

# Anybus<sup>®</sup> Wireless Bolt<sup>™</sup> Serial

## STARTUP GUIDE

SP2554 1.12 en-US ENGLISH



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# Important User Information

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# Table of Contents

Page

<b>1</b>	<b>Preface .....</b>	<b>3</b>
1.1	About This Document .....	3
1.2	Document Conventions.....	3
1.3	Trademarks.....	3
<b>2</b>	<b>Safety .....</b>	<b>4</b>
2.1	General Safety Instructions .....	4
2.2	Intended Use .....	4
<b>3</b>	<b>Preparation .....</b>	<b>5</b>
3.1	General Information .....	5
3.2	I/O-Data Cycle Time .....	5
<b>4</b>	<b>Installation .....</b>	<b>6</b>
4.1	Mechanical Installation .....	6
4.2	Connector .....	7
4.3	Cabling .....	9
4.4	Digital Input .....	10
4.5	RESET Button .....	10
<b>5</b>	<b>Configuration .....</b>	<b>11</b>
5.1	Web Interface .....	12
5.2	Easy Config Modes .....	13
5.3	Set Up a Wireless Infrastructure .....	15
5.4	Factory Restore .....	19
<b>6</b>	<b>Technical Data .....</b>	<b>21</b>
6.1	Technical Specifications .....	21

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# 1 Preface

## 1.1 About This Document

This manual describes how to install Anybus Wireless Bolt Serial and set up a basic configuration.

For additional documentation and software downloads, FAQs, troubleshooting guides and technical support, please visit [www.anybus.com/support](http://www.anybus.com/support).

## 1.2 Document Conventions

The following conventions are used to indicate safety information and other important content in this document:



### **WARNING**

Instruction that must be followed to avoid a risk of death or serious injury.



### **Caution**

Instruction that must be followed to avoid a risk of personal injury.



Instruction that must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.



*Additional information which may facilitate installation and/or operation.*

## 1.3 Trademarks

Anybus® is a registered trademark and Wireless Bolt Serial™ is a trademark of HMS Industrial Networks AB. All other trademarks mentioned in this document are the property of their respective holders.

## 2 Safety

### 2.1 General Safety Instructions

**Caution**

This equipment emits RF energy in the ISM (Industrial, Scientific, Medical) band. Make sure that all medical devices used in proximity to this equipment meet appropriate susceptibility specifications for this type of RF energy.

**Caution**

Minimum temperature rating of the cable to be connected to the field wiring terminals, 90 °C.

**Caution**

Use copper wire only for field wiring terminals.



This equipment is recommended for use in both industrial and domestic environments. For industrial environments it is mandatory to use the functional earth connection to comply with immunity requirements. For domestic environments the functional earth must be used if a shielded Ethernet cable is used, in order to meet emission requirements.



This equipment contains parts that can be damaged by electrostatic discharge (ESD). Use ESD prevention measures to avoid damage.

### 2.2 Intended Use

The intended use of this equipment is as a communication interface and gateway. The equipment receives and transmits data on various physical levels and connection types.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

## 3 Preparation

### 3.1 General Information

Make sure that you have all the necessary information about the capabilities and restrictions of your local network environment before installation.

For optimal reception, wireless devices require a zone between them clear of objects that could otherwise obstruct or reflect the signal. A minimum distance of 50 cm between the devices should also be observed to avoid interference.

The characteristics of the antenna should also be considered when choosing the placement and orientation of the unit.

See the **Anybus Wireless Bolt Serial User Manual** for more information.

### 3.2 I/O-Data Cycle Time

Based on recommendations from industrial equipment suppliers, such as Rockwell and Siemens, it is recommended to use the following minimum I/O-data cycle times for PROFINET and EtherNet/IP networks:

- Wireless link Point-to-Point with Bluetooth PANU-PANU or Wi-Fi Access Point to Station: 32 ms
- Wireless link with Access Point and up to 4 wireless clients/stations, Bluetooth or Wi-Fi: 64 ms

## 4 Installation

### 4.1 Mechanical Installation

The device is intended to be mounted on top of a machine or cabinet through an M50 (50.5 mm) hole using the included sealing ring and nut.

The top mounting surface (in contact with the sealing) must be flat with a finish equivalent to Ra 3.2 or finer and cleaned and free from oils and greases.

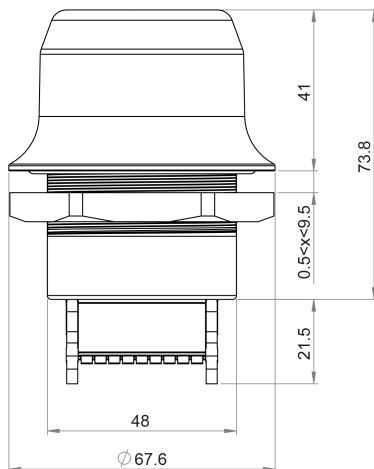
**Tightening torque:** 5 Nm  $\pm$ 10 %



Make sure that the sealing ring is correctly placed in the circular groove in the top part of the housing before tightening the nut.



Always hold the **BOTTOM** part of the unit when untightening the nut, not the top part (the cap).

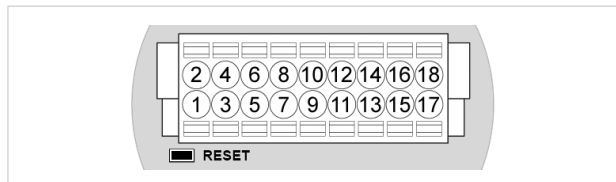


All measurements are in mm.



## 4.2 Connector

The 18-pin connector is common for several models of the Anybus Wireless Bolt. Some pins may have a different function depending on model. Unused pins should not be connected.



**Fig. 1** Connector

The location of the **RESET** button can be used as a reference for the pin numbering when the connector is attached to the Wireless Bolt Serial. Pin 1 will be the pin closest to the button.



*The Ethernet interface is intended for configuration purposes only. Wireless Bolt Serial is not designed for permanent Ethernet communication.*



*A and B marking differs between different devices, in this product A is TX+/RX+ or D+ and B is TX-/RX- or D-.*

Pin	Name	Description
1	VIN	Power + (9–30 V)
2	GND	Power Ground
3	DI	Digital input + (9–30 V)
4	DI_GND	Digital input ground
5	ETN_RD+	Ethernet receive + (white/orange)
6	ETN_RD-	Ethernet receive - (orange)
7	ETN_TD-	Ethernet transmit - (green)
8	ETN_TD+	Ethernet transmit + (white/green)
9	RS485_B	RS-485 B Line
10	FE/Shield	Ethernet: Functional Earth

Pin	Name	Description
		Serial and CAN: Functional Earth and Shield
11	RS232_TXD	RS-232 Transmit
12	RS485_A/RS232_RXD	RS-485 A Line / RS-232 Receive
13	RS232_RTS	RS-232 Request To Send Not used for Wireless Bolt Serial.
14	RS232_CTS	RS-232 Clear To Send Not used for Wireless Bolt Serial.
15	ISO_5V	Isolated 5 V for serial interface
16	RS232_GND/RS485_GND	Isolated Ground for Serial interface
17	CAN_L	CAN Low Not used for Wireless Bolt Serial.
18	CAN_H	CAN High Not used for Wireless Bolt Serial.

**Note:**

- Use RS-485 when connecting multiple devices to a Wireless Bolt Serial.
- The Ethernet wire colors refer to the **T568A** standard.
- If using a shielded Ethernet cable the shield must be unconnected.
- RS-232 and RS-485 cannot be used at the same time.
- Use termination for RS-485 and CAN when required.
- RS485 Common signal reference ground (SC) is the RS485\_GND pin.

## 4.3 Cabling



*When using **Easy Config Modes**, the Wireless Bolt Serial that is to be configured as a Client does not need to be connected to the Ethernet wires. Only power and Serial wiring are used.*

To make an Ethernet, Serial and power connector cable for Anybus Wireless Bolt Serial:

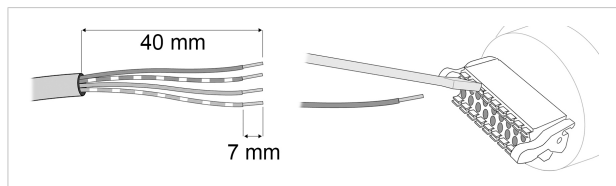


Fig. 2



*To maintain signal integrity, low emission and high immunity to EMI, untwist the twisted pair cable as little as possible.*

1. Cut off one of the connectors on a standard Cat5e or Cat6 Ethernet cable.
2. Strip off about 40 mm (1½ inch) of the cable jacket, from the orange, orange/white, green and green/white wires.  
The shield and the other wires are not used.
3. Strip off about 7 mm (¼ inch) of the isolation on each wire.
4. Push the pin spring release next to each socket on the connector and insert the correct wire end according to [Connector, p. 7](#).
5. Connect the wires from the Serial device to the connector in the same way as the Ethernet wiring.
6. Connect the wires from the power supply to the connector in the same way as the Ethernet wiring. **Make sure that polarity is not reversed.**

## 4.4 Digital Input

The digital input can be used to control roaming between Bluetooth access points (NAP). For more information, refer to the AT Reference Guide at [www.anybus.com/support](http://www.anybus.com/support).



If voltage is applied to the digital input for more than 10 seconds the unit will be reset to factory defaults.

## 4.5 RESET Button

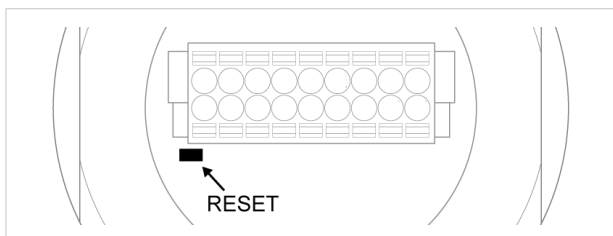


Fig. 3 RESET button

The **RESET** button is located on the bottom of the unit.

When the unit is powered on, press and hold **RESET** for >10 seconds and then release it to reset to the factory default settings.

### Recovery Mode

If the web interface cannot be accessed, the unit can be reset by starting in *Recovery Mode* and reinstalling the firmware using Anybus Firmware Manager II, which can be downloaded from [www.anybus.com/support](http://www.anybus.com/support).

To enter Recovery Mode, press and hold **RESET** during startup.



Firmware updates should normally be carried out through the web interface. Recovery Mode should only be used if the unit is unresponsive and the web interface cannot be accessed.

## 5 Configuration

Anybus Wireless Bolt Serial is configured via a web interface. Parameters can be set individually or using pre-configured **Easy Config** modes.

Advanced configuration can be carried out by issuing AT commands via the web interface or over a Telnet or RAW TCP connection to port 8080 or over serial interface. For more information, refer to the AT Reference Guide at [www.anybus.com/support](http://www.anybus.com/support).

## 5.1 Web Interface

The web interface is accessed by pointing a web browser to the IP address of the unit.



*The default address is 192.168.0.99.*

The configuration settings are described in detail in the User Manual.

**Anybus®** Wireless Bolt Serial™

**System Overview**

- Easy Config
- Network Settings
- WLAN Settings
- Bluetooth Settings
- Serial Settings
- Firmware Update
- AT Commands
- System Settings
- Help

Save and Reboot  
Cancel All Changes

IP	
IP Assignment	Static
IP Address	192.168.0.99
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.99
Internal DHCP Server	Disabled

LAN	
Connection	Connected
MAC Address	00-30-11-32-83-89

WLAN	
Status	On
Operating Mode	Client
Connection	Disconnected
World Mode (1-11,36-140)	Enabled
Channel	
Channel Bands	
Connect to (SSID)	-
Connected to (MAC)	-
MAC	00-30-11-32-83-8A

Bluetooth	
Status	On
Operating Mode	PANU (Client)
Connection	Disconnected
Local Name	bolt_32b389
Connectable	No
Discoverable	No
Connected to	-
MAC Address	00-30-11-32-83-8B

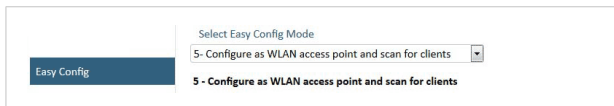
Serial	
Operating Mode	RS232
Baud Rate	57600
Data bits	8
Stop bits	1
Parity	No parity

System	
Device Name	bolt
Firmware	2.01.04 [13:22:44, Nov 21 2019]
Uptime	0 d, 0 h, 19 m, 46 s

**Fig. 4** Web interface

## 5.2 Easy Config Modes

In the web interface, you can perform the initial configuration using Easy Config Modes:

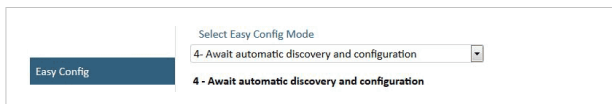


**Fig. 5** Example, Easy Config Mode 5

EC	Role	Description
<b>1</b>	Bluetooth PANU	Configure as Bluetooth client and scan for another client (PANU to PANU). Recommended setting for Bluetooth point-to-point communication. Listens for 40 seconds or until a configuration is established.
<b>2</b>	—	Reset configuration to factory defaults.
<b>3</b>	—	Reset IP settings to factory defaults.
<b>4</b>	Client	Wait for automatic configuration. Listens for 120 seconds or until receiving a configuration. Configure units in mode 4 as clients.
<b>5</b>	WLAN AP	Restart as access point and connect clients.
<b>6</b>	Bluetooth NAP	Mode 5 and 6 will time out after 120 seconds.
<b>11</b>	(any)	Activate ConfigLock mode.

The Easy Config Modes are also described when selected in the web interface.

## Default Easy Config Mode



**Fig. 6** The default mode is Easy Config Mode 4

By default Wireless Bolt and Bridge starts in **Easy Config Mode 4**.

Configuration of Wireless Bolt and Bridge Clients can be performed wirelessly, via a PC connected to the Wireless Bolt or Bridge Access Point.

After factory reset, Wireless Bolt will by default start in Easy Config Mode 4, if there is no Ethernet connection.

When connection is established via the wireless interface, the Wireless Bolt or Bridge Client does not need to be connected with an Ethernet cable during configuration.



## 5.3 Set Up a Wireless Infrastructure

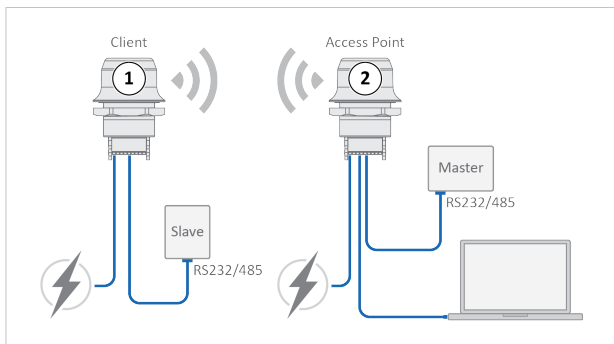
Connect two or more Wireless Bolt Serial units via WLAN or Bluetooth using Easy Config.

When installing more than one Wireless Bolt Serial in the bridge, configure the Wireless Bolt Serial connected to the Master device as the Access Point. Configure the Wireless Bolt Serial connected to the *Slave* as a *Clients*.



*When the Wireless Bolt Serial Access Point is connected to a Modbus network, the Master device must be connected to the Access Point.*

### 5.3.1 Connecting the Devices



**Fig. 7** Serial bridge example

1. Connect *Client unit 1* to a Serial device.
2. Connect *Access Point unit 2* to the master device.
3. Connect *Access Point unit 2* to your PC, with an Ethernet cable.
4. Connect *Access Point unit 2* to power.

### 5.3.2 Activate Easy Config

1. Navigate to the web interface of *Access Point unit 2*.  
The default address to *Access Point unit 2* is **192.168.0.99**.
2. Activate one of the following Easy Config Modes:
  - **Easy Config Mode 1** for Bluetooth PANU-PANU. Used for setting up point-to-point communication.
  - **Easy Config Mode 5** for WLAN
  - **Easy Config Mode 6** for Bluetooth
3. Connect *Client unit 1* to power.
  - *Client unit 1* starts up in **Easy Config Mode 4** and is open for automatic configuration during 120 seconds.
  - *Access Point unit 2* will discover and configure *Client unit 1* as a *Client* and configure itself as an *Access Point*.
  - *Client unit 1* will be assigned the first free IP address in the same Ethernet subnet as *Access Point unit 2*.  
The default address to the first *Client unit* is **192.168.0.100**.
  - If no connection is established during Easy Config Mode:
    - Ensure that *Client unit 1* is disconnected from Ethernet.
    - Disconnect *Client unit 1* from power and repeat Activate Easy Config step 5 and 6.

### 5.3.3 Adding More Wireless Bolt Serial Clients

When using **Easy Config Mode 1**, continue with Serial Configuration.

When using **Easy Config Mode 5** or **Easy Config Mode 6**, up to 6 additional Wireless Bolt Serial Clients can be added to the Serial bridge.

1. To add more *Client units*, repeat Connecting the Devices step 1 and the Activate Easy Config steps.
  - Each new *Client unit* will be assigned the next free IP address in the current Ethernet subnet.

### 5.3.4 Serial Configuration

From the PC connected to *Access Point unit 2*:

1. Navigate to the web interface of each Wireless Bolt Serial unit.
2. Select the **Serial Settings** tab.
3. Configure the serial port settings:

Operating mode	Specify the physical serial communication interface. Select <b>RS232</b> or <b>RS485</b> .
Baud rate	Select a baud rate to specify the rate at which information is transferred in a communication channel. To avoid timing problems if different baud rates are set on the master and the slaves, set the lowest baud rate on the master.
Data bits	Specify the number of data bits to transmit. Select <b>5</b> , <b>6</b> , <b>7</b> or <b>8</b> bits.
Parity	Specify if parity should be used to detect errors in code. Select <b>No parity</b> , <b>Odd parity</b> or <b>Even parity</b> .
Stop bits	Specify the number of stop bits used to indicate the end of data transmission. Select stop bit <b>1</b> or <b>2</b> .
Modbus Optimization	When Modbus Optimization is selected, the communication is optimized to keep all Modbus packets together in one frame. This mode should only be enabled when communicating with Modbus RTU devices.
TCP Mode	Select a TCP Mode from the dropdown menu: Client: Wireless Bolt Serial acts as a client and establishes a connection to the TCP server. Server: Wireless Bolt Serial acts as a server and listens for incoming connections from the TCP client.
TCP Server IP	When TCP Mode Client is enabled, enter the TCP Server IP address.
Modbus Gateway Mode	When TCP Mode Server is enabled, select Modbus Gateway Mode to enable Modbus TCP to Modbus RTU gateway functionality.
TCP Port	When TCP Mode is enabled, enter a TCP Port number. Default port: 5005 When Modbus Gateway Mode is active, the port automatically changes to Modbus TCP port 502.

### 5.3.5 Serial Installation

1. Connect each Wireless Bolt Serial unit to a device or machine equipped with a Serial port.

For more information, refer to [Connector, p. 7](#) and [Cabling, p. 9](#).

## 5.4 Factory Restore

Any one of these actions will restore the factory default settings:

- Clicking on **Factory Restore** on the **System Settings** page
- Executing **Easy Config Mode 2**
- Issuing the AT command **AT&F** and then restarting the unit
- Holding pressed for >10 seconds and then releasing it

### Default Network Settings

<b>IP Assignment</b>	Static
<b>IP Address</b>	192.168.0.99
<b>Subnet Mask</b>	255.255.255.0
<b>Default Gateway</b>	192.168.0.99
<b>Internal DHCP Server</b>	Disabled
<b>DHCP Interfaces</b>	All

### Default WLAN Settings

<b>Operating Mode</b>	Client
<b>Channel Bands</b>	2.4 GHz & 5 GHz
<b>Authentication Mode</b>	WPA/WPA2-PSK
<b>Channel</b>	Auto
<b>Bridge Mode</b>	Layer 3 IP forward

### Default Bluetooth Settings

<b>Operating Mode</b>	PANU (Client)
<b>Local Name</b>	[generated from MAC address]
<b>Connectable</b>	No
<b>Discoverable</b>	No
<b>Security Mode</b>	Just works
<b>Bluetooth LE</b>	Operating Mode: Disabled Connectable: No Discoverable: No

### Default Serial Settings

<b>Operating Mode</b>	RS232
<b>Baud Rate</b>	57600 bits/s

**Default Serial Settings (continued)**

<b>Data bits</b>	8
<b>Stop bits</b>	1
<b>Parity</b>	No parity
<b>Modbus optimization</b>	Off
<b>TCP Mode</b>	Server
<b>Modbus Gateway Mode</b>	Disabled
<b>TCP port</b>	5005

## 6 Technical Data

For complete technical specifications and regulatory compliance information please visit [www.anybus.com/support](http://www.anybus.com/support).

### 6.1 Technical Specifications

Order code	AWB2010	AWB2011
Color	Black	White top and black base
Connector	Included plug connector (2x9p; 3.5mm, Phoenix DFMC 1.5/9-ST-3.5, push-in spring connection).	
Range	Up to 100 meters free line of sight	
Antenna	One internal antenna. Dual-band 2,4GHz and 5GHz.	
Temperature compatibility	Operating: Shadow black and white: -40 to +65 °C Direct sunlight: Black -40 to +45 °C, White -40 to +65 °C Storage temperature: -40 to +85 °C	
Weight	81 g	
Housing material	Top: Valox 357X(f1) PBT/PC. Suitable for outdoor use with respect to exposure to ultraviolet light, water exposure and immersion in accordance with UL 746C. Bottom: Celanex: XFR 6840 GF15. PBT glass reinforced plastic.	
IP protection class	IP66, IP67 and UL Type 4X for top (outside the host), IP21 for bottom (inside the host).	
Dimensions	Diameter: 68 mm. Height: 75 mm (95 mm including connector). Outside height: 41 mm.	
Mounting	M50 screw and nut (50.5 mm hole needed).	
Power	9-30 VDC (-5% +20%), Cranking 12V (ISO 7637-2:2011 pulse 4). Reverse polarity protection. (Consumption: 0.7W idle, 1.7W max.)	
Configuration	Three different methods: 1. Accessing the built-in web pages in the product 2. Sending AT-commands via Telnet/Raw TCP and Serial 3. Using Easy Config modes.	
Vibration compatibility	Sinusoidal vibration test according to IEC 60068-2-6:2007 and with extra severities; Number of axes: 3 mutually perpendicular (X:Y:Z), Duration: 10 sweep cycles in each axes,	

Order code	AWB2010	AWB2011
	<p>Velocity: 1 oct/min, Mode: in operation, Frequency: 5-500 Hz, Displacement <math>\pm 3.5</math> mm, Acceleration: 2g.</p> <p>Shock test according to IEC 60068-2-27:2008 and with extra severities; Wave shape: half sine, Number of shocks: <math>\pm 3</math> in each axes, Mode: In operation, Axes <math>\pm X,Y,Z</math>, Acceleration: 30 g, Duration: 11 ms.</p>	
<b>Humidity compatibility</b>	EN 600068-2-78: Damp heat, +40°C, 93% humidity for 4 days.	
<b>Digital input</b>	Usage: To control roaming between Bluetooth access points (NAP)	
<b>Wired interface</b>	<p>Serial: RS232/485</p> <p>Baud rate: 2.400 - 921.600 kbit/s, data bits 5-8, stop bits 1-2, parity None, Odd, Even.</p> <p>Transparent serial protocol transfer including support for Modbus-RTU.</p> <p>Ethernet: 10/100BASE-T with automatic MDI/MDIX auto cross-over detection. For configuration only.</p>	



Order code	AWB2010	AWB2011
<b>Wireless LAN</b>	<p><b>Wireless standards:</b> WLAN 802.11 a, b, g, n, d, r (fast roaming).</p> <p><b>Operation modes:</b> Access point or Client</p> <p><b>WiFi channels:</b> 2.4 GHz, channel 1-11 + 12-13 depending on regulatory domain scan. 5 GHz Access Point: 36-48 (U-NII-1), 5 GHz Client: 100-116 + 132-140 and 120-128 depending on regulatory domain scan. (U-NII-1, U-NII-2, U-NII-2e).</p> <p><b>RF output power:</b> 13.75 dBm</p> <p><b>Max number of slaves for access point:</b> 7</p> <p><b>Power consumption:</b> 54mA@24VDC</p> <p><b>Net data throughput:</b> 20 Mbps. Link speed: max 65 Mbps (802.11n SISO)</p> <p><b>Security:</b> WEP 64/128, WPA, WPA-PSK and WPA2, TKIP and AES/CCMP, LEAP, PEAP including MS-CHAP.</p>	
<b>Classic Bluetooth</b>	<p><b>Wireless standards (profiles):</b> PANU &amp; NAP</p> <p><b>Operation modes:</b> Access point or Client</p> <p><b>RF output power:</b> 9.75 dBm</p> <p><b>Max number of slaves for access point:</b> 7</p> <p><b>Power consumption:</b> 36 mA@24VDC</p> <p><b>Net data throughput:</b> ~1 Mbps</p> <p><b>Bluetooth version support:</b> Classic Bluetooth v2.1</p> <p><b>Security:</b> Authentication &amp; Authorization, Encryption &amp; Data Protection, Privacy &amp; Confidentiality, NIST Compliant, FIPS Approved</p>	

