

User Manual & Installation Instructions V1



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Symbols



This symbol indicates useful advices and tips.



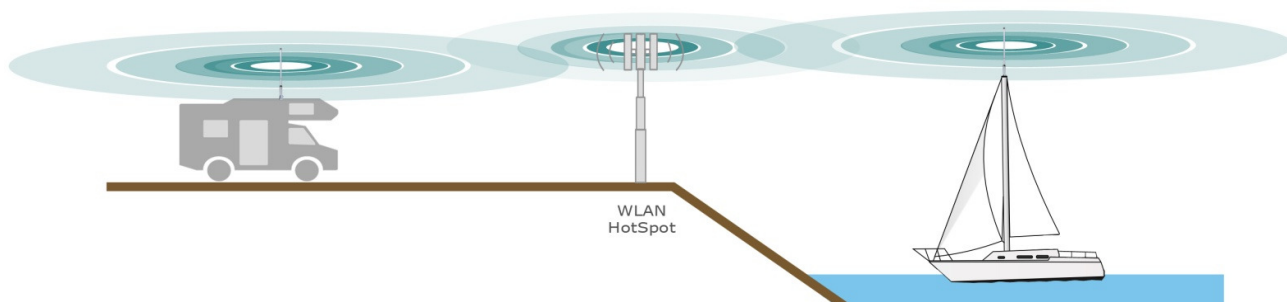
This symbol indicates important recommendations that should be observed in any case to avoid malfunctions.

Communication with green energy...

Nowadays it is essential for most people to be online, well informed and up-to date at any time and on any occasion. No matter how you spend your weekends and holidays -sailing or camping- you will appreciate easy access to the net without limitations or complications.

Most marinas, and ports, campsites or hotels offer WLAN service, either free of charge or on subscription. In order to make use of this service, also inside a boat under deck or inside a camper the WEB-Catcher of SILENTWIND is the perfect solution to establish a fast and reliable WLAN connection. The web catcher antenna set enables you to receive even distant signals of WLAN hotspots simultaneously for your notebook, tablet or smartphone on board or anywhere else without any cable connection.

Thank you for choosing our Web-Catcher. Enjoy stable internet connection with our Wi-Fi antennas!



Please carefully study the manual before you install the items and follow the instructions.



Installation instructions

Please follow the instructions given for each step of the installation of the items to ensure the optimal function of the devices.



Legal regulations and legal limits

Please note that legal regulations -especially the maximum legal radiation of a WLAN device- depend on national laws varying in European countries and the US.



Use inside a car

In case you use the device inside the car, don't forget: safety first! Both hands must control the wheel and you should use the device only when the engine is switched off.



Hospitals and medical equipment

Please observe the applicable laws and regulations. Please switch off the device in vicinity of medical equipment.



Temperature and humidity

Please note that the recommended operating temperature must not be under -15° or above 45°C, humidity should be between 0 and 99%, IP66.



Rain, humidity and Thunderstorms.

The WEB-Catcher is weatherproof and suitable for outdoor use. But the full submersion of the device in water must be avoided..



Servicing and maintenance

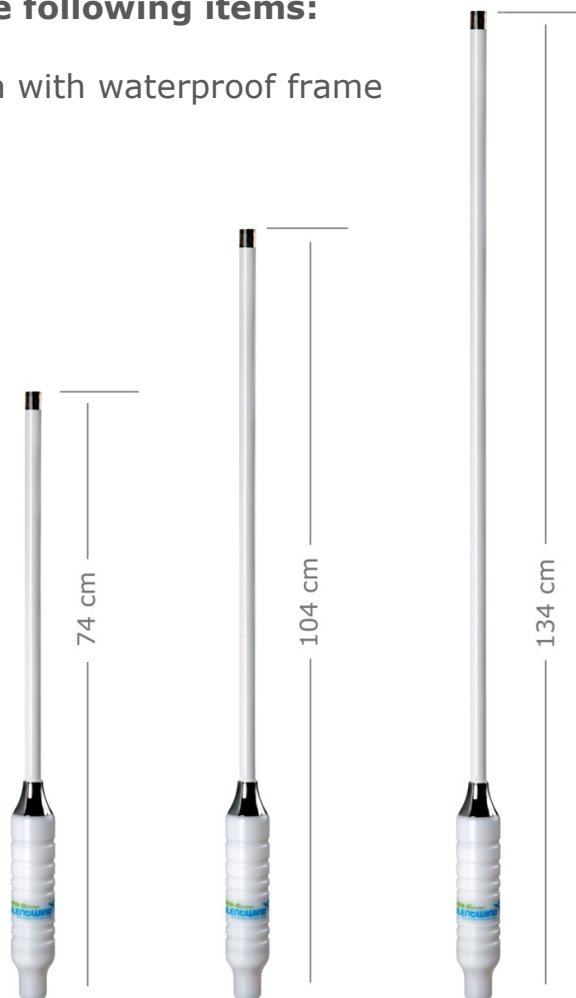
This unit has no parts that require maintenance.

2. First steps

Congratulations to your decision for a WEB-Catcher, the active Omni antenna from SILENTWIND. Our WEB-Catcher is an efficient WLAN active Omni antenna generating outstanding WLAN connections, even at a long distance and in unfavorable conditions.

The WLAN set includes the following items:

- 2,4Ghz WLAN-active antenna with waterproof frame
- for the following ranges:
 - 8,5dBi
 - 10dBi
 - 12,5dBi



Scope of delivery:



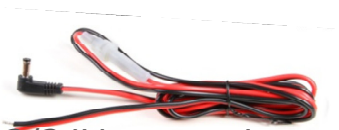
- WLAN-antenna electronics
Type: SWS1512



- WLAN-long-range-router
300Mbps Type: SWR3022



- Power adaptor AC: 100V -
240V | DC 12V 1A



- 12/24V connecting cable



- LAN-cable with RJ45
adaptors.
Available lengths:
10m | 20m | 30m | on
request



- PoE adaptor



- User manual and
installation instructions

3. Installation

3.1 Connection of antenna electronics with antenna



Connect the antenna with the item containing the electronics.
Fix the screw connection with a pipe wrench to get a reliable connection.

3.2 Installation of antenna



Unscrew the sealing cap of the cable inlet and pull out the sealing ring from the housing.

3.3 Installation of antenna cable



Put the Lan network cable through the end cap and the antenna housing. Connect the cable adaptor with the WLAN antenna electronics item.

3.4 Closing of housing

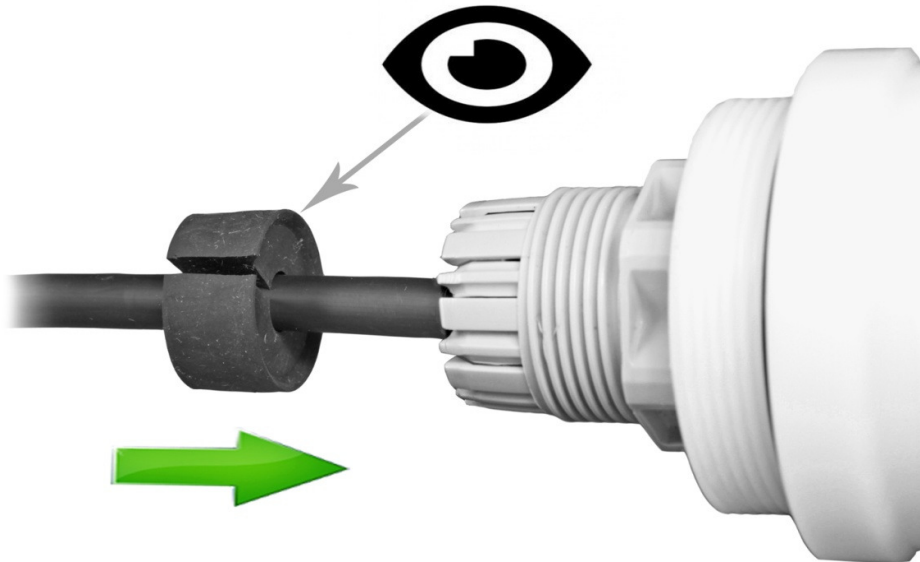


Screw the housing to the antenna.

Do not turn the antenna or the cable, they are FIXED!



3.5 Installation of sealing ring



Now push the sealing ring over the cable and slide the sealing ring into the bottom of the housing.

Make sure that the rubber lip at the sealing ring must be pushed inside the housing!



3.6 Installation of cap



Now your WLAN active antenna is ready for installation.

The 1"UNF x14 internal thread offers a variety of fixing options.



The following fixing options are available:

3.7 Options of fixing systems 1" UNF x14 threads (optional)



2-dimensional
screwable tilting
bracket



3-dimensional
screwable tilting
bracket



2-dimensional
magnetic tilting
bracket



mastmounting bracket
/ horizontal&vertical



double suction cup
mount/ with 2D tilt
link

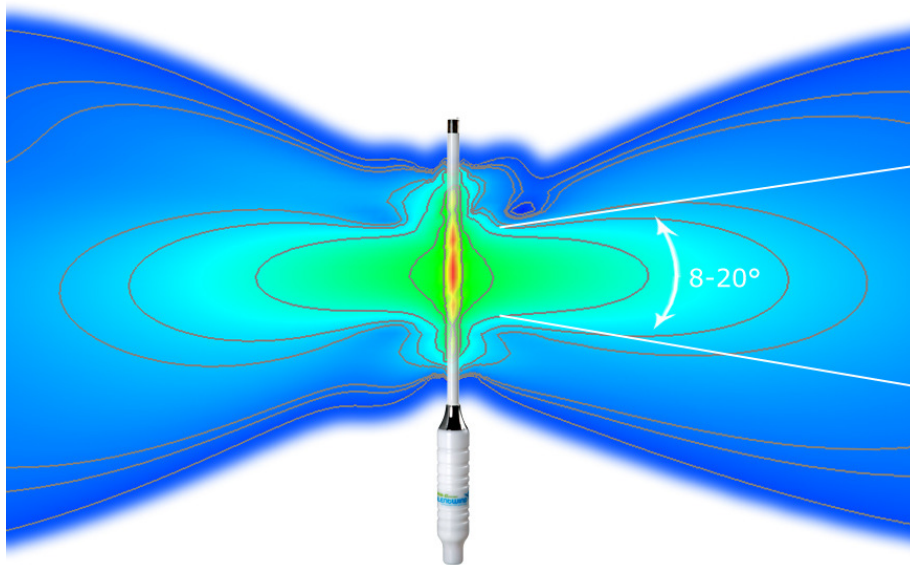


2-dimensional railing
bracket for diameters of
25-30mm



4. Functioning of the device

The WEB-Catcher transmits and receives the WIFI signals in a flat, circular cone (donut) in an angle of 8-20° depending on the type of the antenna. This specific characteristic considerably increases the range of communication (transmission and reception power).



You do not need a long HF antenna cable due to the direct connection of antenna and WLAN electronics. Thus there is no loss of the maximum possible transmission and reception power. Therefore the range of communication can be 50 times higher than that of the integrated systems in notebooks. The radiation power of the antenna can be adjusted in the router set up:

- Type: SW08WL up to 35,5dBm (3548,13mW)
- Type: SW10WL up to 37dBm (5110mW)
- Type: SW12WL up to 39,5dBm (8912,50mW)

5. Positioning of antenna

If you install the antenna in vertical position in unobstructed sight of the WLAN hotspot, you will get the best horizontal communication range.



A wrong installation of the antenna will substantially reduce the maximum possible communication range.



Please also note that a high difference in altitude between hotspot and antenna may cause a bad connection or a total loss of the connection.



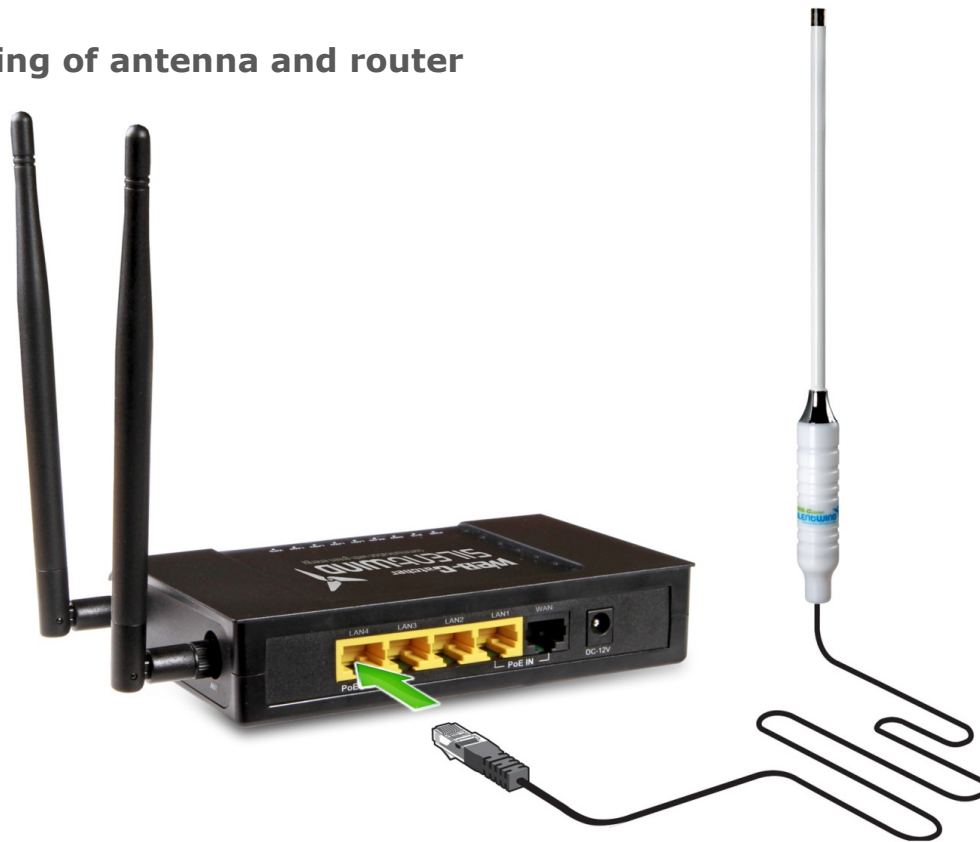
Any obstruction between antenna and hotspot weakens the WLAN waves by reflection or deviation. Therefore an optimal position of the antenna is essential for a good WLAN connection.



Paper, cardboard, textiles, glass, wood, thin plastics and dry leaves are relatively permeable to WLAN waves whereas metal, roof tiles, soundproof windows and thermo glass and especially ferroconcrete are hardly permeable.

6. Wiring instructions

6.1 Wiring of antenna and router



Connect the connection cable of the antenna plugging it into the left port **LAN4** at the back of the WLAN router.

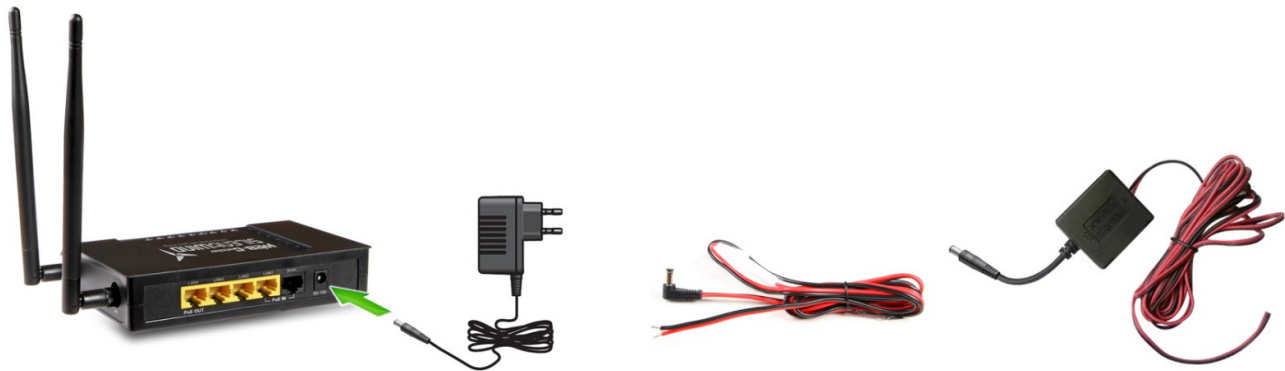


The power supply for the electronics of the antenna is provided via PoE (power over Ethernet). An additional power supply is not necessary. The maximum cable length should not exceed 80m. We recommend using Lan cable CAT6SFTP.



Make sure that you do not use any other port than LAN4 to connect the antenna.

6.2 Power supply of the router



110V - 240V AC
power supply unit

12V - 18V DC
connecting cable *

19V - 35V DC
connecting cable *

* Set depending on
requested connection

Connect the power supply unit (PSU) to the power supply plug of the router and plug the PSU into a socket of 110-240V AC of the power source. Connect 12V cable to the power supply socket of the router if you want to use a 12-18V DC power source. Connect the 24V cable to the power supply socket of the router if you want to use a 19V-35V DC power source.

6.3 Use of antenna without router or different brand router



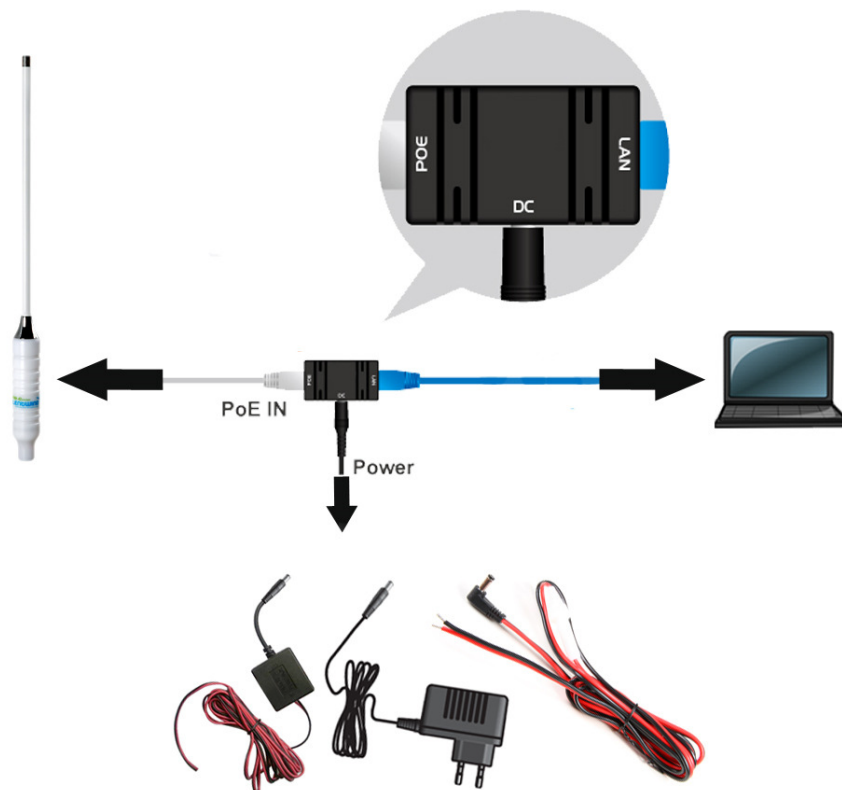
You can connect the antenna directly to the PC/notebook:

Connect the LAN cable of the antenna with the PoE to the PoE port. Then connect your PC/notebook and the LAN port of the PoE adaptor with the patch cable (scope of delivery). At the PoE adaptor (on the side) connect the 12V low voltage power plug with the socket "DC-IN". The power LED now shines green.

Instead of the PC a different brand router can be connected.



In this case mind the correct setting/configuration of the router.



6.4 Connection of additional devices with the router

All devices that can be connected to WLAN, e.g. notebook, smartphone, tablet, printer, IP phone or IP camera) can be connected with the WLAN router SWR3022.

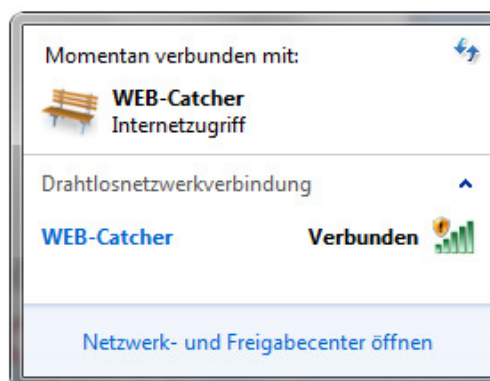
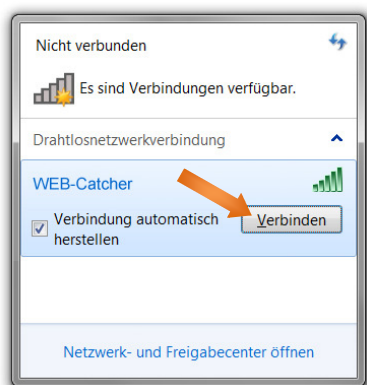
The 3 LAN (LAN1, LAN2 and LAN3) ports enable the connection of wired devices via Ethernet.



7. Initial operation / startup

7.1 Wireless per WLAN

After switching on the router it takes about 40 seconds before a new wireless network called WEB-Catcher pops up in the list of **available WLAN networks** on your PC/notebook/tablet/smartphone. Click "connect" to initiate the connection.



On delivery the WLAN network is open. We strongly advise to activate the network key. See [page 28](#): network encryption.



7.2 Wired LAN

Connect LAN port 1,2 or 3 of the router with your PC/notebook with a LAN (patch) cable.



Set your network card on DHCP-Client. The required IP address will be generated automatically..



A correct connection via WLAN or LAN can only be established if the antenna is installed **EXACTLY** in line with these instructions and is connected with the router in [port 4](#)!

8. Configuration of software

8.1 User interface

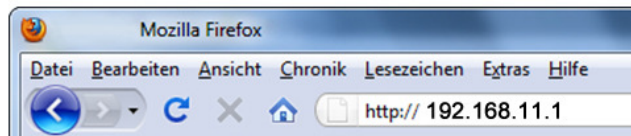
The router has a user interface that you can open with a PC/tablet/smartphone in an internet browser.

You set up the antenna and the WLAN router as shown on the interface. You switch on/off functions and also get information about your antenna and the quality of the connection.

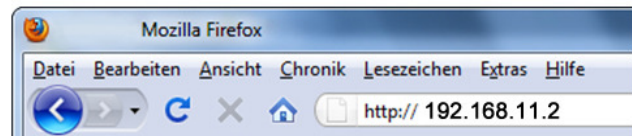
8.2 Opening of user interface

The user interface can be opened at any computer that is connected with the router.

1. Open an internet browser on your computer.
2. Enter the numbers and dots given below into the input field of the browser.



- Interface of antenna:
192.168.11.1



- Interface router:
192.168.11.2

The interface is opened.

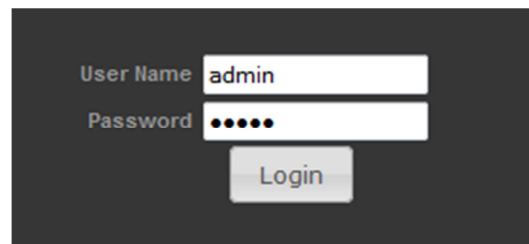


The internet browser "Safari" of Apple is not fully supported. When using a device with IOS operating system (I-Pad, I-Phone) for the software configuration, the browser "Google Chrome" must be used. You can find the application in the App Store for download.

9. WLAN connection with distant hotspot

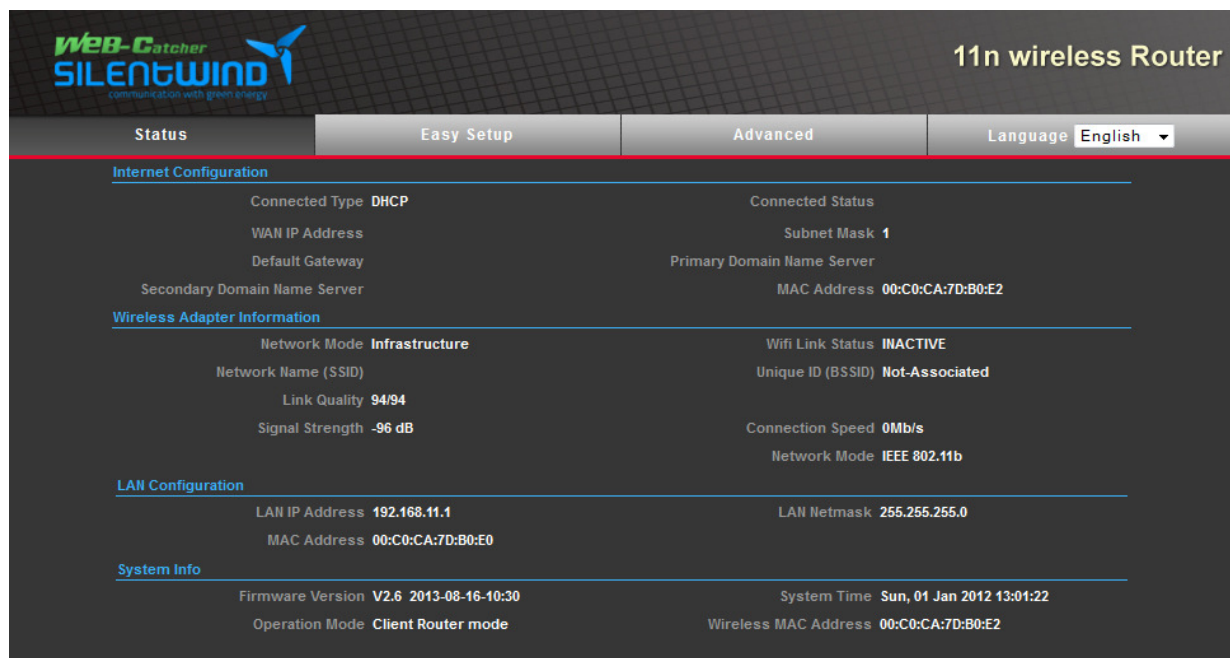
9.1 Registration of antenna 192.168.11.1

In order to open the user interface of the antenna enter **admin** both into the windows "user name" and "Password". Then click on "**log-in**".



A login form with a dark background. It contains two input fields: "User Name" with the text "admin" entered, and "Password" with six dots. Below the fields is a "Login" button.

9.2 Status overview

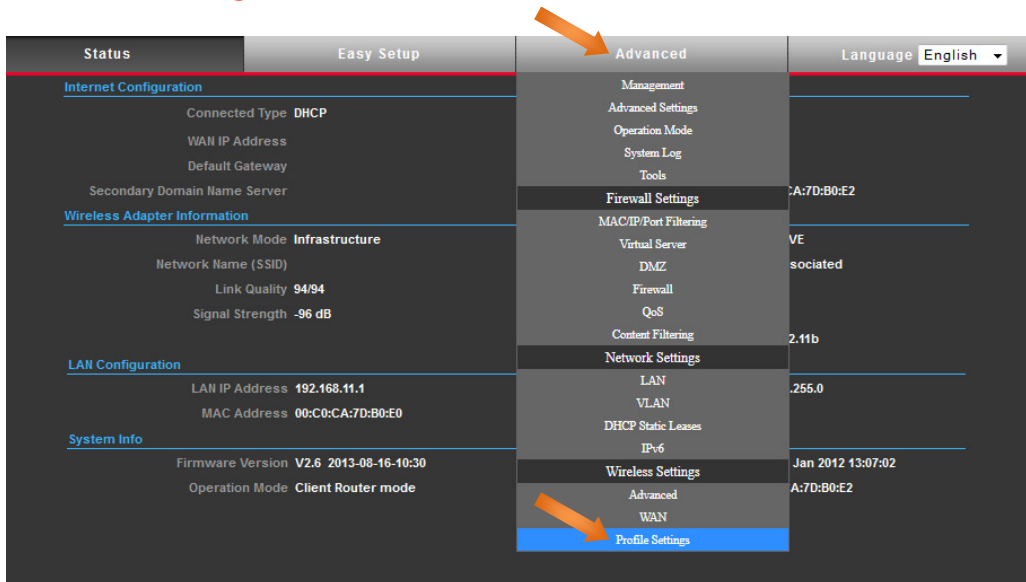


The screenshot shows the "11n wireless Router" status overview page. The page has a dark theme with a grid pattern. At the top left is the "Web-Catcher SILENTWIND" logo. The title "11n wireless Router" is at the top right. Below the title is a navigation bar with tabs: "Status" (selected), "Easy Setup", "Advanced", and "Language" (set to "English"). The main content area is divided into several sections:

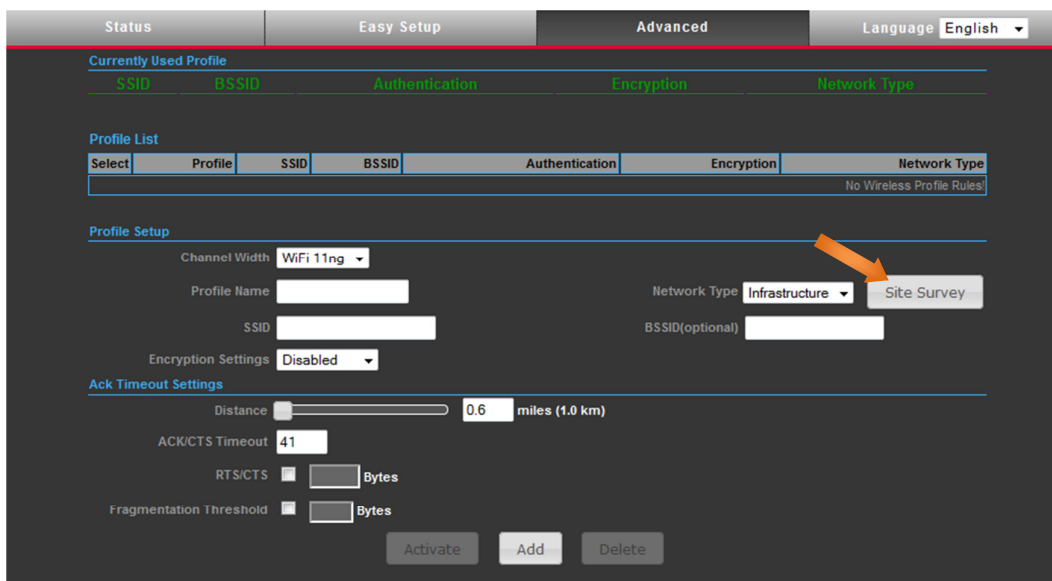
- Internet Configuration:**
 - Connected Type: **DHCP**
 - WAN IP Address
 - Default Gateway
 - Secondary Domain Name Server
 - Connected Status
 - Subnet Mask: **1**
 - Primary Domain Name Server
 - MAC Address: **00:C0:CA:7D:B0:E2**
- Wireless Adapter Information:**
 - Network Mode: **Infrastructure**
 - Network Name (SSID)
 - Link Quality: **94/94**
 - Signal Strength: **-96 dB**
 - Wifi Link Status: **INACTIVE**
 - Unique ID (BSSID): **Not-Associated**
 - Connection Speed: **0Mb/s**
 - Network Mode: **IEEE 802.11b**
- LAN Configuration:**
 - LAN IP Address: **192.168.11.1**
 - MAC Address: **00:C0:CA:7D:B0:E0**
 - LAN Netmask: **255.255.255.0**
- System Info:**
 - Firmware Version: **V2.6 2013-08-16-10:30**
 - Operation Mode: **Client Router mode**
 - System Time: **Sun, 01 Jan 2012 13:01:22**
 - Wireless MAC Address: **00:C0:CA:7D:B0:E2**

9.3 Establishing connection with distant WLAN hotspot

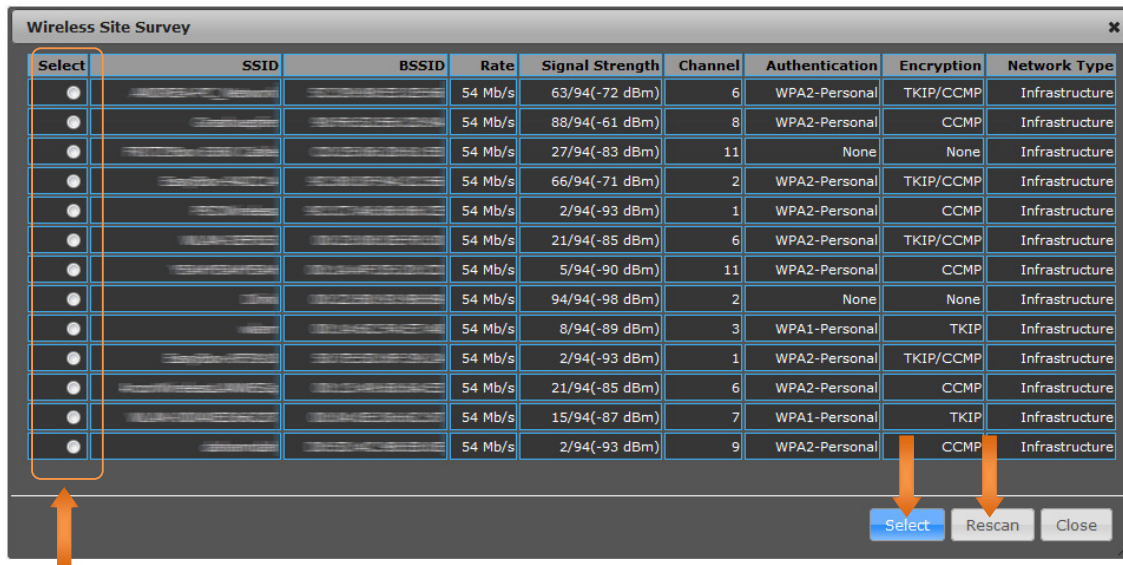
Click on the tab "**Advanced**" and then further down the list on the button "**Profile settings**"



After that click on the button "**Site Survey**". A new window will open showing available hotspots.



9.4 Selection of WLAN hotspot



Click on the hotspot that you want to be connected with. After that you click on the button "Select". The parameters will be applied.



"Authentication and encryption" show you the encryption status.



Under the tabs SSID and BSSID the name of the network and the MAC address are shown.



If you click the button "Rescan" repeatedly, further hotspots that were not given the first time will be shown.

9.5 Security of WLAN hotspot

WLAN-Station unverschlüsselt

Profile Setup

Channel Width: WiFi 11ng

Profile Name: Camping am SEE

Network Type: Infrastructure

SSID: WEB-Catcher

BSSID(optional): 00:0D:CA:7F:81:F4

Encryption Settings: Disabled

Ack Timeout Settings

Distance: 0.6 miles (1.0 km)

ACK/CTS Timeout: 41

RTS/CTS: [] Bytes

Fragmentation Threshold: [] Bytes

Buttons: Activate, Add, Delete

WLAN-Station verschlüsselt

Profile Setup

Channel Width: WiFi 11ng

Profile Name: Hotel am Meer

Network Type: Infrastructure

SSID: Hotel-Hotspot

BSSID(optional): 2f:a6:52:d6:c3:65

Encryption Settings: WPA2-PSK

Encryption: CCMP

Passphrase: [REDACTED]

Ack Timeout Settings

Distance: 0.6 miles (1.0 km)

ACK/CTS Timeout: 41

RTS/CTS: [] Bytes

Fragmentation Threshold: [] Bytes

Buttons: Activate, Add, Delete

Enter the WLAN code of the owner's hotspot into the field "**passphrase**", then click the button "**Activate**" to establish the connection.

If the WLAN hotspot is unencrypted, you only click the button "**Activate**" to establish the connection.



You can enter any desired name into the input window "**Profile Name**"



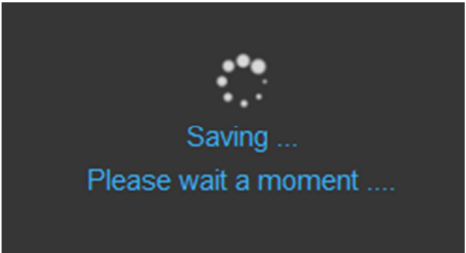
If you know the distance to the hotspot, you can enter the exact distance to the input window "**Distance**". The correct adjustment increases the reliability of the connection.



You should not change any other adjustments to achieve an optimal operation of your device.

9.6 Saving adjustments

Saving all data takes about 40 seconds

A dark grey rectangular box with a circular loading icon at the top. Below the icon, the text "Saving ..." is displayed in a light blue font, followed by "Please wait a moment" in a white font.

Saving ...
Please wait a moment

9.7 Information about connection

Status	Easy Setup	Advanced	Language English ▾
Internet Configuration			
Connected Type	DHCP	Connected Status	Connected
WAN IP Address	192.168.1.23	Subnet Mask	255.255.255.0
Default Gateway	192.168.1.3	Primary Domain Name Server	192.168.1.3
Secondary Domain Name Server	192.168.1.3	MAC Address	00:C0:CA:7D:B0:E2
Wireless Adapter Information			
Network Mode	Infrastructure	Wifi Link Status	COMPLETED
Network Name (SSID)	WLAN-Netz	Unique ID (BSSID)	90:F6:52:E6:C8:9A
Link Quality	50/94	Connection Speed	150 Mb/s
Signal Strength	-76 dB	Network Mode	IEEE 802.11ng
LAN Configuration			
LAN IP Address	192.168.11.1	LAN Netmask	255.255.255.0
MAC Address	00:C0:CA:7D:B0:E0		
System Info			
Firmware Version	V2.6 2013-08-16-10:30	System Time	Sun, 01 Jan 2012 13:02:09
Operation Mode	Client Router mode	Wireless MAC Address	00:C0:CA:7D:B0:E2

In the status overview the field "connected status" will change to "**connected**" within 10 seconds. The WLAN connection between the distant hotspot and the active antenna is established.

If you want WLAN connections with other hotspots, you must repeat all steps starting with 9.1.

10. Transmission and radiation power

10.1 Regulations concerning the maximum transmission power



According to regulations in the EU and many other countries (EU: RTTE regulation) the radiation power (EIRP - Equivalent Isotropic Radiation Power) of a WLAN device must not exceed 20 dBm / 100mW. The radiation power of a WLAN device is the sum of the transmission power of the router and the antenna gain. In order to calculate the radiation power of the WLAN device all power and attenuation levels in dBm must be known. See calculation example below.



If you use your device outside the EU, observe the national regulations of the country in question. In the US, for example, EIRP is 1000mW / 30dBm.

In case the legal radiation power is exceeded, the producer refuses any liability obligations!

Example:

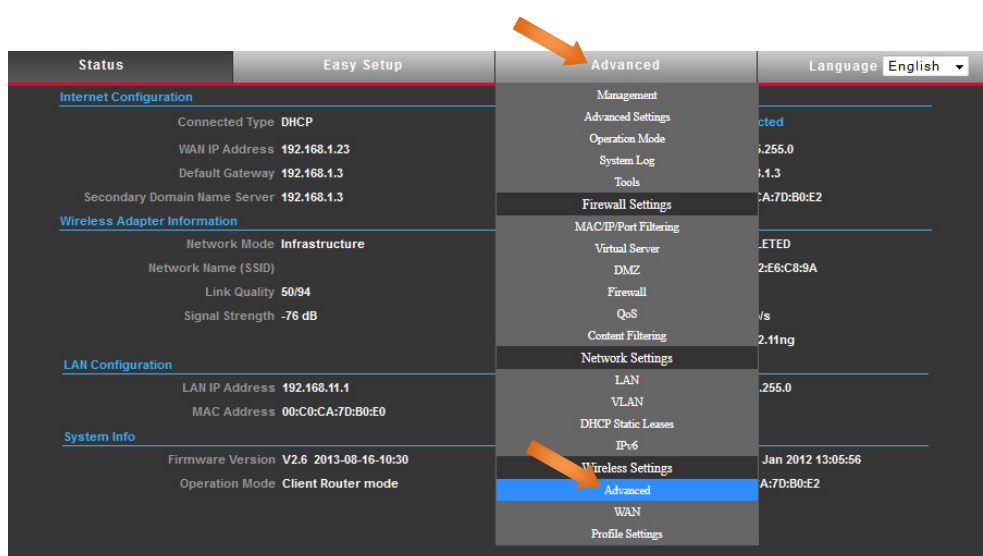
+ 10,0 dbm (transmission power WLAN-device)
+ 10,0 dbi (antenna gain)
= 20 dbm radiation power EIRP

Converting dBm to mW / mW to dBm

- $\text{mW in dBm} = 10\log_{10}(\text{Watt}) + 30$
- $\text{dBm in mW} = 10(\text{dBm}/10)$

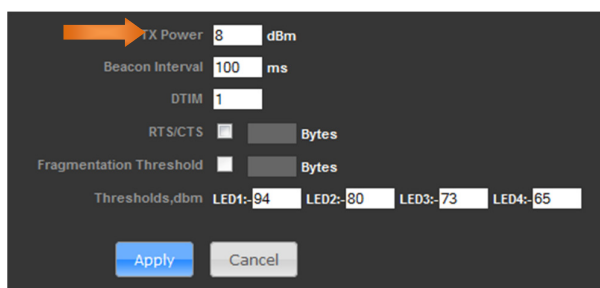
10.2 Adjusting WLAN transmission power

In order to adjust the transmission and radiation power of your WEB-catcher antenna you must click on the tab "Advanced" and further down under the menu item "wireless settings" on the button "Advanced".



In the input window "TX Power" the transmission power of the WLAN electronics can be set from 3 to 27dBm. .

On delivery the transmission power is set on 8dBm to keep the legal radiation power limit of 20dBm (for type SW12WL).



SW12WL: 8dBm + 12dBi = 20dBm

After input of the transmission power click on "Apply".

For the antennas 8dBi and 10dBi the transmission power can be set 10 or 12 dBm to receive the permitted 20dBm.

11. WLAN-Router SWR3022

11.1 Registration of router 192.168.11.2

Open the user interface of the router as explained on page 19 / 8.2.

The screenshot shows the web interface of an 802.11n Long Range 2T2R AP/Router. The left sidebar contains a 'Site contents' menu with options: Setup Wizard, Operation Mode, Wireless, TCP/IP Setting, Firewall, QOS, and Management. The main content area is titled 'Status' and includes a description: 'This page shows the current status and some basic settings of the device.' Below this, there are three expandable sections: System, Wireless Status, and TCP/IP Status. The System section shows Uptime (0day:0h:6m:19s), Firmware Version (v3.2.0.0.5), and Build Time (Thu Nov 21 01:22:10 EST 2013). The Wireless Status section shows Mode (AP), Band (2.4 GHz (B+G+N)), SSID (WEB-Catcher), Channel Number (1), Encryption (Disabled), BSSID (00:c0:ca:7f:81:f4), and Associated Clients (0). The TCP/IP Status section shows Attain IP Protocol (Fixed IP), IP Address (192.168.11.2), Subnet Mask (255.255.255.0), Default Gateway (192.168.11.1), DHCP Server (Disabled), and MAC Address (00:c0:ca:7f:81:f2). There is also a WAN Status section at the bottom showing Attain IP Protocol (Getting IP from DHCP server...), IP Address (0.0.0.0), Subnet Mask (0.0.0.0), Default Gateway (0.0.0.0), and MAC Address (00:c0:ca:7f:81:f3).

System	
Uptime	0day:0h:6m:19s
Firmware Version	v3.2.0.0.5
Build Time	Thu Nov 21 01:22:10 EST 2013

Wireless Status	
Mode	AP
Band	2.4 GHz (B+G+N)
SSID	WEB-Catcher
Channel Number	1
Encryption	Disabled
BSSID	00:c0:ca:7f:81:f4
Associated Clients	0

TCP/IP Status	
Attain IP Protocol	Fixed IP
IP Address	192.168.11.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.11.1
DHCP Server	Disabled
MAC Address	00:c0:ca:7f:81:f2

WAN Status	
Attain IP Protocol	Getting IP from DHCP server...
IP Address	0.0.0.0
Subnet Mask	0.0.0.0
Default Gateway	0.0.0.0
MAC Address	00:c0:ca:7f:81:f3

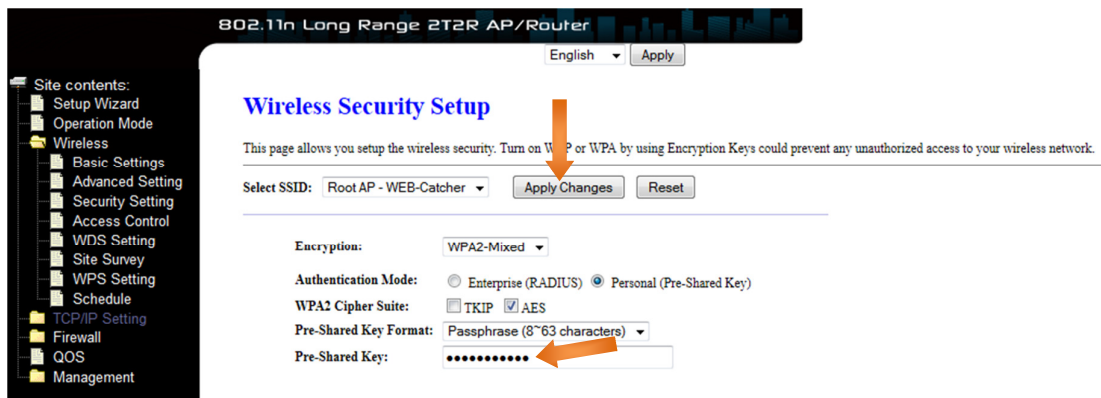
After successful registration you will get the status information of the router.

11.2 Selection of WLAN encryption of the router

Click in the menu on the left on "**Wireless**" and then on "**Security setting**". In the dropdown menu you select "**WPA2-Mixed**" under encryption.



Enter any desired code made up of 8 characters including letters and numbers into the input window "**Pre-Shared Key**". Save the entry by clicking on "**Apply Changes**". Confirm a restart by clicking on the button "Reboot Now."



Please note that the WLAN connection is encrypted after restarting the router. The connection between router and your device must be reactivated with the new WLAN code.
See 7.1, page 18

12. Firmware update

12.1 Firmware of router 192.168.11.2

You open the user interface as explained on page 19 /8.2.

You will find the data file on our website:

www.silentwindgenerator.com/de/downloads

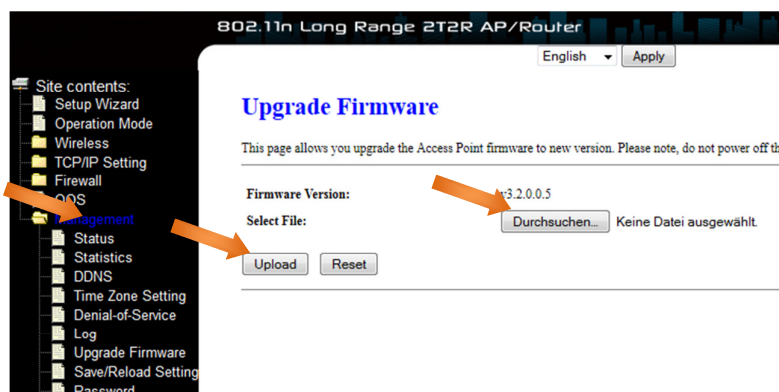
Save the file „fw-aip-w525hv2...” on your computer in the required folder.

Click in the menu on the left on "**Management**" and then on "**Upgrade Firmware**".

Click on the button "**Durchsuchen**" and select the downloaded firmware file in your folder. With a click on "**Upload**" you will start the upgrading process.



Attention! Do not switch off neither PC nor router during the update.



12.2 Loading the WEB-catcher configuration into router

If you have reset the router by mistake, it is possible to manually activate the original presetting with a config file.

You find the config-file on our website:

www.silentwindgenerator.com/de/downloads

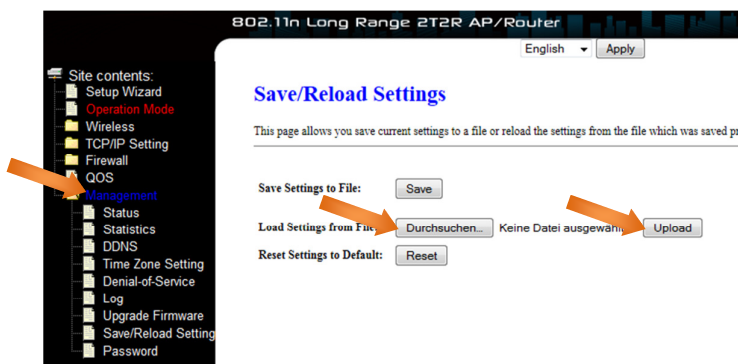
Save the file "**fw-aip-w525hv2...**" on your computer in the requested folder.

On the left menu click on "**Management**" and then on "**Save/Reload Setting**".

Click on the button "**Durchsuchen**" and select the downloaded config-file in your folder. With a click on "**Upload**" you will start the process.



Do not switch off neither your PC nor router during update.



13. Technical data

13.1 Antennas

model name	SW08WL	SW10WL	SW12WL
frequency range	2400 ~ 2500 MHz	2400 ~ 2500 MHz	2400 ~ 2500 MHz
antenna gain	8,5 dBi	10 dBi	12,5 dBi
dimension L Ø1 Ø2 mm:	740 20 55	1040 20 55	1340 20 55
opening gauge horizontal	20°	17°	8°
opening gauge vertical:	360°	360°	360°
temperature range	-20°C ~ +55°C	-20°C ~ +55°C	-20°C ~ +55°C
protection class	IP 66	IP 66	IP 66
connection	N-Type	N-Type	N-Type
VSWR:	< 1,6	< 1,6	< 1,7
impedance	50 Ω	50 Ω	50 Ω
casing colour	White	White	White
material	AlCr GFK PA6	AlCr GFK PA6	AlCr GFK PA6
weight without cable	690 gr	720 gr	790 gr

13.2 WLAN-antenna electronics

model name	SWS1512
frequency range	2.4GHz ISM Band
standards	IEEE 802.11n, IEEE 802.11bg(mixed mode)
chipset	Atheros AR9331
data rate	802.11bg: bis zu 54Mbps 802.11n: bis zu 150Mbps
connections	one 10/100 BASE-T RJ-45 Ethernet connector N-Type-male antenna connection
security	Wired Equivalent Privacy (WEP) data encryption Dynamic WEP key exchange WEP64/128, WPA, WPA2 802.1x
temperature range	-20°C ~ +55°C
dimension L Ø mm:	136 38
HF-transmitting power	3 - 27dBm 2 - 500mW
receiving sensivity	-91dBm@802.11n -95dBm@802.11bg
impedance	50 Ω
power	PoE 11 - 24V DC 1,04 Watt ±5%
casing colour	White
weight	250 gr

13.3 WLAN-router

model name	SWR3022
frequency range	2.4GHz ISM Band
standards	IEEE 802.11b/g/n
data rate	802.11b: 11, 5.5, 2, 1Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9 & 6Mbps 802.11n(20MHz): up to 144Mbps 802.11n(40MHz): up to 300Mbps
chipset	RTL8196C
connections	RP-SMA antenna connection x 2 RJ-45 WAN port x 1 RJ-45 LAN ports x 4
security	Wired Equivalent Privacy (WEP) data encryption Dynamic WEP key exchange WEP64/128, WPA, WPA2 802.1x
functions	AP Client WDS AP+WDS
antennas	2x 5dBi removable
temperature range	-20°C ~ +60°C
dimension L B H mm:	147 98 32
HF-transmitting power	20dBm EIRP
impedance	50 Ω
power	11 - 24V DC 1,52 Watt ±5% Passive PoE
Casing colour	Black
weight	480 gr

13.4 WLAN-Set

model name	SW08WL (8,5dBi)	SW10WL (10dBi)	SW12WL (12,5dBi)
power consumption	11 - 24V DC 2,66 Watt ±5%	11 - 24V DC 2,66 Watt ±5%	11 - 24V DC 2,66 Watt ±5%
radiation power	3dBm = 11,5 dBm / 14,12mW	3dBm = 13 dBm / 19,95mW	3dBm = 15,5 dBm / 35,48mW
EIRP in dB / mW	4dBm = 12,5 dBm / 17,78mW	4dBm = 14 dBm / 25,11mW	4dBm = 16,5 dBm / 44,66mW
	5dBm = 13,5 dBm / 22,38mW	5dBm = 15 dBm / 31,62mW	5dBm = 17,5 dBm / 56,23mW
	6dBm = 14,5 dBm / 28,18mW	6dBm = 16 dBm / 39,81 mW	6dBm = 18,5 dBm / 70,79mW
	7dBm = 15,5 dBm / 35,48mW	7dBm = 17 dBm / 50,11 mW	7dBm = 19,5 dBm / 89,12mW
	8dBm = 16,5 dBm / 44,66mW	8dBm = 18 dBm / 63,09mW	8dBm = 20,5 dBm / 112,20mW
	9dBm = 17,5 dBm / 56,23mW	9dBm = 19 dBm / 79,43mW	9dBm = 21,5 dBm / 141,20mW
	10dBm = 18,5 dBm / 70,79mW	10dBm = 20 dBm / 100,00mW	10dBm = 22,5 dBm / 177,80mW
	11dBm = 19,5 dBm / 89,12mW	11dBm = 21 dBm / 125,89mW	11dBm = 23,5 dBm / 223,80mW
	12dBm = 20,5 dBm / 112,20mW	12dBm = 22 dBm / 158,48mW	12dBm = 24,5 dBm / 281,80mW
	13dBm = 21,5 dBm / 141,20mW	13dBm = 23 dBm / 199,52mW	13dBm = 25,5 dBm / 354,80mW
	14dBm = 22,5 dBm / 177,80mW	14dBm = 24 dBm / 251,18mW	14dBm = 26,5 dBm / 446,60mW
	15dBm = 23,5 dBm / 223,80mW	15dBm = 25 dBm / 316,22mW	15dBm = 27,5 dBm / 562,30mW
	16dBm = 24,5 dBm / 281,80mW	16dBm = 26 dBm / 398,10mW	16dBm = 28,5 dBm / 707,90mW
	17dBm = 25,5 dBm / 354,80mW	17dBm = 27 dBm / 501,18mW	17dBm = 29,5 dBm / 891,30mW
	18dBm = 26,5 dBm / 446,60mW	18dBm = 28 dBm / 630,95mW	18dBm = 30,5 dBm / 1122,01mW
	19dBm = 27,5 dBm / 562,30mW	19dBm = 29 dBm / 794,32mW	19dBm = 31,5 dBm / 1412,53mW
	20dBm = 28,5 dBm / 707,90mW	20dBm = 30 dBm / 1000mW	20dBm = 32,5 dBm / 1778,27mW
	21dBm = 29,5 dBm / 891,30mW	21dBm = 31 dBm / 1258,92mW	21dBm = 33,5 dBm / 2238,72mW
	22dBm = 30,5 dBm / 1122,01mW	22dBm = 32 dBm / 1584,89mW	22dBm = 34,5 dBm / 2818,38mW
	23dBm = 31,5 dBm / 1412,53mW	23dBm = 33 dBm / 1995,26mW	23dBm = 35,5 dBm / 3548,13mW
	24dBm = 32,5 dBm / 1778,27mW	24dBm = 34 dBm / 2511,88mW	24dBm = 36,5 dBm / 4466,83mW
	25dBm = 33,5 dBm / 2238,72mW	25dBm = 35 dBm / 3162,27 mW	25dBm = 37,5 dBm / 5623,41mW
	26dBm = 34,5 dBm / 2818,38mW	26dBm = 36 dBm / 3981,07mW	26dBm = 38,5 dBm / 7079,45mW
	27dBm = 35,5 dBm / 3548,13mW	27dBm = 37 dBm / 5011,87mW	27dBm = 39,5 dBm / 8912,50mW

14. Glossary

In the following we will explain the most important technical terms used in our manual. If you want more detailed information, we recommend electronic technical literature.

IEEE 802.11 Standard

802.11 refers to an industrial standard that clearly regulates and harmonizes regulations for transmitting network devices.

Categories like 802.11b or 802.11g determine a fixed frequency range for radio transmission and its speed etc.. Currently the most common standard used is IEEE 802.11g with a speed of up to 54 MBit/s.

The standards are edited by the Institute of Electrical and Electronics Engineers (IEEE).

Access Point

is a network device that establishes a permanent connection between wired and wireless networks. In most cases an access point connects the connected computers with the internet -to say it quite simplified.

Ad Hoc

An Ad-Hoc wireless LAN is a group of computers equipped with WLAN adaptors that are connected to an independent wireless LAN. Unlike an infrastructure network, this makes a direct connection between computers without access to the internet possible

DHCP

Dynamic Host Configuration Protocol is a mode by which the server automatically allocates IP addresses to network users. DHCP is used to automatically allocate IP addresses. It requires a DHCP server in the network assigned with this task.

Direct Sequence Spread Spectrum

This method uses wireless adaptors to transmit data via the frequency spectrum. An alternative method is frequency switching. With the direct sequence method data are spread by one channel whereas frequency switching means that channels on a narrow frequency band are switched several times per second.

ESSID

is an infrastructure configuration that can also support roaming for mobile staff. If there are at least two BSS (broadband switching system), they can be configured as Extended Service Set (ESS). Users within the can communicate with each other while the connection to the stations of the wireless network is maintained.

Access Points within the ESS must be configured by the same BSS and channel.

Ethernet

is a 10/100-Mbps-network that is used for private home or office LAN cable connections. Users must always be connected to the network to have access to this net.

Gateway

is a device two different systems with each other, e.g. a LAN and a computer. The internet terminology defines a router as gateway. A gateway normally functions as a kind of funneling system for all internet contacts.

Infrastructure

Integrated wireless and wired LANs are called infrastructure configurations. In a lot of companies this infrastructure is used to provide wireless access to the central database and the wireless connection of the mobile staff.

ISM-Frequenzband

Die FCC and related organizations outside the US have reserved a frequency range that may be used (without any license fee) for industrial, scientific and medical purpose for which the spectrum used worldwide is about 2.4 GHZ. This provides users all over the world with high speed, wireless access to the internet..

Local Area Network (LAN)

A LAN consists of several computers which are all equipped with a suitable network. They are connected either via cable or wireless enabling them to use applications, data and peripheral devices together. Connections are made by cable or wireless devices, no telephone lines are used. A LAN is useful to connect WLAN devices on premises, university campuses, railway stations etc.

Network

is a system of connected computers. This network can transmit data, files and news. Networks can be established locally or for wider areas (WAN).

Protocol

is a standardized set of rules that determines how data are transmitted, including the format, chronological sequence, sequencing and/or check of errors.

Roaming

In an infrastructure network roaming refers to the process when a wireless connected notebook switches from the first access point to another access point establishing a new connection.

In a network environment in which access points are used PCs can always be connected regardless of their position or provider.

SSID

is a network identification that is unique for every network. Only clients and access points sharing the same SSID can communicate with each other. Mind upper and lower case in the characters.

Simple Network Management Protocol (SNMP)

is the network management protocol of TCP/IP. In the SNMP hard- or software agents monitor the activities of various devices in the network and report them to the network-console-workstation. Control information about any device is administrated in a structure called management-information block.

Static IP addressing

is a process to allocate network IP addresses to clients. In networks with static IP addressing the network administrator allocates an IP address to every computer. Having allocated a static IP address the computer uses the same address every time it is started and registered unless the address has been manually altered.

Temporal Key Integrity Protocol (TKIP)

The Temporal Key Integrity Protocol is part of the IEEE 802.11i encryption standards for wireless LAN. TKIP is the generation following the WEP (Wired Equivalency Protocol) which is used for the security of wireless 802.11-LAN. TKIP provides a data encryption changing after any data packet and offers a message integrity check and a rekeying mechanism that remedies the security vulnerability of the WEP. .

Transmission Control Protocol / Internet Protocol (TCP/IP)

is a pile of protocols that were developed by the Advanced Research Projects Agency (ARPA). It is often used for company intranets as it is very well suited for WLAN. TCP determines how packets are sequenced for transmission in the network. The term TCP/IP is often used to refer to the complete pile of related protocols.

Transmission/Reception

refers to the throughput of a wireless connection in bytes per second. It is always calculated for the period of two seconds.

Wi-Fi Alliance

is a non-profit international association that was established in 1999 to certify the interoperability of wireless LAN products on the basis of IEEE 802.11 . The target of the association is to improve the interoperability of products for the users. Previously the organization was called WECA.

Wi-Fi Protected Access (WPA)

The Wi-Fi Alliance developed WPA as a method of encrypting data for wireless 802.11-LAN. WPA is an industry led, not yet standardized version of 802.11i that uses the TKIP which (among other features) remedies the security vulnerability of the WEP by the use of dynamic keys.

Wide Area Network (WAN)

A WAN consists of several LANs that are connected by telephone lines and/or glass fiber optic cable. WAN may cover the area of a town, a state, a country or of even the whole planet.

Wired Equivalent Privacy (WEP)

Meanwhile it is generally accepted that WEP, a method to encrypt data protecting the transmission between 802.11 clients and APs is insufficient. It used the same key for all communication devices. The problems of WEP are well-known, among others there is an insufficient length of keys as well as the lack of an automatic method to allocate the keys. WEP can easily be decrypted with standard tools within a few hours..

Wireless LAN (WLAN)

A wireless LAN doesn't use cables but radio waves or infrared technology to transmit data. High frequency and infrared connections are the most used modes of wireless connections. Most wireless LANs use spread spectrum technology. This technique offers a limited spectrum (usually less than 11Mbps) that is used by users with other devices in the spectrum. Users can operate a device with spread spectrum technology without having a license of the FCC.

15. Liability exclusion

- Although the information given in this manual has been carefully checked as to accuracy and completeness we exclude liability for any mistake or omission.
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