Z-BASE A020-2400
2.4 GHz/2.4 GHz Beacon for Z-MOBILE WSN and RTLS

GENERAL DESCRIPTION

Z-BASE A020-2400 is a beacon for the Z-MOBILE Real-Time Location System (RTLS), fully compliant with the Z-WSN Platform Specifications. It uses one interface based on the IEEE 802.15.4 Radio Frequency Standard working on the 2.4 GHz ISM band for tag communication and localization, and one interface based on the ZigBee Radio Frequency Standard working also on the 2.4 GHz band for communication network. The Z-BASE A020-2400 beacon is compliant with the Z-DCM data communication model. Z-BASE A020-2400 is therefore a high-performance location-aware wireless sensor network router in both indoor and outdoor environments.

KEY FEATURES

- 64 bits Unique ID (UID) for identification
- 4kB of EEPROM memory for custom data storage
- Robust and highly performing localization/positioning capability at the Cell-ID level for active asset tracking
- Full ZigBee meshed network for wireless communication
- Cryptographic Secure RF link for data integrity and protection
- 6V DC external power supply

Coexistence guaranteed with Wi-Fi IEEE 802.11b/g
- Fully compliant Z-WSN, standard and custom sensor modules available.

ADVANTAGES

- IEEE 802.15.4/ZigBee RF protocols for the best performances and robustness
- No specific infrastructure needed
- Fully compatible with the Z-TAG A020-2400 and the Z-TAG EX010 series

TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONDITIONS/SPECIFICATIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>500 mA_{min}</td>
<td>-40</td>
<td>0</td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>-</td>
<td>-40</td>
<td>0</td>
<td>12</td>
<td>°C</td>
</tr>
<tr>
<td>Antennas frequency range</td>
<td>2400</td>
<td>30</td>
<td>100</td>
<td>MHz</td>
<td></td>
</tr>
<tr>
<td>Z-RF-1 Output Power</td>
<td>At the antenna connector (50 Ω)</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>dBm</td>
</tr>
<tr>
<td>Z-RF-1 Link Range</td>
<td>Indoor</td>
<td>10</td>
<td>30</td>
<td>m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outdoor</td>
<td>30</td>
<td>100</td>
<td>m</td>
<td></td>
</tr>
<tr>
<td>Z-RF-2 Output Power</td>
<td>At the antenna connector (50 Ω)</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>dBm</td>
</tr>
<tr>
<td>Z-RF-2 Link Range</td>
<td>Indoor</td>
<td>20</td>
<td>50</td>
<td>m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Outdoor</td>
<td>50</td>
<td>150</td>
<td>m</td>
<td></td>
</tr>
<tr>
<td>Temperature sensor range</td>
<td>TA = 25 °C</td>
<td>-40</td>
<td>±1</td>
<td>±2</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>TA = 0 °C to 70 °C</td>
<td>-40</td>
<td>±1</td>
<td>±2</td>
<td>°C</td>
</tr>
<tr>
<td>Ambient light sensor</td>
<td>Spectral bandwidth</td>
<td>450</td>
<td>610</td>
<td>nm</td>
<td></td>
</tr>
<tr>
<td>Angle of half sensitivity</td>
<td>-</td>
<td>±60</td>
<td>-</td>
<td>deg</td>
<td></td>
</tr>
</tbody>
</table>

- Dimensions of the equipment with antennas at 90 deg angle: 63.5 mm x 95 mm x 156 mm
- Dimensions of the equipment with antennas at 180 deg angle: 63.5 mm x 30 mm x 311 mm
- Weight: 205 g for the BASE and 185 g for the GATE.
- Material of the enclosure: Aluminum
CERTIFICATION

The equipment is compliant with the following directives:

- Directive 1999/5/EC [R&TTE]
- Directive 2006/5/EC [LVD]
- Directive 2008/46/EC [Health and Safety]

According to the harmonized standards:

- ETSI EN 301 489-1 et ETSI EN 301 489-3 [EMC]
- ETSI EN 300440-1 et ETSI EN 300440-2 [R&TTE]
- IEC EN 60950-1 [LVD, SAFETY]

All of the electronic components are RoHS certified (2002/95/CE).

Z-GATE A020-2400

The Z-GATE A020-2400 is a specific Z-BASE beacon used as a ZigBee Coordinator and network gateway to a computer. Its characteristics are the same as the Z-BASE series without any sensor. Only one gateway is needed for each ZigBee subnetwork.

HARDWARE ARCHITECTURE

PHYSICAL DIMENSIONS (mm)
Z-TAG A020-2400
2.4 GHz Active Tag for Z-MOBILE WSN and RTLS

GENERAL DESCRIPTION

Z-TAG A020-2400 is a small active tag for the Z-MOBILE Real-Time Location System (RTLS).

It is fully compliant with the Z-WSN platform specifications and has one interface based on the IEEE 802.15.4 Radio Frequency Standard working on the 2.4 GHz ISM band.

Z-TAG A020-2400 contains two active sensors (an accelerometer and a temperature sensor) compliant with the Z-DCM data communication model. One button is accessible for the users to generate an alert when it is necessary.

KEY FEATURES

- 64 bits Unique ID (UID) for identification
- 4kB of EEPROM memory for custom data storage
- Robust and highly performing localization/positioning capability at the Cell-ID level for active asset tracking
- Cryptographic Secure RF link for data integrity and protection
- Motion Sensor Activated RF transmissions for optimized autonomy
- 3-axes ±1.5g accelerometer
- -40 °C to +125°C temperature sensor with ±1°C precision
- 950mAh, 3V Lithium cell power supply giving up to 3 years of autonomy based on application
- Battery level monitoring

ADVANTAGES

- Integration of three main traceability features (ACTIVE RFID, Localization/Positioning and Sensor Acquisition) in one package
- Low-power architecture design to guarantee high autonomy and low maintenance
- IEEE 802.15.4/ZigBee RF protocols for the best performances-consumption ratio
- Possibility to generate alerts
- DEADMAN/FALL detection feature

TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONDITIONS/SPECIFICATIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>Battery 950 mAh - Li/MnO2</td>
<td>2.7</td>
<td>3</td>
<td>3.6</td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>--</td>
<td>0</td>
<td>--</td>
<td>+70</td>
<td>°C</td>
</tr>
<tr>
<td>Antenna frequency range</td>
<td>--</td>
<td>2400</td>
<td>--</td>
<td>2500</td>
<td>MHz</td>
</tr>
<tr>
<td>RF Output Power</td>
<td>At the antenna connector (50 Ω)</td>
<td>0</td>
<td>--</td>
<td>--</td>
<td>dBm</td>
</tr>
<tr>
<td>RF Link Range</td>
<td>Indoor</td>
<td>30</td>
<td>--</td>
<td>--</td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>Outdoor</td>
<td></td>
<td>100</td>
<td>--</td>
<td>m</td>
</tr>
<tr>
<td>Accelerometer measurement range</td>
<td>--</td>
<td>-1.5</td>
<td>--</td>
<td>+1.5</td>
<td>g</td>
</tr>
<tr>
<td>Accelerometer bandwidth response</td>
<td>X and Y axis</td>
<td>--</td>
<td>400</td>
<td>--</td>
<td>Hz</td>
</tr>
<tr>
<td></td>
<td>Z axis</td>
<td>--</td>
<td>300</td>
<td>--</td>
<td>Hz</td>
</tr>
<tr>
<td>Temperature sensor range</td>
<td>--</td>
<td>-40</td>
<td>--</td>
<td>+125</td>
<td>°C</td>
</tr>
<tr>
<td>Temperature accuracy</td>
<td>TA = 25 °C</td>
<td>--</td>
<td>±1</td>
<td>--</td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>TA = 0 °C to 70 °C</td>
<td>-2</td>
<td>±1</td>
<td>+2</td>
<td>°C</td>
</tr>
</tbody>
</table>

- Dimensions of the equipment: 77 mm x 44 mm x 18 mm
- Weight (including battery): 40 g.
- Material of the enclosure: ABS.
### Autonomy

<table>
<thead>
<tr>
<th>Application</th>
<th>Duty Cycle</th>
<th>Autonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning/Tracking of personnel in hospitals and working sites (mobility = 8 hours per day)</td>
<td>2.40 %</td>
<td>Up to 1 year</td>
</tr>
<tr>
<td>Positioning/Tracking of mobile assets (mobility = 2 hours per day)</td>
<td>2.40 %</td>
<td>Up to 1 year</td>
</tr>
<tr>
<td>Low duty cycle tracking of personnel (mobility = 8 hours per day)</td>
<td>0.25 %</td>
<td>Up to 3 years</td>
</tr>
<tr>
<td>Intensive temperature monitoring of blood bags (mobility = 8 hours per day)</td>
<td>4.60 %</td>
<td>Up to 6 months</td>
</tr>
</tbody>
</table>

### Certification

The equipment is compliant with the following directives:

- Directive 1999/5/EC [R&TTE]
- Directive 2006/5/EC [LVD]
- Directive 2008/46/EC [Health and Safety]

According to the harmonized standards:

- ETSI EN 301 489-1 et ETSI EN 301 489-3 [EMC]
- ETSI EN 300440-1 et ETSI EN 300440-2 [R&TTE]
- IEC EN 60950-1 [LVD, SAFETY]

All of the electronic components are RoHS certified (2002/95/CE).

### Hardware Architecture

```
TEMPERATURE SENSOR
  |  ANALOG
  |______________________
  |                     |
  |       MCU           |
  |______________________
  |  SPI   |  SPI   |
  |         |         |
  |         |         |
  |  RF TRANSCEIVER    |
  |                     |
  |  LED               |
  |                     |
  |  PUSH BUTTON       |
```

### Physical Dimensions (mm)

![Physical Dimensions Diagram]
Z-TAG EX010
2.4 GHz Active Tag Certified ATEX for Z-MOBILE WSN and RTLS

GENERAL DESCRIPTION

Z-TAG EX010 is a small active tag for the Z-MOBILE Real-Time Location System (RTLS) certified to operate in an explosive atmosphere (ATEX) of category 3 and zone 2 (Ex nA IIC T6 -20°C ≤ Ta ≤ +60°C Gc).
It is fully compliant with the Z-WSN platform specifications and has one interface based on the IEEE 802.15.4 Radio Frequency Standard working on the 2.4 GHz ISM band.
Z-TAG EX010 contains two active sensors (one accelerometer and one temperature sensor) compliant with the Z-DCM data communication model. One button is accessible for the users to generate an alert when it is necessary.

KEY FEATURES

- 64 bits Unique ID (UID) for identification
- 4kB of EEPROM memory for custom data storage
- Robust and highly performing localization/positioning capability at the Cell-ID level for active asset tracking
- Cryptographic Secure RF link for data integrity and protection
- Motion Sensor Activated RF transmissions for optimized autonomy
- 3-axes ±1,5g accelerometer
- -40°C to +125°C temperature sensor with ±1°C precision
- 950mAh, 3V Lithium cell power supply giving up to 3 years of autonomy based on application
- Battery level monitoring

ADVANTAGES

- Integration of three main traceability features (ACTIVE RFID, Localization/Positioning and Sensor Acquisition) in one package
- Low-power architecture design to guarantee high autonomy and low maintenance
- IEEE 802.15.4/ZigBee RF protocols for the best performances-consumption ratio
- ATEX certification for category 3 and zone 2
- Possibility to generate alerts
- DEADMAN/FALL detection feature

TYPICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONDITIONS/SPECIFICATIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>Two Batteries of 1,7 V – Li/FeS₂</td>
<td>2.7</td>
<td>3</td>
<td>3.6</td>
<td>V</td>
</tr>
<tr>
<td>Operating temperature</td>
<td></td>
<td>-20</td>
<td></td>
<td>+60</td>
<td>°C</td>
</tr>
<tr>
<td>Antenna frequency range</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF Output Power</td>
<td>At the antenna connector (50 Ω)</td>
<td>0</td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>RF Link Range</td>
<td>Indoor</td>
<td>30</td>
<td></td>
<td></td>
<td>m</td>
</tr>
<tr>
<td></td>
<td>Outdoor</td>
<td>100</td>
<td></td>
<td></td>
<td>m</td>
</tr>
<tr>
<td>Accelerometer measurement range</td>
<td></td>
<td>-1.5</td>
<td></td>
<td>+1.5</td>
<td>g</td>
</tr>
<tr>
<td>Accelerometer bandwidth response</td>
<td>X and Y axis</td>
<td>400</td>
<td></td>
<td></td>
<td>Hz</td>
</tr>
<tr>
<td></td>
<td>Z axis</td>
<td>300</td>
<td></td>
<td></td>
<td>Hz</td>
</tr>
<tr>
<td>Temperature sensor range</td>
<td></td>
<td>-40</td>
<td></td>
<td>+150</td>
<td>°C</td>
</tr>
<tr>
<td>Temperature accuracy</td>
<td>TA = 25 °C</td>
<td>±1</td>
<td></td>
<td></td>
<td>°C</td>
</tr>
<tr>
<td></td>
<td>TA = -40 °C to +125 °C</td>
<td>-2</td>
<td>±1</td>
<td>+4</td>
<td>°C</td>
</tr>
</tbody>
</table>

The Z-TAG EX010 is usable in normal air pressure conditions.

- Dimensions of the equipment with the antenna: 110 mm x 55 mm x 25 mm.
- Weight (including batteries): 130 g.
- Material of the enclosure: Anodized aluminum.
- Protection degree: IP54.
### Autonomy

<table>
<thead>
<tr>
<th>Application</th>
<th>Duty Cycle</th>
<th>Autonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positioning/Tracking of personnel in working sites (mobility = 8 hours per day)</td>
<td>2.40 %</td>
<td>Up to 1 year</td>
</tr>
<tr>
<td>Positioning/Tacking of mobile assets (mobility = 2 hours per day)</td>
<td>2.40 %</td>
<td>Up to 3 year</td>
</tr>
<tr>
<td>Low duty cycle tracking of personnel (mobility = 2 hours per day)</td>
<td>0.25 %</td>
<td>Up to 10 years</td>
</tr>
</tbody>
</table>

### Certifications

The equipment is compliant with the following directives:

- Directive 1999/5/EC [R&TTE]
- Directive 2006/5/EC [LVD]
- Directive 2008/46/EC [Health and Safety]

According to the standards:
- ETSI EN 301 489-1 et ETSI EN 301 489-3 [EMC]
- ETSI EN 300440-1 et ETSI EN 300440-2 [R&TTE]

All of the electronic components are RoHS certified.

### Hardware Architecture

![Hardware Architecture Diagram]

### Physical Dimensions (mm)

![Physical Dimensions Diagram]
GENERAL DESCRIPTION

Z-MOBILE is a ZigBee Wireless Sensor Network (WSN) with Real-Time Localization (RTLS) capability (*). It implements the Z-RF-COM link based on ZigBee Radio Frequency Standard working on the 2.4 GHz ISM band for communication network. Z-MOBILE is fully compliant with the Z-DCM data communication model. Any ZigBee compliant device can be connected to the Z-MOBILE WSN system for raw data monitoring. If the Z-DCM Data Communication Model is implemented, ZigBee devices can be fully integrated into the Z-MOBILE WSN. Z-MOBILE is therefore a high-performance location-aware wireless sensor network for both indoor and outdoor environments. Any tag implementing the Z-RF-POS link specification can be connected and localized in the Z-MOBILE WSN.

KEY FEATURES

- 64 bits Unique ID for identification
- Up to 50m/100m RF/wireless link range in indoor/outdoor environments with Z-BASE
- Full ZigBee meshed network for wireless communication
- Up to 30m/50m for RF/wireless link range in indoor/outdoor environments with Z-TAG
- Cryptographic Secure RF link for data integrity and protection
- Coexistence guaranteed with WiFi IEEE 802.11b/g
- Robust and highly performing localization/positioning capability at the Cell-ID level for active asset tracking
- Integrated Z-RF-COM and Z-RF-POS quality management tools
- Integrated self-test and diagnostic infrastructure tools

(*) see the Z-MOBILE Real Time Location data sheet for more information.

ADVANTAGES

- The Z-RF-COM link specification integrates full ZigBee mesh network protocols for wireless sensor network security and availability
- Low level compatibility with any ZigBee Device
- No specific infrastructure needed
- User friendly and efficient deployment tools

CERTIFICATIONS

- ETSI EN 300 440 (RF)
- ETSI EN 301 489-1 and -3 (EMC)
- IEC EN 60950-1 (Safety)

MAIN APPLICATIONS

Z-MOBILE is suitable for applications like:

- Active asset tracking/positioning in hospitals and manufacturing sites
- Pallets localization for warehouse management/logistics
- Car positioning in large parking lots
- Intelligent textile data management and localization
- Audiometric data management and localization

DATA COMMUNICATION MODEL (Z-DCM)

The Z-DCM data communication model is an open framework for any ZigBee device integration into the Z-MOBILE WSN system, and for any transceivers implementing the Z-RF-POS link specification. It manages, for instance:

- Positioning Data (*)
- Tags battery level
- Temperature
- Resistivity
TYPICAL CHARACTERISTICS AND PERFORMANCES

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF-LINK-COM Frequency Range</td>
<td></td>
<td>2400</td>
<td>2483.5</td>
<td>M Hz</td>
<td></td>
</tr>
<tr>
<td>RF-LINK COM Link Range Indoor</td>
<td></td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>m</td>
</tr>
<tr>
<td>RF-LINK COM Link Range Outdoor</td>
<td></td>
<td>50</td>
<td>100</td>
<td>100</td>
<td>m</td>
</tr>
<tr>
<td>Number of Sub Networks</td>
<td></td>
<td>-</td>
<td>-</td>
<td>65536</td>
<td>-</td>
</tr>
<tr>
<td>Number of Network Hops</td>
<td></td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>Number of Nodes (Beacons)</td>
<td></td>
<td>-</td>
<td>-</td>
<td>65536</td>
<td>-</td>
</tr>
<tr>
<td>Data Rate</td>
<td></td>
<td>-</td>
<td>-</td>
<td>250</td>
<td>kbps</td>
</tr>
</tbody>
</table>

| RF-LINK-POS Frequency Range       |            | 2400 | 2483.5 | M Hz |
| RF-LINK-POS Link Range Indoor     |            | 15  | 30   | 100  | m    |
| RF-LINK-POS Link Range Outdoor    |            | 30  | 100  | 100  | m    |
| Number of Tags per Network        | Emission 1 data per 2 seconds | 50  | 100  | 200  | -    |
| Emission 1 data per minute        | 250         | 500 | 1000 | -    | -    |

TABLE 1. TYPICAL CHARACTERISTICS AND PERFORMANCES

MIDDLEWARE

Z-MOBILE is delivered with whole software for WSN data management. You access timestamped data through a simple API.

The Z-MOBILE System Software is WIN 32 compliant.

The Z-MOBILE middleware is composed of:

- Bundle of WIN32 APIs
- Data fusion and position engine
- SQL database
- Configuration and management tools
- Deployment tools

DEPLOYMENT

Z-MOBILE is delivered with user friendly tools for deployment:

- Building maps are managed (wall, partition and their texture concrete, wood, plaster, etc...) in XML format.
- Tools are based on a proprietary RF propagation model that predicts the quality of Z-MOBILE WSN and RTLS, and give help for optimization.
- Deployment tools are delivered as a library to be integrated with users' applications.

Z-MOBILE WSN COMPATIBILITY FLOW CHART

Z-MOBILE A015-24-24

Z-GATE A015-24

Z-BASE A015-24-24

Z-BASE A015-24-xx

Z-TAG A015-2400

IEEE 802.15.4 2.4 GHz Device

WSN/RTLS

Compatible with (with/without Z-DCM)
Z-MOBILE RTLS is a Real-Time Location System (RTLS) compliant with the Z-MOBILE Wireless Sensor Network (*)

Z-MOBILE RTLS offers a robust and performing localization/positioning capability at the Cell-ID level for active asset tracking (people or objects).

Z-MOBILE provides you with a position up to every two seconds and allows you to access the history of position through a very user friendly engine API.

Z-TAG can be localized by cell-ID. Any tag implementing the Z-RF-POS link specification can be connected and localized in the Z-MOBILE WSN.

Z-MOBILE RTLS could be used in stand-alone for tracking and positioning but it becomes extremely efficient when used together with data management provided by sensors installed on your Z-TAG.

**KEY FEATURES**

- No calibration for your environment
- Multi-Floor positioning available
- Cells definition for positioning fully customizable
- Accuracy by cells fully customizable
- Deployment tools help you to optimize and prepare the beacon deployment according to accuracy requirements. “On site” deployment time is reduced to power supply connection
- Period of localization for tracking or positioning is user customizable
- Localizations are delivered with a very accurate and useful confidence level
- Cryptographic Secure RF link for data integrity and protection
- Coexistence guaranteed with WiFi IEEE 802.11b/g

(*) see the Z-MOBILE Wireless Sensor Network data sheet for more information).

**ADVANTAGES**

- No impact of furniture moving
- No complementary infrastructure needed
- Deployment time reduced
- RTLS compliant with any device implementing Z-DCM
- User Friendly and efficient deployment tools

**CERTIFICATIONS**

- ETSI EN 300 440 (RF)
- ETSI EN 301 489-1 and -3 (EMC)
- IEC EN 60950-1 (Safety)

**MAIN APPLICATION**

Z-MOBILE is suitable for applications like:

- Active asset tracking/positioning in hospitals
- Active asset tracking/positioning in manufacturing sites
- Pallets localization for warehouse management/logistics
- Car positioning in large parking lots
- Intelligent textile data management and localization
- Audiometric data management and localization
- Robot tracking for warehouse
### TYPICAL CHARACTERISTICS AND PERFORMANCES

<table>
<thead>
<tr>
<th>FEATURES</th>
<th>CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cells Size</td>
<td>Rooms</td>
<td>1x1</td>
<td>4x4</td>
<td>30x30</td>
<td>m</td>
</tr>
<tr>
<td>Cells Size</td>
<td>Open Space</td>
<td>3x3</td>
<td>5x5</td>
<td>30x30</td>
<td>m</td>
</tr>
<tr>
<td>Cells OverLap</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>mHz</td>
</tr>
<tr>
<td>Number of Cells</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>65536</td>
<td>-</td>
</tr>
<tr>
<td>Cells Location</td>
<td>85%</td>
<td>95%</td>
<td>100%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Beacons by Cells</td>
<td>Indoor</td>
<td>2</td>
<td>1,5</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Tags by NetWork</td>
<td>Emission 1 data</td>
<td>50</td>
<td>100</td>
<td>200</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>by 2 seconds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Emission 1 data</td>
<td>250</td>
<td>500</td>
<td>1000</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>by minute</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TABLE 1. TYPICAL CHARACTERISTICS AND PERFORMANCES**

### MIDDLEWARE

Z-MOBILE is delivered with the whole software for WSN data management. You access timestamped data through a simple API.

Z-MOBILE system software is WIN 32 compliant.

Z-MOBILE middleware is composed of:

- Bundle of WIN32 APIs
- Data fusion and position engine
- SQL Data Base
- Configuration and management tools
- Deployment tools

### DEPLOYMENT

Z-MOBILE is delivered with user-friendly tools for deployment:

- Building maps are managed (wall, partition and their texture concrete, wood, plaster, etc…) in XML format
- Tools are based on a proprietary RF propagation model that predicts the quality of Z-MOBILE WSN and RTLS, and give room for optimization
- Deployment tools are delivered as a library to be integrated with users’ applications

### Z-MOBILE WSN COMPATIBILITY FLOW CHART

Z-MOBILE is compatible with (with/without Z-DCM)

Compatible with (with/without Z-DCM)