EM9201 and EM6819 Based Reference Design for 2.45 ISM Band Low Power Wireless Network

This reference design utilizes the fully integrated, low power 2.45GHz transceiver EM9201 and the low power microcontroller EM6819 to create a low cost wireless network optimized for prolonged battery lifetime of the peripheral nodes. The network has a star topology, with the central node represented by a PC with a USB dongle, and up to 6 peripheral nodes powered by a CR2032 battery. The design comes with a purpose developed communication stack that was optimized to minimize the current consumption on the peripheral nodes. The communication protocol features frequency hopping, and connection oriented and connectionless data transfer. The parameters of individual connections can be optimized with great variability to achieve the optimal tradeoff between the data rate and current consumption. The reference design also comes with a demonstration application that illustrates basic network operations, and provides tools for visualization of measured data.

Parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>&gt;100m</td>
<td>free space</td>
</tr>
<tr>
<td>Battery lifetime</td>
<td>up to 5 years</td>
<td>minimal data rate</td>
</tr>
<tr>
<td>Number of peripheral nodes</td>
<td>6</td>
<td>may be increased in near future</td>
</tr>
<tr>
<td>Maximal data rate</td>
<td>60kbps</td>
<td></td>
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Typical applications:

- Remote sensing in general
- Wireless mouse, keyboard etc.
- Wireless sensors in watches
- Wireless sports equipment
- Alarm and security systems

Peripheral Node

EM6819 - an MCU designed to be battery operated for extended lifetime applications

EM9201 - fully integrated, low power 2.45GHz transceiver

Printed antenna designed for 2.45GHz ISM band

USB Dongle

LNA and PA Block

USB Interface

Demonstration Application

Illustrates basic network operations and provides data visualization tools.

![Demonstration Application](image)