

CONFIGURATION GUIDE

RADWIN JET DUO

Release 4.9.70



RADWIN

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Managing a RADWIN JET DUO Sector

1. Scope of this Document

This document deals with managing the sector when working with a RADWIN JET DUO base station which has Release 4.9.34 and above. It covers DUO HBS configuration and HSU Configuration from the DUO HBS.

- The RADWIN JET DUO has two carrier frequencies in one unit: 5.x GHz, and 3.x GHz. Although they operate independently (they can be activated and de-activated independently, for example), since they are from the same unit, the sector name for both are the same, and if the HBS is reset, the action affects both carriers.
- In contrast to previous products, the RADWIN JET DUO is managed completely via its Web Interface, which is based in the unit itself. Configuration changes are also saved in the unit itself, and not in the accessing computer.

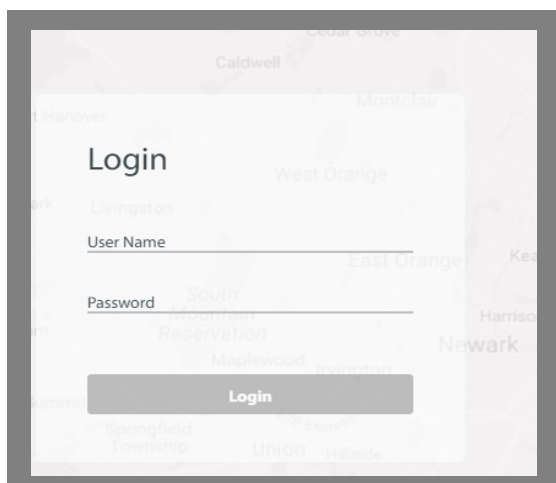


When working with a DUO base station (Release 4.9.34 and above), use its web interface only. It is not possible to use the RADWIN Manager.

However, when working with a LFF, SFF, JET base station, or DUO base station (Release 4.9.31 and below), or upgrading the DUO base station from 4.9.31 to 4.9.34, use the RADWIN Manager as the management application.

2. Login

Access the web interface by connecting to the unit, either directly via RJ45 cable, or via the internet. We recommend using a PC or laptop. Do not use a smartphone. Enter the unit's IP address in a web browser (default value: 10.0.0.120). A welcome message will appear.



Enter the user name and password, then click **Login**

User name: **admin**

Password: **netwireless**

The main window will appear.

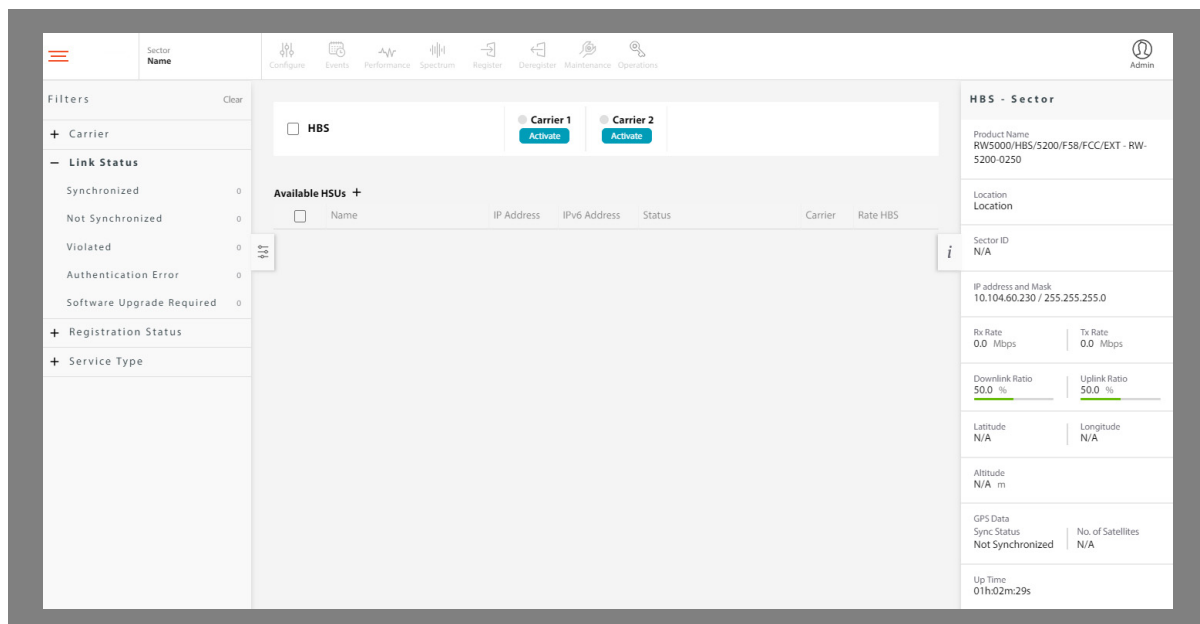


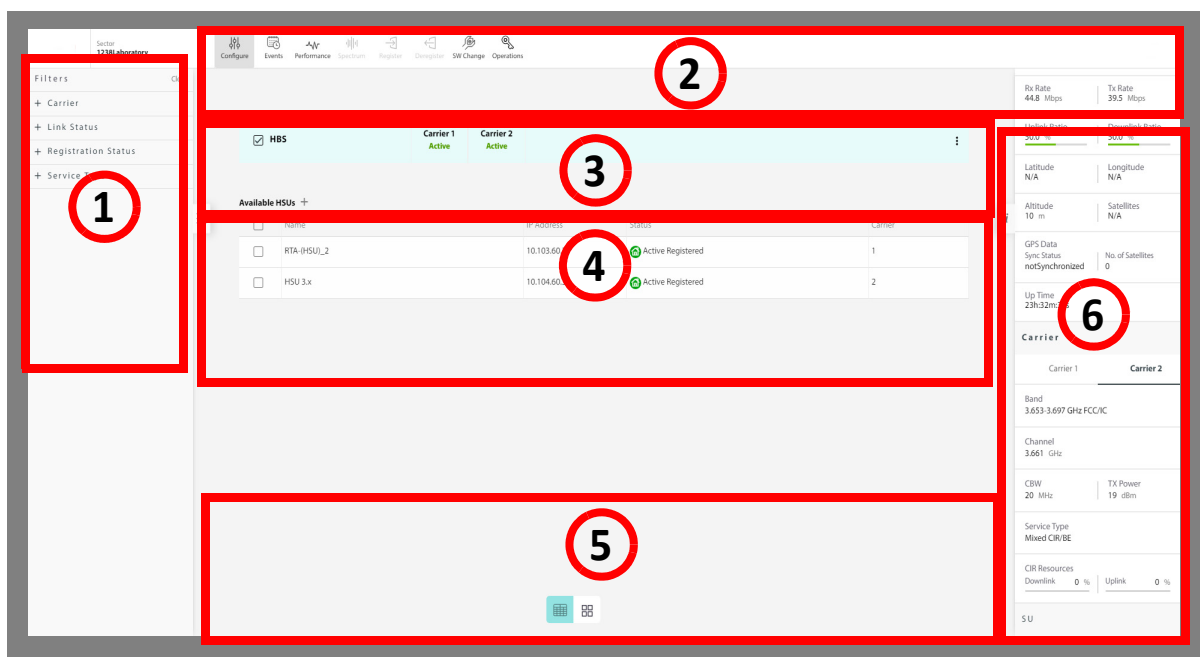
Figure 1: RADWIN JET DUO Main/Overview Window

For an explanation of the Web User Interface, see [Web UI Overview](#)

For instructions on first-time use of a DUO base station, see [First-Time Use](#)

3. Web UI Overview

The Web UI shows the DUO base station and any subscriber units it has detected.



You can see both carrier sectors at the same time, with all subscriber units.

You can filter what you see, and display the subscriber units in various manners.

Click on the section of the Web UI of which you want more information:







1	Filters	2	Main icons
----------	----------------	----------	-------------------

3	<i>HBS List</i>	4	<i>HSU List</i>
5	<i>Sector Display views</i>	6	<i>Right Pane</i>

3.1. Filters

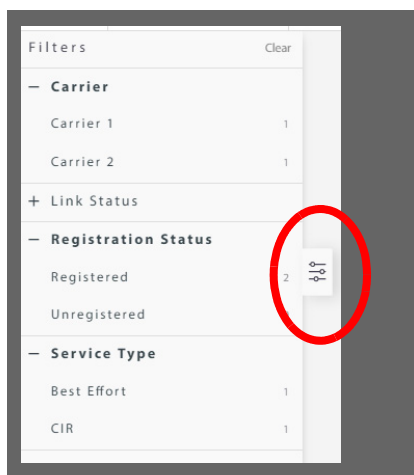
Here you can use certain criteria to filter what is displayed:

- **Carrier:** Select Carrier 1 or Carrier 2 to show only devices using the selected carrier.
To show all devices using all carriers, select the Carrier title.
- **Link Status:** Select the status of the HSUs you want displayed. Possible HSU statuses are:

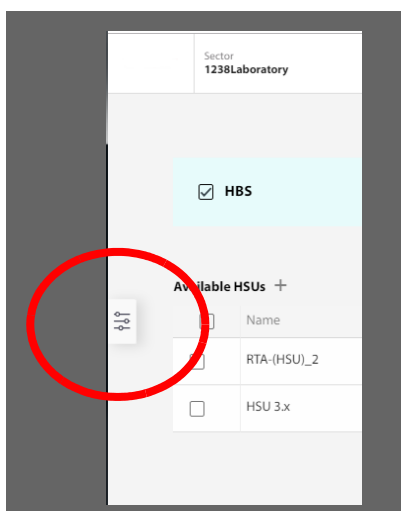
Icon	HSU status Description	
	Active Registered	Registered, in sync
	Active Unregistered	Unregistered
	Not Synchronized	Registered, no sync
	Active Violated	Belongs to another sector
	Active SW Upgrade Required / Freq band mismatch	Software Upgrade required
	Active Authentication Error	Authentication error

To show all devices using all statuses, select the Link Status title.

- **Registration Status:** Select Registered or Unregistered to show only devices in the indicated state.
To show all devices whether registered or not, select the Registration Status title.
- **Service Type:** Select Best Effort or CIR to show only devices with the indicated service type.
To show all devices no matter what the service type, select the Service Type title.
- To minimize the Filters list, click on the minimize symbol:



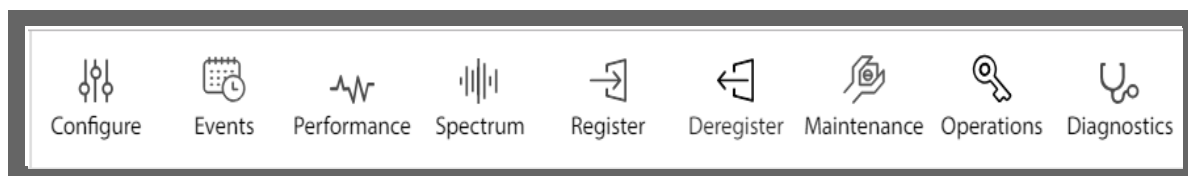
- To restore the Filters list, click on the minimize symbol again:













3.2. Main icons

Along the top edge of the Web UI, there are icons that allow you to carry out certain tasks for the radio units.

The applicable icons become enabled when you select the radio unit relevant for the task. For example, if you select an un-registered HSU, the Register icon will become enabled, but the Deregister icon will not.



 Configure	Configure	Set various parameters for the selected unit, including, but not limited to: <ul style="list-style-type: none"> • IP address, • frequency and bandwidth, • transmission power, • passwords, • NTP settings, • VLAN • QoS, and more
 Events	Events	Shows system failures, loss of synchronization, loss of signal, compatibility problems and other fault conditions and events for the selected unit or units. You can also search and filter the events by severity, source, and time.
 Performance	Performance	The Performance Monitoring feature constantly monitors traffic and collects statistics data, whether or not the Web UI is open. Use this to see performance monitoring for the selected unit or units.

	<i>Spectrum</i>	The Spectrum view utility provides spectral measurements, and is be useful in assisting with diagnosing interference related problems prior to full sector activation. It is operated per carrier.
	<i>Register</i>	Registers an HSU
	<i>Deregister</i>	De-registers an HSU
	<i>Maintenance</i>	Back up, upgrade or restore the software in the selected unit or units.
	<i>Operations</i>	Resets, restores to factory default configuration, and allows license-dependent upgrades on the selected unit or units.
	<i>Diagnostics</i>	Creates diagnostics files, for use by RADWIN professional services and support personnel to expedite assistance.
	<i>User Profile Icon</i>	Click this icon to log out of the HBS.

3.2.1. Configure



These are the configuration categories:

<i>System</i>	<i>Service (HSU only)</i>	
<i>Air Interface (HBS only)</i>	<i>Management</i>	<i>Hub Site Sync (HBS only)</i>
<i>Inventory</i>	<i>Security</i>	<i>Date & Time</i>
<i>Ethernet (HBS only)</i>	<i>General (HBS only)</i>	<i>WiFi (HSU only)</i>

Most are relevant for both HBSes and HSUs, but some are applicable for only one of them, and are indicated. If a category is not relevant for the unit you have selected, it will not appear in the GUI.

In addition, some specific items are different between HBSes and HSUs, and these are indicated in the descriptions as well.

System

General

These items are convenience fields: **Description**, **Object ID**, **Name**, **Contact**, **Location**, and **Last Power Up**. **Name** and **Location** are typically entered during HBS activation. If you make any changes, click **Save** to have them take effect.

System

General

Coordinates

Description
Wireless Link

Object ID
1.3.6.1.4.1.4458.20.5.1.1

Name
DUO_PM

Contact
Person

Location
PM_Lab

Last Power Up
12/11/2018, 14:21:05

Cancel Save

Coordinates

These can be changed for an HSU only, and can be changed only if the device does not have a GPS.

The coordinates (latitude and longitude) use either decimal degrees or degrees, minutes, and seconds. If you make any changes, click **Save** to have them take effect.

System

Coordinates

☒ Decimal Degrees Latitude (-89 to +89)
0.00000

☐ Degrees Minutes Seconds Longitude (-180 to +180)
0.00000

Latitude - Degrees / Minutes / Seconds
0 0 0.00 N S

Longitude - Degrees / Minutes / Seconds
0 0 0.00 E W

Cancel Save

Tx & Antenna

For an HBS, you can make changes for each carrier independently of each other. Changes made here may affect link quality and in the case of antenna type, cause a re-sync for the selected carrier.

Changing the antenna type for an HSU will cause a re-sync to that site only.

If you make any changes, click **Save** to have them take effect.

HBS:

Carrier 1 Carrier 2

Antenna Connection Type:
☒ External ☐ Integrated ⓘ

Antenna Type: Dual ▾ Antenna Gain: 15.0 ⓘ Beamwidth (0 to 360): 90 ° Azimuth (0 to 359): 0 °

Tx Power (Per radio): 18 dBm Tx Power (System): 21 dBm Required Tx Power (Per radio): 25 dBm

Cable Loss: 0.0 ⓘ Max EIRP: 43 dBm EIRP: 36 dBm

Cancel Save

HSU:

Carrier 1

Antenna Connection Type:
☒ External ☐ Integrated ⓘ

Antenna Type: Dual ▾ Antenna Gain: 16.0 ⓘ Beamwidth (0 to 360): ⓘ Azimuth (0 to 359): ⓘ

Tx Power (Per radio): 18 dBm Tx Power (System): 21 dBm Required Tx Power (Per radio): 24 dBm

Cable Loss: 0.0 ⓘ Max EIRP: 43 dBm EIRP: 37 dBm

Cancel Save

Air Interface (HBS only)

Parameters here can be set for each carrier independently of each other.



If you change a band in one carrier, both carriers will be reset.

Radio

Sector ID: Set the Sector ID here. The value will “percolate” to all registered HSUs. It will of course, be “picked up” by newly installed and registered HSUs. The same Sector ID is used for both carriers.

Operating Channel: You can change the operating channel (only to those channels for which there is hardware support) if Automatic Channel Selection is not enabled. For the new channel to take effect you must deactivate, then reactivate the HBS.

Channel Bandwidth: You can choose the channel bandwidth even if Automatic Channel Selection is enabled. The changes will be sector-wide, and affect which RSS Threshold power levels are available.

Automatic Channel Selection: Allows you to choose the channel automatically. We recommend you do this only at configuration time.

ATPC

Automatic HSU Transmit Power Control enables the HBS to optimize the transmit power of all HSUs in the sector for the selected carrier. This is done by configuring the desired RSS (radio signal strength) threshold level. The HBS then tunes the transmission power of the HSUs to give this RSS value.

- **Mode:** Select **Disabled**, **Static**, or **Dynamic** from the pull-down menu.
 - **Disabled:** Disables the ATPC option
 - **Static:** Instructs the HBS to find an optimal transmit RSS value for the HSUs. The HBS then locks on to this power value and does not change it until this configuration option is changed.
 - **Dynamic:** Instructs the HBS to find an optimal transmit RSS value for the HSUs. The HBS will change this power value from time to time when needed.
- **RSS Threshold:** The desired RSS level which the HBS refers to in order to tune the transmission power of the HSUs. The best power level depends on the radio plan, but is also influenced by your choice of Channel Bandwidth.

Carrier 1 Carrier 2

Air interface

Radio

ATPC

CIR/BE Resource

Advanced

Change band

Mode
Static

Rss threshold

Cancel Save

CIR/BE Resource

If the sector you are working with has a combination of CIR and Best Effort HSUs, this option allows you to set what percentage of the sector resources are allocated to CIR units and what percentage are allocated to BE units.

Click the **Use recommended settings** radio button to set the CIR/Best Effort to 80%-20%.

Carrier 1 Carrier 2

Air interface

Radio

ATPC

CIR/BE Resource

Advanced

Change band

Use recommended settings

Customize CIR/BE resource allocation

CIR 80% 50 100

BE 20% 0 50

Best effort only

Cancel Save

If you wish to **customize** the settings, do the following:

- If you have only BE units, check the Best Effort only box. This is like setting CIR/Best Effort Ratio to 0.0%/100.0%. If you have at least one CIR unit, this box is disabled.

The screenshot shows the 'CIR/BE Resource' configuration window for Carrier 1. On the left, a sidebar lists 'Air interface' options: Radio, ATPC, CIR/BE Resource (selected), Advanced, and Change band. The main area has two radio buttons: 'Use recommended settings' (unselected) and 'Customize CIR/BE resource allocation' (selected). Below these are two sliders. The 'CIR' slider ranges from 50 to 100, with a marker at 0%. The 'BE' slider ranges from 0 to 50, with a marker at 100%. A checkbox labeled 'Best effort only' is checked. At the bottom right are 'Cancel' and 'Save' buttons.

- If you have only CIR units, move the slider to the far right, and get 100% for CIR. This is the most efficient use of resources for a sector with only CIR units.

You can set this before any fixed HSUs are registered, and if you choose 100% of one kind or another, you will be limited when registering the HSUs to that resource type.

When you register a specific HSU, you choose what percentage of the specific resource type (CIR or BE) to allocate to this HSU (see [Register Subscriber Units](#) on page 69).

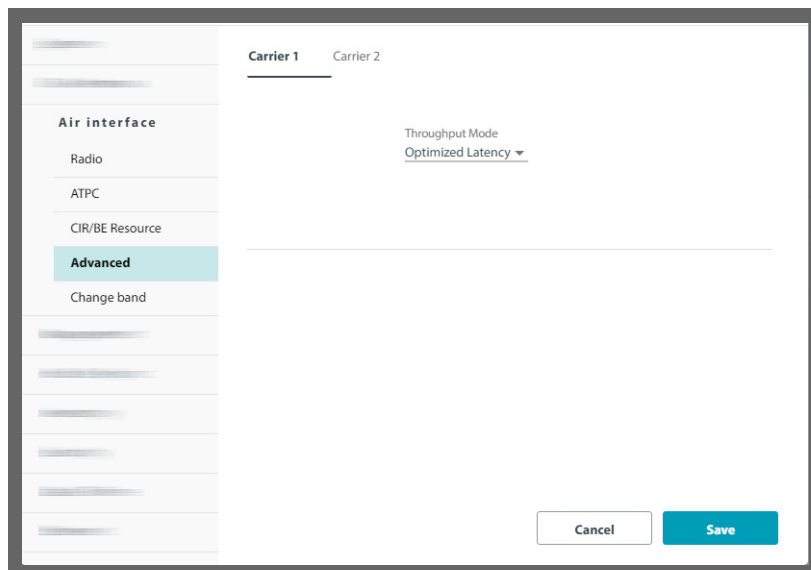
This screenshot shows the same configuration window as above, but with different slider positions. The 'CIR' slider is now at 90% (90) and the 'BE' slider is at 10% (5). The 'Best effort only' checkbox is now unchecked. All other elements remain the same.

Click **Save** to have your changes take effect.

Advanced

This option allows you to configure the **Throughput Mode**: This determines how the Adaptive Modulation mechanism works.

- **Maximum Throughput** (default) should be chosen if throughput is more important than higher delay (If configuring a sector for FCC UCBP, see [Appendix B, Operating Under the FCC Unrestricted Contention Based Protocol](#) for further instructions).
- **Optimized Latency** minimizes delay at the expense of lower throughput.



Click **Save** to have your changes take effect.

Change band

Changing the band in use is always carried out at the sector level, each carrier by itself.

1. Make sure you are logged in to the DUO as Installer.
2. From the **Select a band from the list** pull-down menu, select the new band. The specific list depends on your regulatory environment.
3. Choose the working channel bandwidth and operating channel.
4. Click **Save**. A message will appear cautioning you that all the devices will be reset. Note that this applies to both carriers even if you are only changing the band for one of the carriers.



Caution

When changing a frequency band for one carrier, both carriers will be reset.

5. Click **Yes** to continue.
6. Click **OK**. A sector re-sync follows.

You may also add new Bands by clicking the **Add Bands** button. There are several provisos to this:

- Additional Bands must be available for your hardware
- Such additional Bands must be available within the framework of your local regulations



To obtain and install additional bands:

1. Make a list of ODU serial numbers for all HBSs and all HSUs to receive additional bands. The list should be a simple text file, one serial number per line. (The serial numbers are located on the stickers on the ODUs.)
2. Click **Add Bands**. An instruction panel is displayed

The serial numbers displayed relate to the radios in the sector. Click **Copy** to copy the numbers to the clipboard.

3. This step applies only if you have additional un-installed units:
Before proceeding to Step 2 in the instruction panel, make your own list of serial numbers of units you have in a plain text editor. If the serial numbers are in the list, select your list and copy it all to the clipboard. Otherwise append the clipboard contents to your list. Select the whole list and save it to the clipboard.
4. Now carry out steps 2 to 4 in the instruction panel. Step 2 will take you to a Web page.

This generator can be used for expanding the available bands of an ODU to additional bands supported by the ODU hardware. Different products have different expansion bands available, please consult the Release Notes document or our Professional Services for more information. **Note:** The regulatory rulings of certain regions prohibit adding certain bands. Where this is applicable, the License Generator will prevent adding these prohibited bands. Fill out the form below to generate your License Key. After submitting the form you will receive an email with the new License Key. License Key generation is per serial number, you may enter several serial numbers. Required fields are marked with *. The Reference field is for your own records. The License Key is supported from releases 2.4.50 and 1.9.12. To use it you should login as Installer.

Personal details

End-User Full Name:*	<input type="text"/>	Company:*	<input type="text"/>
Address:*	<input type="text"/>	Phone:*	<input type="text"/>
End-User Email Address:*	<input type="text"/>	Confirm Email:*	<input type="text"/>
Reference:	<input type="text"/>	Enter Code (9193):*	<input type="text"/>

Link details

Required Band:*	<input type="text" value="2.3 GHz Universal"/>	Serial Numbers:*	<input type="text"/>
Installation Country:*	<input type="text" value="Please Select..."/>		

Get Key

- Fill out the requested details in the Web page. Click **Get Key** to terminate the dialog box.
- The results of your request will be displayed with further instructions.

No.	Serial	Status
1	PET540E000A00000	Serial Found
2	PIN580I500A00005	Serial Found
3	PIN580I500A00004	Serial Found
4	PIN580I500A00003	Serial Found

Close

You will receive an automated email during the next few minutes. If it does not arrive, please check that it was not caught by your junk/spam filter.

A few minutes later, you should receive an email, containing in its body, a list of license keys.



You may see error messages in the Status Column such as **Band not supported** or **Serial not found**. Supported bands typically reflect your local regulations. Check missing serial numbers with RADWIN Customer Service.

7. Copy and Paste the license keys into a plain text file and save it to a safe known place.
8. Open the **Operations -> Licenses** window (see [Licenses](#) on page 54). Check the **License File** button and navigate to the file you saved in the last step.
9. Click **Activate**. The next time you enter the Change Bands tab, the new bands will be available.

Management

This category enables you to change the IP address, subnet, mask and gateway of the selected device, configure the management VLAN, set trap destinations, change the management protocol and its authentication mode, and add or remove user definitions.

Network

You may configure a link for IPv4, IPv6, or both. Using both IP versions is useful in conjunction with applications that do not fully support IPv6.

1. Choose what type of IP address to enter (IPv4, IPv6, or both)

The screenshot shows the 'Network' configuration window. On the left, a sidebar lists 'Management' and 'Network' (highlighted). The main area has a dropdown for 'IP Version' set to 'IPv4'. Below it, the 'IPv4' section is active, displaying fields for 'IP Address' (10.104.60.230), 'Subnet Mask' (255.255.255.0), and 'Default Gateway' (10.104.60.201). The 'IPv6' section is inactive. At the bottom right are 'Cancel' and 'Save' buttons.

Here, we choose both, and enter the IPv6 addresses:

The screenshot shows the 'Network' configuration window with the 'IP Version' dropdown set to 'IPv4 + IPv6'. Both the 'IPv4' and 'IPv6' sections are active. The 'IPv4' section shows 'IP Address' (10.104.60.230), 'Subnet Mask' (255.255.255.0), and 'Default Gateway' (10.104.60.201). The 'IPv6' section shows 'IP Address' (205:104:60:230), 'Subnet Prefix Length' (64), and 'Default Gateway' (205:104:60:201). At the bottom right are 'Cancel' and 'Save' buttons. An inset shows the 'IP Version' dropdown menu with 'IPv4 + IPv6' selected.

2. Enter the appropriate IP address or addresses, including the Subnet Mask and Default Gateway (for IPv4), and/or the Subnet Prefix Length and Default Gateway (for IPv6).
3. Click **Save**.

- If you changed any values, you will see a message warning you that a device reset will be done.
To confirm, click **OK**.

VLAN

Configure the management VLAN here. To configure a VLAN for traffic, see [VLAN](#) on page 38.

The management VLAN enables separation of user traffic from management traffic whenever such separation is required. It is recommended that each member of a sector be configured with different VLAN IDs for management traffic. (This reduces your chances of accidentally locking yourself out of the sector.)



VLAN IDs are used by RADWIN products in three separate contexts: Management VLAN, Traffic VLAN and Ethernet Ring. It is recommended that you use different VLAN IDs for each context.

➤ To enable VLAN for management:

- Check **ON** in the VLAN window.
- Enter a VLAN ID. Its value should be between 2 and 4094.
After entering the VLAN ID, only packets with the specified VLAN ID are processed for management purposes by the HBS/HSU. This includes all the protocols supported by the radio (ICMP, SNMP, Telnet and NTP). Using VLAN for management traffic affects all types of management connections (local, network and over the air).
- Enter a Priority number between 0 and 7.
The VLAN priority is used for the traffic sent from the radio to the managing computer.
- Change the VLAN ID and Priority of the managing computer NIC to be the same as those of steps 2 and 3 respectively.
- Click **Save**.

➤ Lost or forgotten VLAN ID or IP Address

If the VLAN ID or IP address of the DUO unit is forgotten, you can carry out the steps shown below to restore the values.

- Set the NIC of the managing computer to a static IP address, using an appropriate Subnet value. Record this subnet value (for eg. 192.168.3.100)

- Open a command line interface, and type

```
ARP -s xxx.yyy.zzz.www 00-15-67-8D-5F-FF
```

Where **xxx.yyy.zzz.www** is an IP address appropriate for the NIC's subnet value.

00-15-67-8D-5F-FF is a unique RADWIN MAC address, and must be entered as-is.

Note that as soon as you enter this command, you have 3 minutes to change whatever needs to be changed on the unit, so do the next few steps quickly:

- Enter the command:

```
ping xxx.yyy.zzz.www
```

You will see several timeout messages. Wait until you see about 3 or 4 of them.

- Enter the command:

```
ARP -d xxx.yyy.zzz.www
```

- Open a web browser, and enter **xxx.yyy.zzz.www**

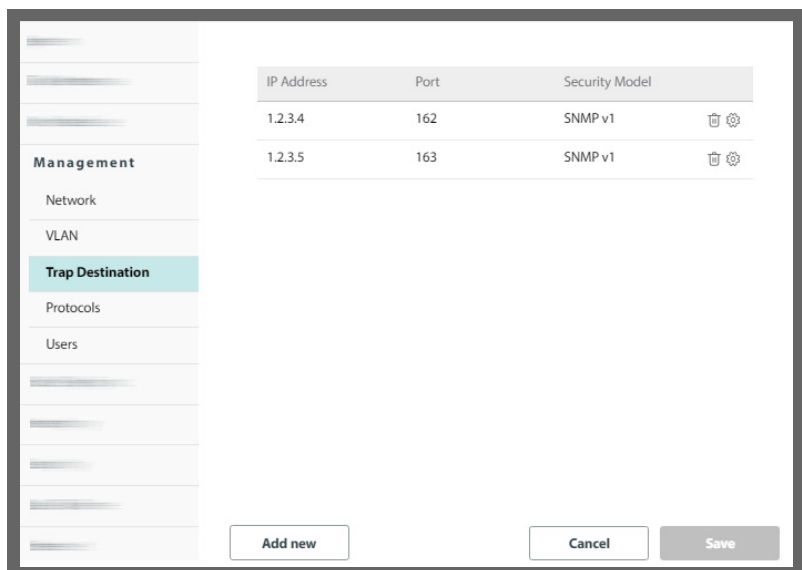
You will see the welcome message of the RADWIN JET DUO

- Enter the user name and password, click **Login**.
- From the main window, follow instructions as shown in this document to either change the IP address, or record the IP address. Do the same with the VLAN ID, if relevant.

Note that during this 3 minute window, there is no VLAN.

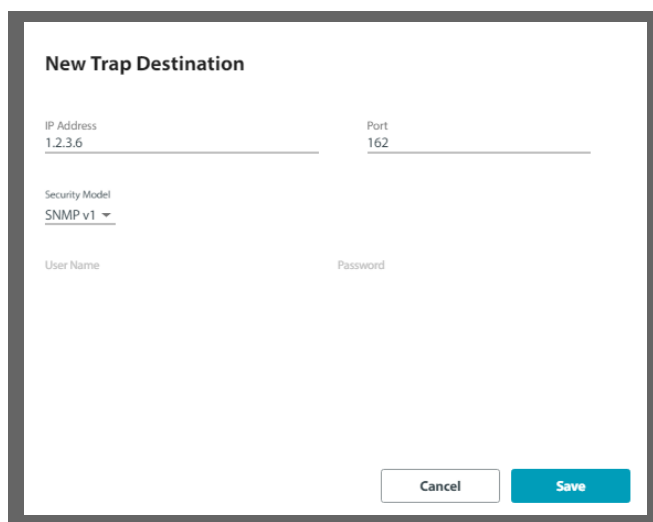
Trap Destinations

All traps are saved at each location you define.



To set a new trap destination:

1. Click **Add new**
2. In the window that appears, enter the Trap Destination IP Address, Port, and Security Model (SNMP v1 or v3). If choosing SNMP v3, enter the User Name and Password. The IP address can be the same as the managing computer. The events log will be stored at the address(es) chosen.



New Trap Destination

IP Address: 1.2.3.6 Port: 162

Security Model: SNMP v1 ▼

User Name: Password:

Cancel Save

- Once you are finished, click **Save** to have your changes take effect.

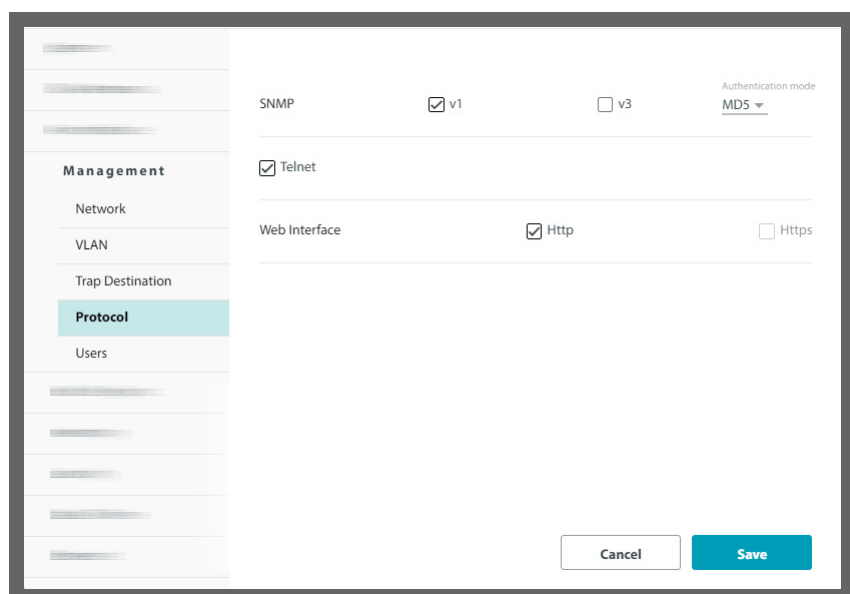


To change (edit or delete) a trap destination:

- To delete a trap destination, click the trash icon (🗑️) on the same line as the IP address.
- To edit a destination, click the configuration icon (⚙️) on the same line as the IP address.
- In the window that appears, change the parameters you wish to change (Trap Destination IP Address, Port, and/or Security Model). If choosing SNMP v3, enter the User Name and Password. The IP address can be the same as the managing computer. The events log will be stored at the address(es) chosen.
- Once you are finished, click **Save** to have your changes take effect.

Protocols

You can set the management protocol as well as the authentication mode.



SNMP ☒ v1 ☐ v3 Authentication mode: MD5 ▼

☒ Telnet

Web Interface ☒ Http ☐ Https

Cancel Save

SNMP

SNMP support is permanently enabled. You may choose between SNMPv1, SNMPv3 or both.

You can leave the default authentication mode for SNMPv3 as MD5 (message digest algorithm), or change it to SHA1 (secure hash algorithm).

Telnet

Telnet can be enabled only for units that have this feature (LFF, SFF, and JET).

For a sector managed as part of a network, direct access to a HBS/HSU using Telnet is considered to be a security breach. Telnet access may be enabled or disabled by clicking the Protocol tab and enabling/disabling Telnet access using the Telnet check-box. For further details about Telnet access see page 5-80.

Web Interface

Only relevant for the RADWIN JET DUO, SU **PRO/AIR** EMB or SU **PRO/AIR** INT.

- The unit can be configured for HTTP, HTTPS, or both. To do this, place a checkmark in the box next to the protocol you want from the **Web Interface** line.
- The next time you log on to the unit's Web Interface, use the protocol you chose here.
- An admin user must be logged in with HTTPS to make changes in users.

Once you are finished, click **Save** to have any changes take effect.

Users

Here an admin user can define users, and assign to them a pre-defined category. The admin user must be logged in using HTTPS. Once you define a user, that person can use the name and password to log in.

User Name	Profile	Last Access time	
observer	observer	0	
admin	admin	0	
installer	installer	0	
operator	operator	0	

Management

Network

VLAN

Trap Destination

Protocol

Users

Add new Cancel Save

Possible user profiles are as follows:

User Profile	Function	Default Password
Observer	Monitoring	netobserver
Operator	Installation, configuration	netpublic
Installer	Operator plus set-band	netinstaller
Admin	Installer plus define users (in other words, Everything)	netwireless

New user:

Click **Add new**, and the New User window will open.



To add or edit a user, you must be logged in via secure HTTP. Do this by making sure that HTTPS is selected (from a selected HBS, click the Configure icon, then from Management -> Protocols, select the HTTPS box. Then log in using the same IP address as before, but add https:// before its address.

1. Enter a convenient name for the new user
2. Choose the profile for this user. The profile determines what the user can and cannot do.
3. Set the password for this user, and confirm it.
4. Click **Save** to have your changes take effect.
5. You will see the new user in the Users list.

Edit user:

Click the configuration icon (⚙️), and the Edit User window will open.

1. Change the name, if needed
2. Change the profile, if needed. This determines what the user can and cannot do.
3. Set the password for this user, and confirm it. This must be done no matter what action you take here.
4. Click **Save** to have your changes take effect.
5. You will see the edited user in the Users list.

Remove user:

You cannot remove the pre-defined users

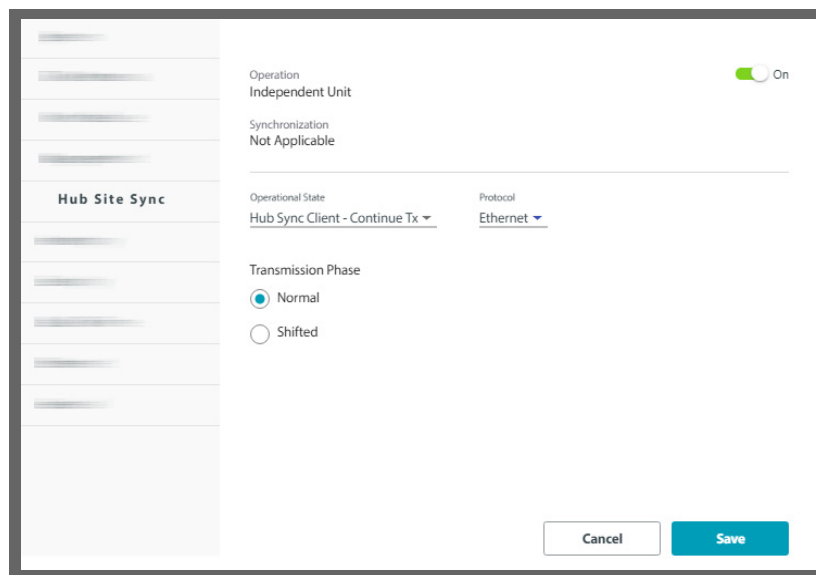
1. Click on the trash icon () to remove the user.
2. The user will be removed from the Users list.

Hub Site Sync (HBS only)

If there are co-located radio units with your HBS, they can interfere with each other. The Hub Site Synchronization (HSS) feature was created to prevent this.

To enable Hub Site Synchronization, click **On**.

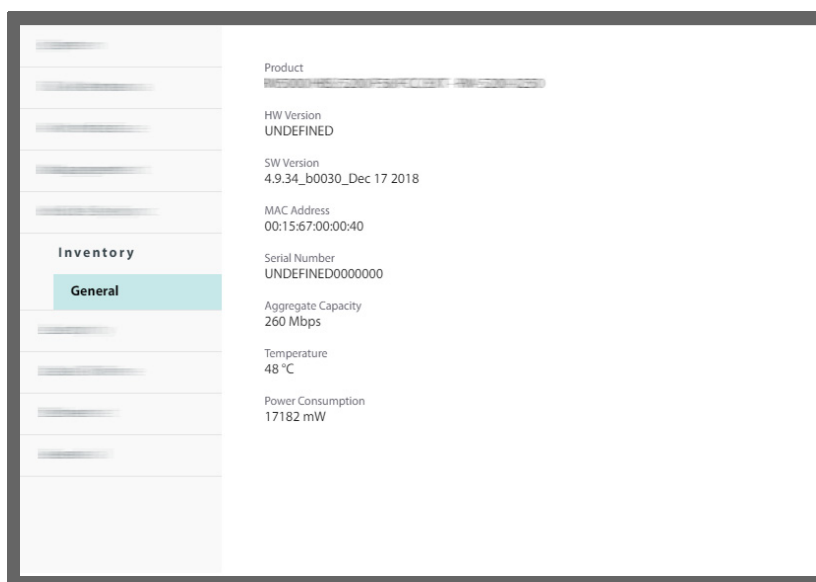
See the *Hub Site Synchronization Application Note* for more details.



Inventory

This shows the identification information for the selected unit: Product version, hardware version and software version, MAC address, serial number, aggregate capacity, the present temperature inside the unit, and the unit's power consumption.

Note you cannot see the IP address here. Go to **Configure -> Management -> Network** to see the IP address of the selected unit.



Security

The Security dialog enables you to change the SNMP Community strings.

If the selected unit is an HBS, you can also create an encrypted SNMP Community string value file, set and change the Link Password, and the present User Password.

SNMP Communities

Each radio unit communicates with the managing computer using the SNMPv1 or SNMPv3 protocol. The SNMPv1 protocol defines three types of communities:

- Read-Only for retrieving information from the radio unit
- Read-Write to configure and control the radio unit
- Trap used by the radio unit to issue traps

The read-write Community strings and read-only Community strings have a minimum of five alphanumeric characters. Changing the trap Community is optional.

Editing SNMPv1 Community Strings

When editing these strings, both read-write and read-only communities must be defined.

➤ To change a Community string:

1. Type the current read-write Community in the **Current Read-Write Community** field (default is **netman**).
2. Click the check box next to the community whose string you wish to change.
3. Type the new Community string and re-type to confirm. A community string must contain at least five and no more than 32 characters excluding SPACE, TAB, and any of ">#@|*?;."
4. Click **Save** to have your changes take effect.

Link Password

The Link Password enables enhanced security for the link. It is not the same as the user password.

This item is available as follows:

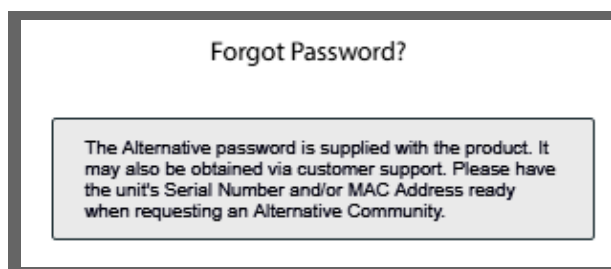
- At an isolated HBS (No active HSUs)
- At an isolated HSU
- Never for an active HSU

The default password is **wireless-p2mp**.

➤ **To change the link password:**

1. Select **Security -> Link Password**. The Link Password dialog box opens.

2. Enter the current link password (The default link password for a new unit is **wireless-p2mp**).
If you have forgotten the Link Password, click **Forgot Password?**. The following tool tip is displayed:



Follow the instructions in the tool tip to use the Alternative Link Password, and click **OK** to finish. Continue with the next step.

3. Enter a new password.
4. Retype the new password in the Confirm field.
5. Click **Save**.
6. Click **Yes** when asked if you want to change the link password.
7. Click **OK** at the *Password changed* success message.



Note

- A link password must contain at least eight but no more than 16 characters excluding SPACE, TAB, and any of ">#@|*?;,"
- Restoring Factory Defaults returns the Link Password to **wireless-p2mp**.

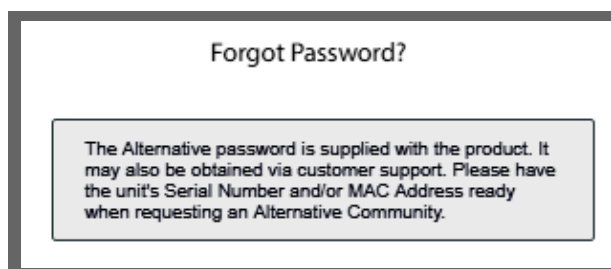
User Password (HBS only)

➤ **To change the user password of the present user:**

1. Select **Security -> User Password**. The User Password dialog box opens.

2. Enter the current password.

If you have forgotten the password, click **Forgot Password?** The following tool tip is displayed:



Follow the instructions in the tool tip to use the Alternative Link Password, and click **OK** to finish. Continue with the next step.

3. Enter a new password.
4. Retype the new password in the Confirm field.
5. Click **Save**.
6. Click **Yes** when asked if you want to change the password.
7. Click **OK** at the *Password changed* success message.



- A user password must contain at least eight but no more than 16 characters excluding SPACE, TAB, and any of ">#@|*?;,"

Date & Time

Here you can set the date and time of the selected unit, whether manually, based on local time or on an NTP Server.

The radio unit maintains a date and time. The date and time should be synchronized with any Network Time Protocol (NTP) version 3 compatible server.

During power-up the radio attempts to configure the initial date and time using an NTP Server. If the server IP address is not configured or is not reachable, a default time is set.

When configuring the NTP Server IP address, you should also configure the offset from the Universal Coordinated Time (UTC). If there is no server available, you can either set the date and time, or you can set

it to use the date and time from the managing computer. Note that manual setting is not recommended since it will be overridden by a reset, power up, or synchronization with an NTP Server.



The NTP uses UDP port 123. If a fire wall is configured between the radio and the NTP Server this port must be opened.
It can take up to 8 minutes for the NTP to synchronize the radio date and time.



To set the date and time:

1. Determine the IP address of the NTP server to be used.
2. Test it for connectivity using the command (Windows XP and 7), for example:
w32tm /stripchart /computer:216.218.192.202

3. If entering an IP address for the NTP Server, enter the new address.
4. Set your site Offset value in minutes ahead or behind GMT¹.
5. To manually set the date and time, click the calendar icon and choose the new date, then click the spinner next to Time to choose the time.
6. To set the time based on the time of the managing computer, click Use Computer Time.
7. Click **Save** to have your changes take effect.

Ethernet (HBS only)

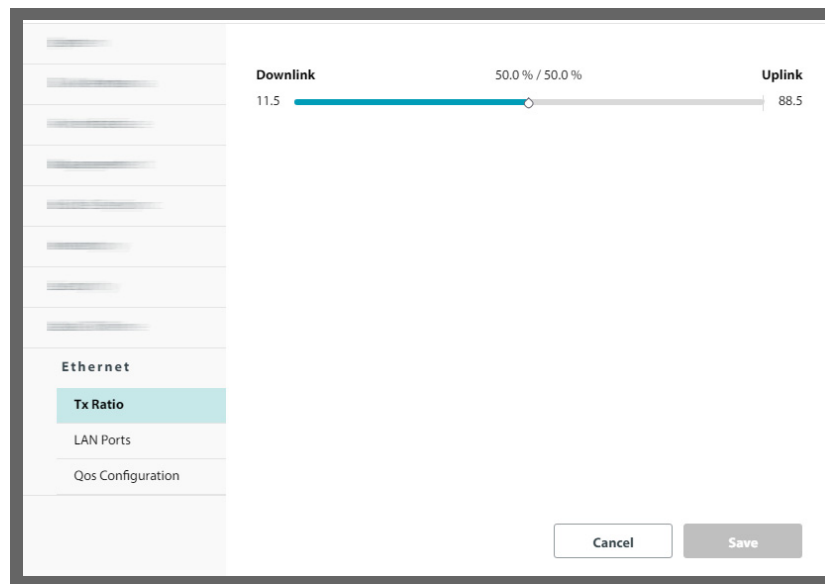
In this category, you can configure the ratio between the uplink and downlink (Tx Ratio), the input ports on the unit, and the QoS (quality of service).

Tx Ratio

The **Tx Ratio** (Transmission Ratio, Asymmetric Allocation) shows the allocation of throughput between downlink and uplink traffic at the HBS. The Transmission Ratio is not only sector-wide: If you use Hub Site Synchronization to collocate several HBSs (to cover adjacent sectors), they must all use the same Transmission Ratio.

1. Move the slider to the right or left to determine the Tx Ratio.
2. Click **Save** to have your changes take effect.

¹ Greenwich Mean Time



Caution

The allowable range is from 50/50 % to 88/11 %. Setting values beyond this range will cause unpredictable results.

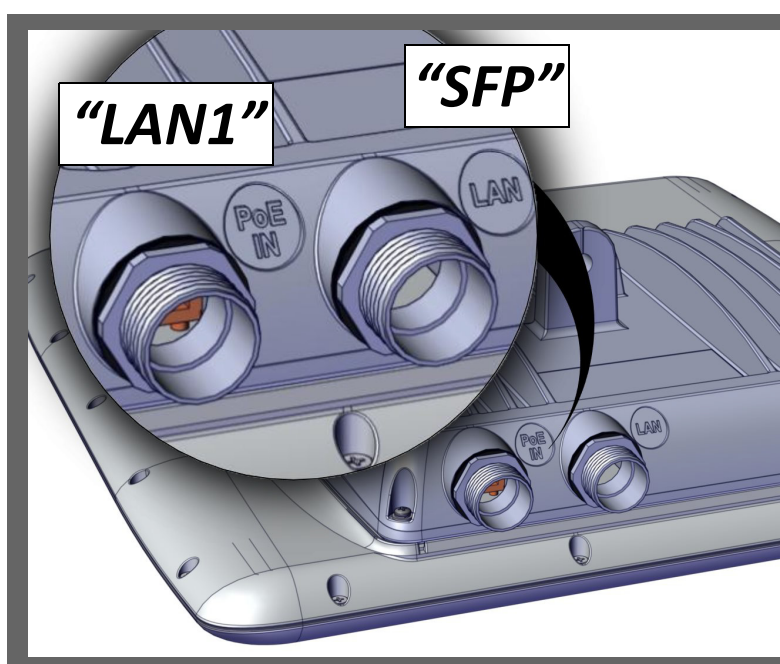
You must ensure that the range remains within allowable values. There is no fail-safe.

The effective available range for symmetric allocation is determined by channel bandwidth as shown as well as link distance. In this context, “link” is any collocated RADWIN HBS, not necessarily a RADWIN JET DUO.

LAN Ports

There are two ports, called LAN1 and SFP:

- LAN1 refers to the port on the radio unit labeled “PoE IN” and can carry data as well as power.
- SFP refers to the port on the radio unit labeled “LAN” and functions as an SFP port which can carry data only.



- The LAN1 input port is configurable for line speed (10/100/1000BaseT) and duplex mode (half or full duplex).
- Line speed 1000BaseT is only available if the HBS is connected to a GbE PoE device.
- An Auto Detect feature is provided, whereby the line speed and duplex mode are detected automatically using auto-negotiation. Use manual configuration when attached external equipment does not support auto-negotiation. The default setting is Auto Detect.
- The SFP input port can only be set as Auto Detect or Disable.
- CRC Errors shows how many Cyclic Redundancy Check errors occurred since the last rest.

The screenshot shows the configuration interface for the LAN1 and SFP ports. On the left, a sidebar lists 'Ethernet' settings, including 'Tx Ratio', 'LAN Ports' (highlighted), and 'QoS Configuration'. The main area is divided into two sections: 'LAN1' and 'SFP'. Each section has a table with columns: 'Current', 'Mode', 'CRC Errors', and 'Main Data Path'. In the 'LAN1' section, the 'Current' value is '1Gbps/Full Duplex', the 'Mode' dropdown is open showing options like 'Auto (100 Mbps)', '10Mbps/Half Duplex', and 'Auto Detect', 'CRC Errors' is '0', and 'Main Data Path' has a checkbox. The 'SFP' section shows 'Current' as 'Not Connected', 'Mode' as a dropdown, 'CRC Errors' as '0', and 'Main Data Path' as a checkbox. At the bottom are 'Cancel' and 'Save' buttons.



Although you can use the LAN (ie, “SFP”) port for traffic and/or management, you still must connect voltage to the PoE IN port (“LAN1”).

QoS Configuration (HBS side)

QoS (Quality of Service) is a technique for prioritization of network traffic packets during congestion.

RADWIN JET DUO sectors support two classification criteria: VLAN based or Diffserv based. You may choose which of them to use. To work with them properly you must be familiar with the use of VLAN (802.1p) or Diffserv.

This section describes how to configure QoS for the HBS for the whole sector. However, to fully configure QoS properly, you must also configure it for each HSU in turn. To configure QoS for a single HSU, see [QoS Configuration \(HSU side\)](#) on page 36.

Based upon the classification criterion chosen, received packets will be mapped into one of four quality groups: Real time, Near real time, Controlled load or Best effort. You may partition the total link capacity across the four Quality queues. The default weights as percentages are shown in the table below:

Quality queue	Priority	
	Diffserv	VLAN
Real time	48-63	6-7
Near real time (responsive applications)	32-47	4-5

Quality queue	Priority	
	Diffserv	VLAN
Controlled load	16-31	2-3
Best effort	0-15	0-1

You can also define part of the link capacity as carrying Voice-over-IP traffic. This is similar to defining part of it as Real time (see [Enabling a VoIP Queue \(HBS side\)](#) on page 32).

1. From the Mode pull-down menu, Choose either the VLAN or Diffserv method.
2. For the method you selected, type the Priority Mapping for each queue. This determines the mapping (or translation) of the priority mapping of the traffic to what is used by the RADWIN JET DUO. Default settings for Diffserv and VLAN are as shown in the next two figures:

Mode: VLAN

Queue	Priority Mapping
<input checked="" type="checkbox"/> Real Time	6 - 7
<input checked="" type="checkbox"/> Near Real Time	4 - 5
<input checked="" type="checkbox"/> Controlled Load	2 - 3
<input checked="" type="checkbox"/> Best Effort	0 - 1

☒ Enable Voice Over IP for all HSUs

To enable QoS, this must also be enabled for each HSU separately

To enable VoIP, this must also be enabled for each HSU separately

Buttons: Cancel, Save

Mode: DiffServ IPv4, IPv6

Queue	Priority Mapping
<input checked="" type="checkbox"/> Real Time	48 - 63
<input checked="" type="checkbox"/> Near Real Time	32 - 47
<input checked="" type="checkbox"/> Controlled Load	16 - 31
<input checked="" type="checkbox"/> Best Effort	0 - 15

☒ Enable Voice Over IP for all HSUs

To enable QoS, this must also be enabled for each HSU separately

To enable VoIP, this must also be enabled for each HSU separately

Buttons: Cancel, Save

3. If you un-check a queue, this queue will be ignored for the sector. It will not prevent the HSU from configuring traffic labeled with this priority level as “live”; it will merely ignore its priority

level, as if the traffic was not assigned with any priority level whatsoever. You cannot un-check the Best Effort queue.

Note the following:

- You can enable QoS from either the HBS or the HSU. If enabled from the HSU, it is done for that HSU only, and its HBS. If done from the HBS, it is done sector-wide.
- If QoS is enabled from the HBS, it is applied to all HSUs presently connected to the sector. For HSUs connected to the sector after QoS was defined, do one of the following:
 - Enable QoS on those individual HSUs (this is the intention of the note “To enable QoS, this must also be enabled for each HSU separately”), or
 - Re-enable it for the whole sector from the HBS.
- To configure QoS from the HSU side, see [QoS Configuration \(HSU side\)](#) on page 36.

Enabling a VoIP Queue (HBS side)

Note the following:

- You can enable a VoIP queue from either the HBS or the HSU¹. If enabled from the HSU, it is done for that HSU only, and its HBS. If done from the HBS, it can be done sector-wide. To enable a VoIP queue from the HBS, select **Enable Voice Over IP for all HSUs**.
- If a VoIP queue is enabled from the HBS, it is applied to all HSUs presently connected to the sector. For HSUs connected to the sector after the VoIP queue was defined, do one of the following:
 - Enable VoIP on those individual HSUs (this is the intention of the note “To enable VoIP, this must also be enabled for each HSU separately”), or
 - Re-enable it for the whole sector from the HBS.
- To configure VoIP from the HSU side, see [Enabling a VoIP Queue \(HSU side\)](#) on page 37.
- The VoIP feature as implemented here assumes that your end-user has a gateway or other network device that defines the traffic to be VoIP with the correct QoS defined (VLAN or DiffServ, in accordance with your configuration done here). The definition must be done at both ends of the data stream.
- Enabling a VoIP queue may decrease the sector’s peak throughput in some scenarios. Therefore, make sure that you absolutely need to enable a VoIP queue before doing so.
 1. Click **Voice Over IP**. The Real Time queue will become disabled. This means that VoIP traffic is treated in a similar fashion to Real Time traffic. VoIP works whether you are using VLAN or Diff-Serv.
 2. Optionally, apply VoIP to all of the HSUs in the sector by clicking on **Enable Voice Over IP for all HSUs**.
 - If you do not choose this, you must go to each HSU for which you want to enable a VoIP queue, and enable it there.
 3. Click **Save** to have your changes take effect.



Make sure the “Mode” selected is the proper one, is consistent throughout your configuration, and that your end-user has equipment that also defines its VoIP traffic with the Mode you defined here.

1. Not available for the SU **PRO/AIR EMB**, SU **PRO/AIR INT**, or small form-factor HBS units.

Queue	Priority Mapping
<input checked="" type="checkbox"/> Real Time	6 - 7
<input checked="" type="checkbox"/> Near Real Time	4 - 5
<input checked="" type="checkbox"/> Controlled Load	2 - 3
<input checked="" type="checkbox"/> Best Effort	0 - 1

☐ Enable Voice Over IP for all HSUs

General (HBS only)

In this category, you can configure the Aging Time, and enable/disable Backwards Compatibility Discovery and Broadcast Flooding Protection.

Aging Time
300 seconds

☒ Backwards Compatibility Discovery ⓘ

☒ Broadcast flooding protection

Aging Time

The HBS works in Bridge Mode. In Bridge mode, it performs both learning and aging, forwarding only relevant packets over the sector. The aging time of the HBS is by default 300 seconds, although you can change this value here.

Backwards Compatibility Discovery

This allows HSUs with firmware older than Release 4.6 (those without the percentage-based DBA mechanism) to discover HBSs with Release 4.6 or above. To work properly, the firmware of the HSU must be upgraded to firmware that is compatible with that of the HBS.

Broadcast Flooding Protection

Broadcast Flooding Protection provides a measure of protection by limiting broadcast packets. This feature works in the downlink direction only.

You may wish to disable this feature if your application is based on broadcast packets.

Service (HSU only)

This category has four sub-categories:

Resources - set the resource type (CIR or BE)

Mir (Maximum Information Rate)

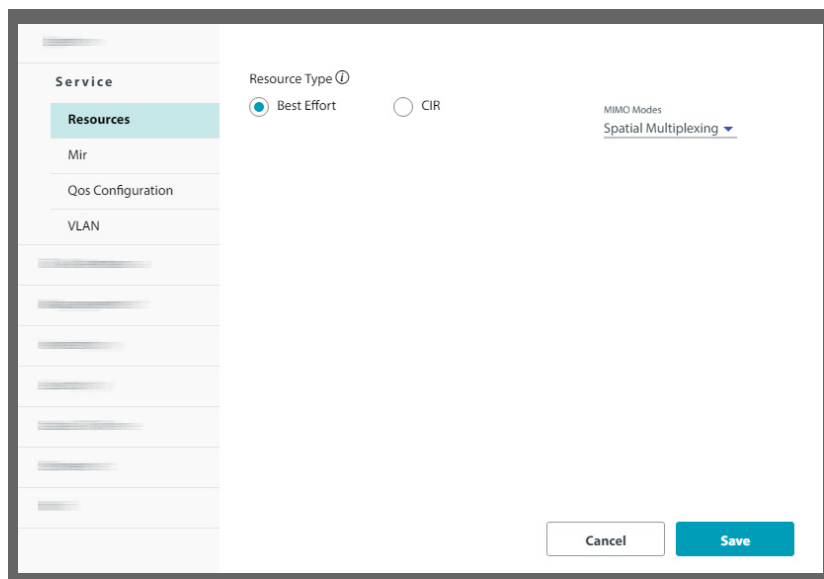
QoS Configuration (HSU side)

VLAN

Resources

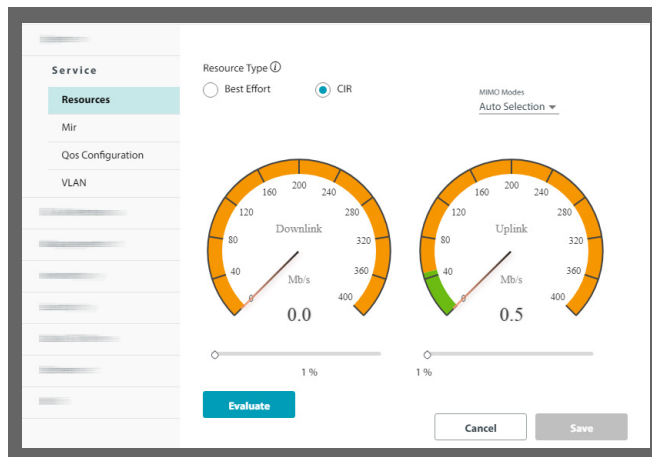
Even after an HSU is registered, you can change these settings here: Resource type and MIMO mode.

- Select the **Resource Type** for the selected HSU. This can be CIR (Committed Information Rate), or BE (Best Effort):
 - **BE** (Best Effort) grants the HSU resources as they become available in the sector.
 - **CIR** (Committed Information Rate) grants the HSU with a certain guaranteed percentage of resources already allocated to CIR traffic in the sector. That percentage is set in the MIR window.
- Select a **MIMO Mode** for the selected HSU:
 - **Spatial Multiplexing** (default) splits the data into two streams on transmission and recombines it on reception providing maximum throughput. This provides a higher throughput.
 - **Diversity** transmits the same data on both streams. This mode helps to ensure more reliable data transmission in a noisy environment, although throughput will be lower.
 - **Auto Selection** instructs the system to choose whichever mode is most efficient.

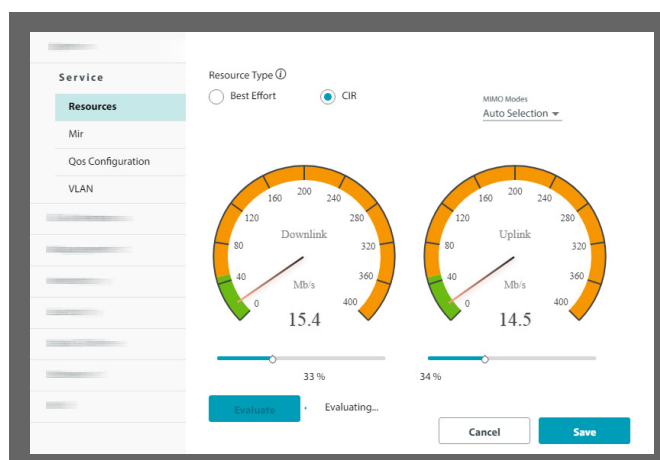


- Click **Save** to have your changes take effect.

If you chose the CIR resource type, CIR evaluate window will appear.



- Click the **Evaluate** button.
Service evaluation takes a few seconds during which an “Evaluating ... ” message is displayed.



After the initial evaluation, dynamic monitoring of the sector is maintained. This allows you to add HSUs in the sector, and the available resources are adjusted automatically.

- Use the sliders to choose the percentage of resources (uplink and downlink) already allocated to CIR traffic in the sector to be allocated to the selected HSU.
- Click **Save** to have your changes take effect.

Mir (Maximum Information Rate)

Although this is set during registration, you can change it here.

Use the sliders to set here the maximum throughput rate you want for the specific HSU in each direction: down link, and up link. You can choose a value, or click the Unlimited checkbox.

Click **Save** to have your changes take effect.

QoS Configuration (HSU side)

This section describes how to configure QoS for an individual HSU. To see how to configure QoS for the whole sector, that is, from the HBS, see [QoS Configuration \(HBS side\)](#) on page 30.

Queue	Strict / Weight %	Maximum Information Rate Mbps
Real Time	↑ 15	0.5
Active Voice over IP	↓ 15	0.5
Near Real Time	↑ 20	0.5
Active	↓ 20	0.5
Controlled Load	↑ 22	0.5
Active	↓ 14	0.5
Best Effort	↑ 40	0.5
Active	↓ 40	0.5
Total uplink	97 %	
Total downlink	89 %	

1. Enable the **Mode** field. ([Enabling a VoIP Queue \(HSU side\)](#) for VoIP).
2. Set the **weight percentage** for each queue by moving the spinners up or down. Light blue for uplink, pink for downlink.

The weight percentage determines what percentage of the throughput will be dedicated for the indicated queue.

The total weight is shown in the lower part of the window. If you exceed 100% total weight, you will receive an error message.

If you are under-booked, for example by setting a queue to zero, the unused weight will be distributed to the remaining queues. The effect of doing this will only become apparent under congestion. In particular, a queue set to zero weight will become nearly blocked under congestion with packets passing through on a best effort basis.

3. **Strict:** If you place a checkmark in the Strict box, **all traffic** of the specific queue will be passed through. The Weight percentage will become disabled. Placing a checkmark here can only be done in order: First Real Time, then finally Best Effort. That is, you cannot place a checkmark in Near Real Time without one in Real Time as well. Like the weight percentage, uplink and downlink are configured separately.
4. **Maximum Information Rate:** Although the weight percentage affects how much relative traffic will be allowed through, you can set here the absolute maximum to allow through. Place a checkmark to make this valued unlimited.
5. **Configure same as** : This allows you to copy the VoIP configuration of a different HSU. From this pull-down menu, choose the HSU whose configuration you want to copy. The settings will appear.

Enabling a VoIP Queue (HSU side)

Note the following:

- You can enable a VoIP queue from either the HBS or the HSU¹. If enabled from the HSU, it is done for that HSU only, and its HBS. If done from the HBS, it can be done sector-wide.
 - To configure VoIP from the HBS side, see [Enabling a VoIP Queue \(HBS side\)](#) on page 32.
 - The VoIP feature as implemented here assumes that your end-user has a gateway or other network device that defines the traffic to be VoIP with the correct QoS defined (VLAN or DiffServ, in accordance with your configuration done here). The definition must be done at both ends of the data stream.
 - Enabling a VoIP queue may decrease the unit's peak throughput in some scenarios. Therefore, make sure that you absolutely need to enable a VoIP queue before doing so.
1. Click **Voice over IP**. The Voice over IP indicator will turn green.

Resources	Queue	Strict / Weight %	Maximum Information Rate Mbps
Mir	Real Time	↑ <input checked="" type="checkbox"/> 0	0.5 <input type="checkbox"/> Unlimited
Qos Configuration	Active	↓ <input checked="" type="checkbox"/> 0	0.5 <input type="checkbox"/> Unlimited
VLAN	Near Real Time	↑ <input type="checkbox"/> 20	0.5 <input type="checkbox"/> Unlimited
Tx & Antenna	Active	↓ <input type="checkbox"/> 20	0.5 <input type="checkbox"/> Unlimited

The weight percentages of the Real Time queue will become zero in both the uplink and downlink directions. This means that VoIP traffic is treated in a similar fashion to Real Time traffic.

VoIP works whether you are using VLAN or DiffServ, but you must be consistent with this QoS mode throughout the data stream.

2. Click **Save** to have your changes take effect.

VLAN

Configure a VLAN for traffic here. To configure the management VLAN, see [VLAN](#) on page 16.

VLAN configuration is carried out per HSU. It is up to you to ensure consistency between the HSUs.

If VLAN is not enabled, ethernet frames pass transparently over the radio links.

VLAN Background Information

The standards defining VLAN Tagging are IEEE_802.1Q and extensions.

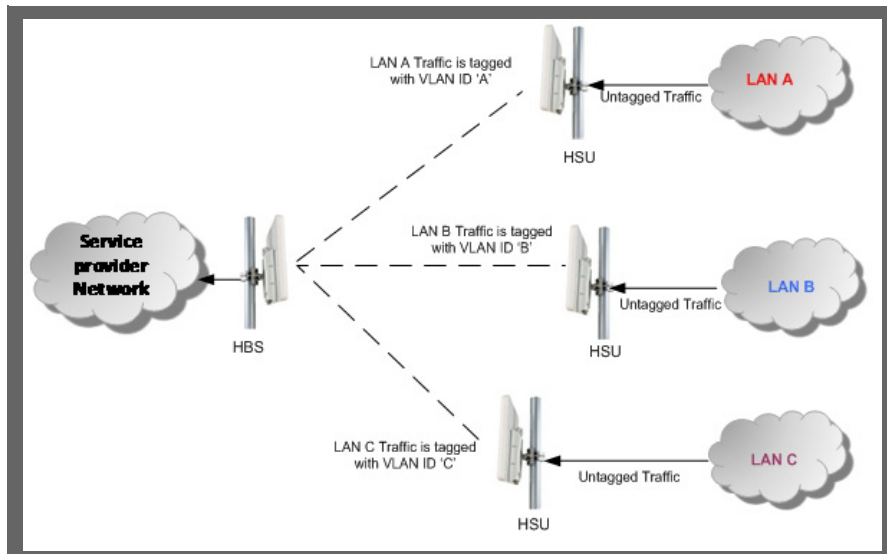
For general background about VLAN see http://en.wikipedia.org/wiki/Virtual_LAN.

Background information about **Double Tagging** also known as **QinQ** may be found here: <http://en.wikipedia.org/wiki/802.1QinQ>.

1. Not available for the SU **PRO/AIR EMB**, SU **PRO/AIR INT**, or small form-factor HBS units.

VLAN Tagging

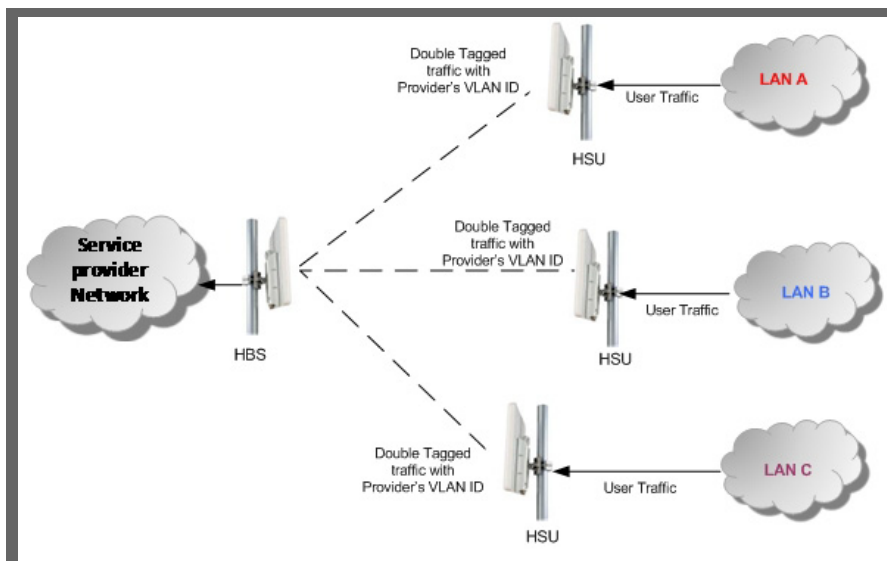
VLAN tagging enables multiple bridged networks to transparently share the same physical network link without leakage of information between networks.



IEEE 802.1Q is used as the encapsulation protocol to implement this mechanism over Ethernet networks.

QinQ (Double Tagging) for Service Providers

QinQ is useful for Service Providers, allowing them to use VLANs internally in their “transport network” while mixing Ethernet traffic from clients that are already VLAN-tagged.



The outer tag (representing the Provider VLAN) comes first, followed by the inner tag. In QinQ the EtherType = 0x9100. VLAN tags may be stacked three or more deep.

When using this type of “Provider Tagging” you should keep the following in mind:

- Under Provider Tagging, the system double-tags egress frames towards the Provider’s network. The system adds a tag with a VLAN ID and EtherType = 0x9100 to all frames, as configured by the service provider (Provider VLAN ID).
- The system always adds to each frame, tags with VLAN ID and EtherType = 0x9100. Therefore,
 - For a frame without a tag – the system will add a tag with VLAN ID and EtherType = 0x9100 so the frame will have one tag
 - For a frame with a VLAN tag – the system will add a tag with VLAN ID and EtherType = 0x9100 so the frame will be double-tagged

For a frame with a VLAN tag and a provider tag – the system will add a tag with VLAN ID and EtherType = 0x9100 so the frame will be triple-tagged and so on.

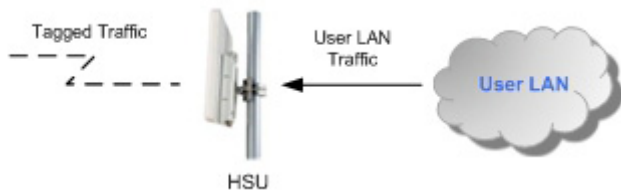

At the egress side, the HSU removes the QinQ tag with EtherType = 0x9100 no matter what the value of its VLAN ID.

Port Setting

In a RADWIN JET DUO sector, all VLAN activity is configured and supported from the HSUs.

The HSU management port can be configured to handle Ethernet frames at the **ingress direction** (where frames enter the HSU) and at the **egress direction** (where frames exit the HSU).

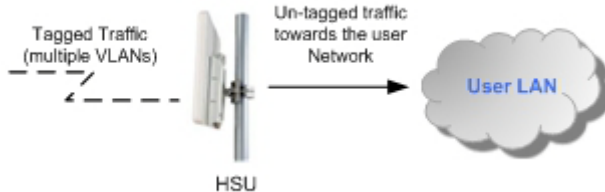
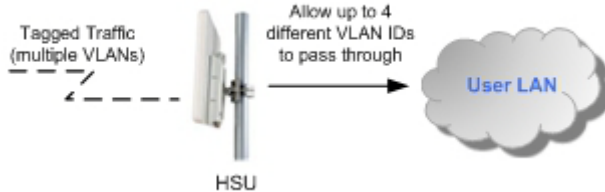
Ingress Direction

Transparent	The port 'does nothing' with regard to VLANs - inbound frames are left untouched.
Tag	<p>Frames entering the HSU port without VLAN or QinQ tagging are tagged with VLAN ID and Priority^a, which are preconfigured by the user. Frames which are already tagged at ingress are not modified and pass through.</p> 
Provider tag	<p>Frames entering the HSU port are tagged with provider's VLAN ID and Priority which are preconfigured by the user. Frames which are already tagged with Provider tagging at the ingress are not modified and passed through.</p> 

a. Priority Code Point (PCP) which refers to the IEEE 802.1p priority. It indicates the frame priority level from 0 (lowest) to 7 (highest), which can be used to prioritize different classes of traffic (voice, video, data, etc).

Egress Direction

Transparent	The port 'does nothing' with regard to VLANs - outbound frames are left untouched.
--------------------	--

Untag all	<p>Port configured to untag user VLAD tags for all frames.</p> 
Filter	

Before proceeding, note the following:



Caution

If you are **not** a VLAN expert, please be aware that incorrect VLAN configuration may cause havoc on your network. The facilities described below are offered as a service to enable you to get best value from your RADWIN JET DUO links and are provided “as is”. Under no circumstances does RADWIN accept responsibility for network system or financial damages arising from incorrect use of these VLAN facilities.

Management Traffic and Ethernet Service Separation

You can define a VLAN ID for management traffic separation. You should configure the system to prevent conflicts:

When configured for the default operational mode, a “Provider port” will handle ingress traffic as follows:

- Filters frames that are not tagged with the Provider VLAN ID
- Removes the Provider double tag

Therefore, if a port is configured for management traffic separation by VLAN and as ‘Provider port’, then the received management frames must be double tagged as follows:

- The outer tag has to be the Provider’s tag (so the frame is not filtered)
- The internal tag has to be management VLAN ID

To avoid mix-ups, best practice is to:

- Separate the management and data ports
- Define only a data port with Provider function



Note

If traffic VLAN tagging is in force for the HSU ingress direction and management VLAN is in use at the HBS (see [VLAN](#) on page 16), then the VLAN ID at the HSU ingress direction must be the same as the VLAN ID for management at the HBS.

VLAN Configuration

1. Select the HSU to be configured, open the Configuration icon, click Service -> VLAN.

2. You can configure VLAN for LAN1 and for LAN2 separately.
3. Click **Off** to enable the VLAN window. It will turn to **On**.

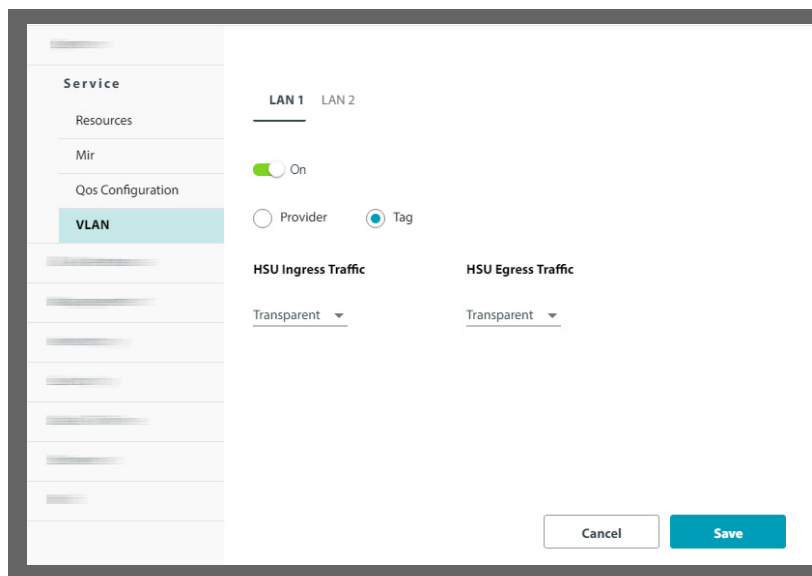
4. If you are using Provider tagging, click the Provider Radio button.
5. In **Provider** mode, Ethernet frames are tagged with the provider's VLAN ID before they enter into the provider's network/backbone.
6. Enter a Provider VLAN ID and Priority. The VLAN ID must be in the range 2 to 4094. The VLAN Priority must be in the range 0 to 7. You may also change the TPID from the default as shown.



Note

This facility is provided to enable connection through legacy switches requiring it. Otherwise, there is no need to change the TPID.

7. Click **Save** to have your changes take effect.
8. If you are using VLAN tagging, click the **Tag** radio button.
9. In **Tag** mode Ethernet frames are tagged or untagged to distinguish between different networks.



10. For completely transparent passage of tagged frames, there is nothing further to do. Click **Save** to have your changes take effect.
11. However, if you wish to not have transparent passage of frames, the following table shows the possible settings for each combination of Ingress and Egress modes:

Ingress	Transparent	Frames are not modified and are forwarded transparently
	Tag	Enter a VLAN ID (1-4094) and Priority (0-7)

Egress	Transparent	Frames are not modified and are forwarded transparently
	Untag All	All frames with VLAN tag are untagged
	Filter	Allow up to 4 VLAN IDs to be passed through.
	Untag Filtered	Allow VLAN IDs: <ul style="list-style-type: none"> Allow up to 4 VIDs to be passed through. Untag: <ul style="list-style-type: none"> Untag the VLAN tag of the selected VLAN IDs.

12. Click **Save** to have your changes take effect.

WiFi (HSU only)

This is only relevant for the SU **PRO/AIR** EMB or SU **PRO/AIR** INT.

The SSID status, Security method, and On status of the WiFi unit are displayed.

Access Point Mode: Turn On or Off the WiFi for the device. Auto allows the system to determine if WiFi needs to be used.

You can set the following WiFi parameters:

- WiFi password
- WiFi IP address
- WiFi channel
- WiFi Tx power

Connected Clients: This area shows up to 5 clients that are connected to this unit, including their MAC addresses and signal strength (RSSI).




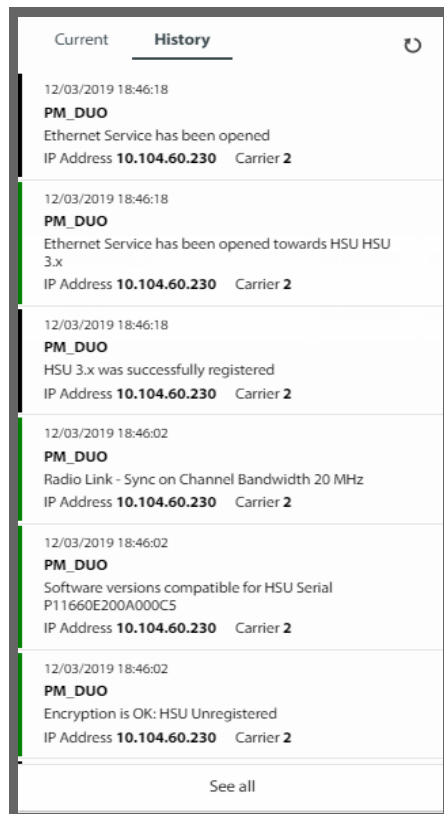
The SSID of the WiFi is R- [serial number of unit]

Click **Save** to have your changes take effect.

3.2.2. Events



1. To display the Events Log, first select the unit or units for which you want to display events. You can select any combination of units.
2. Click on the Events icon in the upper panel of the Web page  ; The events are displayed in the partial Events Log. This is a small version of the complete Events Log, and shows a list of events according to the date and time they occurred, its source, a description of the event, IP address of the source, and on which Carrier the event was recorded.
3. Click **Current** to see alarms since the last log in (these are cleared once the alarm condition is removed), click **History** to see all events recorded.



4. Click **See all** to see the full Events Log.

Events Current History Search by IP, Trap Source, Carrier Download report

RESULTS : 90

Date & Time	Message	Source	IP v4	IP v6	Severity	Carrier	Interface
09/01/2005 , 00:23	Ethernet Service has been opened towards HSU Name192	Name190	10.0.0.190		normal		Radio Interface
09/01/2005 , 00:23	HSU Name192 synchronized	Name190	10.0.0.190		normal		Radio Interface
09/01/2005 , 00:23	Encryption is OK: HSU Name192	Name190	10.0.0.190		normal		Radio Interface
09/01/2005 , 00:23	Software versions compatible for HSU Name Name192	Name190	10.0.0.190		normal		Radio Interface
09/01/2005 , 00:21	HSU Name192 out of sync The reason is: Spectrum analysis	Name190	10.0.0.190		critical		Radio Interface
09/01/2005 , 00:21	Ethernet Service has been closed towards HSU Name192	Name190	10.0.0.190		major		Radio Interface

The Events Log records system failures, loss of synchronization, loss of signal, compatibility problems and other fault conditions and events.

5. The Events Log may be saved as an Excel or PDF file. Click **Download report** to do so.

The Events Log includes the following fields:

- » Date and time stamp
- » Message
- » Trap source (if the source is a radio unit, this is its name)
- » IP address of the unit that initiated alarm - IPv4 or IPv6. Use the pull-down menu here to filter the list according to the indicated criteria.
- » Severity of the trap (color-coded)

Critical

Major



Minor

Warning

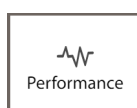
Normal

Info



- » Carrier on which the trap was found (Carrier 1 or Carrier 2)
 - » Interface of the trap
6. Click **Current** to see alarms since the last log in (these are cleared once the alarm condition is removed), click **History** to see all events recorded.
 7. You can filter the list of messages by IP or trap source by entering the desired item in the field at the top center of the window, and clicking the spyglass icon.

3.2.3. Performance



The RADWIN JET DUO Performance Monitoring feature constantly monitors traffic over the radio link and collects statistics data for the air interface and Ethernet ports.

Performance Monitor									
Device		View		LAN		Link			
T42-DUMMY-SERIAL		Current		LAN1		Down		Threshold	
								Refresh	
								Download report	
Integrity	Date & Time	UAS	ES	SES	BRE	Rx MBytes	Tx MBytes	Above Traffic Thresh (100 Mbps)	Active Seconds
✓	09/20/2005, 22:04	0	0	0	0	0	0	0	289

When you click on this icon, the Performance Monitor window opens. It differs slightly if you are accessing an HBS or an HSU.

You have the following options:

- Device** Click this pull-down menu and select a radio to display its results
- View** This pull-down menu has the following options:
 - Current - gives you the latest entry
 - 15 Minutes - provides date in a scroll down list in 15 minute intervals
 - Daily (24 hours) - shows result for the last 30 days at midnight
- LAN** This pull-down menu allows you to show results from LAN1 or LAN2 (see [LAN Ports](#) on page 28 for an explanation of the input ports)
- Link** This pull-down menu allows you to select between the downlink and the uplink directions
- Threshold** Click on this button to set the upper traffic threshold for reporting. The units used depends on the specific parameter. Traffic conditions above the threshold indicate congestion and probably lost frames.
- Refresh** Click on this button to refresh the view to include more recent data.
- Download report** Click on this button to save the report as an Excel file or PDF.

The meaning of the column headings is shown in the following table:

Column Heading	Description
Integrity	Valid data flag: Green tick for current and valid; Red cross for invalidated data. Note that the Performance Monitoring data is not valid if not all the values were stored (e.g., due to clock changes within the interval or power up reset)
Date & Time	Time stamp: Data are recorded every 15 minutes; the last 30 days of recordings are maintained. Roll-over is at midnight.
UAS	Unavailable Seconds: Seconds in which the interface was out of service.
ES	Errored seconds: The number of seconds in which there was at least one error block.
SES	Severe Errored Seconds: The number of seconds in which the service quality was low as determined by the BBER threshold.
BBE	Background Block Error: The number of errored blocks in an interval.
Rx MBytes	Received Mbytes: The number of Megabytes received at the specified port within the interval
Tx MBytes	Transmitted Mbytes: The number of Megabytes transmitted at the specified port within the interval.
Above Traffic Thresh	Threshold set in the previous step: Seconds count when actual traffic exceeded the threshold
Active Seconds	The number of seconds that the configured Ethernet service is active (available for HBS only)

If you have selected an HSU, you will see the following additional parameters:

Column Heading	Description
RSL Thresh 1 (-88dBm)	Receive Signal Level Threshold: The number of seconds in which the Receive Signal Level (RSL) was below the specified threshold.
RSL Thresh 2 (-88dBm)	Receive Signal Level Threshold: The number of seconds in which the RSL was below the specified threshold.
Min TSL (dBm)	Minimum Transmit Signal Level: The minimum of the transmit signal level (measured in dBm)
Max TSL (dBm)	Maximum Transmit Signal Level: The maximum of the transmit signal level (measured in dBm)
TSL Thresh (25 dBm)	Transmit Signal Level Threshold: The number of seconds in which the Transmit Signal Level (TSL) was above the specified threshold
BBER Thresh (1.0%)	Background Block Error Ratio Threshold: The number of seconds in which the Background Block Error Ratio (BBER) exceeded the specified threshold
Rx MBytes	Received Mbytes: The number of Megabytes received at the specified port within the interval

Column Heading	Description
Tx MBytes	Transmitted Mbytes: The number of Megabytes transmitted at the specified port within the interval.
Below Capacity Thresh	Seconds count when throughput fell below the threshold value set in
Above Traffic Thresh	Threshold set in the previous step: Seconds count when actual traffic exceeded the threshold

3.2.4. Spectrum




The Spectrum View utility is an RF survey tool that provides spectral measurement information, power vs. frequency. You can view real-time spectrum information, save results, and view historic spectrum scans. Separate information is generated for the HBS and HSUs - all by selection. The data is stored in the radio unit itself.

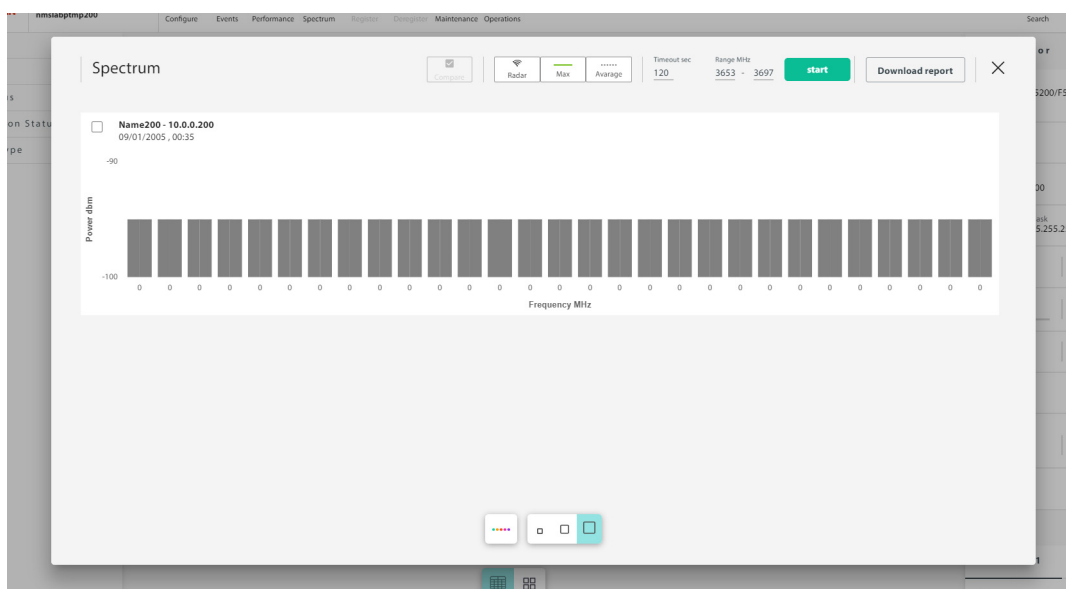
The results of the Spectrum View utility are intended for use by RADWIN Customer Service to assist with diagnosing interference related problems.

Spectrum View can be opened from the HBS, or from an HSU¹, or any combination thereof.

We assume the reader knows about RF Spectrum Analysis so detailed theoretical explanations are not needed.

1. Select the device or devices for which you want to see the Spectrum View. No more than 8 fixed HSUs can be selected.

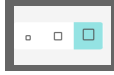
2. Click on the Spectrum View icon  , then choose the carrier for which you want to see the Spectrum View. You can only see it for one carrier at a time. The Spectrum View window will appear.



A blank Spectrum View result display will appear, where all the bars are grey.

The name(s) of the selected unit(s) appear, together with their IP address(es), date and time.

1. Although not from an SU PRO/AIR EMB OR SU PRO/AIR INT

3. The three box icons in the bottom of the window () allow you to adjust the size of the display so you can show results from more than one unit.
4. To start a scan first choose its **Timeout sec** time (top of window), which is the maximum analysis time per scan.
5. Select the frequency range (**Range MHz**, top of window). You can only select allowed frequencies.
6. Once you are ready, click **Start** to start the scan and see the results on screen. You will be warned that this is traffic-affecting. If this is acceptable, then click **Yes**.



Green bars relate to those frequencies you chose when you activated the HBS (see [Activate the DUO Base Station](#) on page 67). Dark green is Antenna A, and light green is Antenna B.

If there are frequencies that you did not choose when you activated the HBS, their bars appear blue.

The frequencies the unit is working at has text that appear blue.

Green lines show the maximum power found for the indicated frequency range.

Dotted lines show the average power found for the indicated frequency range.

Radar shows/hides DFS information

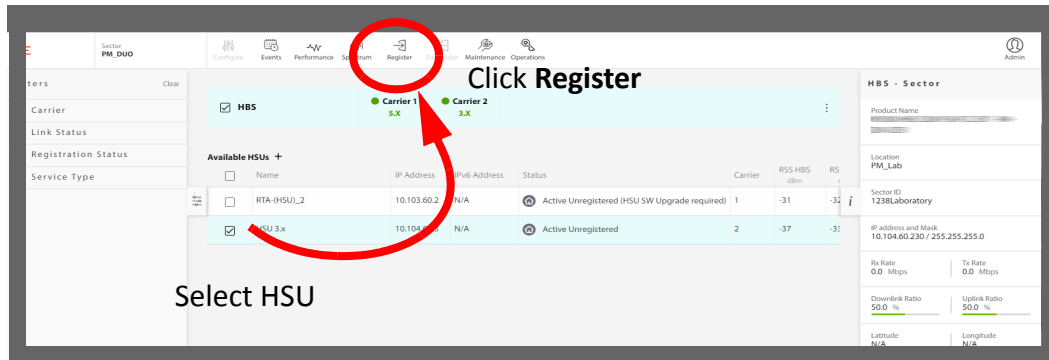
Compare allows you to compare the results from selected units, side-by-side.

7. If you want to save the report, click **Download Report**, and select a location where to save the report file.

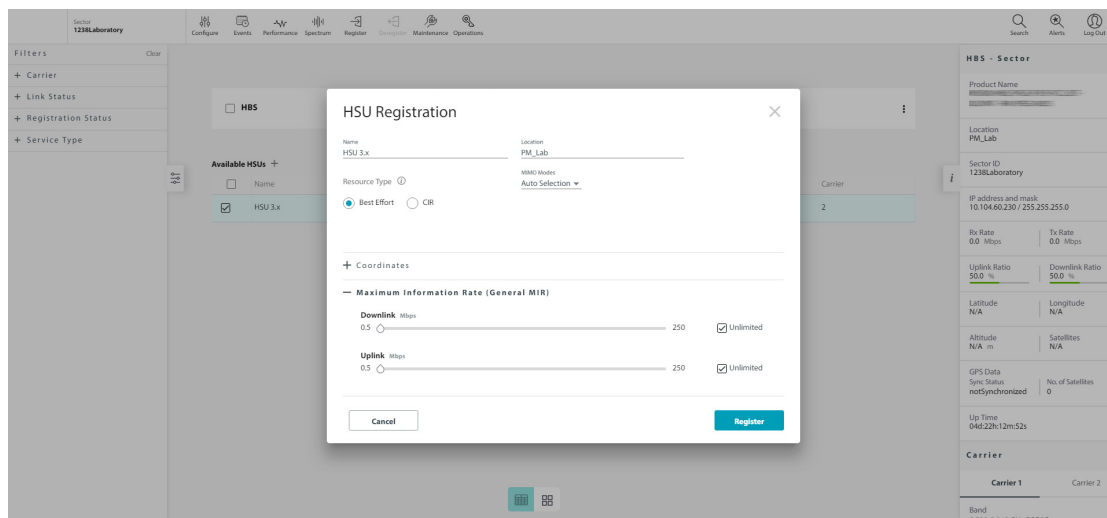
3.2.5. Register



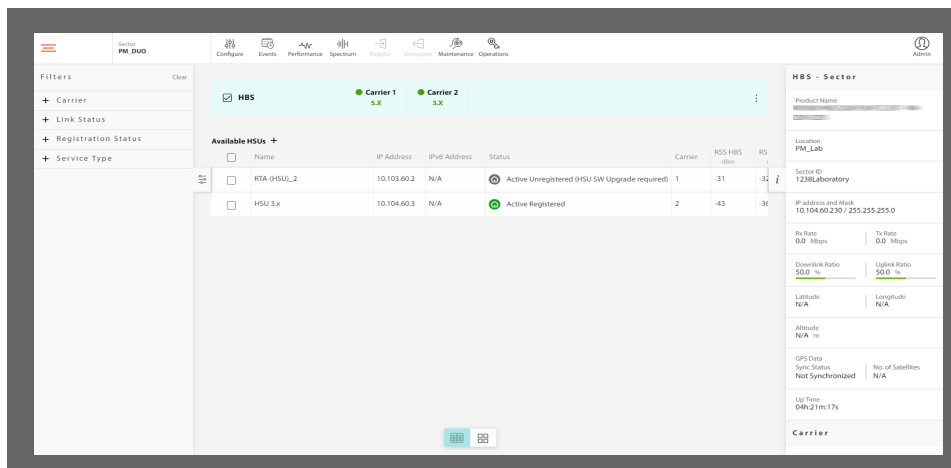
1. Select the HSU you want to register by placing a checkmark next to it:



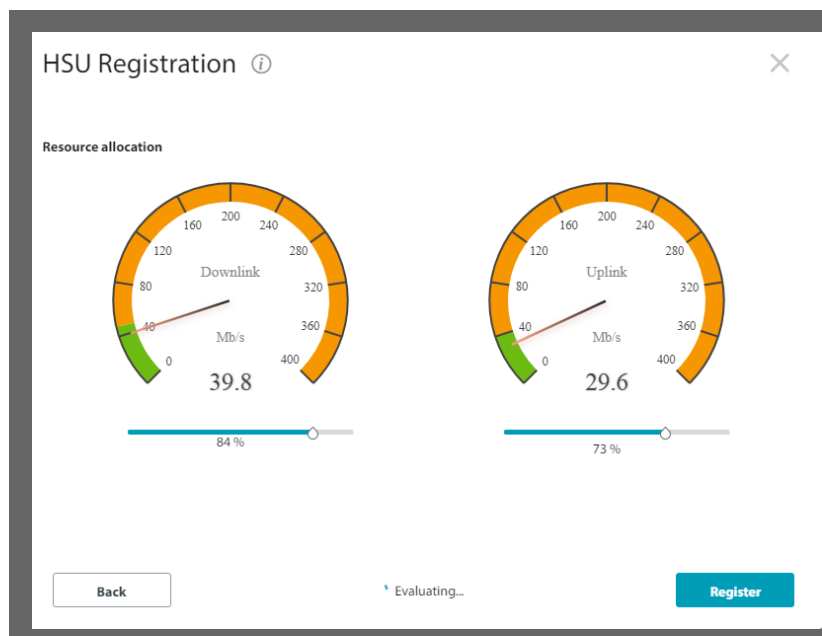
2. Click **Register**. The HSU Registration window will open.



3. You may edit or add the site's **Name**, **Location** and **Coordinates**.
4. If you are registering an SU **AIR** EMB or SU **AIR** INT, the **Resource Type** can only be BE (Best Effort). Skip to Step 6.
5. Select the **Resource Type** for the HSU. This can be CIR (Committed Information Rate), or BE (Best Effort):
 - **BE** grants the HSU resources as they become available in the sector.
 - **CIR** grants the HSU with a certain guaranteed percentage of resources. You set this percentage in the General MIR window.
6. Check a **MIMO Mode** for this HSU:
 - **Spatial Multiplexing** (default) splits the data in to two streams on transmission and recombines it on reception providing maximum throughput. This provides a higher throughput.
 - **Diversity** transmits the same data on from both antennas and check for correctness on reception. This mode helps to ensure more reliable data transmission in a noisy environment, although throughput will be lower.
 - **Auto Selection** instructs the system to choose whichever mode is most efficient.
7. Optionally, you can choose the **Maximum Information Rate**. Use the sliders to set here the maximum throughput rate you want for the specific HSU in each direction: down link, and up link. You can choose a value, or click the Unlimited checkbox.
 - If you chose the BE resource type in Step 5. above, continue to Step 8.
 - If you chose the CIR resource type in Step 5. above, continue to Step 9.
8. If you chose the **BE** resource type in Step 5. above, or your unit is an SU **AIR** EMB or SU **AIR** INT, click the **Register** button. In a few moments, the HSU will be registered.

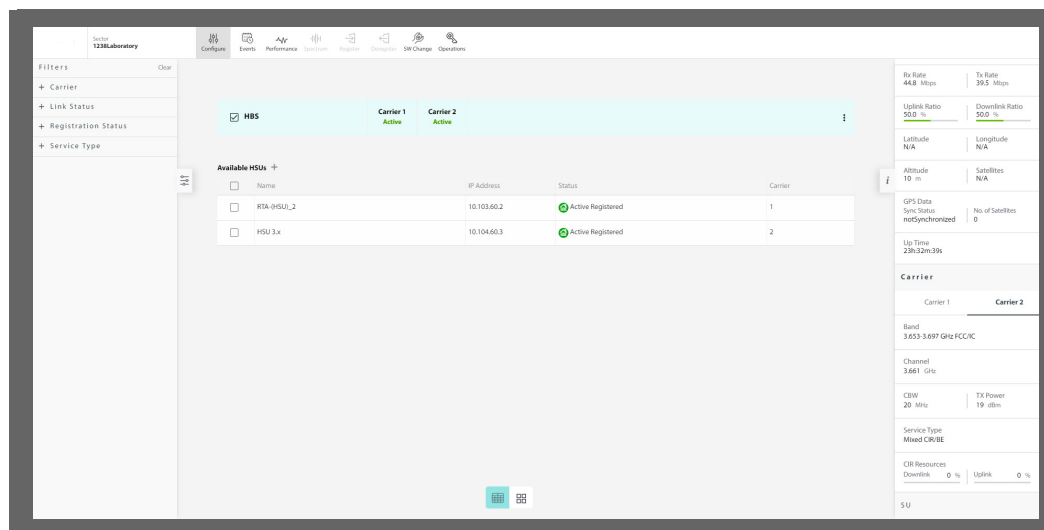


9. If you chose the CIR resource type in Step 5. above, choose the resource allocation. Use the sliders to choose the percentage of resources to be allocated to the HSU. This is the percentage of available resources in the sector. Obviously, you must make sure that the resource percentages of all the HSUs in the sector do not add up to more than 100%.



When a stable value is reached, the **Register** button will become enabled.

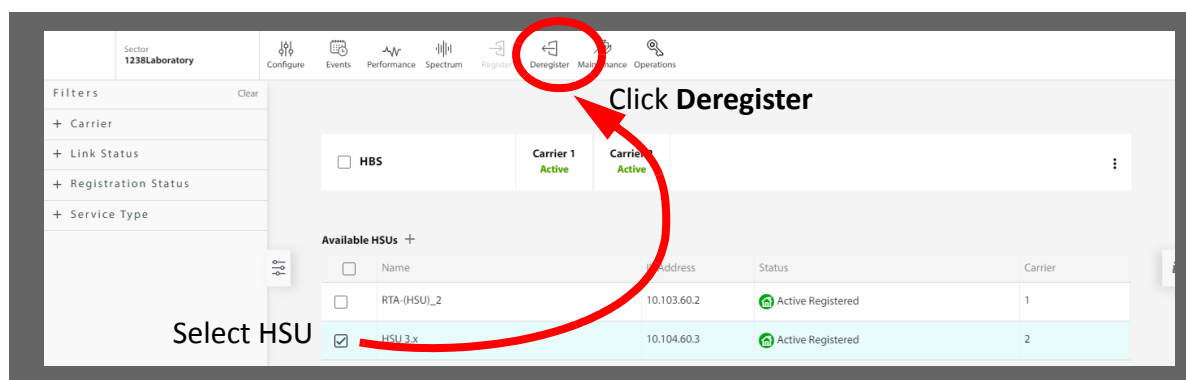
10. Click **Register**.



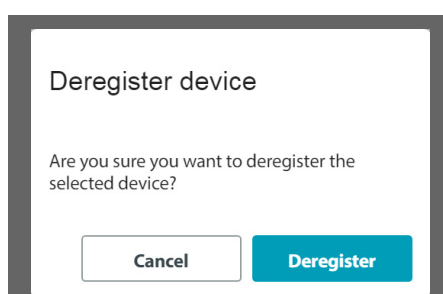
3.2.6. Deregister



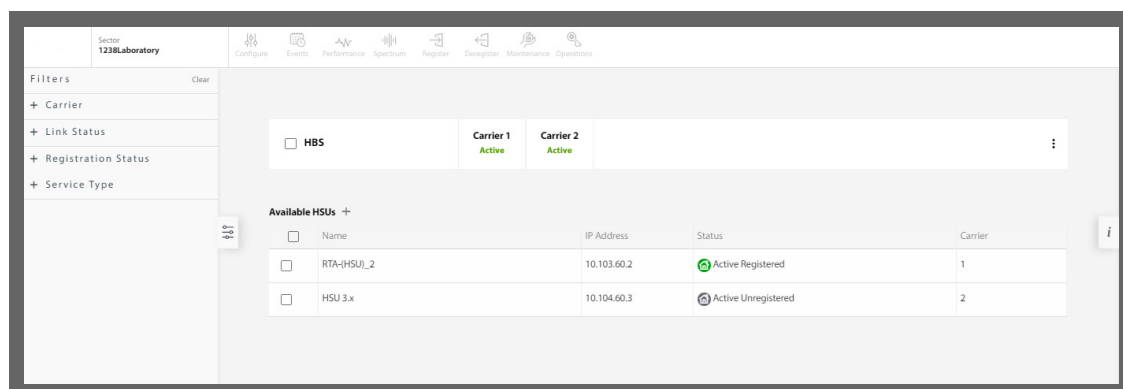
1. Select the H5U you want to de-register by placing a checkmark next to it.



2. Click **Deregister**. You will be asked to confirm that you want to deregister the radio.



3. if you are sure, click **Deregister**. The device will no longer be registered.

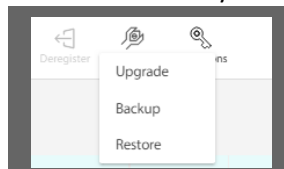


3.2.7. Maintenance



This allows you to upgrade, backup or restore the target software.

Choose the action you want from the pull-down menu.



- Any of these actions requires the NMSTools.exe application. This is the RADWIN Manager, which must be installed on your computer. When you choose any of these options, you will be asked if you want to open this application. Click **Open NMSTools.exe** to open the application.

3.2.8. Operations



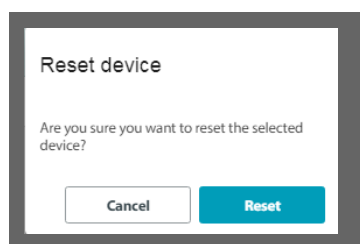
This icon allows you to perform a reset, restore the factory default settings, or to perform a license-dependent upgrade on the selected device.



If you reset an HBS, this affects traffic on both carriers.

Reset

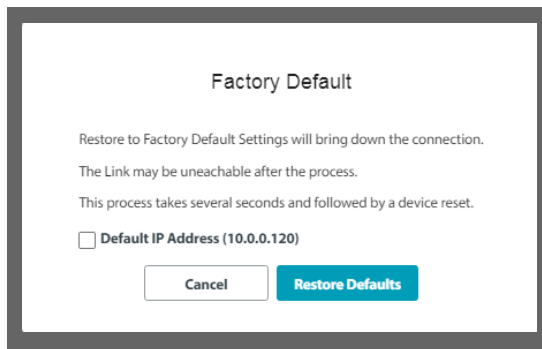
When you choose Reset, you are asked to confirm. Reset is traffic-affecting, and if it is done on an HBS, it stops the traffic throughout the sector. If you are sure, click **Reset**.



Factory Default

When you choose Factory Default, you are asked to confirm. Since Factory Default involves a reset, it is traffic-affecting, and if it is done on an HBS, it stops the traffic throughout the sector. You have an option to restore the default IP address (10.0.0.120), by clicking the box next to Default IP address. If you do not click

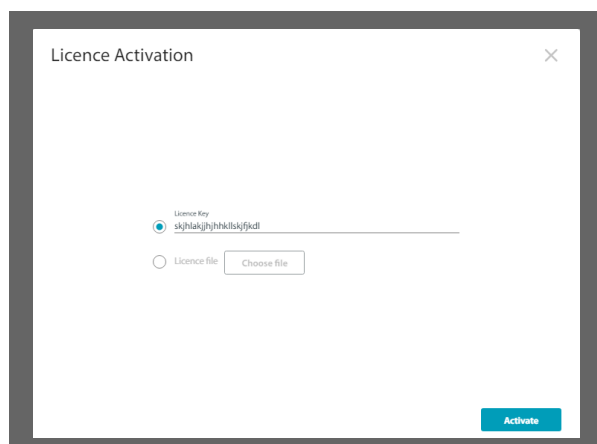
this box, the device will retain its previous IP address. Once you are sure, click **Restore Defaults**, otherwise, click **Cancel**.



Licenses

To carry out a license-dependent upgrade, you must first acquire a license key. Do this as follows:

1. **Catalogue number:** Contact your RADWIN representative, and get a catalogue number of the upgrade you want. Purchase as many of these upgrades as you deem necessary.
2. **PAKs:** You will receive a list of Product Activation Keys (PAK) for each upgrade instance. A PAK number can be used on any compatible RADWIN product; they are not specific to any one given item of equipment.
3. **Activate PAKs:** Associate each PAK to a specific item of equipment: Access the License Key Application website: <http://tools.radwin.com/updates/licensekey/lk-radwin.htm>, and follow the instructions there to activate each PAK for the specific item of equipment you need to upgrade.
4. **Get License Keys:** The License Key Application will then give you a list of license keys. These numbers *are* unique for the specific upgrade and specific item of equipment. We recommend saving this list as a text file in a convenient location.
5. Select the device for which you want to apply a license-dependent upgrade.
6. Choose Operations -> License. The License Activation window will open.



7. Enter the license code in the field, or click **License file**, then **Choose file** to where you have saved the license file.
8. Once you are ready, click **Activate**.
9. The unit will be reset, after which it will be upgraded using the new license.

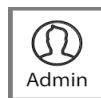
3.2.9. Diagnostics



This creates diagnostic files, to be used by RADWIN professional services and support personnel to expedite assistance.

1. Select the items for which you want information (HBS and/or HSUs). If an item is not selected, the diagnostic files will not contain information for that item.
2. Click this icon to open the **Get Diagnostics** window.
3. You will be warned that this could take a few minutes, depending on how many devices have been selected. If this is acceptable, click **Get Diagnostics**.
 - The main window will darken, and the **Getting monitor diagnostics** message will appear.
 - After a few seconds or minutes, a comma-delimited (*.csv) file will be created, stored in the default downloads section of the managing computer. The **Getting monitor diagnostics** message will disappear.
 - The format of this file name is: **monitor-DATE TIME.csv**.
 - The Diagnostics icon will then be shown with a percentage indicator below it, showing the status of the creation of the second diagnostics file: a JSON file. In addition, a small blue **diagnostics in progress** message will appear next to the Diagnostics icon.
 - After a further few seconds or minutes, the JSON file will be created. This file is also stored in the default downloads section of the managing computer.
 - The format of this file name is: **diagnostics-DATE TIME.json**, accurate to the second.
4. Send these files to RADWIN professional services.

3.2.10. User Profile Icon

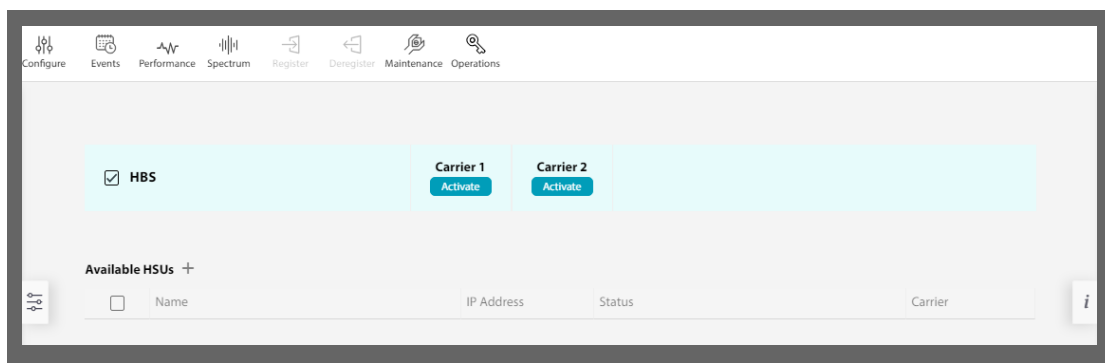


Admin, Observer, Operator, Installer

The name of the user profile will appear on the icon. Click this icon to log out of the HBS.

3.3. HBS List

Near the top of the user interface, the status of the connected HBS is shown, together with the activation status of each Carrier.



To activate a carrier, click **Activate**. For further instructions, see [Activate the DUO Base Station](#) on page 67.

Once a Carrier is activated, you can de-activate it.

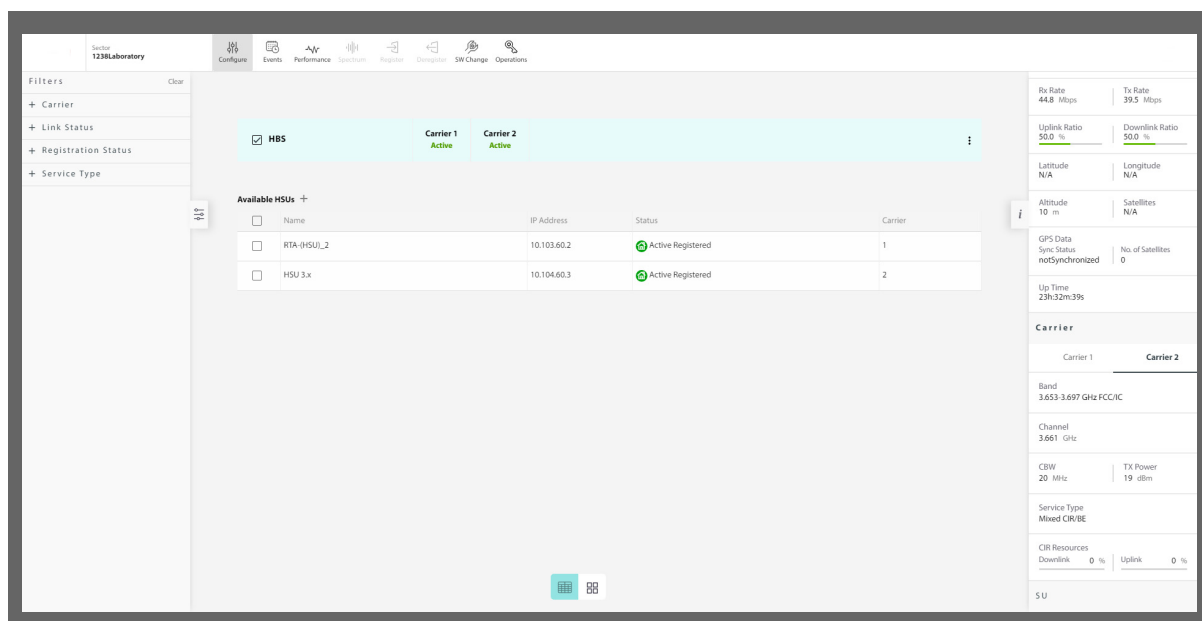
Click the vertical ellipsis next to the Right Pane, then choose which Carrier you want to de-activate.



3.4. HSU List

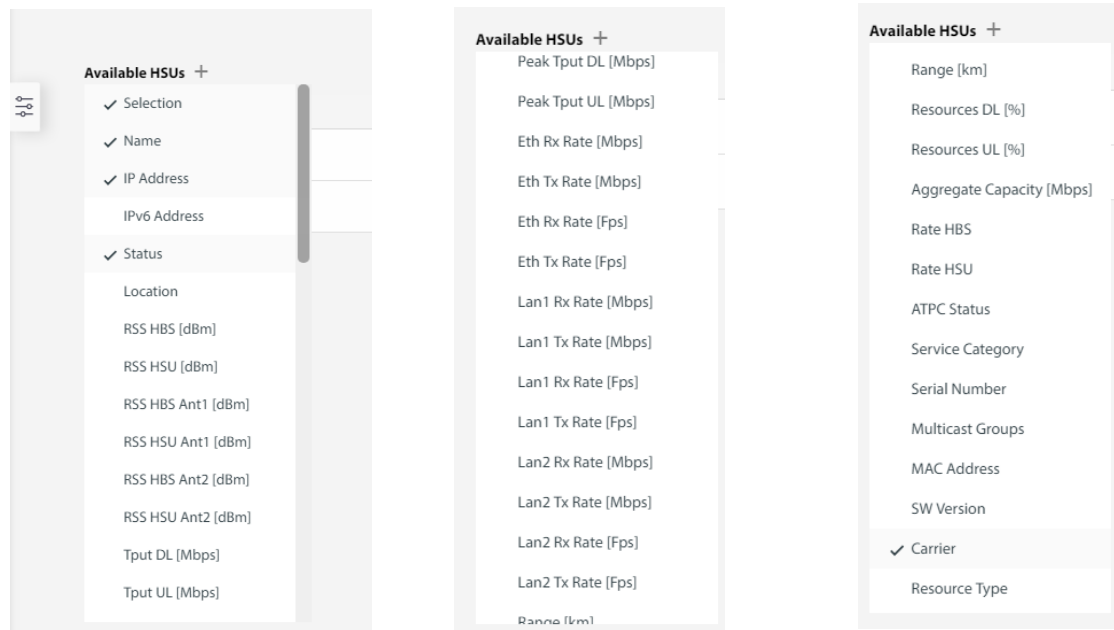
The central part of the user interface shows a list of the HSUs that the HBS has detected. The HBS can only detect HSUs if the carrier is activated (for instructions on activating a Carrier, see [Activate the DUO Base Station](#) on page 67).

The name and IP address of the HSUs (as configured) are listed, as well as their statuses and which carrier they are using (See [HSU status Description](#) on page 3 for the possible HSU statuses).



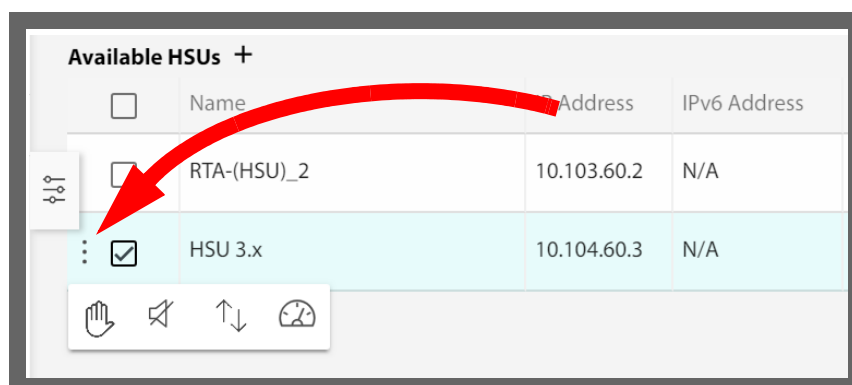
You can add other parameters as well by clicking the plus (+) sign next to the Available HSUs label, and selecting the desired parameters.

Additional HSU parameters, scrolling down on the list:



3.4.1. HSU Mini Menu

At the far left of the HSU line is a mini menu that provides various options. Click on the three dots at the end of the line to display this menu.



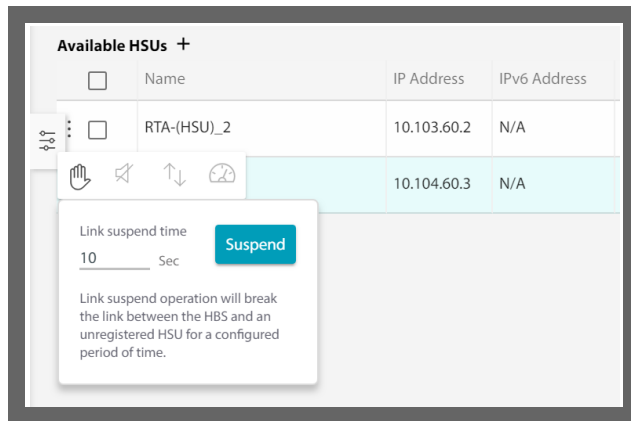
This menu allows you to carry out the actions below, but only if it is relevant for the selected unit:

- [Suspend](#) an HSU
- Control the HSU's [Buzzer](#)
- [Replace](#) a defective HSU with an operative HSU, and transfer all configurations
- Carry out a [Speed Test](#)

Suspend

Remove the selected subscriber unit from the list for a specified period of time that you determine. You can only suspend an un-registered subscriber unit.

1. Click on the HSU mini menu, then click on the Suspend icon:
2. From the window that appears, select the amount of time for which you want to suspend the HSU, then click **Suspend**.

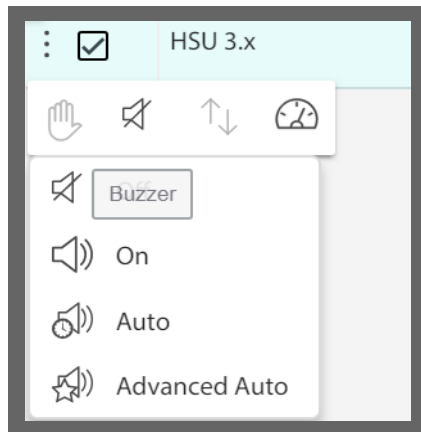


The suspended HSU will disappear from the HBS's list.

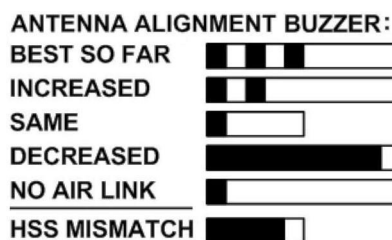
Buzzer

Click on the HSU mini menu, then click on the Buzzer icon:

The **Buzzer** button turns the buzzer On or Off (not relevant for the SU **PRO/AIR** EMB or SU **PRO/AIR** INT).



- The Auto position means that the Buzzer will beep as shown in the figure below during installation or upon sync loss. The main use of the buzzer tone is for HSU antenna alignment.
- The Advanced Auto position means that the buzzer will beep continuously at different rates upon sync loss, antenna mis-alignment and other events for up to two minutes following restoration of sync.



Replace

A defective HSU may be replaced by another HSU belonging to the sector provided that the replacement is not registered.


When doing so, the new HSU receives the configuration parameter values of the replaced HSU.

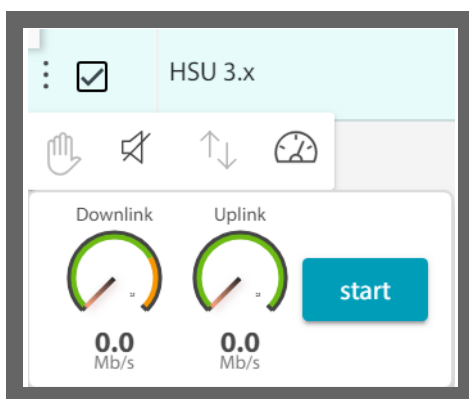
1. Click on the HSU mini menu, then click on the Replace icon:

2. You are offered a list of HSUs available as replacements.
3. Select the required unit by clicking on it.
4. You are asked to confirm before proceeding, do so.
5. Once the unit was replaced successfully, a confirmation message will appear. Note that all of the configuration parameters from the replaced unit will appear in the new unit.

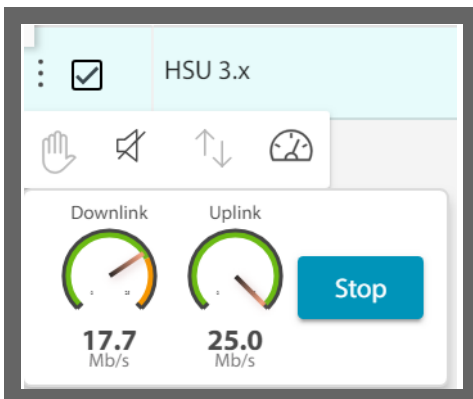
Speed Test

This graphically shows the real time throughput in the downlink and uplink direction of the selected HSU. You can only carry out a speed test on a registered HSU.

1. Click on the HSU mini menu, then click on the Speed Test icon: 
2. Click **Start** to start the test.



The Downlink and Uplink dials will show the speed in each direction.



3. Click **Stop** to stop the test.

3.5. Sector Display views

The default view of the sector (list of HSUs) is in a table format.

However, you can display information about the HSUs in a card-like format as well.

Click the four-square symbol on the bottom of the user interface.

Click here

Name	IP Address	Status	Carrier
RTA-(HSU)_2	10.103.60.2	Active Registered	1
HSU 3.x	10.104.60.3	Active Registered	2

Various card size options will appear.

The size options are Small, Medium, and Large.

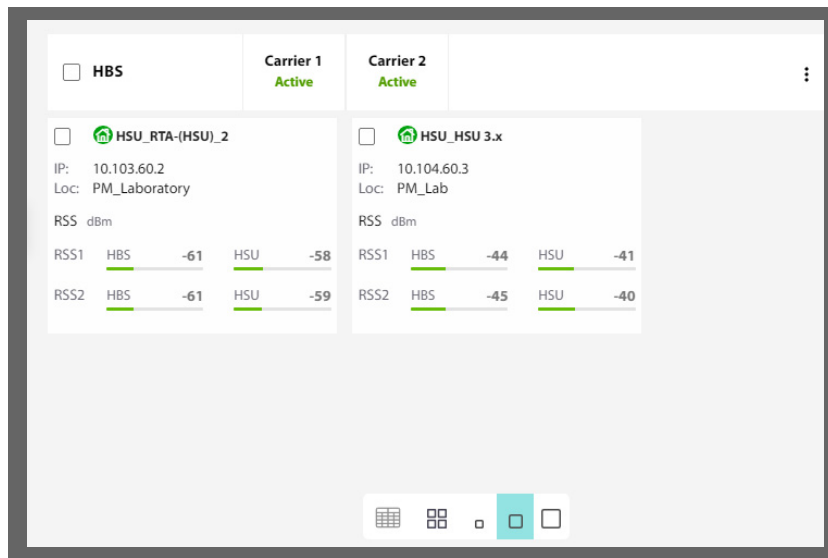
Click on the Small card option, and the information for the HSUs will be displayed in small cards with minimal information:

- Unit name, status
- IP address

Unit Name	Status	IP Address
HSU_RT-(HSU)_2	Active	10.103.60.2
HSU_HSU 3.x	Active	10.104.60.3

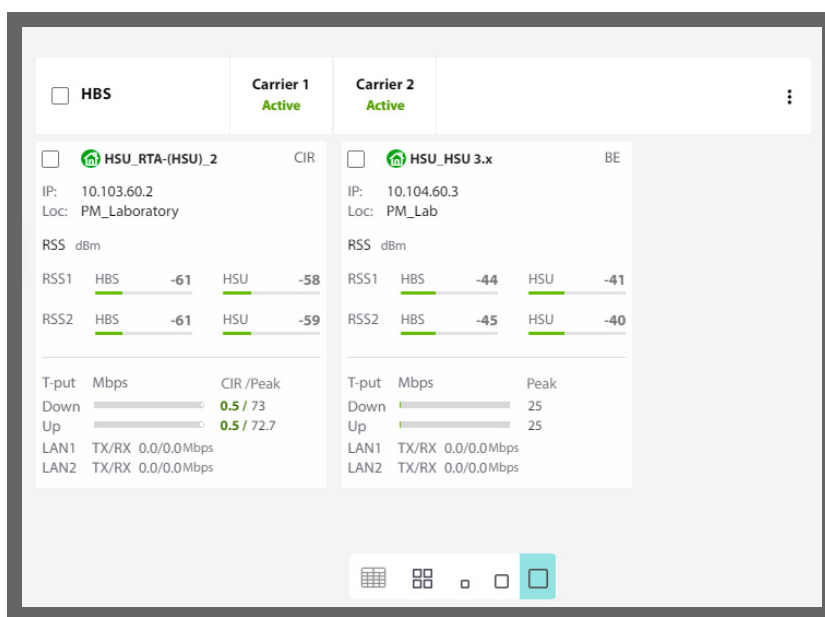
Click on the Medium card option, and the information for the HSUs will be displayed in medium-sized cards with more information:

- Unit name, status
- IP address
- Location
- RSS for each stream (RSS1 and RSS2), on both the HBS side and the HSU side.



Click on the Large card option, and the information for the HSUs will be displayed in large-sized cards with yet more information than the medium cards.

- Unit name, status
- Service category (CIR or BE)
- IP address
- Location
- RSS for each stream (RSS1 and RSS2), on both the HBS side and the HSU side
- Throughput for the uplink and downlink
- CIR and Peak value (as per configuration)
- Tx/Rx ratio for each line (LAN1 and LAN2)



3.6. Right Pane

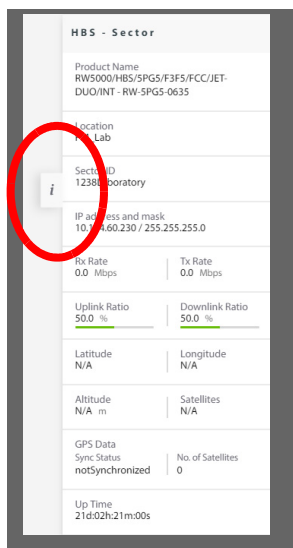
The right pane of the user interface gives a brief overview of the sector, showing the following:

- HBS product name
- Location, Sector ID, IP address and mask (as per configuration)
- The present Rx and Tx Rates
- The present Uplink and Downlink ratios
- The HBS's latitude, longitude, altitude (as per configuration) and if any satellites have been detected
- GPS data, including sync status and number of GPS satellites discovered, and
- The HBS's up time since last reset

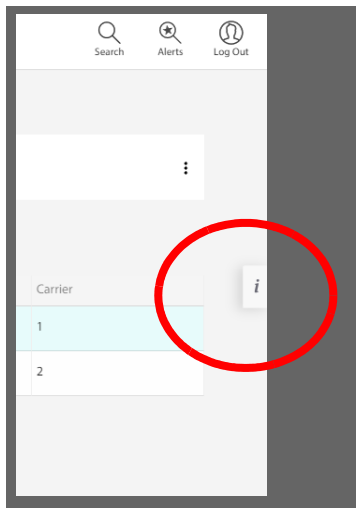
Scroll down, and you can see basic information about the link, which is displayed separately for each Carrier:

- Frequency Band
- Channel
- Channel Bandwidth
- Service Type being used in the sector (CIR, BE, or mixed)
- CIR Resources being used, if any

To minimize the Right Pane, click on the minimize symbol:



- To restore the Right Pane, click on the minimize symbol again:



4. First-Time Use

When working with a DUO base station for the first time, carry out these tasks:

Update DUO Connection Parameters - Change the IP address of the DUO base station, and any other connection parameters in accordance with your radio plan. Although this can be done later, we recommend doing this as soon as possible.

Activate the DUO Base Station - this must be done for each carrier.

Register Subscriber Units - this must be done for each subscriber unit in each carrier.

Update Subscriber Unit Connection Parameters - Change the IP address of each subscriber unit, and any other connection parameters in accordance with your radio plan. This can be done later, but we recommend doing this as soon as possible.

4.1. Update DUO Connection Parameters

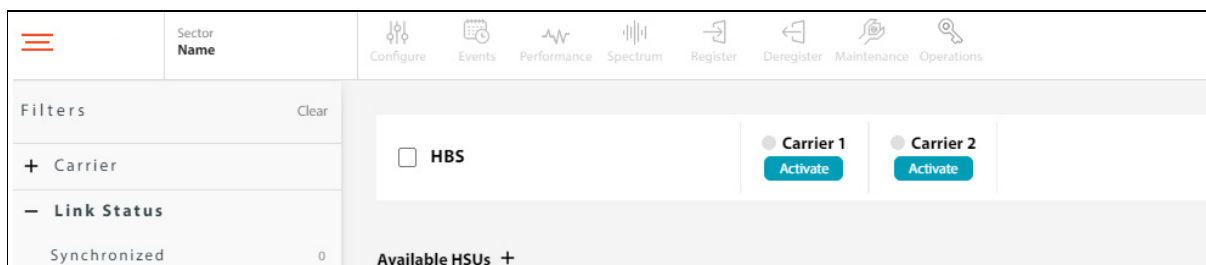
When first logging on to a new DUO base station, you must change its IP address in accordance with your radio plan.

Connect the radio to the network and voltage via its PoE port.

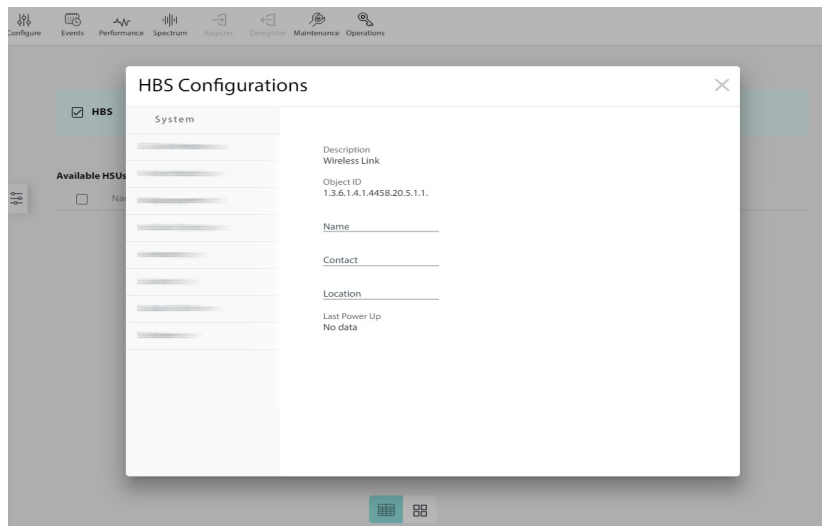
Enter its IP address in a web browser (default value: 10.0.0.120).

Enter username **admin** and password **netwireless**.

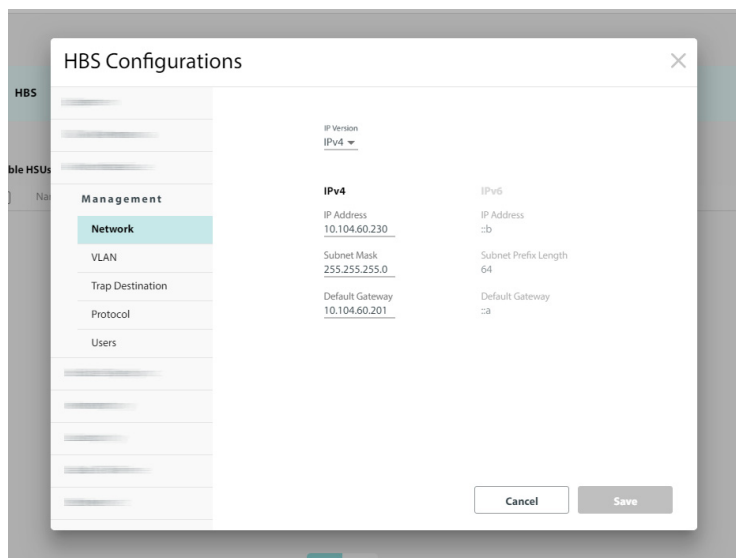
Select the DUO base station unit by placing a checkmark next to it, then click on **Configure**.



The **Configuration** -> **System** window will open.

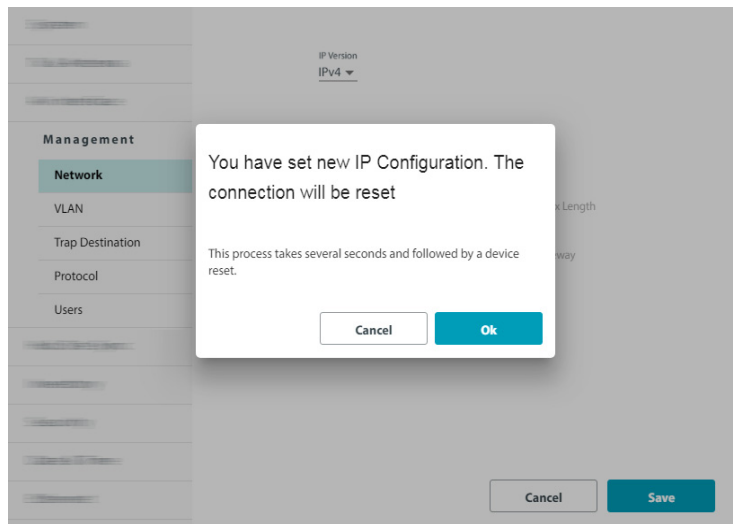


Select **Management -> Network**:



Enter the new IP address, Subnet Mask and Default Gateway in accordance with your radio plan, then click **Save**.

You will be warned that the device (HBS) will be reset. If all the values are correct, click **OK**.

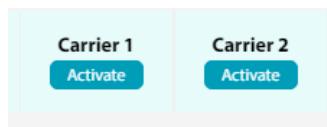


Once the HBS is reset, log in again, using the new IP address.

4.2. Activate the DUO Base Station

There are two carriers, and you must activate the DUO base station for each carrier used.

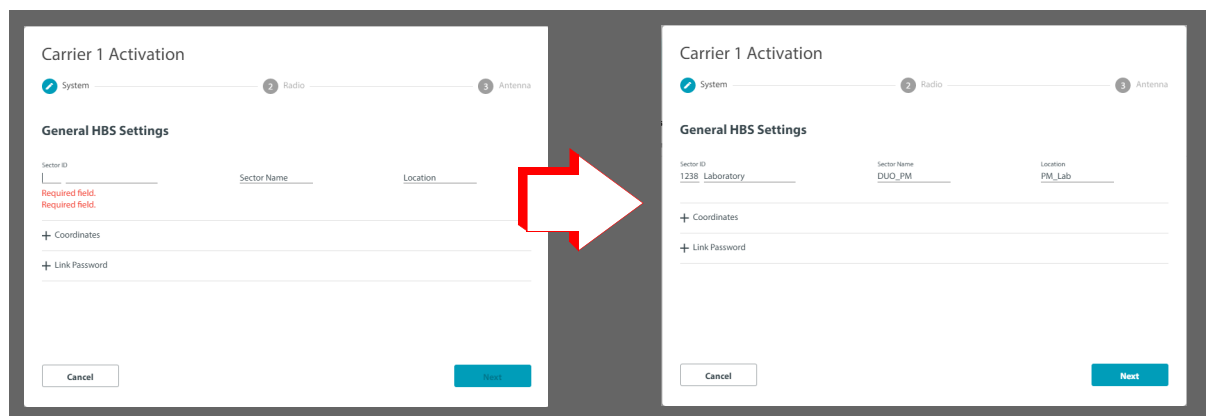
1. For the first carrier, click **Activate** under **Carrier 1**.



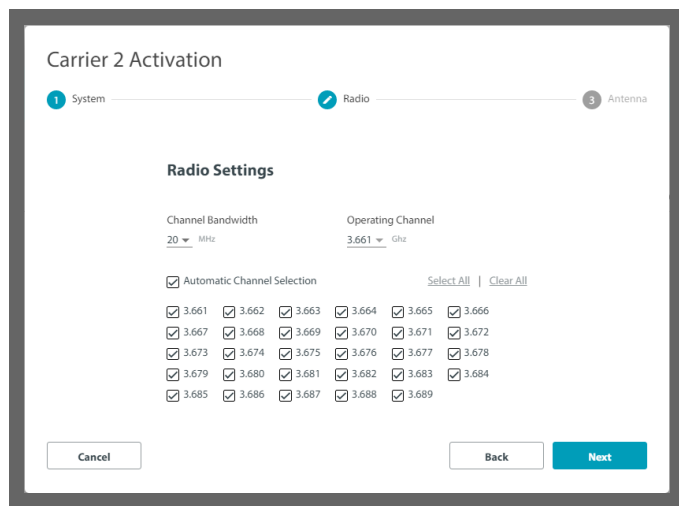
2. Enter the Sector ID, Sector Name and Location.

The Sector ID is used by all radio units connected to this HBS to identify which HBS to connect to.

The same Sector ID is used for both carriers.



3. Click **Next**.



Carrier 2 Activation

1 System — 2 Radio — 3 Antenna

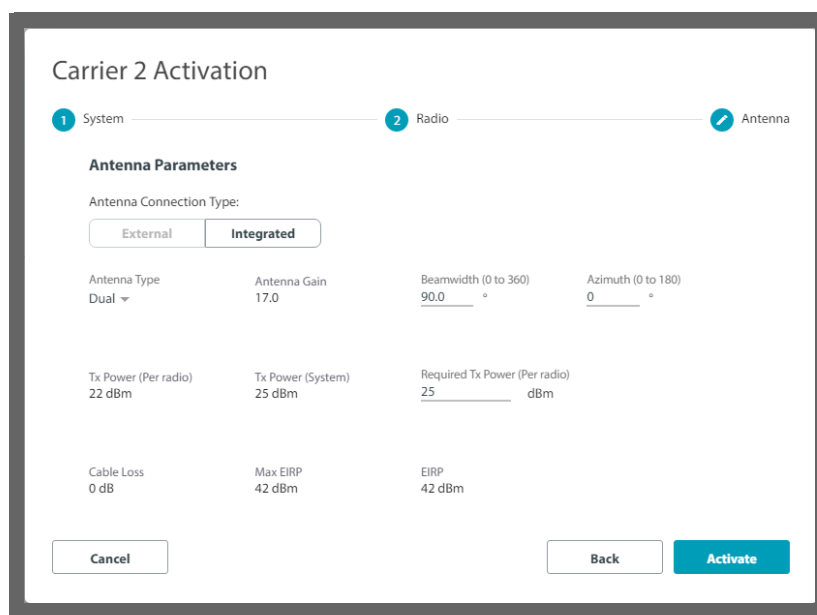
Radio Settings

Channel Bandwidth: 20 MHz
Operating Channel: 3.661 GHz

☒ Automatic Channel Selection [Select All](#) | [Clear All](#)

<input checked="" type="checkbox"/> 3.661	<input checked="" type="checkbox"/> 3.662	<input checked="" type="checkbox"/> 3.663	<input checked="" type="checkbox"/> 3.664	<input checked="" type="checkbox"/> 3.665	<input checked="" type="checkbox"/> 3.666
<input checked="" type="checkbox"/> 3.667	<input checked="" type="checkbox"/> 3.668	<input checked="" type="checkbox"/> 3.669	<input checked="" type="checkbox"/> 3.670	<input checked="" type="checkbox"/> 3.671	<input checked="" type="checkbox"/> 3.672
<input checked="" type="checkbox"/> 3.673	<input checked="" type="checkbox"/> 3.674	<input checked="" type="checkbox"/> 3.675	<input checked="" type="checkbox"/> 3.676	<input checked="" type="checkbox"/> 3.677	<input checked="" type="checkbox"/> 3.678
<input checked="" type="checkbox"/> 3.679	<input checked="" type="checkbox"/> 3.680	<input checked="" type="checkbox"/> 3.681	<input checked="" type="checkbox"/> 3.682	<input checked="" type="checkbox"/> 3.683	<input checked="" type="checkbox"/> 3.684
<input checked="" type="checkbox"/> 3.685	<input checked="" type="checkbox"/> 3.686	<input checked="" type="checkbox"/> 3.687	<input checked="" type="checkbox"/> 3.688	<input checked="" type="checkbox"/> 3.689	

- The operating channel and channel bandwidth will appear. We recommend you use the default values, but depending on the specific version of the product, these can be changed.
- We also recommend you select Automatic Channel Selection, although you can select specific frequencies if your radio plan requires it. You must select at least two frequencies.
- Click **Next**.



Carrier 2 Activation

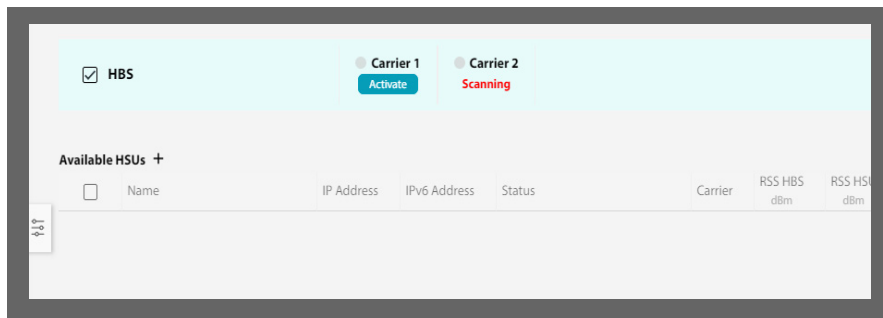
1 System — 2 Radio — 3 Antenna

Antenna Parameters

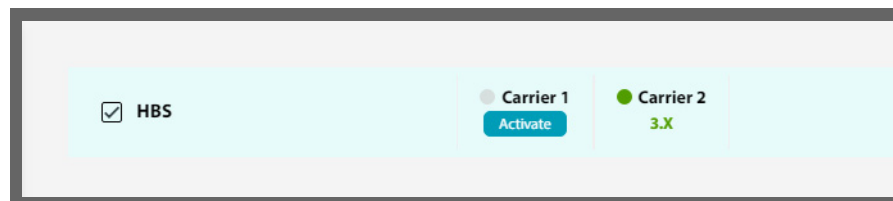
Antenna Connection Type:

Antenna Type Dual	Antenna Gain 17.0	Beamwidth (0 to 360) 90.0 °	Azimuth (0 to 180) 0 °
Tx Power (Per radio) 22 dBm	Tx Power (System) 25 dBm	Required Tx Power (Per radio) 25 dBm	
Cable Loss 0 dB	Max EIRP 42 dBm	EIRP 42 dBm	

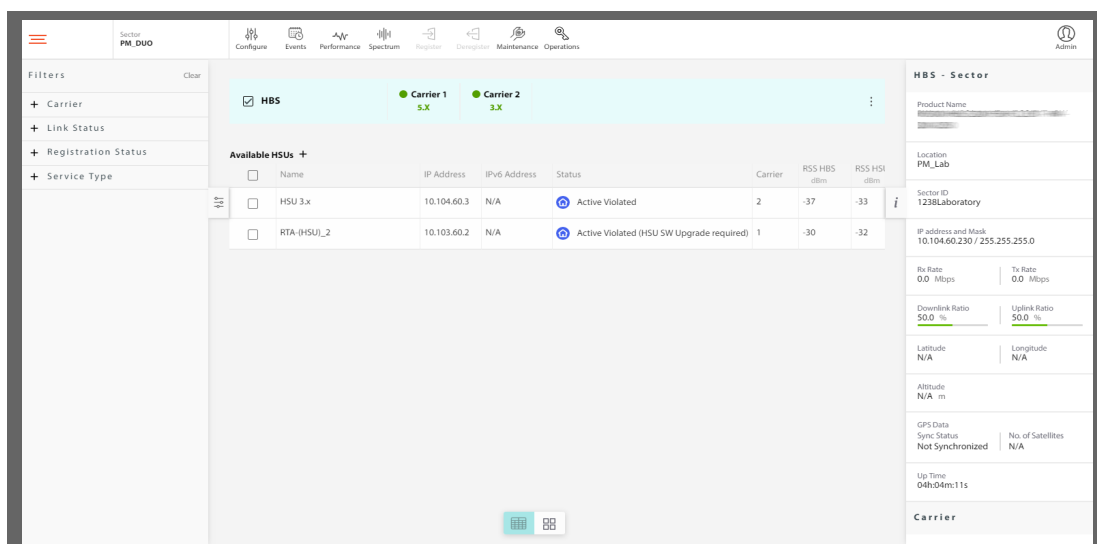
- Check the parameter values in this window, and change any that need to be changed.
Depending on the specific product in use, and especially the regulatory environment in which you are working, not all parameters can be changed.
- Once you are sure the values are correct, click **Activate**.
A “working” graphic below the selected carrier will appear for a few moments.



Then the carrier you are working with will be shown with a green bullet next to it, and its frequency band in green below it, indicating that the carrier is Active.



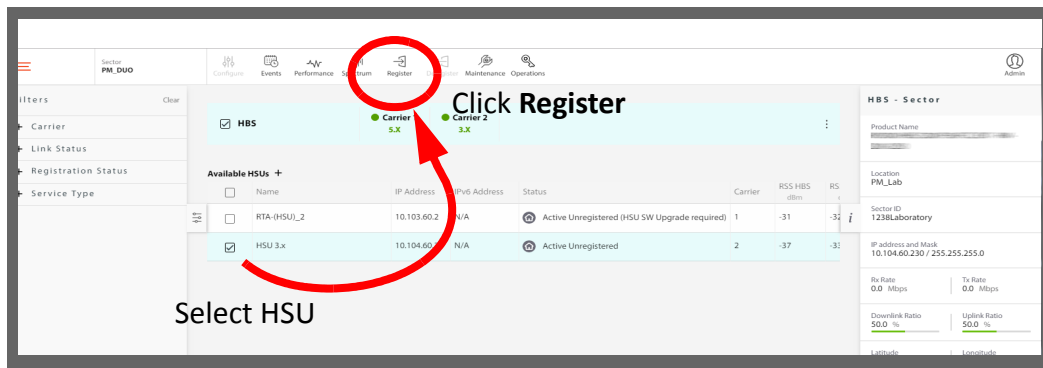
After you have repeated the above for the other carrier, the window will show that carrier as being active.



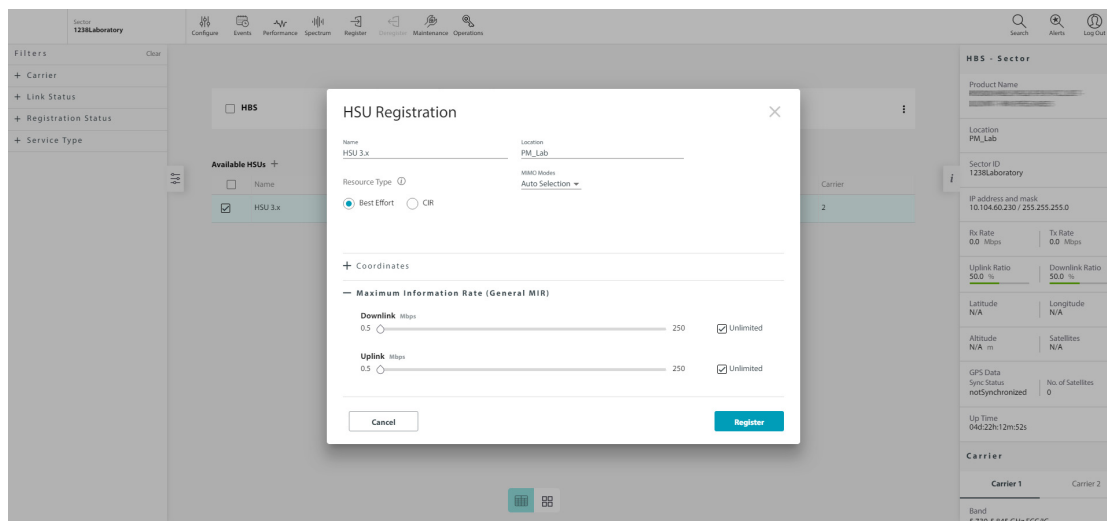
- Both carrier frequencies will be shown as Active, and any HSUs that the HBS was able to contact are shown as well. However, for a first-time use, those HSUs will be shown as un-registered. To work with them, you must register each one.

4.3. Register Subscriber Units

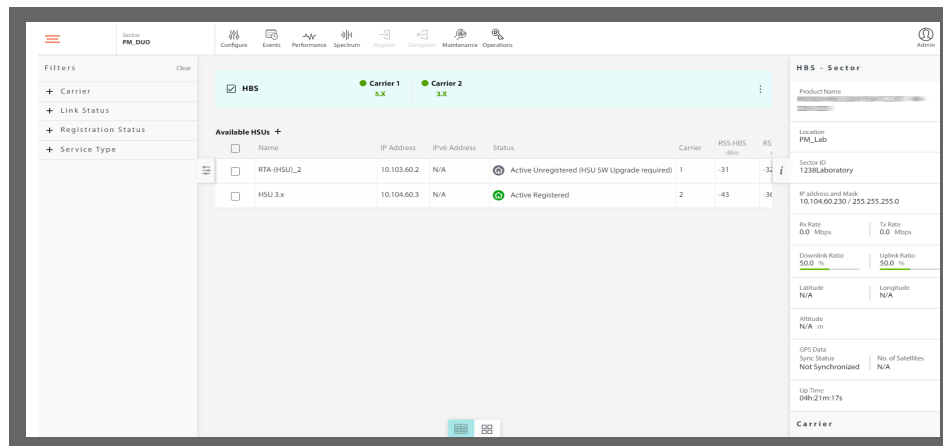
- Select the HSU you want to register by placing a checkmark next to it.



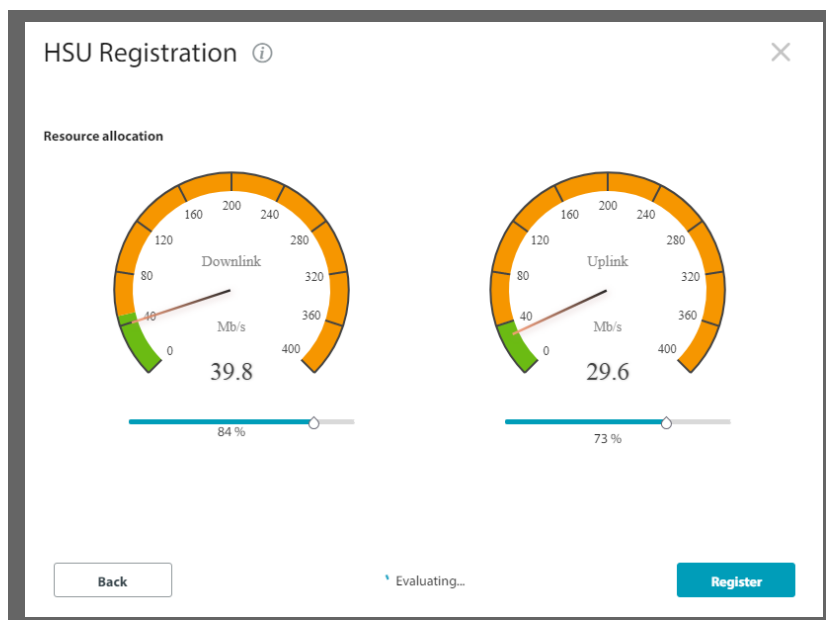
2. Click **Register**. You will see a window similar to the following:



3. You may edit or add the site's **Name**, **Location** and **Coordinates**.
4. If you are registering an SU **AIR** EMB or SU **AIR** INT, the **Resource Type** can only be BE (Best Effort). Skip to Step 6.
5. Select the **Resource Type** for the HSU. This can be CIR (Committed Information Rate), or BE (Best Effort):
 - **BE** grants the HSU resources as they become available in the sector.
 - **CIR** grants the HSU with a certain guaranteed percentage of resources. You set this percentage in the General MIR window.
6. Check a **MIMO Mode** for this HSU:
 - **Spatial Multiplexing** (default) splits the data in to two streams on transmission and recombines it on reception providing maximum throughput. This provides a higher throughput.
 - **Diversity** transmits the same data on from both antennas and check for correctness on reception. This mode helps to ensure more reliable data transmission in a noisy environment, although throughput will be lower.
 - **Auto Selection** instructs the system to choose whichever mode is most efficient.
7. Optionally, you can choose the **Maximum Information Rate**. Use the sliders to set here the maximum throughput rate you want for the specific HSU in each direction: down link, and up link. You can choose a value, or click the Unlimited checkbox.
 - If you chose the BE resource type in Step 5. above, continue to Step 8.
 - If you chose the CIR resource type in Step 5. above, continue to Step 9.
8. If you chose the **BE** resource type in Step 5. above, or your unit is an SU **AIR** EMB or SU **AIR** INT, click the **Register** button. In a few moments, the HSU will be registered.

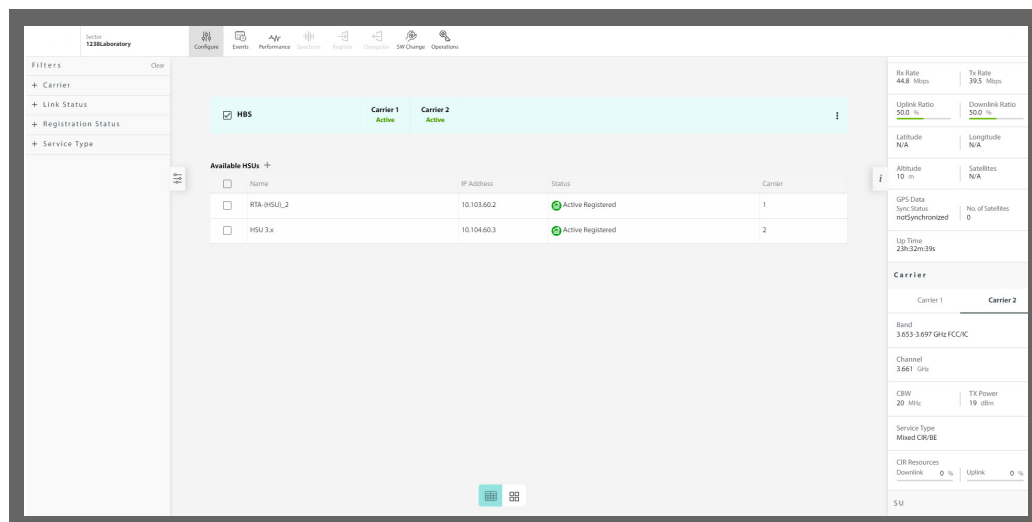


9. If you chose the CIR resource type in Step 5. above, choose the resource allocation. Use the sliders to choose the percentage of resources to be allocated to the HSU. This is the percentage of available resources in the sector. Obviously, you must make sure that the resource percentages of all the HSUs in the sector do not add up to more than 100%.




When a stable value is reached, the **Register** button will become enabled.

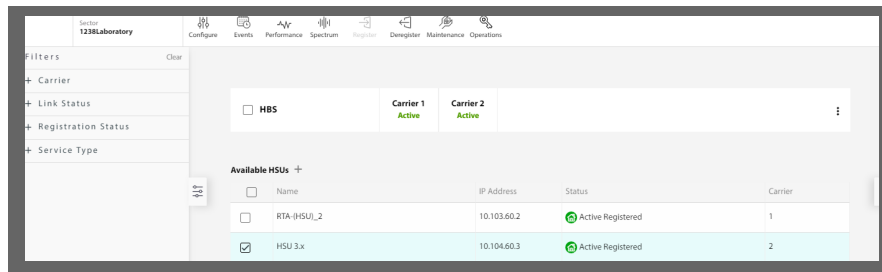
10. Click **Register**.



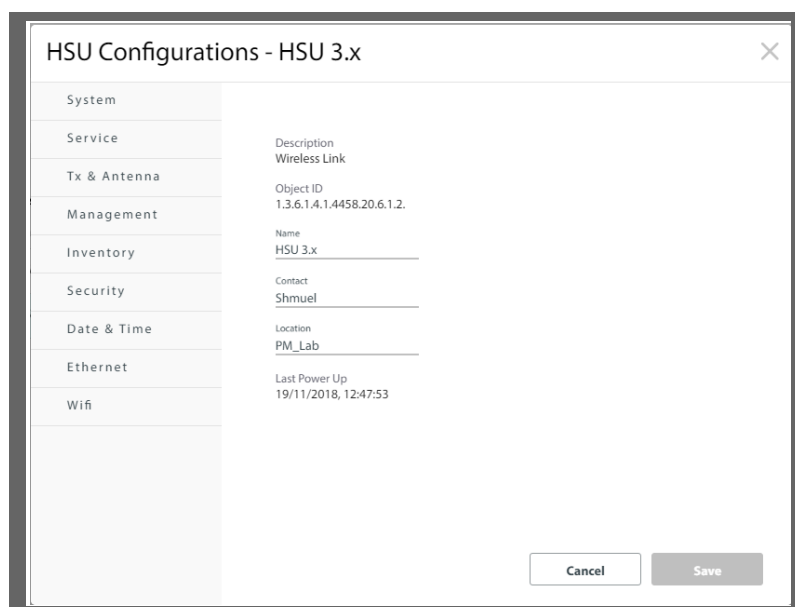
4.4. Update Subscriber Unit Connection Parameters

When first logging on to a new subscriber unit, you must change its IP address in accordance with your radio plan.

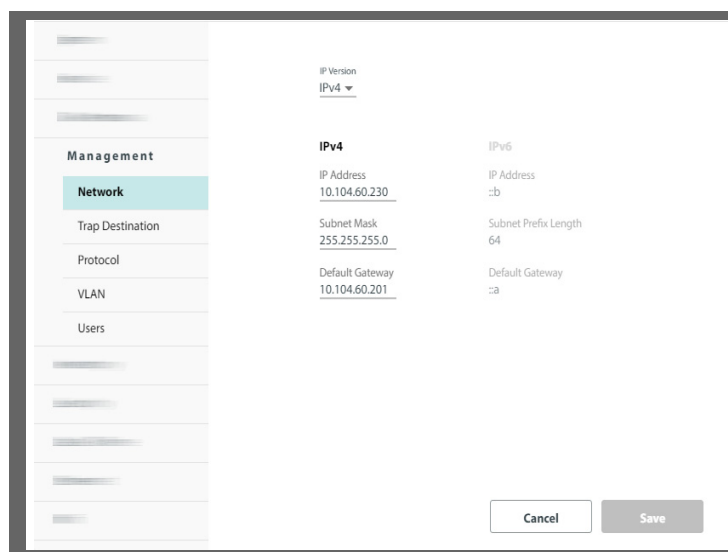
Select the subscriber unit by placing a checkmark next to it, then click on **Configure** [].



The **Configuration -> System** window will appear.

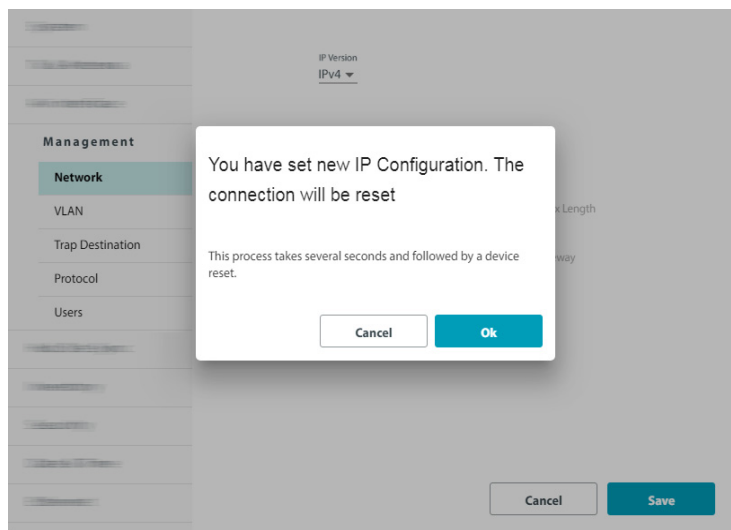


Select **Management -> Network**



Enter the new IP address, Subnet Mask and Default Gateway in accordance with your radio plan, then click **Save**.

You will be warned that the unit will be reset. If all the values are correct, click **OK**.



Once the unit is reset, the base station should synchronize with it shortly.

Appendix A: Terminology

Table A-1: Terminology (Sheet 1 of 4)

Term	Description
Assured throughput	Actual number of timeslots allocated to a radio unit.
ACS	Automatic Channel Selection. Option that instructs the radio to choose which frequency to use. Enabling or disabling this option has various ramifications as shown in the documentation.
ATPC	Automatic Transmit Power Control
BE	Best Effort: A level of priority for traffic in which users receive dynamic resource allocation according to overall demand. They are not guaranteed resources. See also CIR .
BFD	Bidirectional Forwarding Detection. A network protocol used to detect faults between two forwarding engines connected by a link.
BS	Base Station: a radio that can transmit and receive to more than one point. See also HBS
CIR	Committed Information Rate: A level of priority for traffic in which users receive a guaranteed percentage of resources in addition to dynamic resources if available. See also BE .
CPE	Customer Premises Equipment
DBA	Dynamic Bandwidth Allocation: a method that allocates bandwidth between the various users of that same bandwidth in the network.
DBS	Dynamic Bandwidth Selection: When activating a base station, or when changing its bandwidth, if you choose the maximum value available for the bandwidth, the link may dynamically switch between the maximum value and values as low as 20MHz to ensure the best throughput.
DHCP	Dynamic Host Configuration Protocol: a protocol that automatically assigns IP addresses and other network configuration parameters.

Table A-1: Terminology (Sheet 2 of 4)

Term	Description
Diversity	A technique by which the reliability of a radio link is increased using multiple transmitting and receiving antennas, transmitting the same signal on all antennas.
Downlink	Data traffic from an HBS to an HSU, or Data traffic from an RT-A to an RT-B
DUO	Dual Band base station
EIRP	Equivalent (or Effective) Isotropically Radiated Power: The power that an antenna must emit to produce the peak power density in the direction of maximum antenna gain. In our cases, this is usually: System Tx Power + Antenna Gain - Cable Loss.
FAA	Federal Aviation Administration. A U.S. federal office that manages aviation regulations throughout the United States.
Fixed (HSU)	A “fixed” HSU remains in one location, as contrasted with a nomadic or mobile HSU, which does not remain in one location.
GHSS	GPS Hub Site Synchronization
GRE	Generic Routing Encapsulation. A communication protocol used to establish a direct, point-to-point connection between network nodes. GRE lets two peers share data they wouldn’t be able to share over the public network itself.
GRE Tunnel	A virtual point-to-point connection between two networks, using the GRE protocol to carry this out.
HBS	High capacity Base Station. Same as a BS
HMU	High capacity Mobility (subscriber) Unit. Similar to an HSU, but can be mobile.
HSC	Hub Sync Client: When using Hub Site Synchronization, one unit is a master (generates the sync pulses), and the other units are clients.
HSM	Hub Sync Master: When using Hub Site Synchronization, one unit is a master (generates the sync pulses), and the other units are clients.
HSU	High capacity Subscriber Unit. Same as an SU
IGMP	Internet Group Management Protocol
ISU	Integrated Synchronization Unit: a network device that provides a synchronization signal to underground HBSs.
ITHO	Intra-train handover mechanism
LFF	Large Form-Factor

Table A-1: Terminology (Sheet 3 of 4)

Term	Description
MD5	Message digest algorithm: an authentication type for SNMPv3 connections.
MIMO	Multiple In, Multiple Out. A technique by which the capacity of a radio link is increased using multiple transmitting and receiving antennas, transmitting a different signal on all antennas.
MIR	Maximum Information Rate
Mobile (HSU)	A “mobile” HSU can move from location to location and provide service while it moves or when it is stationary.
Nomadic (HSU)	A “nomadic” HSU move from location to location but can only provide service when it is stationary.
ODU	Outdoor Unit: a generic term for any radio, and can usually be exchanged for HBS or HSU.
On-board	Items or subject matter that relates to the environment on or inside the train itself. Also called “Train Side”
PPPoE	Point-to-Point Protocol over Ethernet
PtMP	Point to Multi-Point: link from an HBS to several HSUs
PtP	Point to Point
RADIUS	Remote Authentication Dial-In User Service
RSS	Radio Signal Strength
QoS	Quality of Service
SBM	Smart Bandwidth Management
Sector	A group of radios that consists of one HBS and several HSUs that communicate with the HBS.
SFF	Small Form-Factor
SHA1	Secure hash algorithm: an authentication type for SNMPv3 connections.
SLA	Service Level Agreement - the basic agreement between the service provider and its customer regarding certain aspects of the service provided. For example, what should be the data rate, throughput, jitter of the line, who should pay what fees, the mean time between failure (MTBF) of the equipment, and so forth,
SSM	Synchronization Status Message: Provides traceability of synchronization signals, and is used in the Synchronous Ethernet standard of communication.
SU	Subscriber Unit: a radio that can transmit and receive to one point. See also HSU

Table A-1: Terminology (Sheet 4 of 4)

Term	Description
Sync E or SyncE	Synchronous Ethernet: A standard of communication for ethernet that provides a synchronization signal to network elements that need such a signal.
TBS	Transportation Base Station. Similar to an HBS or BS, but used with high-speed transportation applications.
TDWR	Terminal Doppler Weather Radar: a type of radar station used in the U.S. and other countries for weather reporting. If a radio unit is installed close enough to one of these stations, the FCC requires that certain actions must be taken on the part of the customer. Regulations in other countries varies.
TMU	Transportation Mobile Unit. Similar to an SU
Track Side	Items or subject matter that relates to the environment not on or inside the train. It is not limited to precisely next to the track. Also called “wayside”
Train Side	Items or subject matter that relates to the environment on or inside the train itself. Also called “On-board”
TSN	Time Sensitive Network
Uplink	Data traffic from an HSU to an HBS, or Data traffic from an RT-B to an RT-A
VMU	Vehicular Mobile Unit
Wayside	Items or subject matter that relates to the environment not on or inside the train. It is not limited to precisely next to the track. Also called “Track Side”
WI	Web Interface: web-based application that provides simple configuration capabilities for the radio units.
WISPA	Wireless Internet Service Provider Association. An organization that manages registration of wireless devices that operate close to TDWR facilities run by the FAA.
VRRP	Virtual Router Redundancy Protocol - a networking protocol that provides for automatic assignment of available IP routers to participating hosts.