APÉNDICE B
Dispositivos aplicables al caso de estudio.

A continuación se presentan algunos cuadros donde se detallan las especificaciones técnicas de algunos dispositivos que funcionan con el principio que se ha comentado a lo largo de estas páginas. Los dispositivos corresponden a diferentes marcas. Todos fueron diseñados para cumplir con el estándar IEEE 802.15.4

Specification	XBee	XBee-PRO
Performance		
Indoor/Urban Range	up to 100 ft. (30 m)	Up to 300' (100 m)
Outdoor RF line-of-sight Range	up to 300 ft. (100 m)	Up to 1 mile (1500 m)
Transmit Power Output (software selectable)	1mW (0 dBm)	60 mW (18 dBm) conducted, 100 mW (20 dBm) EIRP*
RF Data Rate	250,000 bps	250,000 bps
Serial Interface Data Rate (software selectable)	1200 - 115200 bps (non-standard baud rates also supported)	1200 - 115200 bps (non-standard baud rates also supported)
Receiver Sensitivity	-92 dBm (1% packet error rate)	-100 dBm (1% packet error rate)
Power Requirements		
Supply Voltage	2.8 – 3.4 V	2.8 – 3.4 V
Transmit Current (typical)	45mA (@ 3.3 V)	If PL=0 (10dBm): 137mA(@3.3V), 139mA(@3.0V) PL=1 (12dBm): 155mA (@3.3V), 153mA(@3.0V) PL=2 (14dBm): 170mA (@3.3V), 171mA(@3.0V) PL=3 (16dBm): 188mA (@3.3V), 195mA(@3.0V) PL=4 (18dBm): 215mA (@3.3V), 227mA(@3.0V)
Idle / Receive Current (typical)	50mA (@ 3.3 V)	55mA (@ 3.3 V)
Power-down Current	< 10 µA	< 10 µA
General		
Operating Frequency	ISM 2.4 GHz	ISM 2.4 GHz
Dimensions	0.960" x 1.087" (2.438cm x 2.761cm)	0.960" x 1.297" (2.438cm x 3.294cm)
Operating Temperature	-40 to 85º C (industrial)	-40 to 85º C (industrial)
Antenna Options	Integrated Whip, Chip or U.FL Connector	Integrated Whip, Chip or U.FL Connector
Networking & Security		
Supported Network Topologies	Point-to-point, Point-to-multipoint & Peer-to-peer	
Number of Channels (software selectable)	16 Direct Sequence Channels	12 Direct Sequence Channels
Addressing Options	PAN ID, Channel and Addresses	PAN ID, Channel and Addresses
Agency Approvals		
United States (FCC Part 15.247)	OUR-XBEE	OUR-XBEEPRO
Industry Canada (IC)	4214A XBEE	4214A XBEEPRO
Europe (CE)	ETSI	ETSI (Max. 10 dBm transmit power output)*
Japan	n/a	005NYCA0378 (Max. 10 dBm transmit power output)**

* When operating in Europe: XBee-PRO RF Modules must be configured to operate at a maximum transmit power output level of 10 dBm. The power output level is set using the PL command. The PL parameter must equal "0" (10 dBm).
Additionally, European regulations stipulate an EIRP power maximum of 12.86 dBm (19 mW) for the XBee-PRO and 12.11 dBm for the XBee when integrating high-gain antennas.

** When operating in Japan: Transmit power output is limited to 10 dBm. A special part number is required when ordering modules approved for use in Japan. Contact MaxStream for more information [call 1-801-765-9885 or send e-mails to sales@max-stream.net].

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Dispositivos aplicables al caso de estudio.

Features

- High Performance RF-CMOS 2.4 GHz Radio Transceiver Targeted for IEEE 802.15.4™, ZigBee®, 6LoWPAN, RF4CE, SP100, WirelessHART™ and ISM Applications
- Industry Leading Link Budget (104 dB):
  - Programmable Output Power from -17 dBm up to 3 dBm
  - Receiver Sensitivity -101 dBm
- Ultra-Low Power Consumption:
  - SLEEP: 20 nA
  - RX: 15.5 mA
  - TX: 16.5 mA (at max Transmit Power of 3 dBm)
- Ultra-Low Supply Voltage (1.8V to 3.6V) with Internal Regulator
- Optimized for Low BoM Cost and Ease of Production:
  - Few External Components Necessary (Crystal, Capacitors and Antenna)
- Excellent ESD Robustness
- Easy to Use Interface:
  - Registers and Frame Buffer Accessible through Fast SPI
  - Only Two Microcontroller GPIO Lines Necessary
  - One Interrupt Pin from Radio Transceiver
  - Clock Output with Prescaler from Radio Transceiver
- Radio Transceiver Features:
  - 128-byte SRAM for Data Buffering
  - Programmable Clock Output to Clock the Host Microcontroller or as Timer Reference
  - Integrated TX/RX Switch
  - Fully Integrated PLL with on-chip Loop Filter
  - Fast PLL Settling Time
  - Battery Monitor
  - Fast Power-Up Time < 1 ms
- Special IEEE 802.15.4-2003 Hardware Support:
  - FCS Computation
  - Clear Channel Assessment
  - Energy Detection / RSSI Computation
  - Automatic CSMA-CA
  - Automatic Frame Retransmission
  - Automatic Frame Acknowledgement
  - Automatic Address Filtering
- Industrial Temperature Range:
  - -40° C to 85° C
- I/O and Packages:
  - 32-pin Low-Profile QFN
  - RoHS/Fully Green
- Compliant to EN 300 328/440, FCC-CFR-47 Part 15, ARIB STD-66, RSS-210
- Compliant to IEEE 802.15.4-2003

AVR®

Low Power 2.4 GHz Transceiver for ZigBee, IEEE 802.15.4, 6LoWPAN, RF4CE and ISM Applications

AT86RF230

5131E-MCU Wireless-02/09

Awarepoint Sensor, Tags and Bridge

Awarepoint Sensor

Awarepoint Appliance (1RU)

Call now for an Awarepoint demonstration and a complimentary Return on Investment consultation.

Call 888-TAG-IT-NOW (888-824-4866) and you'll see for yourself how the Awarepoint Real-time Awareness Solution can make an immediate impact and improve patient safety, patient flow, clinical engineering and business processes - while at the same time prevent "missing" equipment, reduce equipment rental expense and increase equipment utilization.

Product specifications

System requirements

Basic IT infrastructure that supports a standard Ethernet network, and existing networked PCs that support standard Web browsers

Awarenet wireless mesh network

- IEEE 802.15.4 Standard
- ZigBee® based technology
- Operates in the 2400-2483.5 MHz (2.4 GHz) Industrial, Scientific and Medical Band (ISM), at 2.480 GHz
- FCC part 15C approved FC

Awarepoint Sensors

- Receive signals from Tags and from Awarenet to send data to the nearest Awarepoint Bridge
- Physical specifications
  - Size: 3.0 in. x 2.0 in. x 0.5 in.
  - Weight: 2 ounces
- Installation
  - Plugs into 120V AC electrical outlets
  - May be secured to outlet using industrial-strength adhesive
  - No Ethernet or IP address required
- Operational frequency
  - Utilizes 5 MHz bandwidth at 2.480 GHz frequency
  - Low duty cycle, transmissions last less than 5 ms
  - Data is cached from multiple devices before transmitting
  - Transmit power is 1mW (0dBm)
  - FCC part 15C approved FC
- Power
  - Integrated power supply
  - 120V AC 60 Hz (100mW)
- Environmental
  - Product safety TUV certified to UL 60950
  - Flame retardant plastic UL 94V-0

Awarepoint Bridges

- Connect the Awarenet wireless mesh network to the hospital's Ethernet network
- Physical specifications
  - Size: 6.0 in. x 4.0 in. x 1.0 in.
  - Weight: 6.4 ounces
- Installation:
  - Can be placed in a variety of locations, such as telecom closets or storage rooms
  - Standard 10Base-T/100Base-TX Ethernet connection
  - External power supply
  - Requires one static or dynamic (DHCP) IP address
  - Supports Power over Ethernet (IEEE 802.3af) or external power supply
- Network
  - 100 Kbps bandwidth at the server max
  - Data is cached from multiple devices before transmitting
  - FCC part 15C approved FC

Awarepoint Appliance

- Collects the Sensor data, calculates the location of Tags and displays the location of assets on any network-connected device
- Remotely monitored, updated and backed-up by Awarepoint
- One standard rack unit (1RU)
- LAN Connection
  - Requires Internet access
- Backup/continuous performance capabilities
  - Redundant power
  - Redundant hard drives
  - Redundant network interfaces

Awarepoint software

- Browser-based
- No seat licenses
- Map view or tabular display of asset searches
- SQL database
- Complete analytic tools and report generator (Infopoint™)

awarepoint

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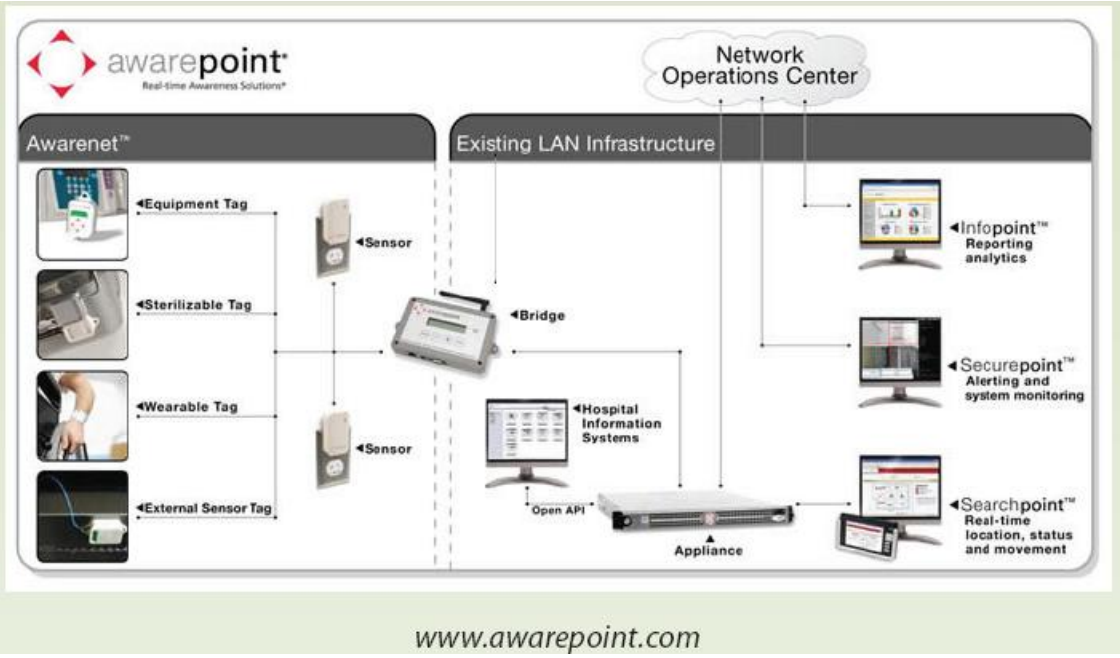
Dispositivos aplicables al caso de estudio.



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Dispositivos aplicables al caso de estudio.

PERVCOM CONSULTING
Real-Time Tracking and Sensing Solutions

PervTrack Devices

Low-cost Low-power IEEE 802.15.4 compliant 2.4 GHz Active Wireless Devices

PervTrack Device Specifications

Operating Voltage	2.8 to 3.6 Volts DC			
Current Requirement	Device Type	Transmit Current	Receive Current	Sleep Mode
	High Power	185 mA	32 mA	10 µA
	Low Power	32 mA	32 mA	10 µA
Power Options	3V DC and 220V AC adaptor jack			
RF Device Range	Device Type	Indoor Range	Outdoor Range	
	Low Power	30m	100m	
	High Power	160m	1600m	
Protocol Stack	IEEE 802.15.4			
Operating Frequency	2.4 GHz (16 channels)			
Operating Conditions	-10 to 60 °C 10 to 90% RH			

PervTrack Locator Tag:

Attached to an asset or carried by a person to track them accurately in real time.

Common Key Features:

- Several years of battery life
- Intelligent power management
- Choke-point detection capability
- Over The Air parameterization
- Multiple mounting options

LT-201

Features:

- Device dimension: 52 X 32 X 15 (mm) [smallest active tag for tracking people and asset]
- Remotely activated customizable LED signals

Typical applications:

token tag, asset tag

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PervTrack Localizer/ Router:

Placed at strategic locations, helps to identify the location of tagged objects within the tracking and monitoring zone, supports multi-hop communication of tag/ sensor data to remote monitoring station.

Common Key Features:

- Auto-configuration switch
- Customizable multicolor LED signals
- Provision for external serial interface to use GSM / GPRS

High Power or Low Power Indoor Localizer: L-20Hi / L-20Li	High Power or Low Power Outdoor Localizer: L-20Ho / L-20Lo
	
Features:	
Device dimension: 120 X 56 X 31 (mm)	• Device dimension: 127 X 75 X 45 (mm) • Provision for external power supply with battery backup • IP65 compliant • Multiple mounting options

PervTrack Gateway:	
G-201 	Enables Tags, Sensors and Localizers to form an IEEE 802.15.4-based mesh network enabling both-way data communication. It is connected to a host system to collect tag/ sensor data from remote monitoring zone. **Common Key Features:** • Device dimension: 140 X 62.7 X 30.5 (mm) • One reset switch • Customizable LED signals • Provision for external power supply with battery backup • Multiple mounting options