# Wireless LAN Subinterfaces

Teldat-Dm 799-I

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# Chapter 1 Wireless LAN Subinterfaces

## 1.1 Introduction

Some WLAN interfaces allow several wireless networks to operate simultaneously. As a result, you can create different wireless networks with different access and security policies using a single Wi-Fi card.

For instance, you may configure a wireless network with WPA-PSK security for Internet access and another network with WPA2 security and 802.1X authentication to access the company's intranet.

To define the different wireless networks, WLAN subinterfaces must be created. A wireless network is configured in each subinterface.

This manual details the procedures to create, configure and monitor WLAN subinterfaces. It also includes a configuration example.

## 1.2 Creating a WLAN subinterface

To configure a WLAN subinterface, use the **ADD DEVICE** command found on the general configuration menu.

*Syntax:*

```
Config>add device wlan-subinterface <WLAN base interface> <subinterface identifier>
```

The subinterface identifier range between 1 and 10000.

*Example:*

```
Config>add device wlan-subinterface wlan3/0 1
Config>
```

The **LIST DEVICES** command allows you to check if the subinterface has been created.

```
Config>list devices

Interface             Connector     Type of interface
ethernet0/0           GE0/FE0/LAN1  Fast Ethernet interface
ethernet0/1           GE1/FE1/LAN2  Fast Ethernet interface
x25-node              ---           Router->Node
wlan3/0               SLOT3         Wireless LAN Interface

wlan3/0.1             ---           Wireless LAN subinterface

Config>
```

**Note**

Not all WLAN interfaces allow WLAN subinterfaces to be created.

Depending on the hardware used, the number of WLAN subinterfaces associated to a WLAN base interface is limited. An error message appears if you try to create more WLAN interfaces than those allowed by the hardware.

```
Config>add device wlan-subinterface wlan3/0 10
CLI Error: Maximum number of subinterfaces for that base interface already configured
CLI Error: Command error
```

## 1.3 Deleting a WLAN subinterface

To delete a WLAN subinterface, use the **NO DEVICE** command (on the general configuration menu) followed by the identifier for the interface you wish to delete.

*Example:*

```
Config>no device wlan3/0.1
Config>
```

# Chapter 2 Configuration

## 2.1 Accessing the Configuration

To access the configuration menu for a subinterface, use the **NETWORK** command found on the main configuration menu. Use the base interface name followed by the subinterface identifier, separated by a period to identify the subinterface.

*Example:*

To access the subinterface 1 configuration menu associated to the wlan3/0 base interface.

```
Config>network wlan3/0.1

-- Wireless LAN Subinterface. Configuration --
wlan3/0.1 WLAN config>
```

## 2.2 Configuration Commands

### 2.2.1 Root Menu Commands

This section summarizes the different configuration commands available in the Wireless LAN subinterface configuration menu.

There are certain commands that are common to all the device interfaces. These commands are described in the common interfaces configuration manual (Teldat-Dm772-I Common Configurations for Interfaces).

The following table summarizes the WLAN subinterface configuration commands. These commands are described in more detail in manual Teldat-Dm 771-I Wireless LAN Interface.

| Command | Function |
|---|---|
| *? (HELP)* | Displays the configuration commands or their options. |
| *BEACON* | Configures parameters relative to sending beacon frames. |
| *BSS* | Accesses the configuration menu for a BSS. |
| *DEBUG-LEVEL* | Configures the traces associated to the driver that are displayed in cases where the WLAN traces are enabled in the events subsystem. |
| *FRAGMENT-THRESHOLD* | Configures the fragmentation threshold. |
| *LEGACY-STATIONS* | Allows association from legacy (non HT) stations. |
| *LIST* | Displays the configuration. |
| *NO* | Configures parameters with their default values. |
| *RTS* | Configures the parameters related to transmission using the RTS/CTS mechanism. |
| *SHORT-GUARD-INTERVAL* | Enables short guard interval. |
| *SSID-CHANGE* | Makes it possible to change the network identifier (SSID) of a BSS. |
| *WMM* | Configures quality of service parameters. |
| *WPS* | Configures the WPS (Wi-Fi Protected Setup) parameters. |
| *EXIT* | Exits the WLAN subinterface configuration menu. |

### 2.2.2 BSS Configuration Menu Commands

This section summarizes the different configuration commands available in the BSS (Basic Service Set) configuration menu for the Wireless LAN subinterfaces.

To access the BSS configuration menu, enter **bss** followed by the network identifier in the WLAN subinterface configuration menu.

```
wlan3/0.1 WLAN config>bss mssid_2

wlan3/0.1 bss mssid_2 config>
```

The BSS configuration commands are described in more detail in manual Teldat-Dm771-I Wireless LAN Interface.

## 2.3 Configuration Restrictions

When configuring WLAN subinterfaces, you need to bear the following restrictions in mind:

- The hardware used limits the number of WAN subinterfaces that can be created. Not all WLAN cards allow WLAN subinterfaces to be created.
- We do not recommend that you have an interface in access point mode and another one in station mode active at the same time, as you might experience connection problems. There is, however, no problem in having various interfaces operating as access points at the same time. I.e. if you configure an interface so it is operating as a station, please make sure that it is the only active WAN interface.

# Chapter 3 Monitoring

## 3.1 Accessing the Monitoring

To access the monitoring menu for a subinterface, use the **NETWORK** command found on the main monitoring menu. Use the base interface name followed by the subinterface identifier, separated by a period to identify the subinterface.

*Example:*

To access the subinterface 1 monitoring menu associated to the wlan3/0 base interface.

```
+network wlan3/0.1

--  WLAN Console  --

wlan3/0.1 WLAN+
```

## 3.2 Monitoring Commands

The WAN subinterface monitoring commands are described in more detail in manual Teldat-Dm771-I Wireless LAN Interface.

# Chapter 4 Configuration Example

## 4.1 Configuring various WLAN networks

### 4.1.1 Scenario

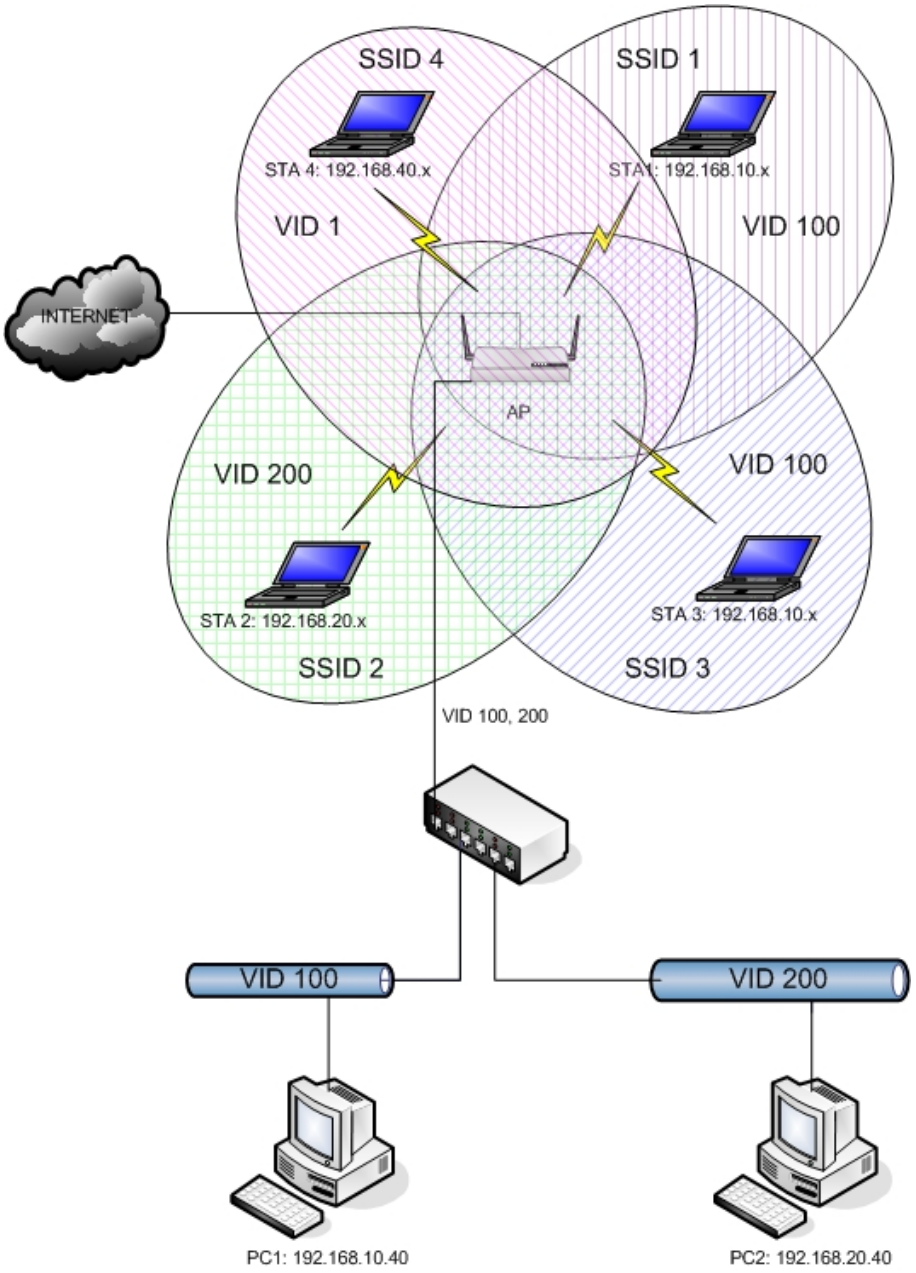


*Fig. 1:* **Scenario**

The above scenario shows how to use several WLAN networks to separate traffic in VLANs. Four networks with the following security characteristics are created:

| SSID | VID | RSN | AKM | Cipher | Key |
|---|---|---|---|---|---|
| mssid_1 | 100 | WPA | PSK | TKIP | ssid1ssid1 |
| mssid_2 | 200 | - | - | WEP | a1b2c |
| mssid_3 | 100 | WPA2 | PSK | AES | ssid3ssid3 |
| mssid_4 | - | WPA, WPA2 | PSK | TKIP, AES | ssid4ssid4 |

## 4.2 Configuration

### 4.2.1 Configuring WLAN

Configuring Wi-Fi is simple: create three WLAN subinterfaces and associate each one to a wireless network with the required security characteristics.

#### 4.2.1.1 Creating the Subinterfaces

Three WLAN subinterfaces are created:

```
   add device wlan-subinterface wlan3/0 2
   add device wlan-subinterface wlan3/0 3
   add device wlan-subinterface wlan3/0 4
```

#### 4.2.1.2 Configuring the Wireless Networks and the associated security

##### 4.2.1.2.1 SSID1

Base interface. Uses WPA-PSK with TKIP cipher.

```
network wlan3/0
; -- Wireless LAN Interface. Configuration --
      bss "mssid_1"
         privacy-invoked
         rsn wpa
         cipher tkip
         akm-suite psk
         wpa-psk passphrase plain ssid1ssid1
      exit
;
   exit
```

##### 4.2.1.2.2 SSID2

Subinterface 2. Uses WEP.

```
network wlan3/0.2
; -- Wireless LAN Subinterface. Configuration --
      bss "mssid_2"
         privacy-invoked
         key 1 size 40 ascii plain a1b2c
      exit
;
   exit
;
```

##### 4.2.1.2.3 SSID3

Subinterface 3. Uses WPA2-PSK with AES cipher.

```
network wlan3/0.3
; -- Wireless LAN Subinterface. Configuration --
      bss "mssid_3"
         privacy-invoked
         rsn wpa2
         cipher aes-ccmp
         akm-suite psk
         wpa-psk passphrase plain ssid3ssid3
      exit
;
   exit
```

##### 4.2.1.2.4 SSID4

Subinterface 4. Uses WPA/WPA2-PSK with TKIP and AES cipher.

```
network wlan3/0.4
; -- Wireless LAN Subinterface. Configuration --
      ip address 192.168.40.1 255.255.255.0
```

```
;
      bss "mssid_4"
         privacy-invoked
         rsn wpa
         rsn wpa2
         cipher aes-ccmp
         cipher tkip
         akm-suite psk
         wpa-psk passphrase plain ssid4ssid4
      exit
;
   exit
```

### 4.2.2 Rest of the Configuration

You configure the device so:

- VLANs 1 and 100 can access the Internet.
- VLAN 200 cannot access the Internet.
- Devices pertaining to a VLAN must be accessible to the rest of the VLAN devices, but not to those devices pertaining to other VLANs.

To do this, you need to execute two different configurations:

With a bridge between WLAN subinterfaces and Ethernet subinterfaces.

With a bridge between WLAN subinterfaces and Ethernet subinterfaces, configuring VLANs in the bridge.

#### 4.2.2.1 Configuring using Ethernet subinterfaces

Create Ethernet subinterfaces for VLANs 100 and 200. Create a bridge instance for each of the VLANs. Each instance must be made up of an Ethernet subinterface and the WLAN networks you want to belong to this VLAN.

```
; Showing Menu and Submenus Configuration for access-level 15 ...
; ATLAS150 Router 7 13 Version 10.8.19-Alfa

   log-command-errors
   no configuration
   set inactivity-timer disabled
   add device eth-subinterface ethernet0/1 100
   add device eth-subinterface ethernet0/1 200
   add device bvi 0
   add device bvi 1
   add device wlan-subinterface wlan3/0 2
   add device wlan-subinterface wlan3/0 3
   add device wlan-subinterface wlan3/0 4
   feature access-lists
; -- Access Lists user configuration --
      access-list 100
         entry 1 description "permitir ping a bvi"
         entry 1 default
         entry 1 permit
         entry 1 destination address 192.168.20.1 255.255.255.255
;
         entry 2 description "permitir DHCP"
         entry 2 default
         entry 2 permit
         entry 2 destination address 255.255.255.255 255.255.255.255
;
         entry 3 description "impedir salida a Internet por VLAN 200"
         entry 3 default
         entry 3 deny
         entry 3 source address 192.168.20.0 255.255.255.0
         ; el resto: deny
;
      exit
;
```

```
   exit
;
   network ethernet0/0
; -- Ethernet Interface User Configuration --
      ip address 192.168.213.48 255.255.254.0
;
   exit
;
   network wlan3/0
; -- Wireless LAN Interface. Configuration --
      bss "mssid_1"
         privacy-invoked
         rsn wpa
         cipher tkip
         akm-suite psk
         wpa-psk passphrase plain ssid1ssid1
      exit
;
   exit
;
   network bvi0
; -- Bridge Virtual Interface configuration --
      ip address 192.168.10.1 255.255.255.0
;
   exit
;
   network bvi1
; -- Bridge Virtual Interface configuration --
      ip access-group 100 in
;
      ip address 192.168.20.1 255.255.255.0
;
   exit
;
   network ethernet0/1.100
; -- Ethernet Subinterface Configuration --
      encapsulation dot1q 100
;
   exit
;
   network ethernet0/1.200
; -- Ethernet Subinterface Configuration --
      encapsulation dot1q 200
;
   exit
;
   network wlan3/0.2
; -- Wireless LAN Subinterface. Configuration --
      bss "mssid_2"
         privacy-invoked
         key 1 size 40 ascii plain a1b2c
      exit
;
   exit
;
   network wlan3/0.3
; -- Wireless LAN Subinterface. Configuration --
      bss "mssid_3"
         privacy-invoked
         rsn wpa2
         cipher aes-ccmp
         akm-suite psk
         wpa-psk passphrase plain ssid3ssid3
      exit
;
   exit
;
```

```
   network wlan3/0.4
; -- Wireless LAN Subinterface. Configuration --
      ip address 192.168.40.1 255.255.255.0
;
      bss "mssid_4"
         privacy-invoked
         rsn wpa
         rsn wpa2
         cipher aes-ccmp
         cipher tkip
         akm-suite psk
         wpa-psk passphrase plain ssid4ssid4
      exit
;
   exit
;
   protocol asrt
; -- ASRT Bridge user configuration --
      bridge
      irb
      port ethernet0/1.100 1
      port wlan3/0 2
      port wlan3/0.3 3
      virtual-bridge 1
; -- Virtual ASRT Bridge user configuration --
         bridge
         irb
         port ethernet0/1.200 1
         port wlan3/0.2 2
         route-protocol ip
      exit
;
      route-protocol ip
   exit
;
   protocol ip
; -- Internet protocol user configuration --
      route 0.0.0.0 0.0.0.0 192.168.212.2
;
      rule 1 local-ip ethernet0/0 remote-ip any
      rule 1 napt translation
;
   exit
;
   protocol dhcp
; -- DHCP Configuration --
      Server
; -- DHCP Server Configuration --
         enable
;
         shared 1
         shared 2
         shared 4
;
         subnet mssid_1 1 network 192.168.10.0 255.255.255.0
         subnet mssid_1 1 range 192.168.10.10 192.168.10.20
;
         subnet mssid_2 2 network 192.168.20.0 255.255.255.0
         subnet mssid_2 2 range 192.168.20.10 192.168.20.20
;
         subnet mssid_4 4 network 192.168.40.0 255.255.255.0
         subnet mssid_4 4 range 192.168.40.10 192.168.40.20
;
      exit
;
   exit
;
```

```
   dump-command-errors
   end
```

#### 4.2.2.2 Configuring using VLAN Bridge

Create a bridge instance with the VLAN characteristics enabled to classify and separate the traffic.

```
; Showing Menu and Submenus Configuration for access-level 15 ...
; ATLAS150 Router 7 13 Version 10.8.19-Alfa

   log-command-errors
   no configuration
   set inactivity-timer disabled
   add device bvi 0
   add device bvi-subinterface bvi0 100
   add device bvi-subinterface bvi0 200
   add device wlan-subinterface wlan3/0 2
   add device wlan-subinterface wlan3/0 3
   add device wlan-subinterface wlan3/0 4
   feature access-lists
; -- Access Lists user configuration --
      access-list 100
         entry 1 description "permitir ping a bvi"
         entry 1 default
         entry 1 permit
         entry 1 destination address 192.168.20.1 255.255.255.255
;
         entry 2 description "permitir DHCP"
         entry 2 default
         entry 2 permit
         entry 2 destination address 255.255.255.255 255.255.255.255
;
         entry 3 description "impedir salida a Internet por VLAN 200"
         entry 3 default
         entry 3 deny
         entry 3 source address 192.168.20.0 255.255.255.0
;
      exit
;
   exit
;
;
   network ethernet0/0
; -- Ethernet Interface User Configuration --
      ip address 192.168.213.48 255.255.254.0
;
   exit
;
   network wlan3/0
; -- Wireless LAN Interface. Configuration --
      bss "mssid_1"
         privacy-invoked
         rsn wpa
         cipher tkip
         akm-suite psk
         wpa-psk passphrase plain ssid1ssid1
      exit
;
   exit
;
   network bvi0.100
; -- BVI Subinterface Configuration --
      ip address 192.168.10.1 255.255.255.0
;
      encapsulation dot1q 100
   exit
;
```

```
   network bvi0.200
; -- BVI Subinterface Configuration --
      ip access-group 100 in
;
      ip address 192.168.20.1 255.255.255.0
;
      encapsulation dot1q 200
   exit
;
   network wlan3/0.2
; -- Wireless LAN Subinterface. Configuration --
      bss "mssid_2"
         privacy-invoked
         key 1 size 40 ascii plain a1b2c
      exit
;
   exit
;
   network wlan3/0.3
; -- Wireless LAN Subinterface. Configuration --
      bss "mssid_3"
         privacy-invoked
         rsn wpa2
         cipher aes-ccmp
         akm-suite psk
         wpa-psk passphrase plain ssid3ssid3
      exit
;
   exit
;
   network wlan3/0.4
; -- Wireless LAN Subinterface. Configuration --
      ip address 192.168.40.1 255.255.255.0
;
      bss "mssid_4"
         privacy-invoked
         rsn wpa
         rsn wpa2
         cipher aes-ccmp
         cipher tkip
         akm-suite psk
         wpa-psk passphrase plain ssid4ssid4
      exit
;
   exit
;
   protocol asrt
; -- ASRT Bridge user configuration --
      bridge
      irb
      port ethernet0/1 1
      port wlan3/0 2
      port wlan3/0.2 3
      port wlan3/0.3 4
      route-protocol ip
      vlan
; 802.1Q Bridge Configuration
         enable
         member port 1 vid 100
         member port 1 vid 200
         member port 2 vid 100
         member port 4 vid 100
         member port 3 vid 200
         tag-default port 2 vid 100
         tag-default port 3 vid 200
         tag-default port 4 vid 100
         tag-removal port 2 vid 100
```

```
        tag-removal port 3 vid 200
        tag-removal port 4 vid 100
      exit
;
   exit
;
;
   protocol ip
; -- Internet protocol user configuration --
      route 0.0.0.0 0.0.0.0 192.168.212.2
;
      rule 1 local-ip ethernet0/0 remote-ip any
      rule 1 napt translation
;
   exit
;
   protocol dhcp
; -- DHCP Configuration --
      server
; -- DHCP Server Configuration --
        enable
;
        shared 1
        shared 2
        shared 4
;
        subnet mssid_1 1 network 192.168.10.0 255.255.255.0
        subnet mssid_1 1 range 192.168.10.10 192.168.10.20
;
        subnet mssid_2 2 network 192.168.20.0 255.255.255.0
        subnet mssid_2 2 range 192.168.20.10 192.168.20.20
;
        subnet mssid_4 4 network 192.168.40.0 255.255.255.0
        subnet mssid_4 4 range 192.168.40.10 192.168.40.20
;
      exit
;
   exit
;
   dump-command-errors
   end
```