



# BreezeULTRA™

## System Manual

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October 2014  
P/N 216046





## Document History

| Changed Item  | Description                                                                                | Version and Date |
|---------------|--------------------------------------------------------------------------------------------|------------------|
|               | First version                                                                              | April 2012       |
| Entire Manual | Updated to reflect all changes and new features of SW version 3.0.<br>General improvements | October 2014     |



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## Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in



a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

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

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

For operation within the 5.15 ~ 5.25GHz frequency range, it is restricted to indoor environment. The band from 5600-5650MHz will be disabled by the software during the manufacturing and cannot be changed by the end user. This device meets all the other requirements specified in Part 15E, Section 15.407 of the FCC Rules.

## Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 165 centimeters between the radiator & your body.

This device is intended only for OEM integrators under the following conditions:

- 1 The antenna must be installed such that 165 centimeters is maintained between the antenna and users, and
- 2 The transmitter module may not be co-located with any other transmitter or antenna.

As long as 2 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

**IMPORTANT NOTE:** In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

## End Product Labeling

This transmitter module is authorized only for use in device where the antenna may be installed such that 165cm may be maintained between the antenna and users. The final end product must be labeled in a visible area with the following: "Contains FCC ID: LKT-BULTRA-5". The grantee's FCC ID can be used only when all FCC compliance requirements are met.



## Manual Information To the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

## Europe - EU Declaration of Conformity

This device complies with the essential requirements of the R&TTE Directive 1999/5/EC. The following test methods have been applied in order to prove presumption of conformity with the essential requirements of the R&TTE Directive 1999/5/EC:

### ■ EN60950-1:2006+A11:2009+A1:2010

Safety of Information Technology Equipment

### ■ EN50385: 2002

Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz - 300 GHz)

### ■ EN 301 893 V1.6.1: 2011

Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive

### ■ EN 302 502 V1.2.1: 2008

Broadband Radio Access Networks (BRAN); 5,8GHz fixed broadband data transmitting systems; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive

### ■ EN 301 489-1 V1.9.2: 2011

Electromagnetic compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements

### ■ EN 301 489-17 V2.2.1: 2012

Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2,4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment

This device is a 5GHz wideband transmission system (transceiver), intended for use in all EU member states and EFTA countries, except in France and Italy where restrictive use applies.



In Italy the end-user should apply for a license at the national spectrum authorities in order to obtain authorization to use the device for setting up outdoor radio links and/or for supplying public access to telecommunications and/or network services.

This device may not be used for setting up outdoor radio links in France. For detailed information the end-user should contact the national spectrum authority in France.

CE 0560

|                                                                                                               |                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  Český<br>[Czech]            | Senao Networks Inc. tímto prohlašuje, že tento BreezeULTRA je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.                                                     |
|  Dansk<br>[Danish]           | Undertegnede Senao Networks Inc. erklærer herved, at følgende udstyr BreezeULTRA overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF.                                             |
|  Deutsch<br>[German]         | Hiermit erklärt Senao Networks Inc., dass sich das Gerät BreezeULTRA in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 1999/5/EG befindet. |
|  Eesti<br>[Estonian]         | Käesolevaga kinnitab Senao Networks Inc. seadme BreezeULTRA vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.                           |
|  English                     | Hereby, Senao Networks Inc., declares that this BreezeULTRA is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.                                        |
|  Español<br>[Spanish]        | Por medio de la presente Senao Networks Inc. declara que el BreezeULTRA cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE.         |
|  Ελληνική<br>[Greek]         | ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ Senao Networks Inc. ΔΗΛΩΝΕΙ ΟΤΙ BreezeULTRA ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 1999/5/EK.                                           |
|  Français<br>[French]        | Par la présente Senao Networks Inc. déclare que l'appareil BreezeULTRA est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE.                          |
|  Italiano<br>[Italian]       | Con la presente Senao Networks Inc. dichiara che questo BreezeULTRA è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.                         |
| Latviski<br>[Latvian]                                                                                         | Ar šo Senao Networks Inc. deklarē, ka BreezeULTRA atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.                                                              |
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## Industry Canada statement

This device complies with RSS-210 of the Industry Canada Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.





Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

**Caution:**

- (i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;
- (ii) the maximum antenna gain permitted for devices in the bands 5250-5350 MHz and 5470-5725 MHz shall comply with the e.i.r.p. limit; and
- (iii) the maximum antenna gain permitted for devices in the band 5725-5850 MHz shall comply with the e.i.r.p. limits specified for point-to-point and non point-to-point operation as appropriate.
- (iv) Users should also be advised that high-power radars are allocated as primary users (i.e. priority users) of the bands 5250-5350 MHz and 5650-5850 MHz and that these radars could cause interference and/or damage to LE-LAN devices.

**Avertissement:**

Le guide d'utilisation des dispositifs pour réseaux locaux doit inclure des instructions précises sur les restrictions susmentionnées, notamment :

- (i) les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux;
- (ii) le gain maximal d'antenne permis pour les dispositifs utilisant les bandes 5250-5350 MHz et 5470-5725 MHz doit se conformer à la limite de p.i.r.e.;
- (iii) le gain maximal d'antenne permis (pour les dispositifs utilisant la bande 5725-5850 MHz) doit se conformer à la limite de p.i.r.e. spécifiée pour l'exploitation point à point et non point à point, selon le cas.
- (iv) De plus, les utilisateurs devraient aussi être avisés que les utilisateurs de radars de haute puissance sont désignés utilisateurs principaux (c.-à-d., qu'ils ont la priorité) pour les bandes 5250-5350 MHz et 5650-5850 MHz et que ces radars pourraient causer du brouillage et/ou des dommages aux dispositifs LAN-EL.

**Radiation Exposure Statement:**

This equipment complies with IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 165cm between the radiator & your body.

**Déclaration d'exposition aux radiations:**

Cet équipement est conforme aux limites d'exposition aux rayonnements IC établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 165cm de distance entre la source de rayonnement et votre corps.

## Disposal of Electronic and Electrical Waste



### Disposal of Electronic and Electrical Waste

Pursuant to the WEEE EU Directive electronic and electrical waste must not be disposed of with unsorted waste. Please contact your local recycling authority for disposal of this product.



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# About this Manual

This manual describes the BreezeULTRA Point-to-Point wireless system, and details how to install, operate and manage the system components.

This manual is intended for technicians responsible for installing, setting and operating the BreezeULTRA equipment, and for system administrators responsible for managing the system.

This manual contains the following chapters and appendices:

- **Chapter 1 - “System Description”**: This chapter describes the BreezeULTRA system and its components and provides main equipment specifications.
- **Chapter 2 - “Installation”**: This chapter describes all the supplies required to install the BreezeULTRA system components, the items included in each installation package and the installation procedure.
- **Chapter 3 - “Commissioning”**: This chapters describes how to configure basic parameters and other actions required for completing initial commissioning of the system.
- **Chapter 4 - “Web Interface”**: This chapter describes how to use the built-in Web Interface for configuring parameters, managing SW versions, loading necessary files, checking system status and monitoring performance.
- **Chapter 5 - “Using the Monitor Program”**: This chapter describes how to use the built-in Text User telnet Interface for configuring parameters, managing SW versions, checking system status and monitoring performance.
- **Appendix A - “Password Reset Procedure”**: This appendix describes the procedure for restoring the factory default values of management access passwords.
- **Appendix B - “BreezeULTRA Traps”**: This appendix describes the traps supported by the equipment.
- **Appendix C - “Monitor Parameters Summary”**: This appendix summarizes the Monitor parameters.
- **Appendix D - “Antennas Separation Guidelines”**: This appendix provides guidelines regarding separation distances between antennas in dual sector installations.

For more information, visit us at <http://www.alvarion.com>.

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# Chapter 1 - System Description

## In This Chapter:

- [“Introducing BreezeULTRA” on page 2](#)
- [“System Architecture” on page 3](#)
- [“Specifications” on page 4](#)



## 1.1 Introducing BreezeULTRA

The BreezeULTRA product family provides high capacity, long range wireless data connectivity in the unlicensed 5 GHz frequency band. The product is an evolution of the BreezeACCESS and BreezeNET B product families, based on an IEEE 802.11n chipset.

The IEEE 802.11n wireless networking system improves on previous 802.11 versions by adding support for the Multiple-Input Multiple-Output (MIMO) technology, using two antennas and spatial division multiplexing to double the raw data rate. In addition to 20 MHz channels, operation using 40 MHz channels is also supported, providing a significantly higher throughput. IEEE 802.11n also brings significant MAC enhancements to achieve increased spectral efficiency. The higher spectral efficiency in conjunction with the native support for 40 MHz channels provides BreezeULTRA with data rates over 500 Mbps for dual sector setups.

The BreezeULTRA system utilizes advanced technologies to support optimal performance in spectrally polluted environments. BreezeULTRA products operate in Time Division Duplex (TDD) mode, using Orthogonal Frequency Division Multiplexing (OFDM) modulation and Forward Error Correction (FEC) coding. Using the enhanced multi-path resistance capabilities of OFDM modem technology, BreezeULTRA enables operation in near and non-line-of-sight (NLOS) environments. The system also features adaptive modulation for automatic selection of modulation schemes to maximize data rate and improve spectral efficiency.

BreezeULTRA is a single band product, covering the entire 4.9 to 5.9 GHz frequency spectrum. Actually available frequencies, as well as other operational parameters, depend on the Country Code being used according to relevant local regulations. In current release available Country Codes support different sub-bands in the range 5.1 to 5.9 GHz.

BreezeULTRA system components can be managed using HTTP to access the Web management interface or using Telnet to access the menu-based Local Craft Interface (LCI) Monitor program. It can also be managed using standard management tools through SNMP agents that implement proprietary MIBs.



## 1.2 System Architecture

BU/RB is a high performance wireless bridge system that provides high-capacity, high-speed point-to-point links. The BU/RB system includes a Base Unit (BU), typically installed at the main site, and a Remote Bridge (RB).

### INFORMATION



To simplify logistic operations, all units are typically supplied as Base Units. When necessary, the functionality of each unit can be changed from Base Unit to Remote Bridge, and vice versa.

Each unit comprises an indoor unit (IDU) and an outdoor unit (ODU). The IDU provides the interface to the user's equipment and Power over Ethernet (PoE) to the ODU. There are two IDU types: AC IDU which is powered from the 110/220 VAC mains, and DC IDU powered from a 48 VDC power source. The customer's data equipment is connected via a standard IEEE 802.3-2008 Gigabit Ethernet 1000BaseT (RJ-45) interface.

The indoor unit is connected to the outdoor unit via an 8-wire Category 5e FTP or higher category Ethernet cable. This cable carries Ethernet traffic between the indoor and the outdoor units, and also transfers power from the indoor unit to the outdoor unit. A second Power over Ethernet (PoE) output port is available on the ODU, providing connectivity for IEEE 802.3af Class 1 and 2 compatible video cameras.

The ODUs contain the processing and radio modules and are available in different models:

- BU/RB-B350: Supports a single radio card and includes an integral dual-polarized 23 dBi antenna.
- BU/RB-B350D: Supports a single radio card and with a pair of RF connections to a detached dual-polarized antenna.
- BU/RB-B600: Supports two radio cards. One radio card is connected to an integral dual-polarized 23 dBi antenna. A pair of RF connectors is used for connecting the second radio card to a detached dual-polarized antenna.
- BU/RB-B600D: Supports two radio cards with two pairs of RF connections to two detached dual-polarized antennas.

An upgrade license is available for upgrading a BU/RB-B350/B350D to a BU/RB-B600/B600D.

Alvarion offers two types of detached antennas:

- Dual polarized, 23 dBi flat panel antenna
- Dual polarized, 28 dBi dish antenna

For a BU/RB-B600 with an integral 23 dBi antenna, only a 23 dBi detached antenna should be used for the second radio card (the same antenna gain should be used on both sectors).



## 1.3 Specifications

### 1.3.1 Radio Specifications

**Table 1-1: Radio Specifications**

| Item                                           | Description                                                                                                                                                                               |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Frequency range                                | 4.9 GHz - 5.9 GHz (see INFORMATION note below)                                                                                                                                            |
| Operating modes                                | Time Division Duplex (TDD)                                                                                                                                                                |
| Modulation                                     | OFDM modulation: BPSK, QPSK, 16QAM, 64QAM                                                                                                                                                 |
| Channel BW (per radio card)                    | 20, 40 MHz                                                                                                                                                                                |
| Air link encryption                            | AES 128                                                                                                                                                                                   |
| Integrated antenna<br>(BU/RB-B350/B600 units)  | 4.9-5.875 GHz, dual polarized, 23dBi, 8°AZ x 8°EL                                                                                                                                         |
| External antennas<br>(BU/RB-B350D/B600D units) | <ul style="list-style-type: none"><li>■ Flat panel, 4.9-5.875 GHz, dual polarized, 23dBi, 8°AZ x 8°EL</li><li>■ Dish antenna, 4.9-6 GHz, dual polarized, 28dBi, 5.5°AZ x 5.5°EL</li></ul> |
| Central frequency resolution                   | 5 MHz (see INFORMATION note below)                                                                                                                                                        |
| TX power accuracy                              | +1/-2 dB                                                                                                                                                                                  |
| Maximum output power at<br>antenna port        | 24 dBm (see INFORMATION note below)                                                                                                                                                       |

**INFORMATION**  Actually supported frequencies and Tx Power range depend on relevant regulations according to the Country Code being used (see [“Country Codes and Dependent Parameters”](#) on page 40 and the Country Codes document). In current release available Country Codes support different sub-bands in the range 4.9 to 5.9 GHz.

Maximum supported Tx Power may also depend on the configured antenna gain and, in some cases, also on the bandwidth, according to the maximum allowed EIRP and spectral density specified in the relevant regulation for the selected Country Code.

For units installed in the United States using FCC Country Code and operating in the 5470-5600 and 5650-5725 MHz bands, see also [“TDWR Interference Avoidance”](#) on page 10.



## 1.3.2 Sensitivity and Max Tx Power per MCS

Table 1-2: Sensitivity and Max Tx Power per Modulation and Coding Scheme

| MCS Index | Spatial Streams | Modulation | Coding Scheme | Sensitivity @ 20 MHz BW (dBm) | Sensitivity @ 40 MHz BW (dBm) | Max Tx Power per RF Port (dBm) |
|-----------|-----------------|------------|---------------|-------------------------------|-------------------------------|--------------------------------|
| 0         | 1               | BPSK       | 1/2           | -92                           | -89                           | 24                             |
| 1         | 1               | QPSK       | 1/2           | -90                           | -87                           | 24                             |
| 2         | 1               | QPSK       | 3/4           | -88                           | -85                           | 24                             |
| 3         | 1               | 16-QAM     | 1/2           | -85                           | -82                           | 23                             |
| 4         | 1               | 16-QAM     | 3/4           | -82                           | -79                           | 22                             |
| 5         | 1               | 64-QAM     | 2/3           | -77                           | -74                           | 20                             |
| 6         | 1               | 64-QAM     | 3/4           | -75                           | -72                           | 20                             |
| 7         | 1               | 64-QAM     | 5/6           | -73                           | -70                           | 18                             |
| 8         | 2               | BPSK       | 1/2           | -90                           | -87                           | 24                             |
| 9         | 2               | QPSK       | 1/2           | -88                           | -85                           | 24                             |
| 10        | 2               | QPSK       | 3/4           | -86                           | -83                           | 24                             |
| 11        | 2               | 16-QAM     | 1/2           | -83                           | -80                           | 23                             |
| 12        | 2               | 16-QAM     | 3/4           | -80                           | -77                           | 22                             |
| 13        | 2               | 64-QAM     | 2/3           | -75                           | -72                           | 20                             |
| 14        | 2               | 64-QAM     | 3/4           | -73                           | -70                           | 20                             |
| 15        | 2               | 64-QAM     | 5/6           | -71                           | -68                           | 18                             |

\* Sensitivity values for single-stream operation (MCS 0 - MCS 7) are for both RF chains (tested together - diversity operation).





### 1.3.3 Configuration and Management

**Table 1-3: Configuration and Management**

| Item                          | Description                                                                                                                                                                                                |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management                    | <ul style="list-style-type: none"><li>■ Menu-based Local Craft Interface (Monitor) via Telnet</li><li>■ WEB Interface, Internet Explorer 8</li><li>■ SNMP</li><li>■ Configuration backup/restore</li></ul> |
| Management access             | <ul style="list-style-type: none"><li>■ Wired LAN</li><li>■ Wireless link</li></ul>                                                                                                                        |
| SNMP agent                    | SNMP v1, v2c                                                                                                                                                                                               |
| Allocation of IP parameters   | Configurable                                                                                                                                                                                               |
| Software upgrade              | <ul style="list-style-type: none"><li>■ HTTP</li><li>■ TFTP</li></ul>                                                                                                                                      |
| Configuration upload/download | <ul style="list-style-type: none"><li>■ HTTP</li><li>■ TFTP</li></ul>                                                                                                                                      |
| License Upgrade               | TFTP                                                                                                                                                                                                       |



## 1.3.4 Standards, Compliance, General

**Table 1-4: Standards Specifications**

| Item                 | Description                                                                                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| EMC                  | ETSI EN 301 489-1/17<br>ETSI EN55022 Class B<br>FCC Part 15 Class B                                                                                |
| Safety               | EN 60950-1, Second Edition<br>EN 60950-22<br>UL 60950-1, Second Edition<br>UL 60950-22<br>EC-60950-1, Second Edition<br>CSA 60950-1<br>AS/NZS 3260 |
| Radio                | ETSI EN 301 893 v1.6.1<br>ETSI EN 302 502 v1.2.1<br>FCC Part 90<br>FCC Part 15.247<br>FCC Part 15.407<br>IC RSS-210                                |
| Ethernet Ports       | IEEE 802.3 (10/100/1000 Base-T)                                                                                                                    |
| Lightning Protection | ITU-T - K.21 (1.5KV surges in RJ-45 connectors)<br>EN-61000-4-5 (4KV surges in the antennas)                                                       |
| RoHS                 | Directive 2002/95/EC<br>China RoHS                                                                                                                 |
| WEEE                 | Directive 2002/96/EC                                                                                                                               |



# 1.3.5 Physical and Electrical

## 1.3.5.1 Mechanical

Table 1-5: Mechanical Specifications

| Unit                                                       | Structure                                                              | Dimensions (mm)                     | Weight (kg)  |
|------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------|--------------|
| General                                                    | An indoor unit (IDU) and an outdoor unit (ODU)                         |                                     |              |
| AC IDU                                                     | Metal box (black), desktop or wall mountable                           | 203 x 108 x 63                      | 1.93         |
| DC IDU                                                     | A UL94-0 rated plastic case                                            | 102 x 47 x 27                       | 0.07         |
| ODU                                                        | Square shaped metal box in a plastic enclosure, pole or wall mountable | 440 x 380 x 130                     | 7            |
| ANT, P/N 850102, 4.9-5.875 GHz, 8°, dual polarized, 23 dBi | Flat panel antenna                                                     | 371 x 371 x 40 mm (max)             | 2.0 kg (max) |
| ANT, P/N 850111, 4.9-6 GHz, 5.5°, dual polarized, 28 dBi   | Dish antenna                                                           | ■ Diameter: 725mm<br>■ Depth: 440mm | 6.3 kg (max) |



## 1.3.5.2 Connectors

**Table 1-6: Connectors**

| Unit   | Connector | Description                                                                                                                                                                                                                                     |
|--------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AC IDU | IN port   | 10/100/1000 MBps BaseT Ethernet (RJ-45)                                                                                                                                                                                                         |
|        | OUT port  | 10/100/1000 Mbps BaseT Ethernet (RJ-45)                                                                                                                                                                                                         |
|        | AC IN     | 3 pin AC power plug                                                                                                                                                                                                                             |
| DC IDU | LAN port  | 10/100/1000 MBps BaseT Ethernet (RJ-45)                                                                                                                                                                                                         |
|        | POE port  | 10/100/1000 Mbps BaseT Ethernet (RJ-45)                                                                                                                                                                                                         |
|        | DC IN     | DC jack with negative polarity                                                                                                                                                                                                                  |
| ODU    | PoE In    | 10/100/1000Mbps BaseT Ethernet (RJ-45), protected by a waterproof sealing assembly                                                                                                                                                              |
|        | PoE Out   |                                                                                                                                                                                                                                                 |
|        | Debug     | Mini USB RS-232 debug port (exclusive for Alvarion personnel)                                                                                                                                                                                   |
|        | ANT       | N-Type jack, 50 Ohm, lightning protected: <ul style="list-style-type: none"><li>■ 2 connectors on BU/RB-B350/B600 models (not used in BU/RB-350)</li><li>■ 4 connectors on BU/RB-B350D/600D models (only one pair used in BU/RB-350D)</li></ul> |

## 1.3.5.3 Electrical

**Table 1-7: Electrical Specifications**

| Unit   | Details                                                                                                                                                                                                                                                                |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AC IDU | <ul style="list-style-type: none"><li>■ Input Voltage: 100 to 240 VAC, 47-63 Hz</li><li>■ Output Voltage: 56 VDC</li><li>■ Total Output Power: 80W maximum</li></ul>                                                                                                   |
| DC IDU | <ul style="list-style-type: none"><li>■ Input Voltage: -44 to -56 VDC</li><li>■ Output Voltage: 48 VDC up to 1A</li><li>■ Total Output Power: 50W maximum</li></ul>                                                                                                    |
| ODU    | <ul style="list-style-type: none"><li>■ PoE In Voltage Range: -45 to -57 VDC (-55 VDC Nominal)</li><li>■ Power Consumption: 40W maximum (excluding power supplied via PoE Out)</li><li>■ PoE Out Voltage: Same as PoE In</li><li>■ PoE Out Power: Up to 30 W</li></ul> |



### 1.3.5.4 Environmental

**Table 1-8: Environmental Specifications**

| Item                                 | Description                                                                                               |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Operating Temperature                | ODU and AC IDU: -40°C to +55°C<br>DC IDU: -20°C to +60°C                                                  |
| Operating Humidity                   | AC IDU: 5% to 90%, non condensing<br>DC IDU: 5% to 905%, non condensing<br>ODU: 5% to 95%, non condensing |
| ODU Rain and Dust Ingress Protection | IP 67                                                                                                     |

### 1.3.5.5 TDWR Interference Avoidance

For units installed in the United States using FCC Country Code and operating in the 5470-5600 and 5650-5725 MHz bands, the following guidelines must be followed:

- The operating frequency of either a master or a client device installed within 22 miles (35 kilometers) of a Terminal Doppler Weather Radar (TDWR) location shall be separated by at least 30 MHz (center-to-center) from the TDWR operating frequency. For TDWRs location information, refer to FCC KDB 443999 or to <http://www.spectrumbridge.com/udia/search.aspx>.
- The installers and the operators have to register the devices in the Wireless Internet Service Providers Association (WISPA) UNII Device Interference Advisor (UDIA) sponsored database and registry, with the appropriate information regarding the location and operation of the device as well as the installer information. The registration form can be found at <http://www.spectrumbridge.com/udia/home.aspx>.

# Chapter 2 - Installation

## In This Chapter:

- ["Packing List" on page 13](#)
- ["Equipment Positioning Guidelines" on page 15](#)
- ["Installing the Outdoor Unit" on page 16](#)
- ["Preparing and Connecting the Indoor-to-Outdoor Cable" on page 26](#)
- ["Installing the AC Indoor Unit" on page 30](#)
- ["Powering Up the Unit" on page 33](#)



## 2.1 Site Installation Options

### 2.1.1 BU/RB Installation Options

The BU/RB unit can be installed on straight or angled poles ( $\pm 45^\circ$  from upward position) and on a flat surface, such as walls. Each unit package includes a tilt bracket that allows pole or wall mount installation with up/down tilt of  $+7.5^\circ$  to  $-10^\circ$ , and rotation of  $\pm 45^\circ$ .

### 2.1.2 Antenna Options

The BU/RB unit (depending on the model) is offered with the following antenna(s):

**Table 2-1: Antenna Configuration Options**

| Model          | Integrated Antenna              | External (detached) Antenna(s)                                                                                                                                                                                   |
|----------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BU/RB-B350-5X  | 23 dBi 8 deg, dual polarization | N/A.                                                                                                                                                                                                             |
| BU/RB-B350D-5X | N/A                             | <ul style="list-style-type: none"><li>■ High gain: 28 dBi 2" parabolic dish, dual polarization</li></ul> OR: <ul style="list-style-type: none"><li>■ Medium gain: 23 dBi flat panel, dual polarization</li></ul> |
| BU/RB-B600-5x  | 23 dBi 8 deg, dual polarization | 23 dBi flat panel, dual polarization                                                                                                                                                                             |
| BU/RB-B600D-5x | N/A                             | Two antennas of the same type (gain): <ul style="list-style-type: none"><li>■ High gain: 28 dBi 2" parabolic dish, dual polarization</li><li>■ Medium gain: 23 dBi flat panel, dual polarization</li></ul>       |

For detached antennas follow the installation guidelines provided with the antennas.

In a two-sectors unit, the minimum vertical and horizontal separation distances between two antennas installed one above the other or side by side depend on antennas' gain, maximum expected Tx power and Country Code used. For more details refer to "[Antennas Separation Guidelines](#)" on page 168.



## 2.2 Packing List

The BU/RB units are available in packages of single, 10, or 50 units. The units are available with either a DC or an AC PoE Injector. The following list describes the content of a package with a single unit.

- One BU/RB unit
- One indoor PoE Injector unit (IDU):
  - » AC PoE Injector, or
  - » DC PoE Injector package, including a DC cable and a Quick Installation Guide flier
- For the AC PoE Injector: Two power cables (one with a European plug and one with a USA plug)
- Sealing gland fastening tool
- One mounting kit:
  - » One carriage
  - » One tilting bracket
  - » Two metal clamps
  - » One hook
  - » M8 threaded rods
  - » M8 hex nuts
  - » M8x20 hex screws
  - » M8 flat washers
  - » M8 spring washers

### 2.2.1 Additional Items Required for Installation

The following items are also required to install the BreezeULTRA. Items marked with an asterisk (\*) are available from Alvarion.

- External antenna(s) (not applicable for B350 units)\*
- Antenna cables (not applicable for B350 units)\*
- A straight outdoor Cat.5e Ethernet cable (FTP 4x2x24 AWG 100 Ohm 8P8C) with two shielded RJ-45 connectors for connecting the IDU to the ODU. This cable is available in various lengths: 20m, 30m, 50m, 70m, 90m, or a drum of 250m\* (see [Section 2.7](#) for instructions on preparing the cable, or [Section 2.2.2](#) for information on ready-made cables)
- 4 metal bands for installing the BU/RB on 4"-6" poles\*





- For an AC PoE Injector: Mains plug adapter or termination plug (if the power plug on the supplied AC power cable does not fit local power outlets)
- For a DC PoE Injector: -48VDC power source with 2A current limit
- A PC/Notebook for configuring the BU/RB unit
- No.13 wrench
- Crimping tool for assembling the ethernet connectors
- Isolation materials. Use high quality cold shrink for the antenna connectors (see [Section 2.6](#))
- Grounding cable with at least 18 AWG gauge and with a closed loop (lug) terminal crimped to the ground cable

## 2.2.2 Indoor-to-Outdoor Cables

### INFORMATION



The length of the Indoor-to-Outdoor Ethernet cable should not exceed 90 meters. The length of the Ethernet cable connecting the indoor unit to the user's equipment, together with the length of the Indoor-to-Outdoor cable, should not exceed 100 meters.

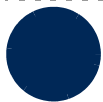
Use at least Category 5e Ethernet cables from approved manufacturers, listed in the following table. Consult with Alvarion's specialists on the suitability of other cables.

**Table 2-2: Approved Category 5E Ethernet Cables**

| Manufacturer                                                            | Part Number |
|-------------------------------------------------------------------------|-------------|
| UNIXSTAR<br><a href="http://www.unixtar.com.tw">www.unixtar.com.tw</a>  | C5ES4P24    |
| WESTERN<br><a href="http://www.westernwire.org">www.westernwire.org</a> | KF804E1D    |

In case of missing information (product specifications, ordering information, etc.) regarding these products on the manufacturer's web site, it is highly recommended to contact the manufacturer's sales representative directly.

For instructions on preparing the indoor-to-outdoor cable, refer to [Section 2.7](#).



## 2.3 Equipment Positioning Guidelines

This section provides key guidelines for selecting the optimal installation locations for the various BreezeULTRA system components.

### CAUTION



ONLY experienced installation professionals who are familiar with local building and safety codes and, wherever applicable, are licensed by the appropriate government regulatory authorities should install outdoor units and antennas.

Failure to do so may void the BreezeULTRA product warranty and may expose the end user or Service Provider to legal and financial liabilities. Alvarion and its resellers or distributors are not liable for injury, damage or regulation violations associated with the installation of Outdoor Units or antennas.

#### Français

SEULS les installateurs professionnels expérimentés qui sont familiers avec les codes locaux des bâtiments et de la sécurité et, lorsque cela s'applique, qui sont autorisés par les autorités gouvernementales de régulation, doivent installer les unités extérieures et les antennes. Le non-respect de cette clause peut invalider la garantie du produit et exposer l'utilisateur final ou le prestataire de services à des responsabilités légales et financières. Le fabricant et ses revendeurs ou distributeurs ne sont pas responsables pour toute blessure, dommage ou violation de la réglementation associée à l'installation d'unités extérieures ou d'antennes.

#### Italiano

ATTENZIONE: SOLO professionisti esperti che hanno familiarità con le norme di costruzione locali e coi codici di sicurezza e, ove applicabile, sono autorizzati dalle autorità governative competenti possono installare unità esterne ed antenne. Assicurarsi che le unità esterne, antenne e strutture di supporto siano installate correttamente per eliminare ogni pericolo fisico a persone o cose. In caso contrario, ciò può invalidare la garanzia del prodotto e può esporre l'utente finale o il fornitore di servizi a responsabilità legali ed economiche. Anche quando la messa a terra non è obbligatoria in base alla normativa regolatoria applicabile e ai codici nazionali, è obbligatorio garantire che l'unità esterna e il palo dell'antenna siano messi a terra e idonei dispositivi di protezione contro i fulmini siano utilizzati in modo da fornire protezione contro le sovratensioni e le scariche statiche. In ogni caso, il Fornitore e i suoi rivenditori non sono responsabili per eventuali danni fisici, danni ad oggetti o violazioni del regolamento associati con o causati dall'installazione, la messa a terra o di protezione contro i fulmini.

Select the optimal locations for the equipment using the following guidelines:

- The outdoor unit can be either pole or wall mounted. Its location should enable easy access to the unit for installation and testing.
- The higher the placement of the antenna, the better the achievable link quality.
- ODU units with detached antenna(s) should be installed as close as possible to the antenna(s) (to ensure that the antenna's characteristics are not affected by the ODU, the distance must be higher than 10 cm).
- The ODU with its integrated antenna, or the detached antenna(s), should be installed to provide a direct, or near line of sight with the antenna(s) on the other side (direct line of sight is always preferable).
- The indoor equipment should be installed as close as possible to the location where the indoor-to-outdoor cable enters the building. The location of the indoor equipment should take into account its connections to the power source and the CPE.

## 2.4 Installing the Outdoor Unit

### 2.4.1 Assembling the Tilt Bracket on the Unit

The tilt bracket is attached and fastened to the unit and then hung on the carriage. After hanging the unit, tilt and rotate the unit as required before fastening the screws. The tilt bracket supports  $+7.5^{\circ}$ - $10^{\circ}$  tilting and  $\pm 45^{\circ}$  vertical plane rotation. Install the unit with the bottom panel, including the LEDs, facing downward.



#### To assemble the bracket on the unit

Place the tilt bracket on the unit and fasten the M8 screws (see [Figure 2-1](#)). Apply torque of 80 [Lib\*In] = 9 [N\*m].

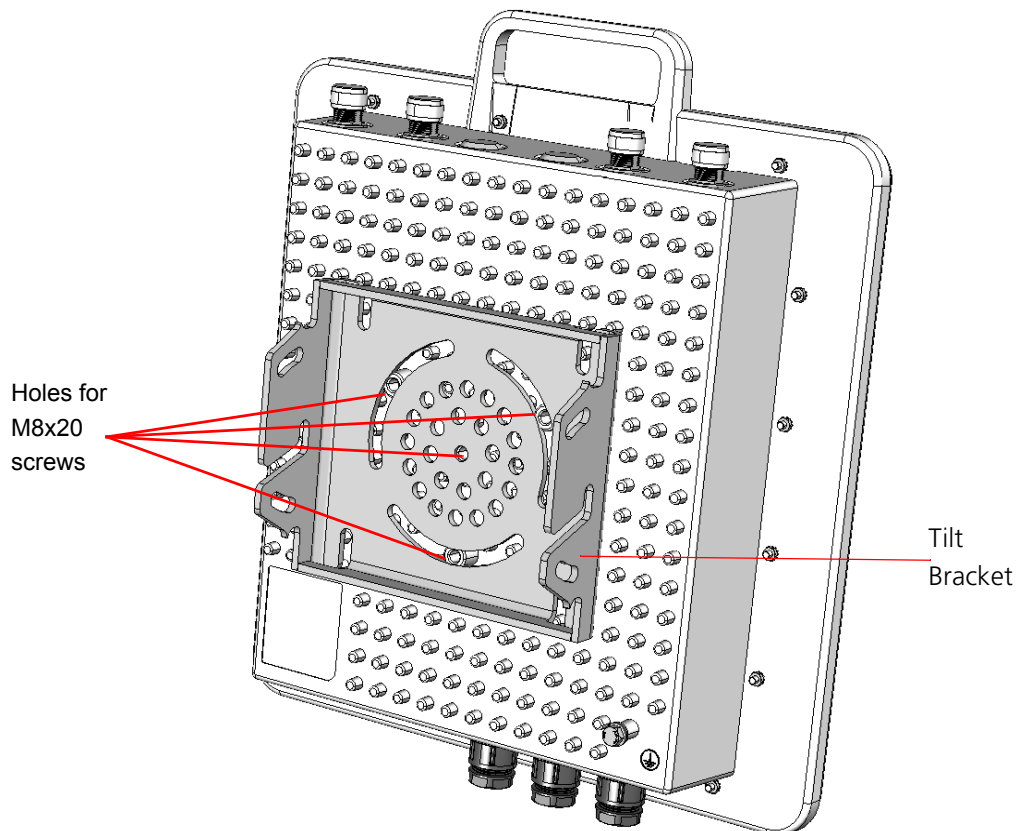


Figure 2-1: Mounting the Tilt Bracket

### 2.4.2 Installing the Carriage on a Pole

The unit can be installed on poles of various sizes using the supplied carriage. For poles of 1.5"-4" in diameter, use the supplied metal clamp. For poles larger than 4" (up to 6") use metal bands.

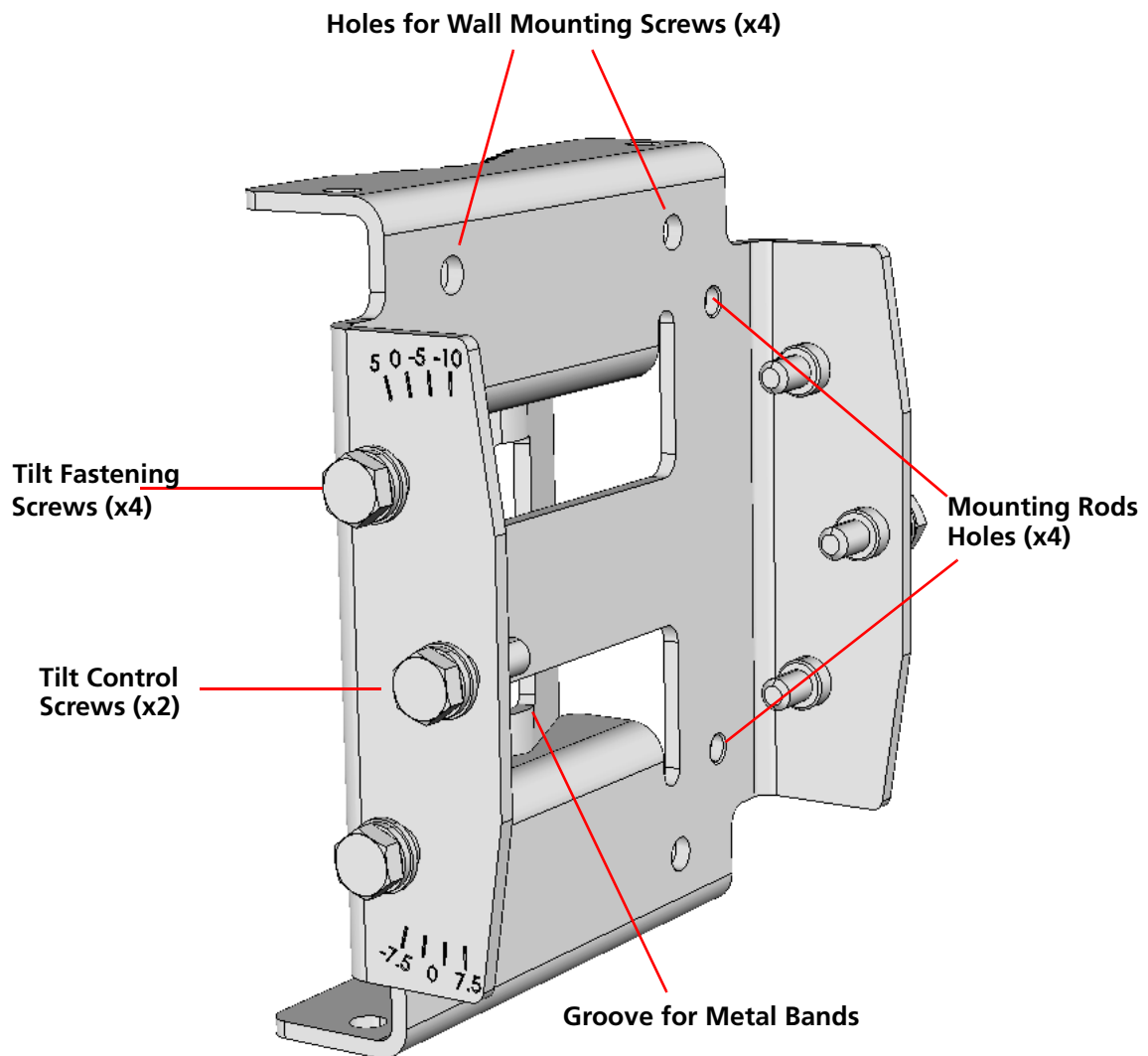


Figure 2-2: Pole Mounting Carriage



**To install the Carriage on a 1.5"-4" pole:**

- 1 Assemble the tilt bracket on the unit and fasten its four screws (see ["Assembling the Tilt Bracket on the Unit" on page 16](#)).
- 2 Thread the four M8 rods through the carriage.
- 3 Attach the bracket and the clamp to the pole and tighten on both sides using the supplied washers, spring washers and nuts. Apply a torque of 80 [Lib\*In] = 9 [N\*m].

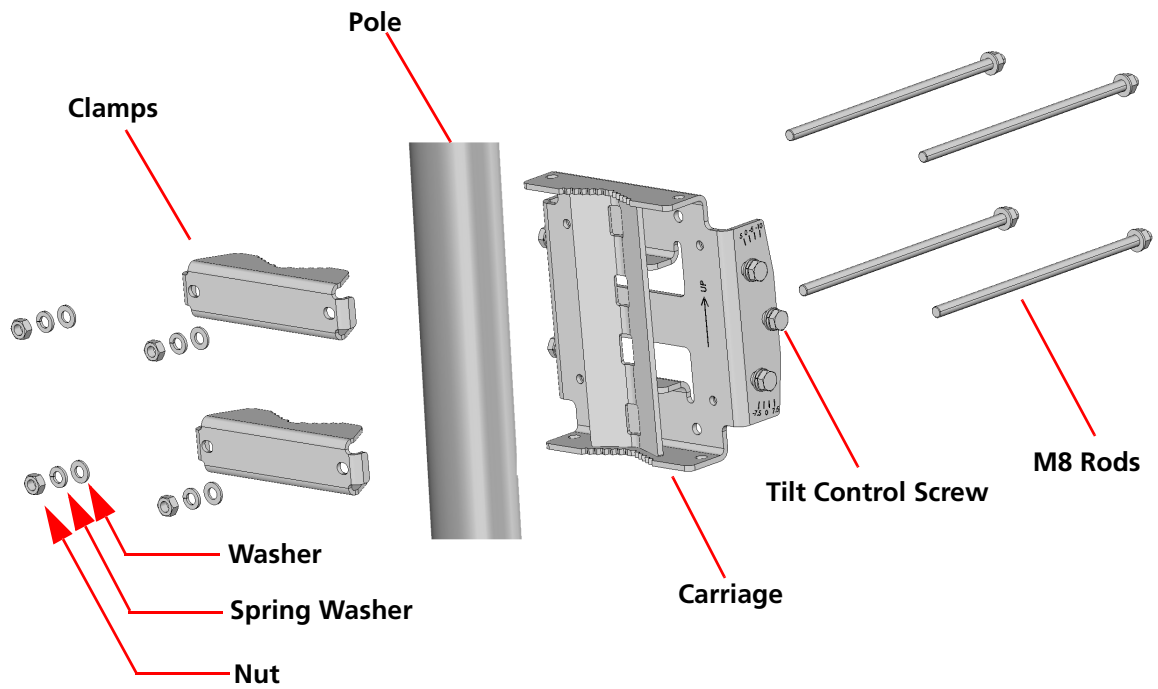


Figure 2-3: Assembling the Carriage and Clamps

- 4 Insert the tilt control screws into the middle-side hole of the carriage on both sides.

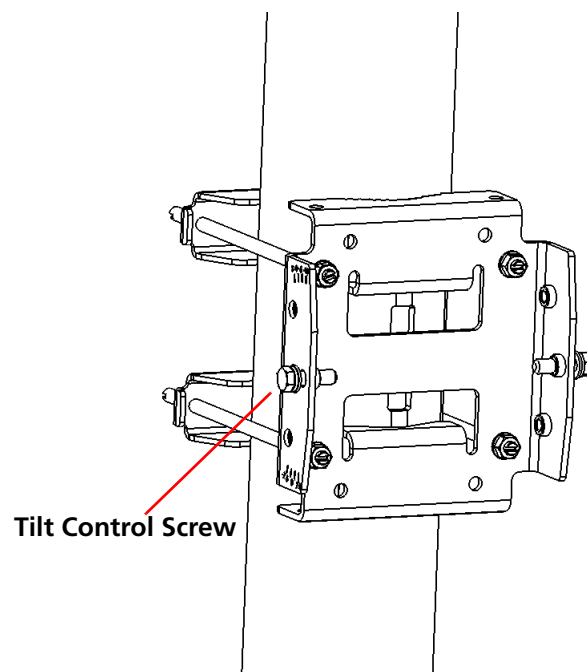
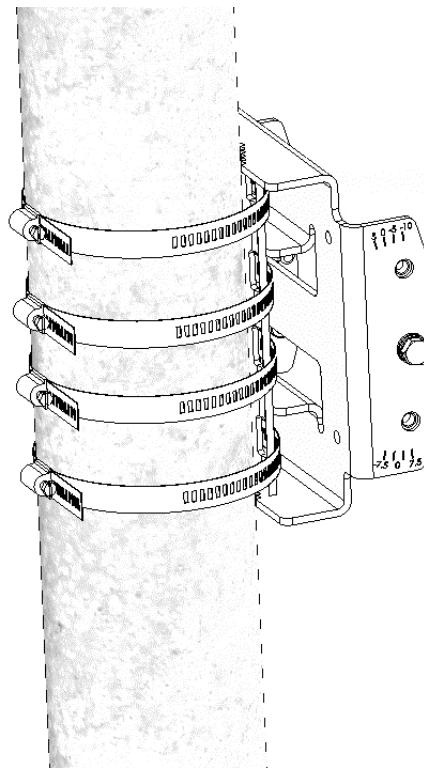


Figure 2-4: Carriage and Clamps Installed

**To install the carriage on a 4"-6" pole:**

- 1 Assemble the tilt bracket on the unit and fasten its four screws (see ["Assembling the Tilt Bracket on the Unit" on page 16](#)).
- 2 Thread the four metal bands through the grooves on the carriage and fasten them (see [Figure 2-5](#)).
- 3 Attach the carriage to the pole and fasten with metal bands (see [Figure 2-5](#)).
- 4 Insert the tilt control screws into the middle-side hole of the carriage on both sides (see [Figure 2-5](#)).



**Figure 2-5: Installed Carriage with Metal Bands**

### 2.4.3 Mounting the Unit on the Carriage

After mounting the unit on the carriage, use the tilt bracket to tilt and rotate the unit as required.

**To mount the unit on the carriage:**

- 1 Hang the unit with the tilt bracket on the tilt control screws of the unit carriage.
- 2 Attach and fasten all the screws on both sides of the unit carriage. Do not over tighten.

- 3 If required, slightly release the tilt bracket screws to enable rotation, and the tilt control screws to enable tilting; adjust the unit's position and tighten the screws. Apply torques of 45 [Lib\*In.] = 5 [N\*m] to the M6 Tilt-control screws, and 80 [Lib\*In.] = 9 [N\*m] to the M8 screws.

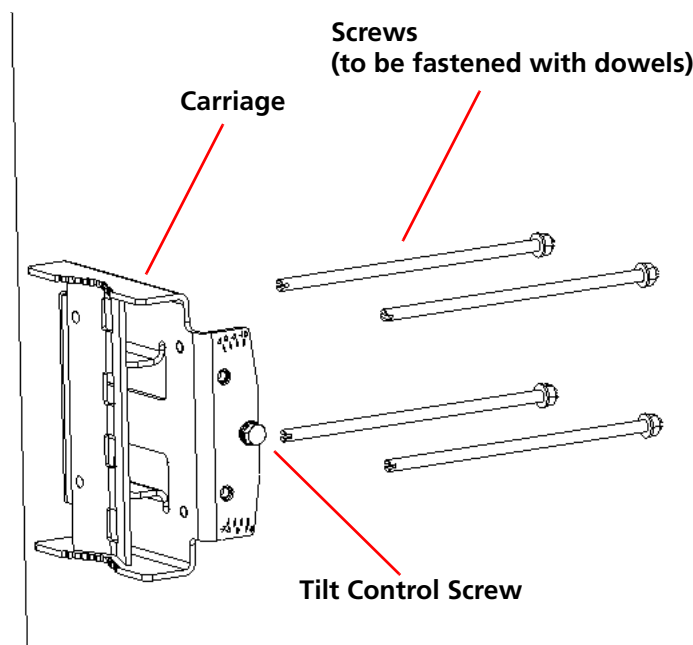
## 2.4.4 Wall Mount Installation

The unit can be installed on walls or any flat surface. This requires attaching and fastening the carriage with the unit to the wall using suitable securing means (not supplied) and then tilting and rotating the unit as required. The location of the screws should be planned with maximum precision.



### To install the unit on a wall:

- 1 Assemble the tilt bracket on the unit and fasten its four screws (see ["Assembling the Tilt Bracket on the Unit"](#) on page 16).
- 2 Place the carriage on the wall and mark the exact location of the holes to drill.
- 3 Drill the holes, and use four metal dowels and screws to affix the carriage to the wall.
- 4 Insert the tilt control screws into the middle-side hole of the carriage on both sides (see [Figure 2-6](#)).



**Figure 2-6: Mounting the Carriage on the Wall**

- 5 Hang the unit with the tilt bracket on the tilt control screws of the unit carriage.
- 6 Attach and fasten all the screws at both sides of the carriage (see [Figure 2-6](#)). Do not over tighten.

- 7 If required, slightly release the tilt bracket screws to enable rotation, and the tilt control screws to enable tilting. Adjust the unit's position and tighten the screws.

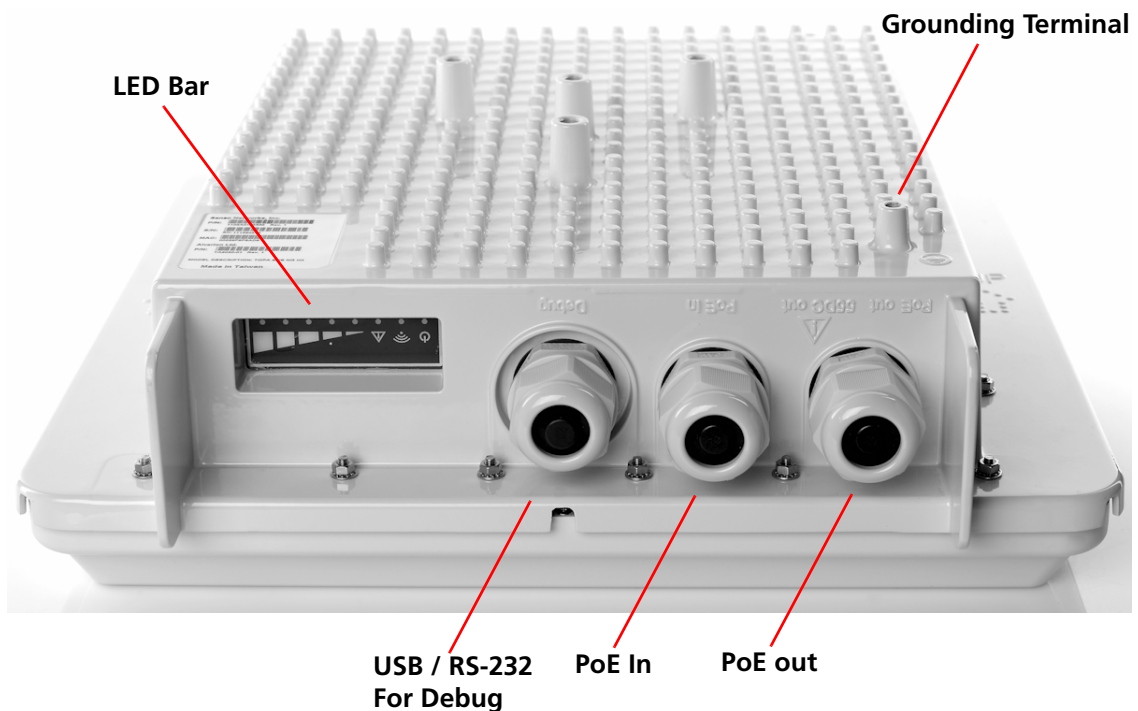
## 2.4.5 Connecting the Grounding Cable

The Grounding screw (marked ) is located on the back panel of the outdoor unit. This grounding terminal must be permanently connected to protective earth using a 18 AWG or lower gauge (0.82 mm<sup>2</sup> or thicker) grounding cable. The grounding cable should be as short as possible.



**To connect the grounding cable:**

- 1 Connect one end of a grounding cable to the grounding terminal (see [Figure 2-7](#)) and tighten the grounding screw firmly.
- 2 Connect the other end of the grounding cable to a good ground (earth) connection.



**Figure 2-7: Bottom Panel (Shown with Seal Assembly)**





## 2.5 Connecting the Antenna Cables

The Antenna RF connectors are located on the top panel of the ODU.



**Figure 2-8: RF Connectors (D model unit)**

In units with an integral antenna, one pair of RF connectors (ANT 5 and ANT 6) is available. In D model units (without an integral antenna), an additional pair of RF connectors (ANT 1 and ANT 2) is available. The following table provides details on typical antenna(s) connections for different models:



Table 2-3: Antenna(s) Connections

| Unit Type   | Sector 1                                        | Sector 3                                               | Notes                                                                                                                                                                                    |
|-------------|-------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BU/RB-B350  | Integral antenna                                | N/A                                                    | ANT 5 and ANT 6 are not operational.<br><br>Alternatively, Sector 3 (ANT 5 and ANT 6 connected to a detached antenna) may be used. In this case the integral antenna is not operational. |
| BU/RB-B350D | ANT 1 and ANT 2 connected to a detached antenna | N/A                                                    | ANT 5 and ANT 6 are not operational.<br><br>Alternatively, Sector 3 (ANT 5 and ANT 6 connected to a detached antenna) may be used. In this case ANT 1 and ANT 2 are not operational.     |
| BU/RB-B600  | Integral antenna                                | ANT 5 and ANT 6 connected to a detached 23 dBi antenna | The two antenna must have the same gain.                                                                                                                                                 |
| BU/RB-600D  | ANT 1 and ANT 2 connected to a detached antenna | ANT 5 and ANT 6 connected to a detached antenna        | The two detached antenna must have the same gain.                                                                                                                                        |

Ready-made antenna cables (LMR-400) can be ordered from Alvarion in several lengths.

Higher length is typically necessary for dual sector installations (see [“Antennas Separation Guidelines” on page 168](#)).



#### To connect the detached antenna(s):

- 1 Connect one end of the coaxial RF cable (LMR 400) to the RF connector (see [Figure 2-8](#) and [Table 2-3](#) for details on connectors to be used).
- 2 Slide the cold shrink sleeve onto the cable before connecting the cable. See [Section 2.6](#) for instructions on sealing the connectors.
- 3 Connect the other end of the RF cable to the antenna.
- 4 Repeat steps 1 to 3 for additional antenna connection(s).

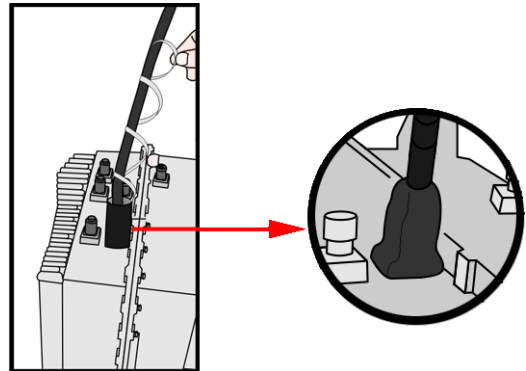
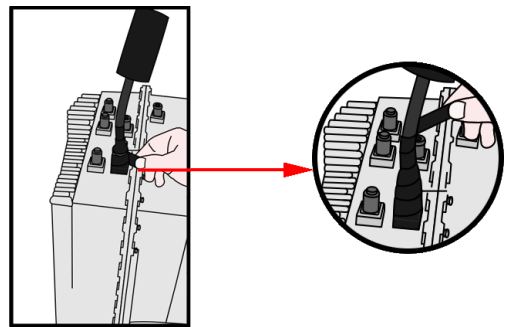
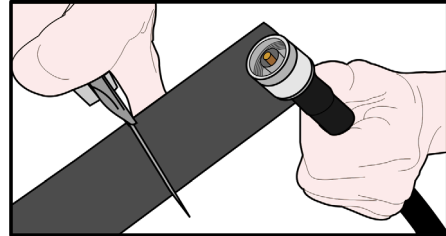


- 5 Seal the RF connectors to protect against rain and moisture. See [Section 2.6](#) for instructions.
- 6 Fix the RF cables onto the pole using Velcro® wide adjustable straps or similar means.
  - » If possible, use additional straps to route the cable such that water can accumulate on the cable bends, away from the unit.
  - » When routing the cable, do not exceed the minimum bending radius in the cable specifications.

## 2.6 Sealing the Antenna Connectors

Use high quality cold shrink sleeves to seal the connectors.

- 1 Cut the cold shrink sleeve to size. Take into account the size of the unit's connector and additional 2.5 cm (1 in.).
- 2 Slide the cold shrink sleeve onto the cable before connecting the cable.
- 3 Connect the cable.
- 4 Attach the mastic tape (Scotchfil™ Electrical Insulation Putty) and wrap it around the connector butting up against the connector. Do not over stretch.
- 5 Squeeze to tighten the mastic sealer. Make sure there are no air bubbles.
- 6 Slide the cold shrink sleeve on top of the connector. Make sure that the sleeve covers both cable connector and unit connector.
- 7 Pull the cord slowly to shrink the sleeve.





## 2.7 Preparing and Connecting the Indoor-to-Outdoor Cable

Use an outdoor Category 5 Ethernet cable of maximum 90 meters in length. Ready-made cables can be ordered from Alvarion in various lengths: 20m, 30m, 50m, 70m, 90m, or a drum of 250m. Crimp a generic shielded 8P8C (RJ-45) modular connector. The Indoor-to-Outdoor cable provides pin-to-pin connection on both ends. All 8 wires are in use.



### To connect the indoor unit to the outdoor unit:

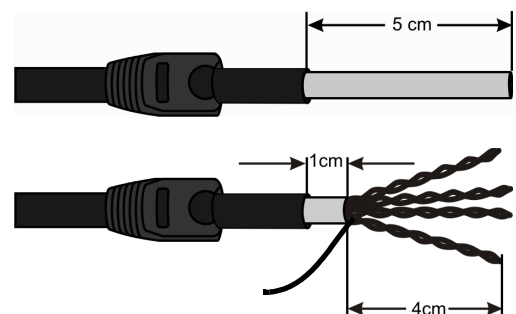
- 1 Remove the sealing gland marked **PoE In** from the outdoor unit.
- 2 Open the gland and thread the cable through the gland's nut.
- 3 Insert the uncrimped end of the indoor-to-outdoor cable through the gland.
- 4 Assemble an RJ-45 connector to the open end of the cable (see ["To assemble an RJ-45 connector to the indoor-to-outdoor cable:"](#) below).
- 5 Connect the cable to the PoE In port on the outdoor unit.
- 6 Reconnect the gland. Use the dedicated tool to fasten it.
- 7 Use the dedicated tool to fasten the sealing gland's nut on the gland's body.
- 8 Connect the other end of the cable with the assembled RJ45 connector to the indoor unit's OUT port.



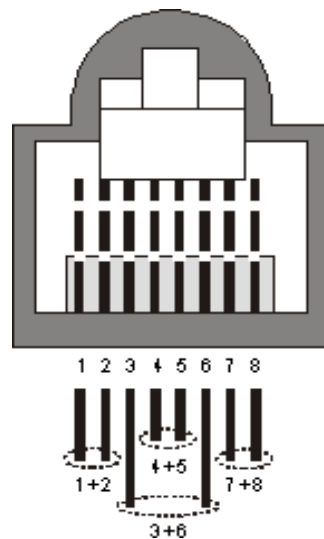
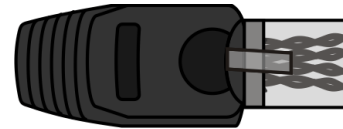
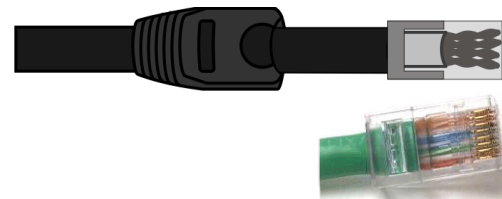
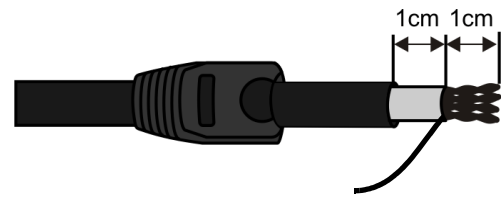
### To assemble an RJ-45 connector to the indoor-to-outdoor cable:

Use a crimp tool for RJ-45 connectors to prepare the wires, insert them into the appropriate pins and use the crimp tool to crimp the connector. Make sure to do the following:

- 1 Thread the RJ-45 plastic cover on the cable.
- 2 Reveal 5 cm of outer sleeve.
- 3 Reveal 4 cm of the inner sleeve.



- 4 Release all wires and arrange them in order. Refer to the tables below for pin assignment.
- 5 Take back the shield drain wire before inserting the cable into the RJ45 connector, to ensure a good connection with the connector's shield after crimping.
- 6 Cut the wires to 1 cm length each.
- 7 Insert the wires into the connector.
- 8 Press the connector using a crimp tool.
- 9 Solder the shield drain wire to the connector.
- 10 Push the plastic cover into place.



**Figure 2-9: Ethernet Connector Pin Pair Assignments**



Table 2-4: Indoor-to-Outdoor Cable Pin-Out

| Pin | Wire Color (recommended) | Pin Pair     | Voltage |
|-----|--------------------------|--------------|---------|
| 1   | Green/White              | Bi-Di pair 1 | -56 VDC |
| 2   | Green                    | Bi-Di pair 1 | -56 VDC |
| 3   | Orange/White             | Bi-Di pair 2 | +56 VDC |
| 4   | Blue                     | Bi-Di pair 3 | +56 VDC |
| 5   | Blow/White               | Bi-Di pair 3 | +56 VDC |
| 6   | Orange                   | Bi-Di pair 2 | +56 VDC |
| 7   | Brown/White              | Bi-Di pair 4 | -56 VDC |
| 8   | Brown                    | Bi-Di pair 4 | -56 VDC |



## 2.8 PoE out Cable

Use an outdoor Category 5 Ethernet cable with shielded RJ-45 modular connectors. The maximum cable length is 100 meters for an AC PoE Injector or 50 meters for a DC PoE Injector. See [“Preparing and Connecting the Indoor-to-Outdoor Cable” on page 26](#) for general guidelines regarding preparation of the cable.

Only a PoE aware video camera should be connected to the PoE out connector.

For equipment operating at 1 Gbps, pin-out mapping is the same as for the Indoor-to-Outdoor cable (see [Table 2-4](#) above).

For equipment operating at 10/100 Mbps, the PoE out connector provides power only on pins 4, 5 (+) and 7, 8 (-). The following table shows the required wire pair pin-to-pin connections for 8-wire cables connecting the PoE out connector to a device operating at 10/100 Mbps:

**Table 2-5: PoE out Wire to Pin Mapping for 10/100 Mbps**

| Pin | Wire Color (recommended) | Description  |
|-----|--------------------------|--------------|
| 1   | Green/White              | Ethernet TXP |
| 2   | Green                    | Ethernet TXN |
| 3   | Orange/White             | Ethernet RXP |
| 4   | Blue                     | PoE 56V Pos. |
| 5   | Blow/White               | PoE 56V Pos. |
| 6   | Orange                   | Ethernet RXN |
| 7   | Brown/White              | PoE 56V Neg  |
| 8   | Brown                    | PoE 56V Neg. |

**NOTE!**



With an AC PoE Injector The PoE out connector can provide up to 30W to a PoE powered device connected to it. For a DC PoE Injector up to 10W can be provided.





## 2.9 Installing the AC Indoor Unit

**NOTE!**



For a DC PoE Injector refer to the Quick Installation Guide supplied with it.



Figure 2-10: Indoor Unit

The following are the IDU's front and rear panels:



Figure 2-11: IDU Front Panel



Figure 2-12: IDU Rear Panel

- 1 Connect one end of the grounding cable to the grounding terminal on either side of the IDU and tighten the grounding screw firmly.

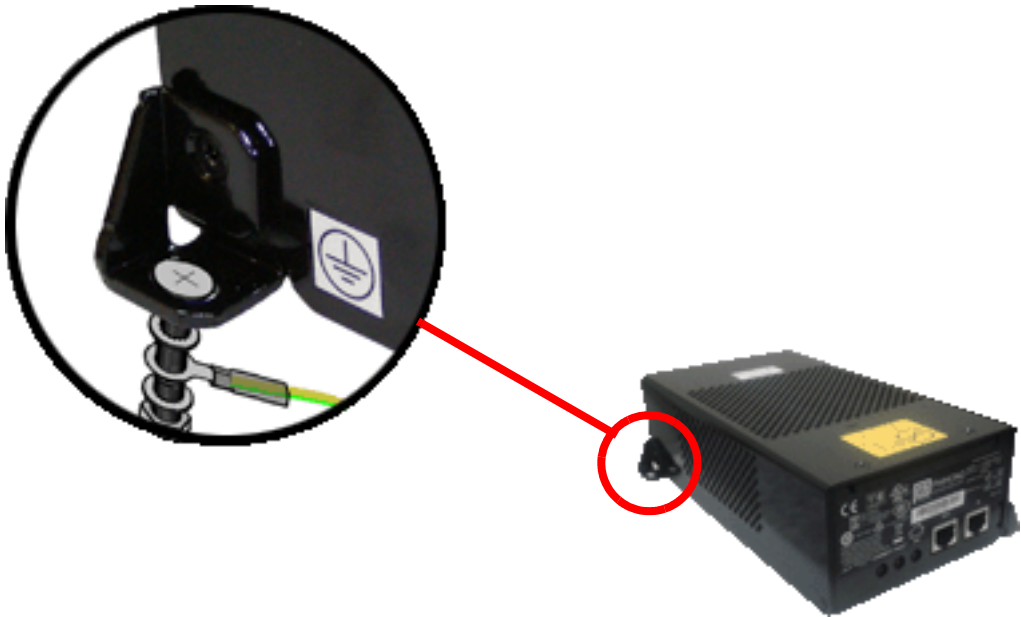


Figure 2-13: IDU Grounding

- 2 Connect the indoor to outdoor cable to the IDU's Out port.

CAUTION



Do not connect the data equipment to the OUT port. The OUT port supplies DC power to the ODU, and this may harm other equipment connected to it.

- 3 Connect the IN port of the indoor unit to the backhauling equipment using a standard Ethernet cable.

NOTE!



The combined lengths of the Ethernet cables must not exceed 100m.

- 4 Connect the power cable to the unit's AC socket, located on the rear panel.

The IDU includes the following connectors and LEDs:

Table 2-6: IDU Connectors

| Label | Connector                                | Description                                                                                     |
|-------|------------------------------------------|-------------------------------------------------------------------------------------------------|
| IN    | 10/100/1000 Mbps Base-T Ethernet (RJ-45) | Cable connection to a PC: crossed<br>Cable connection to a hub: straight                        |
| OUT   | 10/100/1000 Mbps Base-T Ethernet (RJ-45) | Ethernet + power for outdoor connection over a shielded Cat.5e or higher category outdoor cable |

**Table 2-6: IDU Connectors (Continued)**

| Label                                                                             | Connector       | Description                        |
|-----------------------------------------------------------------------------------|-----------------|------------------------------------|
| Power                                                                             | 3-pin AC        | Mains power connection             |
|  | Grounding screw | For connecting the grounding cable |

**Table 2-7: IDU LEDs**

| Label   | Description                 | Functionality                                                                                                                                      |
|---------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| On      | Power indication to the IDU | Blue/green - The IDU is powered by the AC source and DC output is available<br><br>Off - ODU is not connected; ODU fault; Bad indoor-outdoor cable |
| Fault   | IDU-ODU connection          | Red - Fault detected (see below)<br><br>Off - No fault detected (after or during detection)                                                        |
| Connect | Power indication to the ODU | Green - ODU is connected and powered up<br><br>Off - No power to the ODU                                                                           |

Upon power-up, all 3 LEDs will light for 2 seconds, as part of the self-test for the IDU. After these 2 seconds, the "ON" LED will illuminate green. The ON LED may blink for up to 30 seconds until proper ODU identification occurs. The DC output voltage is now available for powering the ODU.



## 2.10 Powering Up the Unit

To power up the unit, connect the IDU's AC power cable to the AC mains. The unit can operate with AC mains of 100-240 VAC, 50-60 Hz.

The ODU LEDs will light up, indicating the unit's status.

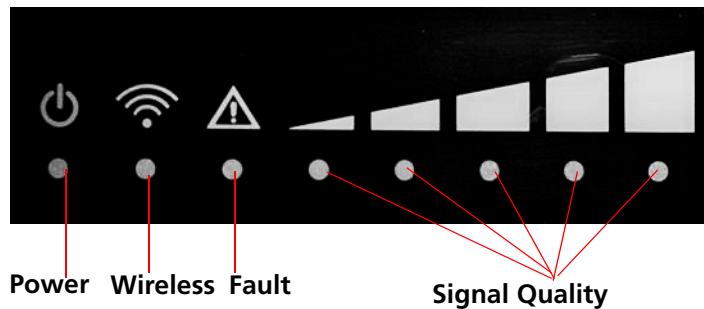


Figure 2-14: ODU LED Display

The following LEDs are available:

Table 2-8: ODU LEDs

| LED            | Description                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power          | Lights if power is supplied to the ODU (56 VDC).<br><br>In a BU/RB-600 operating in Dual Sector mode the Power LED will alternate every 5 minutes between steady on and blinking:<br><br>Steady On: Other LEDs listed below indicate the status of Sector 1.<br><br>Blinking: Other LEDs listed below indicate the status of Sector 3.                                      |
| Wireless       | Lights at startup and if a wireless link is established.                                                                                                                                                                                                                                                                                                                    |
| Fault          | Lights at startup and during operation if a fatal error or a critical alarm occurs.                                                                                                                                                                                                                                                                                         |
| Signal Quality | Indicates the signal to noise ratio (SNR) of received signals if a wireless link is established:<br><br>1 LED On: SNR is 5-8 dB<br>2 LEDs On: SNR is 8-15 dB<br>3 LEDs On: SNR is 15 to 20 dB<br>4 LEDs On: SNR is 20 to 25 dB<br>5 LEDs On: SNR is higher than 25 dB<br>(see description of Power LED above for details on associating these LEDs with the correct sector) |



**NOTE!**



The SNR measurement is accurate only when receiving data transmissions from the associated unit.

You can use a continuous PING to generate data transmission, although a higher amount of continuous data traffic is recommended.

Note that when operating in Dual-Sector mode, Sector 1 is used for downlink data (BU to RB) and Sector 3 is used for uplink data (RB to BU). SNR measurements are performed only on received data.

# Chapter 3 - Commissioning

## In This Chapter:

- ["Initial Configuration" on page 36](#)
- ["Aligning the Antennas" on page 50](#)
- ["Configuring the Maximum MCS" on page 52](#)



## 3.1 Initial Configuration

### 3.1.1 Introduction

Some basic parameters must be configured to ensure that the system operates correctly. This includes parameters required for:

- Management connectivity allowing remote management of the units
- Wireless connectivity meeting applicable regulations and other constraints/requirements

The basic parameters may be configured either before actual installation in laboratory conditions or after initial installation process.

Initial configuration can be performed using either the Web Management Interface or the Monitor program.

#### INFORMATION



For complete details on accessing and using the Web Management Interface refer to [“Using the Web Interface” on page 54](#).

For complete details on accessing and using the Monitor program refer to [“Using the Monitor Program” on page 94](#).



Following instructions are for a new unit with a factory default configuration. For a previously used unit, it is recommended to first reset the unit to its factory default configuration:

- In the Web Management Interface: Settings > Unit Control > Change configuration system > Reset to factory default (in Configuration reset section). Reset the unit after selecting the Reset to factory default option. For more details refer to [“Change Configuration System” on page 76](#).
- In the Monitor: Unit Control > Default Settings > Factory Defaults > Set to Full Factory Default. When prompted, confirm the Reset operation. For more details refer to [“Factory Default” on page 106](#).

### 3.1.2 Using the Web Management Interface for Initial Configuration

#### 3.1.2.1 The Quick Settings Window

##### 3.1.2.1.1 Introduction

The Quick Settings window enables configuring the basic parameters required for initial activation and establishment of wireless link(s) in most installations. It also enables configuring the relevant parameters to enable remote management of the unit.

To access the Quick Settings window, select the Quick Installation option in the main window of the Web interface's GUI.

The Quick Settings window provides two operation modes, depending on the setup method. Selecting the **Manual settings** (the default) or **Configuration file** option buttons switches between the corresponding options (for details see [Manual settings mode](#) below and [“Configuration file mode” on page 42](#)).

**Quick Settings**

**PTP**

**HW type - BU/RB** (🔑)

☒ Manual settings
 ☐ Configuration file

|                    | Sector1          | Sector3 |
|--------------------|------------------|---------|
| Select type        | BU-600           |         |
| Country code       | 5.4 GHz Universa |         |
| Radio interface    | DualSector       |         |
| ESSID              | A203-S1          | A203-S3 |
| Sector name        | 1                | 3       |
| Security           | AES              | AES     |
| Encryption key     | .....            | .....   |
| Antenna gain (dBi) | 23               | 0       |
| Frequency > (MHz)  | 5500             | 5570    |
| IP Address         | 10.0.0.222       |         |
| Subnet Mask        | 255.255.255.0    |         |
| Default Gateway    | 10.0.0.113       |         |
| Unit location      | AI_room          |         |

Back Save

**Figure 3-1: Quick Settings - Manual Settings**

Clicking the Advanced Settings (🔑) icon opens the Radio Sector Configuration window where you can configure additional radio settings. For more details see [“Sector Configuration” on page 80](#).

### 3.1.2.1.2 Manual settings mode

Manual settings mode enables configuration of the basic parameters required for activating the unit and establishing a wireless link. Note that the per-sector parameters are available always regardless of unit's type. In Manual settings mode, the following basic parameters are available:



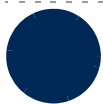


Table 3-1: Manual Settings

| Setting                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select type                  | <p>Defines the functionality of the unit (BU/RB and number of sectors if applicable for the available license). To simplify logistic operations, all units are supplied as Base Units. When necessary, the functionality of each unit can be changed from Base Unit to Remote Bridge, and vice versa. For a Point-to-Point link, one end should be set up as BU (Bridge Unit) and the other end as an RB (Remote Bridge).</p> <p>The available options are:</p> <ul style="list-style-type: none"><li>■ BU-350</li><li>■ RB-350</li><li>■ BU-600</li><li>■ RB-600</li></ul> <p>The BU-600 and RB-600 options are not applicable for a unit that was received from the factory as a BU-350 and was not upgraded to BU/RB-600.</p> <p>An attempt to change the Type from BU/RB-600 to BU/RB-350 will be rejected if the Radio interface parameter (see below) is set to Dual Sector.</p> <p>A change in Unit Type is applied after reboot.</p> |
| Country code                 | <p>Applies a country code (to both sectors if applicable). Depending on the country code, specific limitations such as maximum EIRP, available bandwidths, available channels etc. will apply to radio parameters. See <a href="#">"Change Configuration System" on page 76</a> for information on how to upload a new country codes file if necessary. See more details and information on certain limitations in <a href="#">"Country Codes and Dependent Parameters" on page 40</a>.</p> <p>Note that a country code will be rejected if the configured antenna gain together with minimum available power do not comply with the new EIRP - for any of the sectors.</p> <p>A change in Country Code is applied after reboot.</p>                                                                                                                                                                                                         |
| Radio interface              | <p>Defines the sector(s) to be used: The options are Sector 1, Sector 3 and Dual Sector. Dual Sector is applicable only if Type is set to BU/RB-600 (if the Type is BU/RB-350, selection of the Dual Sector option will be rejected).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| ESSID<br>(Sector 1/Sector 3) | <p>The Extended Service Set IDentifier that identifies the sector's wireless network. Only sectors using the same ESSID are allowed to associate - the same ESSID must be used on both sides of a link. The ESSID can have 1 to 32 characters (a null ESSID is forbidden). The defaults are ESSID1 for Sector 1 and ESSID3 for Sector 3.</p> <p>ESSID must be unique in the wireless network. If both sectors of the same unit are enabled (Dual Sector operation), a unique ESSID must be configured for each sector.</p>                                                                                                                                                                                                                                                                                                                                                                                                                   |

Table 3-1: Manual Settings

| Setting                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sector Name<br>(Sector 1/Sector 3)        | The name identifying the sector. An informational parameter that does not affect sector operation. A string of up to 31 printable characters (defaults are Sector 1/Sector 3).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Security<br>(Sector 1/Sector 3)           | <ul style="list-style-type: none"> <li>■ Disable - Wireless traffic is unencrypted.</li> <li>■ AES - Uses the Advanced Encryption Standard for encrypting the wireless data traffic</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Encryption key<br>(Sector 1/Sector 3)     | Applicable only if Data encryption option is set to AES. Sets the encryption key used by the AES encryption algorithm when it is enabled. A 16 characters long string. The default is a string of 16 zeros. For security reasons the key is not visible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Antenna gain (dBi)<br>(Sector 1/Sector 3) | <ul style="list-style-type: none"> <li>■ For a sector connected to an integrated antennas, this value is automatically enforced to 23 dBi and is not configurable.</li> <li>■ For detached antennas, sets the antenna net gain. The configured gain should take into account the attenuation of the cable connecting the antenna to the unit. In units using certain Country Codes that have some limitations on allowed EIRP the allowed range for the Antenna gain parameter may be limited for compliance with these limitations. For details see <a href="#">"Antenna Gain Limitations" on page 42</a>.</li> <li>■ With certain Country Codes you may have to insert an appropriate RF attenuation (or a longer RF cable) for compliance with relevant regulations when using the standard 23 or 28 dBi detached antennas.</li> </ul> <p>In a Dual Sector system both sectors should use antennas with the same gain.</p> <p>A change in Antenna gain is applied after reboot.</p> |
| Frequency (MHz)<br>(Sector 1/Sector 3)    | <p>Sets a specific frequency channel to be used by the sector.</p> <p>Available frequencies include all frequencies that are marked as available for selection in the Channel List (see <a href="#">"Channel List" on page 87</a>) and are valid according to the current Bandwidth (the Channel List may include also frequencies that are not supported for the current bandwidth).</p> <p>Clicking on <a href="#">Frequency &gt;</a> opens the <a href="#">Channel List</a> window.</p> <p>If both sectors are enabled (Dual Sector operation), the following limitations apply:</p> <ul style="list-style-type: none"> <li>■ For a 20 MHz bandwidth: The minimum distance between the frequencies configured for Sector 1 and Sector 3 is 40 MHz.</li> <li>■ For a 40+ MHz bandwidth: The minimum distance between the frequencies configured for Sector 1 and Sector 3 is 60 MHz.</li> </ul>                                                                                      |
| IP Address                                | Sets the unit's management IP address.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Subnet Mask                               | Sets the unit's management subnet mask.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Default Gateway                           | Sets the unit's management default gateway.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



Table 3-1: Manual Settings

| Setting       | Description                                           |
|---------------|-------------------------------------------------------|
| Unit location | Sets an optional description for the unit's location. |

3.1.2.1.3 Country Codes and Dependent Parameters

Country Codes are sets of radio limitations such as maximum allowed EIRP, available bandwidths, available channels etc. applicable under various jurisdictions. During commissioning, the unit's Country Code must be set in accordance to the relevant local regulations such as FCC, ETSI, etc.

CAUTION



It is the responsibility of the administrator to verify that the selected Country Code, and usable frequencies within the selected Country Code, are in accordance with relevant local regulations.

The default country code is 5.4 GHz Universal (except to units supplied with a "locked" Country Code as described below).

To fully support certain local regulations, certain Country Codes belong to a "locked" group. The Country Code of a unit using a "locked" Country Code can be changed only to another Country Code belonging to the same group (or cannot be changed if the group contains a single Country Code).

If the unit was not shipped from factory with a Country Code belonging to a "locked" group, you can cancel the lock by applying full factory defaults.

The current "locked" groups are:

A FCC Country Codes

The following FCC Country Codes comprise a "locked" group:

- » FCC 5.4 GHz (the default for "FCC" units)
- » FCC 5.8 GHz P2P
- » FCC Dual Band

The Country Code of a unit set to any of these Country Codes can be changed only to a Country Code belonging to this group.

B India Country Code

The 5.8 GHz India Country Code is "locked". The Country Code of a unit set to 5.8 GHz India Country Code (the default for "India" units) cannot be changed.

The parameters that are affected by the selected Country Code are:

- Supported frequency range. Some Country Codes may support two or more sub-bands, where other parameters (Maximum EIRP and/or DFS Support) may differ among the supported sub-bands.

- Maximum EIRP allowed by regulations (or no limitation). If maximum allowed EIRP is limited, it sets the upper limit for Tx Power + Antenna Gain. When using a Country Code in which maximum allowed EIRP is limited, the upper limit for the Antenna Gain parameter (in dBi) is the Regulation Max EIRP - 4 (since the minimum Tx Power is 4 dBm), and the upper limit for the Tx Power parameter (in dB) is Regulation Max EIRP - Antenna Gain.

In Country Codes with several sub-bands where there are different Regulation Max EIRP requirements per sub-band, the lowest Regulation Max EIRP will apply for all sub-bands (including sub-band for which there is no maximum EIRP limitation).

An attempt to change the selected Country Code to a Country Code in which the Regulation Max EIRP -4 is lower than the currently configured Antenna Gain will be rejected. This applies to both sectors, even if one of them is not used (In a device operating as a BU/RB-350 using Sector 1, an attempt to change the selected Country Code will be rejected if the value configured for the Antenna Gain of Sector 3 is too high and does not meet the above limitation, even if the configured value for the Antenna Gain of Sector 1 is configured to an acceptable value).

- Required Dynamic Frequency Selection (DFS) algorithm. In certain regions there are radar systems operating in the 5 GHz band. Applicable regulations dictate that wireless systems operating in these bands shall not interfere with the operation of the radar systems. This means that the wireless system must be able to automatically detect the presence of radar signals and avoid transmissions on frequencies used by radar systems in its vicinity. The Dynamic Frequency Selection (DFS) mechanism is based on monitoring of the frequency being used and automatic switching to a radar-free frequency upon detection of radar activity on the current frequency. If radar was detected on any frequency, it will be marked as Unavailable and will not be tested again for a period of 30 minutes (in a dual sector system, a frequency marked as unavailable on any sector will be marked as unavailable also on the other sector). The test for radar activity is performed according to the applicable standards (ETSI or FCC).

If a radar is detected by the BU it shuts down data transmission in the shortest possible time and starts looking for a radar free channel. RB will enter passive scanning once it loses the BU's beacons.

In systems using FCC DFS the RB does not perform radar detection. In system using ETSI DFS, also the RB performs radar detection. If the RB detects radar it informs the BU that radar was detected, shuts down data transmission and enters passive scanning.

For full details on available Country Codes and relevant limitations refer to the latest Country Codes document.

#### INFORMATION



The list of available Country Codes includes also Test and NF\_Calib Country Codes. These are special Country Codes used during production or special testing by Alvarion's experts that should not be used for regular operation. additional Country Codes not included in above table are reserved for future releases and should not be used.

**CAUTION**

If due to either restrictions imposed by local regulations or any other reason you cannot use the entire frequency band supported by the selected Country Code, you should manually set the usable frequencies in the Channel List.

#### **3.1.2.1.4 Antenna Gain Limitations**

The lower limit for the Antenna Gain parameter is 0 dBi (the default for a detached antenna). In Country Codes with a limitation on the maximum allowed EIRP the upper limit for the Antenna Gain in dBi is the Regulation Max EIRP - 4 (since the minimum Tx Power is 4 dBm). In Country Codes with several sub-bands where there are different Regulation Max EIRP requirements per sub-band, the lowest Regulation Max EIRP will apply for all sub-bands (including sub-bands for which there is no maximum EIRP limitation).

For details on the maximum antenna gain allowed for each Country Code refer to the latest Country Codes document.

Note that with certain Country Codes you may have to insert an appropriate RF attenuation (or a longer RF cable) for compliance with relevant regulations when using the standard 23 or 28 dBi detached antennas.

#### **3.1.2.1.5 Configuration file mode**

Besides entering settings manually, you can use a previously saved configuration file to apply settings to the unit. See [“Change Configuration System” on page 76](#) for information on how to export configuration files.

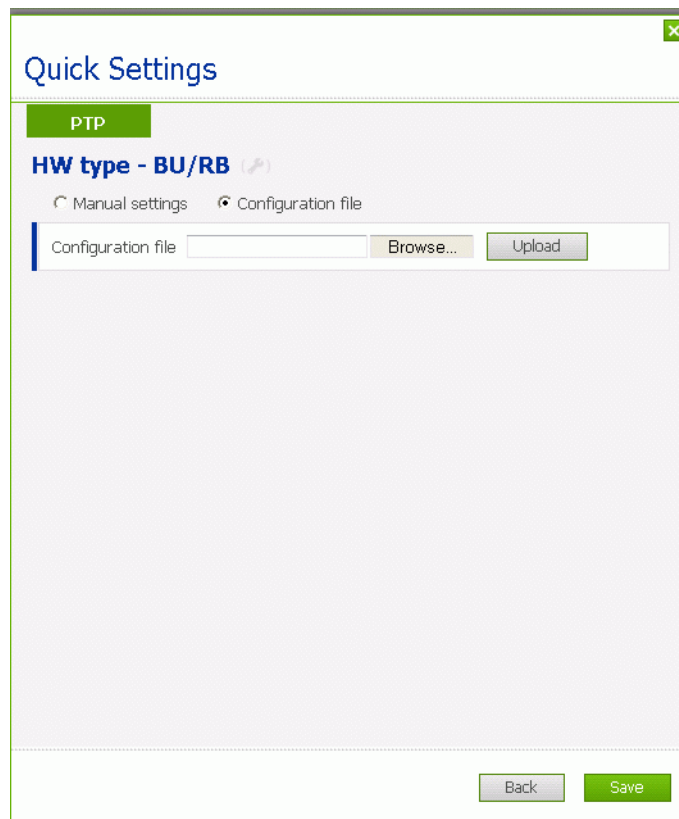


Figure 3-2: Quick Settings - Configuration File



To use a configuration file for uploading unit settings:

- 1 Select the **Configuration file** option button.
- 2 Click **Browse...** A Choose file to upload window opens.
- 3 Navigate to the desired configuration file, select it and click **Open** to upload the file and return to the Quick Settings window.
- 4 Click **Save**.

#### INFORMATION



The new configuration file will be applied after reboot.

### 3.1.2.2 Recommended Manual Settings Process

The recommended process of initial configuration using the Quick Settings window is:



- 1 If the Bandwidth should be changed (the default is 40+ MHz), click the Advanced Settings (  ) icon to open the Radio Sector window where you can configure the required Bandwidth for each sector. For a Dual Sector mode the same Bandwidth must be configured for both sectors. Click **Save** and then click **Back** to return to the Quick Settings window.
- 2 According to the required unit's functionality, select the required option of the Select type parameter.

**NOTE!**

The BU-600 and RB-600 options are not applicable for a unit that was received from the factory as a BU-350 and was not upgraded to BU/RB-600.

An attempt to change the Type from BU-600 to BU/RB-350 will be rejected if the Radio interface parameter (see below) is set to Dual Sector.

- 3 If you have to change Country Code, select required Country Code from the drop-down menu. Click on the **Save** button. Close the Quick Settings window and reset the unit by clicking on the **Reboot** link.

**NOTE!**

A change in Country Code is applied after reset. The available channels in the Channels List depend on the current Country Code. The default selected channels in the Channels List depend also on the Bandwidth configured when the current Country Code is applied. Configuration range for Antenna Gain also depend on the Country Code (where there is a limitation on maximum EIRP).

- 4 Select the required option for the Radio interface parameter, according to the sector(s) that should be used.

**NOTE!**

The Dual Sector option is applicable only if Type is set to BU/RB-600.

- 5 The following parameters should be configured per each sector that should be used.
  - a Configure the ESSID (1 to 32 character. A null ESSID is forbidden). Each ESSID should be unique in the radio network.
  - b Configure a unique Sector name for each sector (up to 31 characters). The Sector name is used in the Channels List window (see "[Channel List](#)" on page 87) to indicate the current operating channel for the sector.
  - c If data encryption should be used, select the AES option of the Security parameter.
  - d If applicable (available only if Security is set to AES), configure the Encryption key (a 16 characters long string).
  - e In sector(s) with a detached antenna, configure the Antenna gain (take into account the attenuation of the RF cable).

**NOTE!**

For a sector connected to an integrated antenna, this value is automatically enforced to 23 dBi and is not configurable

For detached antennas the configured gain should take into account the attenuation of the cable connecting the antenna to the unit. In units using certain Country Codes that have some limitations on allowed EIRP the allowed range for the Antenna gain parameter may be limited for compliance with these limitations. In such cases antennas with higher gain should not be used.

In a Dual Sector system both sectors should use antennas with the same gain.

- f** If certain frequencies supported by the current Country Code and Channel Bandwidth should not be used, click on **Frequency >** to open the Channel List window (see “[Channel List](#)” on page 87). Perform necessary changes, click **Save** and then click **Back**. This will prevent unintentional selection (either manually or automatically) of these frequency during normal operation.
- g** Configure the Frequency parameter (applicable only if the unit will function as a BU).

**NOTE!**

If both sectors are enabled (Dual Sector operation), the following limitations apply:

For a 20 MHz bandwidth: The minimum distance between the center frequencies configured for Sector 1 and Sector 3 is 40 MHz.

For a 40+ MHz bandwidth: The minimum distance between the center frequencies configured for Sector 1 and Sector 3 is 60 MHz.

- 6** Configure the management IP parameters:
  - » IP Address
  - » Subnet Mask
  - » Default Gateway
- 7** Configure the Unit Location parameter (optional).
- 8** Click **Save**. If you changed any parameters that will be applied only after reset (Unit type, Antenna Gain, Country Code), Close the Quick Settings window and reset the unit by clicking on the **Reboot** link.

### 3.1.3 Using the Monitor for Initial Configuration

Configure the required values for the following parameters:





Table 3-2: Basic Parameters in Monitor

| Parameter / path                                                                           | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type<br>Radio > Sector 1/Sector 3 > Sector Configuration<br>> Sector Parameters            | <p>The default Type is Base Unit (BU). When necessary, the functionality of each unit can be changed from Base Unit to Remote Bridge, and vice versa. For a Point-to-Point link, one end should be set up as BU (Bridge Unit) and the other end as RB (Remote Bridge).</p> <p>The available options are:</p> <ul style="list-style-type: none"><li>■ BU-350</li><li>■ RB-350</li><li>■ BU-600</li><li>■ RB-600</li></ul> <p>The BU-600 and RB-600 options are not applicable for a unit that was received from the factory as a BU-350 and was not upgraded to BU/RB-600.</p> <p>An attempt to change the Type from BU/RB-600 to BU/RB-350 will be rejected if the Radio Interface Configuration (see below) is set to Dual Sector.</p> <p>The change will be applied after the next reset.</p> |
| Channel Bandwidth<br>Radio > Sector 1/Sector 3 > Sector Configuration<br>> Link Parameters | <p>The default is 40 MHz. If another bandwidth should be used it is recommended to configure it prior to activating the required Country Code to properly affect the default selected channels list.</p> <p>Must be the same on both sides of the link. For a Dual Sector mode the same Bandwidth must be configured for both sectors.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



Table 3-2: Basic Parameters in Monitor

| Parameter / path                                                                       | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Country Code<br><br>Radio > Country Code > Select Country Code                         | <p>Select according to applicable local regulations.</p> <p>Applies a country code (to both sectors if applicable). Depending on the country code, specific limitations such as maximum EIRP, available bandwidths, available channels etc. will apply to radio parameters. See more details and information on certain limitations in <a href="#">“Country Codes and Dependent Parameters”</a> on page 40.</p> <p>Note that a country code will be rejected if the configured antenna gain together with minimum available power do not comply with the new EIRP - for any of the sectors.</p> <p>Reset the unit ((Unit Control &gt; Reset Unit) after configuring the required Country Code (and Channel Bandwidth if applicable) to apply correct configuration ranges for Channel List and (in Country Codes with EIRP limitations) Antenna Gain parameters.</p> <p>Must be the same on both sides of the link.</p> |
| Interface Selection<br><br>Radio > Radio Interface Configuration > Interface Selection | <p>Defines the sector(s) to be used: The options are Sector 1, Sector 3 and Dual Sector. Dual Sector is applicable only if Type is set to BU/RB-600 (if the Type is BU/RB-350, selection of the Dual Sector option will be rejected).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Status<br><br>Radio > Sector 1/Sector 3 > Sector Configuration > Sector Parameters     | <p>Activates/deactivates the sector(s). Only active sectors can form a radio link.</p> <p>In a BU/RB-600 operating in Dual Sector mode the Status of both sectors must be set to Active.</p> <p>In a BU/RB-350, the Status of one sector must be set to Active, according to the option selected for the Radio Interface Configuration parameter. The Status of the second sector must be set to Inactive.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

Table 3-2: Basic Parameters in Monitor

| Parameter / path                                                                                                 | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Antenna Gain<br><br>Radio > Sector 1/Sector 3 > Sector Configuration<br>> Sector Parameters                      | <ul style="list-style-type: none"> <li>■ For a sector connected to an integrated antennas, this value is automatically enforced to 23 dBi and is not configurable</li> <li>■ For detached antennas, sets the antenna net gain. The configured gain should take into account the attenuation of the cable connecting the antenna to the unit. In units using certain Country Codes that have some limitations on allowed EIRP the allowed range for the Antenna gain parameter may be limited for compliance with these limitations. For details see "<a href="#">Antenna Gain Limitations</a>" on page 42.</li> <li>■ With certain Country Codes you may have to insert an appropriate RF attenuation (or a longer RF cable) for compliance with relevant regulations when using the standard 23 or 28 dBi detached antennas.</li> </ul> <p>In a Dual Sector system both sectors should use antennas with the same gain.</p> <p>You may also configure the optional Antenna description parameter.</p> <p>A change in Antenna Gain parameter will be applied after the next reset (affects the maximum/default value for TX Power in Country Codes with EIRP limitations).</p> |
| Selected Channels<br><br>Radio > Sector 1/Sector 3 > Sector Configuration<br>> Link Parameters > Channel List    | <p>If there is a need, make sure that the Selected Channels List does not include any channels that should not be used due to any reason.</p> <p>Must be the same on both sides of the link.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Configured Frequency<br><br>Radio > Sector 1/Sector 3 > Sector Configuration<br>> Link Parameters > Channel List | <p>Applicable only for BU. The Configured Frequency should be included in the list of selected channels.</p> <p>If both sectors are enabled (Dual Sector operation), the following limitations apply:</p> <ul style="list-style-type: none"> <li>■ For a 20 MHz bandwidth: The minimum distance between the frequencies configured for Sector 1 and Sector 3 is 40 MHz.</li> <li>■ For a 40+ MHz bandwidth: The minimum distance between the frequencies configured for Sector 1 and Sector 3 is 60 MHz.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 3-2: Basic Parameters in Monitor**

| Parameter / path                                                                                                                                              | Comment                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ESSID<br><br>Radio > Sector 1/Sector 3 > Sector Configuration<br>> Link Parameters                                                                            | 1 to 32 characters (a null ESSID is forbidden).<br><br>Must be the same on both sides of the link.<br><br>ESSID must be unique in the wireless network. If both sectors of the same unit are enabled (Dual Sector operation), a unique ESSID must be configured for each sector. |
| Encryption:<br>■ Algorithm<br>■ Key (applicable only if Algorithm is set to AES)<br><br>Radio > Sector 1/Sector 3 > Sector Configuration<br>> Link Parameters | Must be the same on both sides of the link.                                                                                                                                                                                                                                      |
| Management IP parameters:<br>■ IP Address<br>■ Net Mask<br>■ Default Gateway<br><br>Unit Control > Management > IP Configuration                              | After completing configuration of management IP parameter you will have to reconnect to the unit using updated IP Address.                                                                                                                                                       |

If needed, reset the unit to apply changes in Type and/or Antenna Gain (Unit Control > Reset Unit).



## 3.2 Aligning the Antennas

A Signal Quality SNR bar display is located on the bottom panel of the ODU. The five LEDs indicate the quality of the combined received signal. The higher the number of blue LEDs indicating On, the higher the quality of the received signal. This section describes how to align the antennas using the SNR bar display.

**NOTE!**

The functionality of the LEDs indicators, including the Signal Quality LEDs, is as follows:

When the Power LED lights continuously (steady on): the LEDs indicate the status of Sector 1.

When the Power LED is blinking: the LEDs indicate the status of Sector 3.

In a unit operating in Dual Sector mode the Power LED will alternate every 5 minutes between steady on and blinking.

For optimal alignment, it is recommended to use the Continuous SNR Display option (see [“SNR Display” on page 115](#)).

**NOTE!**

Antenna alignment using the SNR bar display or the Continuous SNR Display is possible only after the RB is associated with a BU. Both units must be operational and configured with the correct basic parameters (see [“Initial Configuration” on page 36](#)). Otherwise, the two units will not be able to synchronize with each other. As the SNR measurement is performed on received data frames, it is required to generate traffic in the wireless link (e.g. by a continuous ping, although a higher amount of continuous data traffic is recommended).

Note that when operating in Dual-Sector mode, Sector 1 is used for downlink data (BU to RB) and Sector 3 is used for uplink data (RB to BU). SNR measurements are performed only on received data. In this case, for proper alignment of both antennas:

1. Configure the units to operate on Sector 1 and align the relevant antennas.
2. Configure the units to operate on Sector 3 and align the relevant antennas.
3. Return to Dual-Sector mode.

To align the antennas:

- 1 Point the antenna of the BU (integrated into the front side of the ODU unit, or detached) towards the direction of the RB, and vice versa. Take into account the direction in both horizontal and vertical planes. See note below regarding using a compass for initial alignment.
- 2 Verify that the power indication of the units is on.
- 3 Verify that the Wireless LED of the ODU is on, indicating wireless link connectivity. If the Wireless LED is off, check that the basic parameters (see [Table 3-2](#)) are correctly configured. Proper wireless connectivity depends also on wireless link conditions and correct orientation of the antennas.
- 4 Rotate/tilt the antenna of the RB-ODU until the maximum SNR reading is achieved, where at least 1 blue LED is on. If you encounter prolonged difficulty in illuminating the minimum required number of blue LEDs, try to improve the reception quality by placing the antenna at a higher point or in an alternate location.

**NOTE!**

The LEDs bar should only be used for initial coarse alignment. For optimal alignment you should always use the Continuous SNR Display option via telnet (you may also connect a PC to the unit via the PoE Out connector).

- 5 Ensure that the front of the antenna is always facing the location of the BU. However, in certain conditions, such as when the line of sight to the BU is hampered, better reception may be achieved using a reflected signal. In this case, the antenna is not always directed towards the BU.
- 6 After achieving maximum SNR reading, secure the unit/antenna firmly to the pole.
- 7 Repeat the process at the side of the BU.

**INFORMATION**

If applicable, verify that the achieved SNR is similar to expected SNR according to Radio Network Planning.

If DFS operation is required according to the selected country code it is highly recommended to keep the SNR on the link below 30 (RSSI below -74). If necessary, use up-tilt to reduce the received signal level.

**NOTE!****Aligning the Antenna Using a Compass:**

Aligning the antenna using a compass takes into account the original azimuth and calculates a new azimuth that is shifted by  $\pm 90^\circ$  from the actually required azimuth. The idea is to align the outer frame of the antenna so that it is in line with the new azimuth, which will achieve higher accuracy of initial alignment.

- 1 Point the antenna towards the general direction of the other unit.
- 2 Depending on whether you are looking from the left or the right side of the antenna, add or subtract  $90^\circ$  to/from the original antenna azimuth.
- 3 Identify a reference point on the landscape that is in the direction of the new heading.
- 4 Using the compass, align the outer frame of the antenna to the newly calculated azimuth, or to the reference point identified in point 3 above.



## 3.3 Configuring the Maximum MCS

If the quality of the received signal is too low, it is recommended that you configure the Maximum rate parameter to a value that is lower than the maximum supported by the unit. This can decrease the number of retransmissions due to attempts to transmit at rates that are too high for the actual quality of the link.

Using the Monitor program via Telnet, check the MCS counters (Site Survey > Display Counters > MCS Counters). If for any MCS the retransmissions rate (retransmitted packets vs. sent packets) is too high, the maximum rate should be limited to the highest MCS at which the retransmission rate is still acceptable. This should be performed at each side of the link.

**NOTE!**

The MCS Counters should be checked only after optimal alignment of the antennas.

For meaningful results in MCS Counters there must be traffic on the link for some time prior to checking the counters. If necessary, generate traffic in the wireless link (e.g. using a continuous ping, although a higher amount of continuous data traffic is recommended).

To configure the maximum MCS:

- In the Web Interface: Settings > Radio > Sector configuration > Maximum rate - SNR based.
- In the Monitor: Radio > Sector 1/Sector 3 > Sector Configuration > Performance > Rate Control (the Maximum Rate parameter is available after configuring the Multi Rate parameter).

# Chapter 4 - Web Interface

## In This Chapter:

- ["Using the Web Interface" on page 54](#)
- ["Services & Points" on page 57](#)
- ["Performance" on page 62](#)
- ["Settings" on page 69](#)





# 4.1 Using the Web Interface

The BreezeULTRA offers a user-friendly Web-based graphical interface for managing the unit. The Web interface is accessible using Internet Explorer 8 or higher Web browser from any location with access to the unit’s IP address, either through Ethernet or, if you already have a wireless link set up, over the air.

## 4.1.1 Logging In

- 1 In the Web browser’s address bar, type the management IP address:  
http://<IP\_Address> (the default is 10.0.0.1)

The Web browser will display the Login window. In addition to Username and Password text fields it includes also some read-only details of the managed unit.

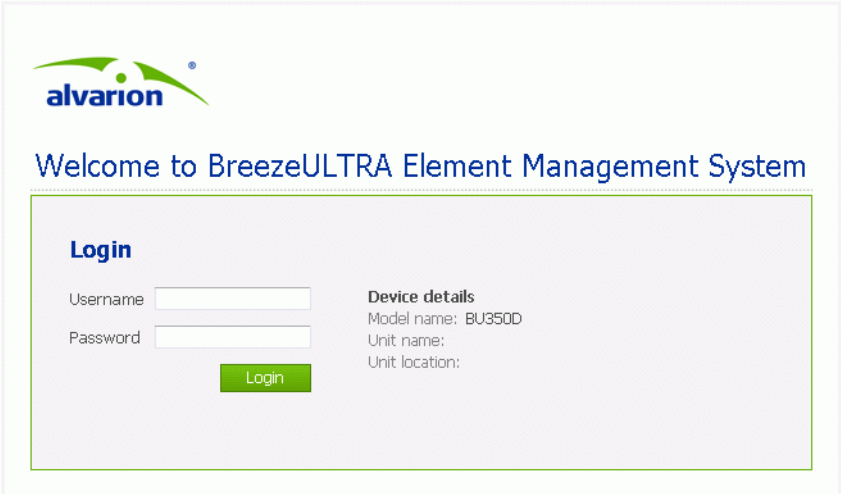


Figure 4-1: Login Screen

- 2 Type in your credentials. The following accounts are available:

Table 4-1: User Accounts

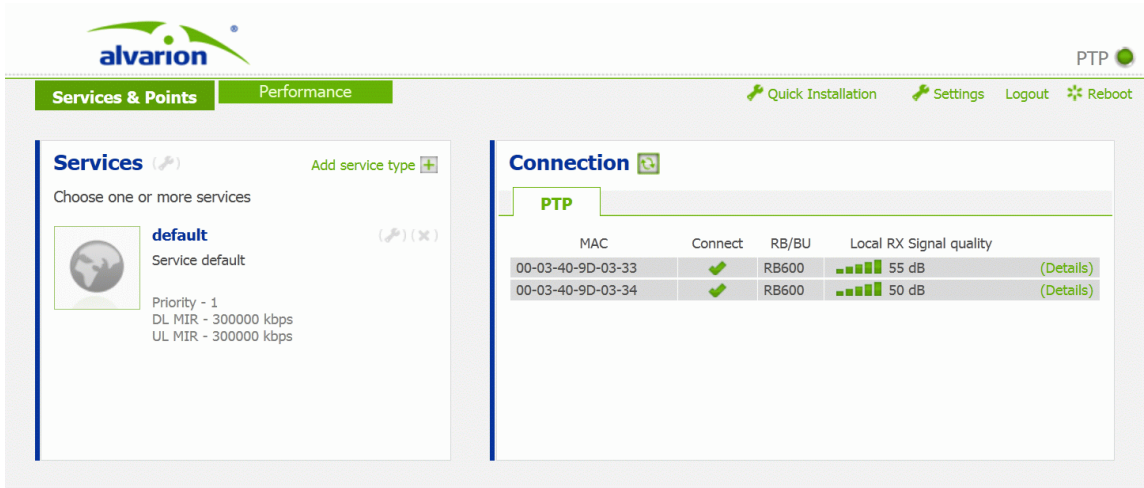
| Username      | Default Password | Description                                                        |
|---------------|------------------|--------------------------------------------------------------------|
| guest         | public           | Read-only account. Cannot change any settings.                     |
| installer     | installer        | Account with writing privileges limited to commissioning settings. |
| administrator | private          | Administrative account with full privileges.                       |

Refer to “[Management](#)” on page 72 for information on how to change the passwords.

- 3 Click **Login** to access the Web GUI.



## 4.1.2 Interface Overview



**Figure 4-2: Web-Based Graphical User Interface (BU-600, administrator privileges)**

The Web interface allows you to monitor the unit’s status and performance and to set up its parameters. The main controls are located at the top of the screen:

**Table 4-2: Graphical User Interface Main Controls**

| Component                                                                                                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| View Tabs                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <div>Services &amp; Points</div>                                                                                  | The interface comprises two views called Services & Points and Performance. Click on their respective name tabs in the top left corner of the screen to switch between them. These views provide an overview of various parameters and performance graphs without the ability to make any changes. For more information about each view, see <a href="#">“Services &amp; Points” on page 57</a> and <a href="#">“Performance” on page 62</a> .                                                                |
| <div>Performance</div>                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Action Links                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <div> Settings</div>           | Parameter editing is done from the Settings menus. Clicking on Settings, in the top right corner of the screen, opens the Settings menus where every function of the unit can be controlled. Most sections in the Services & Point and Performance views display a  shortcut icon which opens the corresponding Settings menu. For more information about the Settings menu, see <a href="#">“Settings” on page 69</a> . |
| <div> Quick Installation</div> | Opens the Quick Settings screen, allowing you to quickly configure the unit’s basic parameters. See <a href="#">“Using the Web Management Interface for Initial Configuration” on page 36</a> for more details.                                                                                                                                                                                                                                                                                               |



Table 4-2: Graphical User Interface Main Controls (Continued)

| Component                                                                                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  Logout | Click the Logout button in the top right corner of the screen to log out. This will take you back to the login screen (see <a href="#">Figure 4-1</a> ). If you are inactive, you will be automatically logged out after 10 minutes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|  Reboot | <p>Click Reboot, in the top right corner of the screen, to reset the unit. This will display a confirmation screen and, if you agree to proceed, the unit will be reset and the login screen (see <a href="#">Figure 4-1</a>) will be displayed after the reboot is complete.</p> <p>After the reboot, the unit always starts using the main software version. See <a href="#">"Change Configuration System" on page 76</a> for details regarding the main and shadow software versions.</p> <p>Changes in the following parameters take effect after reset:</p> <ul style="list-style-type: none"><li>■ Country Code</li><li>■ Antenna Gain</li><li>■ Unit Type (BU/RB)</li></ul> <p>See also <a href="#">"Change Configuration System" on page 76</a> for details on various actions that will take effect after reset.</p> |
| <b>Help Tips</b>                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|       | The question mark symbol is sometimes displayed in the graphical user interface next to various functions. Hovering with the mouse cursor over the question mark symbol will display a help tip for the respective function.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

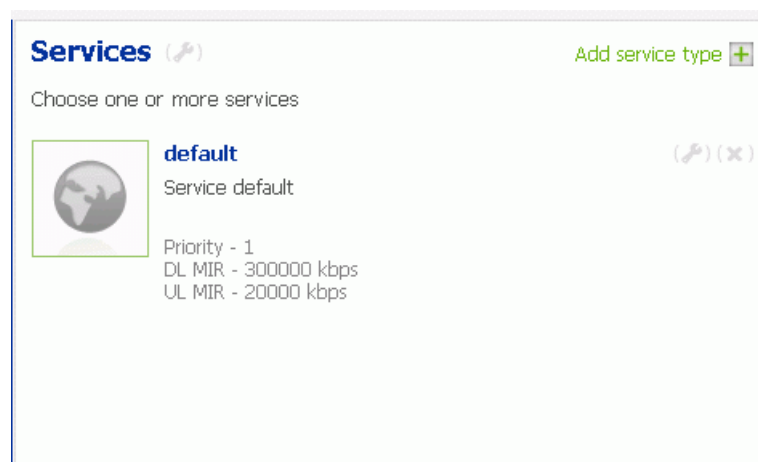


## 4.2 Services & Points

The Services & Points view (the default view after login) displays an overview of the currently set up services and wireless links. The Services & Points view contains the following sections:

- [Services](#)
- [Connection](#)

### 4.2.1 Services



**Figure 4-3: Services Section**

The services section lists all the currently configured services. For more details about services refer to [“Services Menu” on page 88](#).

Clicking either the Edit (🔧) icon next to the Services title or **Add service type** (not available on RB) at the top of the window opens the [Services](#) window (see [“Services” on page 89](#)) enabling to manage the defined services.

For each service, the following information is displayed:

- Service name
- Edit (🔧) icon (not available on RB) - Opens the Service Edit window for the service (see [“Service Edit” on page 58](#)).
- Remove (✖) icon (not available on RB) - Deletes the service. You will be prompted to confirm the requested action.
- Service description
- Service priority
- Downlink MIR in kbps



- Uplink MIR in kbps
- Service Type

The Service Type is indicated by an icon:

Table 4-3: Service Type Icons

| Icon                                                                               | Service Type    |
|------------------------------------------------------------------------------------|-----------------|
|   | Data Service    |
|   | Voice Service   |
|   | Video Service   |
|  | General Service |

4.2.1.1 Service Edit

Service Edit 

Priority

UL - Profile

MIR

DL - Profile

MIR

Back

Done

Figure 4-4: Service Edit Window

See “Services Menu” on page 88 for a full description of services. The Service Edit window contains a limited number of basic settings:



Table 4-4: Service Edit Settings

| Setting             | Description                                                                                                                                |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Priority            | Sets the service priority. The range is 1-4 where 1 is the highest priority. Each Service Group should be assigned a different Priority,   |
| <b>UL - Profile</b> |                                                                                                                                            |
| MIR                 | Sets the Maximum Information Rate (MIR) defined for the Uplink Service Profile assigned to the service. The range is 256 to 300000 Kbps.   |
| <b>DL - Profile</b> |                                                                                                                                            |
| MIR                 | Sets the Maximum Information Rate (MIR) defined for the Downlink Service Profile assigned to the service. The range is 256 to 300000 Kbps. |

When setting your service is complete, click **Done** to apply your settings. Otherwise, click **Back** to abort and go back to the Services & Points display.

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Note that any change in a Profile will be applied to all Services using this Profile.

Clicking the edit () icon next to the Service Edit title opens the Settings - Services menu, displaying the Services window, where you can view/update all service settings. See [“Services” on page 89](#).

NOTE!



To apply changes in services in the associated RB, reboot the RB to force re-association.



## 4.2.2 Connection

### 4.2.2.1 The Connection Section

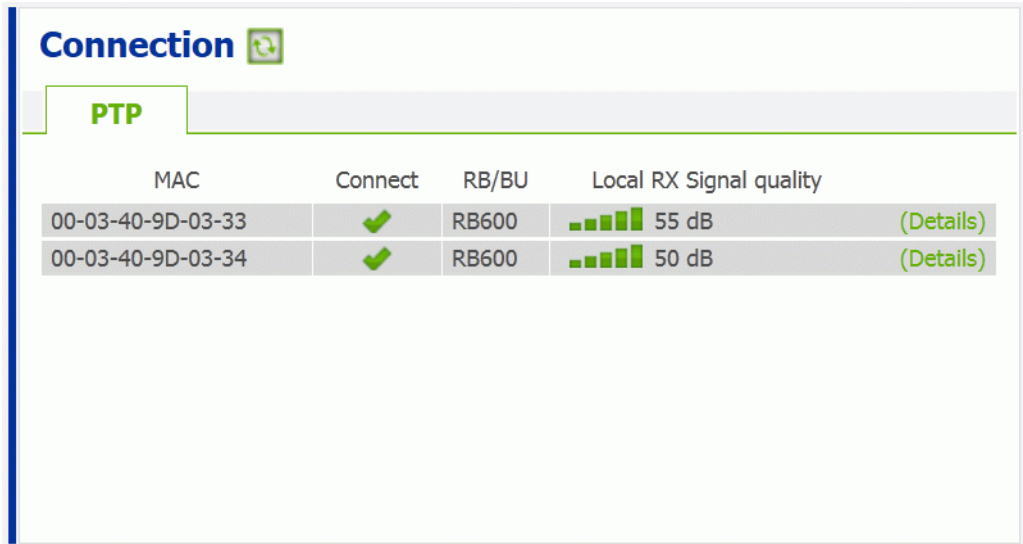


Figure 4-5: Connection Section (BU-600)

The connection section displays the following details of the wireless link for each associated sector:

Table 4-5: Connection Information

| Information             | Description                                                                                                       |
|-------------------------|-------------------------------------------------------------------------------------------------------------------|
| MAC                     | The MAC address of the associated sector (radio card).                                                            |
| Connect                 | Displays a check if the wireless link between the units is up                                                     |
| BU/RB                   | Displays the Type of the associated unit                                                                          |
| Local RX Signal quality | Received Signal to Noise Ratio (SNR) in dB                                                                        |
| Details                 | Not available on RB. Opens the Details window for the respective link. See <a href="#">“Details” on page 61</a> . |

Click on the Refresh () icon to manually refresh the connection information.



### 4.2.2.2 Details

Applicable only for BU. Lists additional details about the associated RB unit and relevant link.

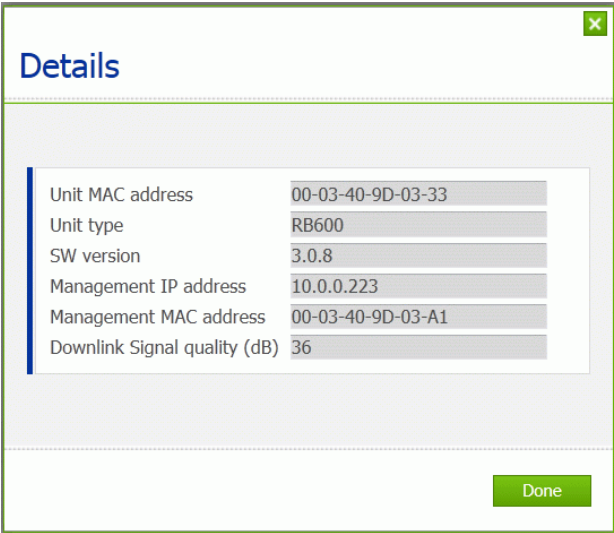


Figure 4-6: Details Window

The Details window contains the following parameters for the associated RB unit and wireless link:

Table 4-6: Details Window Parameters

| Setting                      | Description                                                                                                                            |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Unit MAC address             | Indicates the Media Access Control (MAC) address of the unit’s wireless network interface                                              |
| Unit type                    | Indicates the type of unit                                                                                                             |
| SW version                   | Indicates the firmware version currently running on the unit.                                                                          |
| Management IP address        | Indicates the IP address used by the unit for management traffic.                                                                      |
| Management MAC address       | Indicates the MAC address associated with the management IP address.                                                                   |
| Downlink Signal quality (dB) | Indicates the Signal to Noise Ratio (SNR) of the combined received signal in dB of the signal received at the remote side of the link. |





# 4.3 Performance

The Performance Dashboard view displays various counters and graphs providing an overview of the unit's performance. General information regarding the unit is also available. To open the Performance Dashboard, click the Performance tab in the top left corner of the screen.

Counters are refreshed automatically. Use the **Refresh counters every...** drop-down list in the top right corner of the view to select how often the counters should be refreshed. Available options are 5 seconds and 10 seconds. Click  to refresh the counters manually. Click **Reset counters** to reset them to zero.

Some sections contain switches that allow data to be displayed in multiple forms:

- Delta | Sum - Where applicable, switches between displaying a count since the previous counter refresh (Delta) and displaying a count since the previous unit restart or manual counter reset (Sum).
- Packets | Bytes - Where applicable, switches between counting the number of Packets and counting the number of Bytes. This setting usually works on traffic related counters.

The Performance Dashboard view contains the following sections:

- [Radio](#)
- [Services](#)
- [Graphs](#)
- [Traffic Counters Matrix](#)
- [General Info](#)

## 4.3.1 Radio

The Radio section displays information regarding various counters and performance indicators for the relevant link. If applicable, use the Sector id selector above the Radio section to select the sector for which you wish to view the radio performance details (available options depend on the configured Radio interface parameter - see ["Manual settings mode" on page 37](#)).

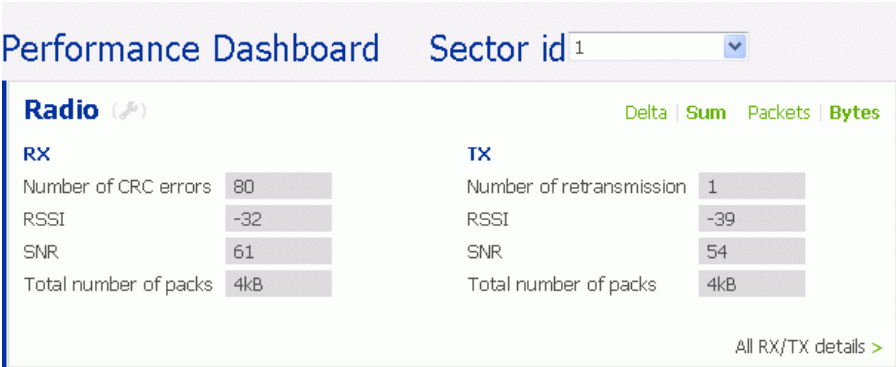


Figure 4-7: Radio Section



The following counters are available:

Table 4-7: Radio Counters

| Counter                   | Description                                                                                                                                                     |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RX</b>                 |                                                                                                                                                                 |
| Number of CRC errors      | The number of Cyclic Redundancy Check (CRC) errored packets received over the air link.                                                                         |
| RSSI                      | The Received Signal Strength Indicator (RSSI) displays the strength of the received signal in dBm.                                                              |
| SNR                       | The Signal-to-Noise Ratio (SNR) in dB.                                                                                                                          |
| Total number of packs     | Displays the total amount of traffic received. This counter can be switched between Packets and Bytes display.                                                  |
| <b>TX</b>                 |                                                                                                                                                                 |
| Number of retransmissions | Number of frames retransmitted due to lack of receiving acknowledgement                                                                                         |
| RSSI                      | The Received Signal Strength Indicator (RSSI) displays the strength of the signal received by the associated unit at the other end of the wireless link, in dBm |
| SNR                       | The Signal-to-Noise Ratio (SNR) in dB at the associated unit at the other end of the wireless link                                                              |
| Total number of packs     | Displays the total amount of traffic sent. This counter can be switched between packets and bytes display.                                                      |



The SNR and RSSI measurements are accurate only when receiving data transmissions from the associated unit.  
You can use a continuous PING to generate data transmission, although a higher amount of continuous data traffic is recommended.

Clicking **All RX/TX details** in the lower right corner of the Radio section displays more detailed counters.

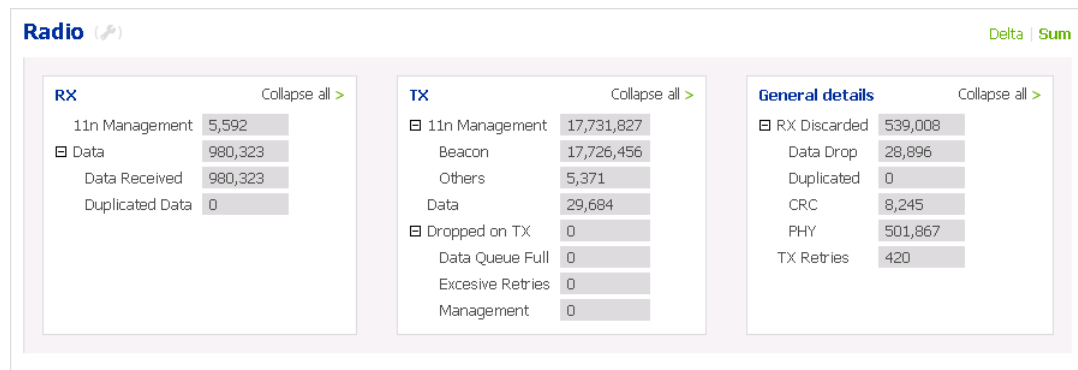


Figure 4-8: Detailed Radio Counters

Some of the counters are grouped together. Use the **+** and **-** buttons to expand and collapse a group of counters. Use the **Expand all** and **Collapse all** commands to expand and collapse all groups inside a zone. The following counters are available:

Table 4-8: Detailed Radio Counters

| Counter         | Description                                                                                                                                                                                                                    |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RX</b>       |                                                                                                                                                                                                                                |
| 11n Management  | Management traffic received over the wireless link                                                                                                                                                                             |
| Data            | All data traffic received over the wireless link. This includes original data received and (if applicable) duplicated data retransmitted by the sender.                                                                        |
| Data Received   | Data traffic received over the wireless link (duplicated data not included)                                                                                                                                                    |
| Duplicated Data | Duplicate data traffic received over the wireless link. This usually happens when the sender unit doesn't receive acknowledgement from the receiver unit for the sent data and concludes it hasn't arrived, thus resending it. |
| <b>TX</b>       |                                                                                                                                                                                                                                |
| 11n Management  | Management traffic sent over the wireless link. This can be either beacons or other type of management traffic.                                                                                                                |
| Beacon          | Beacons sent over the wireless link                                                                                                                                                                                            |
| Others          | Management traffic other than beacons sent over the wireless link                                                                                                                                                              |
| Data            | Data sent over the wireless link                                                                                                                                                                                               |
| Dropped on TX   | Traffic dropped on transmission over the wireless link. This can be data traffic dropped due to filling of the data queue or excessive retries, or management traffic dropped due to excessive retries.                        |
| Data Queue Full | Data traffic dropped on transmission over the wireless link because the data queue was full.                                                                                                                                   |



Table 4-8: Detailed Radio Counters (Continued)

| Counter           | Description                                                                                                                                     |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Excessive Retries | Data traffic dropped on transmission over the wireless link because the maximum number of retries was reached                                   |
| Management        | Management traffic dropped on transmission over the wireless link due to excessive retries                                                      |
| General Details   |                                                                                                                                                 |
| RX Discarded      | Discarded data traffic received over the wireless link. This can be either data dropped, duplicated data, CRC errored data or PHY errored data. |
| Data Drop         | Data traffic received over the wireless link which was dropped                                                                                  |
| Duplicated        | Duplicate data traffic received over the wireless link. This is identical to the Duplicated Data counter in the RX zone.                        |
| CRC               | Data traffic received over the wireless link which contained Cyclic Redundancy Check (CRC) errors                                               |
| PHY               | Data traffic received over the wireless link which contained PHY errors (unidentified signals)                                                  |
| TX Retries        | Data traffic retransmitted over the wireless link, because no acknowledgement was received from the receiver unit.                              |

Clicking on the Radio settings (  ) icon in either the regular or the detailed Radio section opens the Radio-Sector window where you can view/configure all radio sector settings. See [“Sector Configuration” on page 80](#) for more information.

### 4.3.2 Services

The Services section displays information regarding data traffic related to the services set up on the unit. For detailed information about services, see [“Services Menu” on page 88](#). Use the **Service** drop-down list in the top right corner of the section to select a specific service or select All to display aggregated data from all services.

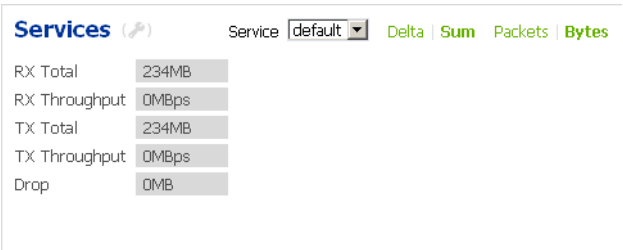


Figure 4-9: Services Section

The following counters are available:



Table 4-9: Services Counters

| Counter       | Description                                                                        |
|---------------|------------------------------------------------------------------------------------|
| RX Total      | Total traffic received using the selected service(s)                               |
| RX Throughput | Throughput of traffic received from Ethernet port for the selected service(s)      |
| TX Total      | Total traffic sent using the selected service(s)                                   |
| TX Throughput | Throughput of traffic transmitted to the wireless link for the selected service(s) |
| Drop          | Traffic dropped when using the selected service(s)                                 |

4.3.3 Graphs

The Graphs section displays graphical representations of various performance counters over time. Use the **Filter by time** drop-down list in the top right corner of the section to switch between time increments of: 5 minutes, 1 hour and 24 hours. Clicking **Reset** will clear all historical data currently displayed on the graphs and set the current time as the initial recording time.

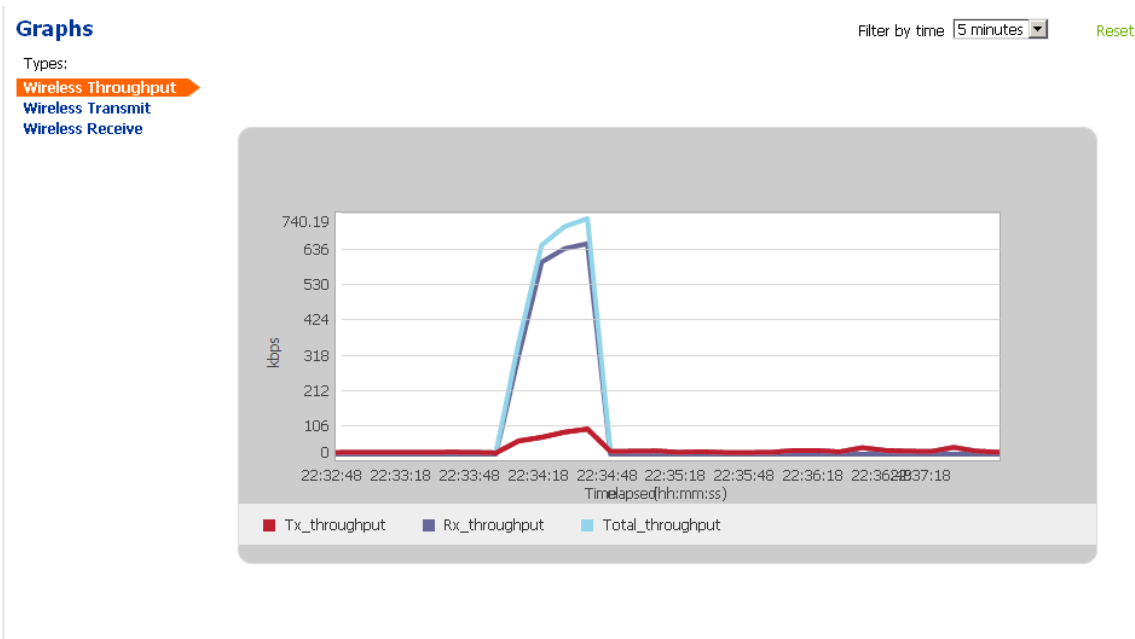


Figure 4-10: Graphs Section

Click on the graph types on the left to choose the graph you wish to display. The currently selected graph is highlighted in orange. The following graphs are available:



- Wireless Throughput - Displays graphs for the unit's throughput. Measurement units (bps, kbps, mbps) are adjusted automatically. The following graphs are displayed:
  - » Tx\_throughput - Transmit throughput
  - » Rx\_throughput - Receive throughput
  - » Total\_throughput - Total throughput calculated by aggregating transmit and receive throughput
- Wireless Transmit - Displays graphs for the number of transmitted packets per second
  - » Tx\_packet\_number - Number of transmitted packets per second
  - » Retransmission\_number - Number of retransmitted packets per second
- Wireless Receive - Displays graphs for the number of received packets per second
  - » Rx\_packet\_number - Number of received packets per second
  - » Rx\_CRCError - Number of Cyclic Redundancy Check (CRC) errored packets received per second
  - » Rx\_PHYError - Number of PHY error events (unidentified signals) received per second

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When two or more graphs overlap, you can click on a counter legend's color indicator to bring the graph for the selected counter on top.

### 4.3.4 Traffic Counters Matrix

The Traffic Counters Matrix section displays the traffic exchanged between the following network interfaces:

- Active Ethernet interfaces: Eth1 (PoE In) and/or Eth0 (PoE Out). An Ethernet interface is active if its link status is up.
- Active Wireless interfaces: Sector 1 and/or Sector 3.
- Management interface: Internal interface for management traffic.

| Traffic Counters Matrix |      |          |          |     | Packets | Bytes |
|-------------------------|------|----------|----------|-----|---------|-------|
|                         | eth1 | Sector 1 | Sector 3 | mng |         |       |
| eth1                    |      | 2MB      | 0MB      | 1MB |         |       |
| Sector 1                | 0MB  |          |          | 0MB |         |       |
| Sector 3                | 2MB  |          |          | 0MB |         |       |
| mng                     | 5MB  | 0MB      | 0MB      |     |         |       |

Figure 4-11: Traffic Counters Matrix Section

The source network interfaces are displayed on the left, and the destination network interfaces are displayed above. Each cell in the table indicates the traffic incoming from the interface displayed in the first column which was forwarded to the interface displayed in the table's header.

### 4.3.5 General Info

The General Info section displays general information about the unit.



Figure 4-12: General Info Section

Clicking on the Unit info settings (🔑) icon opens the Info menu where you can view/configure the unit's general settings. See ["Info" on page 70](#) for more details.



## 4.4 Settings

The Settings menus allow you to manually configure all the unit's settings. After you edit your settings, click **Save** in the lower right corner of the screen to apply them. Clicking **Back** ignores any changes you made and goes back to the previous screen.

The following Settings menus are available:

- [Unit Control Menu](#)
- [Radio Menu](#)
- [Services Menu](#)

### 4.4.1 Unit Control Menu

The Unit Control menu contains the following options:

- [Info](#)
- [Management](#)
- [PoE In/Out](#)
- [Change Configuration System](#)





4.4.1.1 Info

Settings

Unit Control

Radio

Services

Info

Name

Location

Contact person

Country code file version

Main SW version

Shadow SW version

Serial number

Unit type

HW digital

HW radio1 version

HW radio3 version

HW radio1 Serial number

HW radio3 Serial number

MAC address radio1

MAC address radio3

MAC address unit

BU\_Test

Al\_room

Albert

29

3.0.8

3.0.7.1071

121411960

BU600

2

2

2

120121011028

120121010032

00-03-40-9d-03-41

00-03-40-9d-03-46

00-03-40-9D-03-D7

Update >

Currently running

Back

Save

Figure 4-13: Unit Control - Info

The Info window contains the following settings:

Table 4-10: Unit Control - Info Settings

| Setting                   | Description                                                                                                                                                                                                    |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                      | Use this field to specify a name for the unit                                                                                                                                                                  |
| Location                  | Use this field to specify a location description for the unit                                                                                                                                                  |
| Contact person            | Use this field to specify a person in charge with the unit                                                                                                                                                     |
| Country code file version | Indicates the version of the country code settings file. Clicking <b>Update</b> opens the Change Configuration System window. For more details, see <a href="#">"Change Configuration System" on page 76</a> . |

**Table 4-10: Unit Control - Info Settings (Continued)**

| Setting                 | Description                                                                                                                                                                                                                                                                                                                |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Main SW version         | Indicates the firmware version stored in the main memory. For more information about main memory and shadow memory, see <a href="#">“Change Configuration System” on page 76</a> . If the unit is currently running the firmware stored in the main memory, a “Currently running” mark will appear next to this entry.     |
| Shadow SW version       | Indicates the firmware version stored in the shadow memory. For more information about main memory and shadow memory, see <a href="#">“Change Configuration System” on page 76</a> . If the unit is currently running the firmware stored in the shadow memory, a “Currently running” mark will appear next to this entry. |
| Serial number           | Indicates unit’s serial number                                                                                                                                                                                                                                                                                             |
| Unit type               | Indicates the type of unit                                                                                                                                                                                                                                                                                                 |
| HW digital              | The hardware revision of the digital module                                                                                                                                                                                                                                                                                |
| HW radio1 version       | The hardware revision of the radio module used for sector 1                                                                                                                                                                                                                                                                |
| HW radio3 version       | The hardware revision of the radio module used for sector 3 (visible only if the unit operates as a BU/RB-B600)                                                                                                                                                                                                            |
| HW radio1 Serial number | The serial number of the radio module used for sector 1                                                                                                                                                                                                                                                                    |
| HW radio3 Serial number | The serial number of the radio module used for sector 3 (visible only if the unit operates as a BU/RB-B600)                                                                                                                                                                                                                |
| Mac address radio1      | Indicates the Media Access Control (MAC) address of the unit’s radio network interface used for sector 1                                                                                                                                                                                                                   |
| Mac address radio3      | Indicates the Media Access Control (MAC) address of the unit’s radio network interface used for sector 3 (visible only if the unit operates as a BU/RB-B600)                                                                                                                                                               |
| Mac address unit        | Indicates the Media Access Control (MAC) address of the unit’s Ethernet network interface                                                                                                                                                                                                                                  |



4.4.1.2 Management

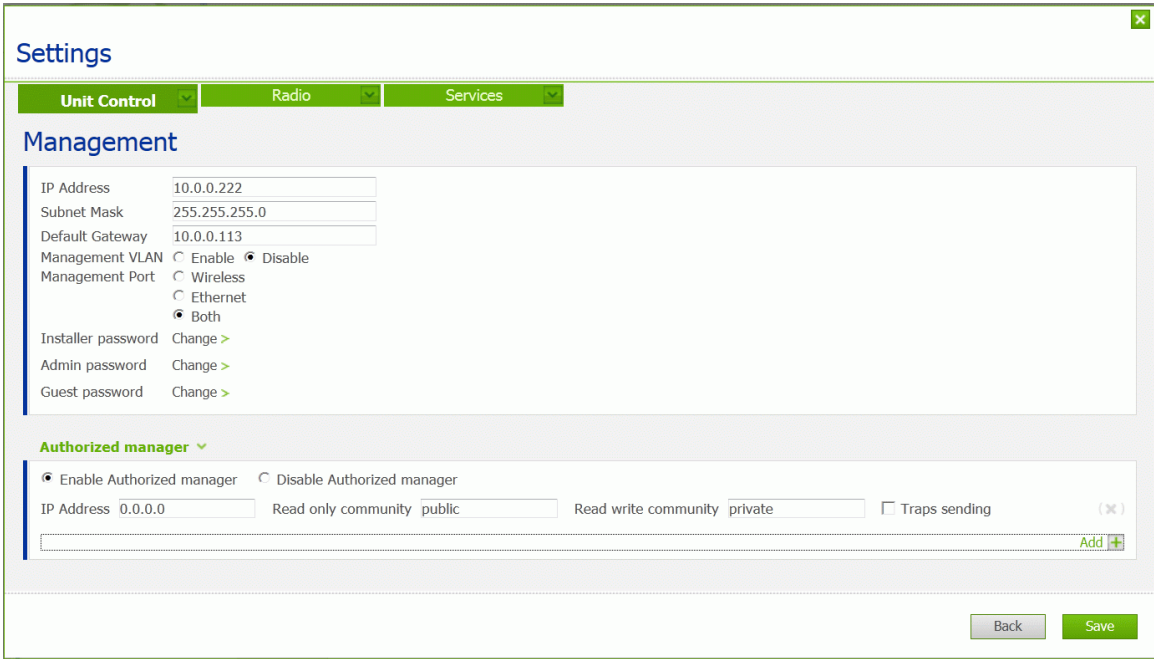


Figure 4-14: Unit Control - Management

This window configures the connection parameters used for unit management. Clicking **Authorized manager** shows/hides the settings for the authorized managers. The following settings are available:

Table 4-11: Unit Control - Management Settings

| Setting         | Description                                                                                                                                                                                                                                                                                                                      |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP Address      | Sets the IP address used by the unit for management traffic.                                                                                                                                                                                                                                                                     |
| Subnet Mask     | Sets the subnet mask for the management IP Address.                                                                                                                                                                                                                                                                              |
| Default Gateway | Sets the IP address of the default gateway for management traffic.                                                                                                                                                                                                                                                               |
| Management VLAN | Enable or disable VLAN tagging for management traffic. The default is Disable. If enabled, the VLAN ID and Priority parameters will become available for configuration.                                                                                                                                                          |
| VLAN ID         | Applicable only if Management VLAN is enabled. Sets up the 802.1Q based VLAN ID used for management frames. When tagging is enabled, the unit responds only to management frames tagged with this VLAN ID, while management frames generated by the unit are tagged with this VLAN ID. Allowed range: 1..4094. Default value: 1. |
| Priority        | Applicable only if Management VLAN is enabled. Sets up the 802.1p based Priority Code Point applied to outgoing management frames. Allowed range: 0..7. Default value: 0.                                                                                                                                                        |

**Table 4-11: Unit Control - Management Settings (Continued)**

| Setting                                                                             | Description                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management Port                                                                     | <ul style="list-style-type: none"><li>■ Wireless - Accepts management only from the Wireless port</li><li>■ Ethernet - Accepts management only from the Ethernet port</li><li>■ Both (default) - Accepts management from both the Wireless and the Ethernet ports</li></ul> |
| Installer password                                                                  | Available only to users with administrator privileges. Click <b>Change</b> to change the password for the installer account. You will be required to enter the current password, the new password and a confirmation of the new password.                                   |
| Admin password                                                                      | Available only to users with administrator privileges. Click <b>Change</b> to change the password for the administrator account. You will be required to enter the current password, the new password and a confirmation of the new password.                               |
| Guest password                                                                      | Available only to users with administrator privileges. Click <b>Change</b> to change the password for the guest account. You will be required to enter the current password, the new password and a confirmation of the new password.                                       |
| <b>Authorized manager</b>                                                           |                                                                                                                                                                                                                                                                             |
| Enable Authorized manager                                                           | Enables management only from specific management stations defined below. At least one Authorized Manager must be defined.                                                                                                                                                   |
| Disable Authorized manager                                                          | Doesn't restrict management to specific management stations (the default).                                                                                                                                                                                                  |
| Add                                                                                 | Adds an authorized manager (up to 10 authorized managers can be defined).                                                                                                                                                                                                   |
|  | Removes the authorized manager.                                                                                                                                                                                                                                             |
| IP Address                                                                          | Management station's IP address                                                                                                                                                                                                                                             |
| Read only community                                                                 | The SNMP community string for read-only access rights. The default is public.                                                                                                                                                                                               |
| Read write community                                                                | The SNMP community string for read/write access rights. The default is private.                                                                                                                                                                                             |
| Traps sending                                                                       | Check if the unit should send SNMP traps to the manager. The default is disable (check-box deselected).<br><br>NOTE: The unit should be rebooted after enabling Traps sending.                                                                                              |



4.4.1.3 PoE In/Out

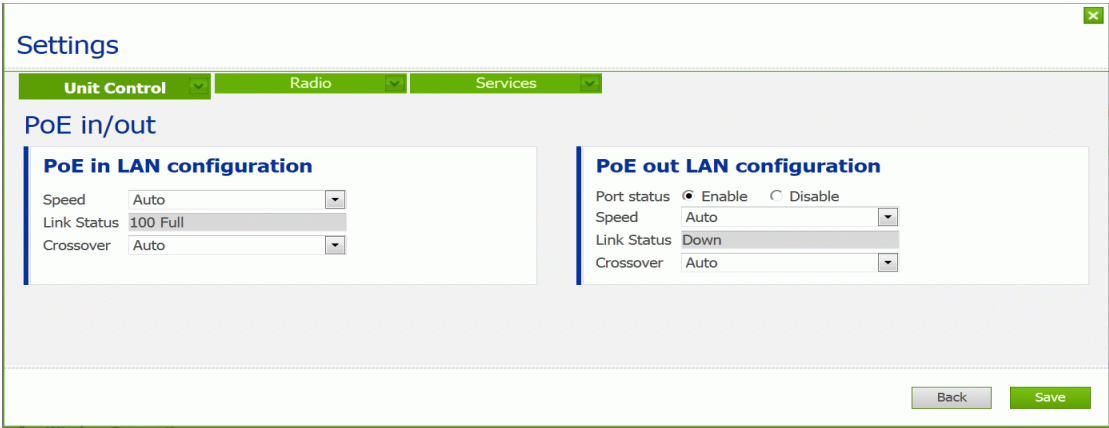


Figure 4-15: Unit Control - PoE In/Out

The PoE In/Out window contains the following settings:

Table 4-12: Unit Control - PoE In/Out Settings

| Setting                         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PoE in LAN configuration</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Speed                           | Sets the speed and duplex mode of the PoE In Ethernet interface: <ul style="list-style-type: none"><li>■ Auto - Use auto-negotiation for connection speed and duplex (default)</li><li>■ 10 Half - 10 Mbps half duplex</li><li>■ 10 Full - 10 Mbps full duplex</li><li>■ 100 Half - 100 Mbps half duplex</li><li>■ 100 Full - 100 Mbps full duplex</li><li>■ 1000 Half - 1 Gbps half duplex</li><li>■ 1000 Full - 1 Gbps full duplex</li></ul> |
| Link Status                     | Indicates the current connection speed (10/100/1000) in Mbps and duplex mode (Full/Half), or Down.                                                                                                                                                                                                                                                                                                                                             |
| Crossover                       | Sets the MDI/MDIX configuration of the PoE In Ethernet interface: <ul style="list-style-type: none"><li>■ Auto - The interface uses Auto-MDIX (automatic medium-dependent interface crossover). This is the default.</li><li>■ Manual MDI - The interface behaves as a medium dependent interface (MDI) port</li><li>■ Manual MDIX - The interface behaves as a medium dependent interface crossover (MDIX) port</li></ul>                     |



Table 4-12: Unit Control - PoE In/Out Settings (Continued)

| Setting                          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PoE out LAN configuration</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Port status                      | <ul style="list-style-type: none"><li>■ Enable - Enables the PoE Out Ethernet interface</li><li>■ Disable - Disables the PoE Out Ethernet interface</li></ul>                                                                                                                                                                                                                                                                                                     |
| Speed                            | <p>Sets the connection speed and duplex mode of the PoE Out Ethernet interface:</p> <ul style="list-style-type: none"><li>■ Auto - Use auto-negotiation for connection speed and duplex (default)</li><li>■ 10 Half - 10 Mbps half duplex</li><li>■ 10 Full - 10 Mbps full duplex</li><li>■ 100 Half - 100 Mbps half duplex</li><li>■ 100 Full - 100 Mbps full duplex</li><li>■ 1000 Half - 1 Gbps half duplex</li><li>■ 1000 Full - 1 Gbps full duplex</li></ul> |
| Link Status                      | Indicates the current connection speed (10/100/1000) in Mbps and duplex mode (Full/Half), or Down.                                                                                                                                                                                                                                                                                                                                                                |
| Crossover                        | <p>Sets the MDI/MDIX configuration of the PoE Out Ethernet interface:</p> <ul style="list-style-type: none"><li>■ Auto - The interface uses Auto-MDIX (automatic medium-dependent interface crossover). This is the default.</li><li>■ Manual MDI - The interface behaves as a medium dependent interface (MDI)</li><li>■ Manual MDIX - The interface behaves as a medium dependent interface crossover (MDIX)</li></ul>                                          |

CAUTION



Set interface configuration to values that match the capabilities of the cable or equipment connected to it.



4.4.1.4 Change Configuration System

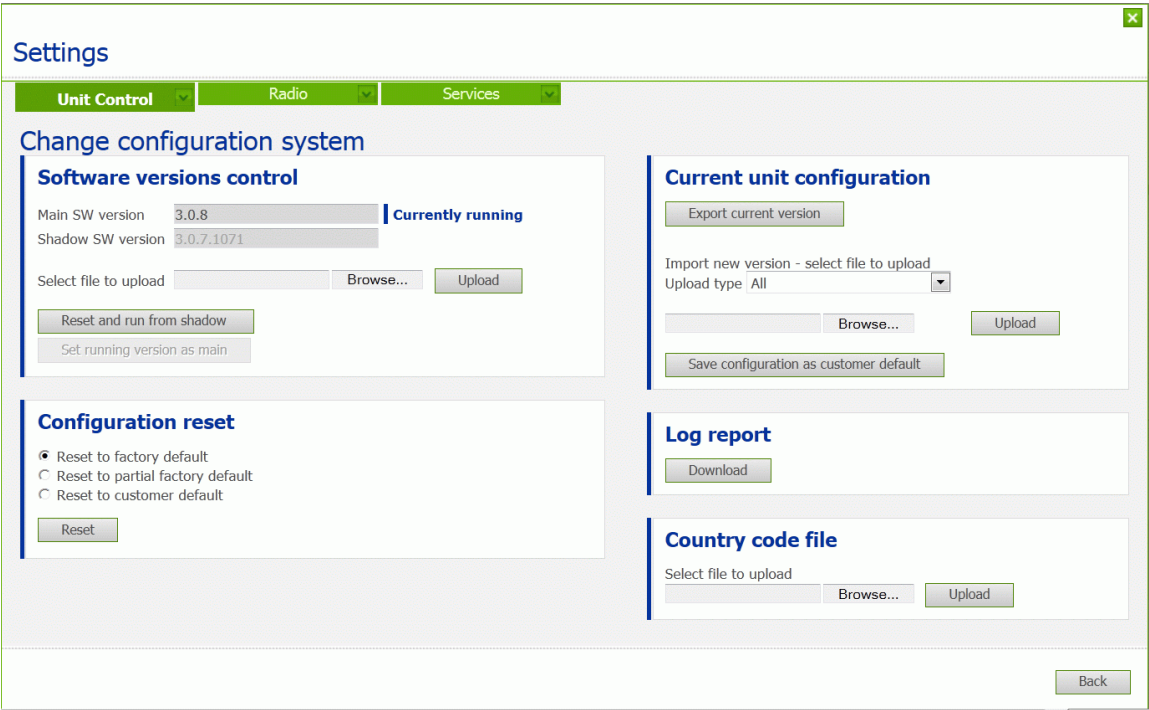


Figure 4-16: Unit Control - Change Configuration System

The Change configuration system window contains the following settings:

Table 4-13: Unit Control - Change Configuration Settings

| Setting                          | Description                                                                                                                                                                                                                                                        |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Software versions control</b> |                                                                                                                                                                                                                                                                    |
| Main SW version                  | Indicates the software version stored in the main memory. If the unit is currently running the software stored in the main memory, a “Currently running” mark will appear next to this entry.<br><br>After reboot the unit will start running the Main SW version. |
| Shadow SW version                | Indicates the software version stored in the shadow memory. If the unit is currently running the software stored in the shadow memory, a “Currently running” mark will appear next to this entry.                                                                  |
| Select file to upload            | Allows you to select a software file for upload. For this purpose:<br><br>1 Click <b>Choose File</b> . A file selection window opens.<br>2 Navigate to the desired software file and select it.<br>3 Click <b>Open</b> .                                           |



Table 4-13: Unit Control - Change Configuration Settings (Continued)

| Setting                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Upload                            | Uploads the currently selected software file to the shadow memory. A new software file can be uploaded only if the unit is currently running from the main memory. <b>Refer also to NOTE below.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Reset and run from shadow         | If the unit is currently running the software version stored in the main memory, the unit is reset and starts using the software version stored in the shadow memory.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Set running version as main       | <p>If the unit is currently running the software version stored in the shadow memory, the shadow memory and main memory switch places so that the same software will run from the main memory.</p> <p>After uploading a new SW Version, it is recommended to apply first the Reset and run from shadow operation. After verifying proper operation, apply the Set running version as main so that after next reset the unit will run using the new version.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Configuration reset</b>        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Reset                             | <p>Resets the unit and changes its configuration:</p> <ul style="list-style-type: none"><li>■ Reset to factory default - Resets the unit to its factory default settings. It also erases any customer default settings that were previously saved. <b>Refer to the CAUTION note below.</b></li><li>■ Reset to partial factory default - resets the unit to the standard Factory Default configuration, excluding the parameters that are required to maintain connectivity and management access to the unit: Country Code, Unit Type (BU/RB), Passwords, Ethernet Port Negotiation Mode, IP Configuration and Management VLAN parameters, Antenna Gain.</li><li>■ Reset to customer default - Resets all parameters to the customer default settings if a customer default configuration was previously saved.</li></ul> <p>After you select one of the options above, click <b>Reset</b> to apply your settings.</p> |
| <b>Current unit configuration</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Export current version            | Exports the unit's current settings as an XML file. You will be prompted to define a name and location for the file. Use this option to backup your current configuration.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |





Table 4-13: Unit Control - Change Configuration Settings (Continued)

| Setting                                       | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Import new version<br>- select file to upload | <p>Upload type - Selects between:</p> <ul style="list-style-type: none"><li>■ All: Import a configuration file received from Alvarion or a previously exported backup XML file</li><li>■ Partial: Import a partial configuration file. This is an edited configuration file that includes only a subset of the parameters with the signature removed</li></ul> <p>To select a complete or partial unit configuration file to import:</p> <ol style="list-style-type: none"><li>1 Click <b>Choose file</b>. A file selection window opens.</li><li>2 Navigate to the desired configuration file and select it.</li><li>3 Click <b>Open</b>.</li></ol> |
| Upload                                        | <p>Uploads the currently selected unit configuration file, while employing the currently selected upload type.</p> <p>The new configuration file will be applied after reboot.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Save configuration as customer default        | <p>Saves current configuration as a customer default configuration. Once a customer default configuration is saved, it allows the user to quickly revert all parameters to these specific values.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Log report</b>                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Download                                      | <p>Saves or opens a txt system log file. Refer to <a href="#">“Logs” on page 114</a> for details on how to manage the content of the file.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Country code file</b>                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Select file to upload                         | <p>Imports a new Country Codes file. Country Codes files contain radio settings and limitations applicable under various regulations such as FCC, ETSI, etc. A new file should be loaded only if Alvarion informs that a new file supplied by it should be used.</p> <ol style="list-style-type: none"><li>1 Click <b>Choose file</b>. A file selection window opens.</li><li>2 Navigate to the desired Country Codes file and select it.</li><li>3 Click <b>Open</b>.</li></ol>                                                                                                                                                                     |
| Upload                                        | <p>Uploads the currently selected Country Codes file.</p> <ol style="list-style-type: none"><li>4 NOTE: The new Country Codes file will be applied after reboot.</li></ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**NOTE!**

Take necessary steps to ensure that the file upload process will not be interrupted until it is fully completed.

Achievable traffic throughput may be affected during file upload. It is recommended to perform file upload during a maintenance window (a time period during which low traffic load is expected).

When two units are associated, the upload of a new SW version file can be done on only one unit at a time (the unit being upgraded will forward only management and broadcasts traffic).

Downgrade of the SW version should be performed only after changing the configuration to match the capabilities supported by the old version.

**CAUTION**

Setting the unit to factory defaults resets all parameters including the Country Code and any other regulatory-dependent parameters. This may result in violations of the regulatory compliance and the users perform this action at their own risk.

Note that the default Type for a BU/RB-350 unit that was upgraded to BU/RB-600 is BU-350, with Sector 3 Status set to Inactive and Radio Interface Configuration set to Sector 1.

In addition, management connectivity to the unit may be lost.

## 4.4.2 Radio Menu

The Radio menu contains the following options:

- [Sector Configuration](#)
- [Channel List](#)



4.4.2.1 Sector Configuration

Radio settings

Unit Control

Radio

Services

Radio interface

DualSector

Sector Id

3

Sector name

3

State

☒ Active ☐ Inactive

Bandwidth

40+

MHz

Current frequency

5570

MHz

Configured frequency

5570

MHz

ESSID

A203-S3

Current TX power

4

dBm

Configured TX power

4

dBm

ATPC

☒ Enable ☐ Disable

Optimal SNR

28

dB

Multi rate

☒ Enable ☐ Disable

Maximum rate - SNR Based

MCS15

Short GI

☒ Enable ☐ Disable

Max Cell Radius

0

km

Antenna type

External

Antenna gain

0

dBi

Country code

5.4 GHz Universal

Less Parameters

Number of retransmissions

9

PHY aggregation

8

ms

CWmin

7

TX Opportunity

0

ms

CWmax

63

Back

Save

Figure 4-17: Radio - Sector Configuration

This Sector configuration window includes radio parameters settings for the selected sector (use the Sector Id parameter to display radio parameters for the selected sector). The parameters of both sectors can be configured regardless of unit's type.

In a unit configured as BU/RB-600 (provided this unit type is supported by the available license), both sectors may be enabled (provided the Radio interface parameter is set to Dual Sector). In this case downlink data (from BU to RB) is transferred through Sector 1, and uplink data (from RB to BU) is transferred through Sector 3. Should one of the sectors fail, the units will revert automatically to single sector operation transferring both downlink and uplink data through the available sector. Following recovery of the failed sector dual sector operation will be resumed automatically.

In a dual sector system, the BU will accept association of two links only if both are identified as belonging to the same RB (same unit's MAC address). Otherwise, a second link trying to associate with the BU will be rejected.

In a unit configured to operate as a BU/RB-350, only a single sector (either Sector 1 or Sector 3) can be operational (active), according to the option configured for the Radio interface Configuration parameter (a BU/RB-600 may also be configured to operate on a single sector).



**NOTE!**



A special procedure, using Telnet, should be followed for switching from BU/RB-350 Sector 1 to BU/RB-350 Sector 3 (or vice versa). For details refer to the NOTE in “[Sector 1/Sector 3](#)” on page 118.

Clicking **More Parameters** / **Less Parameters** shows/hides additional radio parameters. The following settings are available:

**Table 4-14: Radio - Sector Configuration Settings**

| Setting         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Radio interface | Read-only, according to the option configured for this parameter in the Quick Settings window (see “ <a href="#">Manual settings mode</a> ” on page 37). Indicates the available sectors (Sector 1, Sector 3 or DualSector mode in which both sectors are available).                                                                                                                                                                                                                                                                                                                  |
| Sector Id       | The selected sector. Available options depend on the setting of the Radio interface parameter. All following parameters are for the selected sector.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Sector name     | Sets the radio sector’s name. An informational parameter that does not affect sector operation. A string of up to 31 characters (the defaults are Sector 1/Sector 3).                                                                                                                                                                                                                                                                                                                                                                                                                  |
| State           | <div><div>■ Active - Activates the sector</div><div>■ Inactive - Deactivates the sector</div></div> <p>In a BU/RB-600 operating in Dual sector mode both sectors must be activated. In a BU/RB-350 only a single sector can be activated.</p> <p>On Country Codes which enforce DFS, deactivating and reactivating a sector resets DFS information and restarts Channel Availability Check searching for a radar free channel.</p> <p><b>CAUTION:</b> Deactivating all available sectors of a remote unit (via the wireless link) will result in loss of connectivity to the unit.</p> |



**Table 4-14: Radio - Sector Configuration Settings (Continued)**

| Setting           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bandwidth         | <p>Sets channel bandwidth: 20 or 40+ MHz. The default is 40+ MHz.</p> <p>The same Bandwidth must be used on both sides of a link.</p> <p>If both sectors are enabled (Dual Sector operation), the same Channel Bandwidth must be configured for both sectors.</p> <p>To change the bandwidth of an existing single link (Single Sector operation):<br/>Change the bandwidth of the remote side before changing the bandwidth in the local unit.</p> <p>To change the bandwidths of both links (Dual Sector operation):</p> <ol style="list-style-type: none"><li>1. Change the bandwidth of one of the links in the remote unit.</li><li>2. Change the bandwidth of the link in the local unit.</li><li>3. Repeat the same process for the second link.</li></ol> <p>When Spectrum Analysis (see <a href="#">"Spectrum Analyzer" on page 116</a>) is active, the Channel Bandwidth cannot be modified.</p> <p>A change in Channel Bandwidth may cause an automatic modification of the operating frequency to the default frequency if the current frequency is not supported for the new bandwidth according to the current Country Code.</p> |
| Current frequency | Read-only. Displays the frequency in MHz the unit is currently working on                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Table 4-14: Radio - Sector Configuration Settings (Continued)**

| Setting              | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configured frequency | <p>In an RB this parameter will become meaningful only after changing the unit type to BU, thus enabling remote switching of unit type with continued operation on a desired frequency. As long as the unit operates as an RB this parameter has no effect.</p> <p>Sets a specific frequency channel in MHz to be used by the unit. If DFS is used, this is the first frequency to be checked by the DFS mechanism, and actual frequency (see Current frequency above) may be different).</p> <p>Note that for 40+ MHz bandwidths, this is the central frequency of the 20 MHz control channel, on top of which an additional 20 MHz extension channel is used. So, for a 5480 MHz frequency for instance, the sector will use a radio spectrum between 5470 MHz and 5510 MHz.</p> <p>Clicking &gt; opens the <a href="#">Channel List</a> window. The Configured frequency should be included in the subset of selected channels.</p> <p>If both sectors are enabled (Dual Sector operation), the following limitations apply:</p> <ul style="list-style-type: none"><li>■ For a 20 MHz bandwidth: The minimum distance between the frequencies configured for Sector 1 and Sector 3 is 40 MHz.</li><li>■ For a 40+ MHz bandwidth: The minimum distance between the frequencies configured for Sector 1 and Sector 3 is 60 MHz.</li></ul> |
| ESSID                | <p>The Extended Service Set IDentifier that identifies the wireless network. The ESSID is a string used to identify a wireless network and to prevent the unintentional merging of two wireless networks in the same area. Only units using the same ESSID are allowed to associate - the same ESSID must be used on both sides of a link. The ESSID can have 1 to 32 characters (a null ESSID is forbidden). Default value: ESSID1.</p> <p>ESSID must be unique in the wireless network. If both sectors of the same unit are enabled (Dual Sector operation), a unique ESSID must be configured for each sector.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Current TX power     | <p>Read-only. Displays the transmission power in dBm the unit is currently using. When ATPC is enabled actual Current TX power may differ from Configured TX power.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Configured TX power  | <p>Sets the unit's transmit power at the antenna port in dBm. The allowed range starts from 4 dBm up to either the maximum supported Tx Power (24 dBm) or, if EIRP is limited by the Country Code being used, the difference between the maximum allowed EIRP (dBm) and the configured antenna gain (dBi). The default value is either 24 dBm or the highest allowed by the Country Code EIRP limitation minus the configured antenna gain.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Table 4-14: Radio - Sector Configuration Settings (Continued)**

| Setting      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ATPC         | <p>Applicable only in BU. The Automatic Transmit Power Control (ATPC) algorithm automatically adjusts the power level transmitted by the RB according to the actual level at which it is received by the BU. To support proper system operation with optimal performance and minimum interference between neighboring systems, the ATPC algorithm should be enabled.</p> <ul style="list-style-type: none"> <li>■ Enable - Enables ATPC (the default)</li> <li>■ Disable - Disables ATPC</li> </ul> <p>If both sectors are enabled (Dual Sector operation), the same ATPC settings (ATPC and Optimal SNR) should be configured for both sectors.</p>                                                                                                                                                |
| Optimal SNR  | <p>Applicable only in BU. When ATPC is enabled, sets a reference SNR level for optimal performance of the ATPC algorithm. This is the lowest SNR level at which you want the RB to be received at the BU. Allowed range: 4..60 dB. Default is 28 dB.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Multi rate   | <p>When the Multi rate algorithm is enabled, it changes dynamically the modulation, coding scheme and number of spatial streams (see available combinations in <a href="#">“Sensitivity and Max Tx Power per Modulation and Coding Scheme” on page 5</a>) according to link conditions. The purpose is to increase the probability of using the maximum possible modulation level at any given moment. Although the algorithm avoids using modulation levels that are too high for the prevailing link conditions, it might be better under certain conditions to limit the use of higher modulation levels.</p> <ul style="list-style-type: none"> <li>■ Enable - Enables switching between multiple modulation levels for optimal performance</li> <li>■ Disable - Disables multi rate</li> </ul> |
| Maximum rate | <p>Sets the highest modulation level that may be used by the multi rate algorithm. The maximum rate is also applied as manual rate when the Multi rate algorithm is disabled. The default is MCS15 (the highest MCS).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Short GI     | <p>The Short Guard Interval mechanism decreases the inter-symbol guard interval from the standard 800ns (long GI, Short GI is disabled)) to 400ns (Short GI is enabled), thus reducing overhead and making more efficient use of the available air time, ultimately increasing data throughput. However, the Short Guard Interval is more prone to inter-symbol interference caused by propagation delays, echoes and reflections and therefore tends to decrease link reliability in multipath propagation or interfered environments. This parameter is applicable only for a bandwidth of 40+ MHz.</p> <ul style="list-style-type: none"> <li>■ Enable - Enables Short GI (the default)</li> <li>■ Disable - Disables Short GI (Long GI will be used)</li> </ul>                                 |

**Table 4-14: Radio - Sector Configuration Settings (Continued)**

| Setting                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max Cell Radius           | <p>Applicable only for BU (RB will learn it from the BU). Sets the maximum distance to an associated unit in km. The purpose is to compensate for the delays introduced by propagation of the radio signals. The allowed range is 0 to 54Km. It is recommend to configure the parameter to a value slightly higher than the straight line distance between the units, as signal may travel via reflections from objects in between.</p> <p>If both sectors are enabled (Dual Sector operation), the same Distance should be configured for both sectors.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Antenna type              | Read-only. Indicates whether the sector is using an Internal or External antenna. Depends on the type of unit. In a unit with an internal antenna Sector 1 is connected to the internal antenna. Otherwise the antenna is External.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Antenna gain              | <p>Applicable only for a sector connected to a detached (external) antenna. In a sector connected to an Internal antenna the Antenna gain is 23 dBi. The Antenna Gain parameter defines the net gain (in dBi) of a detached antenna. The configured gain should take into account the attenuation of the cable connecting the antenna to the unit. The Antenna Gain is important especially in countries where there is a limit on the EIRP allowed for the unit. The maximum allowed value for the Transmit Power parameters cannot exceed the value of EIRP minus Antenna Gain, where the EIRP is defined by the selected Country Code. The lower limit for the Antenna Gain parameter is 0 dBi (the default). The upper limit for the Antenna Gain in dBi is the Regulation Max EIRP - 4 (since the minimum Tx Power is 4 dBm), up to a maximum of 36 (dBi). For details see <a href="#">“Country Codes and Dependent Parameters” on page 40</a>.</p> <p>When both sectors are enabled (Dual Sector operation), the gain of both antennas must be the same.</p> <p>Reboot the device after changing the Antenna gain.</p> |
| Country code              | Read-only, according to the Country Code configured in the Quick Settings window (see <a href="#">“Manual settings mode” on page 37</a> ). Depending on the country code, specific limitations such as maximum EIRP, available bandwidths, available channels etc. will apply to radio parameters. See more details in <a href="#">“Country Codes and Dependent Parameters” on page 40</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>More parameters</b>    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Number of retransmissions | Sets the maximum number of times that an unacknowledged frame is retransmitted by the unit before it is dropped. Allowed range: from 0 (no retries) to 9. Default value: 9.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| TX Opportunity            | For use in future versions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



**Table 4-14: Radio - Sector Configuration Settings (Continued)**

| Setting         | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PHY aggregation | <p>Sets the maximum duration for PHY aggregation in ms.</p> <p>The PHY aggregation mechanism enables aggregating several data frames into a single frame for transmission to the wireless link. Data packets in the unit's queue can be accumulated before the aggregated frame is transmitted to the wireless medium, thus reducing overhead and increasing achievable throughput in good quality links.</p> <p>Available options are Disable or 1 to 10, defining the maximum duration of the PHY aggregation in ms. The default is 8.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| CWmin           | <p>The CWmin parameter, together with the CWmax parameter, determine the time that a unit waits from the time it has concluded that there are no detectable transmissions by other units until it attempts to transmit. The BreezeULTRA system uses a special back-off mechanism based on detecting the presence of a carrier signal to estimate the activity of another unit. The target is to minimize collisions in the wireless medium resulting from attempts of more than one unit to transmit at the same time. The system uses an exponential Back-off algorithm to resolve contention between two units that want to access the wireless medium. The method requires each unit to choose a random number N between 0 and a given number C each time it wants to access the medium. The unit will attempt to access the medium only after a time equal to a certain minimum plus N time slots, always checking if another unit has accessed the medium before. Each time the unit tries to transmit and a collision occurs the maximum number C used for the random number selection mechanism will be increased to the next available value, up to the value configured for CWmax (see below). The available values are 7, 15, 31, 63, 127, 255, 511 and 1023.</p> <p>CWmin (Minimum Contention Window) sets the first value of C to be used in the back-off algorithm. The default is 7.</p> |
| CWmax           | <p>CWmax (Maximum Contention Window) sets the highest value of C to be used in the back-off algorithm described above. Cannot be lower than the value configured for CWmin. Default value: 63.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |



### 4.4.2.2 Channel List

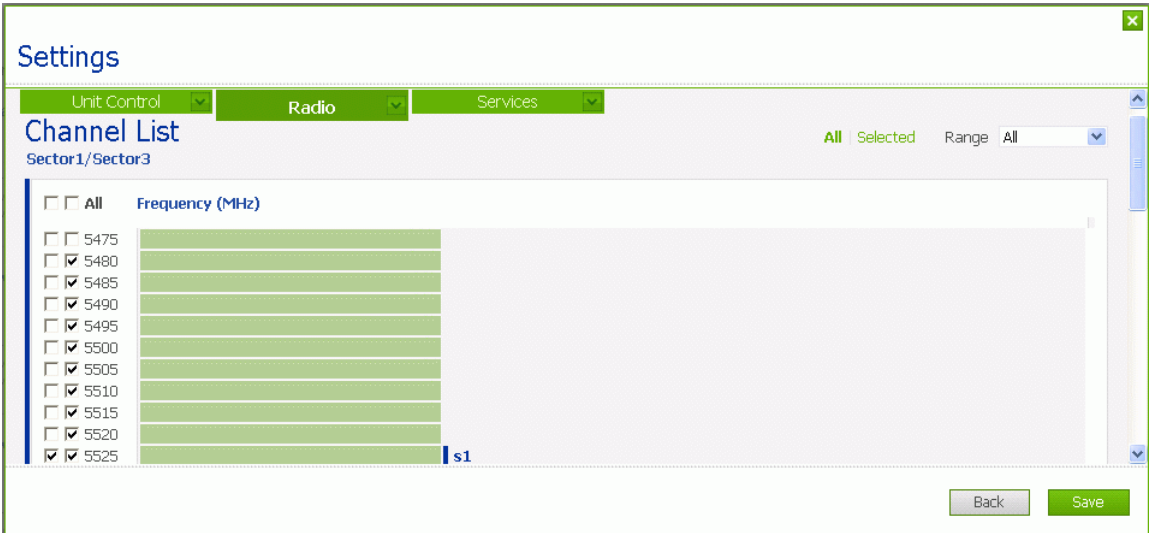


Figure 4-18: Radio - Channel List

The Channel List window allows managing the channels (center frequencies) that can be used in each sector. Note that for 40+ MHz bandwidths, the central frequency is the center of the 20 MHz control channel, on top of which an additional 20 MHz extension channel is used. So, for a 5480 MHz channel for instance, the sector will use a radio spectrum between 5470 MHz and 5510 MHz. Valid frequencies include:

- For a Bandwidth of 20 MHz: In each sub-band supported by the Country Code, frequencies in the range from Minimum Frequency plus 10 MHz to Maximum Frequency minus 10 MHz, using a 5 MHz resolution.
- For a Bandwidth of 40+ MHz: In each sub-band supported by the Country Code, frequencies in the range from Minimum Frequency plus 10 MHz to Maximum Frequency minus 30 MHz, using a 5 MHz resolution.

The selected channels are used for:

- Spectrum Analyzer Test (can be performed via Monitor, see [“Spectrum Analyzer” on page 116](#))
- DFS channel changes
- In RB - scanning (searching for a BU)



#### To set the selected channels

- 1 From the **Range** drop-down list, select the desired frequency band. Channels supported by all sub-bands in the current Country Code that are included in the selected range will be displayed. The frequencies in available ranges are:



Table 4-15: Channel List Ranges

| Range       | Channels        |
|-------------|-----------------|
| 4.9 GHz     | 4900 - 5150 MHz |
| 5.1/5.3 GHz | 5100 - 5350 MHz |
| 5.3 GHz     | 5250 – 5470 MHz |
| 5.4 GHz     | 5470 - 5725 MHz |
| 5.8 GHz     | 5725 - 5900 MHz |
| All         | 4900 – 5900 MHz |

Note that the above listed ranges indicate the entire range that may be available according to the selected option of the Range parameter. Actually available frequencies are those that are supported also by the current Country Code (see the Country Codes document).

**2** Check the frequency channels you wish to select, or select the All check-box to select all available channels (note that this may include channels not supported by current Bandwidth that cannot be used by the device). By default, all channels allowed by the currently enabled Country Code for the Bandwidth used when the Country Code was activated that are included in the selected Range are marked as selected.

**3** Click **Save** to apply your settings.

Clicking **All/Selected** switches between listing all the available frequency channels or only the selected channels. If a radio sector is currently set up on a specific frequency, the sector name is displayed next to the channel's frequency.

### 4.4.3 Services Menu

Services allow you to prioritize and apply quality of service parameters depending on the type of traffic. You can set the Maximum Information Rate (MIR), traffic prioritization and VLAN tagging. On RB units, services are learned from the associated BU during the association process: they are visible, but they cannot be edited or deleted.

#### NOTE!



To update services in the RB, reset the RB to force re-association

The Services menu contains the following options:

- Add/Edit Services - opens the [Services](#) window
- Add/Edit Profiles - opens the [Profiles](#) window



### 4.4.3.1 Services

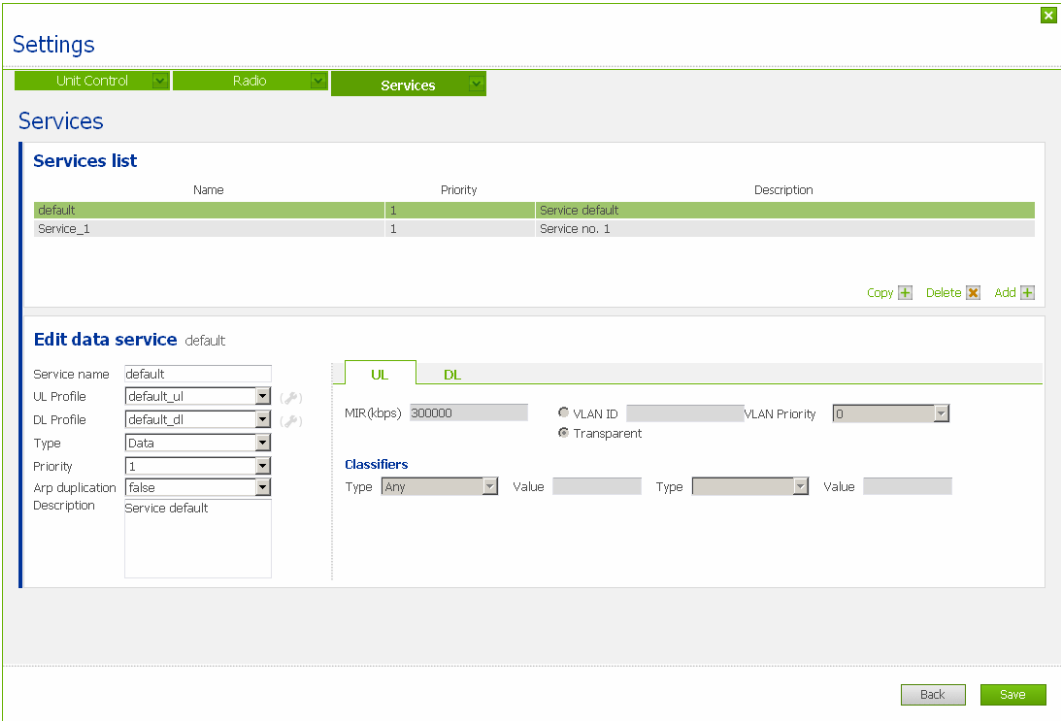


Figure 4-19: Services - Services

At the top of the window, there is a list of the currently set up services. You can add/remove services or duplicate existing services. When you select a service in the list, its settings are displayed at the bottom of the window, where you can edit them.



- **NOTE!** Services apply to the unit management traffic as well as to the data traffic. If you apply a services configuration that filters out management frames, you will not be able to manage remote units.
- As a best practice, it is recommended to create a dedicated service for unit management, with the highest priority (Priority 1).
- For optimal quality of sensitive traffic, such as management or VoIP, it is recommended to create for them dedicated services with Priority values lower (meaning higher priority) than those configured for data-only Services. It is also recommended to limit the MIR of data-only services to a level below that of the maximum TCP link capacity, and reserve enough capacity for the sensitive traffic.

The Services window contains the following settings:



Table 4-16: Services - Services Settings

| Setting                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Services list</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Name                     | Indicates the service's name                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Priority                 | Indicates the service's priority. There are 4 priority levels numbered from 1 to 4, with 1 being the highest priority and 4 being the lowest priority.                                                                                                                                                                                                                                                                                       |
| Description              | Indicates the service description                                                                                                                                                                                                                                                                                                                                                                                                            |
| Copy                     | Duplicates the currently selected service in the list (highlighted in green). The service will be given a default name in the following iterations: Service_1, Service_2, Service_3, etc.                                                                                                                                                                                                                                                    |
| Delete                   | Deletes the currently selected service in the list (highlighted in green).                                                                                                                                                                                                                                                                                                                                                                   |
| Add                      | Adds a new service. The service will be given a default name in the following iterations: Service_1, Service_2, Service_3, etc.                                                                                                                                                                                                                                                                                                              |
| <b>Edit data service</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Service name             | Sets the service name. Should be a unique string of up to 16 characters.                                                                                                                                                                                                                                                                                                                                                                     |
| UL Profile               | Allows you to select a service profile applicable for the uplink traffic. If the UL tab is opened on the right, the profile's settings will be displayed within. Clicking  opens the <a href="#">Profiles</a> window, where you can edit service profiles. See <a href="#">"Profiles" on page 91</a> for information on how to set up service profiles.   |
| DL Profile               | Allows you to select a service profile applicable for the downlink traffic. If the DL tab is opened on the right, the profile's settings will be displayed within. Clicking  opens the <a href="#">Profiles</a> window, where you can edit service profiles. See <a href="#">"Profiles" on page 91</a> for information on how to set up service profiles. |
| Type                     | Sets a generic description for the service's type. The available values are: Data, Voice, Video and General. This setting impacts the service's graphical representation in the Services & Points view (see <a href="#">Table 4-3</a> for details).                                                                                                                                                                                          |
| Priority                 | Sets service's traffic prioritization. There are 4 priority levels numbered from 1 to 4, with 1 being the highest. Packets in a Service with configured Priority value higher than 1 will be sent only if the queues for packets in all Services with a lower configured Priority value are empty or have already reached their configured MIR. Each Service should be assigned a different Priority.                                        |
| Arp duplication          | ARP Duplication has to be enabled if VLAN tagging is used at least on one of the services but the ARP messages are needed also for the functionality of the other services. If set to true (enable) and VLAN tagging in associated Service Profile is enabled, ARP messages will be transmitted also with the relevant VLAN. The default is false (disable).                                                                                 |
| Description              | This field allows you to type in an optional description (up to 16 characters) for the service.                                                                                                                                                                                                                                                                                                                                              |



INFORMATION



VLAN tagging is allowed only in one direction: If there is VLAN tagging in the DL Profile than the UL Profile should be Transparent (no VLAN tagging), and vice versa.

4.4.3.2 Profiles

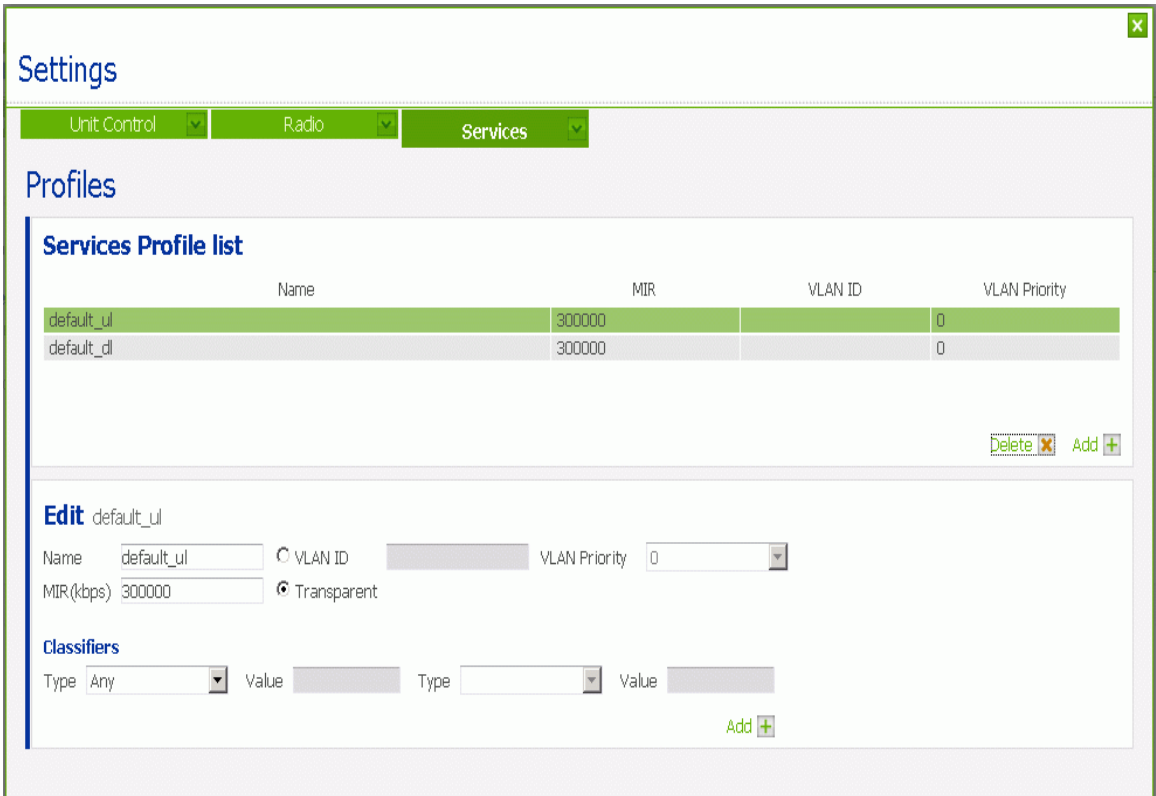


Figure 4-20: Services - Profiles

Service profiles define MIR and VLAN tagging parameters for various types of traffic:

- The Maximum Information Rate (MIR) is the maximum data rate available for transmissions, thus limiting throughput to a value lower than the maximum supported by the unit. The MIR values indicate the achievable net throughput for data applications.
- VLAN tagging (if enabled) is applied according to the IEEE 802.1Q networking standard.

At the top of the window, there is a list of the currently set up service profiles. You can add new profiles or remove existing profiles. When you select a profile in the list, its settings are displayed at the bottom of the window, where you can edit them.

The type of traffic the service profile is applied to is defined by classifiers. Click **Add** at the bottom of the Profiles window to create new classifiers. Clicking once creates a pair of classifiers linked by the logical AND operator. For each service profile, you can add up to 4 such pairs for a total of 8 classifiers. Each



pair (classifiers on the same line) is linked to the others by the logical OR operator. Selecting an empty entry from the classifier's **Type** drop-down list removes the classifiers pair.

The Profiles window contains the following settings:

**Table 4-17: Service - Profiles Settings**

| Setting                       | Description                                                                                                                                                                      |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Services Profiles List</b> |                                                                                                                                                                                  |
| Name                          | Indicates the service profile's name.                                                                                                                                            |
| MIR                           | Indicates the Maximum Information Rate applicable for the service profile                                                                                                        |
| VLAN ID                       | A valid value (in the range 1-4094) indicates the VLAN ID applicable for the service profile. Otherwise VLAN tagging is not applied (Transparent).                               |
| VLAN Priority                 | When VLAN tagging is enabled (VLAN ID in the range 1-4094), indicates the priority 802.1p based priority code point applicable for the service profile                           |
| Delete                        | Deletes the currently selected service profile in the list (highlighted in green).                                                                                               |
| Add                           | Adds a new service profile. The service profile will be given a default name in the following iterations: Profile_1, Profile_2, Profile_3, etc.                                  |
| <b>Edit</b>                   |                                                                                                                                                                                  |
| Name                          | Sets the service profile's name. Should be a unique string of up to 16 characters.                                                                                               |
| MIR                           | Sets the Maximum Information Rate applicable for the traffic routed under the service profile. The allowed range is from 256 to 300000 Kbps.                                     |
| VLAN ID                       | Select the VLAN ID option to enable VLAN tagging for relevant traffic. If VLAN ID is enabled you should specify the VLAN ID value (1-4094).                                      |
| VLAN Priority                 | Applicable only if VLAN tagging is enabled. Sets the 802.1p priority code point the unit will apply in the 802.1Q frame headers for the traffic routed under the service profile |
| Classifiers                   | Sets the type of traffic applicable for the service profile. See <a href="#">Table 4-18</a> below for details on how to set the classifiers.                                     |

The following classifiers can be applied:

**Table 4-18: Service Profile Classifiers**

| Type    | Description                                                                         |
|---------|-------------------------------------------------------------------------------------|
|         | Selecting an empty classifier removes the classifiers row from the list.            |
| Any     | Any type of traffic.                                                                |
| EthType | Traffic with a matching EtherType frame field. The allowed range is 0x0600..0xFFFFE |

**Table 4-18: Service Profile Classifiers (Continued)**

| Type                 | Description                                                                                                  |
|----------------------|--------------------------------------------------------------------------------------------------------------|
| PPPoE                | Traffic using the Point-to-Point Protocol over Ethernet network protocol                                     |
| UDP_port_Source      | User Datagram Protocol traffic using the specified source port number(s). The range is 0..65535.             |
| TCP_port_Source      | Transmission Control Protocol traffic using the specified source port number(s). The range is 0..65535.      |
| VlanId               | Traffic using the specified 802.1Q VLAN ID(s). The range is 1..4094.                                         |
| VlanPriority         | Traffic using the specified 802.1p priority code point(s). The range is 0..7.                                |
| DSCP                 | Traffic using the specified Differentiated Services Code Point class selector(s). The range is 0..63.        |
| UDP_port_Destination | User Datagram Protocol traffic using the specified destination port number(s). The range is 0..65535.        |
| TCP_port_Destination | Transmission Control Protocol traffic using the specified destination port number(s). The range is 0..65535. |

Service classifiers are checked against incoming packets in the order of the service priority. If an arriving packet meets multiple classifiers, it will be processed according to the matching classifier belonging to the service with the higher priority.

**INFORMATION**

If ANY is used as a Classifier for a certain service, any subsequent services with a lower priority will have no effect.

A PPPoE Classifier should not be paired with any other Classifier.



# Chapter 5 - Using the Monitor Program

## In This Chapter:

- [Working with the Monitor Program on page 95](#)
- [Menus and Parameters on page 97](#)



# 5.1 Working with the Monitor Program

This chapter describes how you can use the menu-based Local Craft Interface (LCI) Monitor program to manage BreezeULTRA equipment:

## 5.1.1 Accessing the Monitor Program Using Telnet

- 1 Run the Telnet program connecting to the management IP address of the device:

```
telnet <IP_Address>
```

The Monitor program is accessible from any location with access to the unit's management IP address (default is 10.0.0.1), either through Ethernet or, if you already have a wireless link set up, over the air.

- 2 The Login menu is displayed. Select a Login user name by typing it's corresponding option number. The following accounts are available:

Table 5-1: User Accounts

| Username      | Default Password | Description                                                        |
|---------------|------------------|--------------------------------------------------------------------|
| guest         | public           | Read-only account.                                                 |
| installer     | installer        | Account with writing privileges limited to commissioning settings. |
| administrator | private          | Administrative account with full privileges.                       |

- 3 Enter your password and press **Enter**. The Main Menu is displayed as shown in [Figure 5-1](#).

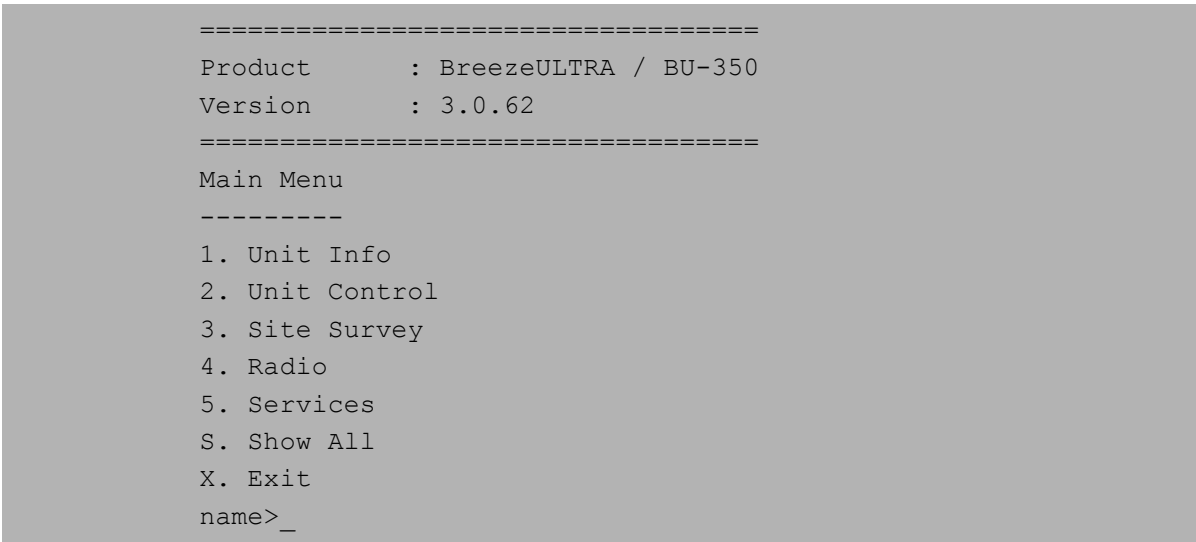


Figure 5-1: Main Menu (Administrator Level)

The display of the Main Menu varies depending on the user's access level, as follows:

- For users with guest access rights, only the Unit Info option is available.



- For users with installer access rights, the Unit Info, Unit Control, Site Survey, Radio and Show All options are available (Services option is not available).
- For users with administrator access rights, all options are available.

## 5.1.2 Common Operations

The following describes standard operations used when working with the Monitor program.

- Each menu header displays the unit's Type (BU/RB-350/600, according to the option currently set for the Type parameter of Sector 1, see [Sector Parameters on page 119](#)) and the running SW Version.
- The configured Unit Name (default is name, see [Sector Parameters on page 119](#)) that is used as the prompt text.
- Type an option number or letter to open or activate the option. In certain cases you may need to press **Enter**.
- Press **Esc** to exit a menu or option and go back to the parent menu.
- A path indicating the current location within the menu hierarchy is displayed at the top of the menu.
- When setting a parameter, the current value/selected option is indicated. Pressing **Tab** displays its acceptable format/value range/available options. In some cases a short description is also displayed.
- When setting a parameter, pressing **Esc** discards the action. When selecting an option that configures a sequence of parameters, pressing **Esc** for any one of the parameter discards the change for that parameter only.



## 5.2 Menus and Parameters

The following sections describe the menus and parameters provided by the monitor program. The main menus are:

- [Unit Info](#)
- [Unit Control](#)
- [Site Survey](#)
- [Radio](#)
- [Services](#)
- [Show All](#)
- [Exit](#)

Actually available options depend on access rights (see [Accessing the Monitor Program Using Telnet on page 95](#)).

### 5.2.1 Unit Info

This menu displays an overview of the unit's properties and current settings divided into the following groups:

- [Show Unit Info](#)
- [Show Unit Control](#)
- [Show Feature License](#)
- [Show Radio Parameters](#)
- [Show Services](#)
- [Show All](#)

#### 5.2.1.1 Show Unit Info

Displays the Unit HW Info. This includes the unit's MAC address and the hardware revisions of the main board and of each radio board:

- **MAC Address:** The unit's unique IEEE Media Access Control address for the management network interface
- **Hardware revision:** The hardware revision of the outdoor unit's main board
- **Radio revision wl0:** The hardware revision of the outdoor unit's first radio board. This is the board used for the first sector (Sector 1)
- **Radio revision wl1:** The hardware revision of the outdoor unit's second radio board (Not available in current release)



- Radio revision wl2: The hardware revision of the outdoor unit's third radio board. This is the board used for the second sector, if applicable (Sector 3 when the unit operates as a BU/RB-600)
- System up time: The time since last reset/power up in hours:minutes:seconds

### 5.2.1.2 Show Unit Control

- Version:
  - » Running Software Version: Firmware version currently running on the unit
  - » Running From: Indicates whether the unit is currently running the firmware stored in the main memory or the firmware stored in the shadow memory.
  - » Main version number: Firmware version stored in the main memory
  - » Main version file: Firmware file stored in the main memory
  - » Shadow version number: Firmware version stored in the shadow memory
  - » Shadow version file: Firmware file stored in the shadow memory
- IP Configuration: IP parameters for management traffic
  - » IP: IP address
  - » IP Mask: Subnet mask
  - » Default Gateway: IP address of the default gateway
- Management VLAN:
  - » Tagging: When enabled, unit responds only to frames tagged with Management VLAN ID. Management frames generated by the unit are tagged with Management VLAN ID and Priority.
  - » VLAN ID: Applicable only if Tagging is Enabled. The 802.1Q based VLAN ID applied to outgoing management frames when tagging is enabled
  - » VLAN Priority: Applicable only if Tagging is Enabled. The 802.1p based Priority Code Point applied to outgoing management frames when tagging is enabled
- Management Port Access Control: Indicates whether the unit can be managed only from the Ethernet port, only from the Wireless port or from Both ports.
- Manager IP ACCESS Control: Indicates whether management is restricted to specific IPs. If Yes, the defined Authorized Managers are listed below. For each Authorized Manager, the list includes information about whether the unit should send SNMP traps to the manager (Trap Sending), and the SNMP Read-Only Community and Read-Write Community.



- Ethernet Port Control: Configuration and status of Ethernet interfaces of PoE Out (Eth0) and PoE In (Eth1) ports
  - » Eth0 status: Indicates whether the PoE Out Ethernet interface is enabled or disabled.
  - » Eth0 speed: Speed and duplex mode configured for the PoE Out Ethernet interface. This can be either Auto or manually configured to 10, 100 or 1000 Mbps in either full duplex or half duplex mode.
  - » Eth0 crossover: The crossover mode of the PoE Out Ethernet interface (MDI, MDIX or Auto).
  - » Eth0 link: Current status of the PoE In Ethernet interface (current speed, duplex mode and crossover mode, or down).
  - » Eth1 speed: Speed and duplex mode configured for the PoE In Ethernet interface. This can be either Auto or manually configured to 10, 100 or 1000 Mbps in either full duplex or half duplex mode.
  - » Eth1 crossover: The crossover mode of the PoE In Ethernet interface (MDI, MDIX or Auto).
  - » Eth1 link: Current status of the PoE In Ethernet interface (current speed, duplex mode and crossover mode, or down).
- Unit Name:
  - » Unit Name: Name allocated to the unit by the user
  - » Unit Location: Operating location specified by the user
  - » Contact Person: Person specified as in charge for the unit
- Console Timeout: Inactivity time interval in minutes after which the Telnet session will be terminated

### 5.2.1.3 Show Feature License

A feature license defines the functionality of the unit. In the current release a single license file is available. The Show Feature License menu enables viewing details related to the current license.

The following options are available:

- [Show License Summary](#)
- [Show License Files](#)

#### 5.2.1.3.1 Show License Summary

Displays for the current license the following information.

- Name: Feature License name. For a basic license generated during production this is the unit's model (BU/RB-350/350D/600/600D-5X). For an upgrade license the name describes the upgraded functionality. In the current release only BU/RB-350\_to\_BU/RB-600\_upgrade is available.



- File: Feature License file name. The format is BTS\_License\_<Part\_Number>\_<MAC\_Address>.lic. For a basic license generated during production the MAC Address is FF-FF-FF-FF-FF-FF. For an upgrade license the MAC Address is the unit's unique MAC address.

The currently available licenses are:

**Table 5-2: Feature Licenses**

| License File                              | License Name                     |
|-------------------------------------------|----------------------------------|
| BTS_License_850350_FF-FF-FF-FF-FF-FF.lic  | BU/RB-B350-5X                    |
| BTS_License_850353_FF-FF-FF-FF-FF-FF.lic  | BU/RB-B350D-5X                   |
| BTS_License_850600_FF-FF-FF-FF-FF-FF.lic  | BU/RB-B600-5X                    |
| BTS_License_850603_FF-FF-FF-FF-FF-FF.lic  | BU/RB-B600D-5X                   |
| BTS_License_850360_<unit_MAC_address>.lic | BU/RB-B350_to_BU/RB-B600_upgrade |

### 5.2.1.3.2 Show License Files

Lists available feature license files (in the current release only a single license file is available). For each file, the following information is displayed:

- License File: Feature License file name
- License name: Feature License name
- Primary: In the current release all licenses are Primary.
- WiFi: Indicates if the license allows the unit to use its' radio. In the current release it is always set to Yes.

### 5.2.1.4 Show Radio Parameters

The following options are available:

- [Country Code](#)
- Sector 1
- Sector 3
- [Show All](#)

#### 5.2.1.4.1 Country Code

Displays the currently active Country Code and corresponding Country Name. See [Display Country List on page 132](#) for information on all available country codes and their corresponding country names.

#### 5.2.1.4.2 Sector 1/Sector 3

For each radio sector, the following information is displayed:

- Type: The current Unit's functionality (BU/RB-350/600) defined for the sector.



- Name: Radio sector name
- Status: Indicates if the sector is active or inactive
- Antenna gain: 23 (dBi) for a sector connected to an integrated antenna (Sector 1 in a unit with an integral antenna) or the value configured for the Antenna gain in a sector connected to a detached antenna.
- Antenna description: Internal antenna for a sector connected to an integrated antenna (Sector 1 in a unit with an integral antenna) or the configured description of the antenna in a sector connected to a detached antenna.
- RF Card ID: HW revision of the radio card
- RF Card Serial Number: Serial number of the radio card

#### 5.2.1.4.3 Show All

Displays all the read-only information displayed in the Show menus for the Country Code, Sector 1 and Sector 3 as described above.

#### 5.2.1.5 Show Services

The following options are available:

- [Show Service Profiles](#)
- [Show Service Groups](#)
- [Show All](#)

##### 5.2.1.5.1 Show Service Profiles

Lists all currently configured service profiles. For each configured service profile, the following information is displayed:

- Name: Service profile's name
- MIR: Maximum Information Rate in kbps
- VLAN Type: Tagging or Transparent
- VLAN ID: The 802.1Q based VLAN ID applied when VLAN Type is Tagging
- VLAN Priority: The 802.1p based Priority Code Point applied when VLAN Type is Tagging

##### 5.2.1.5.2 Show Service Groups

Lists all currently configured services. For each configured service, the following information is displayed:

- Name: Service name
- Priority: Service priority numbered from 1 to 4, with lower values indicating higher priorities
- Downlink Profile: The name of the Service profile applicable for downlink traffic
- Uplink Profile: The name of the Service profile applicable for uplink traffic





- ARP Duplication: Indicates whether ARP Duplication is enabled or disabled. If ARP Duplication is enabled and VLAN tagging in associated Service Profile is enabled, ARP messages will be transmitted with the relevant VLAN.

### 5.2.1.5.3 Show All

Shows all information displayed in the Show Service Profiles and Show Service Groups menus.

### 5.2.1.6 Show All

Shows all information displayed in the Show Unit, Unit Info, Show Unit Control, Show Feature License, Show Radio Parameters and Show Services options.

## 5.2.2 Unit Control

The Unit Control menu includes the following options:

- [Reset Unit](#)
- [Firmware Upgrade](#)
- [Management](#)
- [Default Settings](#)
- [Ethernet Port Control](#)
- [Unit Name](#)
- [Change Password](#)
- [Change Console Timeout](#)
- [Show](#)

### 5.2.2.1 Reset Unit

Resets the unit. You will be prompted to either cancel or confirm the reset operation. Connectivity to the monitor program will be lost. After the reset, the unit will run the firmware version stored in the main memory.

The following changes/actions are performed after reset, according to the configured value/option at the time of reset:

- A change in Selected Country Code parameter
- A change in Antenna Gain parameter
- A change in Unit Type parameter (BU/RB-B350/B600)
- "Use running version after reset" action



- Default Settings actions:
  - » Set to Full Factory Default
  - » Set to Partial Factory Default
  - » Restore Configuration to Customer Default
- after uploading a new Configuration or Country Code file (can be done using the web interface, see [Change Configuration System on page 76](#))
- After uploading a feature license file using tftp

## 5.2.2.2 Firmware Upgrade

### INFORMATION



Refer to [Change Configuration System on page 76](#) for details on loading a new SW version file using the Web interface.

This menu includes unit reset options used for switching between firmware versions stored in the main and shadow memories:

- [Reset and boot from shadow version](#)
- [Use running version after reset](#)
- [Show Version](#)

### 5.2.2.2.1 Reset and boot from shadow version

Resets the unit when it is currently running the firmware stored in the main memory, and restarts using the shadow memory firmware. You will be prompted to either cancel or confirm the operation. Connectivity to the monitor program will be lost.

### 5.2.2.2.2 Use running version after reset

Applicable when the unit is currently running the firmware stored in the shadow memory. You will be prompted to either cancel or confirm the operation. The currently running firmware version will be defined as the main version and the other one as shadow. The system will not be restarted.

### 5.2.2.2.3 Show Version

Displays firmware versions information:

- Running Software Version: Firmware version currently running on the unit
- Running From: Indicates whether the unit is currently running the firmware stored in the main memory or the firmware stored in the shadow memory.
- Main version number: Firmware version stored in the main memory
- Main version file: Firmware file stored in the main memory
- Shadow version number: Firmware version stored in the shadow memory



- Shadow version file: Firmware file stored in the shadow memory

### 5.2.2.3 Management

The Management sub-menu includes the following options:

- [IP Configuration](#)
- [Management VLAN](#)
- [Management Port Access Control](#)
- [Manager IP Access Control](#)
- [Authorized Managers](#)

#### 5.2.2.3.1 IP Configuration

Configures the IP parameters for management traffic:

- IP Address: IP address. Default value 10.0.0.1
- Net Mask: Subnet mask. Default value: 255.255.255.0
- Default Gateway: IP address of the default gateway. Default value 10.0.0.2

#### 5.2.2.3.2 Management VLAN

Sets up VLAN tagging for management traffic.

- Tagging: Enables/disables VLAN tagging
  - » Enabled: Enables VLAN tagging
  - » Disabled: Untagged frames will be used (default)
- VLAN ID: Applicable only if Tagging is enabled. The VLAN ID used for management frames. When tagging is enabled, the unit responds only to frames tagged with this VLAN ID, while management frames generated by the unit are tagged with this VLAN ID. Allowed range: 1..4094. Default value: 1.
- VLAN Priority: Applicable only if Tagging is enabled. The 802.1p based Priority Code Point applied to outgoing management frames. Allowed range: 0..7. Default value: 0.

#### NOTE!



To support over the air management, services configured on the link (see [Services on page 132](#)) must allow classification to remote unit's management VLAN.

#### 5.2.2.3.3 Management Port Access Control

The network interface(s) available for management traffic:

- Ethernet: Enables management only from the Ethernet network interface.
- Wireless: Enables management only from the Wireless network interface.
- Both: Enables management from both Ethernet and Wireless network interfaces (default).



#### 5.2.2.3.4 Manager IP Access Control

Enables/disables management limitation to authorized managers.

- Yes: Authorized managers enabled. Management of the unit is enabled only for devices defined as Authorized Managers (see below). At least one Authorized Manager must be defined.
- No: Authorized managers disabled (default). Any station may manage the unit.

#### 5.2.2.3.5 Authorized Managers

- Select: Selects an existing authorized manager by typing its IP address. Once selected, the following options are available:
  - » Update: Updates the authorized manager's parameters (see details in Add below)
  - » Delete: Deletes the authorized manager
  - » Show: Displays the authorized manager's parameters
- Add: Creates an additional authorized manager. Up to 10 authorized managers may be defined. The following information must be typed in:
  - » IP address: The authorized manager's IP address
  - » Read-Only Community: The authorized manager's SNMP community string for read-only access.
  - » Read-Write Community: Sets the authorized manager's SNMP community string for read-write access.
  - » Trap Sending: Enables/disables sending of SNMP traps to the authorized manager.
- Show: Lists currently set up authorized managers. The following information is listed for each authorized manager:
  - » IP address
  - » Trap Sending
  - » Read-Only Community
  - » Read-Write Community

#### 5.2.2.3.6 Show

Shows all information displayed in the IP Configuration, Management VLAN, Management Port Access Control, Manager IP Access Control and Authorized Managers Show menus.

#### 5.2.2.4 Default Settings

Available only to users with full (administrator) access rights.

Manages customer, full factory and partial factory default settings:

- [Factory Default](#)



- [Save Configuration as Customer Default](#)
- [Restore Configuration to Customer Default](#)

#### 5.2.2.4.1 Factory Default

##### CAUTION



Setting the unit to Full Factory Defaults resets all parameters including the Country Code and any other regulatory-dependent parameters. This may result in violations of the regulatory compliance and the users perform this action at their own risk.

In addition, management connectivity to the unit may be lost.

Note that the default Type for a BU/RB-350 unit that was upgraded to BU/RB-600 is BU-350, with Sector 3 Status set to Inactive and Radio Interface Configuration set to Sector 1.

##### INFORMATION



Note that customer default settings are no longer available if a restore to full or partial factory defaults was performed after the latest customer defaults configuration was saved.

Applies the factory default unit settings:

- Cancel: Returns to the Default Settings menu.
- Set to Full Factory Default: Applies the full factory default unit settings and removes any user-made custom settings.
- Set to Partial Factory Default: Select this option to reset the unit to the standard Factory Default configuration, excluding the parameters that are required to maintain connectivity and management access to the unit:
  - » Country Code
  - » Unit Type (BU/RB-350/600)
  - » Passwords
  - » Ethernet Port Negotiation Mode
  - » IP Configuration and Management VLAN parameters
  - » Antenna Gain.

If the unit is managed via the wireless link, to regain connectivity you may have to change some parameters such as Bandwidth, ESSID and Encryption.

#### 5.2.2.4.2 Save Configuration as Customer Default

Saves current configuration as a customer default configuration. Once a customer default configuration is saved it allows the user to quickly revert all parameters to these specific values.

#### 5.2.2.4.3 Restore Configuration to Customer Default

Applies settings previously saved as customer defaults and resets the units for the changes to take effect.



## 5.2.2.5 Ethernet Port Control

The Ethernet Port Control menu enables managing the parameters of the PoE In and PoE Out Ethernet network interfaces.

### CAUTION



Set interface configuration to values that match the capabilities of the cable or equipment connected to it.

### 5.2.2.5.1 Ethernet 0

The speed and duplex mode of the PoE Out Ethernet interface:

- 0: Auto - Use auto-negotiation for connection speed and duplex mode (default).
- 1: 10 Mbps half duplex
- 2: 10 Mbps full duplex
- 3: 100 Mbps half duplex
- 4: 100 Mbps full duplex
- 5: 1 Gbps half duplex
- 6: 1 Gbps full duplex

### 5.2.2.5.2 Ethernet 0 crossover

- The crossover mode for the PoE Out Ethernet interface.
- 0: Auto - The port uses Auto-MDIX (automatic medium-dependent interface crossover). This is the default.
- 1: Manual MDI - The port behaves as a medium dependent interface (MDI)
- 2: Manual MDIX - The port behaves as a medium dependent interface crossover (MDIX)

### 5.2.2.5.3 Ethernet 0 Status

Enables/disables the Ethernet interface of the PoE Out Ethernet interface:

- 1: Ethernet interface is enabled (the default).
- 2: Ethernet interface is disabled.

### CAUTION



The settings above apply only to the data link. Even if the PoE Out port is disabled, electric power is still supplied to it.

### 5.2.2.5.4 Ethernet 1

The speed and duplex mode of the PoE In Ethernet interface:



- 0: Auto - Use auto-negotiation for connection speed and duplex (default).
- 1: 10 Mbps half duplex
- 2: 10 Mbps full duplex
- 3: 100 Mbps half duplex
- 4: 100 Mbps full duplex
- 5: 1 Gbps half duplex
- 6: 1 Gbps full duplex

#### 5.2.2.5.5 Ethernet 1 crossover

The crossover mode for the PoE In Ethernet interface.

- 0: Auto - The port uses Auto-MDIX (automatic medium-dependent interface crossover). This is the default.
- 1: Manual MDI - The port behaves as a medium dependent interface (MDI)
- 2: Manual MDIX - The port behaves as a medium dependent interface crossover (MDIX)

#### 5.2.2.5.6 Show Status

Configuration and status of PoE Out (Eth0) and PoE In (Eth1) Ethernet interfaces:

- Eth0 status: Indicates whether the PoE Out Ethernet interface is enabled or disabled.
- Eth0 speed: Speed and duplex mode configured for the PoE Out Ethernet interface. This can be either Auto or manually configured to 10, 100 or 1000 Mbps in either full duplex or half duplex mode.
- Eth0 crossover: The crossover mode for the PoE Out Ethernet interface (MDI, MDIX or Auto).
- Eth0 link: Current status of the PoE Out Ethernet interface (current speed, duplex mode and crossover mode for a link that is up, or down).
- Eth1 speed: Speed and duplex mode configured for the PoE In Ethernet interface. This can be either Auto or manually configured to 10, 100 or 1000 Mbps in either full duplex or half duplex mode.
- Eth1 crossover: The crossover mode for the PoE In Ethernet interface (MDI, MDIX or Auto).
- Eth1 link: Current status of the PoE In Ethernet interface (current speed, duplex mode and crossover mode for a link that is up, or down).

#### 5.2.2.6 Unit Name

Sets up descriptive information about the unit. These settings do not affect unit operation in any way:

- Unit name: Unit's name. Used also as the Monitor program's prompt. Up to 31 printable characters. Default: name.
- System location: Unit's location. Default: location. Up to 34 printable characters.
- Contact person: Person in charge of the unit. Empty by default.



### 5.2.2.7 Change Password

Available only to users with full (administrator) access rights.

Resets user account passwords. Each password must be retyped for confirmation.

- Read-Only Password: Password for the guest account. Default value: public. 6 to 16 printable characters.
- Installer Password: Password for the installer account. Default value: installer. 6 to 16 printable characters.
- Administrator Password: Password for the administrator account. Default value: private. 6 to 16 printable characters.

### 5.2.2.8 Change Console Timeout

The inactivity time interval in minutes after which the Telnet session will be terminated. Allowed range: 1..1000. Default value: 1000.

### 5.2.2.9 Show

Shows information regarding firmware versions, IP configuration, management VLAN, authorized managers, ethernet ports set-up, unit name and console timeout.

## 5.2.3 Site Survey

The Site Survey menu includes the following options:

- [Counters](#)
- [Association Database](#)
- [Logs](#)
- [SNR Display](#)
- [Display scanning list](#)
- [Spectrum Analyzer](#)

### 5.2.3.1 Counters

Manages traffic related counters and statistics related to each port, bridge, service and modulation coding scheme:

- [Display Counters:](#)
- [Reset Counters](#)

#### 5.2.3.1.1 Display Counters:

- [Per-port Statistics](#)
- [Bridge Statistics](#)





- [Service Statistics](#)
- [MCS Counters](#)
- [MCS Statistics](#)

**NOTE!**

- 1 Traffic counters show the accumulated relevant traffic since the last unit or counters reset.
- 2 Where applicable, counters/statistics information is displayed for the following interfaces:
  - » Active Ethernet interfaces: Eth 0 (PoE Out) and Eth 1 (PoE In). An Ethernet interface is active if its link status is up.
  - » Active Wireless interfaces: Sector 1 and/or Sector 3.
  - » Management interface: Internal interface for management traffic.

#### 5.2.3.1.1.1 Per-port Statistics

Displays information regarding network traffic for each active Ethernet and Wireless network interface since the last unit or counters reset.

- Ethernet: For each active (link status is up) Ethernet interface, the following information is displayed:
  - » TX Data Packets: Number of packets sent
  - » TX Bytes: Number of bytes sent
  - » TX Data Packets Dropped: Number of sent packets dropped
  - » RX Data Packets: Number of packets received
  - » RX Bytes: Number of bytes received
  - » RX Data Packets Dropped: Number of received packets dropped
- Sector: For each active Wireless interface (sector), the following information is displayed:
  - » Current frequency: Central frequency for the frequency channel used in the sector. Note that for 40+ MHz bandwidths, this is the central frequency of the 20 MHz control channel, on top of which an additional 20 MHz extension channel is used. (for example, for the 5480 MHz frequency, the sector will use a radio spectrum between 5470 MHz and 5510 MHz).
  - » Current TX Power: Unit's transmission power in dBm for that sector
  - » RX Data Packets: Number of packets received
  - » RX Data Packets Dropped: Number of received data packets which were dropped
  - » RX Duplicated Packets: Number of duplicated packets received. Though these packets were received successfully, the acknowledgement packets sent back did not reach the sender unit, thus determining it to assume an error and re-send.
  - » RX Decrypt Errors: Number of encrypted frames received which could not be decrypted



- » RX CRC Errors: Number of Cyclical Redundancy Checked errored packets received
- » RX PHY Errors: Number of PHY error events (unidentified signals) received over the wireless link
- » TX Data Packets: Number of transmitted data packets
- » TX Data Queue Full: Number of data packets dropped on transmission over the wireless link, because the data queue was full
- » TX Data Dropped: Number of data packets that were dropped at transmission over the wireless link, possibly due to a full queue or excessive retries, or management traffic
- » TX Number of Retransmission: Number of packets retransmitted due to lack of receiving acknowledgement
- » RX Management Packets: Number of received management packets
- » TX Management Packets: Number of transmitted management packets
- » TX Management Dropped: Number of transmitted management packets dropped due to excessive retries
- » TX Beacon: Number of beacons sent over the wireless link
- » TX Beacon Dropped: Number of beacons that were dropped at transmission
- » Air Frame Sent: Number of air frames sent over the wireless link
- » ACK Not received: Number of sent packets for which acknowledgement was not received
- » Received Bytes: Number of bytes received
- » Transmitted Bytes: Number of bytes transmitted
- » Number of Assoc: Number of times the unit associated with another unit
- » Number of Radar Detected: Number of times radar activity was detected on the sector's frequency band. Applicable only for country codes that enforce DFS.

#### 5.2.3.1.1.2 Bridge Statistics

Displays statistics for traffic exchanged inside the unit between its active network interfaces and for traffic that was discarded by each network interface when received:

- Bridge Port Transmitted Packets: Number of packets that were transmitted successfully between the unit's active network interfaces. The source network interfaces are displayed on the left, and the destination network interfaces are displayed above. Each cell in the table indicates the traffic incoming from the interface displayed in the first column which was forwarded to the interface displayed in the table's header.
- Bridge Port Dropped Packets: Number of packets that were dropped at transmission between the unit's active network interfaces. The source network interfaces are displayed on the left, and the



destination network interfaces are displayed above. Each cell in the table indicates the traffic incoming from the interface displayed in the first column which was forwarded to the interface displayed in the table's header.

- Bridge Port Discarded Packets: Number of discarded packets over each active interface, such as dropped data, duplicated data, CRC errored data or PHY errored data.

5.2.3.1.1.3 Service Statistics

Displays traffic statistics in packets and bytes for each of the 4 services that may be defined (see [Services on page 132](#) for additional information about services):

- Inserted Packets: Number of packets received from the Ethernet ports
- Transmitted Packets: Number of packets sent over the Wireless port
- Dropped Packets: Number of packets received from the Ethernet ports which were rejected because the QoS queue buffer was full or any other reason
- Aged Out Packets: Number of aged out packets. Traffic which enters the QoS queue but is not transmitted over the air is dropped after a pre-determined duration. Traffic can age out in the QoS queue because of an outgoing rate which is lower than the incoming rate (such as an egress air rate lower than the ethernet ingress rate) or because data request exceeds the configured MIR.
- Inserted Bytes: Number of bytes received from the Ethernet ports
- Transmitted Bytes: Number of bytes sent over the Wireless port
- Dropped Bytes: Number of bytes received from the Ethernet ports which were rejected because the QoS queue buffer was full or any other reason
- Aged Out Bytes: Number of aged out bytes. Traffic which enters the QoS queue but is not transmitted over the air is dropped after a pre-determined duration. Traffic can age out in the QoS queue because of an outgoing rate which is lower than the incoming rate (such as an egress air rate lower than the ethernet ingress rate) or because data request exceeds the configured MIR.

In addition, the following counter is also displayed:

- Unclassified packets: Number of unclassified packets. Unclassified packets are packets which were not assigned to any service because they did not match any of the configured classifiers. These packets are discarded by the QoS mechanism.

5.2.3.1.1.4 MCS Counters

Displays traffic related counters for each Modulation and Coding Scheme per active sector:



- A "Communication with <MAC\_address>" message above the table indicates the MAC address of the radio card (sector) at the other side of the wireless link. A "No station connected" message above the table indicates that there is not any wireless connection.
- When both sectors are active, two tables are displayed: The first table is for Sector 1 and the second is for Sector 3.

- TX Packets: Number of packets transmitted



- TX Bytes: Number of bytes transmitted
- HW TX Packets Retransmission: Number of packets retransmitted due to a complete lack of acknowledgement from the receiver unit.
- SW TX Packets Retransmission: Number of packets retransmitted due to a partial acknowledgement for an aggregated frame. In this case, the unit's software will handle the retransmission by picking only the specific frames within the aggregated frame that were not acknowledged and resending them.
- RX Packets: Number of packets received
- RX Bytes: Number of bytes received

#### 5.2.3.1.1.5 MCS Statistics

Displays MCS statistics for the last 15 minutes for each active sector:

- Sector: Sector number
- TX Max MCS: Maximum Modulation and Coding Scheme used in the sector for outgoing traffic
- TX Min MCS: Minimum Modulation and Coding Scheme used in the sector for outgoing traffic
- RX Max MCS: Maximum Modulation and Coding Scheme used by incoming traffic
- RX Min MCS: Minimum Modulation and Coding Scheme used by incoming traffic
- TX Last MCS: Latest Modulation and Coding Scheme used in the sector for outgoing traffic
- RX Last MCS: Latest Modulation and Coding Scheme used by incoming traffic

#### 5.2.3.1.2 Reset Counters

Resets all traffic counters to 0.

### 5.2.3.2 Association Database

Displays information regarding currently active radio links. For each radio sector, the following options are available:

- General Info: Lists the associated units. For each of them, the following information is available:
  - » Unit MAC Address: Associated unit's Media Access Control address applicable to the network interface used for the radio link (sector).
  - » MAC Address: Associated unit's Media Access Control address applicable to the network interface used for management.
  - » IP Address: Associated unit's Internet Protocol address used for management.
  - » SNR: Signal-to-Noise Ratio for transmissions incoming from the associated unit. Not available in RB.

**NOTE!**

The SNR measurement is accurate only when receiving data transmissions from the associated unit. You can use a continuous PING to generate data transmission, although a higher amount of continuous data traffic is recommended.

- Services: Lists services set up on the current radio sector (see [Services on page 132](#) for reference on how services work). For each service, the following information is available:

- » Name: Service name
- » Priority: Service priority numbered from 1 to 4, with lower values indicating higher priorities
- » DL MIR: Maximum Information Rate applicable for downlink traffic
- » UL MIR: Maximum Information Rate applicable for uplink traffic

### 5.2.3.3 Logs

The Logs menu enables management of logged events. There are two types of logs:

- System Logs: All events belonging to an enabled group are written to a file in the flash memory. The file can be opened or downloaded using the Web based management interface (see Log report in [Change Configuration System on page 76](#)).

**NOTE!**

Do not leave log reporting enabled for extended periods of time or if it reports exceptionally large quantities of events.

- Session Logs: All events belonging to an enabled group are displayed in the current Telnet session window when they occur.

For each Logs type, the menu offers two options:

- Show: Displays the current settings for different event groups.
- Enable: Select this option to set maximum event level (the higher the event level the lower the event severity) for each events group (Facilities). You will be prompted to select a Facility (or All), and then you will be prompted to select the Log level. Only events with a level up to and including the configured level will be written to file/displayed. Select 8 (None) to disable logging for the selected Facility.

**INFORMATION**

To avoid flooding of the flash memory, Log Level 7 (Debug) is not allowed for System Logs.



By default, all Session logs are disabled (Log level=8). For System Logs, ASSOCIATION, LINK MANAGER, UPLOAD/DOWNLOAD and DFS Facilities are set to Log level 5 (Notice). All other Facilities are set to Log level 8 (None).

### 5.2.3.4 SNR Display

Displays Signal-to-Noise Ratio related information.

- Display combined SNR: For each sector, displays Signal-to-Noise Ratio and Noise Floor combined for both MIMO RF chains.
- Continuous SNR Display ON/OFF: Turns on/off detailed Signal-to-Noise Ratio readings for each RF chain as well as the combined SNR value for all RF chains. Once you type the option number, the values are displayed and refreshed continuously. Press the option number again to stop this behavior.

Listed antenna names correspond to the following physical antenna ports:

- » Ant00: Physical antenna 2. The vertical antenna for an integral antenna, ANT 2 for a detached antenna serving sector 1 or ANT 6 for a detached antenna serving sector 3.
- » Ant01: Physical antenna 1. The horizontal antenna for an integral antenna, ANT 1 for a detached antenna serving sector 1 or ANT 5 for a detached antenna serving sector 3.

When operating on the 40+ MHz bandwidth (20MHz control channel + 20MHz extension channel), the values of Ant00 and Ant01 are for the control channel(s). The SNR per antenna values for the extension channel are also displayed:

- » Ant10: Extension channel for physical antenna 2.
- » Ant11: Extension channel for physical antenna 1.

#### NOTE!



The SNR measurement is accurate only when receiving data transmissions from the associated unit. You can use a continuous PING to generate data transmission, although a higher amount of continuous data traffic is recommended.

- Continuous NF Display ON/OFF: Turns on/off detailed noise floor readings for each antenna. Once you type the option number, the values are displayed and refreshed continuously. Press the option number again to stop this behavior.

Listed antenna names correspond to the same physical antenna ports/RF chain as described above for Continuous SNR Display.

#### INFORMATION



Once a continuous display is activated, it will keep displaying SNR/NF values until it is stopped from the SNR Display menu. The menus are still active however, which means that both SNR and NF continuous displays can be activated simultaneously and that you can navigate the menu hierarchy while the continuous displays work. In such a case, you will have to navigate back to the SNR Display menu to stop the continuous displays.



### 5.2.3.5 Display scanning list

The Display Scanning List option is applicable only for an RB unit, displaying the following details for each unit it identified as being able to communicate with during initial scanning:

- BSSID (MAC address of the wireless interface. If the other unit is a BU-600, this is the MAC address of sector 1)
- ESSID
- Frequency
- SNR
- Encryption status

### 5.2.3.6 Spectrum Analyzer

The Spectrum Analyzer functionality enables radio spectrum analysis and optimal operating frequencies selection. The analyzer collects information regarding radio impulses detected on each frequency channel included in Selected Channel list, using a filter equal to the configured Bandwidth (see [Link Parameters on page 121](#) for details).

#### NOTE!



In the current release spectrum analysis is performed only on Sector 1 (since both antennas are collocated and aimed towards the same direction, the results are applicable also for the second sector). If Sector 1 is not active the Spectrum Analyzer cannot be activated (a suitable warning message will be displayed).

for dual sector operation it is necessary to disable Sector 3 during spectrum analysis.

It is recommend to perform the spectrum analysis on both BU and RB simultaneously to avoid identifying signals from the remote partner.

#### 5.2.3.6.1 Configure Scan Parameters

Sets up the spectrum analyzer's scanning parameters:

- Channel Scan Time: Duration in seconds spent scanning for each frequency channel. Allowed range: 2..120. Default value: 5.
- Noise Floor Control: Noise Floor value is used for estimating SNR values and for decisions on existence of signals in the channel. The Noise Floor Control determines the method used for calculation the Noise Floor Value:
  - » Automatic (default): Noise floor is selected automatically by the unit according to the configuration of the Noise Floor parameter (see [Performance on page 125](#))
  - » Forced Value: Noise floor is enforced by the user (see below)
- Noise Floor Value: Noise floor value in dB applied during spectrum analysis if Noise Floor Control is set to Forced Value. Allowed range: -120..-75. Default value: -85. It is advisable to change it to a lower value (but still above -95) before using forced values for links with low RSSI.



### 5.2.3.6.2 Start/Stop Spectrum Analyzer

#### CAUTION



Activating the Spectrum Analyzer disables any radio communication. During the scan, connectivity to any associated unit will be lost. If the unit is managed remotely over the air, it will be reachable only after the scan is completed and the link is reestablished.

#### NOTE!



On country codes without DFS radar detection, RB units perform active scans when attempting to associate to BUs. Therefore, if an active RB is pointed at the BU while the BU is performing spectrum analysis, the RB's Probe request signals will show up in the results table on all frequencies the RB is configured to work on. For accurate results in these situations, it is recommended to start the Spectrum Analyzer simultaneously on the RB and BU.

- Stop: Interrupts the radio spectrum scan if one is currently running. The scanning results table will be incomplete.
- Start: Starts the radio spectrum scan.

### 5.2.3.6.3 Show Results

Displays spectrum analysis scanning results:

- Show 5 MHz Results: Displays results of the last spectrum scan for the corresponding bandwidth. Note that bandwidth of 5 MHz is not applicable for current release.
- Show 10 MHz Results: Displays results of the last spectrum scan for the corresponding bandwidth. Note that bandwidth of 10 MHz is not applicable for current release.
- Show 20 MHz Results: Displays results of the last spectrum scan for the corresponding bandwidth.
- Show 40 MHz Results: Displays results of the last spectrum scan for the corresponding bandwidth.
- Show All Results: Displays last scanning results for all bandwidths.

Results are populated while the scan is ongoing. If the results are displayed before the scan is over or if the scan was manually interrupted by the user, the displayed results will be incomplete.

The results tables contain the following information for each frequency channel scanned:

- Signal: This is an indicator for unidentified interference.
  - » Count: The number of signals (excluding OFDM frames with the correct bandwidth) in the channel.
  - » SNR: The average SNR in dB of signals (excluding OFDM frames with the correct bandwidth) in the channel.
  - » MaxSNR: The maximum SNR in dB of signals (excluding OFDM frames with the correct bandwidth) in the channel.
  - » Width: The average duration in microseconds of signals (excluding OFDM frames with the correct bandwidth) in the channel.





- OFDM: This is an indicator for data impulses identified as WiFi signals. These signals are less problematic due to the CSMA/CA channel access method which is almost always implemented by WiFi equipment. With CSMA/CA, transmitting nodes can work together in an attempt to share the same frequency channel. Consequently, this type of interference is more predictable and somewhat manageable by the unit.

- » Frames: The number of OFDM frames with the correct bandwidth detected in the channel.

- » SNR: The average SNR in dB of OFDM frames received in the channel.

- » MaxSNR: The maximum SNR in dB of OFDM frames received in the channel.

- Noise: Noise floor used during the scan.

When scanning adjacent overlapping channels, such as 40 MHz channels which are 5 MHz apart, the same interference may show up multiple times. Thus, typical WiFi equipment signals (including those from other BreezeULTRA units) may show up as a mix of OFDM interferences on the working frequency and Signal interferences on adjacent frequencies.

## 5.2.4 Radio

This menu sets radio parameters. All radio sectors are listed and available for configuration in the menu:

- Sector 1
- Sector 3
- [Country Code](#)
- [Radio Interface Configuration](#)
- [Show](#)

### 5.2.4.1 Sector 1/Sector 3

The unit includes two radio cards that can support two sectors: Sector 1 and Sector 3.

In a unit configured as BU/RB-600 (provided this unit type is supported by the available license), the Radio Interface Configuration parameter must be set to Dual Sector and the Status of both sectors must be set to Active. In this case downlink data (from BU to RB) is transferred through Sector 1 (a small amount of management messages from BU to RB is transmitted through Sector 3), and uplink data (from RB to BU) is transferred through Sector 3 (a small amount of management messages from RB to BU is transmitted through Sector 1). Should one of the sectors fail, the units will revert automatically to single sector operation transferring both downlink and uplink data in the available sector. Following recovery of the failed sector dual sector operation will be resumed automatically.

In a dual sector system, the BU will accept association of two links only if both are identified as belonging to the same RB (same unit's MAC address). An RB can only associate with a single BU.

In a unit configured to operate as a BU/RB-350, the Radio Interface Configuration parameter must be set to either Sector 1 or Sector 3. Only a single sector (either Sector 1 or Sector 3) can be enabled, according



to the option configured for the Radio Interface Configuration parameter. The Status of the enabled sector must be set to Active, and the Status of the second sector must be set to Inactive.

**NOTE!**

The following procedure should be followed for switching from BU/RB-350 Sector 1 to BU/RB-350 Sector 3 (or vice versa):

- 1 Set on both units Radio Interface Configuration = Sector 3 (see [Radio Interface Configuration on page 132](#)).
- 2 Set on both units Sector 3 Status = Active (see [Sector Parameters on page 119](#)).
- 3 Verify that the same ESSID is configured for Sector 3 in both units (see [Link Parameters on page 121](#)).
- 4 Reset first the remote unit then the local one. At this point both sectors will be activated, and a link should be established on Sector 3.
- 5 Set Sector 1 Status = Inactive on both units.

The Sector 1 and Sector 3 menus include the following options:

- [Sector Configuration](#)
- [Disassociate](#)

#### 5.2.4.1.1 Sector Configuration

For each sector, you have the following options:

- [Sector Parameters](#)
- [Link Parameters](#)
- [Performance](#)
- [Show](#)

##### 5.2.4.1.1.1 Sector Parameters

The Sector Parameters submenu includes the following options:

- **Type:** Displayed the Actual and Configured unit type (a change in unit's Type is applied after reset). To simplify logistic operations, all units are supplied as Base Units. When necessary, the functionality of each unit can be changed from Base Unit to Remote Bridge, and vice versa. For a Point-to-Point link, one end should be set up as BU (Bridge Unit) and the other end as RB (Remote Bridge).

The available options are:

- » BU-350
- » RB-350
- » BU-600
- » RB-600



The BU-600 and RB-600 options are not applicable for a unit that was received from the factory as a BU-350 and was not upgraded to BU/RB-600.

An attempt to change the Type from BU/RB-600 to BU/RB-350 will be rejected if the Radio Interface Configuration (see [Radio Interface Configuration on page 132](#)) is set to Dual Sector.

A change in the Type parameter will be applied after the next reset.

**NOTE!**

The Type must be set to the same option in both sectors.

**CAUTION**

If you need to change the functionality of the units in an already deployed link from BU to RB or vice versa, change first the functionality of the remote unit and reset it to apply the change (otherwise you will lose connectivity to the remote unit).

- **Name:** Prompts you to enter the Sector Name and Sector Info. These optional parameters are for information only and do not affect sector operation. The Sector Name can be up to 31 characters long (the defaults are Sector 1/Sector 3) and the Sector Info can be up to 127 characters long (the default is null).
- **Status:** Activates/deactivates the sector. Type 1 to activate it or 2 to deactivate it. Only active sectors can form a radio link. Inactive sectors neither transmit nor receive any signals. On country codes which enforce DFS, deactivating and reactivating a sector resets the DFS information and restarts Channel Availability Check.

The default value for Sector 1: Active.

The default value for Sector 3: Active for a BU/RB-600, Inactive for a BU/RB-350.

**NOTE!**

In a BU/RB-600 operating in Dual Sector mode the Status of both sectors must be set to Active.

In a BU/RB-350, the Status of one sector must be set to Active, according to the option selected for the Radio Interface Configuration parameter. The Status of the second sector must be set to Inactive.

**CAUTION**

Deactivating all available sectors of a remote unit (via the wireless link) will result in loss of connectivity to the unit.

- **Antenna Gain:** Applicable only for sectors with a detached antenna. Prompts you to enter the gain in dBi and an optional description for the external antenna used for the sector. The Antenna Gain parameter defines the net gain of a detached antenna. The configured gain should take into account the attenuation of the cable connecting the antenna to the unit. The Antenna Gain is important especially in countries where there is a limit on the maximum EIRP allowed for the unit. The maximum allowed value for the Transmit Power parameters cannot exceed the value of the Regulation Max EIRP



minus Antenna Gain, where the Regulation Max EIRP is defined in the selected Country Code. The lower limit for the Antenna Gain parameter is 0 dBi (the default). The upper limit for the Antenna Gain in dBi is the Regulation Max EIRP - 4 (since the minimum Tx Power is 4 dBm), up to a maximum of 36 (dBi). In Country Codes with several sub-bands where there are different Regulation Max EIRP requirements per sub-band, the lowest Regulation Max EIRP will apply for all sub-bands (including sub-bands for which there is no maximum EIRP limitation). For details on the maximum antenna gain allowed for each Country Code refer to the latest Country Codes document.

Note that certain Country Codes cannot be used in units with an integral antenna having a fixed gain of 23 dBi.

With certain Country Codes you may have to insert an appropriate RF attenuation (or a longer RF cable) for compliance with relevant regulations when using the standard 23 or 28 dBi detached antennas.

When both sectors are enabled, the gain of both antennas must be the same.

The antenna description has a maximum length of 127 characters (the default is none).

■ Show: Select this option to view the current values of the following:

- » Actual Type
- » Configured Type
- » Name
- » Status
- » Antenna gain (23 dBi for a sector using an integral antenna)
- » Antenna description (Internal antenna for a sector using an integral antenna)

#### 5.2.4.1.1.2 Link Parameters

The Link Parameters submenu includes the following options:

- Channel Bandwidth: Sets channel bandwidths used by units within the sector. In the current release available options are 20 MHz and 40+ MHz. The default is 40+ MHz.

**NOTE!**

- The same Bandwidth must be used on both sides of a wireless link.
- If both sectors are enabled (Dual Sector operation), the same Channel Bandwidth must be configured for both sectors.
- To change the bandwidth of an existing single link (Single Sector operation): Change the bandwidth of the remote side before changing the bandwidth in the local unit.
- To change the bandwidths of both links (Dual Sector operation):
  1. Change the bandwidth of one of the links in the remote unit.
  2. Change the bandwidth of the link in the local unit.
  3. Repeat the same process for the second link.
- When Spectrum Analysis is active, the Channel Bandwidth cannot be modified.
- A change in Channel Bandwidth may cause an automatic modification of the frequency to the default frequency if the current frequency is not supported for the new bandwidth according to the current Country Code.

- Channel List: The Channel List menu enables configuring the radio center frequencies that can be used in the sector. Note that for 40+ MHz bandwidths, the central frequency is the center of the 20 MHz control channel, on top of which an additional 20 MHz extension channel is used. So, for a 5480 MHz frequency for instance, the sector will use a radio spectrum between 5470 MHz and 5510 MHz. Valid frequencies include:

For a Bandwidth of 20 MHz: In each sub-band supported by the Country Code, frequencies in the range from Minimum Frequency plus 10 MHz to Maximum Frequency minus 10 MHz, using a 5 MHz resolution.

For a Bandwidth of 40+ MHz: In each sub-band supported by the Country Code, frequencies in the range from Minimum Frequency plus 10 MHz to Maximum Frequency minus 30 MHz, using a 5 MHz resolution.

- » Show Selected List: Lists the radio center frequencies that can be used by the unit to associate within the sector. DFS Status per frequency indicates whether the channel is considered as free or as unavailable (if DFS is required by the Country Code) or whether DFS is not required (Non DFS). The frequencies in the Selected List are used for:

- ◇ Spectrum Analyzer
- ◇ DFS channel changes
- ◇ In RB - scanning (searching for a BU)

Available frequency list (see "Display available list: [Display available list: Lists all available radio center frequencies and additional parameters allowed by the currently enabled Country Code for the Bandwidth used when the Country Code was activated: on page 123](#)) is populated according to the limitations of the current Country Code. All frequencies contained in the Available frequency list are enabled by default when a new Country Code is selected.

**NOTE!**

The Selected List is not modified after changing the bandwidth. If the configured bandwidth in effect when the current Country Code has been applied was 40+ MHz, the list will not include certain frequencies that are actually valid for a bandwidth of 20 MHz. If you change the bandwidth to 20 MHz and want to configure a valid frequency that is not included in the current Selected List, you must add it to the list by using one of the available methods - Select All or Add Range (see below).

- » **Select All:** Adds all radio center frequencies allowed by the currently enabled Country code for any bandwidth to the selected list of frequencies. Note that this includes frequencies that are actually not allowed for the bandwidths supported by the current release.
- » **Add Range:** Adds a range of radio center frequencies to the selected list of frequencies. You may add a range (or a single frequency) that includes any frequencies allowed by the current Country Code for any bandwidth, including frequencies that are actually not allowed for the bandwidths supported by the current release.

To define the range, you are first prompted for the Start Frequency in MHz and then for the End Frequency in MHz.

- » **Remove Range:** Removes a range of radio center frequencies from the selected list of frequencies. In order to define the range, you are first prompted for the start frequency in MHz and then for the End Frequency in MHz.
- » **Set Current Frequency:** Applicable only when the sector type is set to BU. Manually enter a specific radio center frequency in MHz that the unit will use in the sector. It must be a frequency included in the Selected List that is indicated on the Available List as available for the current bandwidth. If DFS is used, this is the first frequency to be checked by the DFS mechanism, and actual frequency (current Frequency in relevant Show menus) may differ from the configured Frequency). If the sector type is RB, the unit automatically scans all channels in the selected list.

**NOTE!**

If both sectors are enabled (Dual Sector operation), the following limitations apply:

- For a 20 MHz bandwidth: The minimum distance between the frequencies configured for Sector 1 and Sector 3 is 40 MHz.
- For a 40+ MHz bandwidth: The minimum distance between the frequencies configured for Sector 1 and Sector 3 is 60 MHz.

- » **Display available list:** Lists all available radio center frequencies and additional parameters allowed by the currently enabled Country Code for the Bandwidth used when the Country Code was activated:
  - ◇ Frequency: Radio center frequency in MHz
  - ◇ Max TX Power 5/10/20/40: Maximum Tx power or maximum EIRP (if maximum EIRP is limited by the Country Code used) in dBm allowed when using the specified frequency with a



5/10/20/40 MHz channel (5 and 10 MHz bandwidths are not supported by the current release). "na" means that the frequency is not in the allowed range and cannot be used.

- ◇ DFS: Indicates if Dynamic Frequency Selection is required for the specified frequency according to the currently selected Country Code (YES/NO)
- ESSID: Sets the Extended Service Set IDentifier used in the sector's wireless network. The ESSID is a string used to identify a wireless network and to prevent the unintentional merging of two wireless networks in the same area. Only sectors using the same ESSID are allowed to associate. The ESSID can have 1 to 32 characters (a null ESSID is forbidden). Default value: ESSID1 for Sector 1, ESSID3 for Sector 3.

**NOTE!**

ESSID must be unique in the wireless network. If both sectors of the same unit are enabled (Dual Sector operation), a unique ESSID must be configured for each sector.

- ATPC: Applicable only for BU. The Automatic Transmit Power Control (ATPC) algorithm simplifies the installation process and ensures optimal performance while minimizing interference to other units. This is achieved by automatically adjusting the power level transmitted by the RB according to the actual level at which it is received by the BU. ATPC is enabled by default with an optimal SNR of 28 dB.

When selected, the ATPC option prompts for the following information:

- » ATPC: Type 1 to enable ATPC and 2 to disable ATPC
- » Optimal SNR: Sets a reference SNR level for optimal performance. This is the SNR level at which you want the RB to be received at the BU. Allowed range: 4..60 dB. The default is 28 dB.

**NOTE!**

If both sectors are enabled (Dual Sector operation), the same ATPC settings should be configured for both sectors.

- TX Power: Sets the unit's transmit power at the antenna port in dBm. The allowed range starts from 4 dBm up to:
  - » If the Country Code being used does not impose limitations on maximum EIRP: 24 dBm
  - » If maximum allowed EIRP is limited by the Country Code being used: the difference between the maximum allowed EIRP (dBm) and the configured Antenna Gain (dBi).The default is the highest allowed value.
- Link Distance: Applicable only for BU (RB will learn it from the BU). Sets the maximum distance to an associated unit in km. The purpose is to compensate for the delays introduced by propagation of the radio signals. The allowed range is 0 to 54Km. It is recommend to configure the parameter to a value slightly higher than the straight line distance between the units, as signal may travel via reflections from objects in between.

**NOTE!**

If both sectors are enabled (Dual Sector operation), the same Distance should be configured for both sectors.

- Encryption: Sets encryption for the wireless traffic. When selected, you are prompted for the following information:
  - » Algorithm: Defines whether to use encryption algorithm: Disabled (the default) or AES.
  - » Key: Type the encryption key used by the AES encryption algorithm when enabled. The key must be a 16 characters long string. The default is a string of 16 zeros. To enable/disable the encryption algorithm without rewriting the key each time, press **Esc** when you are prompted for the key.
- Show: Select this option to view the current values of the following:
  - » Bandwidth
  - » Selected List - A table with all selected frequencies and DFS status for each frequency
  - » Configured Frequency
  - » Current Frequency
  - » ESSID
  - » ATPC
  - » Configured TX Power
  - » Current TX Power
  - » Encryption

#### 5.2.4.1.1.3 Performance

The Performance submenu includes the following options:

- Rate Control: Sets modulation and guard interval related parameters. On selection, you are prompted for the following information:
  - » Multi Rate: The multi rate algorithm changes dynamically the modulation, coding scheme and number of spatial streams (see available combinations in [Sensitivity and Max Tx Power per Modulation and Coding Scheme on page 5](#)) according to link conditions. The purpose is to increase the probability of using the maximum possible modulation level at any given moment. Although the algorithm avoids using modulation levels that are too high for the prevailing link





conditions, it might be better under certain conditions to limit the use of higher modulation levels. Type one of the following values:

- ◇ 1: Enables the Multi Rate algorithm (default)
  - ◇ 2: Disables the Multi Rate algorithm
- » Maximum Rate: The highest modulation level that may be used by the multi rate algorithm. Press **Tab** to see the available MCS options (see also [Sensitivity and Max Tx Power per Modulation and Coding Scheme on page 5](#)). When Multi Rate is disabled this is the fixed transmission rate. Default value: MCS\_15.
- » Short Guard Interval: The Short Guard Interval mechanism decreases the inter-symbol guard interval from the standard 800ns (long GI) to 400ns (short GI), thus reducing overhead and making more efficient use of the available air time, ultimately increasing data throughput. However, the Short Guard Interval is more prone to inter-symbol interference caused by propagation delays, echoes and reflections and therefore tends to decrease link reliability in multipath propagation or interfered environments. This parameter is applicable only for a bandwidth of 40+ MHz. Type one of the following values:
- ◇ 1: Enables the Short Guard Interval mechanism (default)
  - ◇ 2: Disables the Short Guard Interval mechanism
- PHY Aggregation: The PHY aggregation mechanism enables linking several data frames into a single frame for transmission to the wireless link. Data packets in the unit's queue can be accumulated before the concatenated frame is transmitted to the wireless medium.
- When selected, the PHY aggregation option prompts for the following information:
- » Configuration: Type one of the following values:
- ◇ 1: Enables the PHY aggregation mechanism (Default)
  - ◇ 2: Disables the PHY aggregation mechanism
- » Maximum Duration: Sets the maximum duration of the PHY aggregation in ms. Allowed range: 1..10 ms. Default value: 8.
- Contention Window: The Contention Window mechanism determines the time that a unit waits after it concludes that there are no detectable transmissions by other units before it attempts to transmit. The BreezeULTRA system uses a special back-off algorithm based on detecting the presence of a carrier signal to estimate the activity of another unit. The purpose is to minimize collisions in the wireless medium resulting from multiple units attempting to transmit at the same time. The system uses an exponential Back-off algorithm to resolve contention between two units that want to access the wireless medium. The method requires each unit to choose a random number N between 0 and a given number C each time it wants to access the medium. The unit will attempt to access the medium only after a time equal to a certain minimum plus N time slots, always checking if another unit has accessed the medium before. Each time the unit tries to transmit and a collision occurs the maximum number C used for the random number selection mechanism will be increased to the next available



value, up to the Maximum value (see below). The available values are 7, 15, 31, 63, 127, 255, 511 and 1023.

When selected, the Contention Window option prompts for the following information:

- » Minimum: Sets the first value of C to be used in the back-off algorithm. Allowed range: 7, 15, 31, 63, 127, 255, 511, 1023. Default value: 7.
  - » Maximum: Sets the highest value of C to be used in the back-off algorithm. Allowed range: 7, 15, 31, 63, 127, 255, 511, 1023. Cannot be lower than the value configured for the Minimum parameter. Default value: 63.
- Retries: Sets the maximum number of times that an unacknowledged frame is retransmitted by the unit before it is dropped. Allowed range: from 0 (no retries) to 9. Default value: 9.
  - Noise floor: The Noise Floor calculation mechanism incorporated in the units is used for estimating the level of the noise floor. This value is used for estimating SNR values and for decisions on existence of signals in the channel.

Typically, the expected noise floor level is -95 +/-2 dBm.

The default calculation mode is Fully Automatic, using only the built-in mechanism. If you experience problems in the wireless link such as excessively long association process or very low throughput, it may be caused by errors in noise floor calculation. In this case, it is recommended to perform a Spectrum Analysis and view the Average Noise Floor values. If the calculated Noise Floor is lower by more than 5 dB from the expected value, it is recommended to change the calculation mode to Automatic with Minimum Value, using the expected value as the minimum (Forced Value).

Note that if the SNR of received signals is very low (typically below 10 dB), it is recommended to maintain the default calculation mode (Fully Automatic). Changing the calculation mode to Automatic with Minimum Value may result in loss of connectivity with units for which the calculated SNR before the change was relatively low.

When selected, the Noise Floor option prompts for the following information:

- » Calculation Mode: The Calculation Mode defines the method used for calculation the Noise Floor value to be used by the device for estimating the quality of received signals. The available options are:
  - ◇ Fully Automatic: According to the built-in noise floor calculation mechanism.
  - ◇ Automatic with Minimum Value: If the calculated Noise Floor using the built-in mechanism is higher than the value configured for the Forced Value parameter, the calculated value will be used. Otherwise, the Forced Value will be used.
  - ◇ Forced: The Noise Floor value is set manually to the value configured for the Forced Value parameter (see below). Typically this mode should be used only for special testing purposes.



The default option is Fully Automatic.

- » Forced Value: The Forced Value parameter enables configuring the Noise Floor to be used if the selected Calculation Mode is Forced. This is also the minimum value to be used if the selected Calculation Mode is Automatic with Minimum Value. If you decided to change the calculation mode to Automatic with Minimum Value and you still experience problems in the link (long association time, exceptionally low throughput), try to improve it by increasing the configured Forced Value. The available range is from -120 to -75 (dBm). The default value is -85.
- » Measurement count: NF calibration is performed repeatedly (currently at an interval of 30 seconds). For a given number of times, the device records the input signal in silence conditions. The minimum of the recorded values is the NF value. The number of measurements is defined by the Measurements Count parameter. The range is from 0 to 7: If the measurements count is 0, the device will perform 8 measurements. If the count is  $N > 0$ , the device will perform  $512 \times N$  measurements. The default is 0.
- TX Opportunity/Burst Duration: Not applicable for current release.
- Show: Select this option to view the current values of the following:
  - » Rate Control:
    - ◇ Multi Rate
    - ◇ Maximum Rate - SNR Based
    - ◇ Short Guard Interval
  - » PHY Aggregation:
    - ◇ Configuration
    - ◇ Maximum Duration
  - » Contention Window:
    - ◇ Minimum
    - ◇ Maximum
  - » Retries
  - » Noise Floor:
    - ◇ Calculation mode
    - ◇ Forced value
    - ◇ Measurements count

#### 5.2.4.1.1.4 Show

Displays all sector related information



#### 5.2.4.1.2 Disassociate

Disassociates the sector from the active radio link. A confirmation is required before disassociation.

#### 5.2.4.2 Country Code

Country codes are sets of radio limitations such as maximum EIRP, available bandwidths, available channels etc. applicable under various jurisdictions. During commissioning, the unit's country code must be set in accordance to the relevant local regulations such as FCC, ETSI, etc.

##### CAUTION



It is the responsibility of the administrator to verify that the selected Country Code, and usable frequencies within the selected Country Code, are in accordance with relevant local regulations.

The default country code is 5.4 GHz Universal (except to units supplied with a "locked" Country Code as described below).

To fully support certain local regulations, certain Country Codes belong to a "locked" group. The Country Code of a unit using a "locked" Country Code can be changed only to another Country Code belonging to the same group (or cannot be changed if the group contains a single Country Code).

If the unit was not shipped from factory with a Country Code belonging to a "locked" group, you can cancel the lock by applying full factory defaults.

The current "locked" groups are:

##### A FCC Country Codes

The following FCC Country Codes comprise a "locked" group:

- » FCC 5.4 GHz (the default for "FCC" units)
- » FCC 5.8 GHz P2P
- » FCC Dual Band

The Country Code of a unit set to any of these Country Codes can be changed only to a Country Code belonging to this group.

##### B India Country Code

The 5.8 GHz India Country Code is "locked". The Country Code of a unit set to 5.8 GHz India Country Code (the default for "India" units) cannot be changed.

The parameters that are affected by the selected Country Code are:

- Supported frequency range. Some Country Codes may support two or more sub-bands, where some parameters may differ among the supported sub-bands.
- Maximum EIRP allowed by regulations (or no limitation). If maximum allowed EIRP is limited, it sets the upper limit for Tx Power + Antenna Gain. When using a Country Code in which maximum



allowed EIRP is limited, the upper limit for the Antenna Gain parameter (in dBi) is the Regulation Max EIRP - 4 (since the minimum Tx Power is 4 dBm), and the upper limit for the Tx Power parameter (in dB) is Regulation Max EIRP - Antenna Gain.

In Country Codes with several sub-bands where there are different Regulation Max EIRP requirements per sub-band, the lowest Regulation Max EIRP will apply for all sub-bands (including sub-band for which there is no maximum EIRP limitation).

An attempt to change the selected Country Code to a Country Code in which the Regulation Max EIRP -4 is lower than the currently configured Antenna Gain will be rejected. This applies to both sectors, even if one of them is not used (In a device operating as a BU/RB-350 using Sector 1, an attempt to change the selected Country Code will be rejected if the value configured for the Antenna Gain of Sector 3 is too high and does not meet the above limitation, even if the configured value for the Antenna Gain of Sector 1 is configured to an acceptable value).

- Required Dynamic Frequency Selection (DFS) algorithm. In certain regions there are radar systems operating in the 5 GHz band. Applicable regulations dictates that wireless systems operating in these bands shall not interfere with the operation of the radar systems. This means that the wireless system must be able to automatically detect the presence of radar signals and avoid transmissions on frequencies used by radar systems in its vicinity. The Dynamic Frequency Selection (DFS) mechanism is based on monitoring of the frequency being used and automatic switching to a radar-free frequency upon detection of radar activity on the current frequency. If radar was detected on any frequency, it will be marked as Unavailable and will not be tested again for a period of 30 minutes (in a dual sector system, a frequency marked as unavailable on any sector will be marked as unavailable also on the other sector). The test for radar activity is performed according to the applicable standards (ETSI or FCC).

If a radar is detected by the BU it shuts down data transmission in the shortest possible time and starts looking for a radar free channel. RB will enter passive scanning once it loses the BU's beacons.

In systems using FCC DFS the RB does not perform radar detection. In system using ETSI DFS, also the RB performs radar detection. if the RB detects radar it informs the BU that radar was detected, shuts down data transmission and enters passive scanning.

**INFORMATION**

The list of Country Codes includes also Test and NF\_Calib Country Codes. These are special Country Codes used during production or special testing by Alvarion's experts that should not be used for regular operation. additional Country Codes not included in above table are reserved for future releases and should not be used.

**CAUTION**

If due to either restrictions imposed by local regulations or any other reason you cannot use the entire frequency band supported by the selected Country Code, you should manually set the usable frequencies, excluding all unwanted frequencies, using the Channel List option (see "Channel List" on page 122).

**INFORMATION**

For more details on Country Codes and relevant limitations refer to the relevant Country Codes document.

### 5.2.4.2.1 Select Country Code

Type in a country code name to apply it. To display all the available country codes use the Display Country List option (see [Display Country List on page 132](#)). Default value: 5.4 GHz Universal (Except to "FCC" and "India" units).

An attempt to change the Country Code to a Country Code in which the Regulation Max EIRP -4 is lower than the currently configured Antenna Gain will be rejected. This applies to both sectors, even if one of them is not used (In a device operating as a BU/RB-350 using Sector 1, an attempt to change the selected Country Code will be rejected if the value configured for the Antenna Gain of Sector 3 is too high and does not meet the above limitation, even if the configured value for the Antenna Gain of Sector 1 is configured to an acceptable value). Note that due to this limitation certain Country Codes cannot be used in units with an integral antenna, having a fixed gain of 23 dBi.

**CAUTION**

Change of the country code is applied after reboot only.

### 5.2.4.2.2 Display Current Country Information

Lists all available radio center frequencies and additional parameters allowed by the currently enabled Country Code:

- Frequency: Radio center frequency in MHz
- Max power TX 5: Maximum Tx power (24 if there is no EIRP limitation) or maximum EIRP (if maximum EIRP for the specific frequency is limited by the Country Code used) in dBm allowed when using a 5 MHz channel (5 MHz bandwidth is not applicable for the current release). "na" means that the frequency is not in allowed range.
- Max power TX 10: Maximum Tx power (24 if there is no EIRP limitation) or maximum EIRP (if maximum EIRP for the specific frequency is limited by the Country Code used) in dBm allowed when using a 10 MHz channel (10 MHz bandwidth is not applicable for the current release). "na" means that the frequency is not in allowed range.
- Max power TX 20: Maximum Tx power (24 if there is no EIRP limitation) or maximum EIRP (if maximum EIRP for the specific frequency is limited by the Country Code used) in dBm allowed when using a 20 MHz channel. "na" means that the frequency is not in allowed range.
- Max power TX 40: Maximum Tx power (24 if there is no EIRP limitation) or maximum EIRP (if maximum EIRP for the specific frequency is limited by the Country Code used) in dBm allowed when using a 40 MHz channel. "na" means that the frequency is not in allowed range.



- DFS: Indicates if DFS (Dynamic Frequency Selection) is required for the specific frequency by relevant regulations (YES/NO)

#### 5.2.4.2.3 Display Country List

Lists all available country codes and their corresponding country names.

### 5.2.4.3 Radio Interface Configuration

The Radio Interface Configuration menu enables viewing and modifying the Interface Selection option. The available values are Sector 1, Sector 3, and Dual Sector.

The default for BU/RB-350 is Sector 1. This applies also to a BU/RB-350 that was upgraded to BU/RB-600. For a unit delivered from factory as BU/RB-600 the default is Dual Sector.

If the Type in Sector 1 is BU/RB-350, selection of the Dual Sector option will be rejected.

#### 5.2.4.4 Show

Displays sectors and country code related information

### 5.2.5 Services

#### 5.2.5.1 Introduction to Services

Services allow you to filter traffic and apply quality of service (QoS) to forwarded packets that meet certain criteria. Specific sets of parameters such as classifiers, Maximum Information Rate (MIR) and VLAN tagging are defined as Service Profiles. Service Profiles are then applied to the service's uplink and downlink traffic and each service receives a priority level for transmission to the wireless link. In RB units that learn the services from the BU during association the services can only be viewed (in RB units services cannot be edited or deleted).

#### NOTE!



Services configured in the BU are learned by the RB during association. In a single sector link use the Disassociate option (see [Disassociate on page 129](#)) on any side to update the services in the RB during re-association. In a dual sector link reset one of the units to achieve re-association on both sectors.

The following entities are used to define the services in BreezeULTRA:

- Service Profile: Defines the QoS and VLAN tagging parameters for the traffic which matches corresponding Classifiers. There can be up to four Classifiers Groups. Between the Classifiers in the same Classifiers Group the logical operation is "AND"; between the Classifiers Groups the logical operation is "OR".
- Classifier: Define the rules for traffic classification.
- Classifiers Group: Groups up to two Classifiers. The logical operation between the Classifiers is "AND".
- Service Group: Defines transmission priority for traffic associated with defined Service Profiles.



## 5.2.5.2 Service Profiles

### 5.2.5.2.1 Introduction to Service Profiles

A Service Profile comprises the following components:

- **Name:** The unique name of the Service Profile. A string of up to 16 characters. A unique name other than an empty string should be defined.
- **MIR:** The Maximum Information Rate is the maximum data rate available for transmissions of data packets assigned to the relevant Service Group, thus limiting throughput to a value lower than or equal to the maximum supported by the unit. The MIR values indicate the achievable net throughput for data applications. The allowed range is from 256 to 300000 Kbps.



the actual data rate is limited by the lowest of the following:

- Configured MIR
- Data transfer capacity of the available phy rates

- **VLAN Type:** Defines whether the Service Profile applies IEEE 802.1Q based VLAN tagging:
  - » Transparent: VLAN tagging disabled
  - » Tagging: VLAN tagging enabled

If you enable VLAN tagging, you will also be prompted to configure the VLAN ID and VLAN Priority:

- **VLAN ID:** The VLAN ID used for VLAN tagging. Allowed range: 1..4094.
- **VLAN Priority:** The 802.1p based Priority Code Point used for VLAN tagging. Allowed range 0..7.
- **Classifier Groups and Classifiers:** The type of traffic the Service Profile is applied to is defined by Classifiers. Classifiers are defined in Classifier Groups. Each Service Profile can have up to 4 Classifier Groups and each Classifier Group can have either 1 or 2 Classifiers. Classifiers in the same Classifier Group are linked by the logical AND operator. Classifier Groups in the same Service Profile are linked between them by the logical OR operator. Thus, complex criteria of up to 8 classifiers can be defined. The following types of classifiers are available:

Table 5-3: Classifiers

| Type            | Description                                                                                                                                     | Allowed Range   |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Any             | Any type of traffic (all traffic will pass)                                                                                                     |                 |
| ETH Type        | Traffic with a matching EtherType frame field                                                                                                   | 0x0600..0xFFFFE |
| PPPoE           | Traffic using the Point-to-Point Protocol over Ethernet network protocol                                                                        |                 |
| UDP Port Source | User Datagram Protocol traffic using the specified source port number(s). This Classifier supports either an individual value or a value range. | 0..65535        |





Table 5-3: Classifiers (Continued)

| Type                 | Description                                                                                                                                                 | Allowed Range |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| TCP Port Source      | Transmission Control Protocol traffic using the specified source port number(s). This Classifier supports either an individual value or a value range.      | 0..65535      |
| VLAN ID              | Traffic using the specified 802.1Q VLAN identifier(s). This Classifier supports either an individual value or a value range.                                | 1..4094       |
| VLAN Priority        | Traffic using the specified 802.1p Priority Code Point. This Classifier supports either an individual value or a value range.                               | 0..7          |
| DSCP                 | Traffic using the specified Differentiated Services Code Point class value(s). This Classifier supports either an individual value or a value range.        | 0..63         |
| UDP Port Destination | User Datagram Protocol traffic using the specified destination port number(s). This Classifier supports either an individual value or a value range.        | 0..65535      |
| TCP Port Destination | Transmission Control Protocol traffic using the specified destination port number(s). This Classifier supports either an individual value or a value range. | 0..65535      |

**INFORMATION**

If ANY is used as a Classifier for a certain service, any subsequent services with a lower priority will have no effect.

A PPPoE Classifier should not be paired with any other layer 3 or 4 Classifier.

The unit has two default Service Profiles set up called default\_ul and default\_dl with the following parameters

- MIR: 300000 kbps
- VLAN tagging: Transparent
- Classifier Group Name: default
- Classifiers: Any

The default Service Profiles cannot be deleted.

Up to a total of 32 Service Profile (including the default Service Profile) can be created.

The Service Profile menu includes the following options:

### 5.2.5.2.2 Select Service Profile

Type in a Service Profile name to edit or delete it. To list the available service profiles, select the Show Service Profiles option (see [Show Service Profiles on page 137](#) for details). A menu is displayed, allowing you to edit the service profile:



#### 5.2.5.2.2.1 Update Service Profile

You are prompted to enter the following settings:

- Name
- MIR: Sets the Maximum Information Rate (MIR) in Kbps. Allowed Range: 256..300000 kbps
- VLAN Type: Sets whether the service profile applies IEEE 802.1Q based VLAN tagging. Type in one of the following:
  - » 0: Transparent (VLAN tagging disabled)
  - » 1: Tagging (VLAN tagging enabled)

If you enable VLAN tagging, you will also be prompted to configure the VLAN ID and VLAN Priority:

- VLAN ID: Type in the VLAN ID used for VLAN tagging. Allowed range: 1..4094.
- VLAN Priority: Type in the 802.1p based Priority Code Point used for VLAN tagging. Allowed range 0..7.

#### INFORMATION



The current product release only supports single tagging (QinQ is not supported).

#### 5.2.5.2.2.2 Delete Service Profile

Deletes the service profile. When you are prompted for confirmation, type Y to confirm or anything else to cancel.

#### 5.2.5.2.2.3 Add Classifier

Adds a new classifier. You are prompted for the following information:

- Classifier Group Name: Type in the name of the Classifier Group the Classifier will belong to (see [Service Profiles on page 133](#) for information on how the Classifier Groups work). You can select Show (see [Show on page 137](#)) prior to adding a Classifier, to list the currently set up Classifier Groups and their content.

Choose a Classifier Group that has an unused Classifier slot or type a new Classifier Group Name, provided there is still room for an additional Classifier Group (there are currently less than 4 Classifier Groups defined). In the later case, a new Classifier Group will be created and the Classifier you are adding will be defined within.
- Classifier Type: Select the type of Classifier by typing the corresponding option number. See [Table 5-3](#) for Classifier Type descriptions.
- Classifier Value 1 (where applicable): Enter the classifier's value. See [Table 5-3](#) for the allowed ranges. For VLAN ID, VLAN Priority, DSCP and TCP/UDP ports classifiers, you can enter the initial value of a value range.



- Classifier Value 2 (where applicable): For VLAN ID, VLAN Priority, DSCP and TCP/UDP port classifiers, type in the final value of a value range if applicable, or the same value as configured for Classifier value 1 if you want a single value.

#### 5.2.5.2.2.4 Update Classifier

Select this option to update an existing Classifier's value(s).

#### INFORMATION



Note that you can only update Classifier's value(s). If you want to change a Classifier Group Name or a Classifier's Type, you will have to delete it and create a new Classifier instead.

The Classifier Group Name and Classifier Type of an existing Classifier cannot be updated. You are prompted for the following information:

- Classifier Group Name: Type in the Classifier Group the Classifier belongs to (see [Service Profiles on page 133](#) for information on how the Classifier Groups work). You can select Show (see [Show on page 137](#)) prior to updating a Classifier, to list the currently set up Classifier Groups and their content.
- Classifier Type: Select the type of classifier by typing the corresponding option number.
- Classifier value 1: Enter the classifier's value. See [Table 5-3](#) for the allowed ranges. For VLAN ID, VLAN Priority and TCP/UDP ports classifiers, you can enter the initial value of a value range.
- Classifier Value 2 (where applicable): For VLAN ID, VLAN Priority and TCP/UDP port classifiers, type in the final value of a value range if applicable, or the same value as configured for Classifier value 1 if you want a single value.

#### 5.2.5.2.2.5 Delete Classifier

Deletes an existing classifier. You are prompted for the following information:

- Classifier Group Name: Type in the Classifier Group the Classifier belongs to. You can select Show (see [Show on page 137](#)) prior to updating a classifier, to list the currently set up classifier groups and their content.
- Classifier Type: Select the type of classifier by typing the corresponding option number.

#### INFORMATION



When deleting the last Classifier inside a Classifier Group, the Classifier Group will be deleted as well.

#### 5.2.5.2.2.6 Delete Classifier Group

Deletes an existing Classifier Group. You are prompted for the Classifier Group Name. You can select Show (see [Show on page 137](#)) prior to deleting a Classifier Group, to list the currently set up Classifier Groups and their content.



#### 5.2.5.2.2.7 Show

Displays the Service Profile's Name, MIR, VLAN and Classifier Group(s)/Classifier(s) settings.

#### 5.2.5.2.3 Add Service Profile

Adds a new Service Profile. You are prompted to enter the following settings:

- Name: Sets the service profiles's name. Allowed value: up to 16 characters. A unique name should be defined.
- MIR: Sets the Maximum Information Rate (MIR) in Kbps. Allowed Range: 256..300000 kbps
- VLAN Type: Sets whether the service profile applies IEEE 802.1Q based VLAN tagging. Type in one of the following:
  - » 0: Transparent (VLAN tagging disabled)
  - » 1: Tagging (VLAN tagging enabled)

If you enable VLAN tagging, you will also be prompted to configure the VLAN ID and VLAN Priority:

- VLAN ID: Type in the identifier used for VLAN tagging. Allowed range: 1..4094.
- VLAN Priority: Type in the 802.1p based Priority Code Point used for VLAN tagging. Allowed range 0..7.

Once the above parameters are set, a simplified classifier setting menu is displayed. You can ignore it and press **Esc** to return to the Service Profiles menu, or you can use it to configure an initial set of classifiers. The following options are available:

- Add Classifier: See [Add Classifier on page 135](#).
- Delete Classifier: See [Delete Classifier on page 136](#)
- Delete Classifier Group: See [Delete Classifier Group on page 136](#)

#### 5.2.5.2.4 Duplicate Service Profile

Creates a new Service Profile based on an existing one. You are prompted for the following information:

- Name: The name of the existing Service Profile you want to duplicate. You can use the Show Service Profiles option to list the existing service profiles (see [Show Service Profiles on page 137](#) for details).
- New Name: Enter a name for the Service Profile duplicate.

#### 5.2.5.2.5 Show Service Profiles

Lists currently set up Service Profiles. For each Service Profile, the following information is displayed: Name, MIR and VLAN settings.

### 5.2.5.3 Service Groups

#### 5.2.5.3.1 Introduction to Services

The service defines how packet received by the unit on either the Ethernet or Wireless port will be handled.



Each Service Group includes the following parameters:

- **Name:** The unique name of the Service Group. A string of up to 16 characters. A unique name other than an empty string should be defined.
- **Priority:** The service's traffic prioritization. There are 4 priority levels numbered from 1 to 4, with 1 being the highest priority. Packets in a service with configured Priority value higher than 1 will be sent only if the queues for packets in all services with a lower configured Priority value are empty or have already reached their configured MIR. Each service should be assigned a different Priority.
- **Downlink Profile:** The Service Profile applicable for downlink transmissions (from BU to RB). Should be the name of an existing Service Profile.
- **Uplink Profile:** The Service Profile applicable for uplink transmissions (from RB to BU). Should be the name of an existing Service Profile
- **ARP Duplication:** ARP Duplication has to be enabled if VLAN tagging is used at least on one of the services but the ARP messages are needed also for the functionality of the other services. If set to Enable and VLAN tagging in associated Service Profile is enabled, ARP messages will be transmitted also with the relevant VLAN. The default is Disabled.

#### INFORMATION



VLAN tagging is allowed only in one direction: If there is VLAN tagging in the Downlink Profile than the Uplink Profile should be Transparent, and vice versa.

The following rules are applied for packets that are received on the Ethernet port intended for transmission to the Wireless port:

- A** A packet with a VLAN tag equal to any of the VLAN ID configured in any of the Service Profiles the packet will be dropped.
- B** If there is no Service Profile with VLAN Tagging set to Transparent, a packet with a VLAN tag will be dropped.
- C** If the packet is without a VLAN tag it will be checked for a match with Classifier Groups:
  - 1** If it matches any of the Classifier Groups in a service that has VLAN tagging active the VLAN tag will be inserted.
  - 2** If it matches any of the Classifier Groups in a service that has VLAN Tagging set to Transparent the packet will be forwarded without any modification. See below the specific rules for ARP packets.
- D** If the packet is with a VLAN tag and there are Service Profiles with VLAN Tagging set to Transparent it will be checked for a match with Classifier Groups from these Service Profiles:
  - 1** If it matches any of the Classifier Groups in a service that has VLAN tagging set to Transparent it will be sent on the corresponding service without any modification.



- 2** If it does not match any of the Classifier Groups in a service that has VLAN tagging set to Transparent it will be dropped. See below the specific rules for ARP packets.
- E** Tagged ARP: The rules from point A and B above will be applied. If ARP is with a VLAN tag and was not dropped it will be sent on the service with the lowest configured Priority value that has VLAN Tagging set to transparent.
- F** Untagged ARP: Untagged ARP packets will be sent on the first service to which it can be classified. In addition, if there are services with VLAN tag set to tagging and ARP Duplication is enabled the packet will be sent on these services tagged with the corresponding VLAN ID.

**INFORMATION**

If a packet matches Classifier Groups in two or more services, it will be assigned to the service with the lowest priority value.

The following rules are applied for packets that are received on the Wireless port intended for transmission to the Ethernet port:

- A** If the packet is with a VLAN tag and the VLAN ID is one of the VLAN IDs used by any service the VLAN tag will be removed.
- B** If the packet is with a VLAN tag that does not match any of the VLAN IDs used by any service the packet will be forwarded to the Ethernet port only if there are services with VLAN Tagging Set to Transparent.
- C** A packet without VLAN tag will be forwarded to the Ethernet port only if there are services with VLAN Tagging set to Transparent.

The unit has a default service set up with the following parameters:

- Name: default
- Priority: 1
- Downlink Profile: default\_dl
- Uplink Profile: default\_ul
- ARP Duplication: Disabled

Up to a total of 4 services (including the default service) can be created

### 5.2.5.3.2 Select Service Group

Type in a Service Group name to edit or delete it. You can select the Show option (see [Show Service Group on page 140](#)) to list the available Service Groups. The following options are available:

#### 5.2.5.3.2.1 Update Service Group

You are prompted to enter the following settings (click **Esc** to use current setting of any parameter):



- Name
- Priority: 1-4. Note that each Priority can be assigned only to a single Service Group.
- Downlink Profile: An existing Service Profile Name
- Uplink Profile: An existing Service Profile Name
- ARP Duplication: Enable/Disable

#### 5.2.5.3.2.2 Delete Service Profile

Deletes the Service Group. When you are prompted for confirmation, type Y to confirm or anything else to cancel.

#### 5.2.5.3.2.3 Show Service Group

Displays the Service Group's settings (Name, Priority, Downlink Service Profile, Uplink Service Profile and ARP Duplication).

#### 5.2.5.3.3 Add Service Group

Creates a new Service Group. You are prompted for the following settings:

- Name
- Priority: 1-4. Note that each Priority can be assigned only to a single Service Group.
- Downlink Profile: An existing Service Profile Name
- Uplink Profile: An existing Service Profile Name
- ARP Duplication: Enable/Disable (default: Disable)

#### 5.2.5.3.4 Show

Lists all Service Groups and displays the settings for each Service Group (Name, Priority, Downlink Service Profile, Uplink Service Profile and ARP Duplication).

### 5.2.6 Show All

Displays all information available within the Main Menu's submenus. You may have to adjust the Monitor application's screen buffer size, for all the information to fit in.

### 5.2.7 Exit

Exits the monitor program.

# Appendix A - Password Reset Procedure





### To reset the unit to the default passwords:

- 1 Open a Telnet connection to the unit and contact Customer Support.

#### NOTE!



The telnet session must remain open during the entire process.

- 2 In the Login menu, type r. This displays the Recover Password menu.

```
Login
-----
1. guest
2. installer
3. administrator
X. Exit
>r

Recover Password
-----
1. Reset password to factory default
X. Exit
```

**Figure A-1: Opening the Recover Password Menu**

- 3 Press 1. A key code is generated.

```
Recover Password
-----
1. Reset password to factory default
X. Exit
>1

To reset the device you should generate pair for the following
string:
Key: h76Y5F8y1J
Enter string:
```

**Figure A-2: Generating the Key Code**

- 4 Provide Customer Support the key code generated by the unit.
- 5 Based on the key, Customer Support will provide you with a response string.
- 6 Type in the response string and press <Enter>. The passwords will be reset to their default values (see [Table 5-1](#)).



```
To reset the device you should generate pair for the following
string:
Key: h76Y5F8y1J
Enter string:7I1MWl0y1SEY5kup4RQXe
Checking...
Key matched, resetting password
Passwords set to factory default
```

**Figure A-3: Resetting the Passwords**

Typing the wrong response string, will display the following message:

```
The given string doesn't match the key
```

In such a case, repeat the above procedure.

# Appendix B - BreezeULTRA Traps

## In This Appendix:

- [Introduction](#)
- [Trap Variables](#)
- [Traps](#)



# B.1 Introduction

The Authorized Managers feature in the devices allows enabling or disabling traps for defined authorized managers. It also enables defining the IP addresses of up to 10 stations to which traps will be sent, and the SNMP Read Community associated with each of these stations.

Each trap includes Trap Variables (Objects) that provide the necessary information on the reported event. All traps include a Trap Sequence Number that allows the management system to keep track of received traps. Each unit that generates traps maintains a history file (vIngTrapHistory) holding the last traps that were sent by it (up to 1024 traps), enabling the management system to request details of previous traps (identified by the sequence number). The sequence number is composed of a boot number and a trap number. When a new trap is generated, the trap number increments by one. After reset, the history file is cleared, the boot number is increased by one and the trap sequence number is set to 0. Traps are stored in the history file even when the traps sending option is disabled, enabling to retrieve traps using appropriate SNMP commands.

# B.2 Trap Variables

All traps contain the following variables:

Table B-1: Trap Variables

| Trap Variable (Object)    | Description                                                                                                                                                                                                                      |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| vIngTrapSequenceNumberVar | Sequence number of the trap (0..2147483647)                                                                                                                                                                                      |
| vIngTrapMacAddrParamVar   | A MAC address. When applicable, then according to specific trap it may be either the MAC address of the unit that generated the trap or the MAC address of an associated unit. If not applicable it contains a null MAC address. |
| vIngTrapIntParam1Var      | the first variable of integer type for the trap. If not applicable the value will be 0.                                                                                                                                          |
| vIngTrapIntParam2Var      | the second variable of integer type for the trap. If not applicable the value will be 0.                                                                                                                                         |
| vIngTrapIntParam3Var      | the third variable of integer type for the trap. If not applicable the value will be 0.                                                                                                                                          |
| vIngTrapStrParamVar       | A string variable of the trap if this is field is applicable. Otherwise it will contain an empty string (null). In current release it is always null (not applicable).                                                           |

In addition, all traps include as a parameter the time ticks since last power up of the unit (100 ticks per second).



## B.3 Traps

**Table B-2: Traps**

| Trap                              | ID  | Description                                                               | Applicable Variables                                                                                                                            |
|-----------------------------------|-----|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| vIngPowerUpFromReset              | 201 | Sent by the unit when the unit powers up after reset                      | vIngTrapSequenceNumberVar<br>vIngTrapMacAddrParamVar - MAC address of the unit                                                                  |
| vIngNewAssociationTRAP            | 202 | A BU trap indicating a new association with an RB                         | vIngTrapSequenceNumberVar<br>vIngTrapMacAddrParamVar - MAC address of the RB                                                                    |
| vIngDisassociationTRAP            | 203 | A BU trap indicating that an RB has been disassociated from the BU        | vIngTrapSequenceNumberVar<br>vIngTrapMacAddrParamVar - MAC address of the RB                                                                    |
| vIngVDFS RadarDetectedTRAP        | 204 | A BU trap indicating that a radar was detected on the current frequency   | vIngTrapSequenceNumberVar                                                                                                                       |
| vIngVLDFS FrequencyTRAP           | 205 | A BU trap indicating that the unit moved to a new frequency               | vIngTrapSequenceNumberVar<br>vIngTrapIntParam1Var - the new frequency                                                                           |
| vIngVLDFSNoFreeChannelsExistsTRAP | 206 | A BU trap indicating that radar was detected and there is no free channel | vIngTrapSequenceNumberVar                                                                                                                       |
| brzaccVLRunTimeIPChangeTRAP       | 207 | Sent when run-time management IP address is changed                       | vIngTrapSequenceNumberVar<br>vIngTrapMacAddrParamVar - MAC address of the unit<br>vIngTrapIntParam1Var - the new IP address (in decimal format) |



Table B-2: Traps (Continued)

| Trap                          | ID  | Description                                                                                                                                                              | Applicable Variables                                                                                                                              |
|-------------------------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| brzaccBandwidthFreqChangeTRAP | 208 | This trap is generated if the bandwidth has been changed and the unit switched to a new frequency because the previous frequency is not available with the new bandwidth | vLngTrapSequenceNumberVar<br>vLngTrapIntParam1Var - New Bandwidth<br>vLngTrapIntParam2Var - Old Frequency<br>vLngTrapIntParam3Var - New Frequency |

# Appendix C - Monitor Parameters Summary



Monitor Parameters Summary:

Table C-1: Monitor Parameters Summary

| Parameter                                                               | Range                                                                                                              | Default       | Run-Time Updated |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------|------------------|
| <b>Unit Control &gt; Management &gt; IP Configuration</b>               |                                                                                                                    |               |                  |
| IP Address                                                              | IP address                                                                                                         | 10.0.0.1      | Yes              |
| Subnet Mask                                                             | subnet mask                                                                                                        | 255.255.255.0 | Yes              |
| Default Gateway                                                         | IP address                                                                                                         | 10.0.0.2      | Yes              |
| <b>Unit Control &gt; Management &gt; Management VLAN</b>                |                                                                                                                    |               |                  |
| Tagging                                                                 | <input checked="" type="checkbox"/> Enable<br><input type="checkbox"/> Disable                                     | Disable       | Yes              |
| VLAN ID                                                                 | 1-4094<br>Applicable only if Tagging is set to Enable                                                              | 1             | Yes              |
| VLAN Priority                                                           | 0-7<br>Applicable only if Tagging is set to Enable                                                                 | 0             | Yes              |
| <b>Unit Control &gt; Management &gt; Management Port Access Control</b> |                                                                                                                    |               |                  |
| Management Port Access Control                                          | <input checked="" type="checkbox"/> Ethernet<br><input type="checkbox"/> Wireless<br><input type="checkbox"/> Both | Both          | Yes              |
| <b>Unit Control &gt; Management &gt; Manager IP Access Control</b>      |                                                                                                                    |               |                  |
| Manager IP Access Control                                               | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No                                             | No            | Yes              |
| <b>Unit Control &gt; Management &gt; Authorized Managers (up to 10)</b> |                                                                                                                    |               |                  |
| IP Address                                                              | IP address                                                                                                         |               | Yes              |
| Read-Only Community                                                     | Up to 32 printable characters                                                                                      | null          | Yes              |
| Read-Write Community                                                    | Up to 32 printable characters                                                                                      | null          | Yes              |
| Trap Sending                                                            | <input checked="" type="checkbox"/> Enable<br><input type="checkbox"/> Disable                                     | Disable       | Yes              |



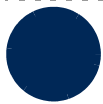


Table C-1: Monitor Parameters Summary (Continued)

| Parameter                                           | Range                                                                                                                                                                                                                                      | Default   | Run-Time Updated |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------|
| <b>Unit Control &gt; Ethernet Port Control &gt;</b> |                                                                                                                                                                                                                                            |           |                  |
| Ethernet 0 (PoE Out)                                | <ul style="list-style-type: none"><li>■ Auto</li><li>■ 10 Mbps half duplex</li><li>■ 10 Mbps full duplex</li><li>■ 100 Mbps half duplex</li><li>■ 100 Mbps full duplex</li><li>■ 1 Gbps half duplex</li><li>■ 1 Gbps full duplex</li></ul> | Auto      | Yes              |
| Ethernet 0 crossover                                | <ul style="list-style-type: none"><li>■ Auto</li><li>■ Manual MDI</li><li>■ Manual MDIX</li></ul>                                                                                                                                          | Auto      | Yes              |
| Ethernet 0 Status                                   | <ul style="list-style-type: none"><li>■ Enable</li><li>■ Disable</li></ul>                                                                                                                                                                 | Enable    | Yes              |
| Ethernet 1 (PoE In)                                 | <ul style="list-style-type: none"><li>■ Auto</li><li>■ 10 Mbps half duplex</li><li>■ 10 Mbps full duplex</li><li>■ 100 Mbps half duplex</li><li>■ 100 Mbps full duplex</li><li>■ 1 Gbps half duplex</li><li>■ 1 Gbps full duplex</li></ul> | Auto      | Yes              |
| Ethernet 1 crossover                                | <ul style="list-style-type: none"><li>■ Auto</li><li>■ Manual MDI</li><li>■ Manual MDIX</li></ul>                                                                                                                                          | Auto      | Yes              |
| <b>Unit Control &gt; Unit Name</b>                  |                                                                                                                                                                                                                                            |           |                  |
| Unit name                                           | Up to 31 printable characters                                                                                                                                                                                                              | name      | Yes              |
| Unit Location                                       | Up to 47 printable characters                                                                                                                                                                                                              | location  | Yes              |
| Contact Person                                      | Up to 31 printable characters                                                                                                                                                                                                              |           | Yes              |
| <b>Unit Control &gt; Change Password</b>            |                                                                                                                                                                                                                                            |           |                  |
| Read-Only Password                                  | Up to 16 printable characters                                                                                                                                                                                                              | public    | Yes              |
| Installer Password                                  | Up to 16 printable characters                                                                                                                                                                                                              | installer | Yes              |
| Administrator Password                              | Up to 16 printable characters                                                                                                                                                                                                              | private   | Yes              |



**Table C-1: Monitor Parameters Summary (Continued)**

| Parameter                                                 | Range                                                                                                                                                                           | Default  | Run-Time Updated |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------|
| <b>Unit Control &gt; Change Console Timeout</b>           |                                                                                                                                                                                 |          |                  |
| Change Console Timeout                                    | 1-1000 (minutes)                                                                                                                                                                | 1000     | Yes              |
| <b>Site Survey &gt; Logs &gt; System Logs &gt; Enable</b> |                                                                                                                                                                                 |          |                  |
| SYSLOG                                                    | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 8 (NONE) | Yes              |
| WLAN                                                      | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 8 (NONE) | Yes              |



**Table C-1: Monitor Parameters Summary (Continued)**

| Parameter | Range                                                                                                                                                                           | Default  | Run-Time Updated |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------|
| CONFIG    | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 8 (NONE) | Yes              |
| FWD       | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 8 (NONE) | Yes              |



**Table C-1: Monitor Parameters Summary (Continued)**

| Parameter   | Range                                                                                                                                                                           | Default    | Run-Time Updated |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------|
| ATPC        | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 8 (NONE)   | Yes              |
| ASSOCIATION | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 5 (NOTICE) | Yes              |



Table C-1: Monitor Parameters Summary (Continued)

| Parameter       | Range                                                                                                                                                                                                               | Default    | Run-Time Updated |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------|
| UPLOAD/DOWNLOAD | Log levels:<br><br>0. EMERG<br><br>1. ALERT<br><br>2. CRIT<br><br>3. ERR<br><br>4. WARN<br><br>5. NOTICE<br><br>6. INFO<br><br>7. DEBUG*<br><br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 5 (NOTICE) | Yes              |
| DFS             | Log levels:<br><br>0. EMERG<br><br>1. ALERT<br><br>2. CRIT<br><br>3. ERR<br><br>4. WARN<br><br>5. NOTICE<br><br>6. INFO<br><br>7. DEBUG*<br><br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 5 (NOTICE) | Yes              |



**Table C-1: Monitor Parameters Summary (Continued)**

| Parameter           | Range                                                                                                                                                                           | Default  | Run-Time Updated |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------|
| DISTANCE            | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 8 (NONE) | Yes              |
| APCPE COMMUNICATION | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 8 (NONE) | Yes              |



**Table C-1: Monitor Parameters Summary (Continued)**

| Parameter                                  | Range                                                                                                                                                                                                               | Default    | Run-Time Updated |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------|
| LINK MANAGER                               | Log levels:<br><br>0. EMERG<br><br>1. ALERT<br><br>2. CRIT<br><br>3. ERR<br><br>4. WARN<br><br>5. NOTICE<br><br>6. INFO<br><br>7. DEBUG*<br><br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs | 5 (NOTICE) | Yes              |
| All                                        | Log levels:<br><br>0. EMERG<br><br>1. ALERT<br><br>2. CRIT<br><br>3. ERR<br><br>4. WARN<br><br>5. NOTICE<br><br>6. INFO<br><br>7. DEBUG*<br><br>8. NONE<br><br>* Log Level 7 (Debug) is not allowed for System Logs |            | Yes              |
| Site Survey > Logs > Session Logs > Enable |                                                                                                                                                                                                                     |            |                  |



Table C-1: Monitor Parameters Summary (Continued)

| Parameter | Range                                                                                                               | Default  | Run-Time Updated |
|-----------|---------------------------------------------------------------------------------------------------------------------|----------|------------------|
| SYSLOG    | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |
| WLAN      | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |





Table C-1: Monitor Parameters Summary (Continued)

| Parameter | Range                                                                                                               | Default  | Run-Time Updated |
|-----------|---------------------------------------------------------------------------------------------------------------------|----------|------------------|
| CONFIG    | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |
| FWD       | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |



Table C-1: Monitor Parameters Summary (Continued)

| Parameter   | Range                                                                                                               | Default  | Run-Time Updated |
|-------------|---------------------------------------------------------------------------------------------------------------------|----------|------------------|
| ATPC        | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |
| ASSOCIATION | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |



**Table C-1: Monitor Parameters Summary (Continued)**

| Parameter       | Range                                                                                                               | Default  | Run-Time Updated |
|-----------------|---------------------------------------------------------------------------------------------------------------------|----------|------------------|
| UPLOAD/DOWNLOAD | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |
| DFS             | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |



**Table C-1: Monitor Parameters Summary (Continued)**

| Parameter           | Range                                                                                                               | Default  | Run-Time Updated |
|---------------------|---------------------------------------------------------------------------------------------------------------------|----------|------------------|
| DISTANCE            | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |
| APCPE COMMUNICATION | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE) | Yes              |



**Table C-1: Monitor Parameters Summary (Continued)**

| Parameter                                 | Range                                                                                                               | Default   | Run-Time Updated |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------|------------------|
| LINK MANAGER                              | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE | 8 (NONE)  | Yes              |
| All                                       | Log levels:<br>0. EMERG<br>1. ALERT<br>2. CRIT<br>3. ERR<br>4. WARN<br>5. NOTICE<br>6. INFO<br>7. DEBUG*<br>8. NONE |           | Yes              |
| <b>Site Survey &gt; Spectrum Analyzer</b> |                                                                                                                     |           |                  |
| Channel Scan Time                         | 2-120 (seconds)                                                                                                     | 5         | Yes              |
| Noise Floor Control                       | ■ Automatic<br>■ Forced Value                                                                                       | Automatic | Yes              |
| Noise Floor Value                         | -120 to -75<br><br>Applicable only if Noise Floor Control is set to Forced Value                                    | -85       | Yes              |



Table C-1: Monitor Parameters Summary (Continued)

| Parameter                                                                            | Range                                                                                                       | Default                                                                                                                                   | Run-Time Updated                                        |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <b>Radio &gt; Sector 1/Sector 3 &gt; Sector Configuration &gt; Sector Parameters</b> |                                                                                                             |                                                                                                                                           |                                                         |
| Type                                                                                 | <ul style="list-style-type: none"><li>■ BU-350</li><li>■ RB-350</li><li>■ BU-600</li><li>■ RB-600</li></ul> | BU-350 or BU-600                                                                                                                          | No                                                      |
| Name                                                                                 | Up to 31 characters                                                                                         | Sector 1/Sector 3                                                                                                                         | Yes                                                     |
| Sector Info                                                                          | Up to 127 characters                                                                                        |                                                                                                                                           |                                                         |
| Status                                                                               | <ul style="list-style-type: none"><li>■ Active</li><li>■ Inactive</li></ul>                                 | For a unit supplied as BU-350: Active for Sector 1, Inactive for Sector 3.<br><br>For a unit supplied as BU-600: Active for both sectors. | Yes                                                     |
| Antenna Gain                                                                         | Available only for sectors with a detached antenna.<br><br>Range depends on Country Code.                   | 0                                                                                                                                         | No (reset required to apply correct range for TX Power) |
| Antenna description                                                                  | Up to 127 characters                                                                                        |                                                                                                                                           | Yes                                                     |
| <b>Radio &gt; Sector 1/Sector 3 &gt; Sector Configuration &gt; Link Parameters</b>   |                                                                                                             |                                                                                                                                           |                                                         |
| Channel Bandwidth                                                                    | <ul style="list-style-type: none"><li>■ 20 MHz</li><li>■ 40+ MHz</li></ul>                                  | 40+ MHz                                                                                                                                   | Yes                                                     |
| Channel List                                                                         | Available frequencies depend on current Country Code and Bandwidth.                                         | 5480-5695 MHz in step of 5 MHz (for units supplied with 5.4 GHz Universal Country Code)                                                   | Yes                                                     |



Table C-1: Monitor Parameters Summary (Continued)

| Parameter                                                                      | Range                                                                                                                                          | Default                                                                                              | Run-Time Updated |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------|
| Frequency                                                                      | Available frequencies depend on current Country Code and Bandwidth.                                                                            | Sector 1: 5480 MHz<br>Sector 3: 5540 MHz<br>(for units supplied with 5.4 GHz Universal Country Code) |                  |
| ESSID                                                                          | 1 to 32 characters (null ESSID is forbidden)                                                                                                   | Sector 1: ESSID1<br>Sector 3: ESSID 3                                                                | Yes              |
| ATPC                                                                           | <input checked="" type="checkbox"/> Enable<br><input checked="" type="checkbox"/> Disable                                                      | Enable                                                                                               | Yes              |
| Optimal SNR                                                                    | 4 - 60 (dB)<br>Applicable only if ATPC is set to Enable                                                                                        | 28                                                                                                   | Yes              |
| TX Power                                                                       | In Country Code with no EIRP limitation: 4-24 (dBm)<br><br>In Country Codes with EIRP limitation: 4 to Maximum Allowed EIRP minus Antenna Gain | The highest allowed value                                                                            | Yes              |
| Link Distance                                                                  | 1-54 (Km) or 0                                                                                                                                 | 0                                                                                                    | Yes              |
| Encryption > Algorithm                                                         | <input checked="" type="checkbox"/> Disabled<br><input checked="" type="checkbox"/> AES                                                        | Disabled                                                                                             | Yes              |
| Encryption > Key                                                               | 16 characters<br><br>Applicable only if Algorithm is set to AES                                                                                | A string of 16 zeros                                                                                 | Yes              |
| <b>Radio &gt; Sector 1/Sector 3 &gt; Sector Configuration &gt; Performance</b> |                                                                                                                                                |                                                                                                      |                  |
| Rate Control > Multi Rate                                                      | <input checked="" type="checkbox"/> Enable<br><input checked="" type="checkbox"/> Disable                                                      | Enable                                                                                               | Yes              |
| Rate Control > Maximum Rate                                                    | MCS_0 to MCS_15                                                                                                                                | MCS_15                                                                                               | Yes              |
| Rate Control > Short Guard Interval                                            | <input checked="" type="checkbox"/> Enable<br><input checked="" type="checkbox"/> Disable<br><br>Applicable only for a bandwidth of 40 MHz     | Enable                                                                                               | Yes              |

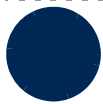


Table C-1: Monitor Parameters Summary (Continued)

| Parameter                                        | Range                                                                                                                                           | Default                                                                                    | Run-Time Updated |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------|
| PHY Aggregation > Configuration                  | Enable<br>Disable                                                                                                                               | Enable                                                                                     | Yes              |
| PHY Aggregation > Maximum Duration               | 1 - 10 (ms)                                                                                                                                     | 8                                                                                          | Yes              |
| Contention Window > Minimum                      | 7, 15, 31, 63, 127, 255, 511, 1023                                                                                                              | 7                                                                                          | Yes              |
| Contention Window > Maximum                      | 7, 15, 31, 63, 127, 255, 511, 1023                                                                                                              | 63                                                                                         | Yes              |
| Retries                                          | 0 - 9                                                                                                                                           | 9                                                                                          | Yes              |
| Noise Floor > Calculation Mode                   | <input checked="" type="checkbox"/> Fully Automatic<br><input type="checkbox"/> Automatic with Minimum Value<br><input type="checkbox"/> Forced | Fully Automatic                                                                            | Yes              |
| Noise Floor > Forced Value                       | -120 to -75 (dBm)<br><br>Applicable only if Calculation Mode is set to Forced                                                                   | -85                                                                                        | Yes              |
| Noise Floor > Measurement Count                  | 0 - 7                                                                                                                                           | 0                                                                                          | Yes              |
| <b>Radio &gt; Country Code</b>                   |                                                                                                                                                 |                                                                                            |                  |
| Select Country Code                              | Available options depend on loaded Country Codes file and current Country Code.<br><br>Must be selected according to local regulations.         | 5.4 GHz Universal (excluding FCC and India units)                                          | No               |
| <b>Radio &gt; Radio Interface Configuration</b>  |                                                                                                                                                 |                                                                                            |                  |
| Interface Selection                              | <input checked="" type="checkbox"/> Sector 1<br><input type="checkbox"/> Sector 3<br><input type="checkbox"/> Dual Sector                       | or a unit supplied as BU-350: Sector 1.<br><br>For a unit supplied as BU-600: Dual Sector. | Yes              |
| <b>Services &gt; Service Profiles (up to 32)</b> |                                                                                                                                                 |                                                                                            |                  |
| Name                                             | 1 - 16 characters                                                                                                                               |                                                                                            |                  |
| MIR                                              | 256 to 300000 Kbps                                                                                                                              |                                                                                            |                  |





**Table C-1: Monitor Parameters Summary (Continued)**

| Parameter                          | Range                                                                                                                                                                                                                                                                                                                      | Default | Run-Time Updated |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------------|
| VLAN Type                          | <ul style="list-style-type: none"><li>■ Transparent</li><li>■ Tagging</li></ul>                                                                                                                                                                                                                                            |         |                  |
| VLAN ID                            | 1 - 4094<br><br>Applicable only if VLAN Type is set to Tagging                                                                                                                                                                                                                                                             |         |                  |
| VLAN Priority                      | 0 - 7<br><br>Applicable only if VLAN Type is set to Tagging                                                                                                                                                                                                                                                                |         |                  |
| Classifier > Classifier Group Name |                                                                                                                                                                                                                                                                                                                            |         |                  |
| Classifier > Type                  | <ul style="list-style-type: none"><li>■ Any</li><li>■ ETH Type</li><li>■ PPPoE</li><li>■ UDP Port Source</li><li>■ TCP Port Source</li><li>■ VLAN ID</li><li>■ VLAN Priority</li><li>■ DSCP</li><li>■ UDP Port Destination</li><li>■ TCP Port Destination</li></ul>                                                        |         |                  |
| Classifier > Value 1               | <ul style="list-style-type: none"><li>■ ETH Type: 0x0600..0xFFFF</li><li>■ UDP Port Source: 0 - 65535</li><li>■ TCP Port Source: 0 - 65535</li><li>■ VLAN ID: 1 - 4094</li><li>■ VLAN Priority: 0 - 7</li><li>■ DSCP: 0 - 63</li><li>■ UDP Port Destination: 0 - 65535</li><li>■ TCP Port Destination: 0 - 65535</li></ul> |         |                  |



Table C-1: Monitor Parameters Summary (Continued)

| Parameter                                    | Range                                                                                                                                                                                                                                                                                                                      | Default  | Run-Time Updated |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------|
| Classifier > Value 2                         | <ul style="list-style-type: none"><li>■ UDP Port Source: 0 - 65535</li><li>■ TCP Port Source: 0 - 65535</li><li>■ VLAN ID: 1-4094</li><li>■ VLAN Priority: 0 - 7</li><li>■ DSCP: 0 - 63</li><li>■ UDP Port Destination: 0 - 65535</li><li>■ TCP Port Destination: 0 - 65535</li></ul> Value 2 cannot be lower than Value 1 |          |                  |
| <b>Service &gt; Service Groups (up to 4)</b> |                                                                                                                                                                                                                                                                                                                            |          |                  |
| Name                                         | 1 to 16 characters                                                                                                                                                                                                                                                                                                         |          |                  |
| Priority                                     | 1 - 4                                                                                                                                                                                                                                                                                                                      |          |                  |
| Downlink Profile                             | Name of an existing Service Profile                                                                                                                                                                                                                                                                                        |          |                  |
| Uplink Profile                               | Name of an existing Service Profile                                                                                                                                                                                                                                                                                        |          |                  |
| ARP Duplication                              | <ul style="list-style-type: none"><li>■ Enabled</li><li>■ Disabled</li></ul>                                                                                                                                                                                                                                               | Disabled |                  |

# Appendix D - Antennas Separation Guidelines

## In This Appendix:

- ["Introduction" on page 169](#)
- ["Minimum Separation Distance" on page 169](#)
- ["Installation Using Country Codes with EIRP Limitation" on page 170](#)
- ["Installation Using Country Codes with No EIRP Limitation" on page 171](#)
- ["Summary - Tx Power Settings" on page 171](#)



## D.1 Introduction

In a Dual Sector installation with two antennas, possible cross interference between the two antennas must be minimized. The minimum distance between the two antennas depend on antennas' gain, the maximum expected Tx power, and how the two antennas are installed relative to each other (due to possible differences in the radiation patterns in the horizontal and vertical plans). It depends also on the frequency separation between the center frequencies used in the two sectors. The following sections provide guidelines for installations where the minimum allowed separation (40 MHz for 20 MHz bandwidth, 60 MHz for 40 MHz bandwidth) can be used.

## D.2 Minimum Separation Distance

The following table provides the minimum required antennas separation distance under different conditions:

**Table D-1: Minimum Separation Distances**

| Maximum Tx Power (dBm) | Minimum Separation Distance (meters) |                                    |                                      |
|------------------------|--------------------------------------|------------------------------------|--------------------------------------|
|                        | 23 dBi Antennas, Horizontal Mounting | 23 dBi Antennas, Vertical Mounting | 28 dBi Antennas, Horizontal Mounting |
| 4-5                    | 1                                    | 0.5                                | 0.75                                 |
| 6-10                   | 1                                    | 1                                  | 1.5                                  |
| 10                     | 1                                    | 1                                  | 1.5                                  |
| 11                     | 1                                    | 1                                  | 3.5                                  |
| 12-13                  | 3.5                                  | 1.5                                | 3.5                                  |
| 14-16                  | 3.5                                  | 3.5                                | 3.5                                  |
| 17                     | 3.5                                  | 3.5                                | None (>3.5)                          |
| 18                     | None (>3.5)                          | 3.5                                | None (>3.5)                          |
| 19-24                  | None (>3.5)                          | 3.5                                | None (>3.5)                          |

Horizontal mounting refers to installations where both antennas are next to each other (on the same horizontal plan). Vertical mounting refers to installations where the two antennas are one above the other (on the same vertical plan).



## D.3 Installation Using Country Codes with EIRP Limitation

For more details on EIRP limitations refer to the latest Country Codes document.

### D.3.1 Maximum EIRP of 30 dBm

A maximum EIRP of 30 dBm is applicable to the following Country Codes:

- 5.3 GHz Canada
- 5.4 GHz Australia
- 5.4 GHz ETSI
- ETSI5.4\_Integral\_Antena
- 5.4 GHz FCC
- FCC Dual Band
- Mauritius

When the maximum allowed EIRP is 30 dBi, 28 dBi antennas cannot be used.

For 23 dBi antennas the maximum Tx power is limited by the software to a maximum of 7 dBm. This means that for a Tx Power of 6 dBm or higher (up to the default of 24 dBm) a distance of at least 1m between the antennas is required (using either horizontal or vertical mounting).

A lower vertical separation distance of just 0.5m may be used, provided the antennas are positioned correctly and Tx power is manually limited to 5 dBm (or lower).

### D.3.2 Maximum EIRP of 36 dBm

A maximum EIRP of 36 dBm is applicable to the following Country Codes:

- 5.7 GHz Australia
- 5.8 GHz UK
- 5.7 GHz ETSI

For 28 dBi antennas the maximum Tx power is limited by the software to a maximum of 8 dBm. This means that for a Tx Power of 6 dBm or higher (up to the default of 24 dBm) the two antennas should be installed at an horizontal distance of at least 1.5m from each other. Horizontal mounting with a lower separation distance of just 0.75m may be used, provided the Tx power is manually limited to 5 dBm (or lower).

For 23 dBi antennas the maximum Tx power is limited by the software to a maximum of 13 dBm. This means that for side-by-side installations, the minimum horizontal separation between the two antennas is 3.5m for a Tx power of 12 dBm or higher (up to the default of 24 dBm). For one-above-the-other installations, the minimum vertical separation distance is 1.5m for a Tx power of 12 dBm or higher (up to



the default of 24 dBm). Lower separation distances of just 1m (for either horizontal or vertical installations) can be used, provided the Tx power is manually limited to 11 dBm (or lower). For vertical installations, an even lower distance of 0.5m may be used, provided the Tx power is manually limited to 5 dBm (or lower).

## D.4 Installation Using Country Codes with No EIRP Limitation

For the following Country Codes there is no limitation on the maximum allowed EIRP:

- All Universal Country Codes
- 5.7 GHz Canada
- 5.8 GHz FCC P2P

The maximum Tx power is not limited by the software, and it is set by default to 24 dBm. However, it may manually be limited to a lower value.

If Tx power is not limited to a value lower than 19 dBm, only vertically installed (one above the other) 23 dBi antennas may be used, with a separation distance of at least 3.5m.

Tx power should be configured to a lower value to support additional installation options and/or lower separation distances. For example, a Tx power of 11 dBm allows a separation distance of just 1m for either horizontal or vertical installations of 23 dBi antennas, and a horizontal separation distance of 3.5m for 28 dBi antennas). A slightly lower Tx power of 10 dBm will allow reducing the horizontal separation distance between 28 dBi antennas to just 1.5m.

## D.5 Summary - Tx Power Settings

- For 23 dBi antennas, side-by-side (horizontal) mounting:
  - » For a distance of 1m: Maximum Tx Power is 11 dBm
  - » For a distance of 3.5m: Maximum Tx Power is 17 dBm
  - » A Tx Power higher than 17 dBm cannot be used
- For 23 dBi antennas, one above the other (vertical) mounting:
  - » For a distance of 0.5m: Maximum Tx Power is 5 dBm
  - » For a distance of 1m: Maximum Tx Power is 11 dBm
  - » For a distance of 1.5m: Maximum Tx Power is 13 dBm
  - » For a distance of 3.5m: Maximum Tx Power is 24 dBm (default)



■ For 28 dBi antennas, side-by-side (horizontal) mounting:

- » For a distance of 0.75m: Maximum Tx Power is 5 dBm
- » For a distance of 1.5m: Maximum Tx Power is 10 dBm
- » For a distance of 3.5m: Maximum Tx Power is 16 dBm
- » A Tx Power higher than 16 dBm cannot be used

**NOTE!**



For Country Codes with a Maximum EIRP of 30 dBm (5.3 GHz Canada, 5.4 GHz Australia, 5.4 GHz ETSI, ETSI5.4\_Integral\_Antena, 5.4 GHz FCC, FCC Dual Band, Mauritius) the maximum Tx power with 23 dBi antennas is limited to 7 dBm (28 dBi antennas cannot be used).

For Country Codes with a Maximum EIRP of 36 dBm (5.7 GHz Australia, 5.8 GHz UK, 5.7 GHz ETSI) the maximum Tx power is limited to 13 dBm with 23 dBi antennas and to 8 dBm with 28 dBi antennas.

**CAUTION**



If for compliance with minimal separation distance requirements in a Dual Sector system the configured Tx Power is set to any value other than the maximum allowed (Maximum Allowed EIRP minus Antenna Gain for Country Codes that have limitation on maximum EIRP, 24 dBm for all other), ATPC MUST be disabled (for both sectors) to avoid power level that should not be used for the particular installation.