I.O.T Solution Expert : High-Flying Introduction

Shanghai High-Flying Electronics Technology Co., Ltd

2014.02

Company Overview

Shanghai High-Flying Electronics Technology Co., Ltd, found in **Dec.2009** by leading experts, is a high-tech enterprises specialized in wireless communication domain and designs,develops, manufacture,markets and sells high quality, robust embedded Wi-Fi modules, and provide total IOT solution (Cloud Servers and APP) to the customer.

High-Flying's WiFi products applied to Industrial, Smart-Metering, Smart Home, Government, Premium Consumer, and Education domain. With High-Flying's creative design, rapid development cycles and aggressive cost engineering, the customers can greatly reduce wireless product development cycle times, and take the hassle out of designing, testing, certifying, and manufacturing products. Leverage High-Flying's expertise to create wireless solutions for vertical markets.

Who We Are?

- **Total 28 Headcount**
  - ✓ Shanghai: HQ/Design Center (23);
  - ✓ Shenzhen: Sales Center (5);

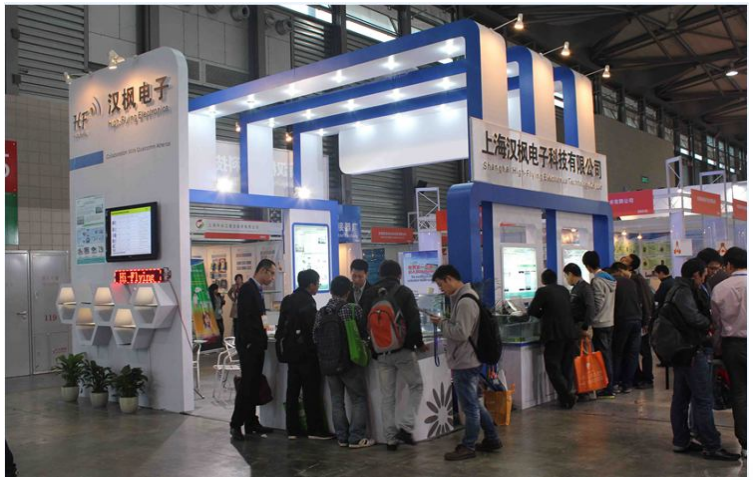
- **~80K/Mon Wi-Fi Module Shipment Now**
  - ✓ Internet of Things (Household electrics, Lighting…);
  - ✓ Industrial control (Solar energy converter, LED control …)
  - ✓ Consumer (Toy control, Electronic scales…);
  - ✓ Health/Medical…;

- **More than 400 Customers**
  - ✓ ~30 In mass production, still many in designing phase;

- **Self-Contained Wi-Fi Module Expert**
  - ✓ Easy-to-use hardware;
  - ✓ Fully off-load software;
  - ✓ Quick Time-To-Market;

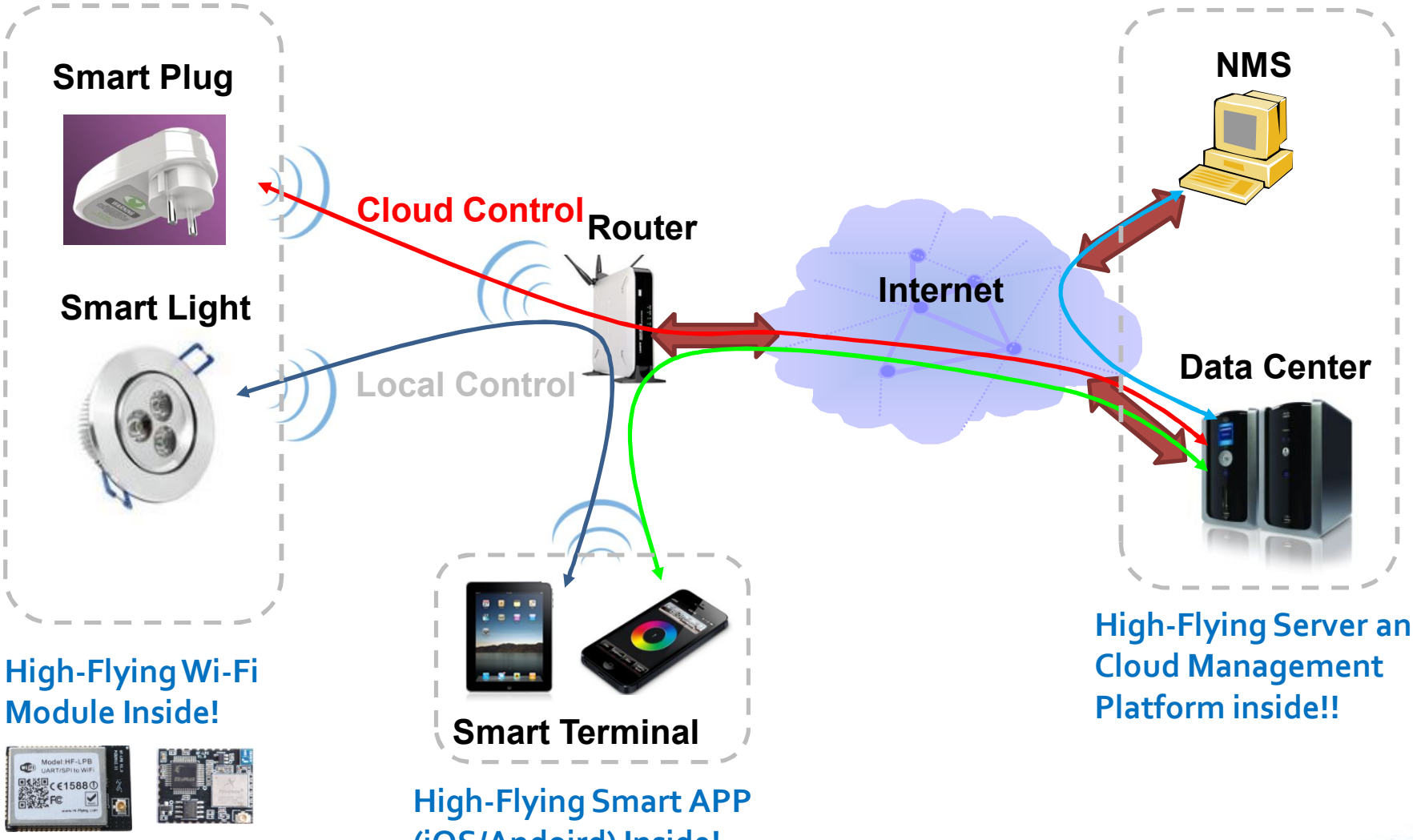
- **Solution Provider**
  - ✓ Wi-Fi Module with customized firmware;
  - ✓ APP with iOS, Android based application;
  - ✓ Cloud Server Platform;

HQ/Design Center (23)
R&D: HW&RF: (2),
SW- Module: (8)
SW- Server (3)
SW- Test (3)
Product MFG/Test: (2)
Market & Technical Support (3)
Finance:(1)
Procumbent: (1)



High-Flying Core Service Domain

One Shop End-to-End Total IOT Solution Provider!



High-Flying Market Overview

Energy Control
Typical applications include:
- PV inverter for solar power
- White goods- air conditioning
- Industry sensor networks
- Remote indoor climate control

Digital Media & Toys
Typical applications include:
- Web radio
- Wireless speakers
- Remote control toys
- Home security web cameras

Industrial Control
Typical applications include:
- Sensors for fire/smoke alarms
- Elevator signalization systems
- Security systems
- LED control

Retail
Typical applications include:
- POS terminals
- Wireless price tags
- Bar code readers
- Printers

Fitness & Healthcare
Typical applications include:
- Glucose meters, Oximeters
- Heart rate, blood pressure monitors
- Exercise equipment
- Weight and BMI scales

Tracking & Asset management
Typical applications include:
- Traffic information
- Location devices
- Intelligent packaging
- Logistics Management

High-Flying Customers

HF-A11/HF-LPB100 for air-condition

HF-A11/HF-A11-SMT for solar inverter

HF-LPB100 for LED gateway
HF-LPT100 for LED bulb

HF-LPB100 for Smart Plug

HF-LPB200 for Smart Home Application

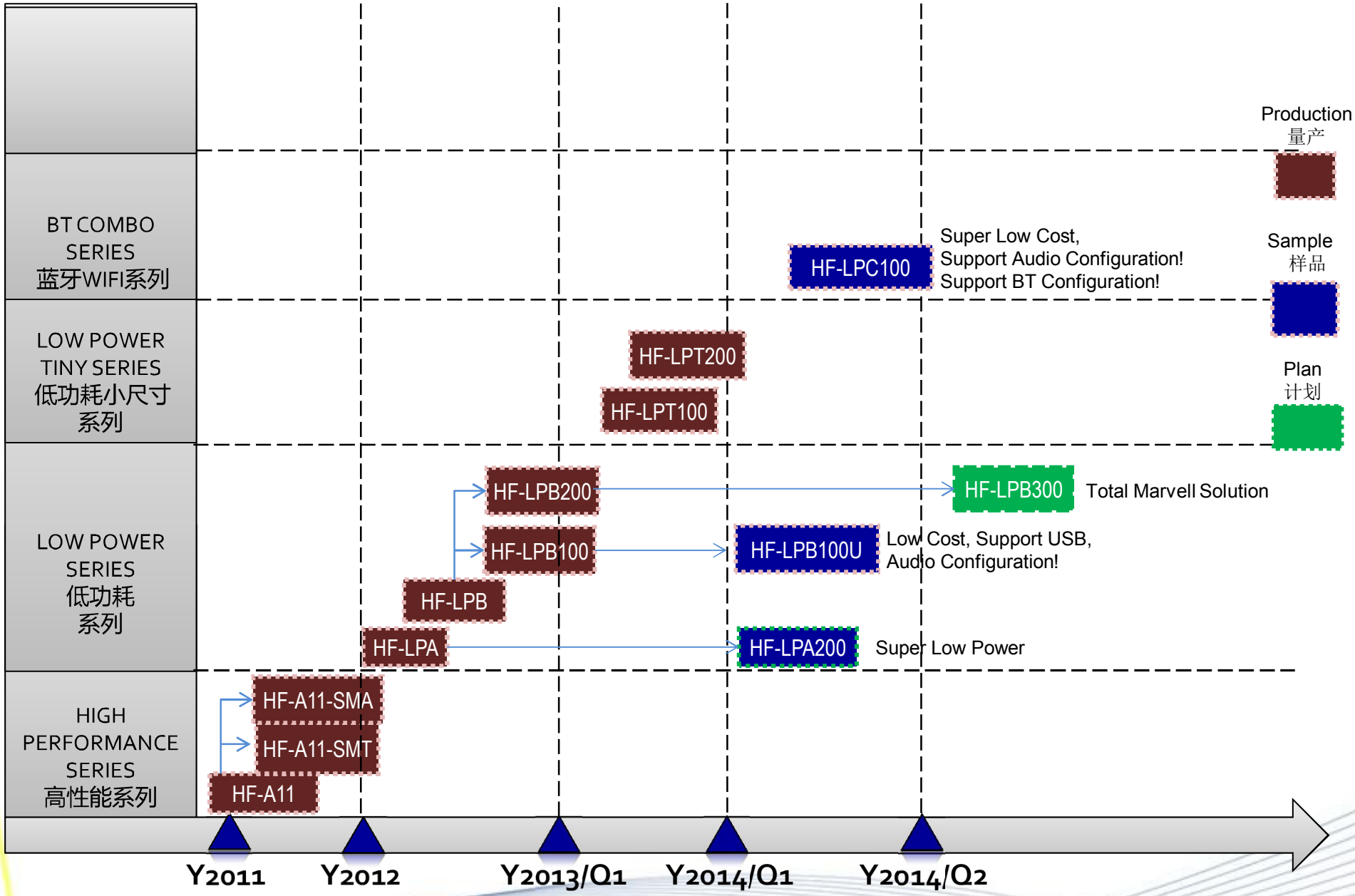
HF-A11 for fitness equipment

HF-A11-SMT for Smart instrument

HF-LPB100/HF-LPB200
for temperature controller

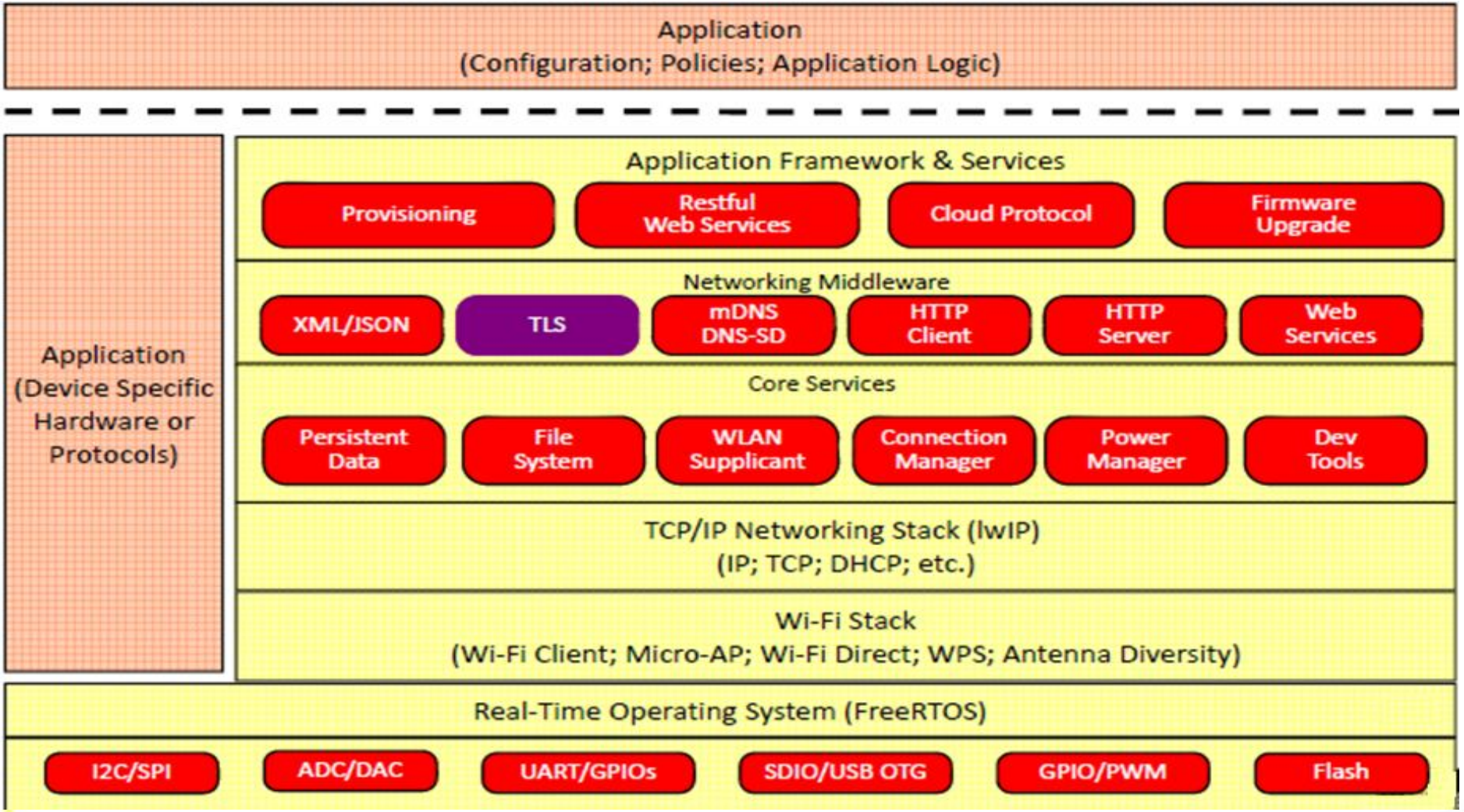
HF-LPB100 for body fat scales

Wi-Fi Module Products Roadmap



Wi-Fi Module SW Platform Introduction

- High-Flying Module Software Platform SDK

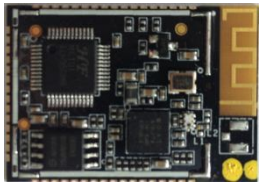


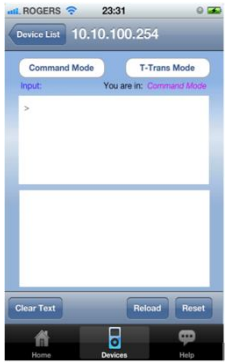
Wi-Fi Module Core Value Proposition

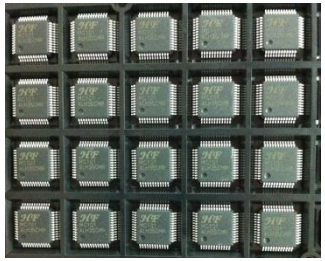
- Easy-to-Use Hardware with Fully Off-load Software
  - ✓ Easy configuration and debug;
  - ✓ Customized firmware;
  - ✓ Factory setting tools;
  - ✓ Quick Time-To-Market;
  - ✓ Strong Local Technical Support;

Instruction	Description
<null>	NULL
E	Open/Close show back function
ENTM	Set module into transparent transmition mode
NETP	Set/Query network protocol parameters
UART	Set/Query serial port parameters
UARTF	Open/Close UART auto-frame function
UARTFT	Set/Query UART auto-frame trigger time
UARTFL	Set/Query UART auto-frame trigger length

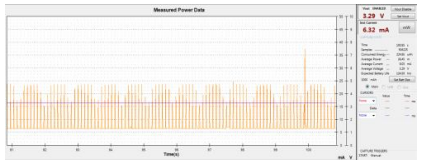
- Most Cost Effective Solution
  - ✓ High-Flying owned MCU (MC101)!;
  - ✓ High-Flying owned SMT line;
  - ✓ Fully BOM material control;







- Mature/Stable Product Platform
  - ✓ More than 3 years SW accumulation;
  - ✓ Fully customer qualification;
  - ✓ Experienced internal verification test;
    - Data performance test;
    - Power consumption test;
    - Temperature test;
    - RF test;
    - …



Wi-Fi Module Configuration

- All series High-Flying Wi-Fi modules supports two configuration methods: **Web Accessing** and **AT+ Instruction Set**.

- AT+ Instruction Set

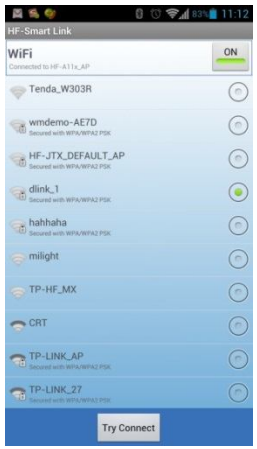
Instruction	Description
<null>	NULL
E	Open/Close show back function
ENTM	Set module into transparent transmition mode
NETP	Set/Query network protocol parameters
UART	Set/Query serial port parameters
UARTF	Open/Close UART auto-frame function
UARTFT	Set/Query UART auto-frame trigger time
UARTFL	Set/Query UART auto-frame trigger length
TMODE	Set/Query data transmition mode (transparent transmition or agreement transmition)
WMODE	Set/Query WIFI work mode (AP or STA)
WSKEY	Set/Query WIFI security parameters as STA
WSSSID	Set/Query WIFI target AP SSID parameters as STA
WSLK	Query WiFi link status as STA
WSLQ	Query WiFi signal strength as STA
WEBU	Set/Query WEB page login parameters (User Name and Password)
WAP	Set/Query WIFI parameters as AP
WAKEY	Set/Query WIFI security parameters as AP
MSLP	Set modules into power save mode.(Turn OFF WiFi)
WSCAN	Seek AP when module works as STA mode
TCPLK	Query if TCP link already build-up
WANN	Set/Query WAN setting, only effective as STA mode
LANN	Set/Query LAN setting, only effective as AP mode
DHCPGW	Set/Query DHCP gateway address
TCPTO	Set/Query TCP timeout
EPHY	Open/Close ETH interface
RELD	Restore to factory default setting
Z	Re-start module
MID	Query module ID information
VER	Query module software version information
H	Help

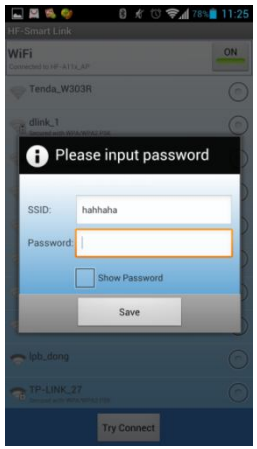
- Web Accessing

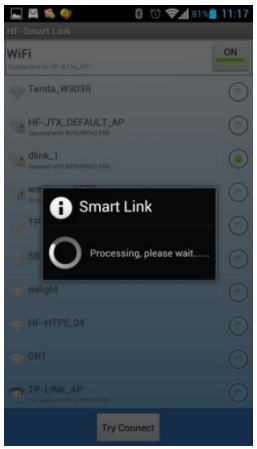
Wi-Fi Module Smart APP Tools

- AT Instruction configuration tools.

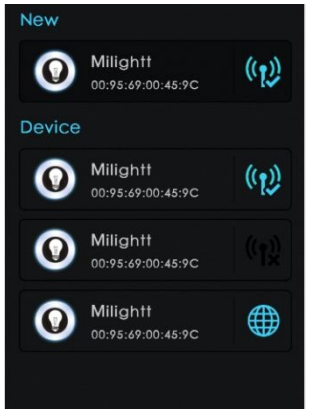
- Smart Link Tools. (Easy Connect)



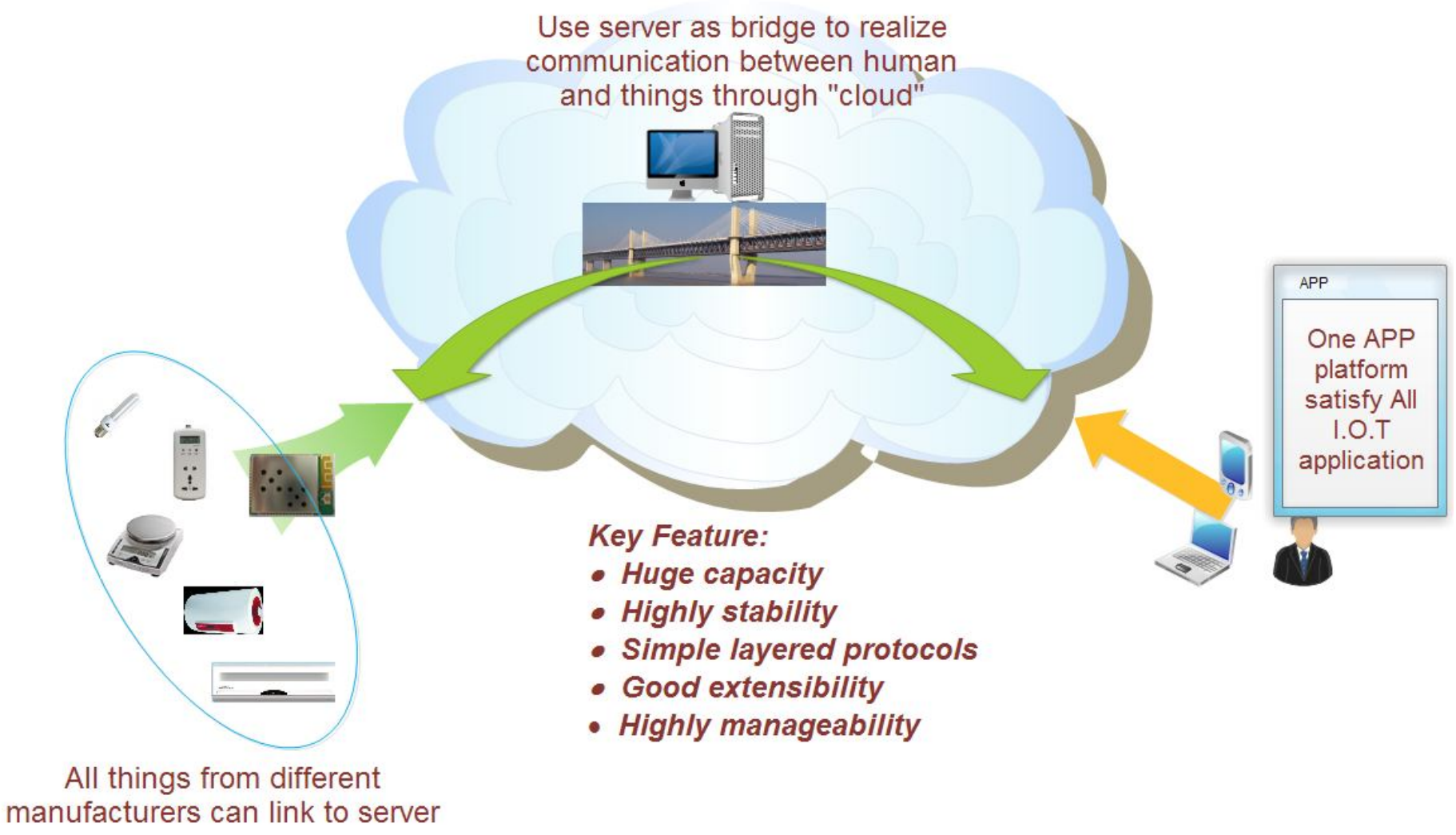




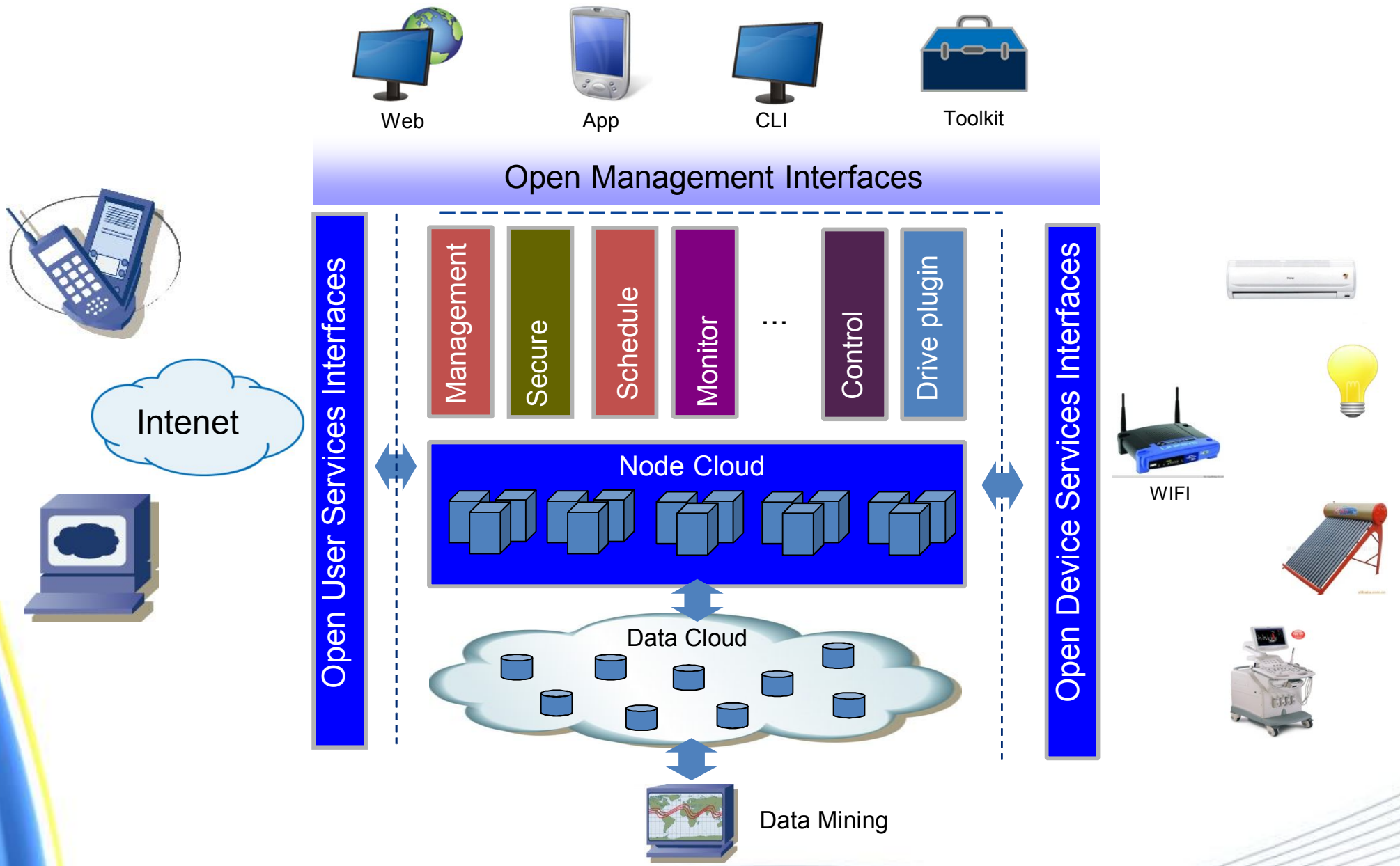
- Customer APP application



High-Flying Cloud Server Features

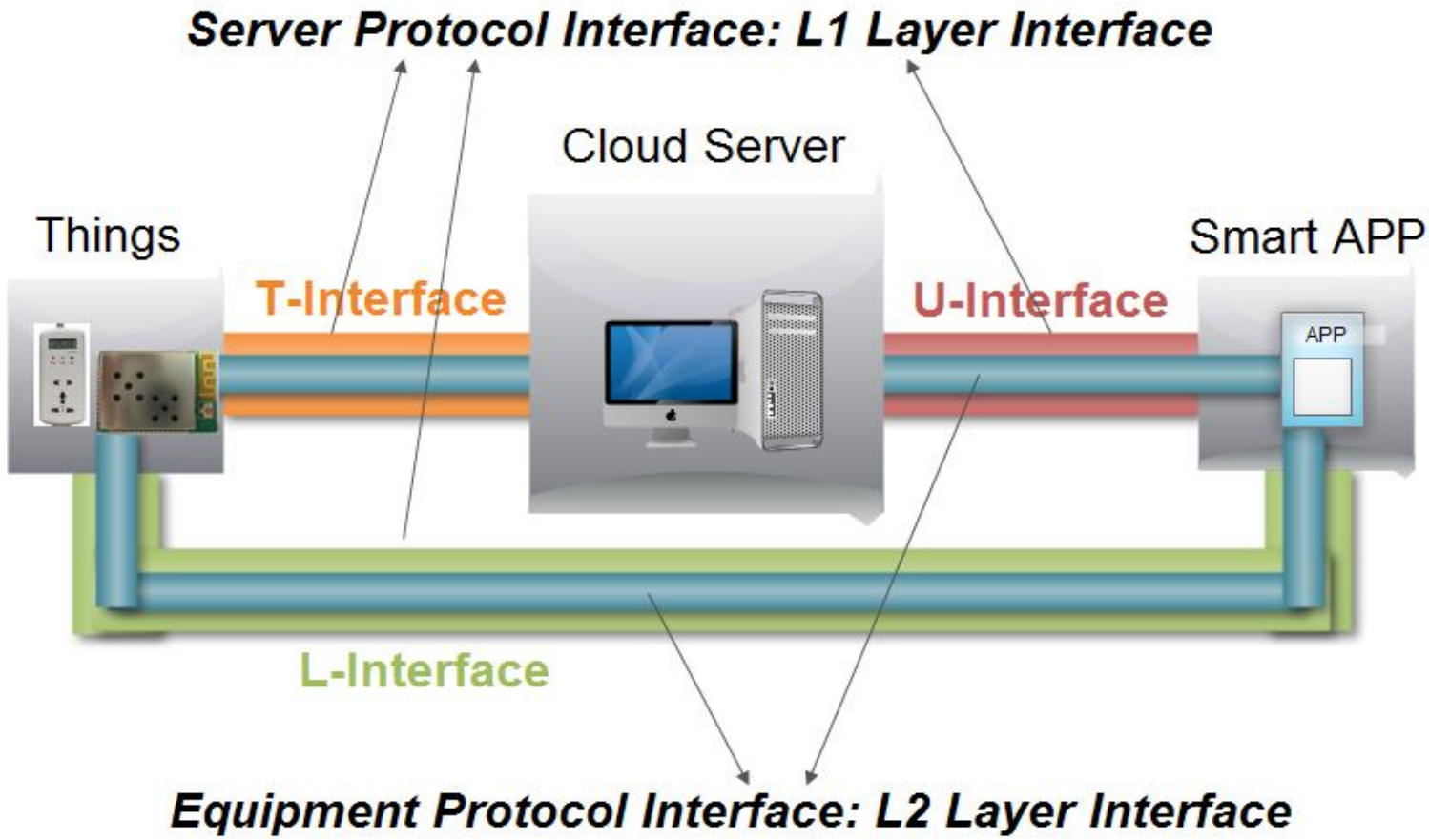


High-Flying Cloud Interface Frame

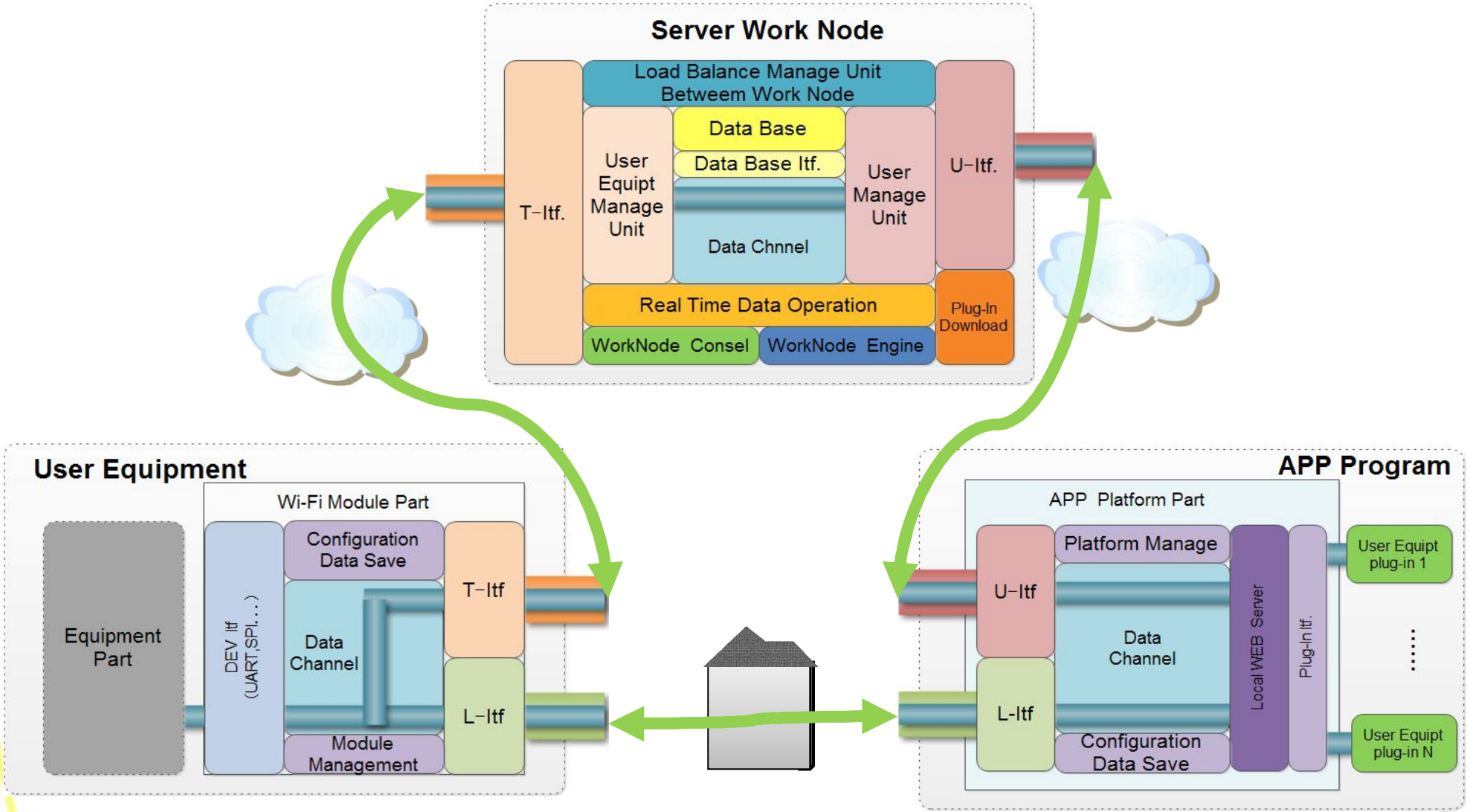


High-Flying Server Protocol Structure

- **L1 Layer Protocol :** High-Flying define L1 protocol and all equipment and APPs which follow L1 protocol can access and managed by High-Flying cloud server.
- **L2 Layer Protocol:** Equipment Manufacture define L2 protocol, which simplify manufacture's effort and not change their own protocol, then easily link to High-Flying cloud server.

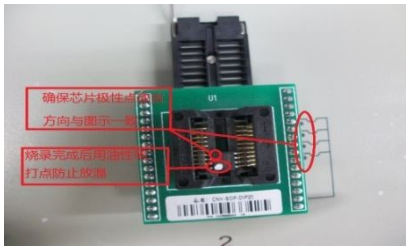


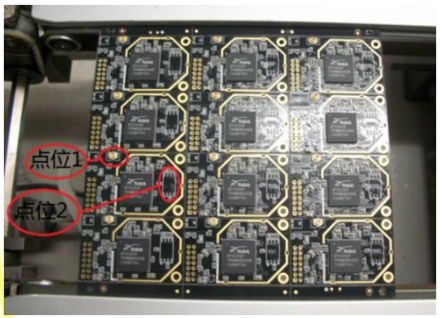
High-Flying I.O.T Solution Protocol Stack

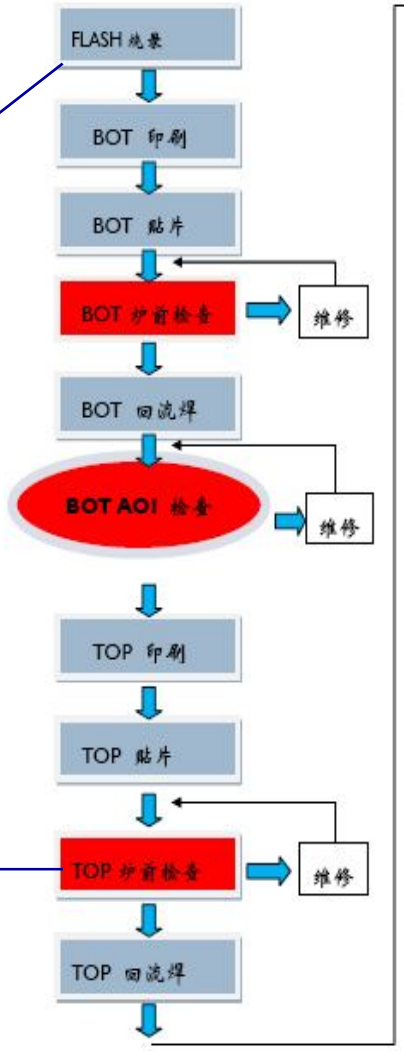


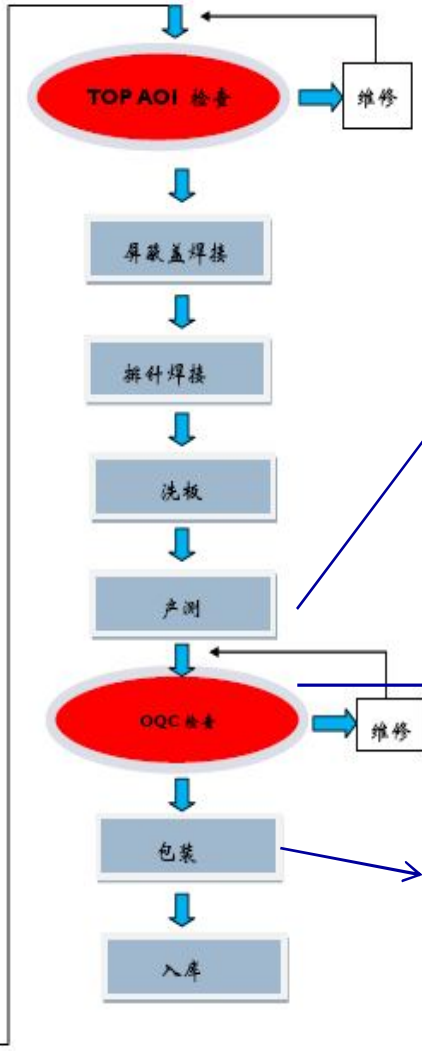
Wi-Fi Module Manufacture SMT Process

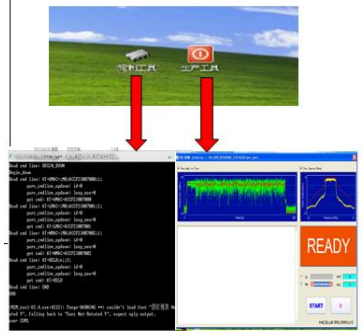
Work Instruction











HF-A11 UART-WIFI Module Introduction

Feature List:

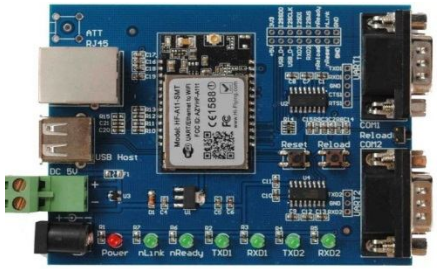
- ✓Support IEEE802.11b/g/n Wireless Standards
- ✓Support TCP/IP/UDP Network Protocols
- ✓Support UART/Ethernet Data Interface
- ✓Support UART Interface +5V Compatible
- ✓Support Work As STA/AP/AP+STA Mode
- ✓Support Router/Bridge Mode Networking
- ✓Support Internal/External Antenna Option
- ✓Support Transparent Transmission Mode
- ✓Support AT+ Instruction Set for Configuration
- ✓Support Friendly Web Configuration Page
- ✓Support UART Port Free/Auto-Frame Function
- ✓Single +3.3V Power Supply
- ✓Smallest Size: 25 x 40mm
- ✓FCC/CE/Telec Certificated
- ✓Flexible Software Platform
- ✓Customized Factory Setting For Customer

Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE/Telec
	Wireless standard	802.11 b/g/n
	Frequency range	2.412GHz-2.484GHz
	Transmit Power	802.11b: +20 dBm (Max.)
		802.11g: +18 dBm (Max.)
		802.11n: +15 dBm (Max.)
	Receiver Sensitivity	802.11b: -89 dBm
		802.11g: -81dBm
		802.11n: -71dBm
	Antenna Option	External:I-PEX Connector
		Internal:On-board chip antenna
Hardware Parameters	Data Interface	UART: 1200bps - 230400bps
		Ethernet: 100Mpbs
	Operating Voltage	3.3V (+/-5%)
	Operating Current	170mA~300mA
	Operating Temperature	-40℃- 85℃
	Storage Temperature	-45℃- 125℃
	Dimensions and Size	25×40×3.5mm
Software Parameters	Network Type	Station /AP mode/AP+STA
	Security Mechanisms	WEP/WAP-PSK/WAP2-PSK/WAPI
	Encryption	WEP64/WEP128/TKIP/AES
	Work Mode	Transparent/Agreement Transmission
	Serial command	AT+instruction set
	Network Protocol	TCP/UDP/ARP/ICMP/DHCP/DNS/HTTP
	Max. TCP Connection	32
	User Configuration	Web Server＋AT command config.
	User Application SW	Support customized application SW.

HF-A11-SMT WIFI Module Introduction

Feature List:

- ✓Support IEEE802.11b/g/n Wireless Standards
- ✓Support TCP/IP/UDP Network Protocols
- ✓Support UART/Ethernet/USB Data Interface
- ✓Support UART Interface +5V Compatible
- ✓Support Work As STA/AP/STA+AP Mode
- ✓Support Router/Bridge Mode Networking
- ✓Support Internal/External Antenna Option
- ✓Support Transparent/Agreement Transmission Mode
- ✓Support AT+ Instruction Set for Configuration
- ✓Support Friendly Web Configuration Page
- ✓Support UART Port Free/Auto-Frame Function
- ✓Single +3.3V Power Supply
- ✓Smallest Size: 25 x 40mm,26-Pin Stamp Hole
- ✓FCC/CE Certificated
- ✓Flexible Software Platform
- ✓Customized Factory Setting For Customer



Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE
	Wireless standard	802.11 b/g/n
	Frequency range	2.412GHz-2.484GHz
	Transmit Power	802.11b: +20 dBm (Max.)
		802.11g: +18 dBm (Max.)
		802.11n: +15 dBm (Max.)
	Receiver Sensitivity	802.11b: -89 dBm
		802.11g: -81dBm
		802.11n: -71dBm
	Antenna Option	External:I-PEX Connector
		Internal:On-board chip antenna
Hardware Parameters	Data Interface	UART: 1200bps - 230400bps (3.3V)
		UART1: 1200bps - 230400bps (5V)
		Ethernet: 100Mpbs
	Operating Voltage	3.3V (+/-5%)
	Operating Current	170mA~300mA
	Operating Temperature	-40℃- 85℃
	Storage Temperature	-45℃- 125℃
	Dimensions and Size	25×40×2.5mm
Software Parameters	Network Type	Station /AP mode/AP+STA
	Security Mechanisms	WEP/WAP-PSK/WAP2-PSK/WAPI
	Encryption	WEP64/WEP128/TKIP/AES
	Work Mode	Transparent/Agreement Transmission
	Serial command	AT+instruction set
	Network Protocol	TCP/UDP/ARP/ICMP/DHCP/DNS/HTTP
	Max. TCP Connection	32
	User Configuration	Web Server＋AT command config.
	User Application SW	Support customized application SW.

HF-LPB Low Power Module Introduction

Feature List:

- ✓ Support IEEE802.11b/g/n Wireless Standards
- ✓ Low-Power for Battery Applications
- ✓ Support UART/SPI Data Communication Interface
- ✓ Support Work As STA/AP/AP+STA Mode
- ✓ Support Smart Link Function
- ✓ Support Wireless/Remote Firmware Upgrade
- ✓ Support User-Defined Web Page Upload
- ✓ Support SDK package
- ✓ Support Internal/External Antenna Option
- ✓ Single +3.3V Power Supply
- ✓ Smallest Size: 23.1mm x 32.8mm x2.7mm
- ✓ FCC/CE Certificated

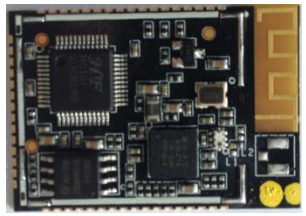
HF-LPB support AP+STA wireless networking. It also provides wireless and remote firmware upgrade. HF-LPB support user defined Web page and can revise the data communication protocol , which reduce much customer's software development and customization work. HF-LPB support smart link application which reduce the effort for quick connection

Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE
	Standard	802.11 b/g/n
	Frequency	2.412GHz-2.484GHz
	Transmit Power	802.11b: +18 dBm (@1Mbps)
		802.11g: +16.5 dBm (@54Mbps)
		802.11n: +12.5 dBm (@HT20, MCS7)
	RX Sensitivity	802.11b: -90 dBm (@11Mbps ,CCK)
		802.11g: -84dBm (@54Mbps, OFDM)
		802.11n: -77dBm (@HT20, MCS7)
	Antenna Option	External:I-PEX Connector
		Internal:On-board chip antenna
Hardware Parameters	Data Interface	UART
		USB, SPI,PWM,GPIO,ADC...
	Operating Voltage	3.1~3.6V
	Operating Current	Continuous TX: ~200mA Normal :Ave. 8mA; Peak: 200mA Standby: <80uA
	Operating Temperature	-40℃- 85℃
	Storage Temperature	-45℃- 125℃
	Dimensions and Size	23.1mm x 32.8mm x 2.7mm
Software Parameters	Network Type	STA /AP/STA+AP
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Firmware Upgrade	Wi-Fi Upgrade Remote Upgrade
	Customization	Support User -Defined Web Page SDK for Application Develop
	Network Protocol	IPv4, IPv6,TCP/UDP/FTP/HTTP

HF-LPB100 Low Power Module Introduction

Feature List:

- ✓ Support IEEE802.11b/g/n Wireless Standards
- ✓ High-Flying MCU (MC101) inside!
- ✓ Low-Power for Battery Applications
- ✓ Support UART/SPI/PWM Data Communication
- ✓ Support Work As STA/AP/AP+STA Mode
- ✓ Support Smart Link Function
- ✓ Support Wireless/Remote Firmware Upgrade
- ✓ Support WPS Function
- ✓ Support Multi-TCP (Upto 5) Client Application
- ✓ Support SDK package
- ✓ Support Internal/External Antenna Option
- ✓ Single +3.3V Power Supply
- ✓ Smallest Size: 23.1mm x 32.8mm x2.7mm
- ✓ FCC/CE Certificated



MC101, Low Cost!!!

Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE
	Standard	802.11 b/g/n
	Frequency	2.412GHz-2.484GHz
	Transmit Power	802.11b: +16 dBm (@1Mbps)
		802.11g: +14 dBm (@54Mbps)
		802.11n: +13dBm (@HT20, MCS7)
	RX Sensitivity	802.11b: -93dBm (@11Mbps ,CCK)
		802.11g: -85dBm (@54Mbps, OFDM)
		802.11n: -82dBm (@HT20, MCS7)
	Antenna Option	External:I-PEX Connector
		Internal:On-board chip antenna
Hardware Parameters	Data Interface	UART
		SPI,PWM,GPIO,ADC...
	Operating Voltage	2.8~3.6V
	Operating Current	Continuous TX: ~200mA Normal :Ave. ~12mA; Peak: 200mA Standby: <200uA
	Operating Temperature	-40℃- 85℃
	Storage Temperature	-45℃- 125℃
	Dimensions and Size	23.1mm x 32.8mm x 2.7mm
Software Parameters	Network Type	STA /AP/STA+AP
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Firmware Upgrade	Wi-Fi Upgrade Remote Upgrade
	Customization	Support User -Defined Web Page SDK for Application Develop
	Network Protocol	IPv4, TCP/UDP/FTP/HTTP

HF-LPB200 Low Power Module Introduction

Feature List:

- ✓ Support IEEE802.11b/g/n Wireless Standards
- ✓ Marvell Solutions
- ✓ Support UART/SPI/USB Data Communication
- ✓ Support Work As STA/AP/AP+STA Mode
- ✓ Support Smart Link Function (APP program provide)
- ✓ Support Wireless/Remote Firmware Upgrade
- ✓ Support Wakeup-On-Wireless and Wakeup local
- ✓ Support FTTPS/TLS and mDNS Application
- ✓ Support Fully SDK package
- ✓ Support Internal/External Antenna Option
- ✓ Single +3.3V Power Supply
- ✓ Smallest Size: 23.1mm x 32.8mm x2.7mm
- ✓ FCC/CE Certificated

Marvell 88MC200+88W8782 Solution

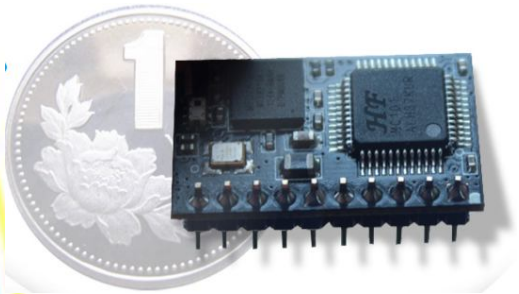
Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE
	Standard	802.11 b/g/n
	Frequency	2.412GHz-2.484GHz
	Transmit Power	802.11b: +16 dBm (@1Mbps)
		802.11g: +14 dBm (@54Mbps)
		802.11n: +13dBm (@HT20, MCS7)
	RX Sensitivity	802.11b: -93 dBm (@11Mbps ,CCK)
		802.11g: -85dBm (@54Mbps, OFDM)
		802.11n: -82dBm (@HT20, MCS7)
	Antenna Option	External:I-PEX Connector
		Internal:On-board chip antenna
Hardware Parameters	Data Interface	UART
		USB, SPI,PWM,GPIO,ADC...
	Operating Voltage	3.1~3.6V
	Operating Current	Continuous TX: ~240mA Normal :Ave. ~50mA; Peak: 240mA Wake-On-Wireless: ~10mA Standby: <100uA
	Operating Temperature	0℃- 80℃
	Storage Temperature	-45℃- 125℃
	Dimensions and Size	23.1mm x 32.8mm x 2.7mm
Software Parameters	Network Type	STA /AP/STA+AP
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Firmware Upgrade	Wi-Fi Upgrade Remote Upgrade
	Customization	Support User -Defined Web Page SDK for Application Develop
	Network Protocol	IPv4,TCP/UDP/FTP/HTTP

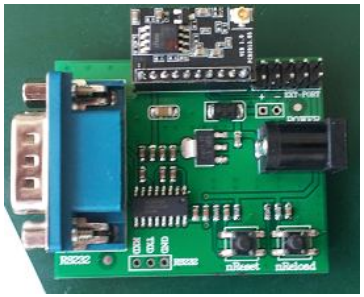
HF-LPT100 Low Power Tiny Module

Feature List:

- ✓ Support IEEE802.11b/g/n Wireless Standards
- ✓ High-Flying MCU (MC101) inside!
- ✓ Low-Power for Battery Applications
- ✓ Support UART/PWM Data Communication
- ✓ Support Work As STA/AP/AP+STA Mode
- ✓ Support Smart Link Function
- ✓ Support Wireless/Remote Firmware Upgrade
- ✓ Support WPS Function
- ✓ Support Multi-TCP (Upto 5) Client Application
- ✓ Support SDK package
- ✓ Support External Antenna Option
- ✓ Single +3.3V Power Supply
- ✓ Smallest Size: 22x 13.5x6mm, 1x10 2mm DIP

Smallest Size!!!



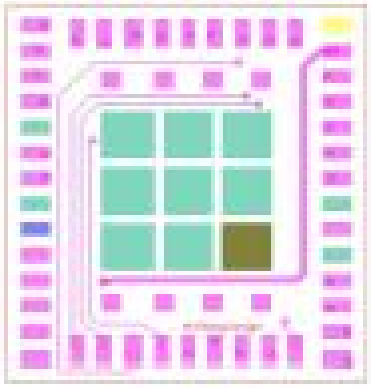


Class	Item	Parameters
Wireless Parameters	Certification	TBD
	Standard	802.11 b/g/n
	Frequency	2.412GHz-2.484GHz
	Transmit Power	802.11b: +16 dBm (@1Mbps)
		802.11g: +14 dBm (@54Mbps)
		802.11n: +13dBm (@HT20, MCS7)
	RX Sensitivity	802.11b: -93dBm (@11Mbps ,CCK)
		802.11g: -85dBm (@54Mbps, OFDM)
		802.11n: -82dBm (@HT20, MCS7)
	Antenna Option	External:I-PEX Connector
		Internal:On-board chip antenna
Hardware Parameters	Data Interface	UART
		PWM,GPIO...
	Operating Voltage	2.8~3.6V
	Operating Current	Continuous TX: ~200mA Normal :Ave. ~12mA; Peak: 200mA Standby: <200uA
	Operating Temperature	-40℃- 85℃
	Storage Temperature	-45℃- 125℃
	Dimensions and Size	22mm x 13.5mm x 6mm
Software Parameters	Network Type	STA /AP/STA+AP
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Firmware Upgrade	Wi-Fi Upgrade Remote Upgrade
	Customization	Support User -Defined Web Page SDK for Application Develop
	Network Protocol	IPv4, TCP/UDP/FTP/HTTP

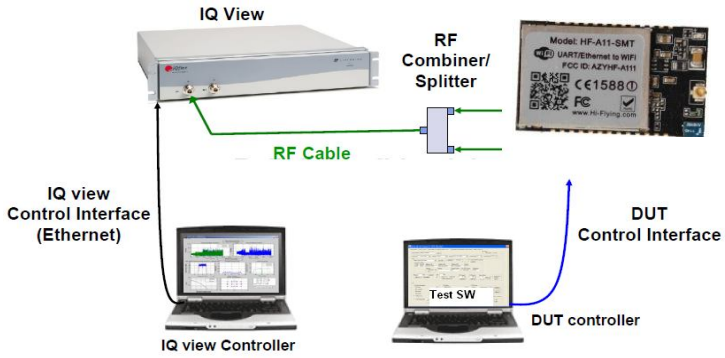
High-Flying Design/RF/Test Capability

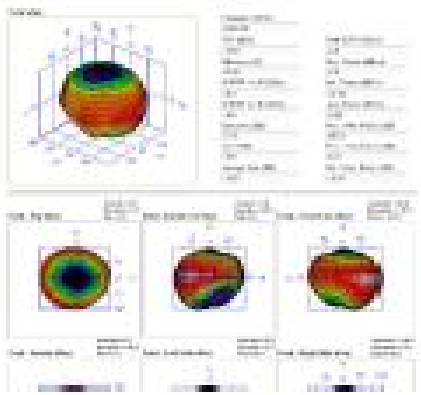
PCB Antenna design

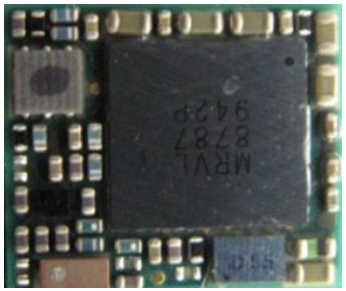
RF SIP Design

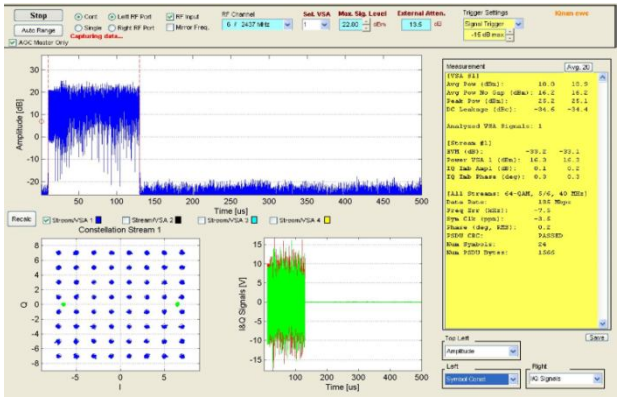


WIFI RF Testing









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