small Cell Home Page*

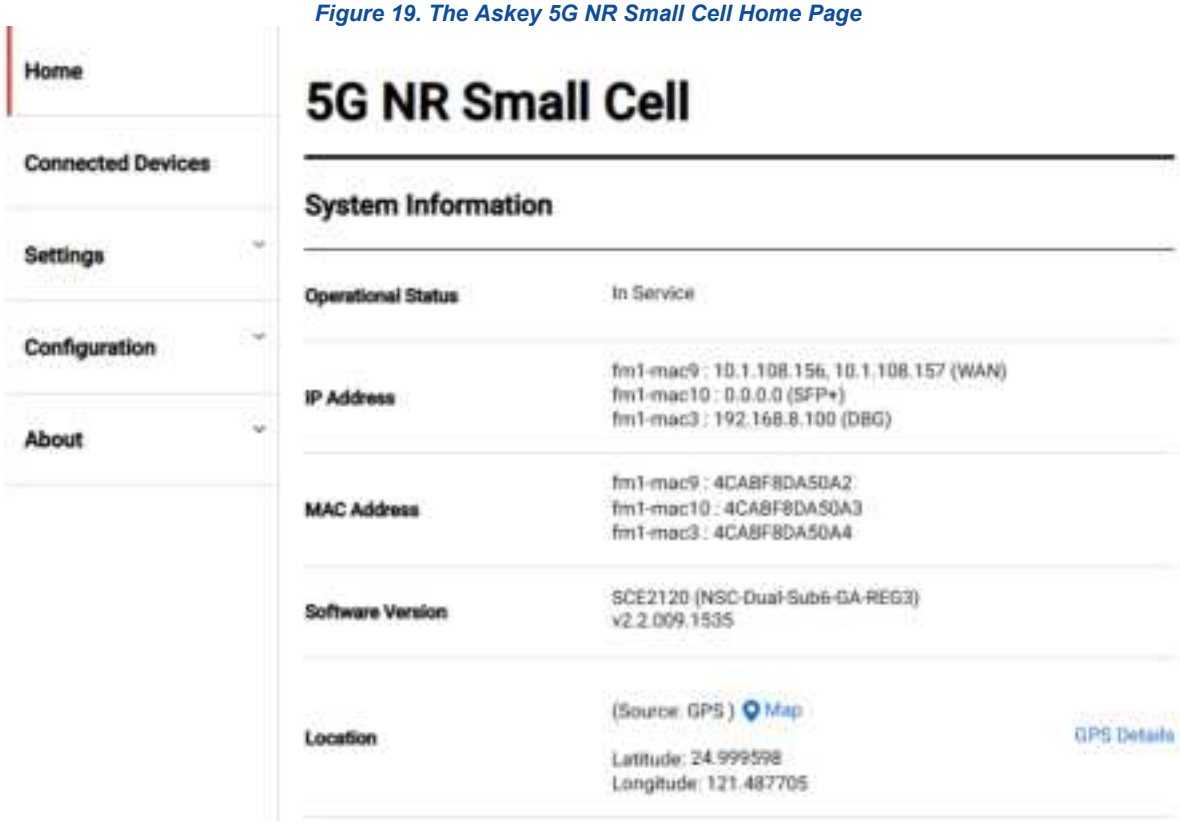



*Table 8. The Askey 5G NR Small Cell Home Page*

| Items | Descriptions |
|---|---|
| Operational Status | The current operational status of the Askey 5G NR Small Cell. |
| IP Address | The Internet Protocol (IP) address of the Askey 5G NR Small Cell for the WAN, SFP+, and DBG ports, or Bridge interface (for NSA mode). |
| MAC Address | The MAC address associated with the device which can also be found on a sticker attached to the Askey 5G NR Small Cell. |
| Software Version | The current software version of the Askey 5G NR Small Cell includes the model name and access mode. |
| Location | It is the physical location of the Askey 5G NR Small Cell as reported by GPS. |
| Map | Clicking this link plots the location of the Askey 5G NR Small Cell on an Open Street Map. The Open Street Map link is available only if the GPS Status is “Location Acquired”. |

# 3.3 Connected Devices

The connected devices page shows the current connected users.

*Figure 20. The Askey 5G NR Small Cell Connected Devices Page*


*Table 9. The Askey 5G NR Small Cell Connected Devices*

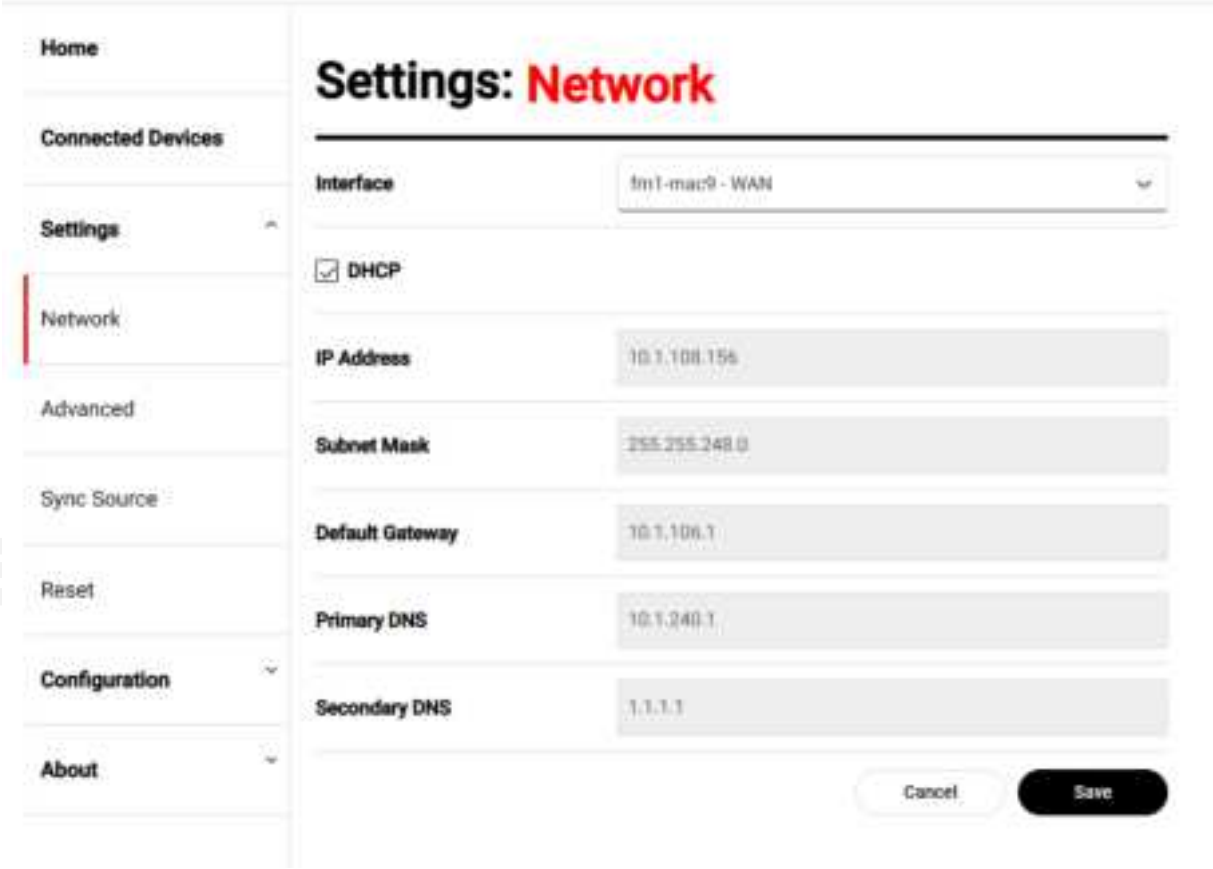
| Item | Description |
|---|---|
| Last Data Refresh | The local time when this page was last refreshed. |
| Total Connections | The number of wireless devices (phone, tablets, or other data devices) currently connected to the Askey 5G NR Small Cell with an active call or data session. |
| Emergency Calls | The number of wireless devices currently connected to the Askey 5G NR Small Cell with an active call to emergency services. |

# 3.4 Settings

## 3.4.1 Network

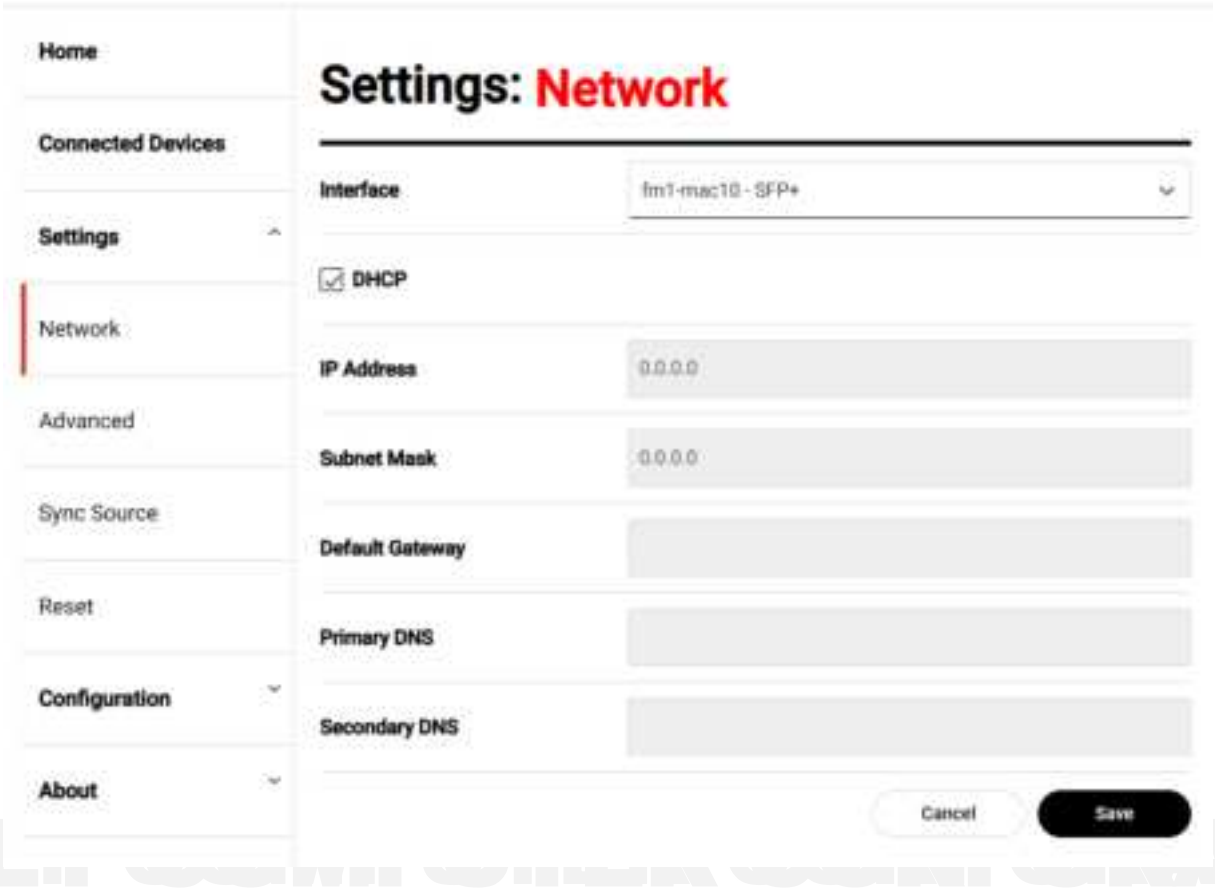
From the Askey 5G NR Small Cell Network page, you can check and modify the detailed network settings. The settings will be effective immediately without rebooting.

*Figure 21. The Askey 5G NR Small Cell Network Page*




If the device has the multiple network interfaces, you can choose the interface by clicking the select bar as the following illustration:


*Figure 22. The Askey 5G NR Small Cell Network Page for the 2nd Interface*

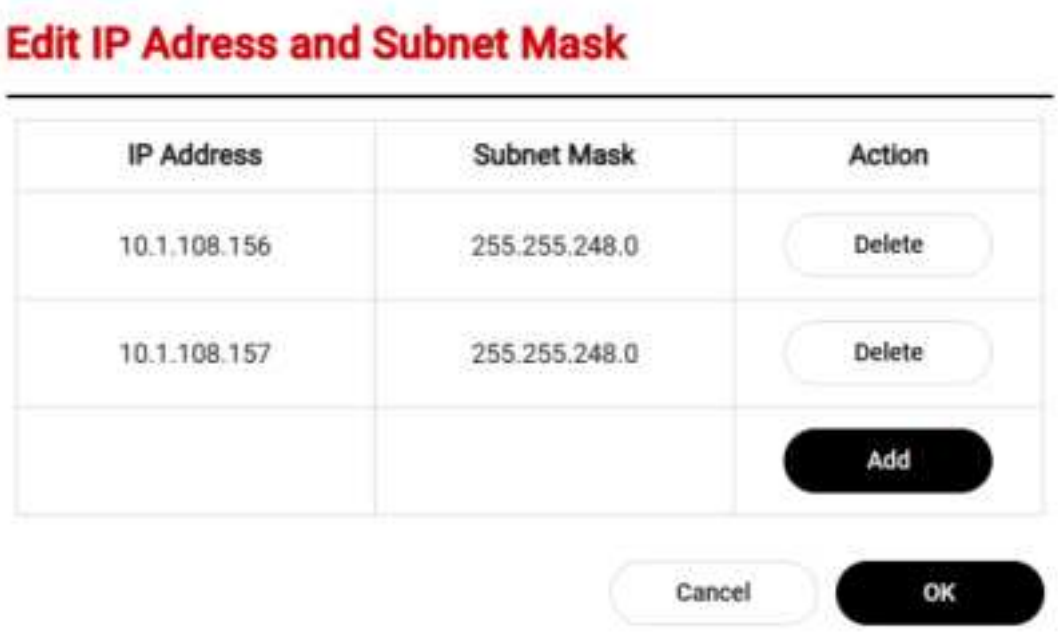



When the DHCP checkbox is disabled, you can manually set the network configurations for the specific interface. Click the IP Address or Subnet Mask item will pop up a dialog window to edit the multiple static IP addresses.


*Figure 23. The Multiple Static IP Addresses Dialog Window*

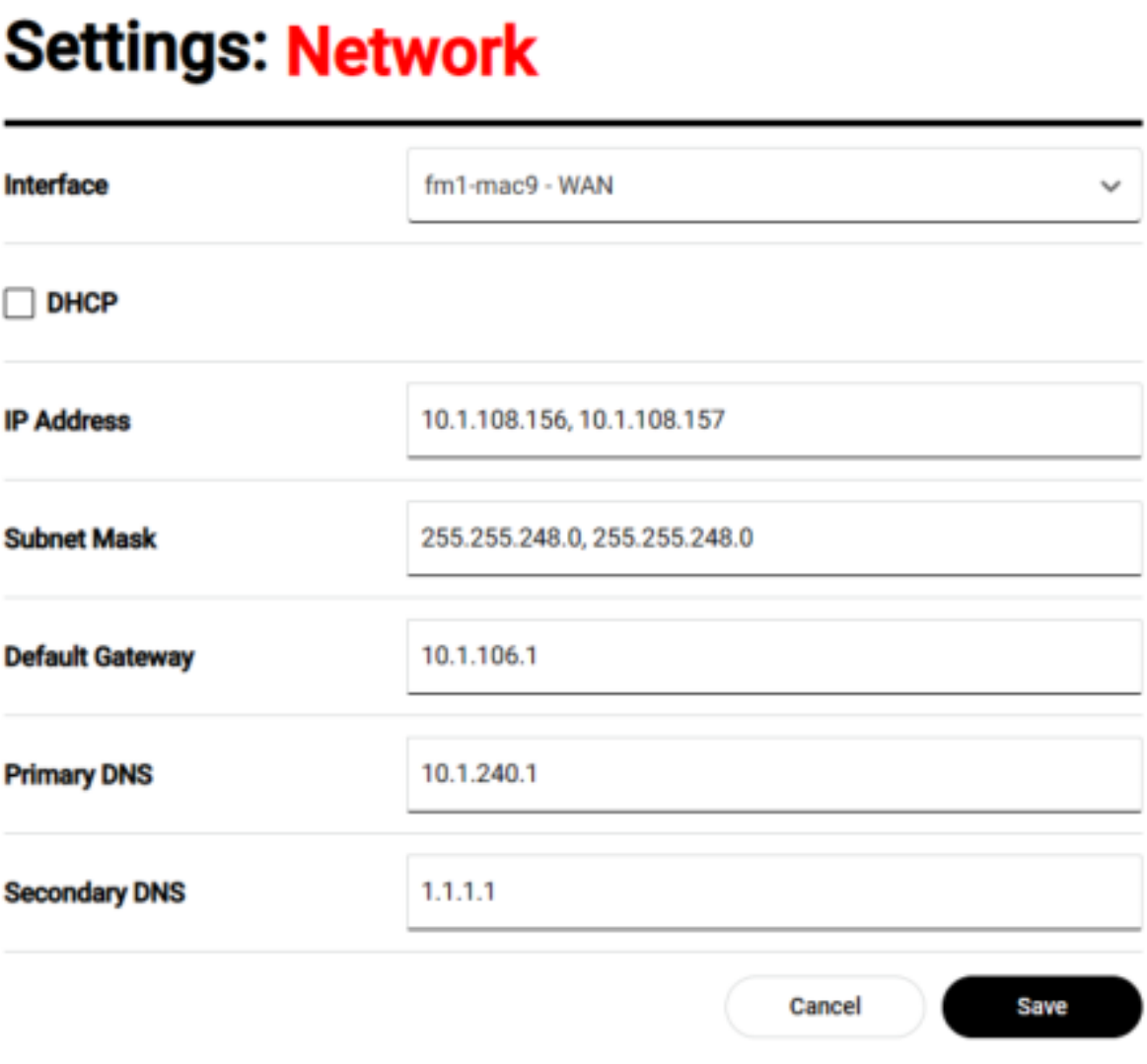

The IP address and subnet mask value can be modified directly on the dialog window, and remove the item by clicking the Delete button. If you want to add a new item, click the Add button and edit the configuration.

*Figure 24. Add a new Item in Static IP Addresses Dialog Window*



All IP addresses and Subnet Mask will display by the comma-separated format on the Admin Website. Click the Save button to activate the multiple IP addresses without rebooting.

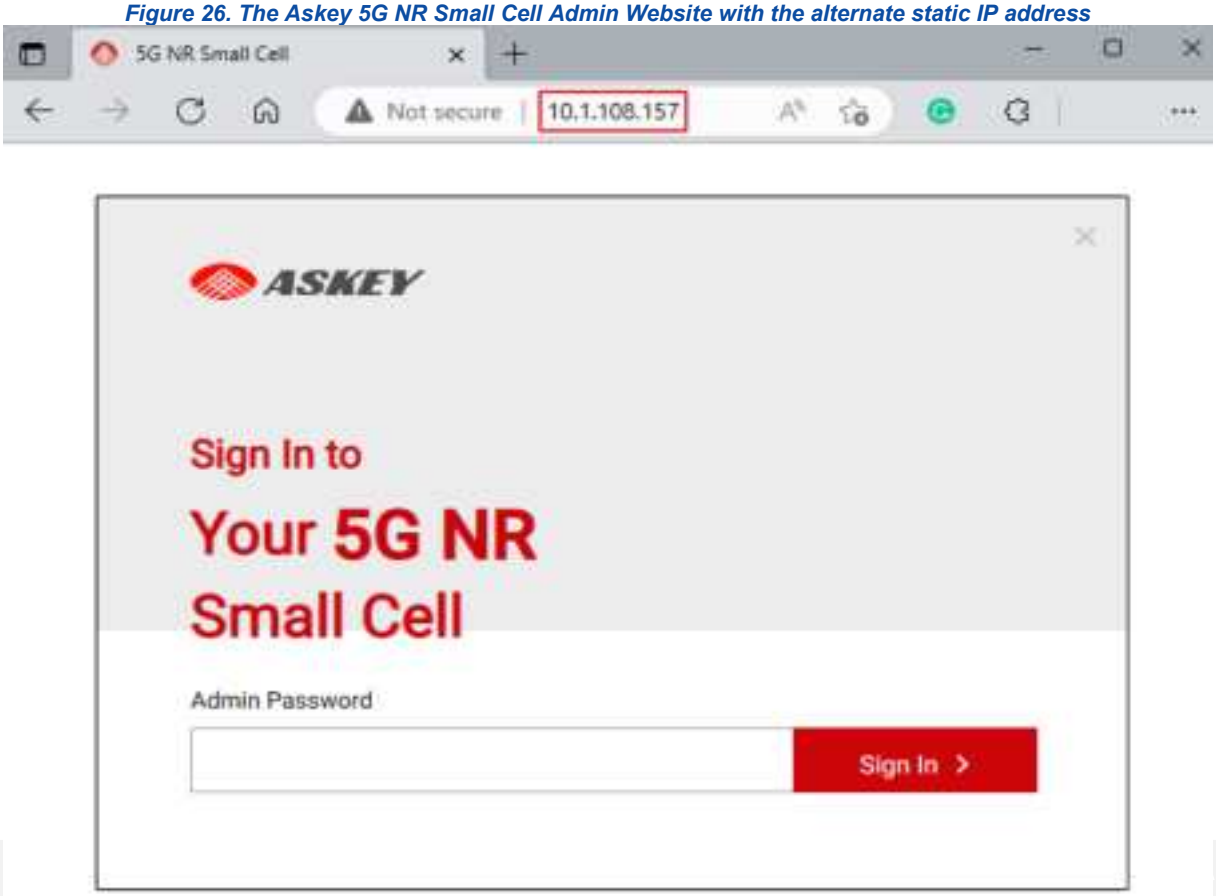
*Figure 25. The Askey 5G NR Small Cell Network Page with the multiple IP addresses*





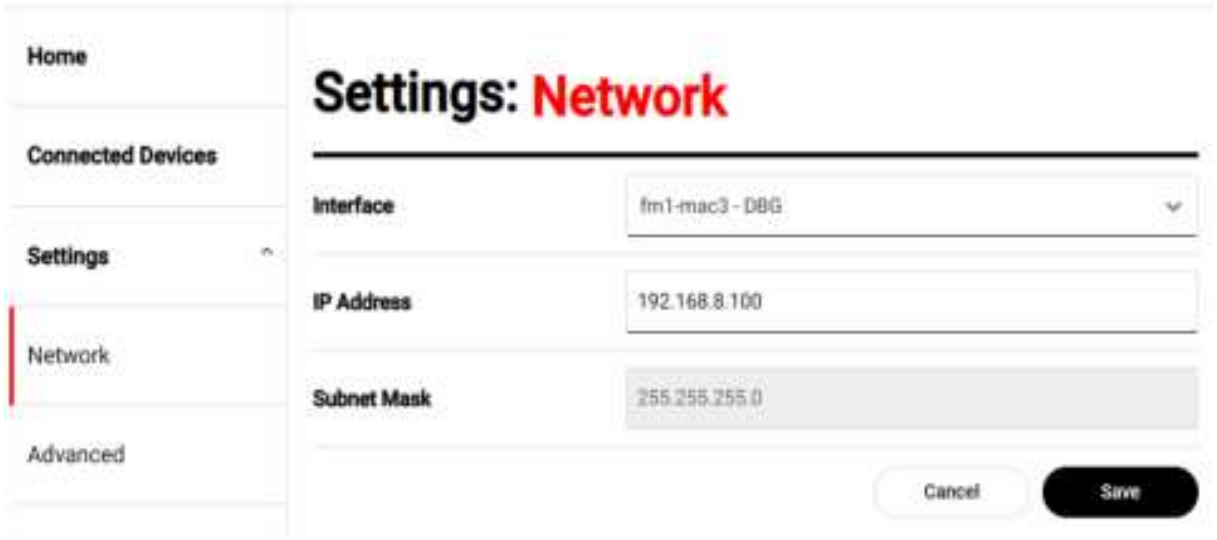
After the setting is changed successfully, you can use the browser to access the Admin Website by the new alternate static IP address.

*Figure 26. The Askey 5G NR Small Cell Admin Website with the alternate static IP address*

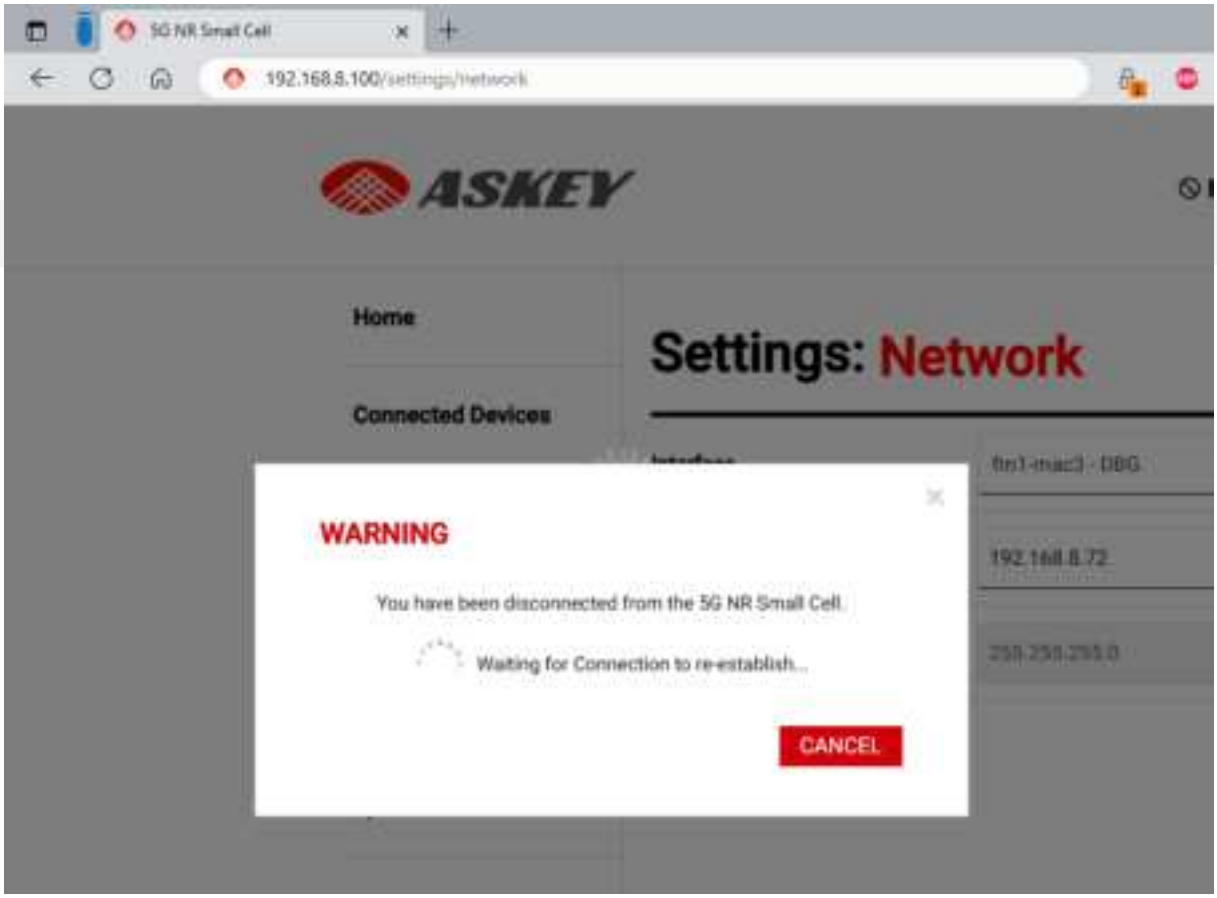



If you access the Admin Web by the IP address of the DBG interface displayed on the homepage, you can find the DBG item in the Interface select box as the following:


It means that you can click the item to modify the IP address of the DBG interface. As per the above statement, the IP address of the DBG interface only supports static IP starting with 192.168.8. and doesn't support to modify the gateway or name server. The GUI has some differences from other ports, as shown in the following illustration:




After you modify the new IP Address of the DBG port, you need to re-access the Admin Website with the new IP address.



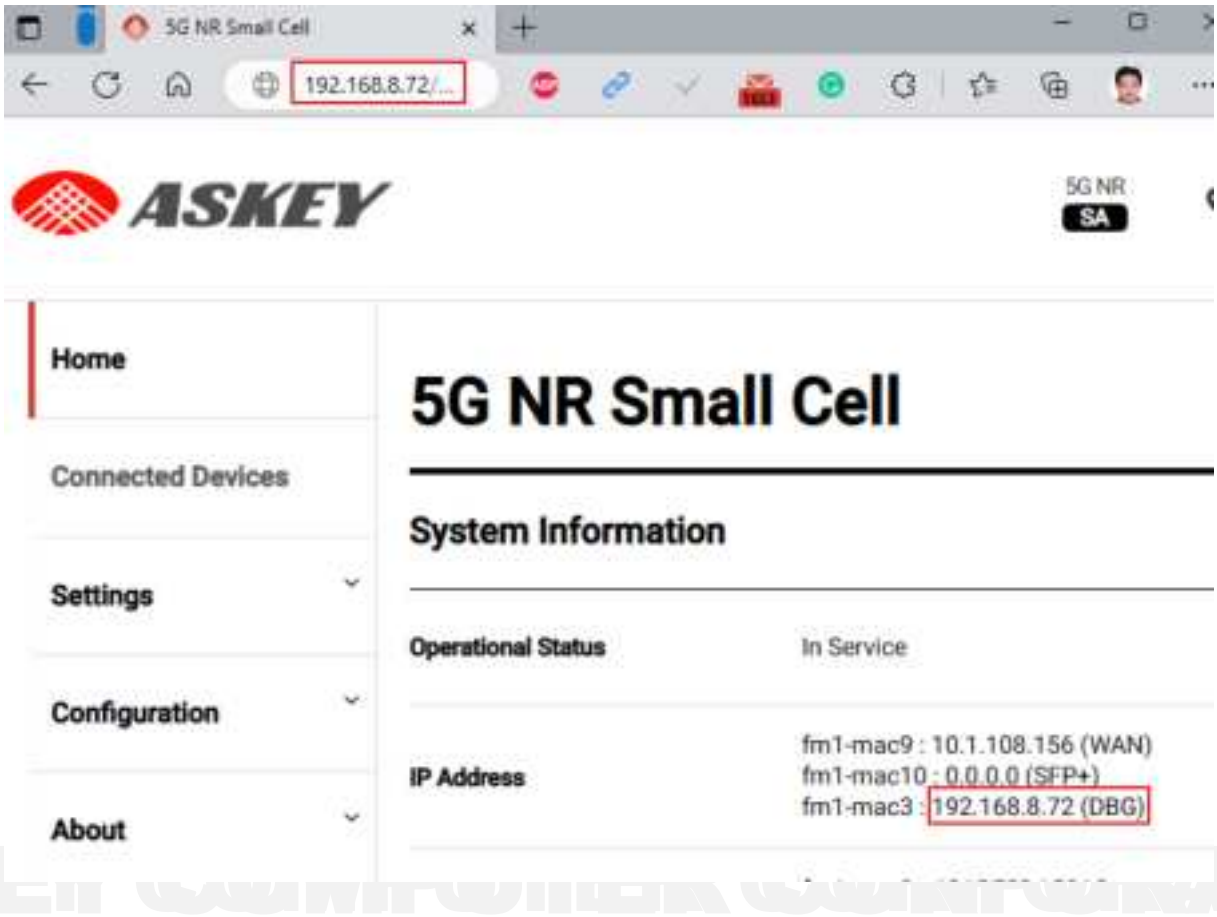



*Table 10. The Askey 5G NR Small Cell Network*

| Item | Description |
|---|---|
| DHCP | This is a checkbox item. When it is checked (default), the DHCP is enabled, and the local DHCP server shall provide the IP configurations to the device. The user may uncheck this box to specify the multiple static IP configuration. |
| Default Gateway | If the DHCP is enabled, this field is read-only. It shows the DHCP-allocated default gateway IP address. If the DHCP is disabled, this field is read-write and indicates the user-defined Default Gateway IP address. |
| IP Address | If the DHCP is enabled, this field is read-only. It shows the DHCP-allocated IPv4 address. If the DHCP is disabled, this field is read-write and indicates the user-defined IPv4 address. It supports multiple combinations of the static IP address and Subnet Mask. |
| Subnet Mask | If the DHCP is enabled, this field is read-only. It shows the DHCP-allocated Subnet Mask. If the DHCP is disabled, this field is read-write and shows the user-defined Subnet Mask. It supports multiple combinations of the static IP address and Subnet Mask. |
| Primary DNS | If the DHCP is enabled, this field is read-only. It shows the DHCP allocated Primary DNS Server's IP address. If the DHCP is disabled, this field is read-write and shows the user-defined Primary DNS Server's IP address. |
| Secondary DNS | If the DHCP is enabled, this field is read-only. It shows the DHCP allocated Secondary DNS Server's IP address. If the DHCP is disabled, this field is read-write and indicates the user-defined Secondary DNS Server's IP address. |

## 3.4.2 Advanced

The Askey 5G NR Small Cell Advanced page provides all cells' information and sync status.

*Figure 27. The Askey 5G NR Small Cell Advanced Page*

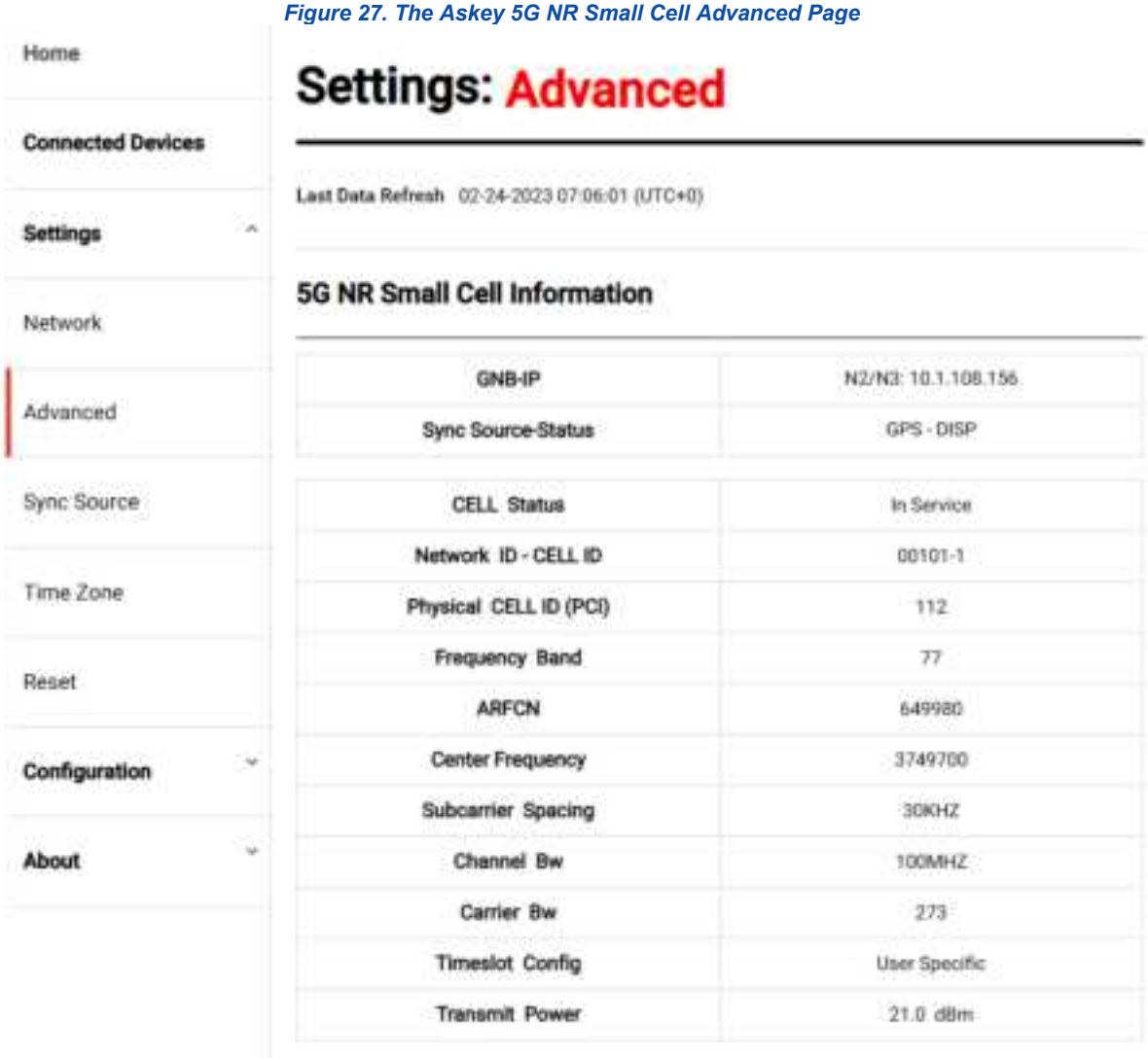


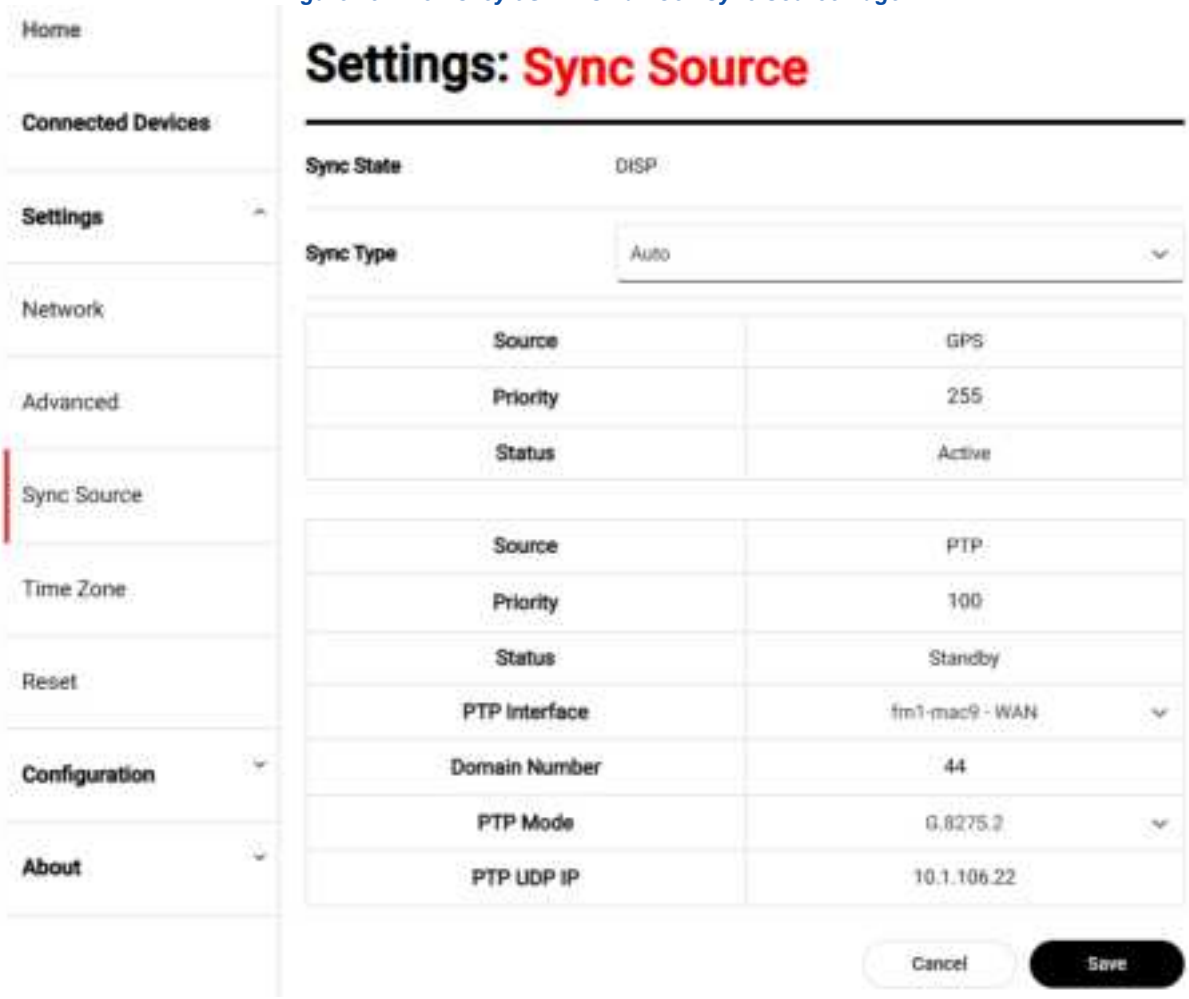

*Table 11. The Askey 5G NR Small Cell Advanced*

| Item | Description |
|---|---|
| Last Data Refresh | The local time when this page was last refreshed. |
| 5G NR Small Cell Information | This table shows the detailed information for The Askey 5G NR Small Cell. Where:<br>•GNB-IP: The IP address of gNodeB<br>•Sync Source-Status: The sync source and sync state |
| Serving Cell information | If the gNB processes are running, it will show the information of the serving cell(s).<br>Additionally, the transmit power will show the correct value when the cell status is in-service. |

## 3.4.3 Sync Source

The Askey 5G NR Small Cell Sync Source page provides the current sync state and the sync status for each sync source. It also allows the user to modify the sync type, priority, and detailed PTP configurations.

*Figure 28. The Askey 5G NR Small Cell Sync Source Page*




The sync type can be **Auto** or **Manual**. If the type is **Manual**, you should specify **GPS** or **PTP** as the sync source.


The PTP Mode will be **G.8275.1** or **G.8275.2**. If the mode is **G.8275.2**, it should also specify the PTP UDP IP.

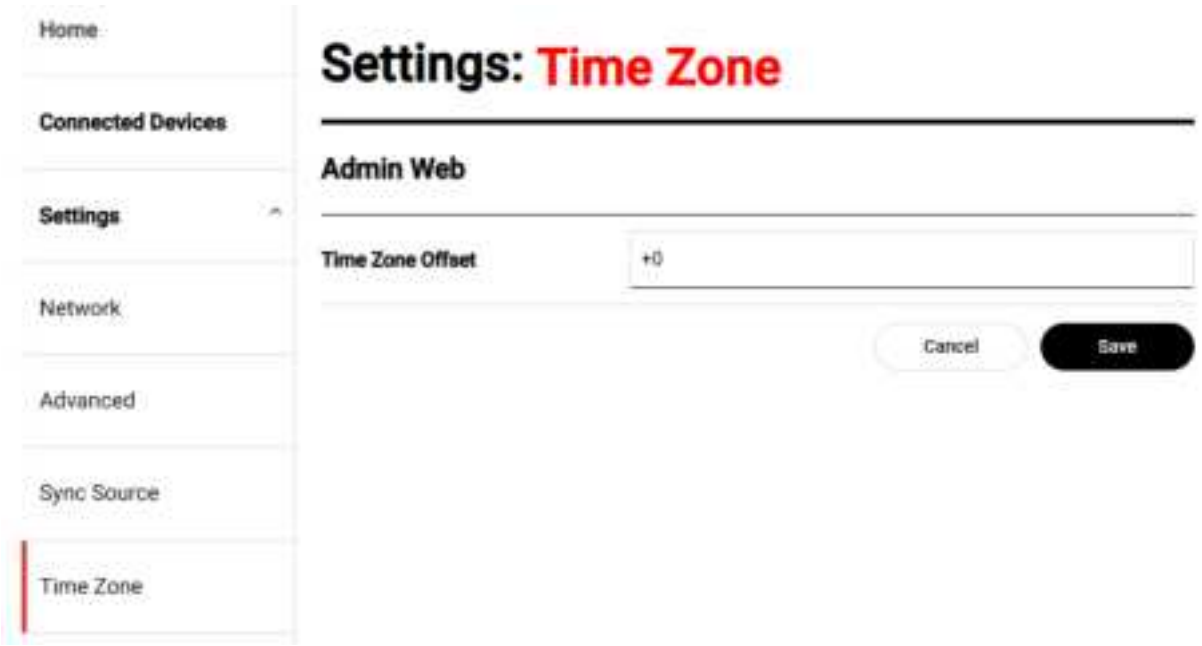

*Table 12. The Askey 5G NR Small Cell Sync Source*

| Item | Description |
|---|---|
| Sync State | It indicates the current sync state. It should be **INIT**, **HARD_SYNC**, **DISP**, **RESYNC**, or **HOLDOVER**. The cell processes will start until the sync state is **DISP** |
| Sync Type / Sync Source | It indicates the sync source choice mechanism. The **Auto** type will try the multiple sync sources based on the priority value. For the **Manual** type, it should specific the sync source be **GPS** or **PTP**. (For the small cell with network bridge mode, the sync source is only **GPS**) |
| Priority | If the sync type is Auto, the higher priority value will be tested earlier. The priority value should be the integer from **1** to **255**. |
| Status | It indicates the sync status for source GPS or PTP. The status will be **Standby** or **Active**. |
| PTP Interface | It indicates which network interface the gNB connects to the PTP server. |
| Domain Number | Specific the PTP clock domain by an integer in the range of **0** to **127**. |
| PTP Mode / PTP UDP IP | It indicates the current PTP mode, which supports **G.8275.1** and **G.8275.2**. If the mode is **G.8275.2**, it should also specify the **PTP UDP IP**. |

## 3.4.4 Time Zone

The Askey 5G NR Small Cell Time Zone page allows the user to adjust the Time Zone Offset for the data refresh time on the Admin Website

*Figure 29. The Askey 5G NR Small Cell Time Zone Page*



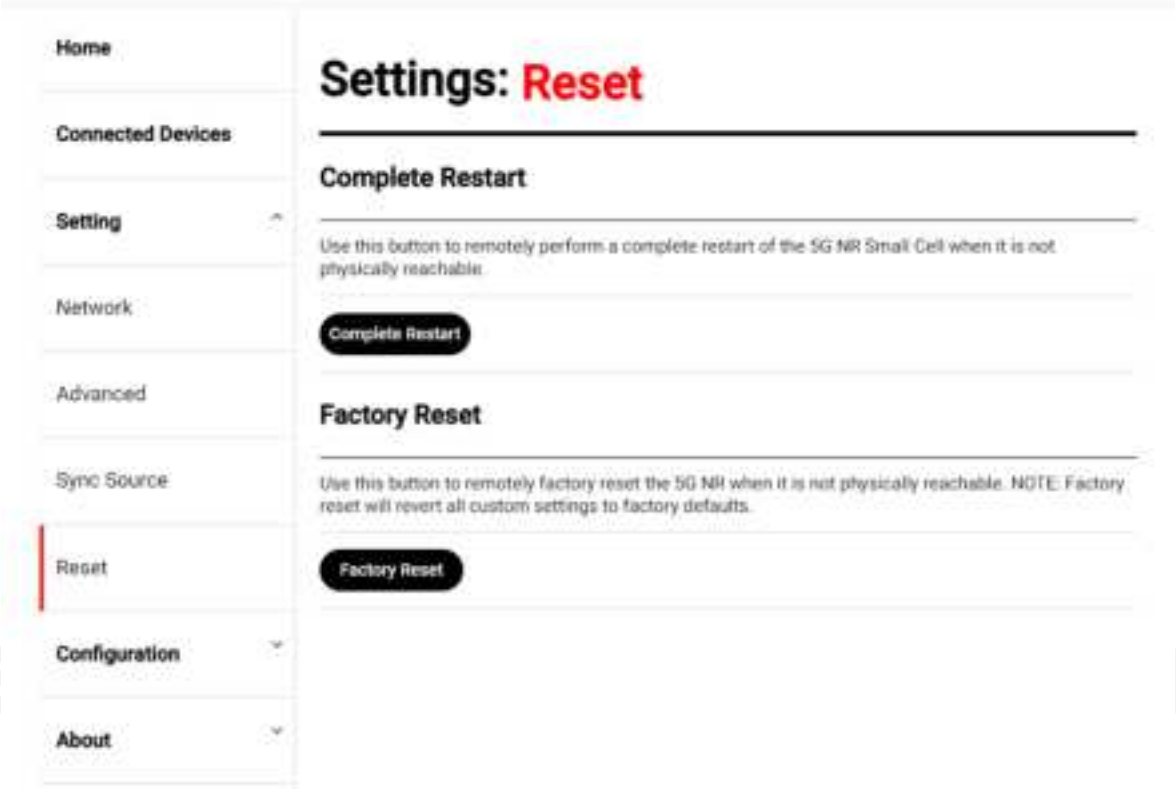

The default time zone offset is +0 (UTC). If the page will refresh automatically, the last data refresh will be displayed on the page as the following illustration:


The Time Zone Offset can adjust as an integer number that ranges from -12 to 14 and activates without rebooting.

## 3.4.5 Reset

The Askey 5G NR Small Cell Reset page allows users to remotely restart or factory reset the 5G NR Small Cell.

*Figure 30. The Askey 5G NR Small Cell Reset Page*




Factory reset will revert the custom settings to factory default settings. The admin website will pop up the following prompt message when clicking the Factory Reset button:


If the network setting of the Askey 5G NR Small Cell is wrong or you cannot get the current IPv4 address, such that you cannot access the Admin Website by IPv4. You can use the MAC to IPv6 link-local address to

access the Admin Website by the URL **http://[IPv6 Link-Local Address]**/ in the same LAN. Please check the topic "**Access the Admin Website by IPv6 Link-Local Address**" in chapter 4. Or, if the Askey 5G NR Small Cell is near you, you can hold the reset button for more than 15 seconds and release, it will trigger the device to perform the factory reset. The following illustration is the reset button location of the device. After performing the factory reset, the Askey 5G NR Small Cell will get the IPv4 address from the DHCP server.


# 3.5 Configuration



## 3.5.1 Dashboard

This Askey 5G NR Small Cell Dashboard page shows the integrated small cell information, including the service and location data.

*Figure 31. The Askey 5G NR Small Cell Dashboard Page*

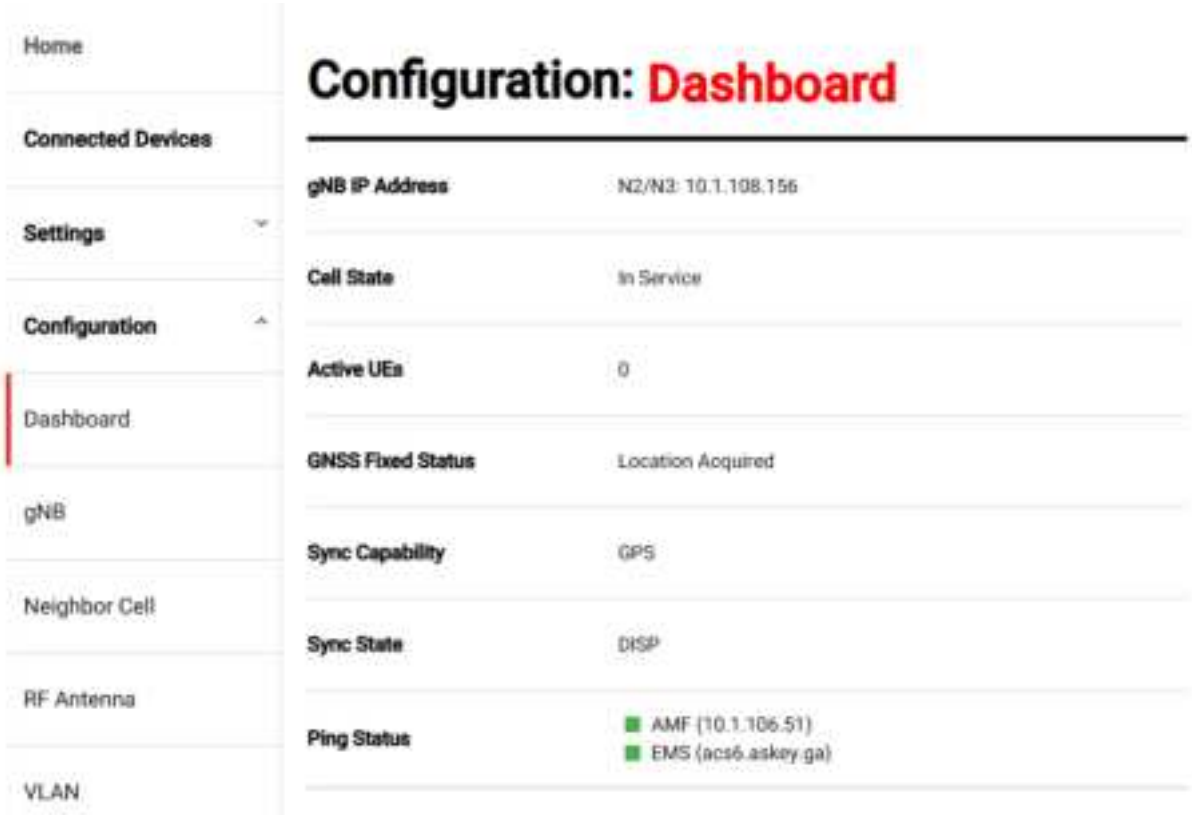


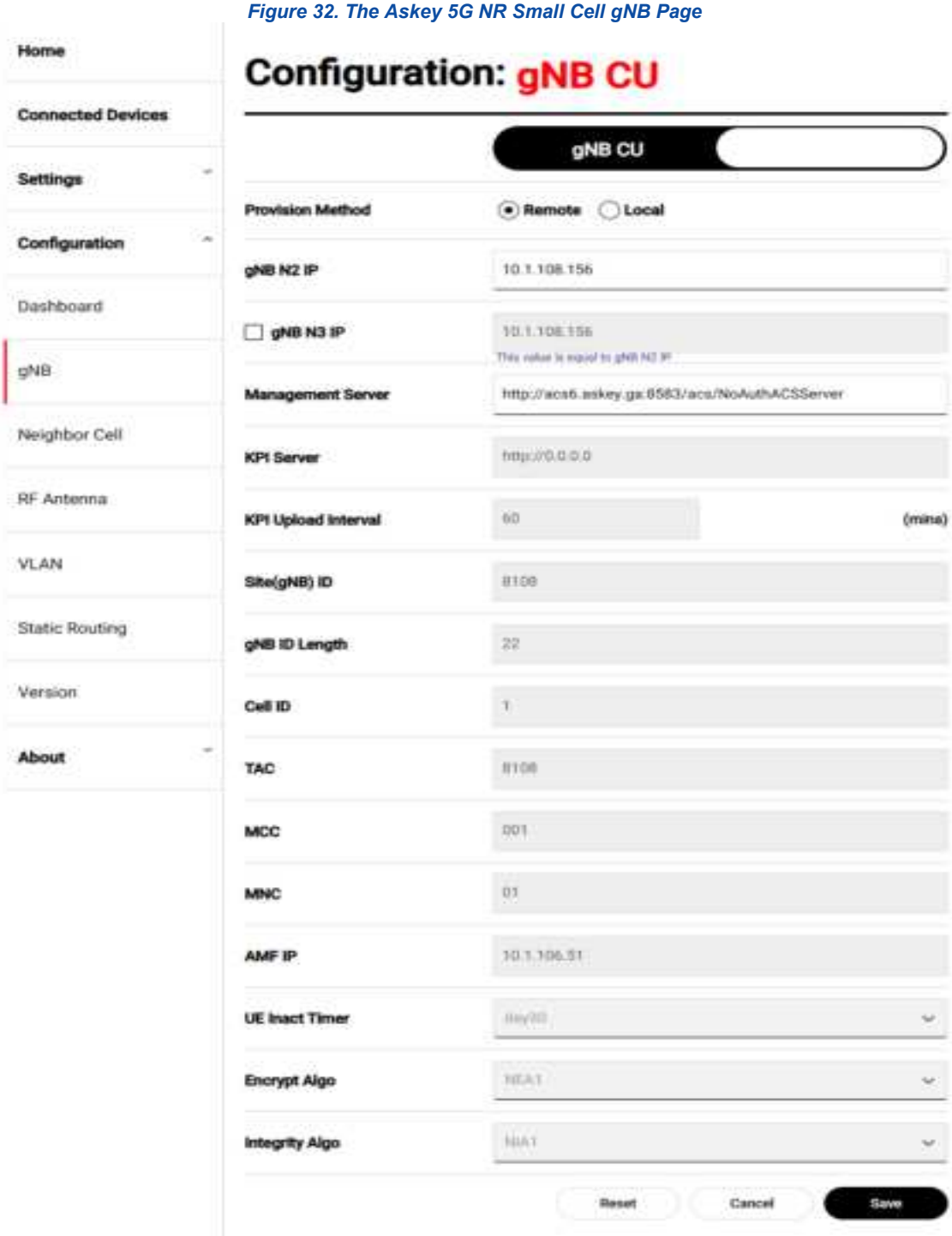

*Table 13. The Askey 5G NR Small Cell Dashboard*

| Items | Descriptions |
|---|---|
| gNB IP Address | The IP address of gNodeB. Support separately specifying the gNB local interface with AMF (N2 interface) and the UPF (N3 interface) on the gNB configuration page. The IP address is the same value for the N2 and N3 interfaces by default. |
| Cell State | The current state of the small cell. It will be **Not In-Service** or **In-Service** |
| Active UEs | The number of wireless devices (phone, tablets, or other data devices) currently connected to the Askey 5G NR Small Cell |
| GNSS Fixed Status | The fixed status of GNSS. It will be **Searching signal** or **Location Acquired** |
| Sync Capability | The sync capability of the device |
| Sync State | It indicates the current sync state. It should be **INIT**, **HARD_SYNC**, **DISP**, **RESYNC**, or **HOLDOVER**. The cell processes will start until the sync state is **DISP** |
| Ping Status | Check whether the network connection status of the following server by ping command (ICMP): **AMF**, **EMS**, **KPI**, and **SAS** |

## 3.5.2 gNB

This Askey 5G NR Small Cell gNB page shows the principal configurations of CU and DU. There are some items different between SA and NSA mode. These items on Web GUI will be read-only in the remote provision method except for gNB IP because the value of gNB IP address may be one of the physical network interfaces or VLAN interfaces.

*Figure 32. The Askey 5G NR Small Cell gNB Page*



You can change the local provision method by clicking the option **Local** in the Provision Method. After modifying the configurations, you can save these configurations by clicking the **Save** button. If there are some wrong settings, such that the cell cannot provide the 5G NR service, you can click the Default button to restore the **default** setting.

*Figure 33. The Local Provision Method in gNB Configuration*


After saving these configurations, the Admin Web will trigger to restart the device such that these configurations are effective. The gNB IP address is the same value for the N2 and N3 interfaces by default. You can click the check box to specify the gNB IP for N3 interface.

| | |
|---|---|
| **gNB N2 IP** | 10.1.108.156 |
| ☑ **gNB N3 IP** | 10.1.108.157 |

According the following figure, you should check whether the gNB IP is correct based on the network setting and whether the cable connects to the WAN port, SFP+ port, or one of the VLAN IP addresses.

*Figure 34. The Askey OAM Architecture*

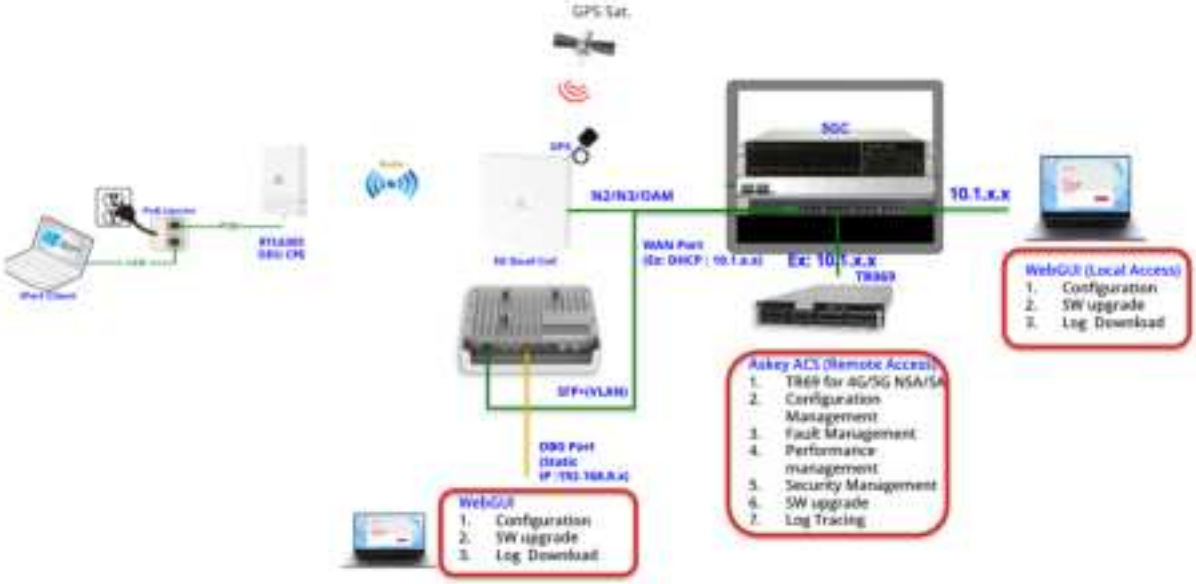




*Figure 35. VLAN IP Adress*

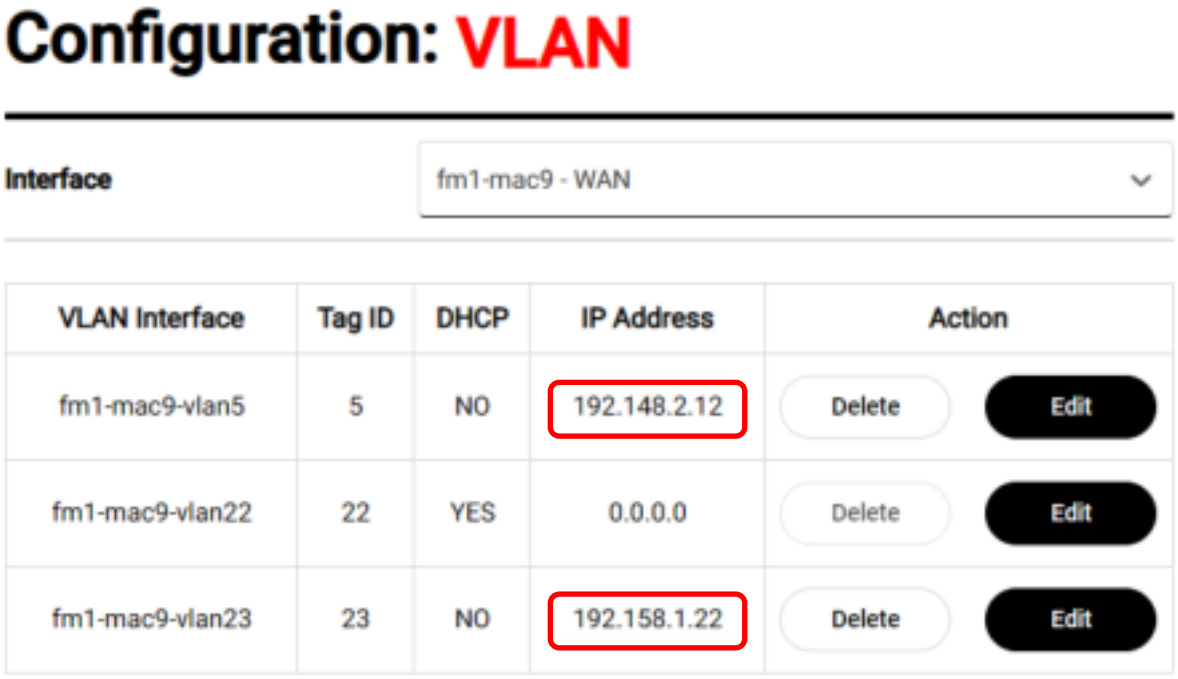



*Table 14. The Askey 5G NR Small Cell CU Configuration*

| Items | Descriptions |
|---|---|
| Provision Method | The Provision Method should be **Remote** or **Local**.<br>1. The **Remote** provision method means that the remote server, e.g., ACS, will provision the primary gNB configurations to the 5G NR Small Cell.<br>2. The **Local** provision method means that the 5G NR Small Cell will apply all the configurations in the local files. Users can modify the primary gNB configurations on the Admin Web GUI. |
| gNB N2 IP/gNB N3 IP | The IP address of gNodeB. It should be the IP address of WAN port, SFP+ port, or one of the VLAN interfaces. Support separately specifying the gNB local interface with AMF (N2 interface) and the UPF (N3 interface) on the gNB configuration page. The IP address is the same value for the N2 and N3 interfaces by default. |
| Site(gNB) ID | It identifies a gNB within a PLMN. |
| gNB ID Length | The number of bits for encoding the gNB ID. |
| Cell ID | The physical-layer Cell ID of the signal. The number format |
| TAC | Tracking Area Code, an element of the tracking area identity (TAI) that serves to uniquely identify the Tracking Area. |
| MCC | Mobile Country Code |
| MNC | Mobile Network Code |
| AMF IP | The Access and Mobility Management Function IP address to carry the signaling traffic |
| UE Inact Timer | Duration while UE has not received or transmitted any user data |
| Encrypt Algo | NEA (Encryption Algorithm for 5G). It supports the **NEA0**, **NEA1**, **NEA2**, and **NEA3** |
| Integrity Algo | EIA (EPS Integrity Algorithm). It supports the **NIA1**, **NIA2**, and **NIA3** |

You can click the upper button to switch the configuration from gNB CU to gNB DU, and vice versa.

*Figure 36. The Askey 5G NR Small Cell Switch CU or DU Configuration*


There are many items in the DU configuration tab; they can be split by Common Items, Bandwidth Profile, NR ARFCN Profile, and Time Slot Profile.

*Figure 37. The Askey 5G NR Small Cell DU Configuration – Common Items*

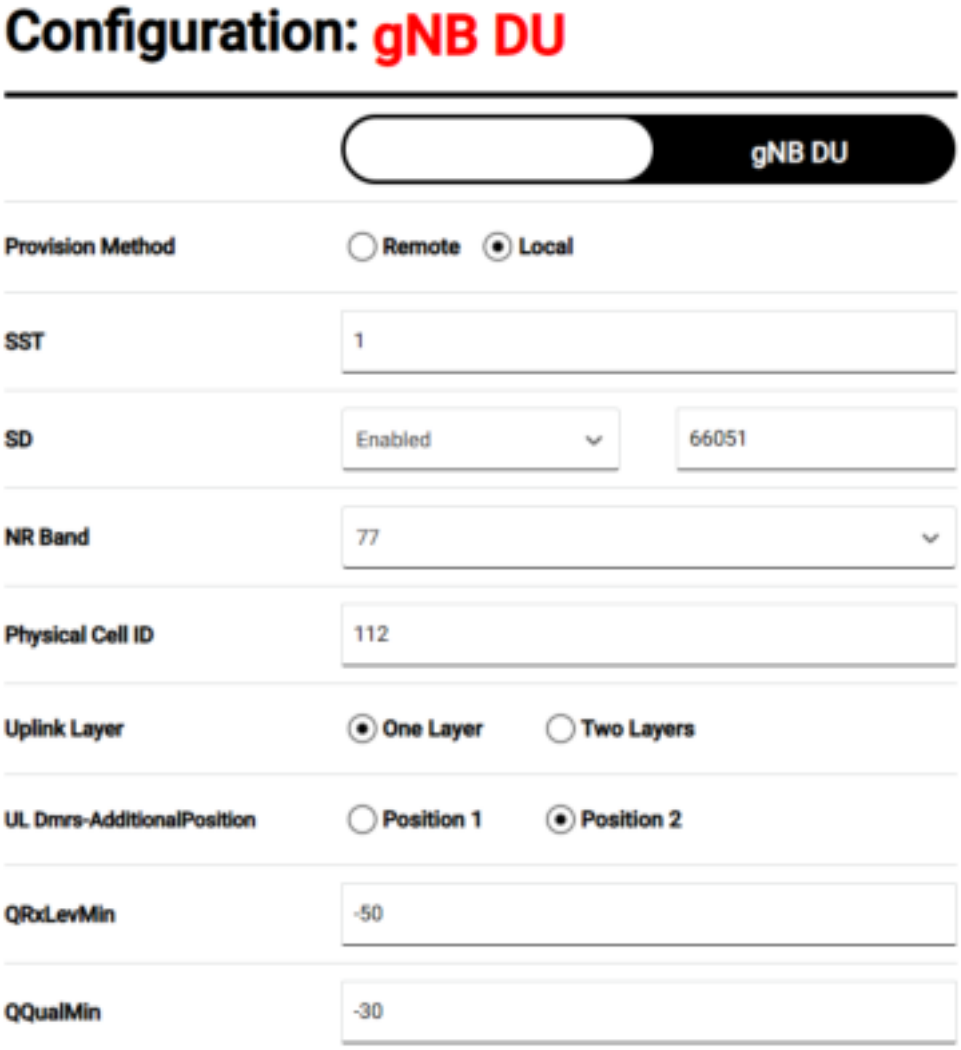



*Table 15. The Askey 5G NR Small Cell DU Configuration – Common*

| Items | Descriptions |
|---|---|
| SST | Slice/Service Type, refers to the expected Network Slice behavior in terms of features and services |
| SD | Slice Differentiator, complements the SST to differentiate amongst multiple Network Slices of the same SST. The SD value can be disabled for the standardized S-NSSAI that has only SST. |
| NR Band | Frequency bands for 5G New Radio. It supports the N48, N77 |
| Physical Cell ID | Physical Cell identifier, is used to distinguish cells on the radio side. The value must be small than 512. |
| Uplink Layer | The channel over which a symbol on the antenna port is conveyed can be inferred from the channel over which another symbol on the same antenna port is conveyed. |
| UL Dmrs-AdditionalPosition | Position for additional demodulation reference signal (**DMRS**) in uplink. |
| QRxLevMin | Minimum required RX level in the cell (dBm) |
| QQualMin | Minimum required quality level in the cell (dB) |

If the device supports the NR Band 48, the SAS Provider item will display in the CU configuration as the NR band is modified to 48.

*Figure 38. The Askey 5G NR Small Cell DU Configuration – Bandwidth Profile*

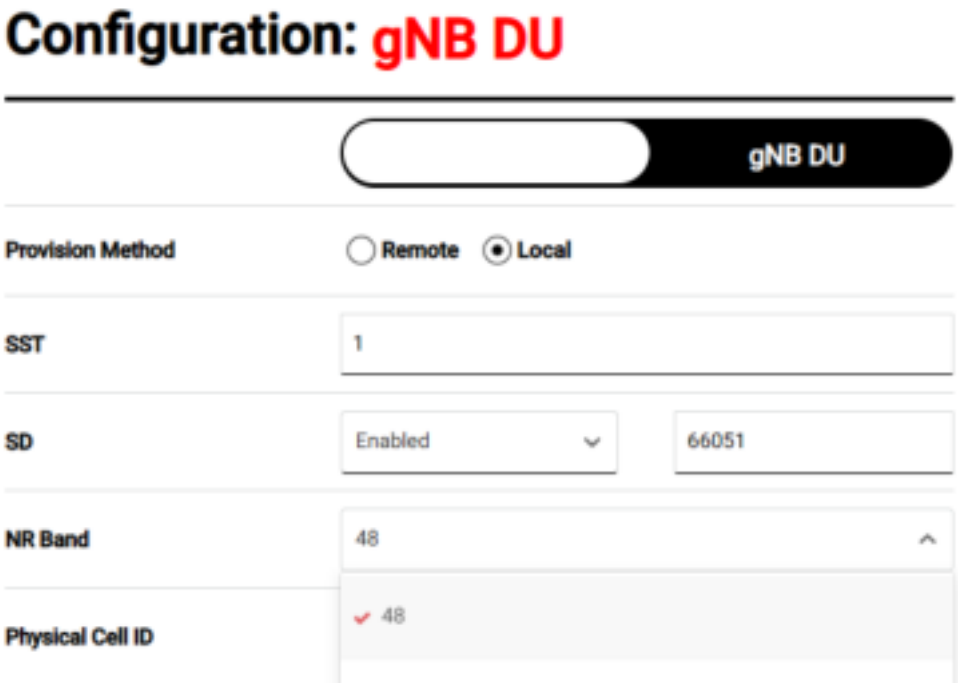
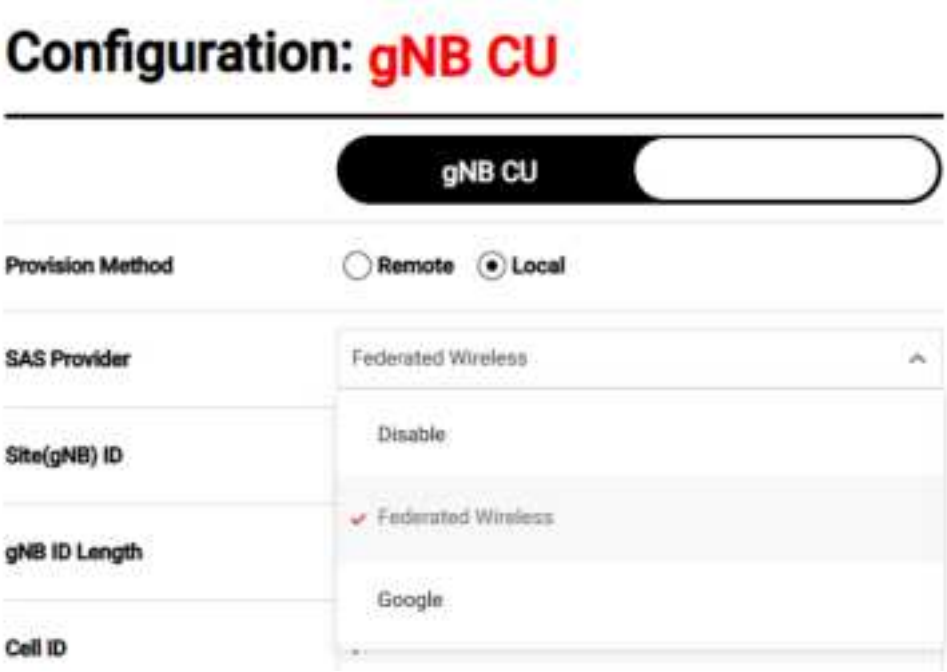
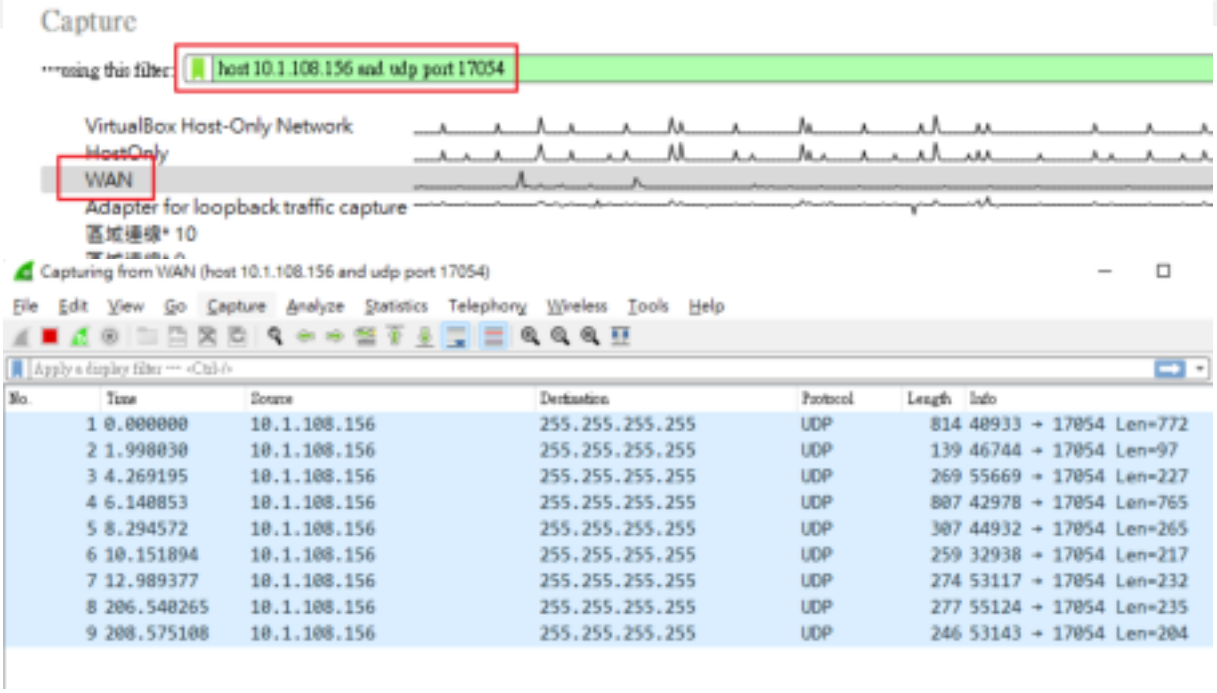



*Figure 39. The Askey 5G NR Small Cell DU Configuration – SAS Provider*

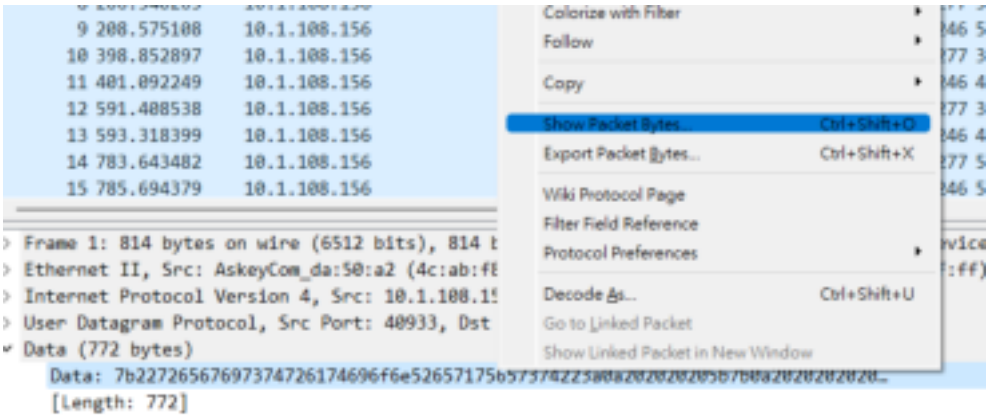



After rebooting the 5G NR Small Cell, the device will perform the normal SAS-CBSD procedures. The related messages can be captured by Wireshark with the following capture filter:

**host 10.1.108.156 and udp port 17054**




For check the content of the SAS-CBSD procedures, you can click the right mouse on the raw data and choose the item "**Show Packet Bytes**".




The message content will be displayed on the new window of the Wireshark as the following illustration:

Wireshark · Data (data.data) · WAN (host 10.1.108.156 and udp port 17054)


```
{"registrationRequest":
    [{
        "cbsdSerialNumber":"84301498175650",
        "fccId":"Askeyfccid22A",
        "userId":"MdwtmV",
        "cbsdCategory":"A",
        "airInterface":{
            "radioTechnology":"NR"
        },
        "measCapability":[""],
        "installationParam":{
            "latitude":62.5,
            "longitude":-155.5,
            "heightType":"AGL",
            "height":1.0,
            "antennaGain":5,
            "eirpCapability":29,
            "indoorDeployment":true
        },
        "cbsdInfo":{
            "vendor":"Askey Corporation",
            "model":"SCE2120",
            "softwareVersion":"v2.2.008.685",
            "hardwareVersion":"SCE2120_ES0",
            "firmwareVersion":"0.4.6.48.ev0"
        }
    }]
}
```


In the bandwidth and NR ARFCN configurations, the Admin Website provides the supported item for each NR band. After choosing the profile option, the recommended values will be filled in the related items. For the more configurations, you can read the Chapter "**The Recommend NR ARFCN Configuration**" in the bottom of this document.

For the NR ARFCN, the Admin Website provide some profile options, and the recommended values will be filled in the related items. For the more configurations, you can read the Chapter "**The Recommend NR ARFCN Configuration**" in the bottom of this document.

*Figure 40. The Askey 5G NR Small Cell DU Configuration – NR ARFCN*

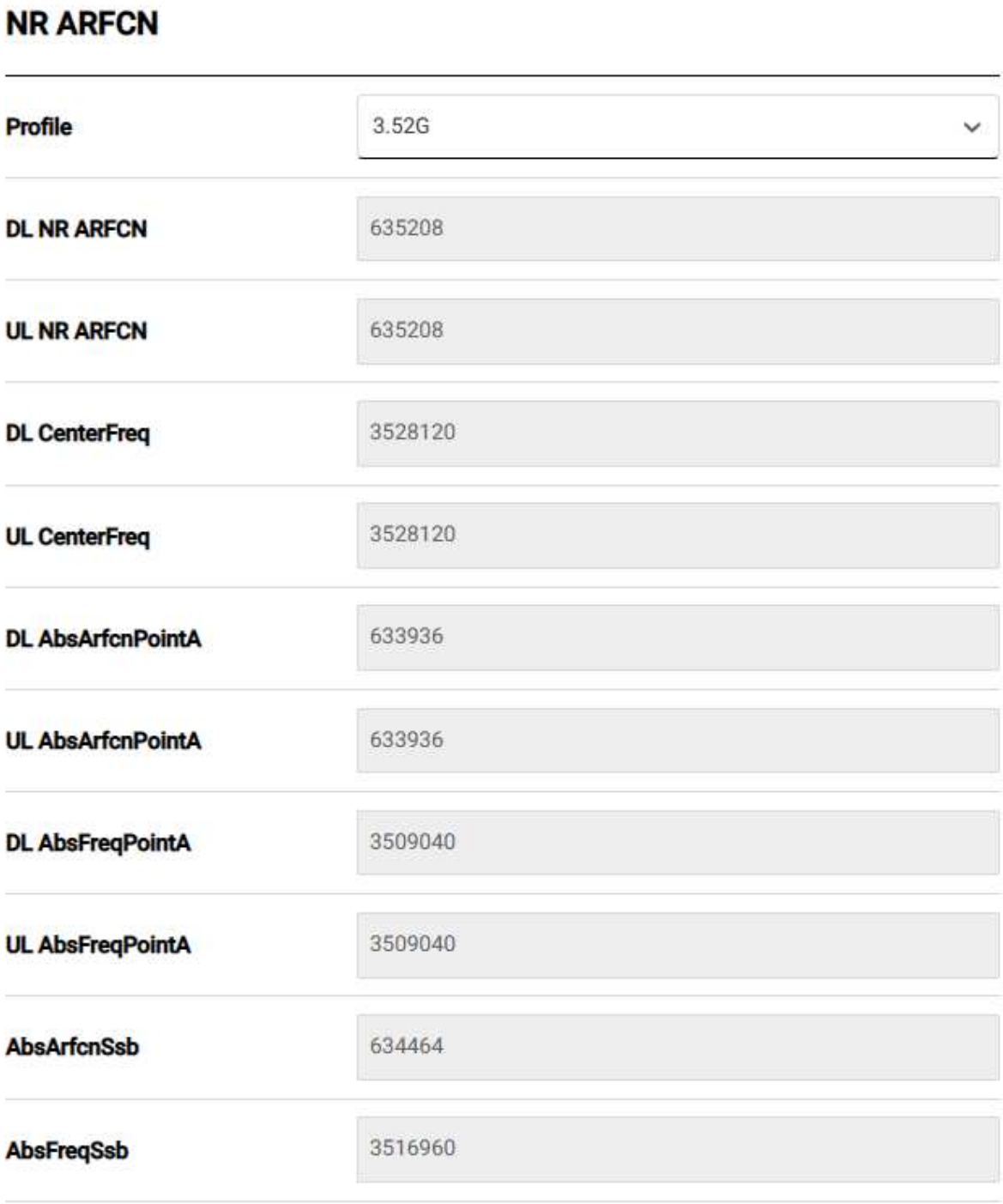


*Table 16. The Askey 5G NR Small Cell DU Configuration – Bandwidth and NR ARFCN*

| Items | Descriptions |
|---|---|
| Bandwidth Profile | N48 : 20/30/40 MHz<br>N77 : 40/50/60/70/80/90/100MHz |
| ARFCN Profile | It provides the recommended ARFCN configuration |
| DL NR ARFCN | The downlink NR ARFCN of the whole bandwidth |
| UL NR ARFCN | The uplink NR ARFCN of the whole bandwidth |
| DL CenterFreq | The downlink center frequency value in KHz |
| UL CenterFreq | The uplink center frequency value in KHz |
| DL AbsFreqPointA | The downlink absolute frequency point A configuration in KHz |
| UL AbsFreqPointA | The uplink absolute frequency point A configuration in KHz |
| DL AbsArfcnPointA | The downlink absolute ARFCN point A configuration |
| UL AbsArfcnPointA | The uplink absolute ARFCN point A configuration |
| AbsFreqSsb | The absolute frequency SSB configuration in KHz |
| AbsArfcnSsb | The absolute ARFCN SSB configuration |

For the Time Slot Format, the Admin Website provides some typical profiles and the recommended value of the related items. You can click the profile option, and the related values will be filled in these detailed items.

*Figure 41. The Askey 5G NR Small Cell DU Configuration – Time Slot Profile*

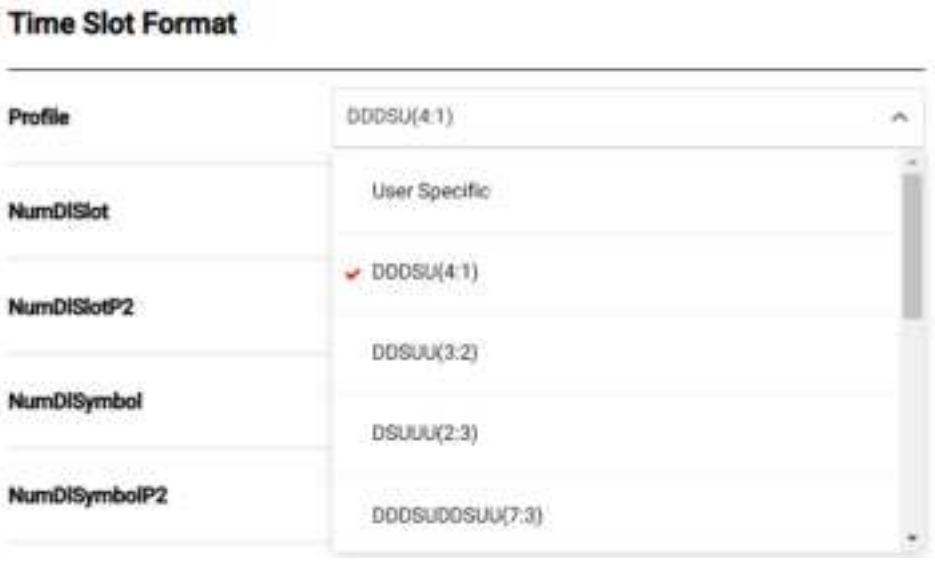



*Figure 42. The Askey 5G NR Small Cell DU Configuration – Time Slot Parameters*

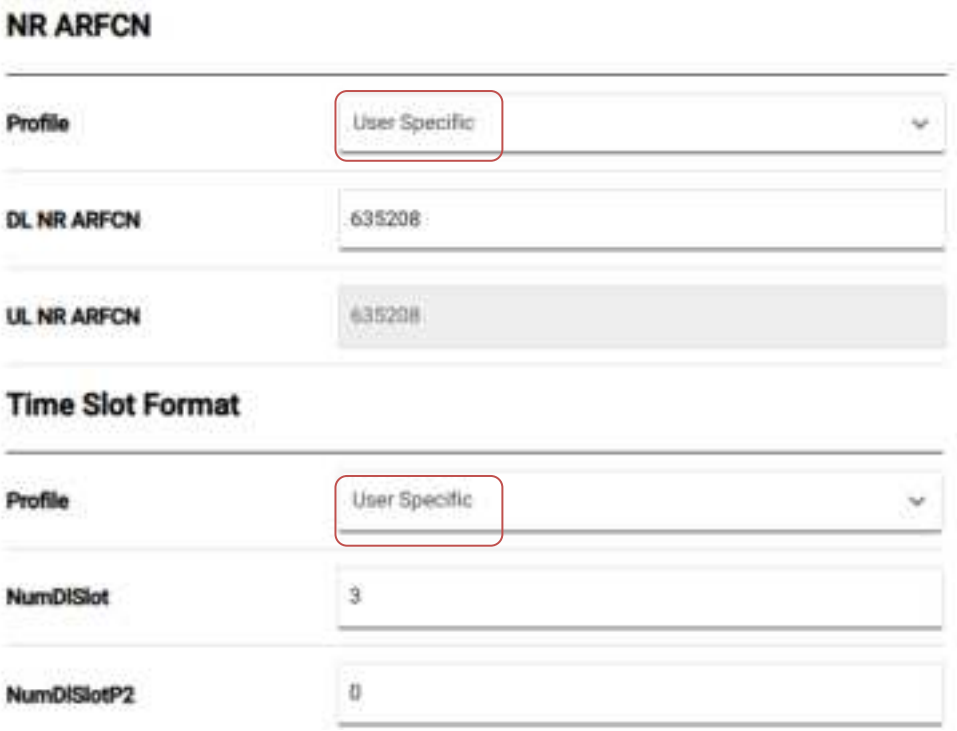
## Time Slot Format

| | |
|---|---|
| **Profile** | DDDSU(4:1) |
| **NumDlSlot** | 3 |
| **NumDlSlotP2** | 0 |
| **NumDlSymbol** | 10 |
| **NumDlSymbolP2** | 0 |
| **NumUlSlot** | 1 |
| **NumUlSlotP2** | 0 |
| **NumUlSymbol** | 2 |
| **NumUlSymbolP2** | 0 |
| **P2 Pres** | 0 |
| **PrachCfgIdx** | 159 |
| **PreambleFormat** | RACH_FORMAT_B4 |

*Table 17. The Askey 5G NR Small Cell DU Configuration – Time Slot Format*

| Items | Descriptions |
|---|---|
| Profile | List the common time slot patterns and provide the default value for detailed setting |
| numDlSlot | The number of downlink slots |
| numDlSlot2 | The number of P2 downlink slots |
| numDlSymbol | The number of downlink symbols for slot format |
| numDlSymbolP2 | The number of P2 downlink symbols for slot format |
| numUlSlot | The number of uplink slots |
| numUlSlotP2 | The number of P2 uplink slots |
| numUlSymbol | The number of uplink symbols for slot format |
| numUlSymbolP2 | The number of P2 uplink symbols for slot format |
| p2Pres | The Pattern 2 (P2) presence value |
| PrachCfgIdx | The PRACH configuration index value |
| PreambleFormat | Long preamble: Format 0, 1, 2, and 3<br>Short preamble: Format A1, A2, A3, B1, B2, B3, B4, C0, and C2 |

In the NR ARFCN and Time Slot Format configurations, the detailed items will be read-only for the pre-defined profile. If the user wants to modify the detailed items, the profile should be selected to "**User Specific**".

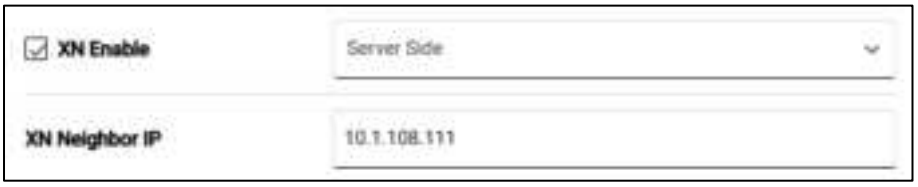


## 3.5.3 Neighbor Cell

This Askey 5G NR Small Cell Neighbor Cell displays the related gNB information, and you can modify some items in the local provision. You can also manually add the neighbor cell on the page's bottom. These items will be read-only if the device is under remote provisioning.

*Figure 43. The Askey 5G NR Small Cell Neighbor Cell Page*


If the XN Enable is checked, you can choose the server or client side for Xn handover. You should also provide the XN neighbor IP address as the following illustration:




You can add the neighbor cell by clicking the **Add** button in the Action column and fill the neighbor data on the popup window.


The gNB ID, gNB ID Length, and Cell ID cannot all be the same value as another neighbor cell. It should be noted that the Askey 5G NR Small Cell currently doesn't support the inter handover if the **Neighbor NR Band** or the **AbsArfcnPointA** is not the same as the gNB.


The max number of neighbor cells is 4, and you can perform the delete or edit action to adjust the neighbor cells.

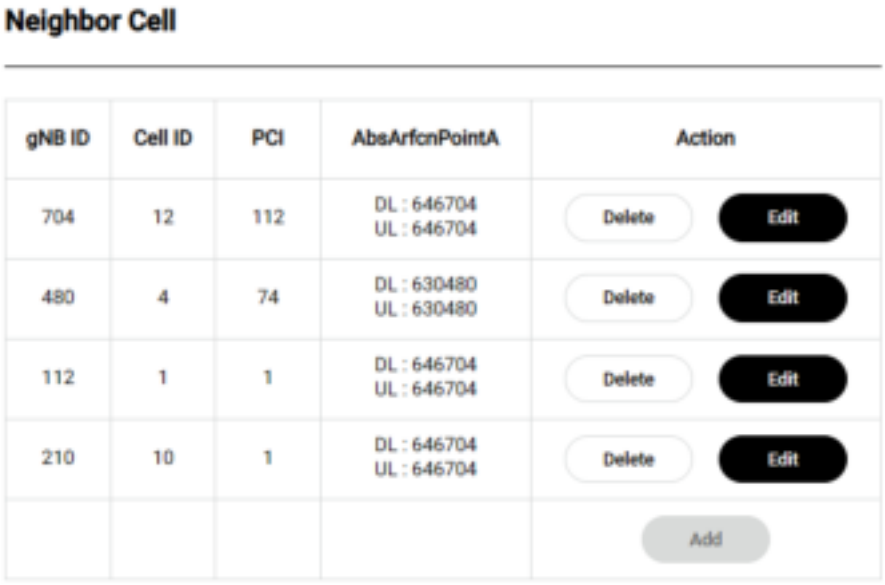


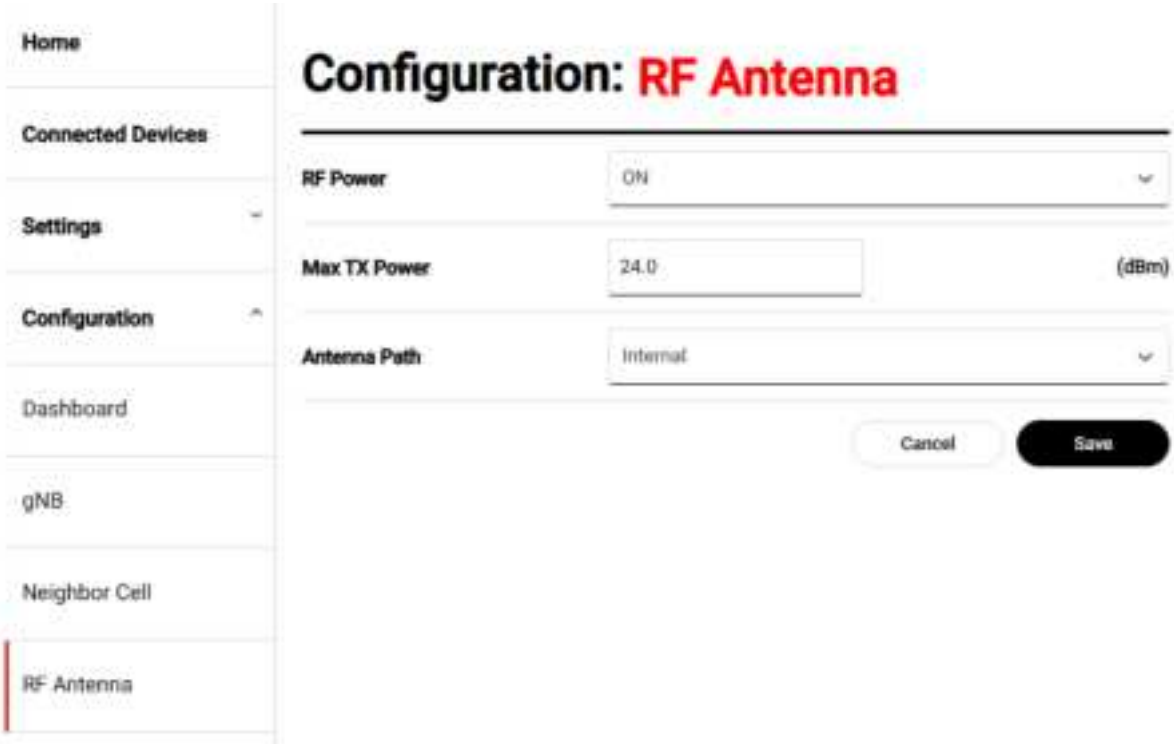

*Table 18. The Askey 5G NR Small Cell Neighbor Cell Configuration*

| Items | Descriptions |
|---|---|
| NeighborCell AbsArfcnSsb | The absolute ARFCN point A configuration of the neighbor cell |
| A3 RSRP Offset | The Reference Signal Received Power (RSRP) offset of event A3.<br>The number range is -30 to 30 (dB). |
| A3 Hysteresis | The hysteresis value of event A3.<br>The number range is 0 to 30 (dB). |
| A3 Timer To Trigger | The timer helps to avoid irregular measurement and handover. Support the following items:<br>MS0, MS40, MS64, MS80, MS100, MS128, MS160, MS256, MS320, MS480, MS512, MS640, MS1024, MS1280, MS2560, MS5120 |
| XN Enable | If checked, the device will enable the Xn handover. It needs to choose the server or client side for Xn handover |
| XN Neighbor IP | The IP address of the peer gNB on the Xn interface |

## 3.5.4 RF Antenna

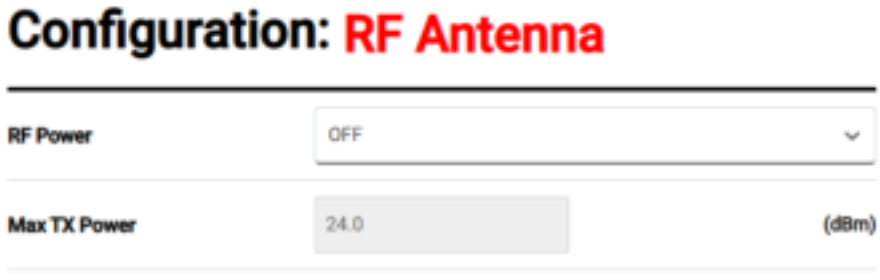
This Askey 5G NR Small Cell RF Antenna page allows users to modify the max TX power and the RF antenna path.

*Figure 44. The Askey 5G NR Small Cell RF Antenna Page*




The RF Power will be N/A if the Askey 5G NR Small Cell isn't in service.


After the cell state is in service, you can turn off the RF power. In the meantime, the MAX TX power will be read-only.




This max TX power is the number in one decimal place, and the range is from 0.0 to 24.0

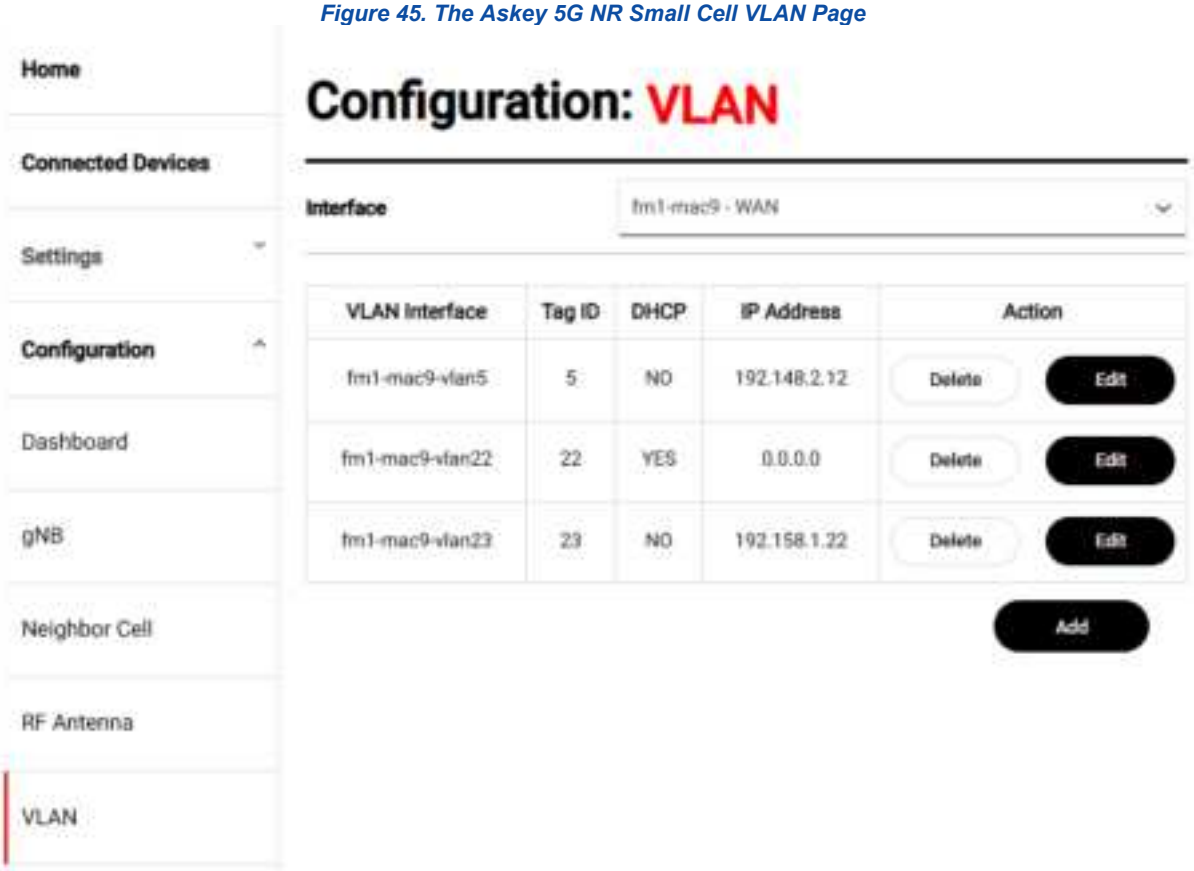

This antenna path can be **Internal** or **External**. If the antenna path is switched to External, the RF signal will be transmitted through the **external** antenna connector as the illustration:

External antenna ports ANT1/ANT2 are disabled via software for this model and is not modifiable by any third-party / end-user.


## 3.5.5 VLAN

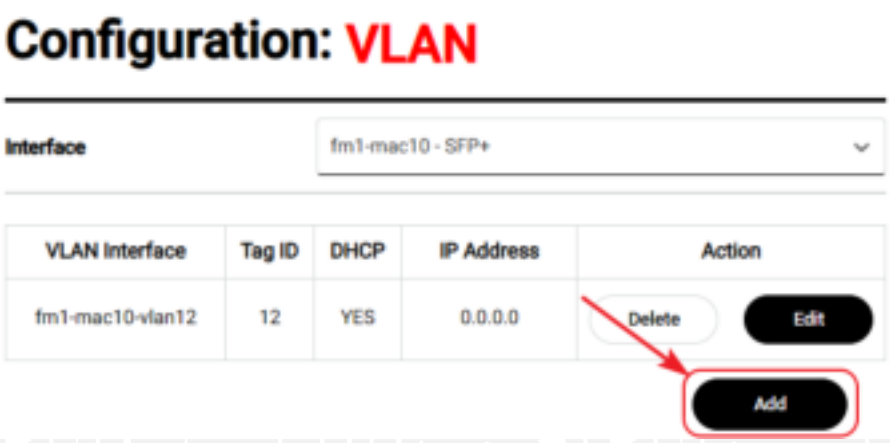
This Askey 5G NR Small Cell VLAN page allows users to create, read, update and delete the VLAN (Virtual Local Area Network) configurations.

*Figure 45. The Askey 5G NR Small Cell VLAN Page*




At first, you should choose which physical network interface the VLAN attaches. When the interface is changed, the related VLAN configurations attached on the physical network interface will be displayed on the page.


*Figure 46. The Askey 5G NR Small Cell VLAN Page – Read Operation*




Click the **Add** button will prompt a window to create a new VLAN attached to the physical network interface. The DNS configurations are optional for the VLAN with static IP. If the DHCP is enabled, add the ignore default route option Ignore **Routes.**

*Figure 47. The Askey 5G NR Small Cell VLAN Page – Create Operation*

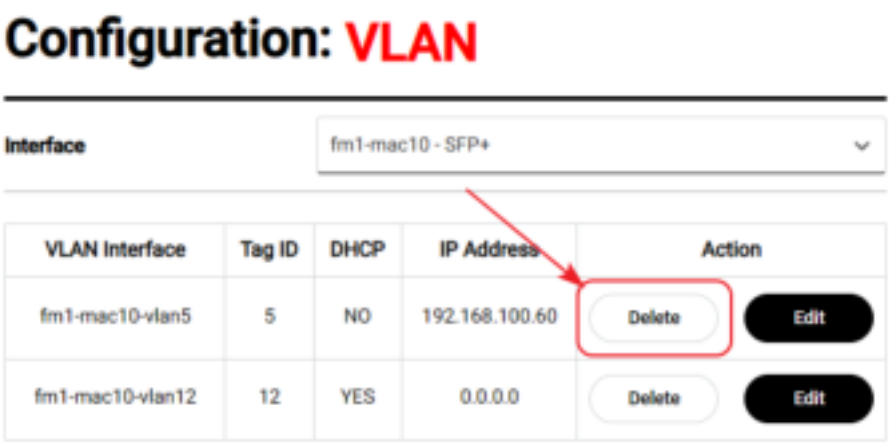

Click the **Edit** button in the VLAN list will prompt a window to update the specified VLAN configuration.

*Figure 48. The Askey 5G NR Small Cell VLAN Page – Update Operation*


In addition, if the VLAN tag ID has existed in the create operation, it will become an update operation that will update the previous VLAN configuration with the tag ID.

Click the **Delete** button in the VLAN list will delete the specified VLAN configuration. It doesn't need to restart the device for the delete operation.

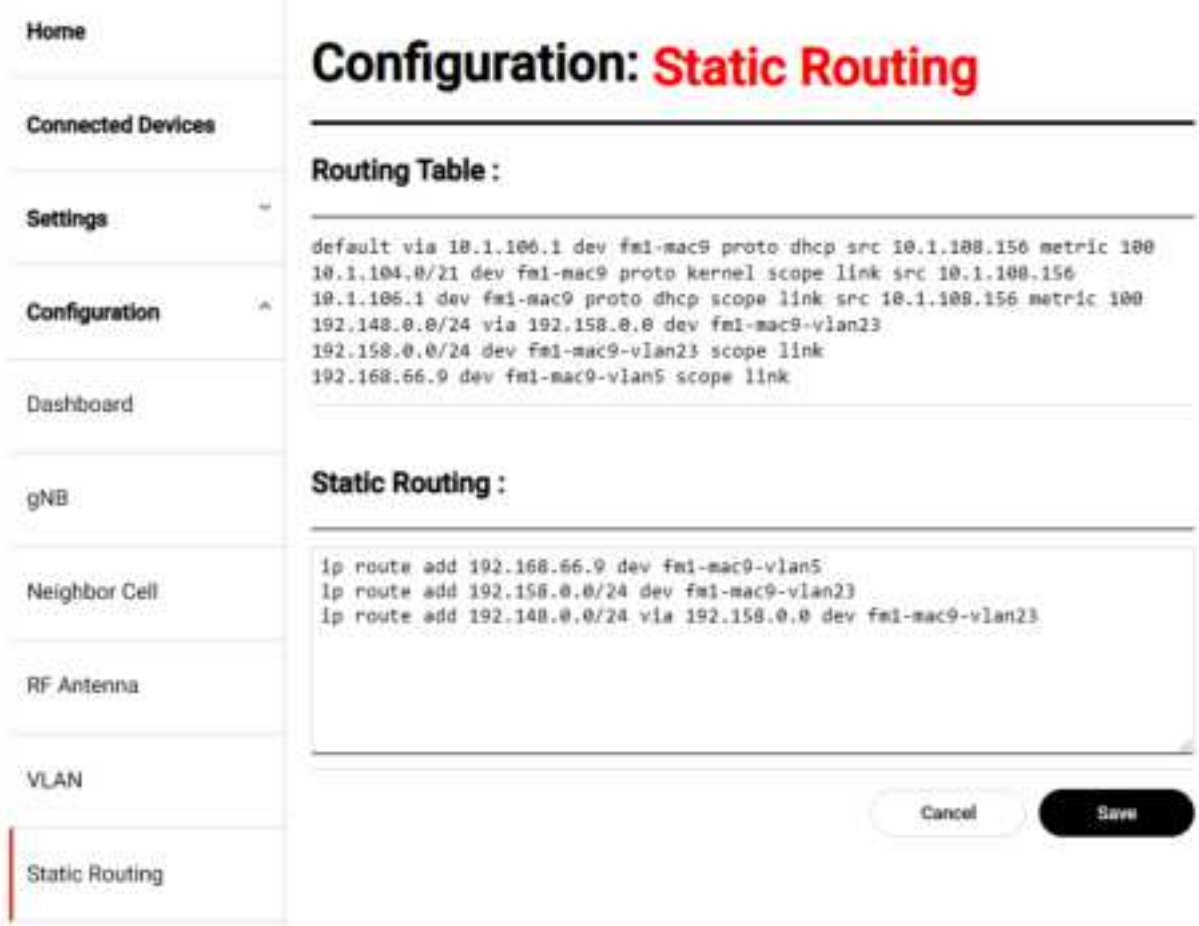
*Figure 49. The Askey 5G NR Small Cell VLAN Page – Delete Operation*




## 3.5.6 Static Routing

This Askey 5G NR Small Cell Static Routing page shows the current routing table and allows users to define the static routing rules. The commands in the static routing rules need to be started with "**ip route**"; otherwise, the command will be ignored.

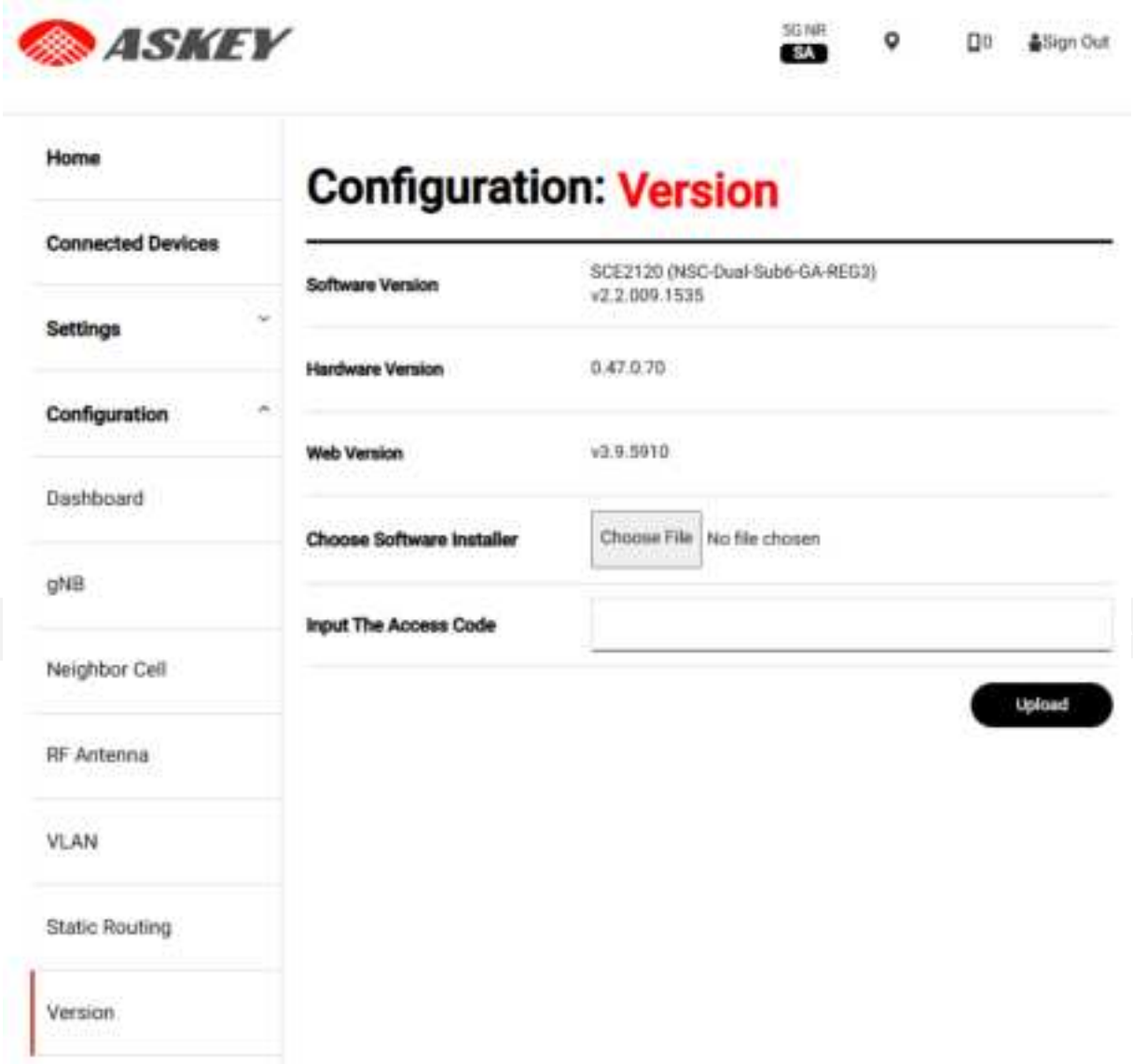
*Figure 50. The Askey 5G NR Small Cell Static Routing Page*



## 3.5.7 Version

This Askey 5G NR Small Cell Version page shows the current software, hardware, and web version. In Addition, you can upload an encoded installer with matched access code to perform a local upgrade of the Askey 5G NR Small Cell.

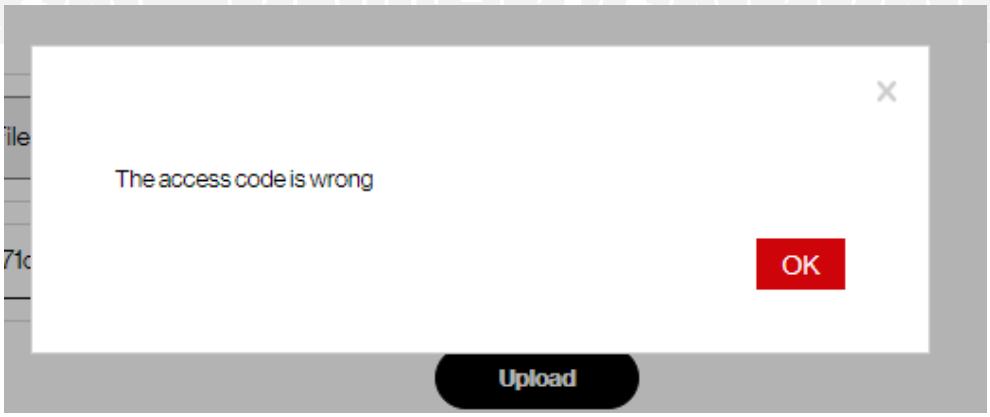
*Figure 51. The Askey 5G NR Small Cell Version Page*



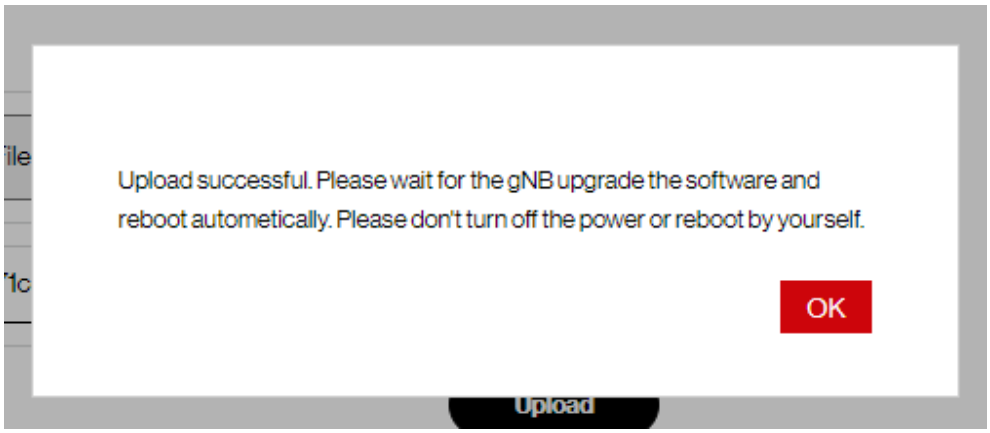

Firstly, you need to choose the encrypted software installer and input the access code provided by Askey. The installer will be uploaded to the DUT after clicking the Upload button..


There is a progress bar to indicate the upload processing progress. When the progress is 100%, the API server will concatenate the chunked upload files and check the access code.

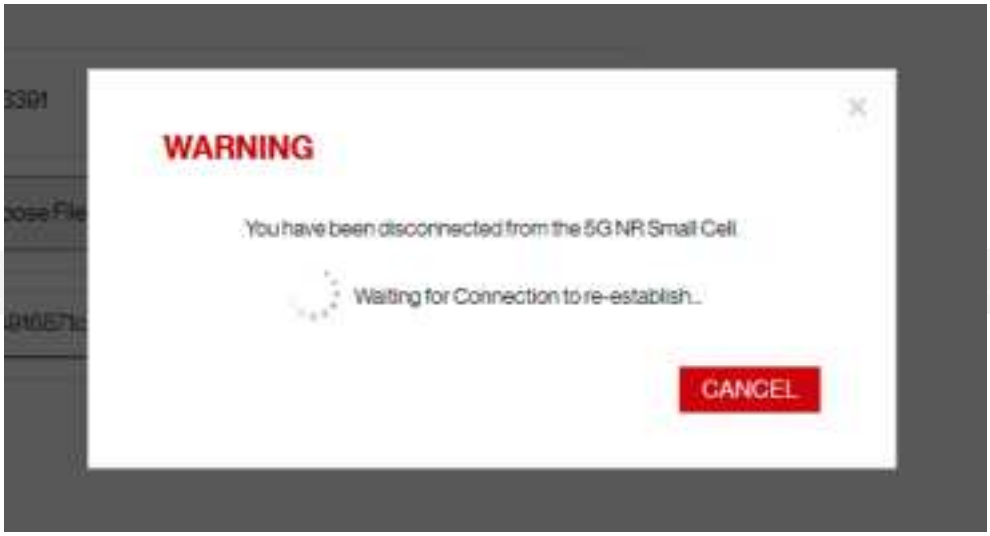

If the access code is wrong, the Admin Website will provide a warning message as the following illustration. Please check the access code and upload it again with the correct code.



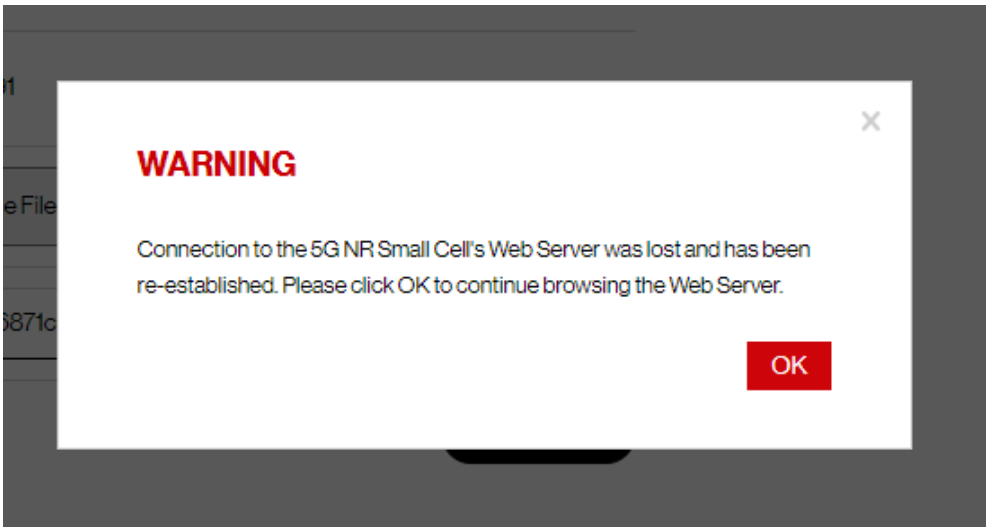

If the access code is correct, the Admin Website will pop-up a message as the following illustration to indicate the upload is successful and the Askey 5G NR Small Cell will start to upgrade the software.




In the meantime, the API server is decoding the installer and perform the local upgrade. Therefore, if you click the “OK” button, the Web GUI cannot do other operations as in the following illustration. After finishing the upgrade, the Admin Website will provide another message as the following illustration.




Finally, when the Admin Website provides the following message, the Askey 5G NR Small Cell startup procedure is finished. Click the “OK” button will redirect to the login form to access the Admin Website.




# 3.6 About

## 3.6.1 GPS

This Askey 5G NR Small Cell GPS Page shows the GPS status, including GPS Satellite ID, signal quantities, description, etc.

*Figure 52. The Askey 5G NR Small Cell GPS Page*

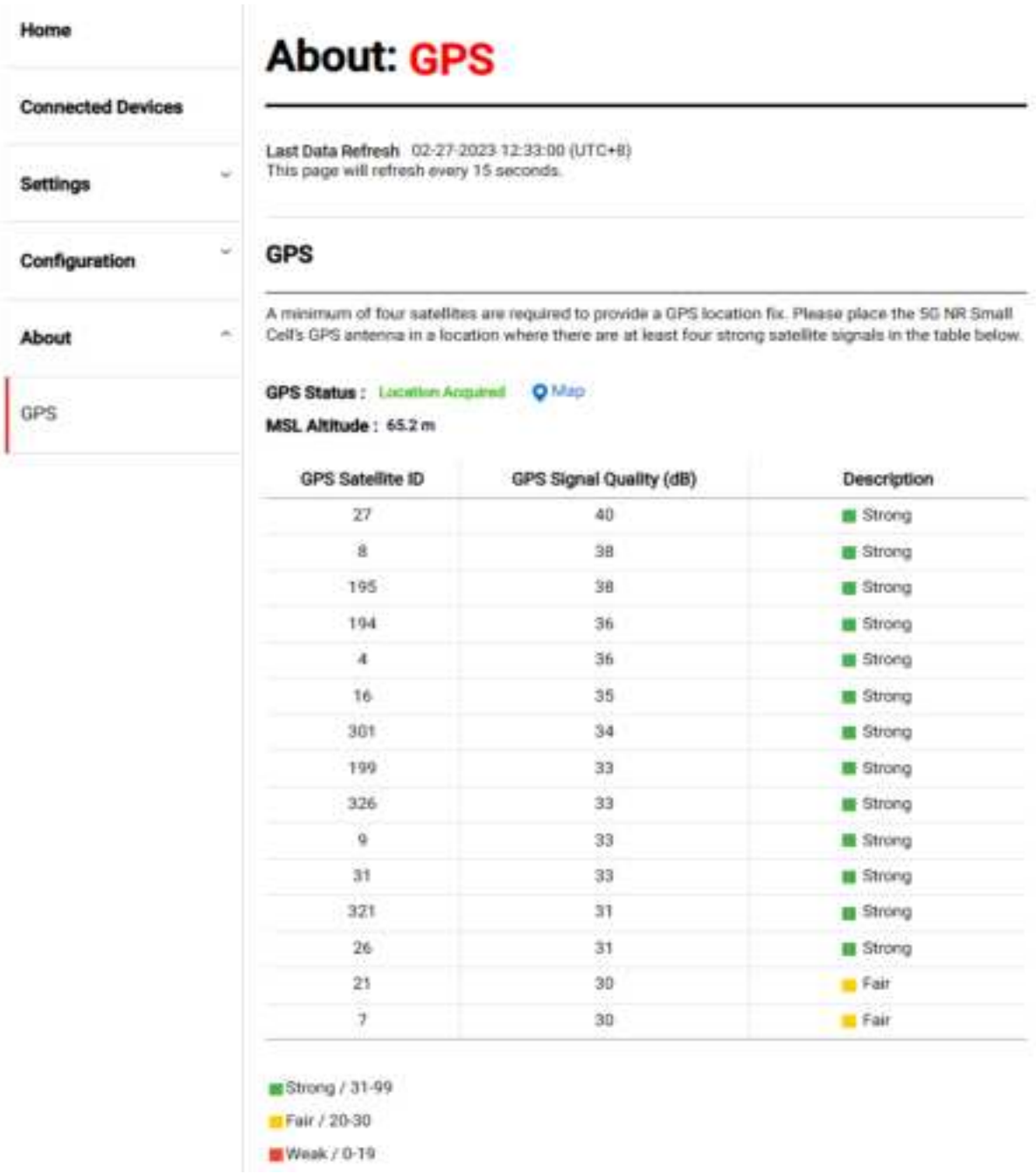


*Table 19. The Askey 5G NR Small Cell GPS*

| Items | Descriptions |
|---|---|
| Last Data Refresh | The local time when this page was last refreshed. |
| Last Data Refresh | The local time when this page was last refreshed. |
| GPS Status | This indicates if The Askey 5G NR Small Cell has acquired GPS signals or not. The Askey 5G NR Small Cell will not come into service if the status does not say "Location Acquired". |
| GPS Satellite ID | The list of GPS satellites identifies how many satellites are currently being detected along with each satellite's unique identifier. |
| GPS Satellite Quality (dB) | This value describes the signal-to-noise ratio for the GPS signal. A higher value means better quality. If the description is either Fair or Weak, you should consider repositioning the unit or GPS antenna. If the signal quality does not improve, an external GPS antenna may be required. |
| Description | Describes the quality level of the satellite signal as either: Strong, Fair or, Weak. Refer to the legend for the mapping. |

# Chapter 4 The Askey 5G NR Small Cell Support Utilities

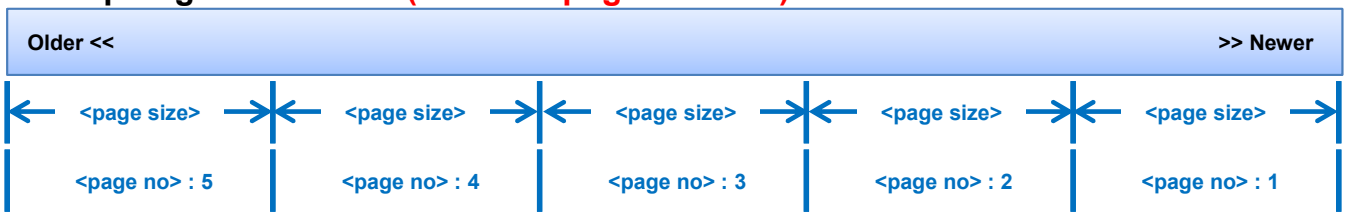
## 4.1 Small Cell Log Download Mechanism

You can download the runtime or backup log files by the following HTTPS linking URL and send them back to the Askey Small Cell team to analyze.

**PS:**

1. **Please don't modify the downloaded file name**
2. **Please don't download two log files at the same time**

**Backup Log Illustration: (The max page size is 3)**






### The Askey 5G NR Small Cell

**Runtime Log:**

**https://<ip address>/api/logs/TwpEceURn15qxDYSW88IJddB7LAsiOr64HNg**

**Backup Log:**

**https://<ip address>/api/logs/TwpEceURn15qxDYSW88IJddB7LAsiOr64HNg/<page size>**

**https://<ip address>/api/logs/TwpEceURn15qxDYSW88IJddB7LAsiOr64HNg/<page size>/<page no>**

**Examples:**

**https://10.1.108.15/api/logs/TwpEceURn15qxDYSW88IJddB7LAsiOr64HNg**
**➔ Runtime log:**
**askeylog_280375459184643_20221025-092816_nsc.tgz.enc**

**https://10.1.108.15/api/logs/TwpEceURn15qxDYSW88IJddB7LAsiOr64HNg/3**
**➔ Backup log (page size 3, page no 1):**
**askeylog_280375459184643_20221025-092825_nsc_last_01-03.tgz.enc**

**https://10.1.108.15/api/logs/TwpEceURn15qxDYSW88IJddB7LAsiOr64HNg/3/3**
**➔ Backup log (page size 3, page no 3):**
**askeylog_280375459184643_20221025-092902_nsc_ last_07-09.tgz.enc**

# 4.2 Access the Admin Website by IPv6 Link-Local Address

If the network setting of the Askey 5G NR Small Cell is wrong or you cannot get the current IP address, you cannot access the Admin Website by IPv4. You can use the MAC to IPv6 Converter (https://nettools.club/mac2ipv6) to get the link-local address of the Askey 5G NR Small Cell. After that, you can access the Admin Website by the URL http://[IPv6 Link-Local Address]/ in the same LAN.

For example, if the MAC address is “FE:FF:FF:A6:00:03”, you can get the following result by converter.


Then, you can access the Admin Website by the URL http://[fe80::fcff:ffff:fea6:3]/ in the same LAN. If you access the Admin Website by the method for the first time, it may need more than one time refresh to finish the IPv6 Neighbor Discovery.

# 4.3 The Recommend NR ARFCN Configuration

## 5G Sub6G Band N48

| NR ARFCN Profile | 40 MHz 3.57G | 30 MHz 3.56G | 20 MHz 3.62G | | |
|---|---|---|---|---|---|
| DL Earfcn | 637992 | 637656 | 641652 | | |
| UL Earfcn | 637992 | 637656 | 641652 | | |
| DL CenterFreq | 3569880 | 3564840 | 3624780 | | |
| UL CenterFreq | 3569880 | 3564840 | 3624780 | | |
| DL AbsArfcnPointA | 636720 | 636720 | 641040 | | |
| UL AbsArfcnPointA | 636720 | 636720 | 641040 | | |
| DL AbsFreqPointA | 3550800 | 3550800 | 3615600 | | |
| UL AbsFreqPointA | 3550800 | 3550800 | 3615600 | | |
| AbsArfcnSsb | 637248 | 636960 | 641280 | | |
| AbsFreqSsb | 3558720 | 3554400 | 3619200 | | |

## 5G Sub6G Band N77, 100MHz Bandwidth

| NR ARFCN Profile | 3.75G | 3.675G | | | |
|---|---|---|---|---|---|
| DL Earfcn | 649980 | 647772 | | | |
| UL Earfcn | 649980 | 647772 | | | |
| DL CenterFreq | 3749700 | 3716580 | | | |
| UL CenterFreq | 3749700 | 3716580 | | | |
| DL AbsArfcnPointA | 646704 | 644496 | | | |
| UL AbsArfcnPointA | 646704 | 644496 | | | |
| DL AbsFreqPointA | 3700560 | 3667440 | | | |
| UL AbsFreqPointA | 3700560 | 3667440 | | | |
| AbsArfcnSsb | 647232 | 645024 | | | |
| AbsFreqSsb | 3708480 | 3675360 | | | |



## 5G Sub6G Band N77, 90MHz Bandwidth

| NR ARFCN Profile | 3.75G | 3.75G | 3.6G | 4.05G | |
|---|---|---|---|---|---|
| DL Earfcn | 649644 | 649836 | 640044 | 669996 | |
| UL Earfcn | 649644 | 649836 | 640044 | 669996 | |
| DL CenterFreq | 3744660 | 3747540 | 3600660 | 4049940 | |
| UL CenterFreq | 3744660 | 3747540 | 3600660 | 4049940 | |
| DL AbsArfcnPointA | 646704 | 646896 | 637104 | 667056 | |
| UL AbsArfcnPointA | 646704 | 646896 | 637104 | 667056 | |
| DL AbsFreqPointA | 3700560 | 3703440 | 3556560 | 4005840 | |
| UL AbsFreqPointA | 3700560 | 3703440 | 3556560 | 4005840 | |
| AbsArfcnSsb | 647232 | 647424 | 637632 | 667584 | |
| AbsFreqSsb | 3708480 | 3711360 | 3564480 | 4013760 | |

### 5G Sub6G Band N77, 80MHz Bandwidth

| NR ARFCN Profile | 4.05G | | | | |
|---|---|---|---|---|---|
| DL Earfcn | 669996 | | | | |
| UL Earfcn | 669996 | | | | |
| DL CenterFreq | 4049940 | | | | |
| UL CenterFreq | 4049940 | | | | |
| DL AbsArfcnPointA | 667392 | | | | |
| UL AbsArfcnPointA | 667392 | | | | |
| DL AbsFreqPointA | 4010880 | | | | |
| UL AbsFreqPointA | 4010880 | | | | |
| AbsArfcnSsb | 667968 | | | | |
| AbsFreqSsb | 4019520 | | | | |



### 5G Sub6G Band N77, 70MHz Bandwidth

| NR ARFCN Profile | 3.587G | | | | |
|---|---|---|---|---|---|
| DL Earfcn | 639180 | | | | |
| UL Earfcn | 639180 | | | | |
| DL CenterFreq | 3587700 | | | | |
| UL CenterFreq | 3587700 | | | | |
| DL AbsArfcnPointA | 636912 | | | | |
| UL AbsArfcnPointA | 636912 | | | | |
| DL AbsFreqPointA | 3553680 | | | | |
| UL AbsFreqPointA | 3553680 | | | | |
| AbsArfcnSsb | 637440 | | | | |
| AbsFreqSsb | 3561600 | | | | |

### 5G Sub6G Band N77, 60MHz Bandwidth

| NR ARFCN Profile | 3.675G | 3.6966G | 4.05G | | |
|---|---|---|---|---|---|
| DL Earfcn | 645000 | 646440 | 670008 | | |
| UL Earfcn | 645000 | 646440 | 670008 | | |
| DL CenterFreq | 3675000 | 3696600 | 4050120 | | |
| UL CenterFreq | 3675000 | 3696600 | 4050120 | | |
| DL AbsArfcnPointA | 643056 | 644496 | 668064 | | |
| UL AbsArfcnPointA | 643056 | 644496 | 668064 | | |
| DL AbsFreqPointA | 3645840 | 3667440 | 4020960 | | |
| UL AbsFreqPointA | 3645840 | 3667440 | 4020960 | | |
| AbsArfcnSsb | 643584 | 645024 | 669312 | | |
| AbsFreqSsb | 3653760 | 3675360 | 4039680 | | |



### 5G Sub6G Band N77, 50MHz Bandwidth

| NR ARFCN Profile | 3.587G | | | | |
|---|---|---|---|---|---|
| DL Earfcn | 639180 | | | | |
| UL Earfcn | 639180 | | | | |
| DL CenterFreq | 3587700 | | | | |
| UL CenterFreq | 3587700 | | | | |
| DL AbsArfcnPointA | 637584 | | | | |
| UL AbsArfcnPointA | 637584 | | | | |
| DL AbsFreqPointA | 3563760 | | | | |
| UL AbsFreqPointA | 3563760 | | | | |
| AbsArfcnSsb | 638112 | | | | |
| AbsFreqSsb | 3571680 | | | | |

### 5G Sub6G Band N77, 40MHz Bandwidth

| NR ARFCN Profile | 3.75G | 4.05G | | | |
|---|---|---|---|---|---|
| DL Earfcn | 649896 | 670008 | | | |
| UL Earfcn | 649896 | 670008 | | | |
| DL CenterFreq | 3748440 | 4050120 | | | |
| UL CenterFreq | 3748440 | 4050120 | | | |
| DL AbsArfcnPointA | 648624 | 668736 | | | |
| UL AbsArfcnPointA | 648624 | 668736 | | | |
| DL AbsFreqPointA | 3729360 | 4031040 | | | |
| UL AbsFreqPointA | 3729360 | 4031040 | | | |
| AbsArfcnSsb | 649152 | 669312 | | | |
| AbsFreqSsb | 3737280 | 4039680 | | | |