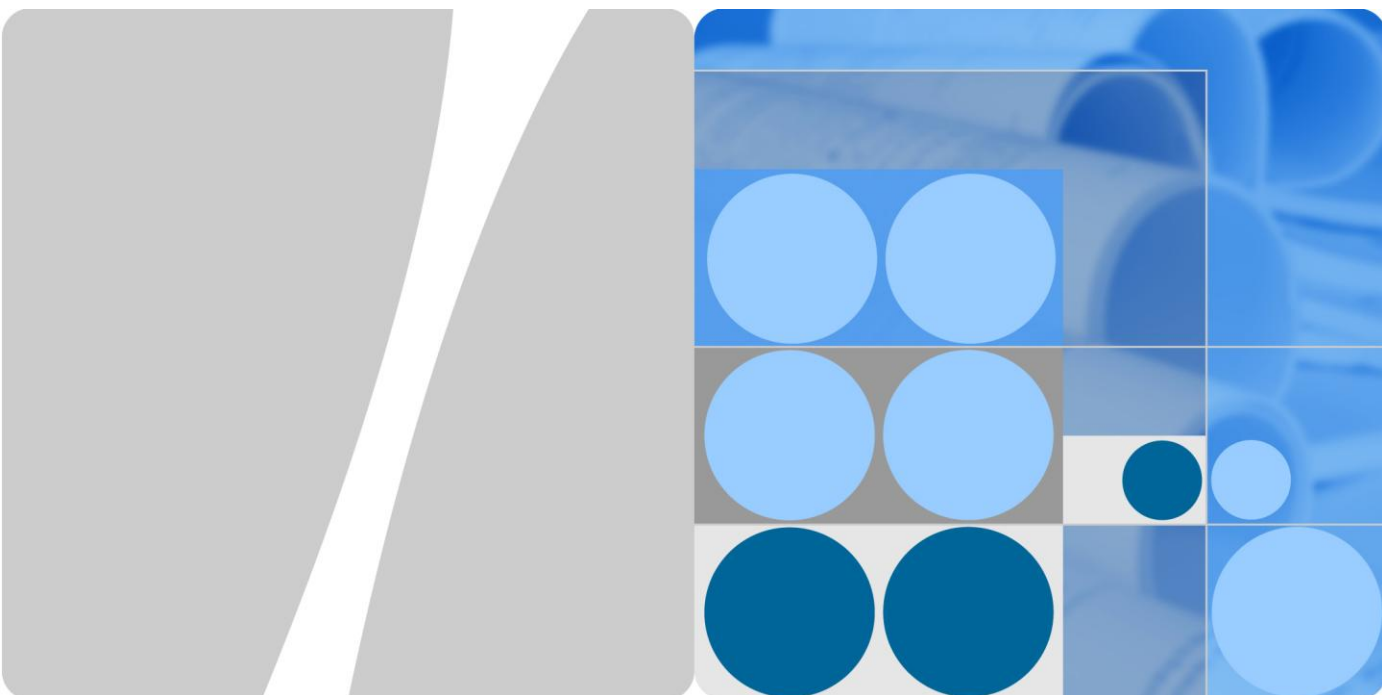# Product Description

Huawei E3531 HSPA+ USB Stick
V100R001

Issue   01

Date   2013-6-13

HUAWEI TECHNOLOGIES CO., LTD.

Huawei Technologies Co., Ltd. provides customers with comprehensive technical support and service. Please feel free to contact our local office or company headquarters.

Huawei Technologies Co., Ltd.

Address:	Huawei Industrial Base
	Bantian, Longgang
	Shenzhen 518129
	People's Republic of China
Website:	http://www.huawei.com

About This Document

Summary

This document provides information about the major functions, supported services, system architecture, and technical references of Huawei E3531 HSPA+ USB Stick (hereinafter referred to as the Huawei E3531).

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 Huawei E3531.
2 Features	The supported features and technical specifications of the Huawei E3531.
3 Services and Applications	The services and applications of the Huawei E3531.
4 System Architecture	The architecture of the Huawei E3531.
5 Technical Reference	The technical references of the Huawei E3531.
6 Packing List	The items contained in the package of the Huawei E3531.
A Acronyms and Abbreviations	The acronyms and abbreviations mentioned in this document.

History

Issue	Details	Date	Author	Approved by
01	Initial draft completed.	2013-6-13		

Contents

1 Overview

Huawei E3531 HSPA+ USB Stick(hereinafter referred to as the Huawei E3531) as a high speed network access terminal product, in order to meet the requirement from different operators, the sub-products E3531s-1、E3531s-2、E3531s-3、E3531s-6 and E3531Ws-1 are included, which support different frequency bands, the detailed as below:

- E3531s-1 HSPA+/UMTS 2100 MHz，
  EDGE/GPRS/GSM 850/900/1800/1900 MHz
- E3531s-2 HSPA+/UMTS 2100/900MHz，
  EDGE/GPRS/GSM 850/900/1800/1900 MHz
- E3531s-3 HSPA+/UMTS 2100/850MHz，
  EDGE/GPRS/GSM 850/900/1800/1900 MHz
- E3531s-6 HSPA+/UMTS 2100/1900/850MHz，
  EDGE/GPRS/GSM 850/900/1800/1900 MHz
- E3531Ws-1 HSPA+/UMTS 2100 MHz，

The Huawei E3531 supports the following standards:

- High-speed packet access plus (HSPA+)
- Universal Mobile Telecommunications System (UMTS)
- Enhanced data rates for GSM Evolution Global Evolution (EDGE)
- General packet radio service (GPRS)
- Global system for mobile communications (GSM)

The Huawei E3531 provides the following services:

- HSPA+ packet data service
- HSUPA packet data service
- HSDPA/UMTS packet data service
- EDGE/GPRS packet data service

You can connect the Huawei E3531 with the USB interface of a computer. In the service area of the HSPA+/UMTS/EDGE/GPRS/GSM network, you can surf the Internet and send/receive emails. The Huawei E3531 is fast, reliable, and easy to operate. Thus, mobile users can experience many new features and services with the Huawei E3531. These features and services will enable a large number of users to use the Huawei E3531 and the average revenue per user (ARPU) of operators will increase substantially.

Figure 1-1 shows the profile of the Huawei E3531.

Figure 1-1 Huawei E3531 profile

2 Features

2.1 Main Features

The Huawei E3531 mainly supports the following features:

- HSPA+/UMTS 2100/1900/900/850MHz,
  GSM/GPRS/EDGE 850/900/1800/1900 MHz;
- Equalizer and receive diversity（TYPE 3i）
- HSPA+ data service of up to 21.6Mbps;
- HSUPA data service of up to 5.76Mbps;
- WCSMA PS domain data service of up to 384Kbps;
- EDGE PS domain data service of up to 236.8Kbps;
- GPRS PS domain data service of up to 85.6Kbps;
- Micro Secure Digital Memory (microSD) Card;
- USB Stick, easy to connect;
- Plug-and-Play;
- Standard USB interface（Type A）
- 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;
- HiLink features (Driverless, Zero installation, Auto connect)

2.2 Technical Specifications

2.2.1 Hardware

Table 2-1 Hardware specifications

Item	Specifications
Technical standard	GSM/GPRS/EGPRS
	WCDMA/HSDPA R5, HSUPA R6, HSPA+ R7
Operating frequency	WCDMA/HSPA+ 2100MHz:
	1920MHz~1980 MHz(Uplink)/2110MHz~2170 MHz(Downlink)
	WCDMA/HSPA+ 1900MHz:
	1850MHz~1910MHz(Uplink)/1930MHz~1990MHz(Downlink)
	WCDMA/HSPA+ 900MHz:
	880MHz~915MHz(Uplink)/925MHz~960 MHz(Downlink)
	WCDMA/HSPA+ 850MHz:
	824MHz~849MHz(Uplink)/869MHz~894MHz(Downlink)
	GSM/GPRS/EDGE 850MHz:
	824MHz ~849 MHz(Uplink)/869MHz ~894 MHz(Downlink)
	GSM/GPRS/EDGE 900MHz:
	880MHz~915MHz(Uplink)/925MHz~960 MHz(Downlink)
	GSM/GPRS/EDGE 1800MHz:
	1710MHz~1785MHz(Uplink)/1805MHz~ 1880MHz (Downlink)
	GSM/GPRS/EDGE 1900MHz:
	1850MHz~1910MHz(Uplink)/1930MHz~ 1990MHz(Downlink)
External interfaces	USB 2.0 High Speed
	SIM/USIM card: standard 6-pin SIM card interface
	microSD Card Slot
LED	indicating the status of the Huawei E3531
Maximum transmitter power	WCDMA/HSPA+ 2100/1900/900/850MHz: 24dBm +1/-3 (Power Class 3)
	GSM/GPRS 850MHz/900MHz: +33dBm (Power Class 4)
	GSM/GPRS 1800MHz/1900MHz: +30dBm (Power Class 1)
	EDGE 850MHz/900MHz+27dBm (Power Class E2)
	EDGE 1800MHz/1900MHz: +26dBm (Power Class E2)
Static receiver sensitivity	WCDMA/HSPA+ 2100/1900/900/850MHz: Compliant with 3GPP TS 25.101(R7)

Item	Specifications
	GSM/GPRS/EDGE 850 MHz/900 MHz/1800 MHz/1900 MHz: Compliant with 3GPP TS 05.05
Maximum power consumption	<3.0W
Power supply	5V / 500mA
Dimensions (D × W × H)	84x27x10.5 mm
Weight	<30g
Temperature	• Operating: −10℃ to +45℃ • Storage: −20℃ to +70℃
Humidity	5% to 95%

Notes:

3GPP = The 3rd Generation Partnership Project

EGPRS = enhanced GPRS

LED = light-emitting diode

MSC = mobile switching center

SIM = subscriber identity module

TS = technical specification

USIM = UMTS subscriber identity module

2.2.2 Software Specifications

Table 2-2 Software specifications

Item	Description
Basic specifications	• Driverless • Zero installation • Auto connect, auto reconnect • Display the device information by website
PIN management	PIN unlock
Special SMS reminding	Support the display of unread service messages (Customizing service number required)
Device information display	• Connection status • Signal • Operator name • Network mode • Roam status

Item	Description
System requirement	• Windows XP SP3, Windows Vista SP1/SP2, Windows 7, Windows 8 and Windows 8.1 (No Dashboard, only MBIM)；Mac OS X 10.6,10.7,10.8 and 10.9 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 × 600 or above

Notes:

PIN = personal identification number

PUK = PIN unblocking key

3 Services and Applications

3.1 Packet Data Service

The Huawei E3531 supports the data service based on HSPA+/HSUPA/HSDPA/UMTS/EDGE/GPRS

After you connect the Huawei E3531 to a PC with the USB interface, the Huawei E3531 will connect the network automatically. Then you can send or receive E-mail, access the network through wireless connection, and download files through wireless data channels.

4 System Architecture

4.1 System Architecture

Figure 4-1 System architecture
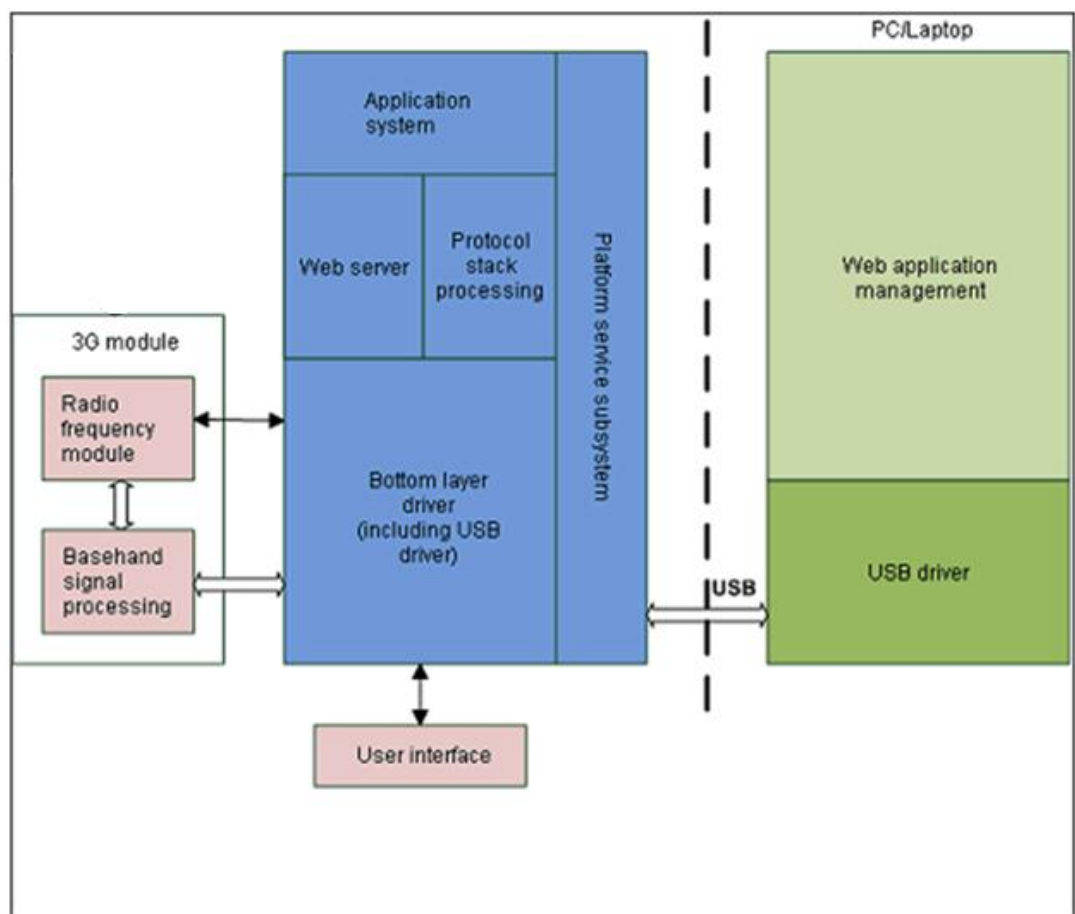
4.2 Functional Modules

Radio Frequency Module

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

Baseband Signal Processing

It processes WCDMA/GSM/GPRS baseband digital signals, including:

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

Bottom Layer Driver

It drives peripherals, including USB, microSD and SIM/USIM card and so on.

Platform Service Subsystem

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

Protocol Stack System

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

User Interface

It provides interfaces to connect peripherals. Interfaces are for LED, microSD and SIM/USIM.

User Driver within OS

It is used for achieving the interaction between application and device.

Application Management

The application for accessing the network.

5 Technical Reference

5.1 Layer 1 Specifications (Physical)

- Examples of Channel Coding and Multiplexing TR 25.944
- Physical Layer–General Description TS 25.201
- Physical Channels and Mapping of Transport Channels onto Physical Channels (FDD) TS 25.211
- Multiplexing and Channel Coding (FDD) TS 25.212
- Spreading and Modulation (FDD) TS 25.213
- Physical Layer–Procedures (FDD) TS 25.214
- Physical Layer–Measurements (FDD) TS 25.215
- 3GPP HSDPA overall description 25.308
- 3GPP UE radio access capabilities 25.306

5.2 Layer 2 Specifications (MAC/RLC)

- MAC Protocol Specification TS 25.321
- RLC Protocol Specification TS 25.322

5.3 Layer 3 Specifications (RRC)

- UE Interlayer Procedures in Connected Mode TS 25.303
- UE Procedures in Idle Mode TS 25.304
- RRC Protocol Specification TS 25.331

5.4 Layer 3 NAS/Core Network (MM/CM)

- Architectural Requirements for Release 1999 TS 23.121
- NAS Functions Related to Mobile Station (MS) in Idle Mode TS 23.122
- Mobile Radio Interface Signaling Layer 3–General Aspects TS 24.007
- Mobile Radio Interface Layer 3 Specification–Core Network TS 24.008
- PP SMS Support on Mobile Radio Interface TS24.011

5.5 GSM Protocol Specifications

- Mobile Radio Interface Layer 3 Specification, Radio Resource Control Protocol TS 04.18
- Mobile Station–Base Station System (MS–BSS) interface; Data Link (DL) Layer Specification TS 04.06
- Digital Cellular Telecommunications System (Phase 2+); Multiplexing and Multiple Access on the Radio Path TS 05.02
- Technical Specification Group GERAN; Channel coding TS 05.03
- Digital Cellular Telecommunications System (Phase 2+); Radio Subsystem Link Control TS 05.08
- Digital Cellular Telecommunications System (Phase 2+); Radio Subsystem Synchronization TS 05.10

5.6 GPRS Protocol Specifications

- Overall Description of the GPRS Radio Interface; stage 2 TS 3.64
- Mobile Radio Interface Layer 3 Specification TS 04.08
- Mobile Radio Interface Layer 3 Specification: Radio Resource Control Protocol TS 04.18
- 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
- Mobile Station–Serving GPRS Support Node (MS–SGSN) Logical Link Control (LLC) Layer Specification TS 04.64
- Mobile Station–Serving GPRS Support Node (MS–SGSN); Subnetwork Dependent Convergence Protocol (SNDCP) TS 04.65
- Multiplexing and Multiple Access on the Radio Path TS 05.02
- Channel Coding TS 05.03
- Modulation TS 05.04
- Radio Transmission and Reception TS 05.05
- General Packet Radio Service (GPRS); Stage 1 TS 22.060
- Mobile Execution Environment (MexE) TS 23.057
- General Packet Radio Service (GPRS) Service description; stage 2 TS 23.060

5.7 General Specifications

- UE Capability Requirements TR 21.904
- UE Radio Access Capabilities TR 25.926
- Vocabulary TR 25.990
- Radio Interface Protocol Architecture TS 25.301
- Services Provided by the Physical Layer TS 25.302
- Synchronization in UTRAN Stage 2 TS 25.402

5.8 Performance/Test Specifications

- UE Radio Transmission and Reception (FDD) TS 25.101
- Common Test Environments for User Equipment (UE) TS 34.108
- Special Conformance Testing Functions TS 34.109
- Terminal Conformance Specification TS 34.121
- User Equipment (UE) Conformance Specification; Part 1: Protocol Conformance TS 34.123-1
- User Equipment (UE) Conformance Specification; Part 2: Protocol Conformance TS 34.123-2

5.9 SIM Specifications

- SIM and IC Card Requirements TS 21.111
- 3rd Gen. Partnership Proj Tech. Spec. Group Terminals; SIM App. Toolkit (USAT) TS 31.111

6 Packing List

This chapter describes the items contained in the package of the Huawei E3531.

Table 6-1 Packing list of the Huawei E3531

Item	Quantity	Remarks
Huawei E3531 HSPA+ USB Stick	1	Standard
Huawei E3531 HSPA+ USB Stick Quick Start	1	Standard
USB external cable	1	Optional
microSD Card	1	Optional

A Acronyms and Abbreviations

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

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
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
UTRAN	UMTS Terrestrial Radio Access Network
WCDMA	Wideband Code Division Multiple Access