**Oviphone B2315L LoRaWAN Device Protocal**

**欧孚通信B2315L LoRaWAN设备协议**

**(V1.1) 2022-03-04**

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本协议合适用于欧孚B2315L LoRaWAN手环。若需要下行确认（全双工模式）或其他协议，请咨询欧孚通信（欧孚通信有其他定制协议的应用）。

This protocol use for Oviphone B2315L LoRaWAN wristband) .

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

设备功能的不断完善和丰富，本协议会不断更新，请从官网下载最新版本。This document will continue updape, please download the newest version.

 手环加网方式（wristband register network）：Activation by Personalization (独立激活方式 ABP)

 Default APPSKEY： 2B7E151628AED2A6ABF7158809CF4F3C

Default NWKSKEY：735F2F22103042BE724197AC1727EA94

If you need special KEY, please contact with Oviphone.

# 报文标示符(Message ID)

|  |  |
| --- | --- |
| **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) |
|  |  |

# 上行报文(Upload Messages: Device send data to Server)

**2.1设备信息相关**

## 2.1.1 固件版本号(Device Firmware Version Upload）(0xBB)

说明：开机报文，上传固件版本号 （device power on, upload the firmware version）

payload contents

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Byte offset | Format | Name | Unit | Decription |
| 1 | UINT8 | Version\_len | / | 软件版本号长度 |
| N | ASCII[n] |  | / | 软件版本号 |

Example：

 BB 10 42323331332E4F563836382E54483031

 上报内容 B3213.OV868.TH01

## 2.1.2电量,计步和信号强度上传 (Battery Power, Predometer, Signal Level Upload) (0xF6)

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Size(Bytes) | Format | Name | Scale | Unit | Decription |
| 2 | U16 | Bat\_volt |  | -/- | 电池电量格数(Battery Level) |
| 4 | U32 | Step\_num |  |  | 记步数据(Prodemeter Step) |
| 1 | U8 | Signal\_strength |  |  | 信号强度(Signal level,0-3) |
| 4 | Int32 | timestamp |  |  | 时间戳小端(timestamp, little endian) |

Example： f60300940400005028F2CD5F

F6 : MSGID

0300 : 小端（littele Endian），电量3格(Battery Level 3).

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

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

50 ： 信号强度80%( Signal Level 80%(0x50--》80-->80%)

28F2CD5F： 时间戳：北京时间2020-12-07 17:13:12 (Timestamp: Beijing time2020-12-07 17:13:12)

**2.2设备定位相关**

## 2.2.1GPS/北斗位置上传(GPS/Glonass Location upload) (0x03)

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  |  |  | 时间戳(Timestamp) |

Example： 0322fb20cb827a5c4021ea3e00a99536404e4541cf084e5f

03: MSGID

22fb20cb827a5c40 : 小端（littele Endian），0x405c7a82cb20fb22，数据为double类型，需要转为浮点数，longitude值为：113.9142330000000 （dd.dddd格式）；(Double type, need change the data to Floating point

21ea3e00a9953640 : 小端（littele Endian），0x403695a9003eea21，数据为double类型，需要转为浮点数，longitude值为：22.5846100000000（dd.dddd格式）；(Double type, need change the data to Floating point)

4E : ASCII 编码表述，南、北纬度，范围为/\*N or S\*/，表示为：N（北纬）；

(ASCII code, south and north latitude, the range is /\*N or S\*/,: N (north latitude))

45 : ASCII 编码表述，东、西经度，范围为/\*E or W\*/，表示为：E（东经）；

 (ASCII code, east and west longitude, range is /\*E or W\*/: E (east longitude))

41 : ASCII 编码表述，定位状态，范围为/\*A or V\*/，表示为：A（有效）；

 (ASCII code representation, positioning status, range is /\*A or V\*/, expressed as: A (valid))

cf084e5f : 小端（littele Endian），0x5f4e08cf，Unix时间戳转换后，值为：2020/9/1 16:39:43 ；

## 2.2.2蓝牙定位信息(LBE Location)（MsgId=0xD6）

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes)  | Format  |  Name  | Decription |
| 1 | U8 | Type | 目前固定为0 (Fix value 0) |
| 4 | Int32 | Utc | Utc时间戳 (UTC timestamp) |
| 1 | U8 | Total\_PackCount | 当前时间的包总数 (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: 固定

 70DAF861 时间戳：北京时间2022-02-01 15:00:00 (Timestamp: Beijing time 2022-02-01 15:00:00)

 01 当前有1笔蓝牙定位信息

 4327: 小端（littele Endian）， 0x2743 major = 10051

 1794: 小端（littele Endian）， 0x9417 minor = 37911

 ac -85 (rssi)

**2.3设备健康相关**

### 2.3.1 心率血压上传(Heart rate, Blood Pressure)(0xC2)

payload contents

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  Byte offset | Format | Name | Scale | Unit | Decription |
| 2 | U16 | bp\_high | - | - | 收缩压：2byteSystolic Blood |
| 2 | U16 | bp\_low | - | - | 舒张压：2byteDiastolic Blood |
| 2 | U16 | Bp\_heart | - | - | 心率：2byteHeart rate |
| 4 | U32 | Timestamp |  |  | 时间戳Timestamp |

 例：C2 7500 4D00 4800 28F2CD5F

 C2 : MSGID；

 7500 : 小端（littele Endian）， 0x0075 收缩压 = 117 (Systolic Blood Pressure Value 117)

 4D00 : 小端（littele Endian）， 0x004D，舒张压 = 77 (Diastolic Blood Pressure Value 77)

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

 28F2CD5F : 时间戳：北京时间2020-12-07 17:13:12 (Timestamp: Beijing time2020-12-07 17:13:12)

### 2.3.2温度上传（Temperature）（MsgId=0xBA）

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Byte size | Format | Name | Scale | Unit | Decription |
| 1 | U8 | 时间戳标识 | 必选Must |  | 00 - 带时间戳with timestamp；01 - 不带时间戳-without timestamp |
| 4 | Int32 | 时间戳timestamp | 可选Optional |  | 如果时间戳标识为01，则不需要此字段timestamp ID is 01, this field is not required |
| 1 | U8 | 温度类型（Temp. type） | 必选Must |  | 1：表示上传体表温度和体温：(1: upload wrist and body temp).2：表示上传体表温度，体温和环境温度2:upload wrist, body and environment temp. |
| 2 | S16 | 体表温度（wrist Temp.） | 可选Optional |  | 体表温度小数点后面保留一位 （×10） 上报值为整数，根据温度类型决定是否有此字段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 | 体温（Body Temp.） | 可选Optional |  | 体温小数点后面保留一位 （×10） 上报值为整数，根据温度类型决定是否有此字段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 | 环境温度(environment temperature) | 可选Optional | / | 环境温度小数点后面保留一位 （×10） 上报值为整数，根据温度类型决定是否有此字段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 |

# 2.4设备报警相关

## 2.4.1报警数据上传(Alarm message)（MsgId=0x02）

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes) | Format | Name | Drscription |
| 2 | U16 | Upl\_warn | Bitfield see below |
| 4 | U32 | Timestamp | 时间戳(小端优先) |

Bitfield WRN:

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| bit | Name | Description | 调整后的16进制Hexadecimal | 十进制Decimal |
| 8 | 设备佩戴Wear status | 设备佩戴Wear status | 0100 | 1\*256=256 |
| 4 | 摘掉设备Takeoff status | 摘掉设备Takeoff status | 0010 | 1\*16=16 |
| 2 | 关机 Power off | 关机Power off | 0004 | 4 |
| 1 | SOS |  | 0002 | 2 |
| 0 | 低电量 Low Power | 低电量Low Power | 0001 | 1 |
|  | 跌落报警（在一定高度手环落下，特殊固件支持，通用固件暂无） |  | 4000 | 4\*4096=16384 |

 Example**：**

 关机报文（Power off） 02040028F2CD5F

 低电报文（Low battery） 02010028F2CD5F

 佩戴报文（Wear status） 02000128F2CD5F

 摘掉报文（Takeoff status） 02100028F2CD5F

# 2.5消息反馈

## 2.5.1查询下行消息(Download Message Check) (0xC1)

|  |  |
| --- | --- |
| Message | 消息查询  |
| Description | 消息查询 |
| Direction | Terminal => Terminal Server |
| Message structure | Message ID | Payload |
| 0xC1 | / |

**2.5.2 下行反馈(msg response)（MsgId=0xC0）--部分固件有**

|  |  |  |  |
| --- | --- | --- | --- |
| Format | Name | Scale | Description |
| U8 | length | 1 | 可能一次下行多个msgID，msgId的个数，通常情况下为1个（It is possible to downlink multiple msgIDs at a time, the number of msgIds, but generally 1） |
| U8 | msgId | 1 | 和下行MSGid 保持一致（Consistent with the downstream MsgId） |

# 下行报文（Download Message）

说明：classA模式上报时接收下行，classC模式实时接收下行

* 1.

## 3.1下行消息（Send Message to Device） (MSGID=0xD2)--通用固件不带

payload contents

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

 Example**：**

 D2 16 0C 0047005000536d4b8bd54e2d

 长度（Length）为 : 0C

 内容为（Contect） ： GPS测试中 （GPS Testing）

## 3.2设置周期定位（Set periodic positioning）(MSGID=0xD2)

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes) | Format |  Name  | Decription |
| 1 | U8 | type | 0x17 |
| 1 | U8 | Len | 内容长度 (Contect Length) |
| 1 | u8 | enable | 是否启用(Enable or not) | 　时间段1Time1 |
| 1 | U16 | Interval | 时间间隔（分钟）(Period Minutes) |
| 1 | u8 | time\_start\_h | -时Hour |
| 1 | u8 | time\_start\_m | -分Minute |
| 1 | u8 | time\_end\_h | -时Hous |
| 1 | u8 | time\_end\_m | -分Minute |
| 1 | u8 | 　enable | 是否启用(Enable or not) | 时间段2Time2 |
| 1 | U16 | Interval | 时间间隔（分钟）(Period Minutes) |
| 1 | u8 | time\_start\_h | -时Hour |
| 1 | u8 | time\_start\_m | -分Minute |
| 1 | u8 | time\_end\_h | -时Hour |
| 1 | u8 | time\_end\_m | -分Minute |

 Example**：**

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

 0点到19点，每隔3分钟定位一次(0 o'clock to 19 o'clock, positioning once every 3 minutes)

## 3.3设置定位优先(MSGID=0xD2)

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes) | Format |  Name  | Decription |
| 1 | U8 | type | 0xCE |
| 1 | U8 | Len | 内容长度 (Contect Length) |
| N | U8 |  | 01 --gps 02 --wifi 03 --蓝牙信标 |

Example**：**

D2 CE 02 01 03

 01 为GPS, 03 为蓝牙信标，所以当前定位顺序是优先启动GPS，如GPS定位失败再启动蓝牙定位。

## 3.4设置时区 (MSGID=0xD2)

|  |  |  |  |
| --- | --- | --- | --- |
| Size(Bytes) | Format |  Name  | Decription |
| 1 | U8 | type | 0x06 |
| 1 | U8 | Len | 内容长度 (Contect Length) |
| 1 | S8 |  | 时区  |

Example**：**

 D2 06 01 F8

 设时区为 -5