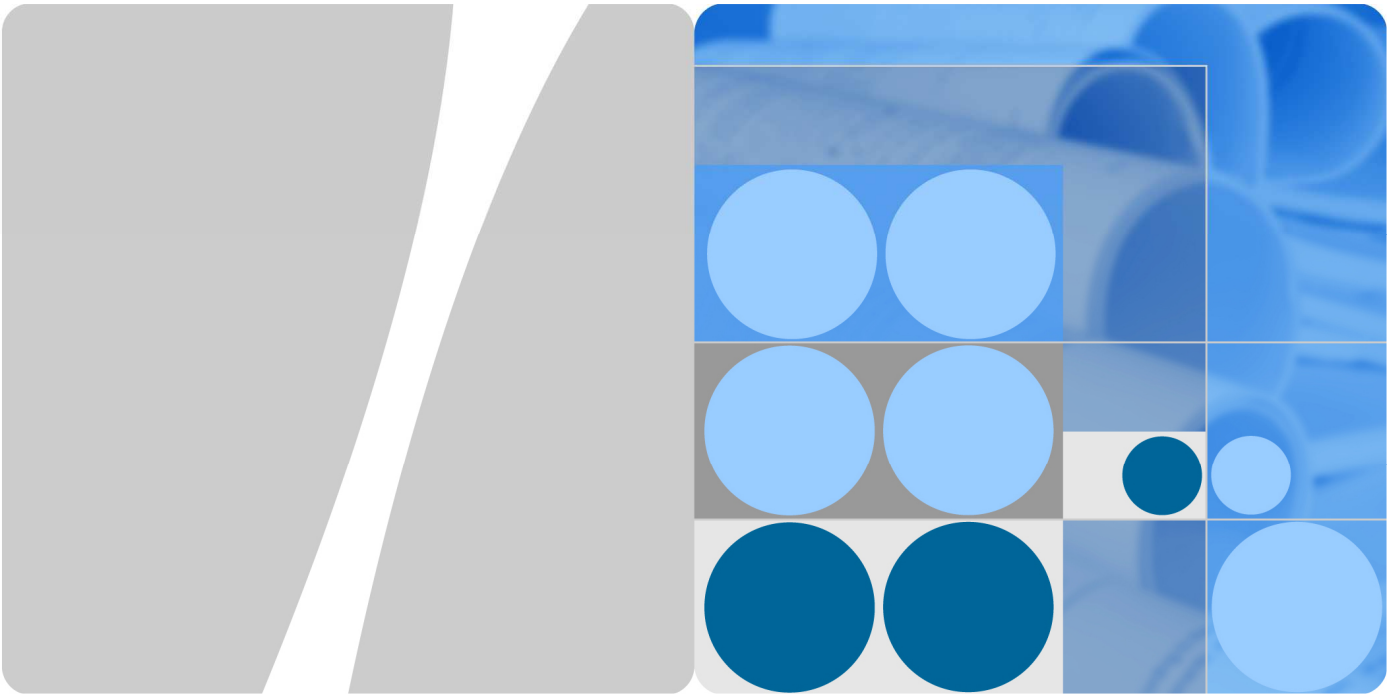
# Product Description



HUAWEI E392 TDD LTE USB Stick

**Issue** 01

**Date** 2011-12-02

**HUAWEI TECHNOLOGIES CO., LTD.**

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# Huawei Technologies Co., Ltd.


Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: http://www.huawei.com

Email: support@huawei.com




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# About This Document

## Summary

This document provides information about the major functions, supported services, system architecture, and technical references of HUAEI E392 TDD LTE USB Stick (hereinafter referred to as the E392).

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 E392. |
| 2 Features | The supported features and technical specifications of the E392. |
| 3 Services and Applications | The services and applications of the E392. |
| 4 System Architecture | The architecture of the E392. |
| 5 Technical Reference | The technical references of the E392. |
| 6 Packing List | The items contained in the package of the E392. |
| A Acronyms and Abbreviations | The acronyms and abbreviations mentioned in this document. |

# History

| Issue | Details | Date | Author | Approved by |
|---|---|---|---|---|
| 01 | Initial draft completed. | 2011-9-24 | E392 Team | Zhou Taotao |
| 02 | Modify E392u-21 band spec | 2011-12-3 | E392 Team | Zhou Taotao |
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# Contents

# 1 Overview

The E392 supports the following standards:

- FDD/TDD Long Term Evolution（LTE）
- High-speed packet access (HSPA+)
- Universal Mobile Telecommunications System (UMTS)
- Enhanced data rates for global evolution (EDGE)
- General packet radio service (GPRS)
- Global system for mobile communications (GSM)

The E392 provides the following services:

- LTE packet data service
- HSPA+ packet data service
- HSUPA packet data service
- HSDPA/UMTS packet data service
- EDGE/GPRS packet data service
- WCDMA/GSM Short Message Service (SMS)
- Prepared for LTE Short Message Service (SMS) over SGs, but not activated.

You can connect the E392 with the USB interface of a computer. In the service area of the LTE/HSPA+/UMTS/EDGE/GPRS/GSM network, you can surf the Internet and send/receive messages/emails cordlessly. The E392 is fast, reliable, and easy to operate. Thus, mobile users can experience many new features and services with the E392. These features and services will enable a large number of users to use the E392 and the average revenue per user (ARPU) of operators will increase substantially.

Figure 1-1 shows the profile of the E392.

**Figure 1-1** E392 profile

# 2 Features

## 2.1 Main Features

The E392 mainly supports the following features:

- Model:E392u-21:
  TDD/FDD LTE 2600MHz,
  DC-HSPA+/HSPA+/UMTS 2100MHz/900MHz
  GSM/GPRS/EDGE 850MHz/900MHz/1800MHz/1900MHz
- Model:E392u-22:
  TDD/FDD LTE 2600MHz,
  FDD LTE 2100/1800/900/DD800
  DC-HSPA+/HSPA+/UMTS 2100/900/1800MHz
  GSM/GPRS/EDGE 850MHz/900MHz/1800MHz/1900MHz
- Support TDD LTE 2600 10M/20M bandwidth
- Support TDD LTE 2300 10M/20M bandwidth
- Support LTE 2600 10M/20M bandwidth
- Support LTE 2100 5M/10M bandwidth
- Support LTE 1800 15M/20M bandwidth
- Support LTE 900 5M/10M bandwidth
- Support LTE DD800 5M/10M bandwidth
- LTE 2×2 MIMO
- FDD LTE uplink data service of up to 50Mbps
- FDD LTE downlink data service of up to 100Mbps
- TDD LTE uplink data service of up to 17Mbps
- TDD LTE downlink data service of up to 68Mbps
- HSPA+ data service of up to 42Mbps(Dual carrier)
- HSDPA/HSPA+ Equalizer and receive diversity(TYPE 3)
- HSPA+ data service of up to 21Mbps(64QAM)
- HSUPA data service of up to 5.76Mbps
- HSDPA data service of up to 14.4Mbps
- UMTS PS domain data service of up to 384 kbps
- EDGE packet data service of up to 296kbps on DL with MSC33
- GPRS packet data service of up to 85.6 kbps
- CS domain data service based on UMTS and GSM
- SMS based on CS/PS domain of GSM and WCDMA

- WCDMA/GSM SMS service
- Prepared for LTE SMS over SGs service, but not activated
- Support LTE intra-frequency handover, inter-frequency handover will be supported by firmware upgrade later
- Support LTE and UMTS inter-RAT idle mobility, LTE and GERAN inter-RAT idle mobility will be supported by firmware upgrade later
- Inter-RAT connected mobility will be supported by firmware upgrade later
- Automatic installation
- Standard USB interface (Type A)
- Micro SD card Slot
- External antenna interface
- Windows XP SP2/SP3, Windows Vista SP1/SP2, Windows 7, Mac OS X 10.5, 10.6,10.7 with latest upgrades

# Technical Specifications

## 2.1.1 Hardware

Table 2-1 lists the hardware specifications.

**Table 2-1** Hardware specifications

| Item | Specifications |
|---|---|
| Technical standard | LTE Rel 8<br>WCDMA Rel '99 plus,<br>HSDPA Rel 5,<br>HSUPA Rel 6,<br>HSPA+(cat 18) Rel 7,<br>DC-HSPA+(cat 24) Rel 8<br>GSM/GPRS/EDGE<br>**UMTS Rel 8 Feature:**<br>Support 64QAM<br>Support multi cell<br>Support UTRA CELL_PCH/URA_PCH to EUTRA RRC_IDLE cell reselection<br>Support absolute priority based cell re-selection in UTRAN<br>Support cell-specific TX diversity configuration for dual-cell operation |

| Item | Specifications |
|---|---|
| Operating frequency | TDD LTE 2600MHz:<br>2570MHz~2620MHz (Uplink)/2570MHz~2620MHz (Downlink)<br>TDD LTE 2300MHz:<br>2300MHz~2400MHz (Uplink)/2300MHz~2400MHz (Downlink)<br>FDD LTE 2600MHz:<br>2500MHz~2570MHz (Uplink)/2620MHz~2690MHz (Downlink)<br>FDD LTE/WCDMA/HSPA+ 2100MHz:<br>1920MHz~1980MHz (Uplink)/2110MHz~2170MHz (Downlink)<br>FDD LTE/WCDMA/HSPA+ 1800MHz:<br>1710MHz~1785MHz (Uplink)/1805MHz~1880MHz (Downlink)<br>FDD LTE/WCDMA/HSPA+ 900MHz:<br>880MHz~915MHz (Uplink)/925MHz~960MHz (Downlink)<br>FDD LTE DD800MHz:<br>832MHz~862MHz (Uplink)/791MHz~821MHz (Downlink)<br>GSM/GPRS/EDGE 1900MHz:<br>1850MHz~1910MHz (Uplink)/1930MHz~1990MHz (Downlink)<br>GSM/GPRS/EDGE 1800MHz:<br>1710MHz~1785MHz (Uplink)/1805MHz~1880MHz (Downlink)<br>GSM/GPRS/EDGE 900MHz:<br>880MHz~915MHz (Uplink)/925MHz~960MHz (Downlink)<br>GSM/GPRS/EDGE 850MHz:<br>824MHz~849MHz (Uplink)/869MHz~894MHz (Downlink) |
| External interfaces | USB 2.0 High Speed |
| | SIM/USIM card: standard 6-pin SIM card interface |
| | Micro SD card Slot |
| | External antenna interface |
| Maximum transmitter power | LTE 2600MHz/2300MHz/2100MHz/1800MHz/900MHz/DD800MHz: (Power Class 3) |
| | WCDMA/HSPA+ 2100MHz/1800MHz/900MHz: (Power Class 3) |
| | GSM/GPRS 850MHz/900MHz: (Power Class 4) |
| | GSM/GPRS 1800MHz/1900MHz: (Power Class 1) |
| | EDGE 850MHz/900MHz:(Power Class E2) |
| | EDGE 1800MHz/1900MHz: (Power Class E2) |
| Static receiver sensitivity | LTE 2600MHz/2100MHz/1800MHz/900MHz/DD800MHz: Compliant with 3GPP TS 36.101(R8/R9) |

| Item | Specifications |
|---|---|
| | WCDMA/HSPA+ 2100MHz/1800MHz/900MHz: Compliant with 3GPP TS 25.101(R7) |
| | GSM/GPRS/EDGE 850MHz/900MHz/1800MHz/1900MHz: Compliant with 3GPP TS 05.05 (R99) |
| TRP | TDD LTE 2600MHz/2300MHz<br>TRP :TBD |
| | LTE 2600MHz/2100MHz/1800MHz/900MHz/DD800MHz<br>TRP :TBD |
| | UMTS 2100MHz/1800MHz/900MHz TRP: TBD |
| | GSM850MHz TRP: TBD |
| | GSM900MHz TRP: TBD |
| | DCS1800MHz TRP: TBD |
| | PCS1900MHz TRP: TBD |
| TRS | TDD LTE 2600MHz/2300MHz<br>TRS :TBD |
| | LTE 2600MHz/2100MHz/1800MHz/900MHz/DD800MHz<br>TRS: TBD |
| | UMTS 2100MHz/1800MHz/900MHz TRS: TBD |
| | GSM850MHz TRS: TBD |
| | GSM900MHz TRS: TBD |
| | DCS1800MHz TRS: TBD |
| | PCS1900MHz TRS: TBD |
| Maximum power consumption | <4W |
| Power supply | 4.75V-5.25V / 750mA |

| Item | Specifications |
|---|---|
| LED | indicating the status of the E392<br>No attached to network: green LED blinks twice<br>Attached to GERAN: Green LED blinks once<br>Traffic on GERAN: Green LED lights fixed<br>Attached on WCDMA: Blue LED blinks once<br>Traffic on WCDMA: Blue LED lights fixed<br>Traffic on HSPA+: Cyan LED lights fixed<br>Attached on LTE: Cyan LED blinks once<br>Traffic on LTE: Cyan LED lights fixed. |
| Dimensions (D × W × H) | 100mm x 35mm x 13.8mm |
| Weight | <40g |
| Temperature | • Operating: –10℃ to +40℃<br>• Storage: –20℃ to +70℃ |
| Humidity | 5% to 95% |
| Notes:<br>LTE = Long Term Evolution<br>3GPP = The 3rd Generation Partnership Project<br>EGPRS = enhanced GPRS<br>LED = light-emitting diode<br>MSC = mobile switching center<br>SIM = subscriber identity module<br>TS = technical specification<br>USIM = UMTS subscriber identity module | |

## 2.1.2 Dashboard

Two types of dashboards are available, the Windows dashboard and Mac dashboard. The following table takes Windows dashboard as an example.

Table 2-2 lists the dashboard specifications.

**Table 2-2** Dashboard specifications

| Item | Description |
|---|---|
| SMS | Writing/Sending/Receiving |
| | Sending/Receiving extra-long messages |
| | Group sending |

| Item | Description |
|---|---|
| | Storage: The messages are saved in the hard disk of the PC. |
| | Sorting |
| | New message prompt (visual prompt/audio prompt) |
| Flow display and statistics (data services) | Current connection:<br>• Duration<br>• Send/Receive flow<br>• Send/Receive rate |
| | Traffic statistics |
| Phonebook | Capacity: It depends on the SIM/USIM card capacity or the hard disk space. |
| | Messages can be sent from the phonebook. |
| | Importing/Exporting: Import/Export contacts between the SIM/USIM card and a laptop or a file of supported formats. |
| Network connection setup | • APN management<br>• Set up network connection |
| Software installation | Automatic installation |
| Other | Network connection settings:<br>• Automatic network selection and registration<br>• Manual network selection and registration |
| | Network status display: signal, operator name, system mode, and so on. |
| | Selection of network connection types. |
| | PIN management: activate/deactivate PIN, PIN lock, changing PIN, unblocking by using the PUK. |
| System requirement | • Windows XP SP2/SP3, Windows Vista SP1/SP2, Windows 7<br>• Mac OS X 10.5,10.6 and 10.7 with latest upgrades<br>• Your computer's hardware system should meet or exceed the recommended system requirements for the installed version of OS<br>• Display resolution: 800 × 600 or above |
| **Notes:**<br>PIN = personal identification number<br>PUK = PIN unblocking key | |

# 3 Services and Applications

## 3.1 Packet Data Service

The E392 supports the PS domain data service based on LTE/HSPA+/UMTS /EDGE/GPRS

After you connect the E392 to a PC with the USB interface, the E392 driver and the client software are installed on the PC automatically. Dual APN is supported in LTE mode. A default APN will be used at initial attach to LTE. The other APN is use like normal APN in 2G/3G. You can configure APN through the E392 application (or directly use the default settings) and set up a network connection. Then you can send or receive E-mail, access the network through wireless connection, and download files through wireless data channels.

To use the data service, perform the following steps:

1. Enter ***99#** or ***98#** to launch the packet data service.
2. In the **Choose Connection Type** dropdown box, choose a network type.

## 3.2 SMS

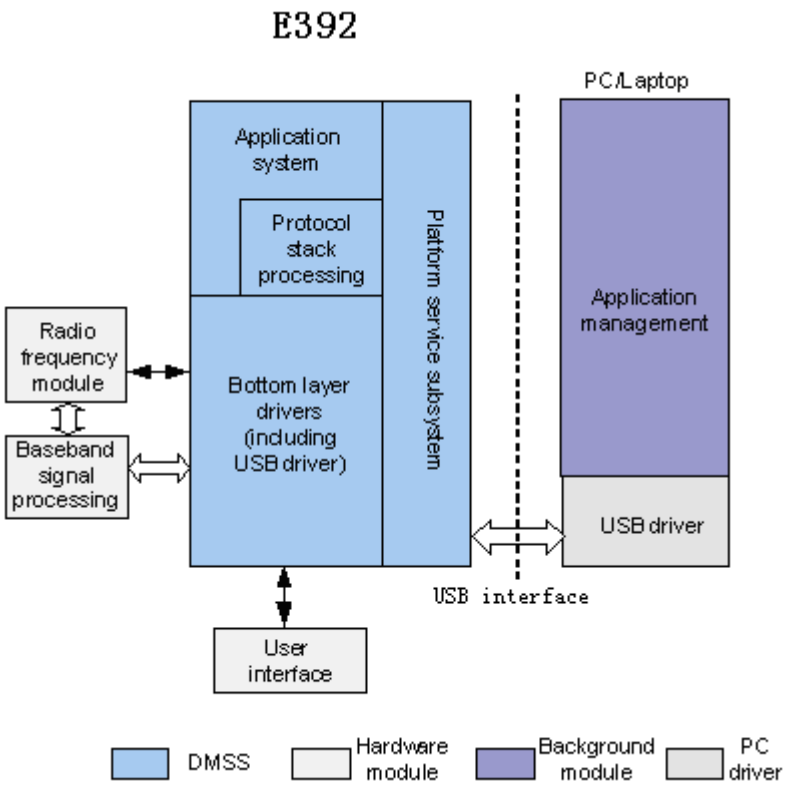
The E392 supports message writing/sending/receiving and group sending on GSM/EGDE/UMTS network. As long as SMS over SGs is not activated for LTE, so no messages can be sent/or received on LTE, and the messages can only be stored. You can manage messages through the dashboard, such as sorting the messages by telephone number or 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 LTE/HSPA+/UMTS/EDGE/GPRS/GSM baseband digital signals, including:

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

**Bottom Layer Driver**

It drives peripherals, including USB, LED, Micro-SD and SIM/USIM.

**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 LTE/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:

- Call management
- Message management
- CS/PS domain service management

**User Interface**

It provides interfaces to connect peripherals. Interfaces are USB (type A), External Antenna, Micro-SD and SIM/USIM.

**Application Management**

Through the application window, you can set the parameters of the E392 and operate the E392.

# 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
- LTE Physical Layer - General Description 36.201 R8
- E-UTRAN Physical Channels and Modulation 36.211
- E-UTRAN Multiplexing and channel coding 36.212
- E-UTRAN Physical layer procedures 36.213
- E-UTRAN Physical layer – Measurements 36.214
- E-UTRAN Services provided by the physical layer 36.302

## 5.2 Layer 2 Specifications (MAC/RLC)

- MAC Protocol Specification TS 25.321
- RLC Protocol Specification TS 25.322
- E-UTRAN Layer 2 – Measurements 36.314
- E-UTRAN Medium Access Control (MAC) protocol specification 36.321
- E-UTRAN Radio Link Control (RLC) protocol specification 36.322
- E-UTRAN Packet Data Convergence Protocol (PDCP) specification 36.323

## 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
- E-UTRAN Radio Resource Control (RRC) Protocol specification 36.331
- E-UTRAN User Equipment (UE) procedures in idle mode 36.304

## 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
- Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS) 24.301

## 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

- User Equipment (UE) Conformance Specification; Radio transmission and reception TS 36.521
- User Equipment (UE) conformance specification; Part 1: Protocol conformance specification TS 36.523-1
- 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
- 3rd Generation Partnership Project .Technical Specification Group Core Network and Terminals ;Characteristics of the Universal Subscriber Identity Module (USIM) application TS 31.102

# 6 Packing List

This chapter describes the items contained in the package of the E392.

Table 6-1 lists the items contained in the package of the E392.

**Table 6-1** Packing list of the E392

| Item | Quantity | Remarks |
|---|---|---|
| HUAWEI E392 LTE USB Stick | 1 | Standard |
| HUAWEI E392 LTE 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 |
| **HSUPA** | High-Speed Uplink Packet Access |
| **HSDPA** | High-Speed Downlink Packet Access |
| **LED** | Light Emitting Diode |
| **LTE** | Long Term Evolution |
| **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 |