

# SPECIFICATION SHEET



## iBeek® Sensor Beacon VER 1.6



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## HARDWARE SPECIFICATION

<b>Battery</b>	3.6V / 2600mAh – Primary Lithium
<b>Size</b>	2.36" x 0.85" (60mm x 21mm)
<b>Weight</b>	1.0 oz (28 gr)
<b>Temperature Range</b>	-30°C to 68°C
<b>Bluetooth Type</b>	Bluetooth Low Energy 4.1
<b>Bluetooth Sensitivity</b>	-97dBm
<b>Bluetooth Max Power Output</b>	+5dBm
<b>Bluetooth Antenna</b>	0dBm Single Antenna, Omni Directional
<b>Frequency Supported</b>	<ul style="list-style-type: none"><li>• 2.4 Ghz ISM</li><li>• Bluetooth LE channels: 1- 40 &amp; Adv Ch: 37;38;39</li><li>• Non Bluetooth Channels: SDR from 2400Mhz to 2500Mhz</li></ul>
<b>Bluetooth Data Rate</b>	1Mbit/s / 2Mbit/s*
<b>Bluetooth Security</b>	128 bit AES
<b>Power Consumption - RX</b>	7.5mA RX Active Mode
<b>Power Consumption - TX</b>	6.5mA TX Active Mode
<b>Power Consumption - Sleep</b>	1.6 µA (SRAM retention and RTC running)

<b>Operational Life Running</b>	<ul style="list-style-type: none"> <li>• Full iBeacon Mode: 2.2 years at 0dBm TX Power, Running 24/7, 100ms advertisement rate</li> <li>• iBeacon Medium power saving mode: 4.5 years at 0dB and 200ms advertisement rate</li> <li>• Sensor Mode: Accelerometer + Temp collection and advertisement every 1 second: 5 years</li> <li>• Sensor mode power savings: Temperature only and advertisement every 3 seconds: 10 years</li> <li>• RTLS mode + Sensor mode power savings, advertisement every 1 second: 5 years</li> </ul>
<b>Power Output (Range)</b>	<ul style="list-style-type: none"> <li>• -40dBm to +5dBm. Can be configured over the air (Phone or from Cloud via BluFi)</li> <li>• -40 dBm is equivalent to approx. 3m Line of Sight range</li> <li>• +5 dBm is equivalent to approx. 150m Line of sight range</li> </ul>
<b>CPU</b>	<b>Dual Core: ARM Cortex M3 and M0</b> <b>Smart sensor processing and learning capabilities</b>
<b>Sensors</b>	<p><b>High Accuracy Temperature sensor</b></p> <ul style="list-style-type: none"> <li>• Accuracy without calibration: 0.5c (max) from -25c to +65c</li> <li>• Accuracy with calibration: 0.2c from -30c to +70c</li> <li>• Resolution: 12bits (0.0625c)</li> <li>• NIST Traceable</li> <li>• Conversion time 26ms</li> </ul> <p><b>3 Axis Accelerometer</b></p> <ul style="list-style-type: none"> <li>• 12Bit Digital</li> <li>• ODR from 1.56hz to 800hz</li> <li>• Four embedded Ch of configurable motion detection: (Freefall, Motion, Pulse, Transient)</li> <li>• Maximum Digital Sensitivity 1024 counts/g</li> <li>• Custom detection: Door opening/closing with counter; human walking detection; driving detection (Automotive); motor vibration learning</li> </ul> <p><b>Magnetometer (Optional)</b></p> <ul style="list-style-type: none"> <li>• High performance 3-axis magnetometer</li> <li>• 16 bit data output</li> <li>• <math>\pm 4/\pm 8/\pm 12/\pm 16</math> gauss magnetic full scale</li> <li>• Custom detectable modes: Door opening and closing, Metal nearby trigger, car detection, electric motor efficiency/torque detection</li> </ul> <p><b>Light Sensor (Optional)</b></p> <ul style="list-style-type: none"> <li>• Dynamic range from 0.01 lux to 64k lux</li> <li>• 16 bit resolution</li> </ul>
<b>Internal Flash Memory</b>	<p><b>55KB Flash standard</b>  Can record internally temperature, door openings (cooler for ex.), Motion (Asset motion) for over 2 months</p> <p><b>512KB Flash (Optional)</b>  For more advance internal recording and machine learning with accurate per minute timestamps recordings</p>

<b>LED</b>	Red LED
<b>Certifications</b>	FCC / CE / JRF / IC
<b>Environmental Resistance</b>	Sealed: Water Resistant, IP67, UV Resistant

## SOFTWARE SPECIFICATION

### **Bluision proprietary Bluetooth Stack - Can be customized for beacon operation:**

- Simultaneous support iBeacon + full Eddystone frames
- Bluetooth band support and Out-Of-Bnd (2.4Ghz ISM) support with auto scan for noise
- Fully compliant with Bluetooth Smart 4.1
- Dual Mode Support: Central and Peripheral
- Central supports multiple BLE connections at the same time with peripherals (Supports connecting at the same time to multiple beacons)
- Peripheral supports multiple BLE connections at the same time with central devices (Supports connecting at the same time to multiple phones)
- Supports Multiple Peripheral Protocols (iBeacon, Eddystone, sBeacon, etc. in same frames)
- Supports Peripheral Reverse RSSI
- Fully configurable
- Can log temperature and acceleration – See sensor & internal flash above

### **Security**

- Bluzone Cloud – Key-vault managed security
- Unique internal key per individual beacon
- Unique Device ID per individual beacon (sBV2 ID)
- Internal Unix time clock /timer since 'On' (Manufacture)
- RSA Private/Public (With Bluzone Cloud key-vault) - Communication from/to beacon encrypted using RSA

### **RTLS Mode:**

- RTLS Mode with per beacon advertisement millisecond Unix time
- Out-Of-Band adaptive scan advertisement
- 1dB TX Output Accuracy

### **Mounting Accessory**

iBEEK comes complete with ultra strong, industrial grade permanent 3M VHB self-adhesive for mounting that is fully compatible with outdoor /indoor mountings and can sustain pressure-wash from zero distance

# BLUVISION BLE STACK SPECIFICATION

## Key Features

- Bluetooth 4.0 compliant single mode protocol stack
  - GAP, SM, GATT, ATT, L2CAP and Link layer protocols
  - Peripheral and broadcaster roles
  - Central role
  - Observer and limited master role
  - Fully embedded software architecture. No bifurcation between Host and Controller
- GATT: Server role. Limited client role
- Advertising
  - Reverse RSSI
  - Configurable interval
  - Configurable adaptive advertisement mode for lower power consumption
- Security Manager: Unauthenticated no MITM. Just Works. OOB
- GAP: Limited Discoverable, General Discoverable
- Operating System
  - Bare metal implementation
  - Callback functions for handling events and interrupts
  - Asynchronous
  - Basic scheduler with interrupt based timer events
- Memory
  - ~54 kB stack and application size (Flash non-volatile memory)
  - ~8 kB RAM requirement
  - No memory Isolation between Application and protocol stack
- Over the Air device firmware update
- Link-Layer
  - Packets per connection interval - Configurable up to 12
  - Connection parameters update
  - Connection channel map update
  - Connection graceful terminate
  - AES128 Encryption request and response
- Calibration
  - Individual, per beacon, calibration TX offset in dBm

## Applications/Services/Profile

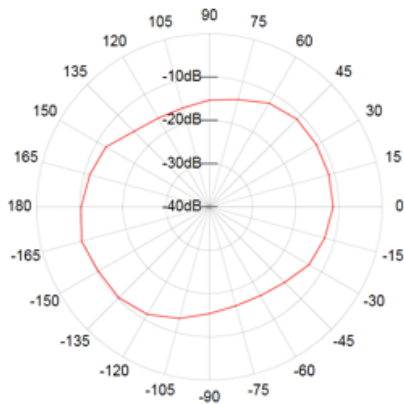
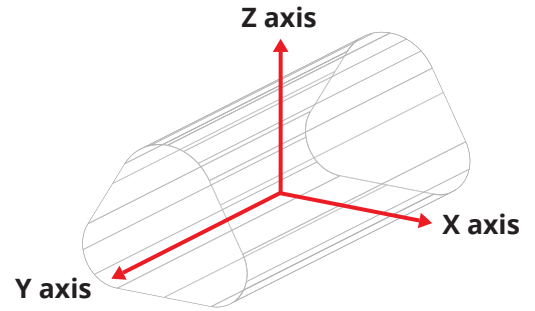
- iBeacon support
- sBeacon support
- Eddystone support
- Fully open and easily configurable for 3rd party Beacon protocol

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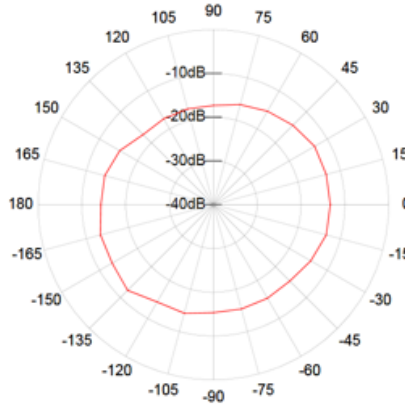
# iBEEK ANTENNA CHARACTERISTICS

## 1. Orientation 1, Beacon - XY

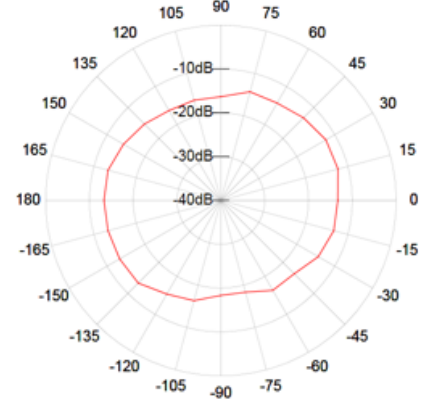
### 1.1 Antenna Polarity - H



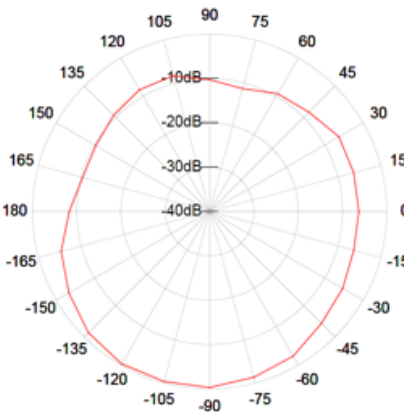
Frequency (Mhz): 2402  
 Maximum Gain (dBi): -9.34  
 Minimum Gain (dBi): -16.34  
 Average Gain (dBi): -13.04



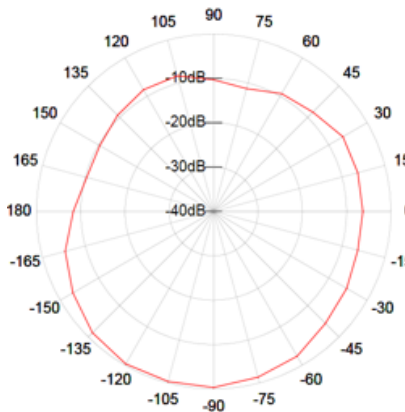
Frequency (Mhz): 2438  
 Maximum Gain (dBi): -12.34  
 Minimum Gain (dBi): -17.34  
 Average Gain (dBi): -14.84



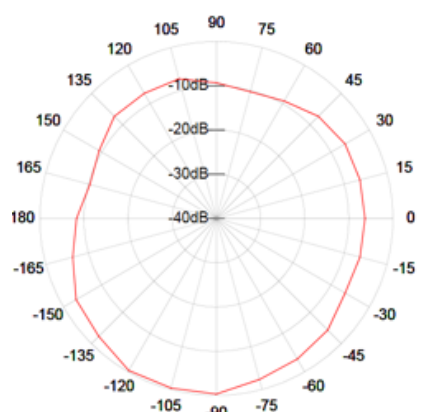
Frequency (Mhz): 2478  
 Maximum Gain (dBi): -12.34  
 Minimum Gain (dBi): -18.34  
 Average Gain (dBi): -14.75



Frequency (Mhz): 2402  
 Maximum Gain (dBi): -0.34  
 Minimum Gain (dBi): -11.34  
 Average Gain (dBi): -6.00



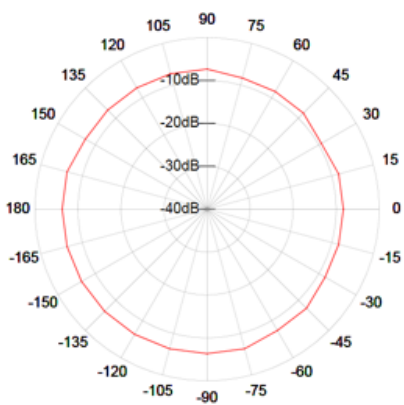
Frequency (Mhz): 2438  
 Maximum Gain (dBi): -1.34  
 Minimum Gain (dBi): -11.34  
 Average Gain (dBi): -6.29



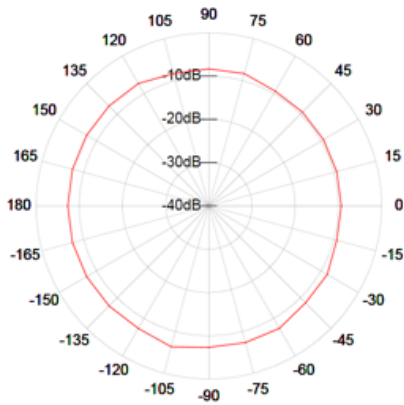
Frequency (Mhz): 2478  
 Maximum Gain (dBi): -0.34  
 Minimum Gain (dBi): -10.34  
 Average Gain (dBi): -5.88

# 1. Orientation 2, Beacon - YZ

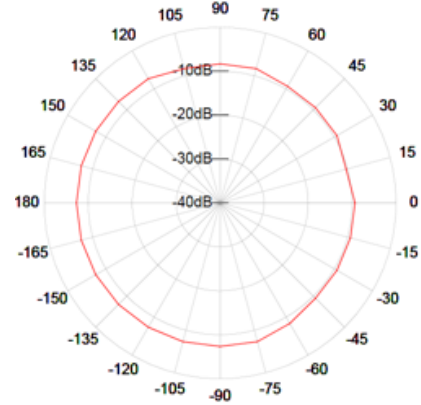
## 2.1 Antenna Polarity - H



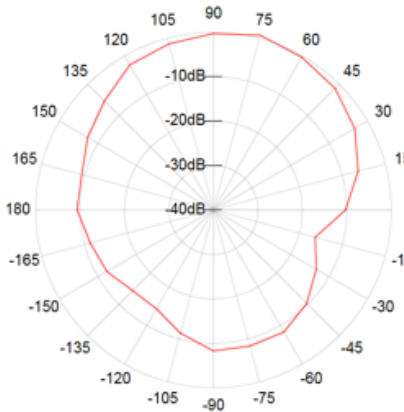
Frequency (Mhz): 2402  
 Maximum Gain (dBi): -6.34  
 Minimum Gain (dBi): -9.34  
 Average Gain (dBi): -7.34



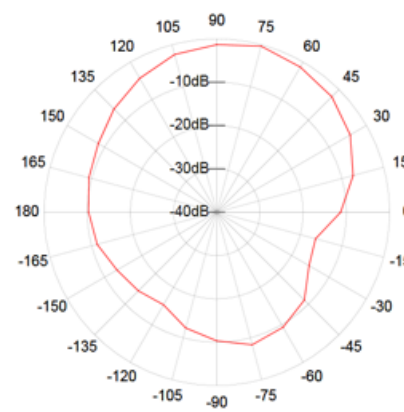
Frequency (Mhz): 2438  
 Maximum Gain (dBi): -6.34  
 Minimum Gain (dBi): -9.34  
 Average Gain (dBi): -8.00



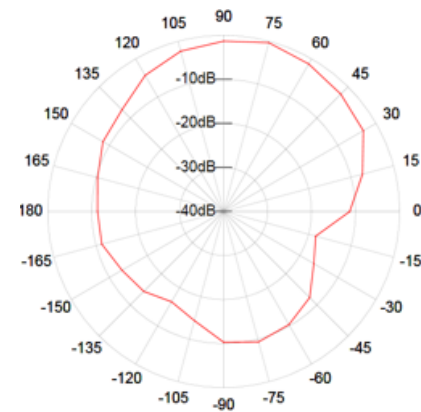
Frequency (Mhz): 2478  
 Maximum Gain (dBi): -7.34  
 Minimum Gain (dBi): -10.34  
 Average Gain (dBi): -8.21



Frequency (Mhz): 2402  
 Maximum Gain (dBi): -0.66  
 Minimum Gain (dBi): -16.34  
 Average Gain (dBi): -7.71



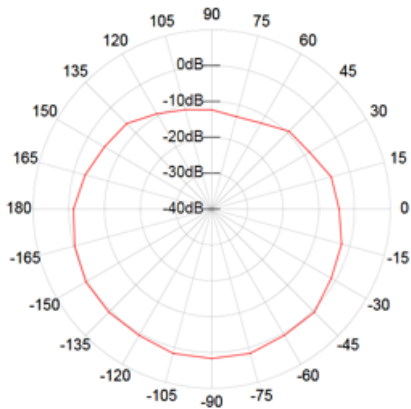
Frequency (Mhz): 2438  
 Maximum Gain (dBi): -0.34  
 Minimum Gain (dBi): -16.34  
 Average Gain (dBi): -8.63



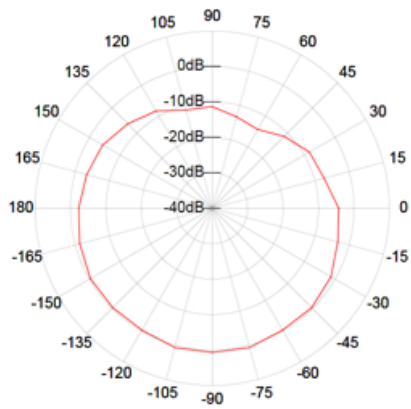
Frequency (Mhz): 2478  
 Maximum Gain (dBi): -0.34  
 Minimum Gain (dBi): -18.34  
 Average Gain (dBi): -9.09

### 3. Orientation 3, Beacon - ZX

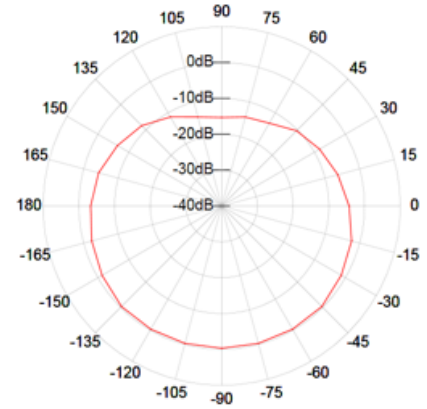
#### 3.1 Antenna Polarity - H



Frequency (Mhz): 2402  
 Maximum Gain (dBi): 1.66  
 Minimum Gain (dBi): -13.34  
 Average Gain (dBi): -4.09

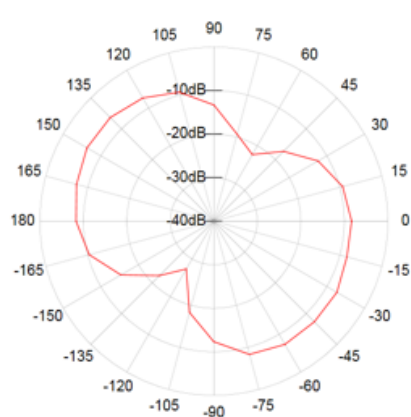


Frequency (Mhz): 2438  
 Maximum Gain (dBi): -0.66  
 Minimum Gain (dBi): -14.34  
 Average Gain (dBi): -4.67

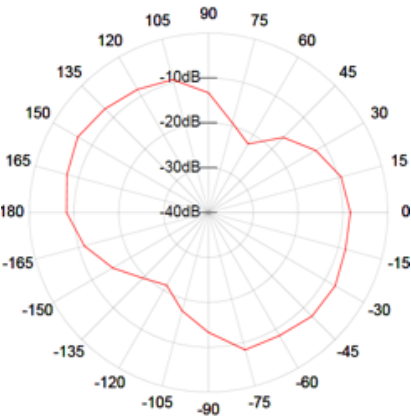


Frequency (Mhz): 2478  
 Maximum Gain (dBi): -0.34  
 Minimum Gain (dBi): -15.34  
 Average Gain (dBi): -5.42

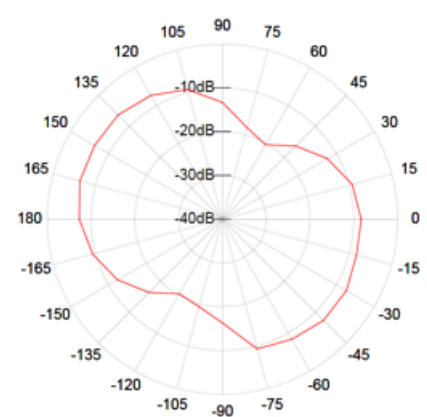
#### 3.2 Antenna Polarity - V



Frequency (Mhz): 2402  
 Maximum Gain (dBi): -6.34  
 Minimum Gain (dBi): -27.34  
 Average Gain (dBi): -12.17



Frequency (Mhz): 2438  
 Maximum Gain (dBi): -6.34  
 Minimum Gain (dBi): -22.34  
 Average Gain (dBi): -11.92



Frequency (Mhz): 2478  
 Maximum Gain (dBi): -6.34  
 Minimum Gain (dBi): -20.34  
 Average Gain (dBi): -11.5