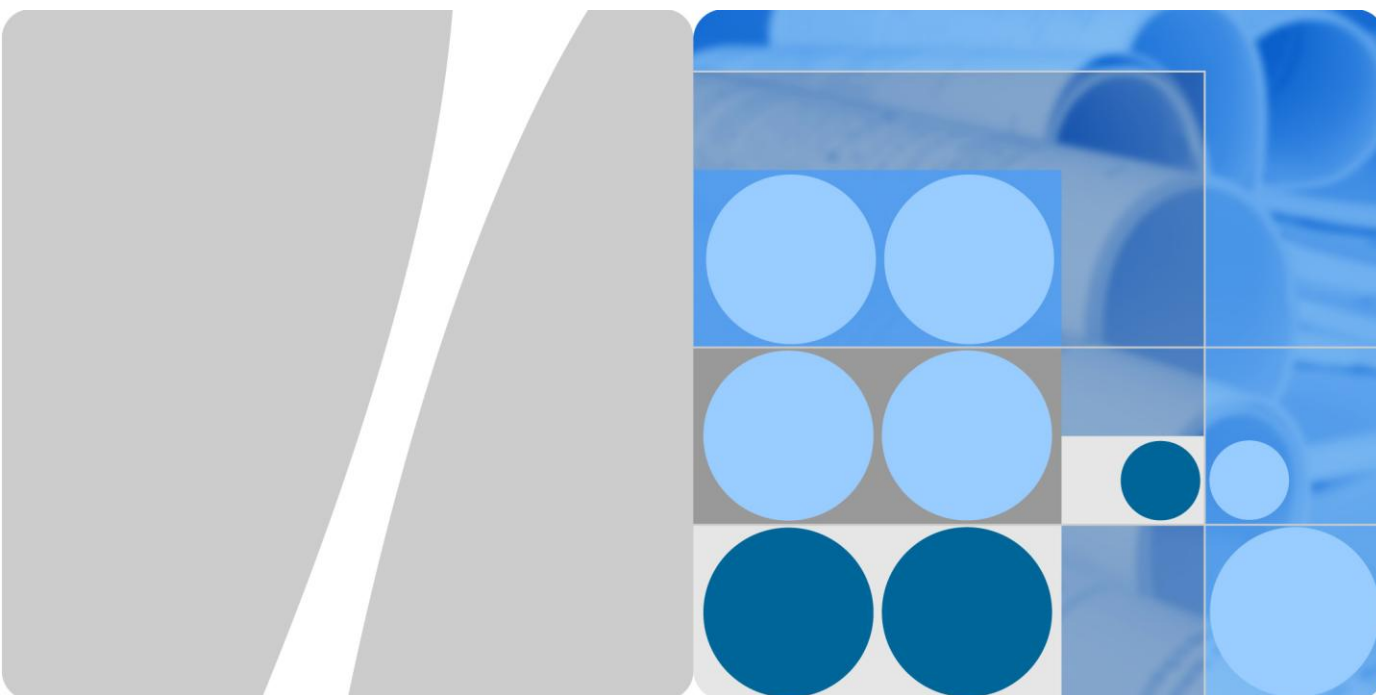


Product Description



HUAWEI E8231 HSPA+ Wingle
V100R001

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About This Document

Summary

This document provides information about the major functions, supported services, system architecture, and technical references of HUAWEI E8231 HSPA+ Wingle (hereinafter referred to as the E8231).

The following table lists the contents of this document.

Chapter	Describes
1 Overview	The supported network modes, basic services and functions, and the appearance of the E8231.
2 Features	The supported features and technical specifications of the E8231.
3 Services and Applications	The services and applications of the E8231.
4 System Architecture	The architecture of the E8231.
5 Technical Reference	The technical references of the E8231.
6 Packing List	The items contained in the package of the E8231.
A Acronyms and Abbreviations	The acronyms and abbreviations mentioned in this document.



History

Issue	Details	Date	Author	Approved by
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Contents

1 Overview	5
2 Features	7
2.1 Main Features	7
2.2 Technical Specifications	8
2.2.1 Hardware	8
2.2.2 Software Specifications	9
3 Services and Applications	11
3.1 Packet Data Service	11
3.1.1 USB Modem	11
3.1.2 Wireless Modem	11
3.2 SMS	13
4 System Architecture	14
4.1 System Architecture	14
4.2 Functional Modules	15
5 Technical Reference	17
5.1 Standards/Protocols for Data product	17
5.2 Standards/Protocols for wireless Um interface	17
6 Packing List	21

1 Overview

The E8231 supports the following standards:

- High Speed Packet Access Plus (HSPA+)
- High Speed Uplink Packet Access (HSUPA)
- High Speed Downlink Packet Access (HSDPA)
- Universal Mobile Telecommunications System (UMTS)
- Enhanced Data Rates for Global Evolution (EDGE)
- General Packet Radio Service (GPRS)
- Global System for Mobile Communications (GSM)
- Wireless local area network as WiFi AP(WLAN)

The E8231 provides the following services:

- HSPA+ packet data service, the maximum rate up to 21.6Mbit/s;
- HSPA (HSUPA/HSDPA)/UMTS packet data service, the maximum rate up to 14.4Mbit/s;
- EDGE/GPRS packet data service, the maximum rate up to 236.8Kbit/s;
- UMTS/GSM Short Message Service (SMS)

You can connect the E8231 with the USB interface of a computer, or with the power adapter/in car also by USB interface.

In the service area of the HSPA+/HSPA/UMTS/EDGE/GPRS/GSM network, you can surf the Internet and send/receive messages/emails cordlessly. The E8231 is fast, reliable, and easy to operate. Thus, mobile users can experience many new features and services with the E8231. These features and services will enable a large number of users to use the E8231 and the average revenue per user (ARPU) of operators will increase substantially.

Figure 1-1 shows the profile of the E8231.



Figure 1-1 E8231 profile

2 Features

2.1 Main Features

The E8231 mainly supports the following features:

- HSPA+/HSPA/UMTS 2100MHz (E8231s-1)、2100/900MHz(E8231s-2), EDGE/GPRS/GSM 1900MHz/1800MHz/900MHz/850MHz
- Equalizer
- Receive diversity
- HSPA+ downlink data service of up to 21.6Mbps
- HSDPA data service of up to 14.4Mbps
- HSUPA data service of up to 5.76Mbps
- UMTS PS domain data service of up to 384 kbps
- EDGE packet data service of up to 236.8 kbps
- GPRS packet data service of up to 85.6 kbps
- SMS based on CS/PS domain of GSM and UMTS
- Wi-Fi AP and WPS
- Inner DHCP server, DNS RELAY and NAT
- Plug and Play
- Standard USB interface
- UMTS and WLAN inner antenna
- Wi-Fi AP, supports up to 10 users
- Windows XP SP3, Windows Vista SP1/SP2, Windows 7, Windows 8(Does not support Windows RT), Mac OS X 10.6, 10.7 and 10.8 with latest upgrades

2.2 Technical Specifications

2.2.1 Hardware

Table 2-1 lists the hardware specifications.

Table 2-1 Hardware specifications

Item	Specifications	
Technical standard	GSM/GPRS/EGPRS R99 WCDMA/HSDPA R5, HSUPA R6, HSPA+ R7 WLAN: IEEE 802.11b/g/n	
Operating frequency	HSPA+/HSPA/UMTS	2100MHz (E8231s-1), 2100/900MHz(E8231s-2)
	EDGE/GPRS/GSM: 1900MHz/1800MHz/900MHz/850MHz	
	WLAN: 2412MHz~2472MHz	
Maximum transmitter power	WCDMA/HSPA+: +24dBm (Power Class 3)	
	GSM/GPRS 850M/900MHz: +33dBm (Power Class 4) GSM/GPRS 1800MHz/1900MHz: +30dBm (Power Class 1)	
	EDGE 850M/900MHz: +27dBm (Power Class E2) EDGE 1800MHz/1900MHz: +26dBm (Power Class E2)	
	WLAN:	802.11b: 13 (+/-3) dBm 802.11g: 11 (+/-3) dBm 802.11n: 11 (+/-3) dBm
Static receiver sensitivity	WCDMA/HSPA/HSPA+: Compliant with 3GPP TS 25.101(R7)	
	GSM/GPRS/EDGE: Compliant with 3GPP TS 05.05 (R99)	
	WLAN:	802.11b: -85 (+/-3) dBm 802.11g: -71 (+/-3) dBm 802.11n: -70 (+/-3) dBm
WLAN speed	802.11b: up to 11Mbit/s	
	802.11g: up to 54Mbit/s	
	802.11n: supporting MCS0~MCS7, up to 72.2Mbit/s	
Maximum power consumption	3W	

Item	Specifications
Power supply	DC: 5V/1A
External interfaces	USB 2.0 High Speed
	SIM card: standard 6-pin SIM card interface
Key	Reset key
Antenna	<ul style="list-style-type: none"> • Inner GSM/UMTS main antenna • Inner UMTS diversity antenna • Inner WLAN antenna
Size	88x27x11.5 mm
Weight	<30g
Temperature	<ul style="list-style-type: none"> • Operating: -10°C to +45°C • Storage: -20°C to +70°C
Humidity	5% to 95%
Notes: EGPRS = enhanced GPRS SIM = subscriber identity module USIM = UMTS subscriber identity module	

2.2.2 Software Specifications

Table 2-2 lists the dashboard specifications.

Table 2-2 Software specifications

Item	Description
SMS	<ul style="list-style-type: none"> • Writing/Sending/Receiving • Sending/Receiving long messages • Group sending • Storage: The messages are saved up to 500 items. • Sorting • New message prompt
Network connection setup	<ul style="list-style-type: none"> • APN management • Set up network connection

Item	Description
WLAN setup	<ul style="list-style-type: none"> • SSID broadcast and conceal • Certification of Open System, Shared Key • Input way for ASCII, HEX of password • 64/128bits WEP Encrypt • 256bits WPA-PSK、WPA2-PSK encrypt • TKIP, AES Encrypt arithmetic • TKIP and AES mixed encrypt arithmetic • auto speed and manual adjustment • STA management
Firewall setup	<ul style="list-style-type: none"> • supporting firewall activation and deactivation • supporting LAN IP filtering • supporting virtual server • supporting DMZ • supporting UPnP • supporting WAN Ping block
DHCP setup	<ul style="list-style-type: none"> • supporting DHCP Server deactivation and activation • supporting DHCP Server address configuration • supporting DHCP lease configuration
Software installation	Automatic installation for Plug and Play
Other	Network connection settings: <ul style="list-style-type: none"> • Automatic network selection and registration • Manual network selection and registration
	Network status display: signal, operator name, system mode, and so on.
	Selection of network connection types(For example: Auto, 3G only and 2G only).
	PIN/PUK: activate/deactivate PIN, changing PIN, unblocking by using the PUK.
System requirement	<ul style="list-style-type: none"> • Windows XP SP3, Windows Vista SP1/SP2, Windows 7, Windows 8(Does not support Windows RT), Mac OS X 10.6, 10.7 and 10.8 with latest upgrades • Your computer's hardware system should meet or exceed the recommended system requirements for the installed version of OS • Display resolution: 800 x 600 or above
Notes: PIN = personal identification number PUK = PIN unblocking key	

3 Services and Applications

3.1 Packet Data Service

3.1.1 USB Modem

After you connect the E8231 to a PC with the USB interface, you can send or receive E-mail, access the network through wireless connection, and download files through wireless data channels.

Figure 1-1 shows the device connecting to the network by USB.



3.1.2 Wireless Router (Wi-Fi AP)

As Wi-Fi AP, after the device accesses the 3G network, user can enjoy the wireless network through the connection between Wi-Fi and E8231.

E8231 supports up to 10 users to connect to the wireless network at the same time so as to achieve the wireless LAN establishment.

Figure 1-1 shows multi-devices access the wireless work through Wi-Fi and USB.



Figure 1-1 shows multi-devices access the wireless work through adapter



Figure 1-1 shows multi-devices access the wireless work through the car



3.2 SMS

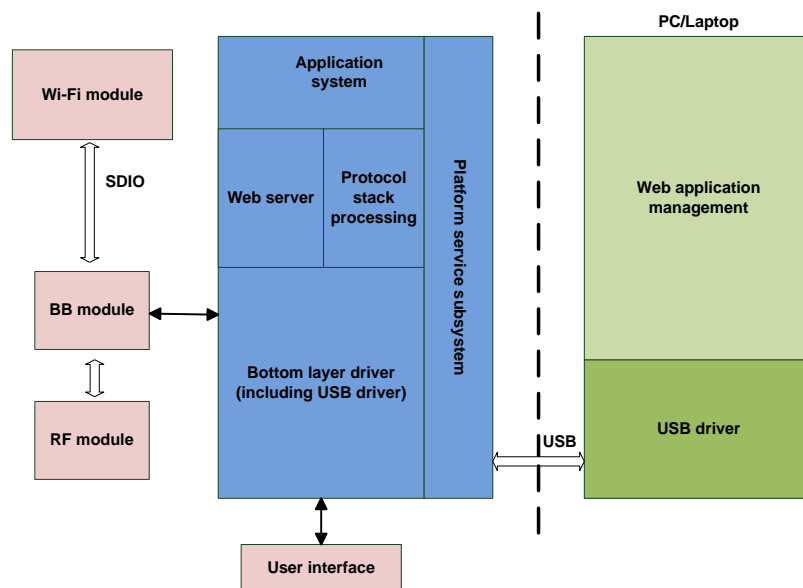
The E8231 supports message writing/sending/receiving. Web page provides strong message management, including outbox, inbox, draft box, and so on; supports sorting by time.

4 System Architecture

4.1 System Architecture

Figure 4-1 shows the system architecture.

Figure 4-1 System architecture



4.2 Functional Modules

Radio Frequency Module

It sends/receives radio signals and modulates/demodulates the radio frequency (RF) signals and baseband signals.

Baseband Signal Processing

It processes HSPA+/HSPA/UMTS/EDGE/GPRS/GSM baseband digital signals, including:

- Modulating/Demodulating HSPA+/HSPA/UMTS baseband signals
- Modulating/Demodulating EDGE/GPRS/GSM baseband signals
- Encoding/Decoding HSPA+/HSPA/UMTS channel
- Encoding/Decoding EDGE/GPRS/GSM channel

Wi-Fi module

It realizes the Wi-Fi AP function.

Bottom Layer Driver

It drives peripherals, including USB and SIM/USIM.

Protocol Stack System

It processes protocols of HSPA+/HSPA/UMTS/EDGE/GPRS/GSM.

Application System

It sends laptop commands to the bottom layer protocol for processing and returns the value to the laptop.

Existing applications include the following:

- Message management
- CS/PS domain service management

Web server

It provides server application for Web client.

User Interface

It provides interfaces to connect peripherals. Interfaces are for SIM/USIM.

Platform Service Subsystem

It initializes programs, diagnoses the running of the system, downloads data and serves as a watchdog.



Web Application Management

Through the application window, you can set the parameters of the E8231 and operate the E8231.

5 Technical Reference

5.1 Standards/Protocols for Data product

Table 5-1 Standards/Protocols for Data product

Items	Description
Physical Layer	RFC894
ARP	RFC826
IP	RFC791、RFC1122、RFC1071、RFC1141、RFC1624、RFC792、RFC950、RFC1256
ICMP	RFC792、RFC950、RFC1256
TCP	RFC793
UDP	RFC768
DHCP	RFC1531、1533
NAT	RFC1631

5.2 Standards/Protocols for wireless Um interface

Wireless Um interface compliant with the standards/protocols of UMTS R99, R4, R5, R6, R7.

Table 5-2 Standards/Protocols for wireless Um interface

Items	Description
Layer1 Specifications (Physical)	<p>Examples of Channel Coding and Multiplexing TR 25.944 (V3.3.0)</p> <p>Physical Layer – General Description TS 25.201 (V3.1.0)</p> <p>Physical Channels and Mapping of Transport Channels onto Physical Channels (FDD) TS 25.211 (V3.5.0)</p> <p>Multiplexing and Channel Coding (FDD) TS 25.212 (V3.5.0)</p> <p>Spreading and Modulation (FDD) TS 25.213 (V3.4.0)</p> <p>Physical Layer – Procedures (FDD) TS 25.214 (V3.5.0)</p> <p>Physical Layer – Measurements (FDD) TS 25.215 (V3.5.0)</p>
Layer 2 Specifications (MAC/RLC)	<p>MAC Protocol Specification TS 25.321 (V3.6.0)</p> <p>RLC Protocol Specification TS 25.322 (V3.5.0)</p>
Layer 3 Specifications (RRC)	<p>UE Interlayer Procedures in Connected Mode TS 25.303 (V3.6.0)</p> <p>UE Procedures in Idle Mode TS 25.304 (V3.5.0)</p> <p>RRC Protocol Specification TS 25.331 (V3.5.0)</p>
Layer 3 NAS/Core Network (MCM)	<p>Architectural Requirements for Release 1999 TS 23.121 (V3.5.1)</p> <p>NAS Functions Related to Mobile Station (MS) in Idle Mode TS 23.122 (V3.5.0)</p> <p>Mobile Radio Interface Signaling Layer 3 – General Aspects TS 24.007 (V3.6.0)</p> <p>Mobile Radio Interface Layer 3 Specification – Core Network TS 24.008 (V3.6.0)</p> <p>PP SMS Support on Mobile Radio Interface TS24.011 (V3.5.0)</p>
GSM Protocol Specifications	<p>Mobile Radio Interface Layer 3 Specification, Radio Resource Control Protocol TS 04.18 (V8.10.0)</p> <p>Mobile Station - Base Station System (MS - BSS) interface; Data Link (DL) Layer Specification TS 04.06 (V8.11.0)</p> <p>Digital Cellular Telecommunications System (Phase 2+); Multiplexing and Multiple Access on the Radio Path TS 05.02 (V8.9.0)</p> <p>Technical Specification Group GERAN; Channel coding TS 05.03 (V8.6.1)</p> <p>Digital Cellular Telecommunications System (Phase 2+); Radio Subsystem Link Control TS 05.08 (V8.a.0)</p> <p>Digital Cellular Telecommunications System (Phase 2+); Radio Subsystem Synchronization TS 05.10 (V8.8.0)</p>

Items	Description
GPRS Protocol Specifications	<p>Overall Description of the GPRS Radio Interface; stage 2 TS 3.64 (V8.8.0)</p> <p>Mobile Radio Interface Layer 3 Specification TS 04.08 (V8.0.0)</p> <p>Mobile Radio Interface Layer 3 Specification: Radio Resource Control Protocol TS 04.18 (V8.10.0)</p> <p>General Packet Radio Service (GPRS): Mobile Station (MS) – Base Station System (BSS) interface; Radio Link Control / Medium Access Control (RLC/MAC) protocol TS 04.60 (V8.10.0)</p> <p>Mobile Station - Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) Layer Specification TS 04.64 (V8.6.0)</p> <p>Mobile Station - Serving GPRS Support Node (MS-SGSN); Subnetwork Dependent Convergence Protocol (SNDTCP) TS 04.65 (V8.1.0)</p> <p>Multiplexing and Multiple Access on the Radio Path TS 05.02 (V8.9.0)</p> <p>Channel Coding TS 05.03 (V8.6.1)</p> <p>Modulation TS 05.04 (V8.3.0)</p> <p>Radio Transmission and Reception TS 05.05 (V8.10.0)</p> <p>General Packet Radio Service (GPRS); Stage 1 TS 22.060 (V3.5.0)</p> <p>Mobile Execution Environment (MexE) TS 23.057 (V3.4.0)</p> <p>General Packet Radio Service (GPRS) Service description; stage 2 TS 23.060 (V8.8.0)</p>
General Specifications	<p>UE Capability Requirements TR 21.904 (V3.3.0)</p> <p>UE Radio Access Capabilities TR 25.926 (V3.2.0)</p> <p>Vocabulary TR 25.990 (V3.0.0)</p> <p>Radio Interface Protocol Architecture TS 25.301 (V3.6.0)</p> <p>Services Provided by the Physical Layer TS 25.302 (V3.7.0)</p> <p>Synchronization in UTRAN Stage 2 TS 25.402 (V3.4.0)</p>
Performance/Test Specifications	<p>UE Radio Transmission and Reception (FDD) TS 25.101 (V3.5.0)</p> <p>Common Test Environments for User Equipment (UE) TS 34.108 (V3.2.0)</p> <p>Special Conformance Testing Functions TS 34.109 (V3.2.0)</p> <p>Terminal Conformance Specification TS 34.121 (V3.3.0)</p> <p>User Equipment (UE) Conformance Specification; Part 1: Protocol Conformance TS 34.123-1 (V3.2.0)</p> <p>User Equipment (UE) Conformance Specification; Part 2: Protocol Conformance TS 34.123-2 (V3.2.0)</p>

Items	Description
Performance/Test Specifications	Terminal Conformance Specification, Radio Transmission and Reception (FDD) TS 34.121 (V3.3.0) User Equipment (UE) Conformance Specification; Part 1: Protocol Conformance TS 34.123-1 (V3.2.0) S48 User Equipment (UE) Conformance Specification; Part 2: Implementation Conformance Statement (ICS) Specification TS 34.123-2 (V3.2.0)
USIM Specifications	SIM and IC Card Requirements TS 21.111 (V3.3.0) 3rd Gen. Partnership Proj Tech. Spec. Group Terminals; SIM App. Toolkit (USAT) TS 31.111 (V3.3.0)

6 Packing List

This chapter describes the items contained in the package of the E8231.

Table 6-1 lists the items contained in the package of the E8231.

Table 6-1 Packing list of the E8231

Item	Quantity	Remarks
HUAWEI E8231 HSPA+ Wingle	1	Standard
Adapter	1	Optional
Quick start	1	Standard
Safety Information	1	Standard
USB external cable	1	Optional

A Acronyms and Abbreviations

3G	The Third Generation
3GPP	3rd Generation Partnership Project
APN	Access Point Name
ARPU	Average Revenue Per User
BSS	Base Station Subsystem
CM	Connection Management
CS domain	Circuit Switched domain
EDGE	Enhanced Data Rates for GSM Evolution
EGPRS	Enhanced GPRS
FDD	Frequency Division Duplex
GERAN	GSM/EDGE Radio Access Network
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HSPA+	High-Speed Packet Access Plus
HSUPA	High-Speed Uplink Packet Access
HSDPA	High-Speed Downlink Packet Access
IC	Integrated Circuit
LED	Light Emitting Diode
MAC	Medium Access Control
MexE	Mobile Execution Environment
MM	Mobility Management
Modem	Modulator Demodulator
MS	Mobile Station

MSC	Mobile Switching Center
NAS	Non-Access Stratum
OS	Operating System
PC/SC	Personal Computer/Smart Card
PIN	Personal Identification Number
PnP	Plug and Play
PP	Point-to-Point
PS domain	Packet Switched domain
PUK	PIN Unblocking Key
RF	Radio Frequency
RLC	Radio Link Control
RRC	Radio Resource Control
SGSN	Serving GPRS Support Node
SIM	Subscriber Identity Module
SMS	Short Messaging Service
SNDCP	Subnetwork Dependent Convergence Protocol
SOHO	Small Office and Home Office
TR	Technical Report
TS	Technical Specification
UE	User Equipment
UMTS	Universal Mobile Telecommunications System
USAT	USIM Application Toolkit
USB	Universal Serial Bus
USIM	UMTS Subscriber Identity Module
USSD	Unstructured Supplementary Service Data
UTRAN	UMTS Terrestrial Radio Access Network
WCDMA	Wideband Code Division Multiple Access