Lab wireless - Guideline

Topics
A. Wireless topologies
B. 802.11 protocol

A. Wireless topologies
WWAN:
- GSM, GPRS, CDMA, TDMA, EDGE, MBWA,
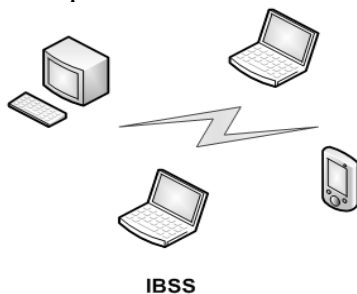WMAN:
- 802.16 WiMAX
WPAN:
- Bluetooth, ZigBee

B. 802.11 protocol

- 802.11 physical layer
  - RF (FHSS, DSSS), IR
- RF:
  - 5GHz Unlicensed National Information Infrastructure (U-NII),
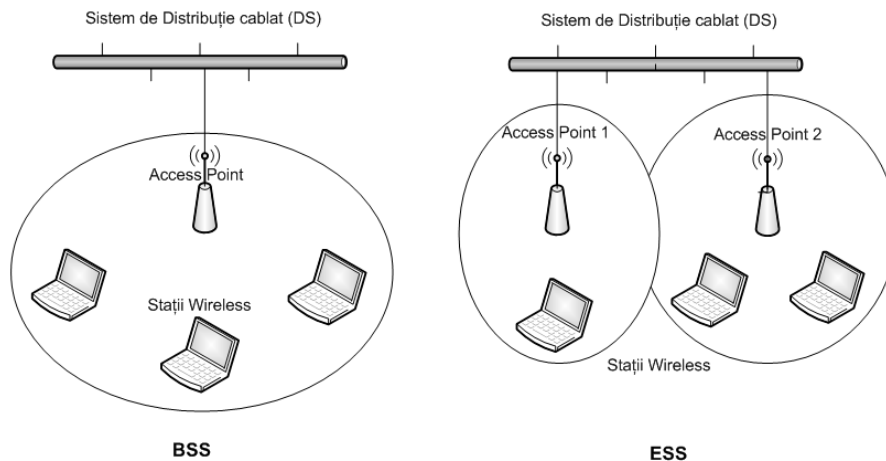 - 2.4GHz Industrial, Scientific, and Medical (ISM)
- 802.11 a,b,g,n,ac

Ad-hoc Mode
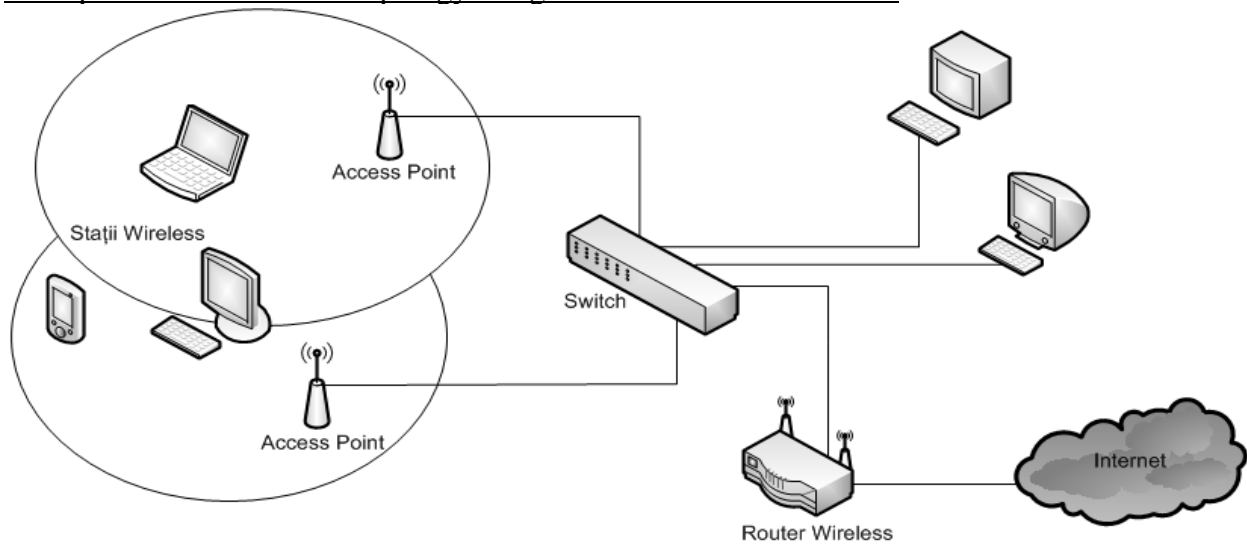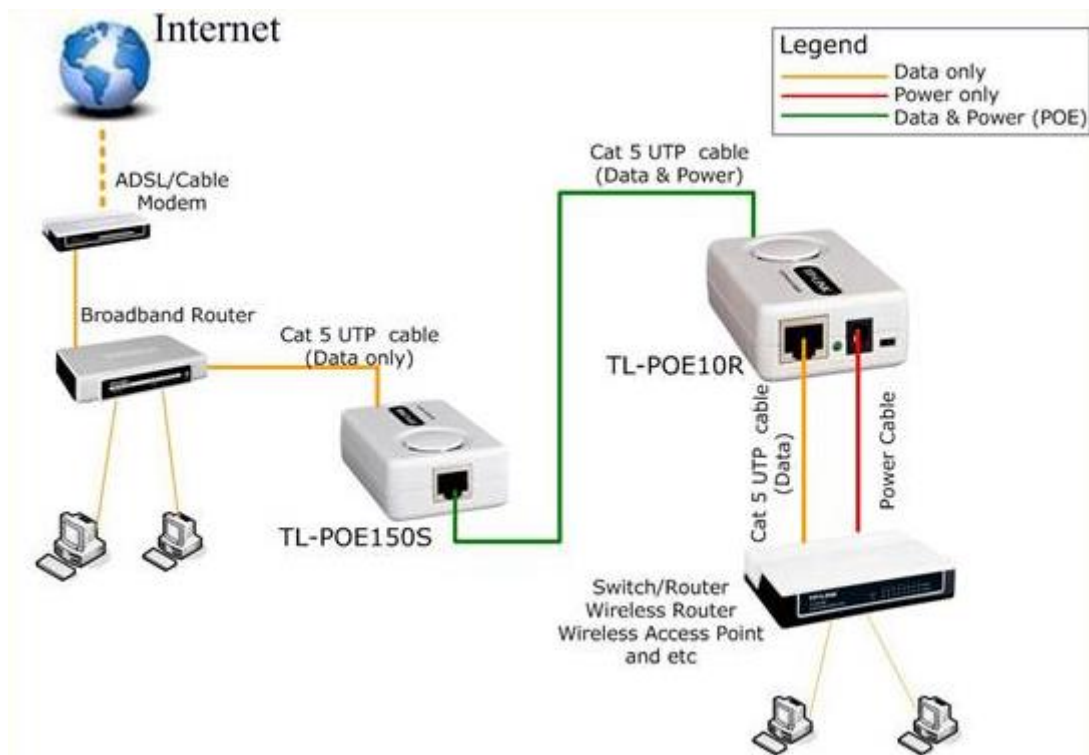- Independent Basic Service Set (IBSS)

IBSS

Infrastructure Mode
- Access Point (AP) – layer 2 device; role: bridge traffic
- AP and clients: BSS (Basic Service Set)
- Several BSS connected: ESS (Extended Service Set)
- SSID (Service Set Identifier:)

Example of wired/wireless topology using Wireless Routers and APs:

POE (Power over Ethernet)

www.tp-link.us

Wifi Extender

- 5 GHz Wireless
- 2.4 GHz Wireless
- Extender Coverage
- Router Coverage

5GHz Wi-Fi for video and gaming

2.4GHz Wi-Fi for data transfer

Router

EW-7238RPD

www.edimax.com

Power line adapters (Powerline AV2/ HomePlug AV2 standard)

WWW   **ISP**   **Router**   **Access Point**

Devices

http://tekeye.biz/
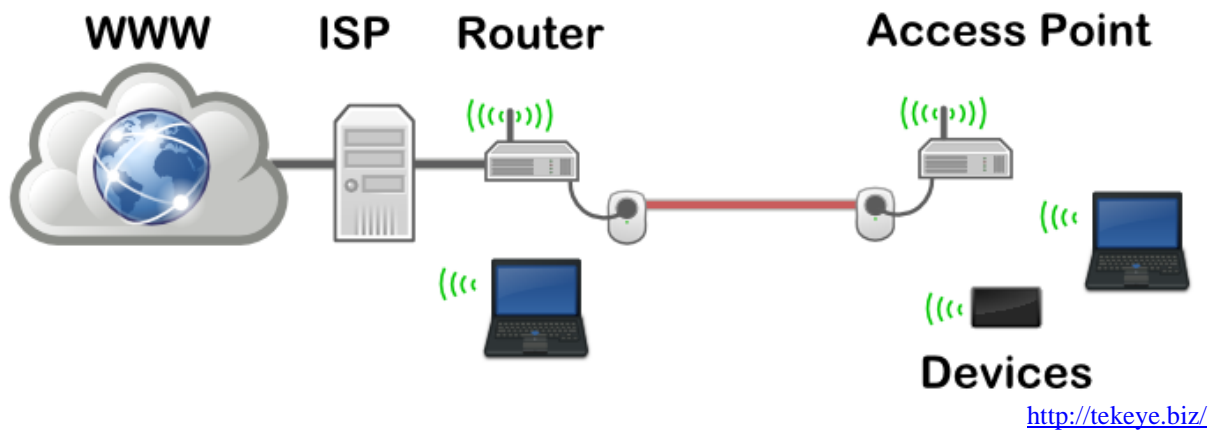
TP-LINK

WiFi
AV500

www.tp-link.pt

Using VLANs on a network – different VLAN for WiFi

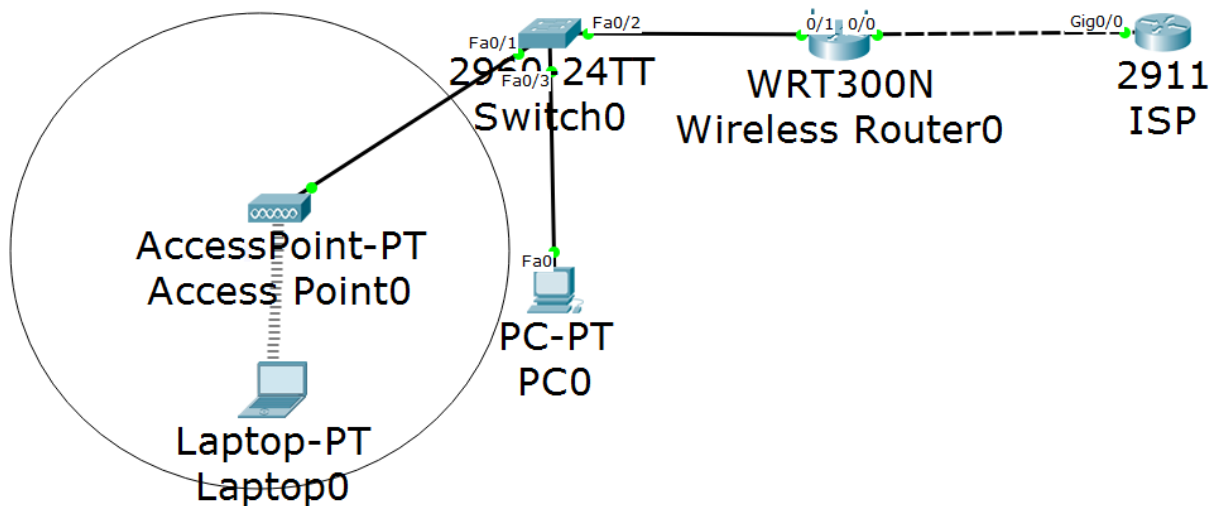**Laboratory test configuration:**

Device		IP Address	Subnet mask	Default Gateway
Router	Internet	DHCP	DHCP	DHCP
	Wireless	192.168.0.1	255.255.255.0	-
PCs, Laptop		192.168.0.x Dynamic (DHCP)	255.255.255.0 Dynamic (DHCP)	192.168.0.1 Dynamic (DHCP)

Device	SSID	Standard Channel	Wireless Sec. Protocol	Wireless Password	Remote Management Password
Router Wireless	Wi-Fi	11	WPA2 Personal	Cisco1234	Pass1234

Copy the following configuration to router ISP, in the configuration mode:

```
hostname ISP
!
interface GigabitEthernet0/0
ip address 1.1.1.1 255.0.0.0
no shutdown
!
ip dhcp excluded-address 1.1.1.1
!
ip dhcp pool WiFi
network 1.0.0.0 255.0.0.0
default-router 1.1.1.1
dns-server 8.8.8.8
```

Test the connectivity.
  a.   ping <target IP> and tracert <target IP>

Configure a wireless router:

Wireless Router0

| Physical | Config | GUI | Attributes |

Wireless-N Broadband Router

Firmware Version: v0.93.3

| | | | | | Wireless-N Broadband Router | WRT300N |

| **Setup** | Setup | Wireless | Security | Access Restrictions | Applications & Gaming | Administration | Status |

Basic Setup   DDNS   MAC Address Clone   Advanced Routing

Internet Setup

Help...

Internet Connection type   Automatic Configuration - DHCP

Optional Settings (required by some internet service providers)

Host Name:
Domain Name:
MTU: Size: 1500

Network Setup

Router IP   IP Address: 192 . 168 . 0 . 1
Subnet Mask: 255.255.255.0

DHCP Server Settings   DHCP Server: ● Enabled   ○ Disabled   DHCP Reservation

Start IP Address: 192.168.0. 100
Maximum number of Users: 50
IP Address Range: 192.168.0. 100 - 149
Client Lease Time: 0   minutes (0 means one day)
Static DNS 1: 0 . 0 . 0 . 0
Static DNS 2: 0 . 0 . 0 . 0
Static DNS 3: 0 . 0 . 0 . 0

Wireless Router0

| Physical | Config | GUI | Attributes |

Wireless-N Broadband Router

Firmware Version: v

| | | | | | Wireless-N Broadband Router | WRT300 |

| **Wireless** | Setup | Wireless | Security | Access Restrictions | Applications & Gaming | Administration | Status |

Basic Wireless Settings   Wireless Security   Wireless MAC Filter   Advanced Wireless Settings

Basic Wireless Settings

Help...

Network Mode: Mixed
Network Name (SSID):   Wi-Fi
Radio Band: Auto
Wide Channel: Auto
Standard Channel: 11 - 2.462GHz
SSID Broadcast: ● Enabled   ○ Disabled

Physical | Config | GUI | Attributes

Wireless-N Broadband Router

Firmware Version: v0.93.3

Wireless-N Broadband Router   WRT300N

Wireless | Setup | Wireless | Security | Access Restrictions | Applications & Gaming | Administration | Status

Basic Wireless Settings | Wireless Security | Wireless MAC Filter | Advanced Wireless Settings

Wireless Security

Help...

Security Mode: WPA2 Personal

Encryption: AES

Passphrase: Cisco1234

Key Renewal: 3600 seconds

Wireless Router0

Physical | Config | GUI | Attributes

Wireless-N Broadband Router

Firmware Version: v0.93.3

Wireless-N Broadband Router   WRT300N

Administration | Setup | Wireless | Security | Access Restrictions | Applications & Gaming | Administration | Status

Management | Log | Diagnostics | Factory Defaults | Firmware Upgrade

Management

Help...

Router Access

Router Password: ●●●●●
Re-enter to confirm: ●●●●●

Web Access

Web Utility Access: ☑ HTTP   ☐ HTTPS

Web Utility Access via Wireless: ◉ Enabled   ○ Disabled

Remote Access

Remote Management: ○ Enabled   ◉ Disabled

Web Utility Access: ◉ HTTP   ○ HTTPS

Remote Upgrade: ○ Enabled   ○ Disabled

Allowed Remote Ip Address:

○ Any Ip Address

○ 0 . 0 . 0 . 0 to 0

Remote Management Port: 8080

Upnp

Upnp: ○ Enabled   ◉ Disabled

Allow Users to Configure: ○ Enabled   ◉ Disabled

Allow Users to Disable Internet Access: ○ Enabled   ◉ Disabled

BackUp Configurations | Restore Configurations

BackUp and Restore

Connect to a wireless AP from Laptop0: