BlueUp S.r.l.s.
Loc. Belvedere, Ingresso 2, 53034 Colle di Val d'Elsa (SI) - ITALY
Tel. +39 344 2030929, Fax +39 0577 043101
E-mail: info@blueupbeacons.com, Web: www. blueupbeacons.com
P.IVA/CF/N. iscr. CCIAA (SI). 01373980521, VAT: IT01373980521

BlueBeacon
Bluetooth LE proximity-beacon

Advertising packets in second-generation firmware

BlueUp released in Jan. 2017 a completely new firmware (second-generation, version 5.0 and newer) for its BLE beacons (BlueBeacon series) that simultaneously supports iBeacon and Eddystone technologies (with full support of Eddystone specifications, including GATT and EID frame), together with other technologies such as Quuppa for precise localization of beacons and BlueUp Sensors for environment sensing.

The total number of time slots available for these packets is 8: 4 for Eddystone frames, and 4 for other frames (iBeacon, Quuppa, BlueUp Sensors). These packets are individually configurable for data, transmission power and advertising interval, and are always non-connectable.

The format of these packets is strictly compliant to the specifications of each technology:

- iBeacon: https://developer.apple.com/ibeacon/
- Eddystone (UID, URL, TLM, EID): https://github.com/google/eddystone
- Quuppa: proprietary format
- Sensors: https://blueupbeacons.com/docs/BlueBeacon%20-%20SensorsPacket.pdf

Interleaved with (and independently from) these packets, BlueBeacon beacons periodically broadcast an **Advertising Packet** that contains the following information:

- local name Service, with the unique identifier of the device, composed by manufacturer name (“BlueUp”), model number (2 digits) and serial number (6 digits)
- battery Service, with estimated status of the battery (expressed in %)
- 16-bit custom Service, with beacon-status flags, identifying the enabled advertising-packet technologies (iBeacon, Eddystone, Quuppa, BlueUp Sensors)

This Advertising Packet is broadcast at fixed non-modifiable power (-8dBm) and with a periodic interval according the following rule: every about 300msec for 5 minutes after power-up (or every disconnection) and, subsequently, every 2 seconds. This solution (introduced with BlueBeacon firmware version 5.5) allows to balance between a short response delay for configuring the beacon after power-up and an ultra-low energy consumption during operating life.

The Advertising Packet allows to uniquely identify the beacon (manufacturer name, model and serial numbers are always printed on the sticker applied on the beacon) and access to its status (battery level, configured packets), without connecting to it. It is noted that this packet is always broadcast (unless the beacon is configured in “Anonymous Mode”), also when no slot is configured for advertising packets (Eddystone, iBeacon, Quuppa or BlueUp Sensors frames).

When (and only when) the beacon is connectable (by default, beacons are always connectable unless configured in “Non-Connectable Mode”), it also broadcast a **Scan-Response Packet**, that contains the Eddystone configuration GATT service UUID as a 128-bit Service UUID.

The following tables contains the format of Advertising Packet and Scan-Response Packet.

 BlueUp Srls 2017 – All rights reserved

BlueUp S.r.l.s.
Loc. Belvedere, Ingresso 2, 53034 Colle di Val d'Elsa (SI) - ITALY
Tel. +39 344 2030929, Fax +39 0577 043101
E-mail: info@blueupbeacons.com, Web: www. blueupbeacons.com
P.IVA/CF/N. iscr. CCIAA (SI). 01373980521, VAT: IT01373980521

Advertising Packet

Byte	Value (hex)	Description	Comments	Property
1	0x02	AD Length	Length of packet data	Fixed
2	0x01	AD Type	Flags	Fixed
3	0x06	Flags value	No EDR, general discoverable	Fixed
4	0x11	AD Length	Length of packet data	Fixed
5	0x09	AD Type	Complete local name	Fixed
6	0x42 (“B”)	Complete local name (1st byte)	Complete local name of the beacon. Complete local name has the following format: “BlueUp-nn-ssssss”, where BlueUp is manufacturer name nn (2 decimal digits) is model number ssssss (6 dec. digits) is serial number Model number: Mini: nn = 01 Maxi: nn = 02 Forte: nn = 04 Tag: nn = 05 Board: nn = 06 Sensor: nn = 07 Serial number ranges from 000000 to 999999.	Variable
7	0x6C (“l”)	Complete local name (2nd byte)		
8	0x75 (“u”)	Complete local name (3rd byte)		
9	0x65 (“e”)	Complete local name (4th byte)		
10	0x55 (“U”)	Complete local name (5th byte)		
11	0x70 (“p”)	Complete local name (6th byte)		
12	0x2D (“-”)	Complete local name (7th byte)		
13	*XX* (“*n*”)	Complete local name (8th byte)		
14	*XX* (“*n*”)	Complete local name (9th byte)		
15	0x2D (“-”)	Complete local name (10th byte)		
16	*XX* (“*s*”)	Complete local name (11th byte)		
17	*XX* (“*s*”)	Complete local name (12th byte)		
18	*XX* (“*s*”)	Complete local name (13th byte)		
19	*XX* (“*s*”)	Complete local name (14th byte)		
20	*XX* (“*s*”)	Complete local name (15th byte)		
21	*XX* (“*s*”)	Complete local name (16th byte)		
22	0x04	AD Length	Length of packet data	Fixed
23	0x16	AD Type	Service data	Fixed
24	0x18	Battery Service UUID (1st byte)	Bluetooth battery service UUID (0x180F)	Fixed
25	0x0F	Battery Service UUID (2nd byte)		
26	*XX*	Battery value	State of the battery, expressed in %, from 0x64 (100%) to 0x00 (0%)	Variable
27	0x04	AD Length	Length of packet data	Fixed
28	0x16	AD Type	Service data	Fixed
29	0x88	Custom Service UUID (1st byte)	Custom 16-bit service UUID (0x8800)	Fixed
30	0x00	Custom Service UUID (2nd byte)		
31	*XX*	Advertised frames flags	Logical OR between: 0x01: Eddystone 0x02: iBeacon 0x04: Quuppa 0x08: BlueUp Sensors	Variable

 BlueUp Srls 2017 – All rights reserved

BlueUp S.r.l.s.
Loc. Belvedere, Ingresso 2, 53034 Colle di Val d'Elsa (SI) - ITALY
Tel. +39 344 2030929, Fax +39 0577 043101
E-mail: info@blueupbeacons.com, Web: www. blueupbeacons.com
P.IVA/CF/N. iscr. CCIAA (SI). 01373980521, VAT: IT01373980521

Scan-Response Packet

Byte	Value (hex)	Description	Comments	Property
1	0x11	AD Length	Length of packet data	Fixed
2	0x07	AD Type	Complete List of 128-bit Service Class UUID	Fixed
3	0x95	128-bit Service UUID (1st byte)	Eddystone Configuration GATT Service UUID: a3c87500-8ed3-4bdf-8a39-a01bebede295 (little-endian) (see: https://github.com/google/eddystone/tree/master/configuration-service)	Fixed
4	0xE2	128-bit Service UUID (2nd byte)		
5	0xED	128-bit Service UUID (3rd byte)		
6	0xEB	128-bit Service UUID (4th byte)		
7	0x1B	128-bit Service UUID (5th byte)		
8	0xA0	128-bit Service UUID (6th byte)		
9	0x39	128-bit Service UUID (7th byte)		
10	0x8A	128-bit Service UUID (8th byte)		
11	0xDF	128-bit Service UUID (9th byte)		
12	0x4B	128-bit Service UUID (10th byte)		
13	0xD3	128-bit Service UUID (11th byte)		
14	0x8E	128-bit Service UUID (12th byte)		
15	0x00	128-bit Service UUID (13th byte)		
16	0x75	128-bit Service UUID (14th byte)		
17	0xC8	128-bit Service UUID (15th byte)		
18	0xA3	128-bit Service UUID (16th byte)		

BlueUp Srls 2017 – All rights reserved