**Oviphone Technology Limited Company: B2315L device LORAWAN protocol**

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# Overview

This agreement is applicable to the Oviphone B2315L LoRaWAN watch. If downlink confirmation (full duplex mode) or other protocols are required, please consult with Oviphone Communication (Oviphone Communication has other customized protocol applications).

This protocol use for Oviphone B2315L LoRaWAN wristband) .

If you need downlink confirmation (full-duplex mode) or other protocols, please check with Oviphone.

With the continuous improvement and enrichment of device functions, this agreement will be constantly updated. Please download the latest version from the server. This document will continue updape, please download the newest version. <http://aiday.com.cn/Help/api/Device/LORA/>

The module over there:

Wristband register network method for watches:

1: Activation by Personalization (OTAA-CLASSA activation method)

Default APPSKEY： 2B7E151628AED2A6ABF7158809CF4F3C

If you need special KEY, please contact with Oviphone

2: Another ABP network access mode---（default）

CAPPSKEY - EF6D6E2503F57AE2FA151CDA87455F18

CNWKSKEY - 2E8C8650B4041672BBB9A399F2DEB427

# 2.Protocol Data Packet Structure

## 2.1Message ID

MessageId represents the content as described in Chapter 3.

Note: The reported message has been actually reported. This agreement is a general agreement, and part of the message may not be reported

|  |  |
| --- | --- |
| **Message ID** | **Description** |
| 0xBB | 固件版本号上传 （Device Firmware Version Upload） |
| 0xF6 | 电量,计步和信号强度上传 (Battery Power, Predometer, Signal Level Upload) |
| 0x03 | GPS/北斗定位数据上传 (GPS/Glonass Data Upload) |
| 0xC2 | 心率 血压数据上传 （Heart rate, Blood Pressure Data） |
| 0xBA | 温度数据上传 (Temperature Upload) |
| 0x02 | 告警数据上传 (Warning Upload) |
| 0xD6 | 蓝牙定位信息(LBE Location) |
| 0xC1 | 下行消息查询 (Download Message Status Check ) |
| 0xD2 | 下行消息/设置报文 (Message, Set periodic positioning) |
|  |  |

## 2.2 Payload

The payload below refers to the effective content of the protocol, excluding the head token and checksum. The length of the content is indicated afterwards.

The data formats used in the payload are shown in the following table:

[U-unsigned; I-signed; X-bitfield; number-bytes occupied]

In the protocol below, little-endian is used for all data types except for ch, u8, i8, and x8.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Short** | **peTypeType** | **Size(Bytes)** | **Min/max** | **Resolution** | **explain** |
| CH | ASCII/ISO 8859.1 | 1 | - | - | char |
| u8 | Unsigned Char | 1 | 0..255 | 1 | unsigned short |
| i8 | Signed Char | 1 | -128..127 | 1 | short |
| x8 | Bitfield | 1 | - | - | bit |
| u16 | Unsigned Short | 2 | 0..65，535 | 1 | unsigned int |
| i16 | Unsigned Short | 2 | -32,768..32,767 | 1 | int |
| x16 | Bitfield | 2 | - | - | （bit）2 |
| u32 | Unsigned Long | 4 | 0..4,294,967,295 | 1 | unsigned long |
| i32 | Signed Long | 4 | -2,147,483,648..2,147,483,647 | 1 | long |
| u64 | Uint64\_t | 8 | 0..18,446,744,073,709,551,616 | 1 | uint64\_t |
| float | float | 4 | -3.44\*10e38..3.4\*10e38 | - | float |

## 2.3 Checksum

The content to be added to the checksum includes the payload, as shown in Figure 1. The algorithm is as follows, where Buffer[N] represents the data to be accumulated.

Ck\_sum = 0

For(i=0; i<N; i++)

{

ck\_sum = ck\_sum + Buffer[i]

ck\_sum = ck\_sum % 0x100

}

ck\_sum = 0xFF – ck\_sum

Return ck\_sum

Where ck\_sum cannot exceed 0xFF, so after each loop, it must be modulo 0x100 and then taken the remainder.

# **3.**messages

## Equipment information related

### 3.1.1 Battery Power, Predometer, Signal Level Upload (0xF6)

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Size(Bytes) | Format | Name | Scale | Unit | Decription |
| 2 | U16 | Bat\_volt |  | -/- | Battery Level |
| 4 | U32 | Step\_num |  |  | Prodemeter Step |
| 1 | U8 | Signal\_strength |  |  | Signal level |
| 4 | Int32 | timestamp |  |  | timestamp, little endian |

Example： f60300940400005028F2CD5F

F6 : MSGID

0300 : littele Endian，Battery Level 3.

Value 0 - 3 Mean 0% - 100% (10% 30% 60% 100%)；

94040000： littele Endian，0x00000494：Prodometer 1172 (step)；

50 ： Signal Level 80%

28F2CD5F： Timestamp: Beijing time2020-12-07 17:13:12

### 3.1.2 Device Firmware Version Upload(0xBB)

evice power on, upload the firmware version）

payload contents

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Unit | Decription |
| 1 | UINT8 | Version\_len | / | Software  version number and length |
| N | ASCII[n] |  | / | Software version |

Example：

BB 10 42323331332E4F563836382E54483031

Report the content B3213.OV868.TH01

## 3.2 Positioning related reporting

### 3.2.1GPS/BDS Position Reporting: Location Data Reporting (0x03)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Message | MSG\_UPL\_GPS | | | |
| Decription | 回馈GPS/BDS定位数据 | | | |
| Firmware | -/- | | | |
| Payload Length | 23 bytes | | | |
| Message structure | / | Message ID | Payload | Checksum |
| / | 0x03 | See below | CK\_sum |

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 8 | Double | lon |  | -/- | longitude |
| 8 | Double | lat |  |  | latitude |
| 1 | U8 | north\_south |  |  | /\*N or S\*/ |
| 1 | U8 | east\_west |  |  | /\*E or W\*/ |
| 1 | U8 | status |  |  | /\*A or V\*/ |
| 4 | U32 | Timestamp |  |  | Timestamp |

Example： 03000000C0424C5E4000000000A5DC3C404E4541E62C616078

Lon: 000000C0424C5E40Lat: 00000000A5DC3C40 4E –N 45-E 41-A Time E62C6160

Lon:121.191574Lat: 28.861893

Status = A indicates that the information content is accurate. It can be resolved to V and can be abandoned.

Example of GPS parsing (JAVA)：

DBDBDBDB037d9f84ac81815c40e766926b1d8936404e4541749d695f0b

//DBDBDBDB03 7d9f84ac81815c40 e766926b1d893640 4e 45 41 749d695f 0b

public static void main(String[] args){

//eg:7d9f84ac81815c40 -->405c8181ac849f7d

Double.longBitsToDouble(Long.parseLong("405c8181ac849f7d",16))); //114.02353966666665

//message e766926b1d893640 actual value 4036891d6b9266e7

Double.longBitsToDouble(Long.parseLong("4036891d6b9266e7", 16))) ;//22.535605166666667

HexToStr(data.Substring(“4e”)); //N

HexToStr(data.Substring(“45”));//E

HexToStr(data.Substring(“41”));//AA represents data "OK", V represents a warning

//Message 749d695f actual value 5f699d74

Date date=new Date();

date.setTime(Long.parseLong(“5f699d74",16)\*1000);

SimpleDateFormatsdf = new SimpleDateFormat("yyyyMMddHHmmss");

System.out.println(sdf.format(date)); //2020-09-22 14:45:08

### 3.2.2 Bluetooth positioning information(LBE Location)（MsgId=0xD6）

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes) | Format | Name | Decription |
| 1 | U8 | Type | Fix value 0) |
| 4 | Int32 | Utc | (UTC timestamp) |
| 1 | U8 | Total\_PackCount | (total time package) |
| 2 | U16 | Major[0] | Major |
| 2 | U16 | Minor[0] | Minor |
| 1 | U8 | Rssi[0] | Rssi |
| 2 | U16 | Major[1] | Major |
| 2 | U16 | Minor[2] | Minor |
| 1 | U8 | Rssi[2] | Rssi |

Example：

D6 00 70DAF861 01 4327 1794 ac 4327 3094 aa 6a

D6: MSGID；

00:

70DAF861 Timestamp: Beijing time 2022-02-01 15:00:00)

01 there is currently 1 pen of Bluetooth location information

4327: littele Endian， 0x2743 major = 10051

1794: littele Endian， 0x9417 minor = 37911

ac -85 (rssi)

**3.3：Alarm related reporting**

### 3.3.1Alarm message（MsgId=0x02）

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes) | Format | Name | Drscription |
| 2 | U16 | Upl\_warn | Bitfield see below |
| 4 | U32 | Timestamp | timestamp, little endian |

Bitfield WRN:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 |  |  |  |  |  |  | 8 |  |  |  | 4 |  |  | 1 | 0 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| bit | Name | Description | Hexadecimal | Decimal |
| 8 | Wear status | Wear status | 0100 | 1\*256=256 |
| 4 | Takeoff status | Takeoff status | 0010 | 1\*16=16 |
| 2 | Power off | Power off | 0004 | 4 |
| 1 | SOS |  | 0002 | 2 |
| 0 | Low Power | Low Power | 0001 | 1 |

Example**：**

Power off 02040028F2CD5F

Low battery 02010028F2CD5F

Wear status 02000128F2CD5F

Takeoff status 02100028F2CD5F

**3.4Equipment information and status reporting**

**--To be updated**

**3.5 Downstream feedback report**

### 3.5.1Download Message Check(0xC1)

|  |  |  |
| --- | --- | --- |
| Message | Download Message Check | |
| Description | Download Message Check | |
| Direction | Terminal => Terminal Server | |
| Message structure | Message ID | Payload |
| 0xC1 | / |

## 3.6Health related reports

### 3.6.1 Heart rate, Blood Pressure(0xC2)

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Scale | Unit | Decription |
| 2 | U16 | bp\_high | - | - | Systolic Blood:2byte |
| 2 | U16 | bp\_low | - | - | Diastolic Blood：2byte |
| 2 | U16 | Bp\_heart | - | - | Heart rate:2byte |
| 4 | U32 | Timestamp |  |  | Timestamp |

例：C2 7500 4D00 4800 28F2CD5F

C2 : MSGID；

7500 : littele Endian， 0x0075 117 (Systolic Blood Pressure Value 117)

4D00 : littele Endian， 0x004D，77 (Diastolic Blood Pressure Value 77)

4800 : littele Endian，0x0048，72 (Heart Rate Value 72)

28F2CD5F : Timestamp: Beijing time2020-12-07 17:13:12

### 3.6.2 Temperature（MsgId=0xBA）

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte size | Format | Name | Scale | Unit | Decription |
| 1 | U8 | Time stamp logo | Must |  | 00 -with timestamp；  01 -without timestamp |
| 4 | Int32 | timestamp | Optional |  | timestamp ID is 01, this field is not required |
| 1 | U8 | Temp. type | Must |  | 1: upload wrist and body temp  2:upload wrist, body and environment temp. |
| 2 | S16 | wrist Temp. | Optional |  | One digit after the decimal point is reserved for body surface temperature (×10). The reported value is an integer. It is determined whether there is this field according to the temperature type |
| 2 | S16 | Body Temp. | Optional |  | One digit after the decimal point is reserved for body surface temperature (×10). The reported value is an integer. It is determined whether there is this field according to the temperature type |
| 2 | S16 | environment temperature | Optional | / | One digit after the decimal point is reserved for body surface temperature (×10). The reported value is an integer. It is determined whether there is this field according to the temperature type |

# **4.Setting**

## 4.1Downlink

Note: classA mode receives downlink when reporting, and classC mode receives downlink in real time

### 4.1.1Send Message to Device (MSGID=0xD2)

payload contents

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes) | Format | Name | Decription |
| 1 | U8 | type | 0x16 |
| 1 | U8 | Len | Contect Length |
| U8 \* len |  | Data | content, UCS2 code, Maxium 20 bytes |

Example**：**

D2 16 0C 0047005000536d4b8bd54e2d

Length : 0C

Contect ： GPS Testing

### 4.1.2Set periodic positioning(MSGID=0xD2)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Size(Bytes) | Format | Name | Decription | |
| 1 | U8 | type | 0x17 | |
| 1 | U8 | Len | Contect Length | |
| 1 | u8 | enable | Enable or not | Time1 |
| 1 | U16 | Interval | Period Minutes |
| 1 | u8 | time\_start\_h | Hour |
| 1 | u8 | time\_start\_m | Minute |
| 1 | u8 | time\_end\_h | Hous |
| 1 | u8 | time\_end\_m | Minute |
| 1 | u8 | enable | Enable or not | Time2 |
| 1 | U16 | Interval | Period Minutes |
| 1 | u8 | time\_start\_h | Hour |
| 1 | u8 | time\_start\_m | Minute |
| 1 | u8 | time\_end\_h | Hous |
| 1 | u8 | time\_end\_m | Minute |

Example**：**

D2 17 0E 01 03 00 00 00 13 00 00 00 00 00 00 00 00

0 o'clock to 19 o'clock, positioning once every 3 minutes

### 4.1.3 Set positioning first (MSGID=0xD2)

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes) | Format | Name | Decription |
| 1 | U8 | type | 0xCE |
| 1 | U8 | Len | Contect Length |
| N | U8 |  | 01 --gps 03 --BLE |

Example**：**

D2 CE 02 01 03

01 GPS, 03 ble

Bluetooth beacon, so the current location order is to start GPS first, such as GPS location failure and then start Bluetooth location.

### 4.1.4 Set time zone (MSGID=0xD2)

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes) | Format | Name | Decription |
| 1 | U8 | type | 0x06 |
| 1 | U8 | Len | Contect Length |
| 1 | S8 |  | Time zone |

Example**：**

D2 06 01 F8

Time zone -5