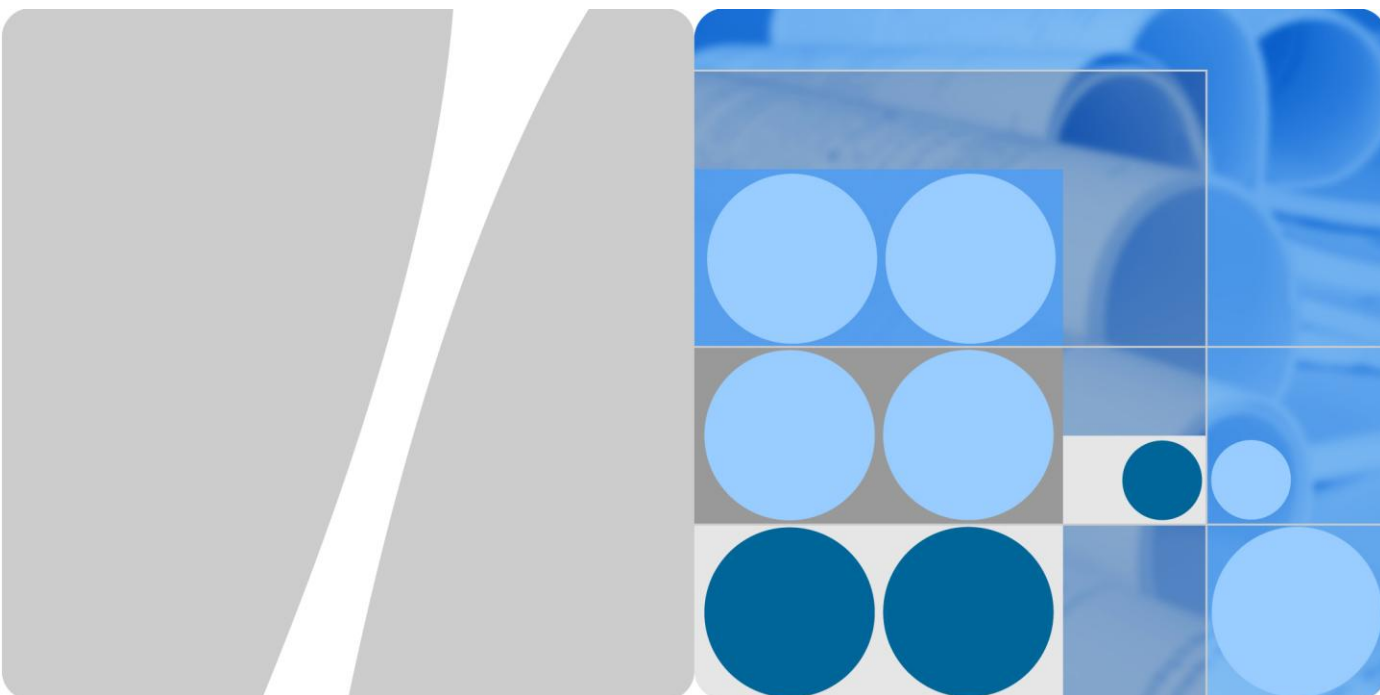# Product Description

HiLink E3231 HSPA+ USB Stick
V100R001

Issue   01

Date   2012-2-24

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About This Document

Summary

This document provides information about the major functions, supported services, system architecture, and technical references of HiLink E3231 HSPA+ USB Stick (hereinafter referred to as the HiLink E3231).

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 HiLink E3231.
2 Features	The supported features and technical specifications of the HiLink E3231.
3 Services and Applications	The services and applications of the HiLink E3231.
4 System Architecture	The architecture of the HiLink E3231.
5 Technical Reference	The technical references of the HiLink E3231.
6 Packing List	The items contained in the package of the HiLink E3231.
A Acronyms and Abbreviations	The acronyms and abbreviations mentioned in this document.

History

Issue	Details	Date	Author	Approved by
01	Initial draft completed.	2012-2-24	Huangxing/194155	

Contents

1 Overview

The HiLink E3231 supports the following standards:

- High-speed packet access plus (HSPA+)
- Universal Mobile Telecommunications System (UMTS)
- Wideband Code Division Multiple Access (WCDMA)

The HiLink E3231 provides the following services:

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

You can connect the HiLink E3231 with the USB interface of a computer. In the service area of the HSPA+/UMTS network, you can surf the Internet and send/receive emails. The HiLink E3231 is fast, reliable, and easy to operate. Thus, mobile users can experience many new features and services with the HiLink E3231. These features and services will enable a large number of users to use the HiLink E3231 and the average revenue per user (ARPU) of operators will increase substantially.

Figure 1-1 shows the profile of the HiLink E3231.

Figure 1-1 HiLink E3231 profile

2 Features

2.1 Main Features

The HiLink E3231 mainly supports the following features:

- HSPA+/UMTS 2100MHz;
- Equalizer and receive diversity（EEIC）
- HSPA+ data service of up to 21.6 Mbps
- HSUPA data service of up to 5.76 Mbps
- UMTS PS domain data service of up to 384 kbps
- Micro Secure Digital Memory (microSD) Card;
- USB Stick, easy to connect;
- Plug and play;
- Standard USB interface（Type A）
- Dual internal antenna
- Windows XP SP3、Windows Vista SP1/SP2、Windows 7、Mac OS X 10.5, 10.6 and 10.7 with latest upgrades;
- HiLink features (Driverless, Web UI, Auto connect)

2.2 Technical Specifications

2.2.1 Hardware

Table 2-1 Hardware specifications

Item	Specifications
Technical standard	WCDMA/HSDPA R5, HSUPA R7，HSPA+ R7
Operating frequency	WCDMA/HSPA/HSPA+ 2100MHz： 1920MHz~1980 MHz/2110MHz~2170 MHz(UL/DL)
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 HiLink E3231
Maximum transmitter power	WCDMA/HSPA+ 2100MHz: 24dBm +1/-3 (Power Class 3)
Static receiver sensitivity	WCDMA/HSPA+ 2100 MHz: Compliant with 3GPP TS 25.101(R8)
Power supply	4.75V-5.25V
Dimensions (D × W × H)	86.5X26X11mm
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 • Web UI • 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
System requirement	• Windows XP SP3、Windows Vista SP1/SP2、Windows 7、Mac OS X 10.5, 10.6 and 10.7 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 HiLink E3231 supports the data service based on HSPA+/HSUPA/HSDPA/UMTS.

After you connect the HiLink E3231 to a PC with the USB interface, the HiLink E3231 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
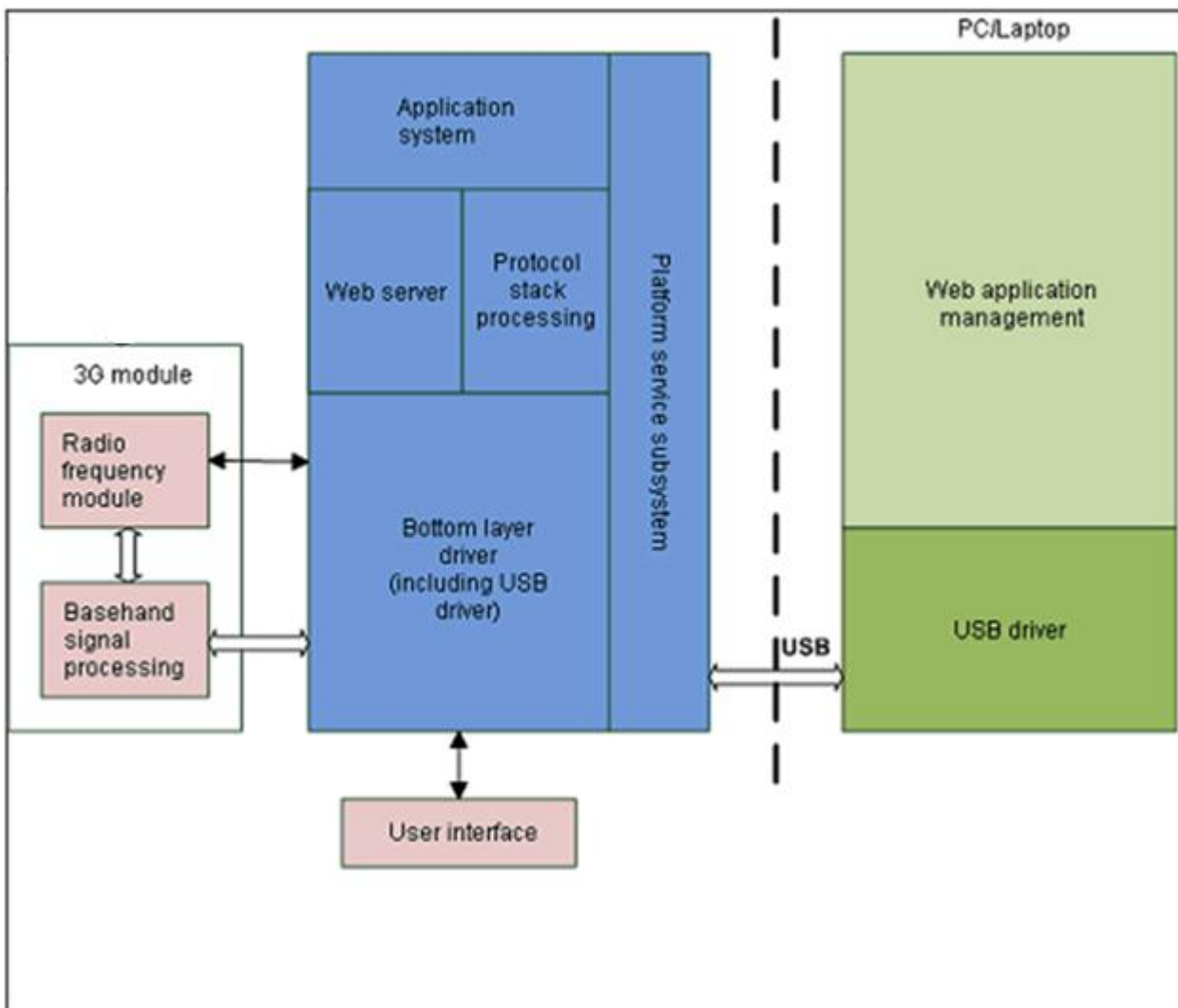
4.2 Functional Modules

Radio Frequency Module

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

Baseband Signal Processing

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

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

Bottom Layer Driver

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

Protocol Stack System

It processes protocols of HSPA+/HSPA/UMTS.

Application System

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

Web server

It provides server application for Web client.

User Interface

It provides interfaces to connect peripherals. Interfaces are for microSD and 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 HiLink E3231 and operate the HiLink E3231.

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 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

5.6 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

5.7 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 HiLink E3231.

Table 6-1 Packing list of the HiLink E3231

Item	Quantity	Remarks
HiLink E3231 HSPA+ USB Stick	1	Standard
HiLink E3231 HSPA+ USB Stick Quick Start	1	Standard

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