Visible Assets, Inc.

RuBee™ Visibility Networks
IEEE P1902.1 (Pending)

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## The Technology

<table>
<thead>
<tr>
<th>Standard</th>
<th>WiFi 802.11</th>
<th>ZigBee 802.15.4</th>
<th>Bluetooth 802.15.1</th>
<th>RuBee P1902.1</th>
<th>RFID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application</td>
<td>Voice</td>
<td>Monitor</td>
<td>Cable</td>
<td>Visibility</td>
<td>Tracking</td>
</tr>
<tr>
<td>Data</td>
<td>1 MB +</td>
<td>4 - 32 KB</td>
<td>250 KB</td>
<td>5 KB</td>
<td>0.1 KB</td>
</tr>
<tr>
<td>Battery Days</td>
<td>.5 - 1</td>
<td>10 - 100</td>
<td>1 - 7</td>
<td>4,000</td>
<td>NA</td>
</tr>
<tr>
<td>Bandwidth KB/s</td>
<td>11,000</td>
<td>20 - 150</td>
<td>720</td>
<td>1 + Clip</td>
<td>100</td>
</tr>
<tr>
<td>Net Size</td>
<td>32</td>
<td>No-limit</td>
<td>7</td>
<td>No Limit</td>
<td>48</td>
</tr>
<tr>
<td>Range M</td>
<td>1 - 300</td>
<td>1 - 100</td>
<td>1 - 10</td>
<td>1 - 30</td>
<td>1 - 5</td>
</tr>
<tr>
<td>Security</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Base $</td>
<td>$60 - $500</td>
<td>$100 - $500</td>
<td>$50</td>
<td>$1 - $200</td>
<td>$500 - $1,500</td>
</tr>
<tr>
<td>Node $</td>
<td>$15 - $50</td>
<td>$15 - $50</td>
<td>$50</td>
<td>$0.1 - $10</td>
<td>$0.05 - $4</td>
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</tbody>
</table>
RFID
Transponder Passive/Active Backscattered Non Radiating

Base Station

Hello 23

Carrier

Reflection

Hi Base I am Here

Tag

Tag 23
Maxwell's Equations

\[ \nabla \cdot \vec{E} = \frac{\rho}{\varepsilon_0} \] (Gauss' Law - electrostatics)

\[ \nabla \cdot \vec{B} = 0 \] (Gauss' Law - magnetostatics)

\[ \nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t} \] (Faraday's Law)

\[ \nabla \times \vec{B} = \mu_0 \vec{J} + \mu_0 \varepsilon_0 \frac{\partial \vec{E}}{\partial t} \] (Ampère-Maxwell Law)
RuBee

131 KHz Battery + Crystal

Base Station

Transmit TX  Hello 23  Receive RX

Tag

Tag 23
RuBee

131 KHz TCP/IP IPv6 Protocol
IEEE P1902.1 – Pending

“WiFi, Ziggbee, Bluetooth”
802.11 abgd, 802.15.4
RuBee
Peer to Peer

Hey Wake Up
Base – I’m Sick
Need Help SOS SOS
The RuBee Tags

Form Factors

Rubee Smart Tags
2mm - 0.78mm thick
The RuBee Tags

The Data

<table>
<thead>
<tr>
<th>Tag IP</th>
<th>11.11.11.00</th>
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</thead>
<tbody>
<tr>
<td>Tag Subnet</td>
<td>11.11.11.1</td>
</tr>
<tr>
<td>MAC:</td>
<td>77-AC-D8-9A-99-AC</td>
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<tr>
<td>Object Name</td>
<td>Hip 23678</td>
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<tr>
<td>Size</td>
<td>23mm x 18mm</td>
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<tr>
<td>Birthdate</td>
<td>11/23/2004</td>
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<tr>
<td>Expirydate</td>
<td>11/2007</td>
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<tr>
<td>Manf. Site</td>
<td>Ireland</td>
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<tr>
<td>Manufacture</td>
<td>Medco</td>
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<tr>
<td>CRC</td>
<td>34567</td>
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</tbody>
</table>
RuBee
Selective Encrypted Security

Rijndael (AES), LZW, Eliptic, PGP, TWOFISH, BLOWISH, CAST, MARS, TEA

Single Use Key or OTP
The RuBee Tags
Sensors + Temperature Data Logs
RuBee Routers and Dot-Tag Servers
Safety

RuBee Max Field Strength

\[ E = 40 \text{ nanowatts} \]

\[ B = 800 \text{ milligauss} \]
OSHA Specific Absorption Rate

IEEE C95.1 Absorbed power in Watts/kg

SAR vs. Frequency

Normalized specific absorption rate (W/kg per W/m²)

131Khz

Subresonance range
Whole body
Partial body (head)
Hot spot range
Surface absorption range

SAR vs. Frequency

Visible™
Rubee P1902.1 Summary

✓ Long Battery Life
✓ Long Range
✓ Volumetric Reads
✓ Noise Immunity
✓ Liquid Immunity
✓ Steel Friendly
✓ High Security
✓ High Safety
✓ Competitive Costs