

**BTS3911E**

# Hardware Description

**Issue** 08  
**Date** 2019-01-07



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# 1 BTS3911E Hardware Description

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## Introduction

This document describes the BTS3911E and related information, such as networking, cables, cable connections, and specifications, to provide guidelines for planning and deploying the BTS3911E.

## Product Version

The following table lists the product versions related to this document.

| Product Name | Solution Version                                                                                                              | Product Version       |
|--------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| BTS3911E     | <ul style="list-style-type: none"><li>● SRAN12.1 and later</li><li>● RAN19.1 and later</li><li>● eRAN12.1 and later</li></ul> | V100R012C10 and later |

## Intended Audience

This document is intended for:

- BTS3911E installation engineers
- System engineers
- Site maintenance engineers

## Organization

# 2 Changes in BTS3911E Hardware Description

This section describes the changes in *BTS3911E Hardware Description*.

## 08 (2019-01-07)

This is the seventh commercial release.

Compared with Issue 07 (2018-10-19), this issue does not include any new information.

Compared with Issue 07 (2018-10-19), this issue includes the following change.

| Topic                                           | Change Description                                |
|-------------------------------------------------|---------------------------------------------------|
| <a href="#">1 BTS3911E Hardware Description</a> | Added V100R015C10 in applicable product versions. |

No information in Issue 07 (2018-10-19) is deleted from this issue.

## 07 (2018-10-19)

This is the seventh commercial release.

Compared with Issue 06 (2018-02-05), this issue does not include any new information.

Compared with Issue 06 (2018-02-05), this issue includes the following changes.

| Topic                | Change Description                          |
|----------------------|---------------------------------------------|
| Ports and Indicators | Added the <b>RUN</b> indicator description. |

No information in Issue 06 (2018-02-05) is deleted from this issue.

## 06 (2018-02-05)

This is the sixth commercial release.

Compared with Issue 05 (2017-12-08), this issue does not include any new information.

Compared with Issue 05 (2017-12-08), this issue includes the following changes.

| Topic                                  | Change Description                                |
|----------------------------------------|---------------------------------------------------|
| <b>1 BTS3911E Hardware Description</b> | Added V100R013C10 in applicable product versions. |

The following topic in Issue 05 (2017-12-08) is deleted from this issue.

- (Optional) OPM30A

## 05 (2017-12-08)

This is the fifth commercial release.

Compared with Issue 04 (2017-08-03), this issue does not include any new information.

Compared with Issue 04 (2017-08-03), this issue includes the following changes.

| Topic                  | Change Description                       |
|------------------------|------------------------------------------|
| (Optional) GPS Antenna | Added specifications of the GPS antenna. |

No information in Issue 04 (2017-08-03) is deleted from this issue.

## 04 (2017-08-03)

This is the fourth commercial release.

Compared with Issue 03 (2017-06-30), this issue includes the following new topic:

- (Optional) OPM30A

Compared with Issue 03 (2017-06-30), this issue includes the following changes.

| Topic                | Change Description                                 |
|----------------------|----------------------------------------------------|
| Ports and Indicators | Modified the descriptions about the ACT indicator. |

No information in Issue 03 (2017-06-30) is deleted from this issue.

## 03 (2017-06-30)

This is the third commercial release.

Compared with Issue 02 (2017-03-10), this issue does not include any new information.

Compared with Issue 02 (2017-03-10), this issue includes the following changes.

| Topic                                           | Change Description                                |
|-------------------------------------------------|---------------------------------------------------|
| <a href="#">1 BTS3911E Hardware Description</a> | Added V100R013C00 in applicable product versions. |

No information in Issue 02 (2017-03-10) is deleted from this issue.

## 02 (2017-03-10)

This issue is the second commercial release.

Compared with Issue 01 (2016-08-30), this issue does not include any new information.

Compared with Issue 01 (2016-08-30), this issue includes the following changes.

| Topic                | Change Description                                                            |
|----------------------|-------------------------------------------------------------------------------|
| Ports and Indicators | Added 2.1 GHz and 2.6 GHz to the TX/RX frequency bands supported by RF ports. |

No information in Issue 01 (2016-08-30) is deleted from this issue.

## 01 (2016-08-30)

This is the first commercial release.

Compared with Draft A (2016-06-30), this issue does not include any new information.

Compared with Draft A (2016-06-30), this issue includes the following changes.

| Topic                | Change Description                                                                                            |
|----------------------|---------------------------------------------------------------------------------------------------------------|
| Ports and Indicators | Added the description that the port FE/GE0 or FE/GE1 can provide PoE power supply to devices connected to it. |

No information in Draft A (2016-06-30) is deleted from this issue.

## Draft A (2016-06-30)

This is Draft A.

# 3 BTS3911E

This section describes the appearance, ports, and indicators of the BTS3911E.

## 3.1 Appearance

This section describes the appearance and dimensions of the BTS3911E.

### 3.2 Ports and Indicators

This section describes the BTS3911E ports (on the bottom and in the side maintenance cavities) and indicators (on the bottom).

### 3.3 Working Principles and Functions

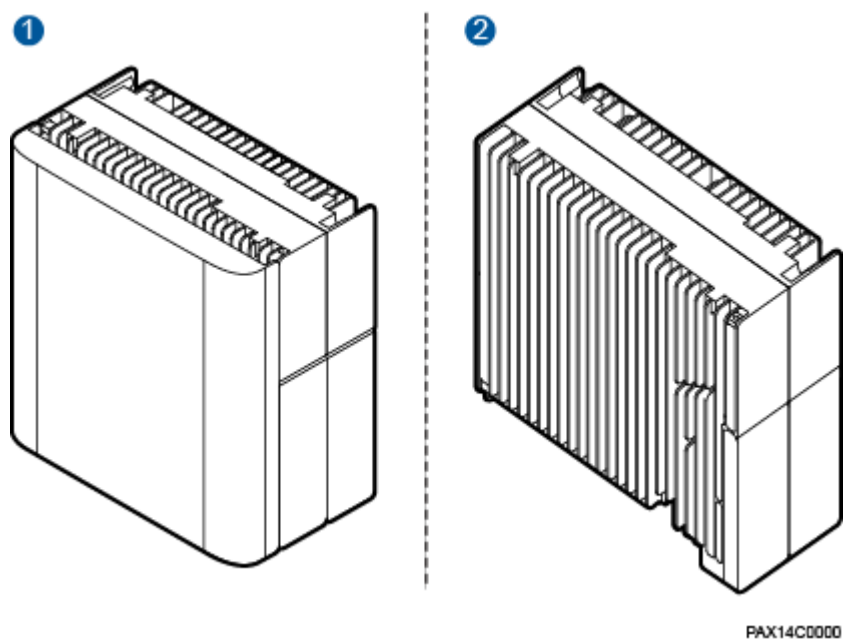
The BTS3911E is an integrated micro base station. It processes baseband signals of a base station.

## 3.1 Appearance

This section describes the appearance and dimensions of the BTS3911E.

**Figure 3-1** shows the appearance of the BTS3911E.

**Figure 3-1** Appearance of the BTS3911E

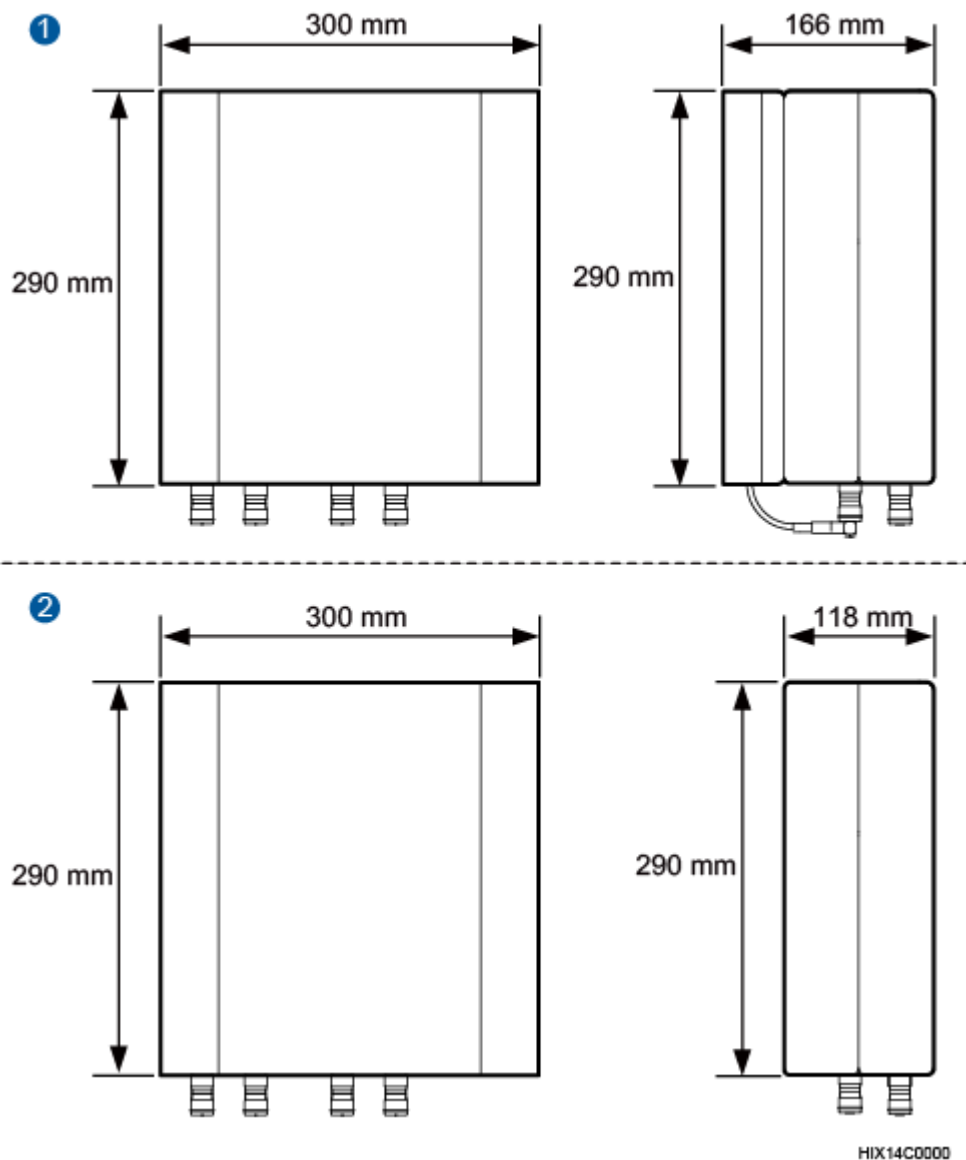




|                                     |                                     |
|-------------------------------------|-------------------------------------|
| (1) BTS3911E with internal antennas | (2) BTS3911E with external antennas |
|-------------------------------------|-------------------------------------|

Figure 3-2 shows dimensions of the BTS3911E.

Figure 3-2 Dimensions of the BTS3911E



|                                     |                                     |
|-------------------------------------|-------------------------------------|
| (1) BTS3911E with internal antennas | (2) BTS3911E with external antennas |
|-------------------------------------|-------------------------------------|

## 3.2 Ports and Indicators

This section describes the BTS3911E ports (on the bottom and in the side maintenance cavities) and indicators (on the bottom).

## Positions


**Figure 3-3** shows ports and indicators on the BTS3911E.

**Figure 3-3** Ports and indicators on the BTS3911E

## Ports

**Table 3-1** describes the ports on the BTS3911E.

**Table 3-1** Ports on the BTS3911E

| Port                                                                                | Description                                                                                                                                                                                                            |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PWR                                                                                 | Power input port                                                                                                                                                                                                       |
| CPRI                                                                                | Optical port for BTS3911E connecting to RRUs                                                                                                                                                                           |
| EXT-ALM                                                                             | Dry contact alarm port used for monitoring peripherals                                                                                                                                                                 |
| TF                                                                                  | Anchor slot for the trans flash card (TF card, also called micro SD card) for BTS3911E deployment                                                                                                                      |
| DBG                                                                                 | Commissioning port                                                                                                                                                                                                     |
| FE/GE0                                                                              | Electrical ports used for BTS3911E connecting to external transmission equipment or BTS3911E cascading. The BTS3911E can provide PoE power supply ( - 57 V DC to - 37 V DC) to devices connected to it over the ports. |
| FE/GE1                                                                              |                                                                                                                                                                                                                        |
| FE/GE2                                                                              | Optical ports used for BTS3911E connecting to external transmission equipment or BTS3911E cascading                                                                                                                    |
| FE/GE3                                                                              |                                                                                                                                                                                                                        |
| $A_{RO}^{T0}, B_{RO}^{T0}, C_{RI}^{T1}, D_{RI}^{T1}$                                | TX/RX RF ports (Smart-N-type female connector)                                                                                                                                                                         |
| GPS                                                                                 | GPS port used for BTS3911E connecting to GPS antennas to achieve clock synchronization                                                                                                                                 |
| USB WIFI                                                                            | Wi-Fi port used for contactless maintenance and deployment                                                                                                                                                             |
|  | Ground terminal                                                                                                                                                                                                        |

### NOTE

RRU3230Es and RRU3930Es are allowed to connect to the BTS3911E.

The following table lists the TX/RX frequency bands supported by the RF ports.

**Table 3-2** TX/RX frequency bands supported by the RF ports

| RF Port              | $A_{RO}^{TO}, B_{RO}^{TO}$ | $C_{RI}^{TI}, D_{RI}^{TI}$ |
|----------------------|----------------------------|----------------------------|
| TX/RX Frequency Band | 1.8 GHz                    | 2.1 GHz                    |
|                      | PCS                        | AWS                        |
|                      | 2.1 GHz                    | 2.6 GHz                    |

## Indicators

A BTS3911E provides four indicators to indicate its operating status. [Table 3-3](#) describes the indicators.

 **NOTE**

The indicators on the BTS3911E can be turned on or off by following instructions provided in section "Turning On or Off Indicators" of *BTS3911E Site Maintenance Guide*.

**Table 3-3** Indicators on the BTS3911E

| Indicator | Meaning          | Status                                            | Description                                                                                        |
|-----------|------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------|
| RUN       | Operating status | Steady green                                      | There is power supply, but the BTS3911E is faulty.                                                 |
|           |                  | Steady off                                        | There is no power supply, or the BTS3911E is faulty.                                               |
|           |                  | Blinking green (on for 1s and off for 1s)         | The BTS3911E is running properly.                                                                  |
|           |                  | Blinking green (on for 0.125s and off for 0.125s) | Software is being loaded to the BTS3911E, or the BTS3911E has not started.                         |
| ALM       | Alarm status     | Steady red                                        | An alarm has been generated. The BTS3911E needs to be replaced.                                    |
|           |                  | Blinking red (on for 1s and off for 1s)           | An alarm has been generated. The BTS3911E may need to be replaced, depending on the type of fault. |
|           |                  | Steady off                                        | No alarms have been generated.                                                                     |

| Indicator | Meaning           | Status                                                                                                                             | Description                                                                                                                                   |
|-----------|-------------------|------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| ACT       | Service status    | Steady green                                                                                                                       | The BTS3911E is activated and working properly.                                                                                               |
|           |                   | Steady off                                                                                                                         | The BTS3911E is deactivated or is not running.                                                                                                |
|           |                   | Blinking green at 4 Hz (on for 0.125s and off for 0.125s)                                                                          | The operation and maintenance link (OML) is disconnected.                                                                                     |
|           |                   | Blinking green [In every 4s, the indicator is on for 0.125s and off for 0.125s (eight times) in the first 2s and then off for 2s.] | <ul style="list-style-type: none"> <li>● Not all the cells served by the BTS3911E are activated.</li> <li>● The S1 link is faulty.</li> </ul> |
| VSWR      | VSWR alarm status | Steady red                                                                                                                         | A VSWR alarm has been generated. The BTS3911E may need to be replaced.                                                                        |
|           |                   | Steady off                                                                                                                         | No VSWR alarms have been generated.                                                                                                           |

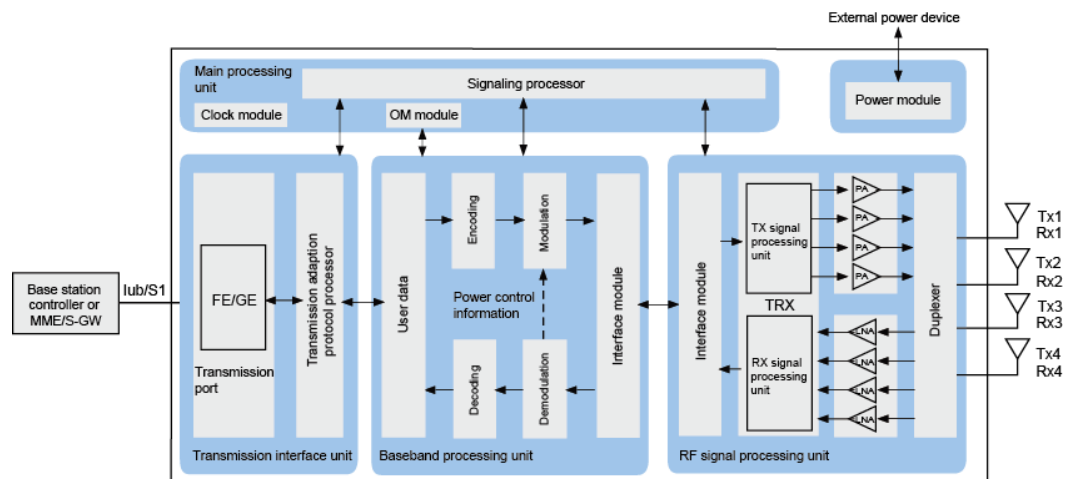
### 3.3 Working Principles and Functions

The BTS3911E is an integrated micro base station. It processes baseband signals of a base station.

The BTS3911E mainly consists of the main processing unit, power module, transmission interface unit, baseband processing unit, and radio frequency (RF) processing unit.

**Figure 3-4** shows the functional structure of the BTS3911E.

**Figure 3-4** Functional structure of the BTS3911E



## Main Processing Unit

The main processing unit centrally manages, maintains, and operates the BTS3911E, provides clock signals for the BTS3911E, and processes signaling messages.

The functions of the main processing unit are as follows:

- Manages the configuration.
- Manages resources.
- Provides various reference clocks for the BTS3911E.
- Processes signaling messages over the S1 or Iub interface.
- Provides BTS3911E O&M functions, including device management, configuration management, alarm management, software management, and commissioning management.
- Monitors the working state of the BTS3911E.
- Provides the signal input and output interfaces for the BTS3911E.

## Transmission Interface Unit

The transmission interface unit provides ports for communication between the BTS3911E and base station controller/MME/S-GW as well as OMCHs for BTS3911E maintenance on the operation and maintenance center (OMC).

## Baseband Processing Unit

The baseband processing unit processes the uplink and downlink baseband signals.

- Downlink transmitting
 

The baseband processing unit receives FP packets from the transport subsystem. After operations such as channel coding and downlink modulation have been completed, the baseband processing unit distributes the downlink data.
- Uplink receiving
 

The baseband processing unit receives the uplink baseband data. After demodulation and decoding, the board sends the data in the format of FP packets to the transmission interface unit.

- Closed-loop processing for the physical layer  
The baseband signal processing unit implements the closed-loop processing for acquisition indication (AI), the closed-loop power control of the uplink and downlink at the physical layer, and the closed-loop transmit diversity of the downlink.

## RF Processing Unit

The RF processing unit modulates, demodulates, processes, combines, and divides RF signals.

- The functions of the downlink TX channel are as follows:
  - Shaping and filtering of downlink spread spectrum signals
  - Digital-to-analog conversion
  - Up-conversion of IF signals to the transmitting band
- The functions of uplink RX channels are as follows:
  - Down-conversion of received signals to IF signals
  - Amplification of the IF signals
  - Analog-to-digital conversion
  - Digital down-conversion
  - Matched filtering
  - Digital automatic gain control (DAGC)

## Power Module

The power module obtains power from external power devices and supplies power to other units of the BTS3911E.

# 4 BTS3911E Cables

---

This section describes the BTS3911E cables in terms of the appearance, core wire type, and installation position.

## 4.1 Cable List

This section describes the connection positions and connector types of BTS3911E cables.

### 4.2 PGND Cable

A PGND cable connects the ground terminal of a BTS3911E to a ground bar, providing ground protection for the BTS3911E.

### 4.3 Power Cable

The power cable connects the BTS3911E to external power supply equipment that can supply AC power to the BTS3911E.

### 4.4 FE/GE Ethernet Cable

An FE/GE Ethernet cable transmits FE/GE signals between a BTS3911E and the external transmission equipment or between two BTS3911Es.

### 4.5 FE/GE Optical Cable

An FE/GE optical cable transmits optical signals between a BTS3911E and transmission equipment or between two BTS3911Es.

### 4.6 Alarm Cable

An alarm cable transmits alarm signals from external equipment to a BTS3911E so that the BTS3911E can monitor the operating status of the external equipment.

### 4.7 (Optional) RF Jumper

The 1/2" RF jumper is used for the BTS3911E to transmit and receive RF signals.

## 4.1 Cable List

This section describes the connection positions and connector types of BTS3911E cables.

BTS3911E cables include the PGND cable, power cable, FE/GE Ethernet cable, FE/GE optical cable, CPRI optical cable, alarm cable, and RF jumper. [Table 4-1](#) lists the BTS3911E cables.

**Table 4-1** BTS3911E cable list

| Cable                           | One End                                            |                                                                                         | The Other End                                    |                                                          |
|---------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------------|
|                                 | Connector                                          | Installation Position (Equipment/Module/Port)                                           | Connector                                        | Installation Position (Equipment/Module/Port)            |
| <b>4.2 PGND Cable</b>           | OT terminal (M6, 6 mm <sup>2</sup> )               | Ground terminal of the BTS3911E                                                         | OT terminal (M8, 6 mm <sup>2</sup> )             | External ground bar                                      |
| <b>4.3 Power Cable</b>          | Tool-less female connector AC-EPC1 (pressfit type) | PWR port in the BTS3911E maintenance cavity                                             | Depending on the external power supply equipment | External power supply equipment                          |
| <b>4.4 FE/GE Ethernet Cable</b> | RJ45 connector                                     | FE/GE0 or FE/GE1 port in the BTS3911E maintenance cavity                                | RJ45 connector                                   | External transmission equipment                          |
|                                 | RJ45 connector                                     | FE/GE0 or FE/GE1 port in the BTS3911E maintenance cavity                                | RJ45 connector                                   | FE/GE0 or FE/GE1 port in the BTS3911E maintenance cavity |
| <b>4.5 FE/GE Optical Cable</b>  | DLC connector                                      | FE/GE2 or FE/GE3 port in the BTS3911E maintenance cavity                                | FC, LC, or SC connector                          | External transmission equipment                          |
|                                 |                                                    |                                                                                         | DLC connector                                    | FE/GE2 or FE/GE3 port in the BTS3911E maintenance cavity |
| <b>4.6 Alarm Cable</b>          | RJ45 connector                                     | EXT-ALM port in the BTS3911E maintenance cavity                                         | Depending on the external monitored equipment    | External monitored equipment                             |
| <b>4.7 (Optional) RF Jumper</b> | Smart-N type male connector                        | Ports $A_{RO}^{TO}$ , $B_{RO}^{TO}$ , $C_{RI}^{TI}$ , and $D_{RI}^{TI}$ on the BTS3911E | Type N male connector                            | External antenna system                                  |



## 4.2 PGND Cable

A PGND cable connects the ground terminal of a BTS3911E to a ground bar, providing ground protection for the BTS3911E.

### Appearance

**Figure 4-1** shows the appearance of the PGND cable with connectors.

**Figure 4-1** Appearance of the PGND cable



(1) OT terminal

### Cable Description

**Table 4-2** describes the BTS3911E PGND cable.

**Table 4-2** PGND cable

| Cable      | One End                              | The Other End                        | Color                     |
|------------|--------------------------------------|--------------------------------------|---------------------------|
| PGND cable | OT terminal (M6, 6 mm <sup>2</sup> ) | OT terminal (M8, 6 mm <sup>2</sup> ) | Yellow and green or green |

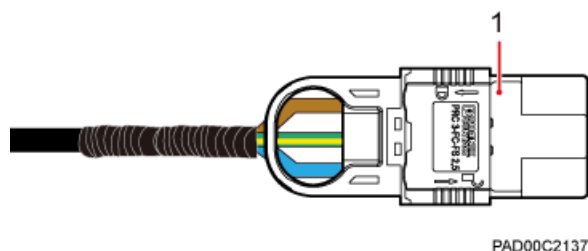
## 4.3 Power Cable

The power cable connects the BTS3911E to external power supply equipment that can supply AC power to the BTS3911E.

### Appearance

A tool-less female connector (pressfit type) needs to be added to one end of the power cable onsite. A corresponding terminal needs to be added to the other end based on the port on the external power supply equipment. **Figure 4-2** shows the appearance of the BTS3911E power cable.

**Figure 4-2** BTS3911E power cable



(1) Tool-less female connector (pressfit type)

## Cable Description

The following table describes the AC power cable for a BTS3911E.

**Table 4-3** BTS3911E AC power cable

| Cable                | Core Wire | Wire Color       | Cable Specifications                       |
|----------------------|-----------|------------------|--------------------------------------------|
| BTS3911E power cable | L         | Brown            | 1.5 mm <sup>2</sup> to 2.5 mm <sup>2</sup> |
|                      | N         | Blue             |                                            |
|                      | PE        | Yellow and green |                                            |

### NOTE

The color and structure of a power cable vary with countries and regions. A locally purchased power cable must be a pure copper outdoor three-core cable that has a cross-sectional area of 1.5 mm<sup>2</sup> to 2.5 mm<sup>2</sup> and a maximum outer diameter of 8.9 mm to 12 mm and complies with local regulations.

## 4.4 FE/GE Ethernet Cable

An FE/GE Ethernet cable transmits FE/GE signals between a BTS3911E and the external transmission equipment or between two BTS3911Es.

### NOTE

FE/GE Ethernet cables can be used for transmission over a maximum distance of 100 m.

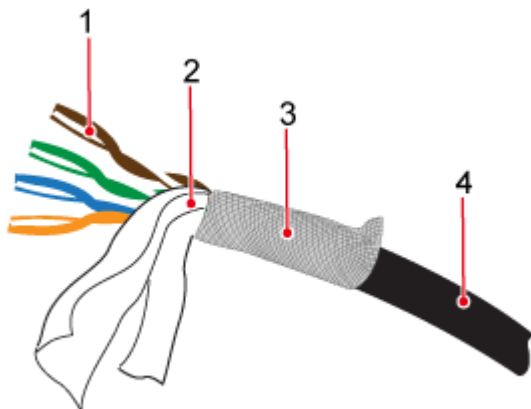
## Appearance

An FE/GE Ethernet cable is a Cat 5e straight-through shielded foil twisted pair (SFTP) cable in compliance with TIA/EIA-568B for outdoor scenarios. [Figure 4-3](#) shows the structure of the FE/GE Ethernet cable. [Figure 4-4](#) shows the appearance of the Ethernet cable with an RJ45 connector at each end.

**NOTE**

Ethernet cables of a higher level can also be used. For detailed specifications, see standards related to Ethernet cables.

**Figure 4-3** Structure of the FE/GE Ethernet cable



|               |                   |                   |            |
|---------------|-------------------|-------------------|------------|
| (1) Core wire | (2) Aluminum foil | (3) Braided layer | (4) Jacket |
|---------------|-------------------|-------------------|------------|

**Figure 4-4** Appearance of the FE/GE Ethernet cable



|                    |
|--------------------|
| (1) RJ45 connector |
|--------------------|

### Cable Description

**Table 4-4** describes the pin assignment of an FE/GE Ethernet cable.

**Table 4-4** Pin assignment of an FE/GE Ethernet cable

| Pin on the RJ45 Connector | Wire Color | Wire Type    | Pin on the RJ45 Connector |
|---------------------------|------------|--------------|---------------------------|
| X1.2                      | Orange     | Twisted pair | X2.2                      |

| Pin on the RJ45 Connector | Wire Color   | Wire Type    | Pin on the RJ45 Connector |
|---------------------------|--------------|--------------|---------------------------|
| X1.1                      | White/orange |              | X2.1                      |
| X1.6                      | Green        | Twisted pair | X2.6                      |
| X1.3                      | White/green  |              | X2.3                      |
| X1.4                      | Blue         | Twisted pair | X2.4                      |
| X1.5                      | White/blue   |              | X2.5                      |
| X1.8                      | Brown        | Twisted pair | X2.8                      |
| X1.7                      | White/brown  |              | X2.7                      |

## 4.5 FE/GE Optical Cable

An FE/GE optical cable transmits optical signals between a BTS3911E and transmission equipment or between two BTS3911Es.

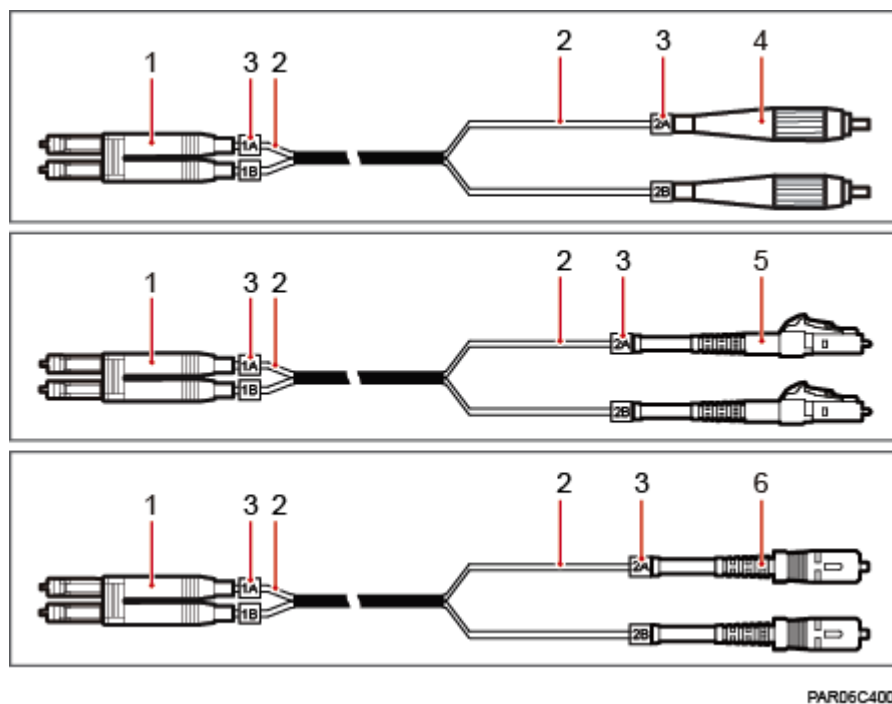
 **NOTE**

The length of a standard optical cable must not exceed 100 m.

### Connecting a BTS3911E and Transmission Equipment

An FE/GE optical cable connecting a BTS3911E and the transmission equipment has a DLC connector at one end, and an FC, LC, or SC connector at the other end, as shown in [Figure 4-5](#).

Figure 4-5 FE/GE optical cable (1)



PAR06C4002

|                   |                          |                                |
|-------------------|--------------------------|--------------------------------|
| (1) DLC connector | (2) Branch optical cable | (3) Branch optical cable label |
| (4) FC connector  | (5) LC connector         | (6) SC connector               |

## Connecting Two BTS3911Es

An FE/GE optical cable connecting two BTS3911Es has a DLC connector at each end, as shown in [Figure 4-6](#).

Figure 4-6 FE/GE optical cable (2)



|                   |                          |                                |
|-------------------|--------------------------|--------------------------------|
| (1) DLC connector | (2) Branch optical cable | (3) Branch optical cable label |
|-------------------|--------------------------|--------------------------------|

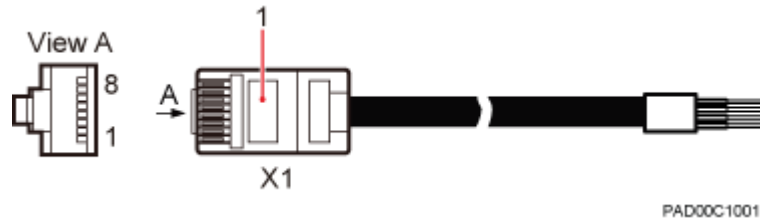
## 4.6 Alarm Cable

An alarm cable transmits alarm signals from external equipment to a BTS3911E so that the BTS3911E can monitor the operating status of the external equipment.

## Appearance

An RJ45 connector needs to be added to one end of a BTS3911E alarm cable. A corresponding terminal needs to be added to the other end based on the port on the external monitored equipment. **Figure 4-7** shows the appearance of the alarm cable.

**Figure 4-7** Appearance of the alarm cable



(1) RJ45 connector

## Cable Description

**Table 4-5** describes the pin assignment of the alarm cable.

**Table 4-5** Pin assignment of the alarm cable

| Pin  | Wire Color   | Wire Type    | Description             |
|------|--------------|--------------|-------------------------|
| X1.1 | White/orange | Twisted pair | Boolean input 0+        |
| X1.2 | Orange       |              | Boolean input 0 - (GND) |
| X1.3 | White/green  | Twisted pair | Boolean input 1+        |
| X1.6 | Green        |              | Boolean input 1 - (GND) |
| X1.5 | White/blue   | Twisted pair | Boolean input 2+        |
| X1.4 | Blue         |              | Boolean input 2 - (GND) |
| X1.7 | White/brown  | Twisted pair | Boolean input 3+        |
| X1.8 | Brown        |              | Boolean input 3 - (GND) |

## 4.7 (Optional) RF Jumper

The 1/2" RF jumper is used for the BTS3911E to transmit and receive RF signals.

An RF jumper has a type N male connector at one end and a Smart-N-type male connector at the other end. **Figure 4-8** shows the appearance of the RF jumper.

**Figure 4-8** Appearance of the RF jumper



|                                 |                           |
|---------------------------------|---------------------------|
| (1) Smart-N-type male connector | (2) Type N male connector |
|---------------------------------|---------------------------|

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# 5 Auxiliary Devices

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This section describes auxiliary devices of the BTS3911E, including the GPS antenna, DIN-male N-female connector, and optical module.

## [5.1 \(Optional\) GPS Antenna](#)

A GPS antenna connects to the BTS3911E for clock synchronization. The GPS antenna is optional.

## [5.2 \(Optional\) DIN-Male N-Female Connector](#)

## [5.3 Optical Module](#)

An optical module transmits optical signals between an optical port and an optical cable.

## 5.1 (Optional) GPS Antenna

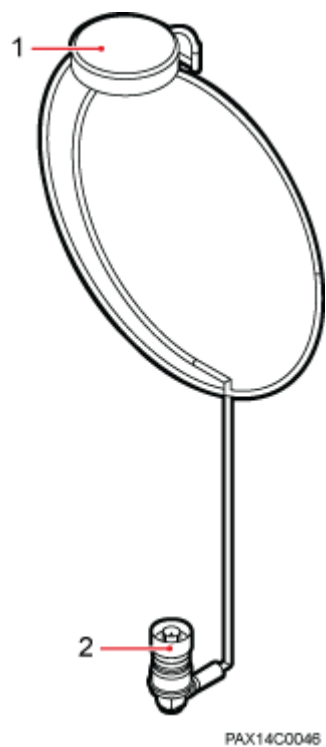
A GPS antenna connects to the BTS3911E for clock synchronization. The GPS antenna is optional.

### Appearance

A GPS antenna has a Smart-N-type male connector at one end. [Figure 5-1](#) shows the appearance of the GPS antenna.



**Figure 5-1** Appearance of the GPS antenna



|                 |                                 |
|-----------------|---------------------------------|
| (1) GPS antenna | (2) Smart-N-type male connector |
|-----------------|---------------------------------|

## Specifications

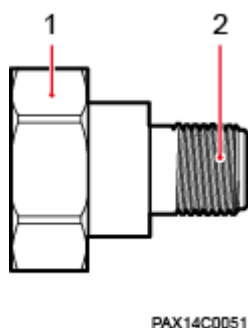
| Item                     | Specifications                                                                               |
|--------------------------|----------------------------------------------------------------------------------------------|
| Frequency (MHz)          | 1574.42 to 1576.42                                                                           |
| Antenna type             | Omnidirectional                                                                              |
| Polarization mode        | Right-hand circular polarization                                                             |
| Antenna gain (dBi)       | 4                                                                                            |
| Horizontal beamwidth (°) | 360                                                                                          |
| Vertical beamwidth (°)   | 110                                                                                          |
| VSWR                     | ≤ 2                                                                                          |
| LNA gain (dB)            | 35                                                                                           |
| Noise factor             | <ul style="list-style-type: none"> <li>● &lt; 2.5 (25°C)</li> <li>● &lt; 3 (85°C)</li> </ul> |
| Dimensions (mm)          | Φ50 x 14                                                                                     |
| Weight (Kg)              | < 1.0                                                                                        |

| Item                  | Specifications                                                                                                                                |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature | <ul style="list-style-type: none"> <li>Without sunlight exposure: - 40°C to +55°C</li> <li>With sunlight exposure: - 40°C to +50°C</li> </ul> |

## 5.2 (Optional) DIN-Male N-Female Connector

The DIN-male N-female connector has a DIN-type male connector at one end and a type N female connector at the other end. [Figure 5-2](#) shows the appearance of the DIN-male N-female connector.

**Figure 5-2** Appearance of the DIN-male N-female connector



|                             |                             |
|-----------------------------|-----------------------------|
| (1) Type N female connector | (2) DIN-type male connector |
|-----------------------------|-----------------------------|

## 5.3 Optical Module

An optical module transmits optical signals between an optical port and an optical cable.

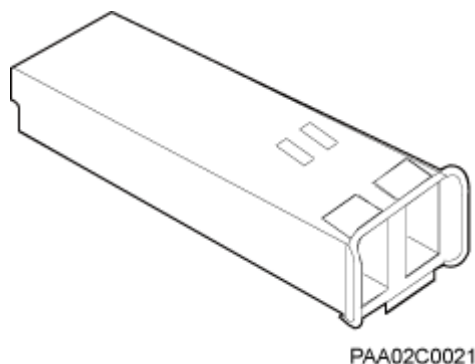
### NOTE

- The appearance of the optical module and the label on the optical module in this section are for reference only.
- Huawei wireless equipment can only use optical modules that have been certified by Huawei Wireless Product Line. The optical module must meet the following:
  - Requirements of devices on which optical modules are to be installed
  - Laser safety requirements in the IEC 60825-1 standard
  - General safety requirements in the IEC 60950-1 standard
- For the codes of SFP and QSFP optical modules that have been certified by Huawei Wireless Product Line, see *BTS3911E Spare Parts Catalog*.

### Appearance

[Figure 5-3](#) shows the appearance of the optical module.

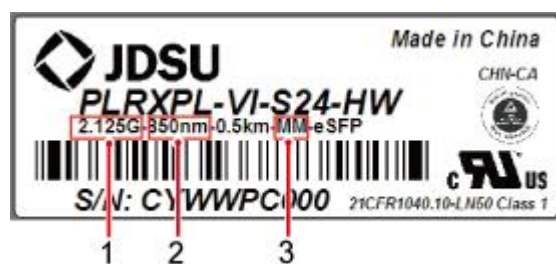
**Figure 5-3** Appearance of the optical module



## Label on the Optical Module

There is a label on each optical module, which provides information such as the rate, wavelength, and transmission mode. See [Figure 5-4](#).

**Figure 5-4** Label on the optical module



|          |                |                       |
|----------|----------------|-----------------------|
| (1) Rate | (2) Wavelength | (3) Transmission mode |
|----------|----------------|-----------------------|

### NOTE

The rate, say 2.125 Gbit/s, in the preceding figure is for reference only. Optical modules used in different base stations have different rates.

# 6 Typical Networking and Cable Connection

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This section describes the BTS3911E networking modes and cable connection principles.

## 6.1 Cable Connection Principles

This section describes the connection principles for the PGND cable, power cable, transmission cable, alarm cable, and RF jumper.

### 6.1 Cable Connection Principles

This section describes the connection principles for the PGND cable, power cable, transmission cable, alarm cable, and RF jumper.

#### PGND Cable

The PGND cable length must not exceed 30 m.

#### Power Cable

The power cable length must not exceed 100 m.

#### Transmission Cable

- An Ethernet cable or optical cable can be used for signal transmission between a BTS3911E and the MME/S-GW/RNC. The length of a standard optical cable must not exceed 100 m. An Ethernet cable must be made onsite, with a maximum length of 100 m.
- A maximum of three BTS3911Es can be cascaded over Ethernet cables or optical cables (recommended). The maximum distance between two BTS3911Es cascaded over an Ethernet cable is 100 m.

#### Alarm Cable

The alarm cable length must not exceed 100 m.

## **RF Jumper**

The RF jumper length depends on scenario-specific coverage requirements and must not exceed 10 m.

# 7 Power Requirements

This section describes the requirements on the upper-level (customer-provided) circuit breakers and cross-sectional areas.

Type C bipolar circuit breakers in accordance with IEC 60934 are recommended. Circuit breakers must be configured for L and N wires for the sake of O&M security.

Slow-blow fuses of the gL (DIN VDE)/gG (IEC) class in accordance with IEC 60269-1 are recommended. Fuses of the same specifications must be configured for L and N wires for the sake of O&M security.

**Table 7-1** describes the recommended specifications.

**Table 7-1** Requirements on the upper-level circuit breakers and power cables

| Power Supply            | Current of the Upper-level AC Circuit Breakers (or Fuses)                                                                                | Cross-Sectional Area of the Input Power Cable |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| 220 V AC single-phase   | <ul style="list-style-type: none"> <li>● Minimum value: 5 A</li> <li>● Recommended value: 16 A</li> <li>● Maximum value: 20 A</li> </ul> | 1.5 mm <sup>2</sup> to 2.5 mm <sup>2</sup>    |
| 110 V AC dual-live-wire |                                                                                                                                          |                                               |
| 110 V AC single-phase   |                                                                                                                                          |                                               |

 **NOTE**

- The requirements provided in the preceding table are based on the peak power of base station and do not represent power consumption when the base station is running.
- Minimum value: Ensures that a base station can work normally under normal circumstances. However, lightning strikes or abnormal voltage fluctuations may trip the circuit breaker or melt the fuse.
- Recommended value: Ensures that a base station can work normally under normal circumstances and that the circuit breaker does not trip in the event of lightning strikes or abnormal voltage fluctuations.
- Maximum value: Indicates the maximum rated current allowed for the circuit breaker or fuse when the base station is working properly.

# 8 Engineering Specifications

This section describes the BTS3911E engineering specifications, including power supply specifications, equipment specifications, environment specifications, surge protection specifications for the ports on the BTS3911E, and standards that the BTS3911E complies with.

For more details, see *Micro BTS3900 Series Technical Description*.

## Power Supply Specifications

[Table 8-1](#) describes the input and output power specifications of a BTS3911E.

**Table 8-1** Power supply specifications

| Item               | Specifications         |
|--------------------|------------------------|
| AC input power     | 100 V AC to 240 V AC   |
| Output power (PoE) | - 57 V DC to - 37 V DC |

## Equipment Specifications

[Table 8-2](#) describes the dimensions and weight of a BTS3911E.

**Table 8-2** Equipment specifications

| Item                            | Dimensions (H x W x D)            | Weight  |
|---------------------------------|-----------------------------------|---------|
| BTS3911E with internal antennas | 290 mm x 300 mm x 166 mm (14.4 L) | ≤ 13 kg |
| BTS3911E with external antennas | 290 mm x 300 mm x 118 mm (10.2 L) | ≤ 11 kg |

## Environment Specifications

[Table 8-3](#) describes the environment specifications of a BTS3911E.



**Table 8-3** Environment specifications

| Item                                                  | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating temperature                                 | <ul style="list-style-type: none"> <li>● Without sunlight exposure: - 40°C to +55°C</li> <li>● With sunlight exposure: - 40°C to +50°C</li> </ul> <p><b>NOTE</b><br/>Depending on the installation scenario, traffic volume, and carrier configuration, the output power of the BTS3911E may temporarily decrease when it is working in extreme conditions (from 45°C to 55°C in scenarios without sunlight exposure or from 40°C to 50°C in scenarios with sunlight exposure).</p> |
| Storage temperature                                   | - 40°C to +70°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Relative humidity                                     | 5% RH to 95% RH                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Absolute humidity                                     | 1 g/m <sup>3</sup> to 30 g/m <sup>3</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Altitude                                              | - 60 m to +1800 m                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Operating atmospheric pressure                        | 70 kPa to 106 kPa                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Operating environment                                 | ETSI EN 300019-1-4 Class 4.1                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Storage environment                                   | ETSI EN 300019-1-1 class 1.2 "Weather protected, not temperature-controlled storage locations"                                                                                                                                                                                                                                                                                                                                                                                      |
| Transportation environment                            | ETSI EN 300019-1-2 class 2.3 "Public transportation"                                                                                                                                                                                                                                                                                                                                                                                                                                |
| IP rating                                             | IP65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Anti-seismic performance                              | <ul style="list-style-type: none"> <li>● IEC 60068-2-57 Environmental testing <ul style="list-style-type: none"> <li>- Part 2-57: Tests - Test Ff: Vibration</li> <li>- Time-history method</li> </ul> </li> <li>● ETSI EN 300019-2-4</li> <li>● YD 5083-99: Interim Provisions for Test of Anti-seismic Performances of Telecommunications Equipment (telecom industry standard in the People's Republic of China)</li> </ul>                                                      |
| Protection from damp heat, salt mist, and mold growth | <ul style="list-style-type: none"> <li>● IEC 60068-2-30</li> <li>● IEC 60068-2-52</li> <li>● IEC 60068-2-10</li> </ul>                                                                                                                                                                                                                                                                                                                                                              |
| Storage time                                          | It is recommended that the device be installed and used within one year after its delivery. Failure rates increase after one year if the device is not installed.                                                                                                                                                                                                                                                                                                                   |

| Item               | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ETL                | <p>Conforms to UL STD.60950-1 &amp; UL STD. 60950-22 CERTIFIED TO CAN/CSA STD.C22.2 NO.60950-1-07 &amp; CAN/CSA STD.C22.2 NO.60950-22-07</p>  <p>CONFORMS TO<br/>UL STD.60950-1<br/>&amp; UL STD.60950-22<br/>CERTIFIED TO CAN/CSA STD.<br/>C22.2 NO.60950-1-07<br/>&amp;CAN/CSA STD.C22.2 NO.<br/>60950-22-07</p> <p><b>Intertek</b><br/>4001377</p> |
| Laser safety class | <p>Class 1</p>  <p><b>CLASS 1 LASER PRODUCT</b></p>                                                                                                                                                                                                                                                                                                   |

### Surge Protection Specifications for the Ports on the BTS3911E

[Table 8-4](#) describes the surge protection specifications for the ports on the BTS3911E.

**Table 8-4** Surge protection specifications

| Port            | Surge Protection Mode | Specifications |
|-----------------|-----------------------|----------------|
| AC power socket | Differential mode     | 20 kA          |
|                 | Common mode           | 20 kA          |

### Standards Compliance

[Table 8-5](#) describes the standards that the BTS3911E complies with.

**Table 8-5** Standards compliance

| Item                            | Specifications                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMC                             | <p>The BTS3911E meets the EMC requirements and complies with the following standards:</p> <ul style="list-style-type: none"> <li>● CISPR 22</li> <li>● EN 55022</li> <li>● EN 301 489-17</li> <li>● EN 301 489-23</li> <li>● CISPR 24</li> <li>● IEC 61000-4-2</li> <li>● IEC 61000-4-3</li> <li>● IEC 61000-4-4</li> <li>● IEC 61000-4-5</li> <li>● IEC 61000-4-6</li> <li>● IEC 61000-4-29</li> <li>● GB 9254</li> <li>● ETSI EN 301 489-1</li> <li>● VCCI V-3</li> </ul> |
| 3GPP                            | <ul style="list-style-type: none"> <li>● Release 99</li> <li>● Release 4</li> <li>● Release 5</li> <li>● Release 6</li> <li>● Release 7</li> <li>● Release 8</li> <li>● Release 9</li> <li>● Release 10</li> <li>● Release 11</li> <li>● Release 12</li> <li>● Release 13</li> </ul>                                                                                                                                                                                        |
| Environment protection standard | RoHS                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Surge protection standards      | <ul style="list-style-type: none"> <li>● IEC 61000-4-5</li> <li>● IEC 61312-1</li> <li>● YD 5098</li> </ul>                                                                                                                                                                                                                                                                                                                                                                 |
| Protection standards            | <ul style="list-style-type: none"> <li>● YD 5098</li> <li>● YD 5068-98</li> <li>● IEC 61000-4-5</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  |

| Item                  | Specifications                                                                                                                                                                                                                    |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Safety standards      | <ul style="list-style-type: none"><li>● UL 60950-1</li><li>● IEC 60950-1</li><li>● EN 60950-1</li><li>● AS/NZS 60950-1</li><li>● UL 60950-22</li><li>● IEC 60950-22</li><li>● EN 60950-22</li><li>● AS/NZS 60950-22</li></ul>     |
| Environment standards | <ul style="list-style-type: none"><li>● IEC 68-2-1</li><li>● IEC 68-2-2</li><li>● IEC 60068-2-2</li><li>● ETSI EN 300 019-1-1</li><li>● ETSI EN 300 019-1-2</li><li>● ETSI EN 300 019-1-4</li><li>● ETSI EN 300 019-2-4</li></ul> |