

O35 - Bluetooth Low Energy





Wireless communication interface

DESCRIPTION

BLE stands for Bluetooth Low Energy and defines a wireless communication standard for short distances between compatible devices.

The standard also known as Bluetooth 4.0 uses a 2.4 Ghz radio frequency as well as its predecessor Bluetooth 2.0.

These devices are used in the healthcare medical application industry, in the telecommunications industry, embedded in smartphones, and in generic features such as proximity and presence sensors.

The Bluetooth Low Energy aims to provide a significantly reduced power consumption and cost, while maintaining a communication range similar to that of Bluetooth 2.0.

BLE devices are detected by a procedure based on the transmission of announcement packets. This is done using 3 separate channels (frequencies) in order to reduce interference. The announcement device sends a packet on at least one of these three channels, with a repetition period called the announcement interval.

To reduce the possibility of multiple consecutive collisions, a random delay of up to 10 milliseconds is added to each announcement interval. The analyser device listens to the channel for a duration called the scan window, which is periodically repeated at each scan interval.

The latency of discovery is therefore determined by a probabilistic process and depends on the three parameters (i.e., the announcement interval, the scan interval and the scan window).

The discovery scheme adopted by BLE uses a technique based on periodic intervals, so that the upper limits to discovery latency can be deduced for most of the parameterizations.

ForTest Series-T tools are equipped with BLE devices that allow through unique identifiers called Service, Characteristic, and Descriptor to make attributes and methods accessible through an access point.

Each instrument has associated a unique and proprietary UUID.

INTERFACE

All Low Energy Bluetooth devices use the General Attribute Profile (GATT).

The application programming interface offered by an operating system that supports Bluetooth Low Energy will generally be based on GATT concepts.

GATT has the following terminology:

Client

A device that initiates GATT commands and requests and accepts responses, such as a computer or smartphone.

Server

A device that receives GATT commands and requests and returns responses such as a temperature or pressure sensor.

Characteristic

A data value transferred between client and server, for example the current battery voltage.

Service

A collection of related features that work together to perform a particular function. For example, the Health Thermometer service includes features for a temperature measurement value and a time interval between measurements.

Descriptor

A Descriptor provides additional information about a Characteristic. For example, a Characteristic of the temperature value may have an indication of its units (e.g. Celsius) and the maximum and minimum values that the sensor can measure.

TECHNICAL CODE

Within the technical code the field that defines the optional BLE is located in position 35.