

## APPLICATION NOTE

## APNUS003 – A SIMPLE WIRELESS LINK using WaveOS products

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To help you get started with WaveOS products, here is a very simple example, describing the minimum configuration required to create a wireless link between two devices, using an access point and a Wi-Fi client to replace a wired link.

For this example, we want each device to have a fixed IP address, on the 192.168.1.0/24 subnet. We will set the AP (Access Point) to **192.168.1.252** and leave the client on **192.168.1.253**, which is the default address. The products will be installed in Belgium, so we will choose this country to ensure that we use the authorized frequencies and output levels. We want to use channel 36, on the 5 GHz band (802.11a + n), and the name of the wireless network will be **MYSSID**. As we want to protect our network against intrusions, we will use the WPA2 security mode, with the key **MyPresharedKey** 



Using your usual browser, open the WEB page of the first product (AP), at 192.168.1.253, then select the SETUP tab. The main page is the Physical Interfaces Overview. The first thing to do is activate the radio card by clicking on the red button:

ICAL INTERFACES	WIRELES	SINTERFACES O	ERVIEW						
1 NC	You can	set up to 8 simultaneou	rolae (wifi interface types) per	radio card, among the	following combinati	one:			
UAL INTERFACES	Tou can	set up to o siniditarieou	s toles (will intenace types) per	radio card, among the	nonowing combinati	0115.			
/ORK			Channel s	election		Max number of interfaces			
		Combination	Multiplicity	Can use DFS	Access point	Infrastructure client	Mesh point	Ad-hoc	
2000		Multiple access point	s single, auto, multiple	yes	8				
SING		Portal	single	no	8		1		
ING / FIREWALL		Client / bridge	single, auto, multiple,	yes		1			
			rounning						
ICES	When u Repeate WI-FLINTERFA	Other / repeater sing several roles, they a er mode is a combination	single Il use the same shared channel of two roles: access point + cli	no ; in this case, the clien ent.	8 nt role must not be s	1 (non-roaming) set to multichannel roam	1 ing.	1	
ICES	When u Repeate WI-FI INTERF/ WI-I	Other / repeater sing several roles, they a er mode is a combination ACE Fi 4 (802.11n) Wireles	ll use the same shared channel of two roles: access point + cli	<b>no</b> ; in this case, the clier ent.	8 nt role must not be	1 (non-roaming) set to multichannel roam	1 ing.	1	
ICES	When u Repeate WI-FI INTERF/ WI-FI WI-FI	Other / repeater sing several roles, they a er mode is a combination ACE Fi 4 (802.11n) Wireles CHANNEL 802.	single Il use the same shared channel of two roles: access point + cli sinterface	no ; in this case, the clier ent. ROL	8 nt role must not be s	1 (non-roaming) set to multichannel roam SECURITY	1 ing. ACT	1	
ICES	When u Repeate WI-FI INTERF/ WI-I	Other / repeater       sing several roles, they a       or mode is a combination       ACE       Fi 4 (802.11n) Wireless       CHANNEL     802.       Automatic     802.	s interface 11 MODE SSID 12119+n acksys	no ; in this case, the clier ent. ROL Access Point (in	8 nt role must not be : E Infrastructure)	1 (non-roaming) set to multichannel roam SECURITY none	1 ing. ACT Interface	1 Enable int	
ICES	When u Repeate WI-FI INTERF/ WI- MI- MI- MI- MI- MI- MI- MI- MI- M	Other / repeater         sing several roles, they a         or mode is a combination         ACE         Fi 4 (802.11n) Wireless         CHANNEL       802.         Automatic       802.         PARAMETERS         LATION AREA	s interface MODE SSID S 119+n acksys	no ; in this case, the clier ent. ROL Access Point (in	8 nt role must not be : E Ifrastructure)	1 (non-roaming) set to multichannel roam SECURITY none	1 ing. ACT Interface	1 Enable int	



Then select the country where the product will be installed:

ELES You ca	SS INTERFACES	S OVER	<b>VIEW</b> s (wifi interfa	ce types) pe	Bangladesh Barbados Belarus	E			
				Channel	Belgium 📐		mber of interfa	ices	
	Combinatio	on	Multip	licity	Belize		ucture client	Mesh point	Ad-hoc
	Multiple access	points	single, auto	o, multiple	Bermuda				
	Portal		sing	gle	Bhutan			1	
	Client / brid	ge	single, auto roan	), multiple, hing	Bolivia		1		
	Other / repea	iter	sing	gle	Bosnia and Herzegovina		n-roaming)	1	1
Repeat	FACE	ation of tw	o roles: acce	ess point + c	Brunei Darussalam Bulgaria Burkina Faso		uchannel roam	ing.	<b>(</b> )
Wi		reress in	lemade						
Wi	CHANNEL	802.11	MODE	SSID	Cambodia		SEC	URITY	ACTIONS
Wi	CHANNEL Automatic	802.11 802.1	MODE 1g+n	S SID acksys	Cambodia Canada		SEC	one	
Wi DBAL	CHANNEL Automatic PARAMETERS	802.11 802.1	MODE 1g+n	SSID acksys	Cambodia Canada Cayman Islands Central African Republic Chad Chile		SEC n	one	

You can now Save and Apply:

Save Save Save & Apply

You must now click on the button **Edit this network**, on the right:

WI-FI INT	TERFACE					
1	Wi-Fi 4 (802.11n) V	Vireless interface				<b>()</b>
	CHANNEL	802.11 MODE	SSID	ROLE	SECURITY	ACTIONS
	Automatic	802.11g+n	acksys	Access Point (infrastructure)	none	2 ×
		0.000			11	43



On the **WIRELESS SETTINGS** page, select the **802.11a + n** mode and uncheck the **Automatic channel select** box, so that you can choose channel 36. Enter your wireless network name (ESSID), then Save and Apply

RELESS SETTINGS : WIFI			
The Device Configuration section covers physic encryption or operation mode are in the Interfa If SRCC role is selected, most of the Device C	ical settings of the radio hardware which is shared amo ace Configuration. Configuration is irrelevant (please refer to the product us	ng all defined wireless networks. Per netwo er guide).	rk settings like
EVICE CONFIGURATION			
General Setup a/b/g Data Rates 802.11n	Mcs Advanced Settings		
802.11 mode	802.11a+n (5 GHz)	e 'a/b/g data rates' tab	
HT mode	20MHz 20MHz HT mode is not compati		
Automatic channel select	Automatic channel select is not comp.	atible with Ad-hoc, Mesh and multi-interfaces	
	36 (5.180 GH2) - Max 1x power 20 GB 40 (5.200 GH2) - Max 1x power 20 GB 44 (5.220 GH2) - Max 1x power 20 GB 48 (5.240 GH2) - Max 1x power 20 GB	m E m m	
TERFACE CONFIGURATION	52 (5.260 GHz) - Max Tx power 20 dB 56 (5.280 GHz) - Max Tx power 20 dB 36 (5.280 GHz) - Max Tx power 20 dB 37 This field is ignored in client proactive roar	m (DFS) m (DFS) – – ning mode; see 'Roaming' tab instead	
TERFACE CONFIGURATION General Setup Wireless Security Advance	52 (5.260 GHz) - Max Tx power 20 dB 56 (5.280 GHz) - Max Tx power 20 dB 36 This field is ignored in dient proactive roar This field is ignored in dient proactive roar ad Settings MAC Filter Frame filters Access Point (infrastructure)	m (DFS) m (DFS) ning mode; see 'Roaming' tab instead	
TERFACE CONFIGURATION General Setup Wireless Security Advance Role ESSID	ed Settings MAC Filter Frame filters Access Point (infrastructure)	m (DFS) m (DFS)	
TERFACE CONFIGURATION         General Setup       Wireless Security       Advance         Role         ESSID         Maximum simultaneous associations	52 (5.260 GHz) - Max Tx power 20 dB         56 (5.280 GHz) - Max Tx power 20 dB         (a) This field is ignored in dient proactive roar         (b) This field is ignored in dient proactive roar         (c) Access Point (infrastructure)         (c) MYSSID         Max allowed by radio card (see docuntion)         (c) Specifies the maximum number of clients to	m (DFS) m (DFS) ning mode; see 'Roaming' tab instead	
TERFACE CONFIGURATION         General Setup       Wireless Security       Advance         Role         ESSID         Maximum simultaneous associations         Hide ESSID	S2 (5.260 GHz) - Max Tx power 20 dB         S6 (5.280 GHz) - Max Tx power 20 dB         Image: Second	m (DFS) m (DFS) ning mode; see 'Roaming' tab instead ming mode; see	on and select a
TERFACE CONFIGURATION         General Setup       Wireless Security       Advance         Role         ESSID         Maximum simultaneous associations         Hide ESSID         Network	ed Settings MAC Filter Frame filters Access Point (infrastructure) MYSSID Max allowed by radio card (see docum @ Specifies the maximum number of clients t DFS channel. See the user guide for more deta @ Ian: 20 @ Ian: 20 @ @ Choose the network you want to attach this	m (DFS) m (DFS) ning mode; see "Roaming" tab instead ming mode; see "Roaming" tab instead mentation mentation) o connect tition, clients might not associate if you check this opti ils.	on and select a

For the moment, we don't define the security mode, this will be done later.

In the left column, click on NETWORK, then click on the button Edit this network on the right.

	SETUP	TOOLS	STATUS				
PHYSICAL INTERFACES	NETWORK	OVERVIEW					
VIRTUAL INTERFACES	NE IWORK	OVERVIEW		10 m			
NETWORK	NAME	ENABLED	IP ADDRESS	NETMASK	GATEWAY (METRIC)	PERSISTENCE	ACTIONS
LAN	lan		192.168.1.253	255.255.255.0		Enabled	R
VPN	*						Edit this netwo
BRIDGING	Add	network					
ROUTING / FIREWALL							
QOS							
SERVICES							



## Here, just change the IP address to 192.168.1.252, then Save & Apply

SICAL INTERFACES	NETWORK - LAN		
UAL INTERFACES			
VORK	On this page you can configure the network interfaces.	You can bridge several interfaces by t	icking the "bridge interfaces" field and tick the names of several
N	network intenaces.		
	COMMON CONFIGURATION		
ing			
ING / FIREWALL	General Setup   Interfaces Settings   Advanced Setting	Ja	
ICES	Network description		
12		Friendly name for your network	
	Protocol	static	X
	IPv4-Address	192.168.1.252	
	IPv4-Netmask	255.255.255.0	
	Default IPv4 gateway		
	Default gateway metric	0	
		Gateway priority when several de (Used only when a default gateway is	fault gateways are configured; lowest is chosen. defined on this interface)
	DNS server(s)		2
		You can specify multiple DNS ser automatically assigned ones.	vers here, press enter to add a new entry. Servers entered here will override
	IP ALIASES		
	This section contains no values yet		
		) Add	

The first step of the Access Point configuration is complete, you can now close the tab of your browser and use the second PC to configure the Wi-Fi client. If you only have one PC, you must connect it to the switch on the client side. Note that each time you move the PC from the AP side to the client side, or vice versa, you must open a command prompt, **in administrator mode**, and type the command **arp** -**d** 

Administrateur : Invite de commandes	
C:\Users\>arp -d	H
C:\Users\>_	-



Configure the client in the same way as the access point. Start by selecting the country, then the WIRELESS SETTINGS as follows: select the 802.11a+n mode. You can either set the channel to **36**, as on the AP, or leave the Automatic channel selection box checked (the Client will automatically find the AP channel). Set the role to **Client** (infrastructure), enter the ESSID "**MYSSID**" then Save & Apply

encryption or operation mode are in the If SRCC role is selected, most of the D	physical settings of the radio hardware which is shared among all defined wireless networks. Per network setting Interface Configuration. vice Configuration is irrelevant (please refer to the product user guide).	ıs like
VICE CONFIGURATION		
General Setup a/b/g Data Rates 8	2.11n Mcs Advanced Settings	
802.11 mode	802.11a+n (5 GHz)	
HT mode	20MHz	
	Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces	
Automatic channel select	Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces           Image: Comparison of the select is not compatible with Ad-hoc, Mesh and multi-interfaces	
Automatic channel select TERFACE CONFIGURATION General Setup	dvanced Settings Roaming Frame filters Client (infrastructure)	
Automatic channel select TERFACE CONFIGURATION General Setup Wireless Security	Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces	
Automatic channel select TERFACE CONFIGURATION General Setup Wireless Security	dvanced Settings Roaming Frame filters Client (infrastructure) Client (infrastructure) MYSSID	
Automatic channel select TERFACE CONFIGURATION General Setup Wireless Security General Setup Kole Multiple ESSIDs ESSID Network	Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces	

You can now go to the STATUS/Wireless page to verify that the client is connected to the Access Point:

DEVICE INFO	A 6 6 6 6 14		•						
NETWORK	ASSOCIA	IED STATION	5						
WIRELESS	ASSOCIATE	D STATIONS RESU	ILTS : 1						
ASSOC STATIONS CHANNEL STATUS MESH SURVEY	GRAPH	RADIO	NAME / SSID	MODE	MAC ⊖		SIGNAL		SIGNAL/NOISE
SERVICES STATUS	âŭ	WiFi	MYSSID	Infrastructure	00:80:48:64:22:D2	36	-44 dBm	-91 dBm	47 dB



From the command prompt, verify that you can ping the Access Point:

- 0 X Administrateur : Invite de commandes C:\Users\>arp -d -----C:\Users\>ping 192.168.1.252 Envoi d'une requête 'Ping' 192.168.1.252 avec 32 octets de données : Réponse de 192.168.1.252 : octets=32 temps<1ms TTL=64 Statistiques Ping pour 192.168.1.252: Paquets : envoyés = 4, reçus = 4, perdus = 0 (perte 0%), Durée approximative des boucles en millisecondes : Minimum = Oms, Maximum = Oms, Moyenne = Oms

Now is the time to set the security mode. You can either use the PC on the Access Point side, or open the Access Point web page from the Client side PC. Edit the Wireless Settings directly, then click on the **Wireless Security** tab and Select security mode **WPA2-PSK (Personal)** 

	SETUP TOOLS STATUS	s
PHYSICAL INTERFACES	WIRELESS SETTINGS : WIFI	
WIFI LAN VIRTUAL INTERFACES	The Device Configuration section covers network settings like encryption or operal If SRCC role is selected most of the Dev	physical settings of the radio hardware which is shared among all defined wireless networks. Per tion mode are in the Interface Configuration.
NETWORK		
BRIDGING	DEVICE CONFIGURATION	
QOS	General Setup a/b/g Data Rates 802 Enable device	2.11n Mcs Advanced Settings
SERVICES	802.11 mode	802.11a+n (5 GHz)  Changing the mode may affect the list in the 'a/b/g data rates' tab
	HTmode	20MHz (2) Automatic 40MHz HT mode is not compatible with AP, Ad-hoc, Mesh and multi-interfaces
	Automatic channel select	🔲 💿 Automatic channel select is not compatible with Ad-hoc, Mesh and multi-interfaces
	Channel	36 (5.180 GHz) - Max Tx power 20 dBm         40 (5.200 GHz) - Max Tx power 20 dBm         44 (5.220 GHz) - Max Tx power 20 dBm         48 (5.240 GHz) - Max Tx power 20 dBm         52 (5.260 GHz) - Max Tx power 20 dBm (DFS)         56 (5.280 GHz) - Max Tx power 20 dBm (DFS)         56 (5.280 GHz) - Max Tx power 20 dBm (DFS)         This field is ignored in client proactive roaming mode; see 'Roaming' tab instead
	INTERFACE CONFIGURATION	
	General Setup Wireless Security Adv Security	vanced Settings Roaming Frame filters No encryption No encryption
	Back to Overview	WEP WPA2-EAP (Enterprise) WPA2-PSK (Personal)
		Mixed WPA/WPA2 PSK (Personal) WPA-EAP (Enterprise) WPA-PSK (Personal)



Enter your security key (Pre-Shared Key), here MyPresharedKey, then Save & Apply.

ecurity	WPA2-PSK (Personal)	
rotected management frame (802.11w)	disable	
ast transition support (802.11r)		
re-Shared Key	🔎 MyPresharedKey	A&●
	This key must have a length from 8 to hexadecimal format	63 characters. If the key length is 64 characters it will be used directly as

You can now do exactly the same for the Client. After saving, you can check as before that the units are associated in the STATUS/Wireless pages.