

# sWiFi/all v1.0

Serial to WiFi Converter

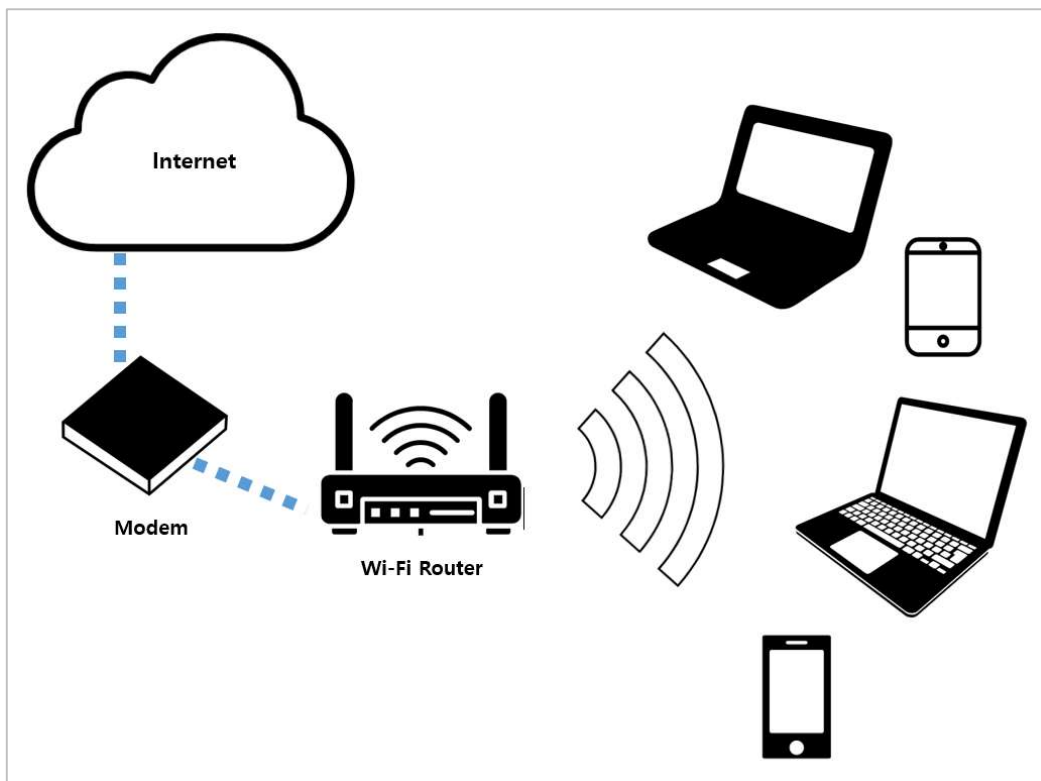
## White Paper

Ver 1.0

2020.07.03

# Overview

Wi-Fi is generally included as the primary method of wireless communication in all recently released smartphones, tablets and laptops. Wi-Fi is also called Wireless LAN, which explains why Wi-Fi was born. In other words, Wi-Fi is a wireless version of the computer networking technology that we call Ethernet or Wired LAN. Wi-Fi or wireless LAN technology allows data communication at the same speed and quality as wired LAN even in wireless environments. The name Wi-Fi is also short for Wireless Fidelity, which means it provides excellent quality such as wired LAN through wireless method.



# Wi-Fi Technology

Wi-Fi is used as a synonym for the IEEE 802.11 standard, but it is slightly different. IEEE 802.11 is a technical standard for wireless LAN, and Wi-Fi is a brand name of an organization called Wi-Fi Alliance for wireless LAN devices developed on the basis of this standard. However, since we usually use as the same meaning, we would like to use the Wi-Fi or IEEE 802.11 standard in the same sense here.



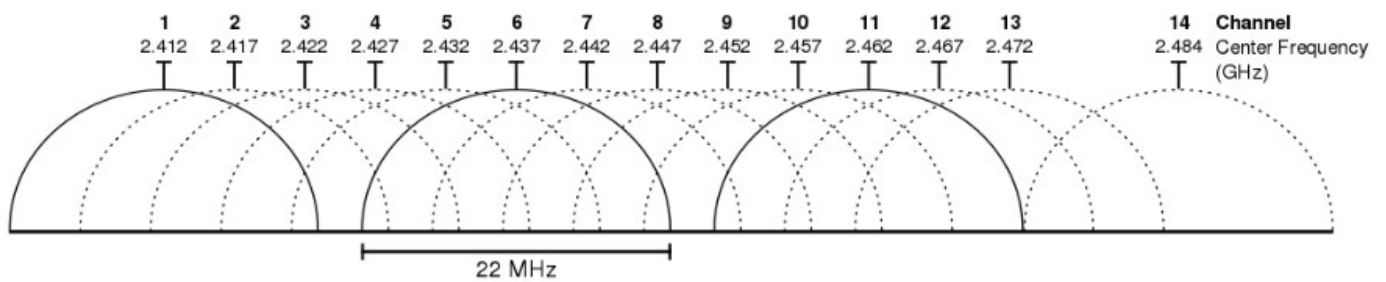
The first version of the Wi-Fi standard was released in 1997 and provided a communication speed of up to 2Mbps. In September 1999, the IEEE 802.11b standard, which provides speeds up to 11Mbps, and the IEEE 802.11a standard, which provides speeds up to 54Mbps, were subsequently released. Since then, the spread of Wi-Fi devices has been activated and video services such as YouTube have spread, requiring faster Wi-Fi standards. The standard issued in response to these needs was IEEE 802.11n, provides communication speeds of up to 150Mbps. In addition, standards such as IEEE 802.11ac provide maximum speeds up to 6.9Gbps.

Standard	<b>802.11b</b>	<b>802.11a</b>	<b>802.11g</b>	<b>802.11n</b>	<b>802.11ac</b>
Frequency Band	2.4GHz	5GHz	2.4GHz	2.4/5GHz	5GHz
Modulation	DSSS	OFDM	OFDM, DSSS	OFDM	OFDM
Antenna System	SISO	SISO	SISO	MIMO	MU-MIMO
Bandwidth	20MHz	20MHz	20MHz	20/40MHz	20/40/80/160MHz
Max. Data Rate	11Mbps	54Mbps	54Mbps	600Mbps	6.9Gbps

### Frequency Band and Interference

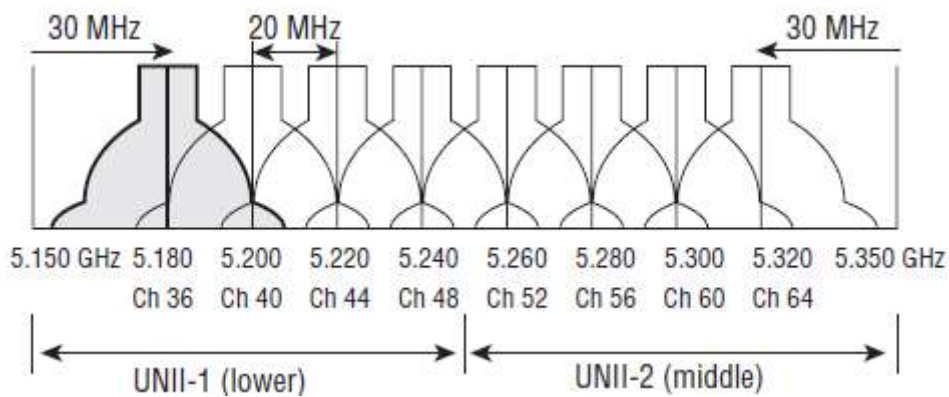
Wi-Fi uses frequencies in 2.4GHz and 5GHz band designated as the ISM(Industrial Scientific and Medical) band. This frequency band is allocated for industrial, scientific and medical devices, and if only basic rules are observed, there is no need to pay a separate fee to use the frequency band, unlike mobile telecommunications.

If multiple Wi-Fi devices are used on the same channel, or if Wi-Fi devices use adjoining channels, collisions can occur while communicating between different devices, which is called interferences.



Wi-Fi channels in 2.4GHz band

To solve the interference problem, it is recommended to use channels that do not overlap with each other, such as using channel 1, 6, 13, or channel 1, 5, 9, 13. However, Wi-Fi devices have not been able to meet the increasing speed. So more recently, the use of standards such as IEEE 802.11g and IEEE 802.11n, which can be used in the 5GHz band with more than 20 non-interfering channels, is increasing.



Wi-Fi channels in part of 5GHz band

# Serial to WiFi Converter sWiFi/all

## Overview

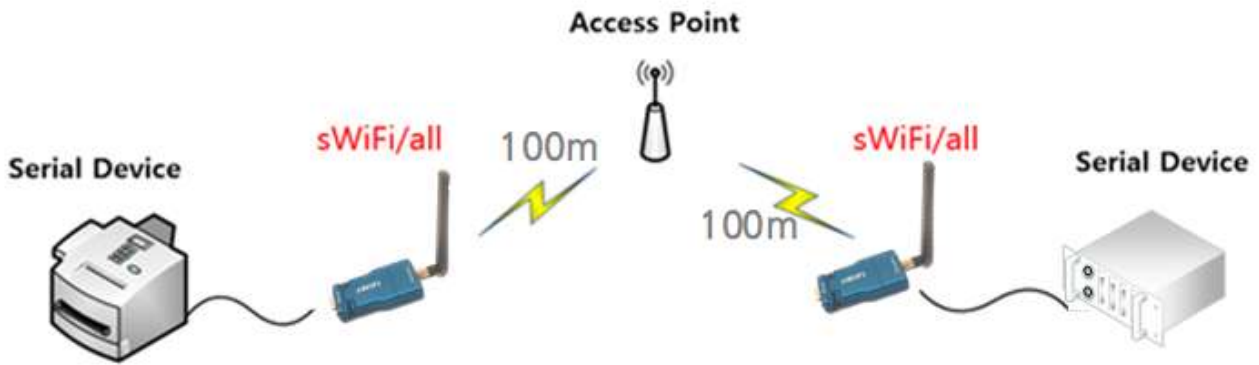
sWiFi/all is a serial to wireless device server that converts data of serial equipment without TCP/IP functionality into TCP/IP data in compliance with IEEE 802.11a/b/g/n standards. It supports RS232, RS422/485 interface and provides wireless network communication to serial equipment with simple connections. It enables remote monitoring and controlling of various serial equipment in industrial sites.

## Functions

The basic functions of sWiFi/all are as follows. Other functions will be introduced through this manual.

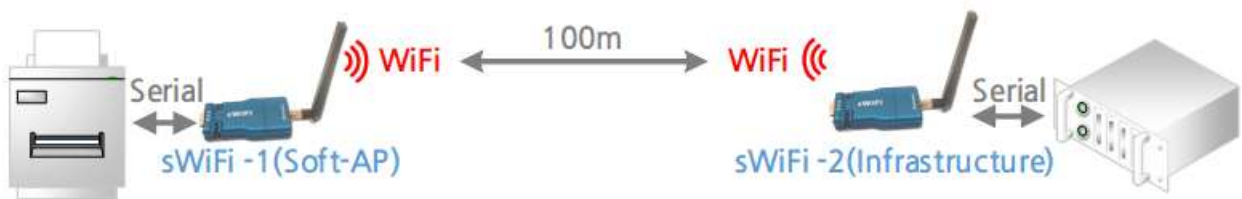
- 2.4GHz/5GHz Dual Band IEEE 802.11 a/b/g/n
- RS-232/422/485 (Max. 921.6Kbps)
- Wireless communication section(WiFi) Max. 54Mbps
- VCP using COM Port Redirector
- Infrastructure Mode, Soft AP Mode
- Roaming
- Enterprise Mode
- Setup equipment using sWiFi Utility

### Infrastructure Mode



In Infrastructure mode, sWiFi/all performs connection between ComRedirector, TCP Server/Client and UDP via AP. For sWiFi/all to access AP, the IP of the router band can be set to static IP which is a fixed IP, or set as DHCP which the IP is assigned. For communication, each sWiFi/all can be connected to an AP-wired PC, or sWiFi/all's can be connected as Server/Client each other.

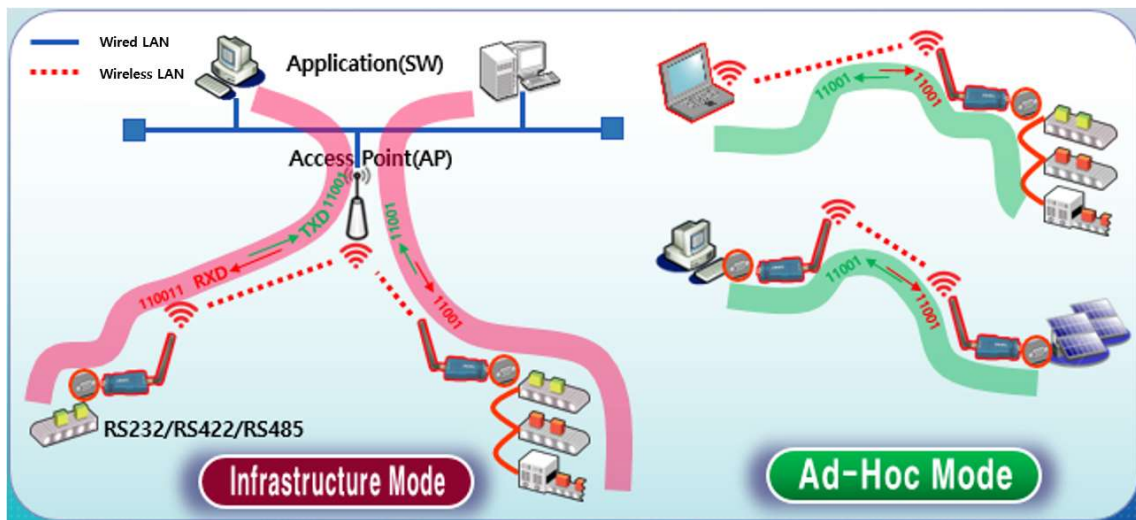
### Soft-AP Mode



Between two equipment communicates through serial port, with sWiFi/all attached to each end and connected 1:1, wireless communication is available. To perform the sWiFi/all connection and communication, select the operating mode of one sWiFi/all with Soft-AP which operates as AP and the other with Infrastructure so the AP operates as Soft-AP. At this point, set to either TCP Server on one side and TCP Client on the other, or UDP on both sides to connect serial socket and communicate. The Soft AP mode of sWiFi/all supports one WiFi connection.

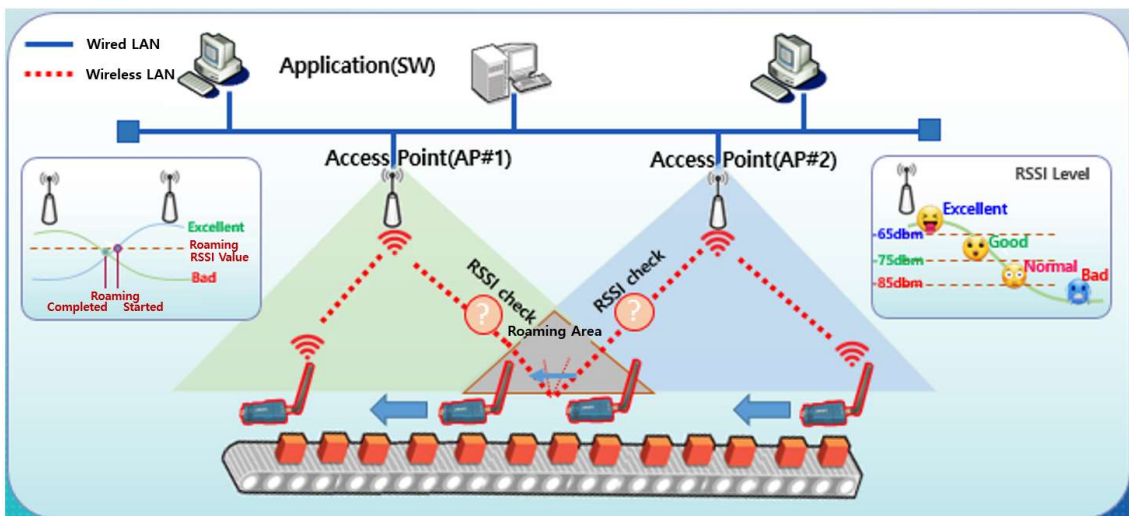
## sWiFi Applications

sWiFi can be applied in various fields, such as connection of POS devices, building automation, operation status monitoring/control/data collection of general equipment, production facilities, remote equipment over the Internet and control of roads, railways, airports, ports, etc.



## Access Point(AP) Roaming

Automatically finds and connects AP points according to RSSI(Received Signal Strength Indicator) values in overlapping zone when connected equipment is being linked to AP.



Roaming by RSSI value (dBm)