

SPECIFICATION SHEET



BEEKs Industrial
VER 1.6



HARDWARE SPECIFICATION

Battery	3.6V / 2600mAh – Primary Lithium
Size	2.36" x 0.85" (60mm x 21mm)
Weight	1.0 oz (28 gr)
Temperature Range	-30°C to +77°C
Bluetooth Type	Bluetooth Low Energy 4.1
Bluetooth Sensitivity	-97dBm
Bluetooth Max Power Output	+5dBm
Bluetooth Antenna	0dBm Single Antenna, Omni Directional
Frequency Supported	<ul style="list-style-type: none">• 2.4 Ghz ISM• Bluetooth LE channels: 1- 40 & Adv Ch: 37;38;39• Non Bluetooth Channels: SDR from 2400Mhz to 2500Mhz
Bluetooth Data Rate	1Mbit/s / 2Mbit/s*
Bluetooth Security	128 bit AES
Power Consumption - RX	7.5mA RX Active Mode
Power Consumption - TX	6.5mA TX Active Mode
Power Consumption - Sleep	1.6 μ A (SRAM retention and RTC running)

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

LED	Red LED
Certifications	FCC / CE / JRF / IC
Environmental Resistance	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:

- Out-Of-Band adaptive scan advertisement
- 1dB TX Output Accuracy

Mounting Accessory

BEEKs Industrial 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

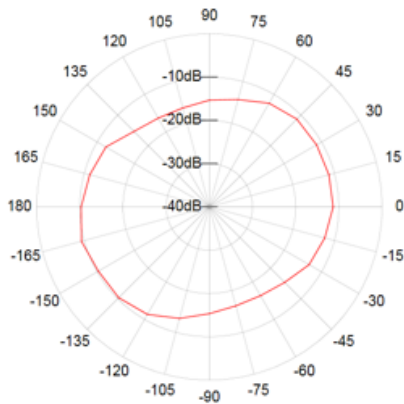
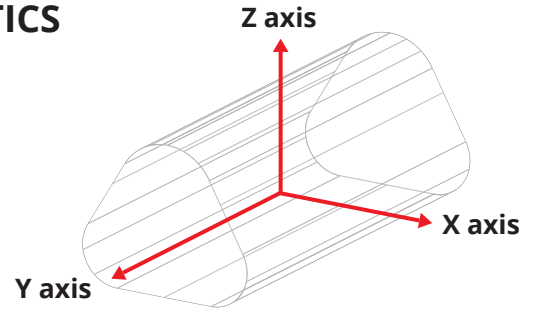
Applications/Services/Profile

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

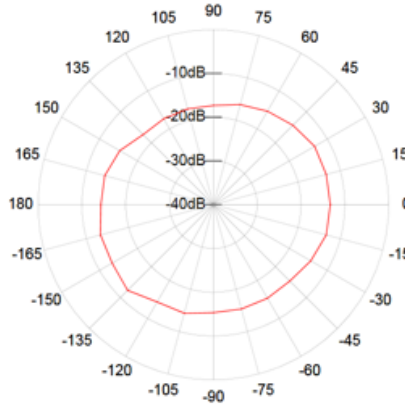
BEEKs INDUSTRIAL ANTENNA CHARACTERISTICS

1. Orientation 1, Beacon - XY

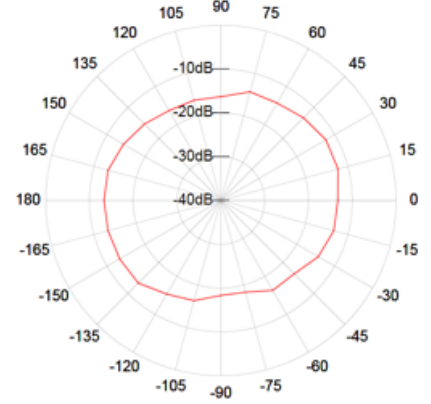
1.1 Antenna Polarity - H



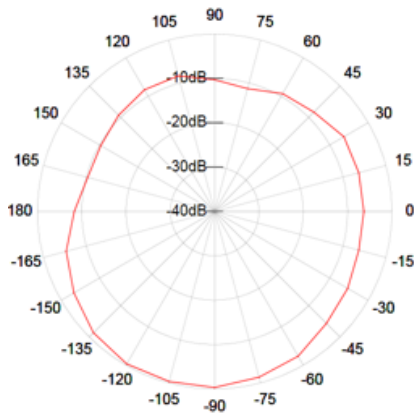
Frequency (Mhz): 2402
 Maximum Gain (dBi): -9.34
 Minimum Gain (dBi): -16.34
 Average Gain (dBi): -13.04



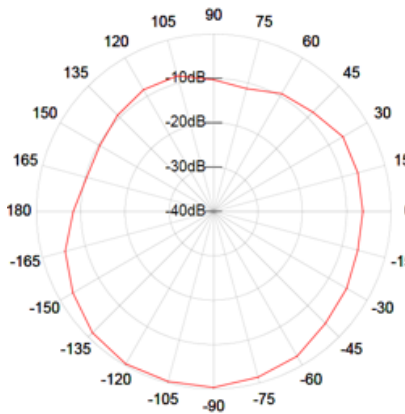
Frequency (Mhz): 2438
 Maximum Gain (dBi): -12.34
 Minimum Gain (dBi): -17.34
 Average Gain (dBi): -14.84



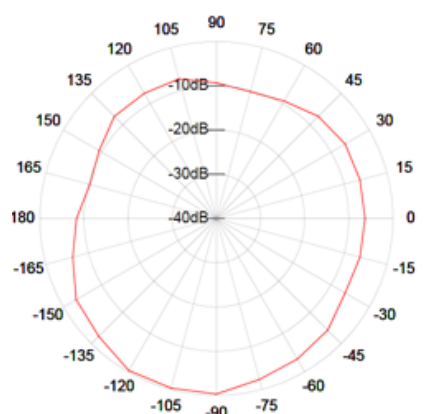
Frequency (Mhz): 2478
 Maximum Gain (dBi): -12.34
 Minimum Gain (dBi): -18.34
 Average Gain (dBi): -14.75



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



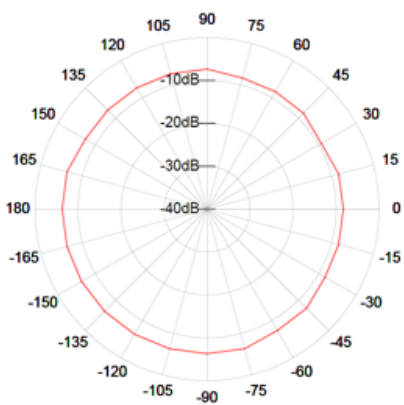
Frequency (Mhz): 2438
 Maximum Gain (dBi): -1.34
 Minimum Gain (dBi): -11.34
 Average Gain (dBi): -6.29



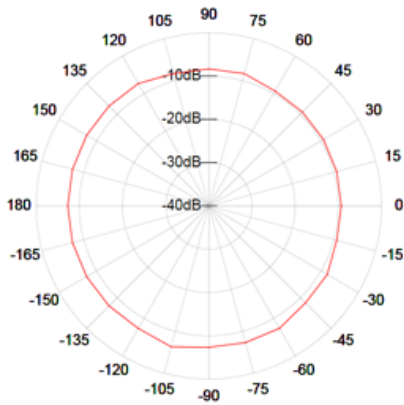
Frequency (Mhz): 2478
 Maximum Gain (dBi): -0.34
 Minimum Gain (dBi): -10.34
 Average Gain (dBi): -5.88

1. Orientation 2, Beacon - YZ

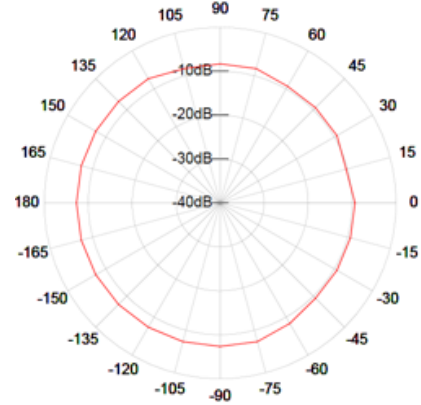
2.1 Antenna Polarity - H



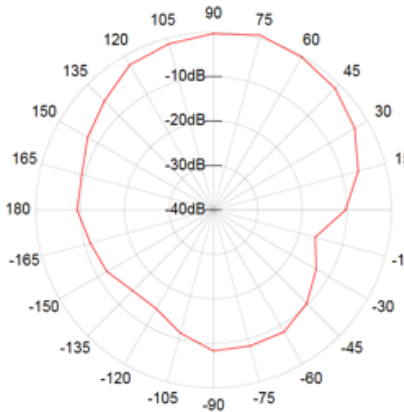
Frequency (Mhz): 2402
 Maximum Gain (dBi): -6.34
 Minimum Gain (dBi): -9.34
 Average Gain (dBi): -7.34



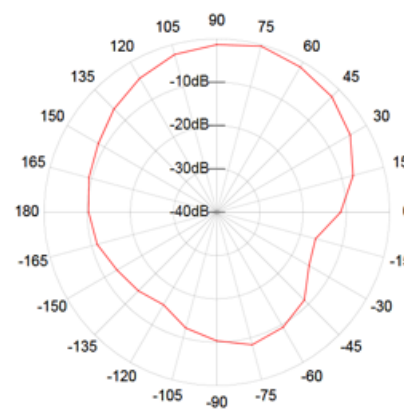
Frequency (Mhz): 2438
 Maximum Gain (dBi): -6.34
 Minimum Gain (dBi): -9.34
 Average Gain (dBi): -8.00



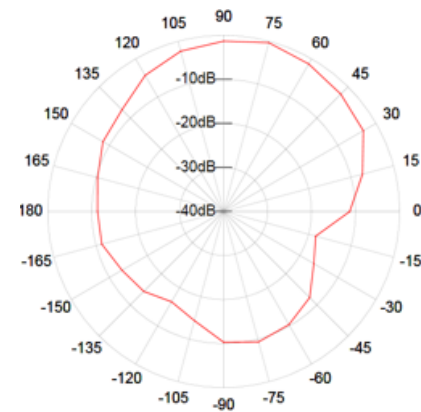
Frequency (Mhz): 2478
 Maximum Gain (dBi): -7.34
 Minimum Gain (dBi): -10.34
 Average Gain (dBi): -8.21



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



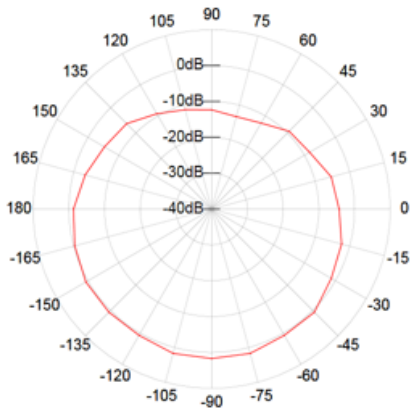
Frequency (Mhz): 2438
 Maximum Gain (dBi): -0.34
 Minimum Gain (dBi): -16.34
 Average Gain (dBi): -8.63



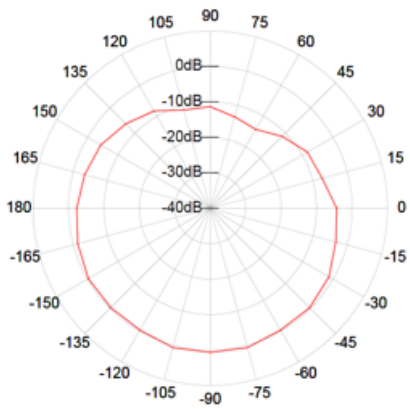
Frequency (Mhz): 2478
 Maximum Gain (dBi): -0.34
 Minimum Gain (dBi): -18.34
 Average Gain (dBi): -9.09

3. Orientation 3, Beacon - ZX

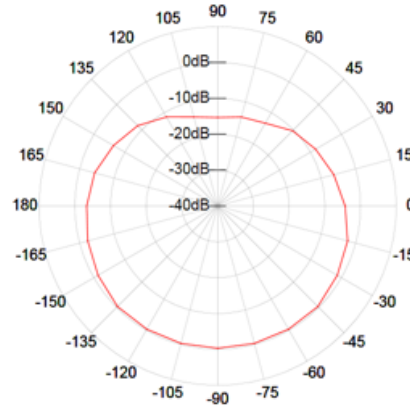
3.1 Antenna Polarity - H



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

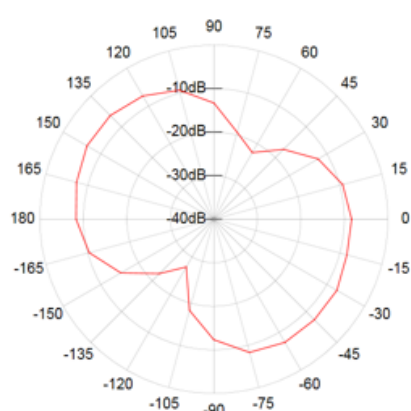


Frequency (Mhz): 2438
 Maximum Gain (dBi): -0.66
 Minimum Gain (dBi): -14.34
 Average Gain (dBi): -4.67



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

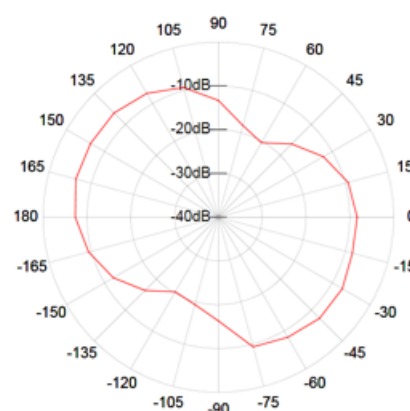
3.2 Antenna Polarity - V



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