visible®

Laptop Security and Visibility Network
Laptop 20/20

An IEEE 1902.1 "RuBee" Network,
Providing real-time events and asset visibility.

Visible Assets, Inc. (A US Based Company)
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1 Introduction

This document describes a laptop security and visibility network, based on RuBee, a IEEE international wireless standard (IEEE 1902.1). RuBee has unparalleled ability to work in harsh environments and can successfully communicate through and around metal, liquids, and people. RuBee also virtually eliminates tempest, target, and eavesdropping threats that are a serious issue with other wireless technologies (e.g. RFID, Wi-Fi, Bluetooth, and ZigBee). RuBee wireless systems have been approved for use in armories and at some of the most secure US government locations where all other wireless technologies are banned.

RuBee is an alternative to many other wireless technologies and was designed from the ground up for visibility networks. RuBee is particularly suited to working in "harsh" environments near metal/water/people. RuBee systems provide high read accuracy in these environments without opening up the facility to wireless security risks.

The basic laptop security system consists of several key components:

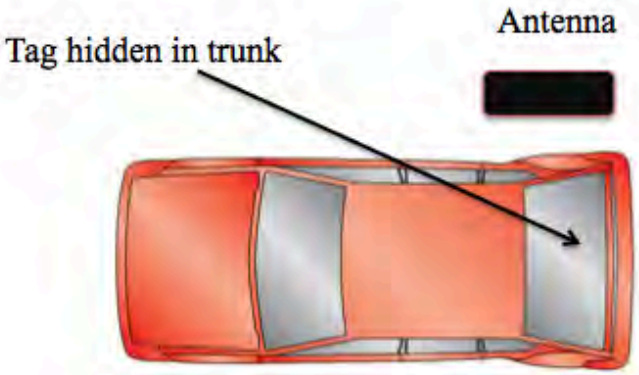
1. Security Pad Tags – attached to bottom on any laptop as pads or other assets.
2. Muster Stations -- placed at exit /entries and reads IDs and laptops as they pass by a location.
3. Laptop Vaults - optional secure storage racks for laptops, with full real-time visibility.
4. Dot-Tag Oracle Visibility Engine – real-time control of "2" and "3"
5. Optional 20/20 Oracle application modules.

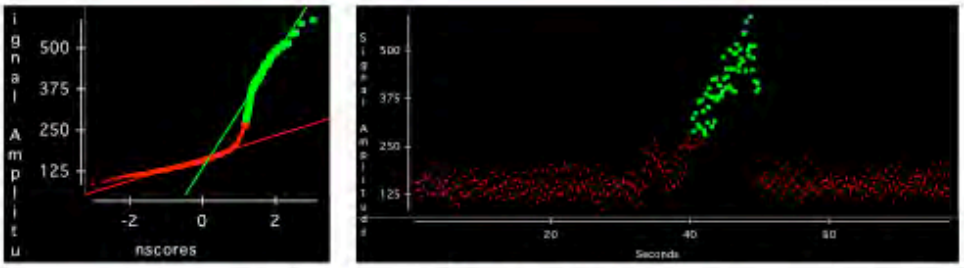
A 20/20 application reads the database contained in the Dot-Tag Visibility engine. The Dot-Tag Visibility Engine is a networked, thin-client, middleware system that manages all real-time functions within all RuBee Appliances and enables two-way communication with tags and tagged assets via a Visibility Infrastructure. A single Dot Tag Visibility Engine can manage up to 100 storage locations, with 20 RuBee laptop storage racks multiplexed in each location. The information from those storage facilities can be available to the user anywhere in the world that is reachable over the network. Dot Tag keeps a full event record of all activities, which can optionally be expanded to include the generation of DoD 5015.2-compliant audit trails.

1.1 How Laptop 20/20 Works

Laptop 20/20 retrofits RuBee tags onto each laptop and uses several optional RuBee appliances to read tags manage Laptop security. We have optional checkin checkout security laptop vaults (see below). Muster Stations placed a doors in halls to detect exit entry events. RuBee reads through steel and people so can be difficult to take un authorized equipment outside of permitted zones or areas.

Muster Stations provide a volumetric read through people and metal of up to four tags, including an ID card on neck lanyard, or in wallet, as a person walks by at normal walking speed. Detection of an asset is possible, even it it is wrapped in aluminum foil or in a steel brief case.

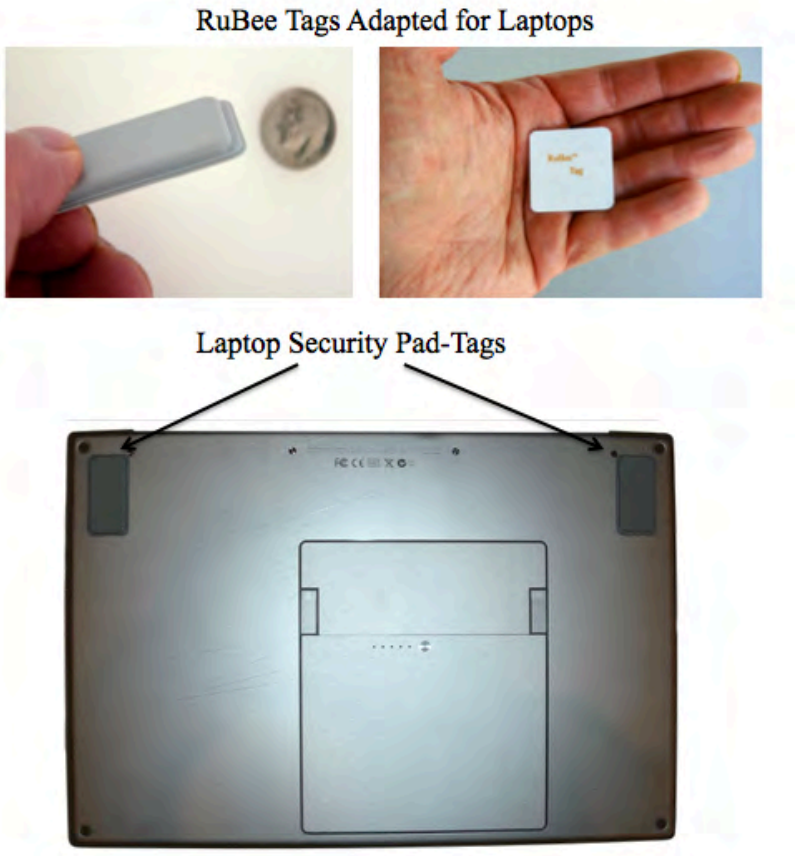




RuBee uses magnetic signals not RF to read tags, and as a result RuBee is not blocked by steel. The graph above right shows time in seconds vs signal strength as a car is driven by a RuBee antenna at about 6 mph, with a tag hidden in the trunk. Green indicates signal that is at least 1.7 std above noise (detectable) nscores graph of signal is shown above on left used to isolate signal on right (green).

2 Laptop Security Pad Tags

Visible has several form factors for security tags that will work on a laptop. Figure 1 shows standard tags now used by Department of Energy for cell phone detection.



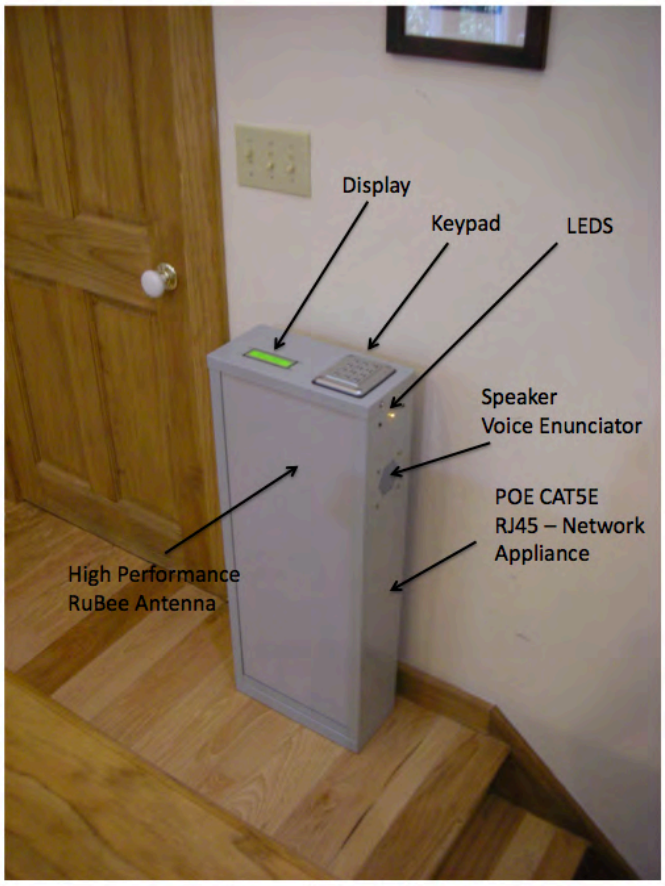
These wireless tags can be affixed to the laptops as pads on the base, and communicate wirelessly with any RuBee network

RuBee tags may be simple identity tags with only an IP address, or can have tiny four bit processor with 500 bytes to 5,000 bytes of static memory, optional sensors (shock, temperature), signal processing firmware, displays and buttons. Battery life is extended because RuBee operates at a low frequency and because all systems components are optimized for low power consumption. We have field proven life of over 20 years on a coin size CR2525 Li battery, typical life using smaller coin batteries is five years. Range can be from less than an inch to over 15 feet, and RuBee antennas are volumetric, not line-of-sight

3 RuBee Appliances

RuBee appliances read and write to RuBee tags within a RuBee network. Smart Shelves, Weapons Racks, Muster Stations, Key Vaults, and Laptop Vaults are all example RuBee Appliances. The Dot-Tag Visibility Engine maintains and supports networks of RuBee Appliances.

3.1 RuBee Muster Station



RuBee Muster Station

A RuBee Muster Station, shown in Figure 2, is a general purpose read/ write portal that can be placed on a wall in hallway, near a door, or exit. The Muster Station has an optional keypad and display, with voice enunciator to manage standard exit entry ID functions. The units also have an optional motion detector, or video camera. The Muster Station is a RuBee Network appliance with optional POE and a single Cat5e RJ45 connector. Units are all weather hardened and may be located indoors or

outdoors. Muster Stations may simply report when an ID and asset moves by the Station, or can be used for access control as well as high security ID and asset control. Muster Stations use a RuBee Volumetric RPM antenna. That means it can read a tag in a wallet, or a laptop in a brief case, or a laptop in an aluminum case.

3.2 Dot-Tag Network of Muster Stations

A single Dot-Tag Server can maintain 100's of Muster Stations within a networked facility. The 20/20 application reads the database within the Dot-Tag Server and provides real time reports for laptops and people who pass by a Muster Station.

Oracle Dot Tag Server – manages 100's of Muster Stations within a facility. Provides real time sense and respond alarms and events, as well as DOD 1502.15 compliant audit trails

3.3 RuBee Laptop Vault Applinace

The RuBee-based system at the heart of Dot Tag Laptop and Server Storage provides flexible options for access control, including wireless ID cards and integrated Personal Identification Numbers (PIN). Users enter a PIN number on the keypad and the Laptop Vault pings the ID card in users wallet to verify ID and identity. At that time, an electronic lock opens the correct compartment to allow access to the laptop. Optional LED indicators are available to give visual feedback on access and presence/absence of individual items.

User enters PIN number on keypad, Laptop Vault, pings tag contained in wallet. If two match laptop assigned to that ID opens door or flashes LED. All details date time recorded in log. User does not have to remove wallet, no process change, other than enter PIN number.

Users are assigned a RuBee ID card, a user PIN, and the storage cases are equipped with keypads. The ID cards may be integrated with existing ID card functionality including magnetic stripe reading. With these components, access may be controlled by requiring the presence of the User ID tag, doubly validated by the entry of the correct PIN code for that user. Because RuBee wireless signals are not affected by metal or water, the card can be carried in a wallet or around a neck lanyard – it does not need to be taken out in order for the system to operate.

3.3.1 RuBee Non-Power Storage Vault Solution

If Laptops do not require powering or networking and physical presence/security is the only requirement, we have a 2 Compartment or 3-Compartment inserts. These can be inserted into any one of our tambour door cabinets. Each compartment can be keyed differently or alike with a master key as an option, and electronic locks maybe optionally added. Storage can include laptops, tablets, digital cameras, and many other sensitive items.

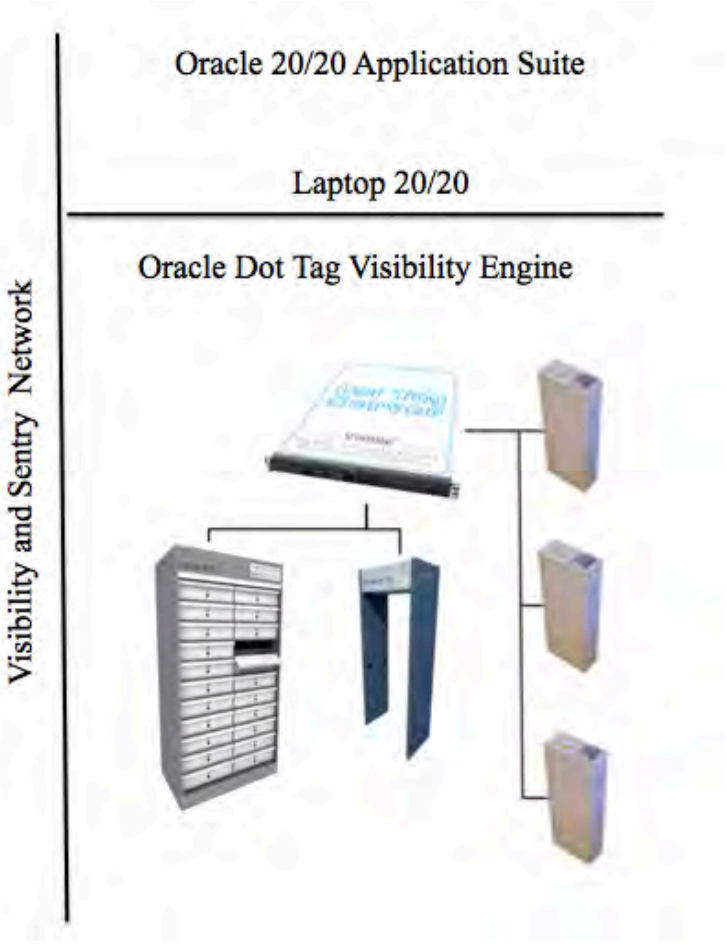
Compartment Inserts with RuBee Visibility in Vault


3.3.2 RuBee Power Storage Vault Solution

If Laptops require charging or networking during storage period then the following Visible Laptop Storage Cabinets are a more fully functional solution. Our Tambour Door cabinets are powered and are designed with vents, power bars, exhaust fans, and cable management. They come complete with all steel bi-parting tambour door, keylock & 2 keys, 9 outlet power bar with surge protection, louvered sided, vented top, (4) cable grommet holes, all steel-welded unit, and standard finish.

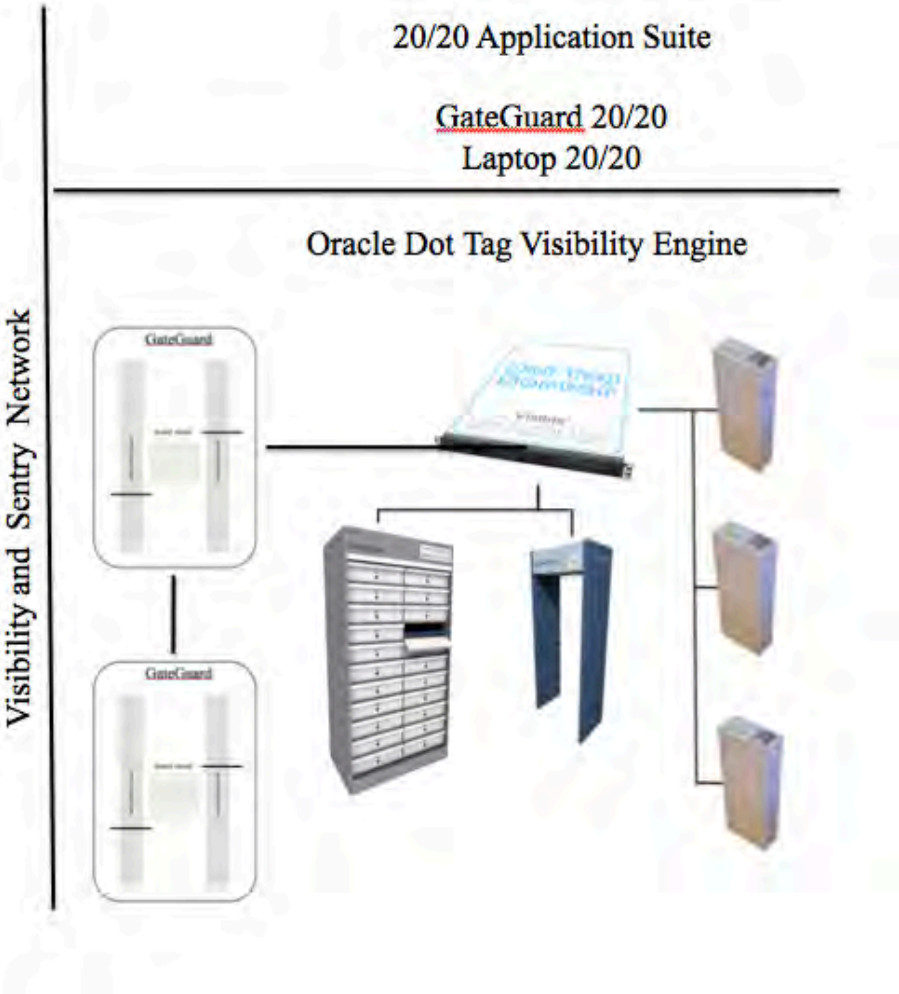

"Single Wide" version Laptop Cabinet. Side Panels have louvered vents and the top panel is perforated for warm air escape. Convenient cable management holes are located in both side panels for Network hook-up of Laptops and switches. Cabinets come complete with our unique all steel bi-parting Tambour Door and keylock. Choose any combination from 2 styles of Laptop Roll-out shelves and a Roll-out storage drawer. ½" increment adjustment is standard. O.D. 64" H x 25"W x 24"D.

3.4 RuBee Laptop Visibility Functions and Features



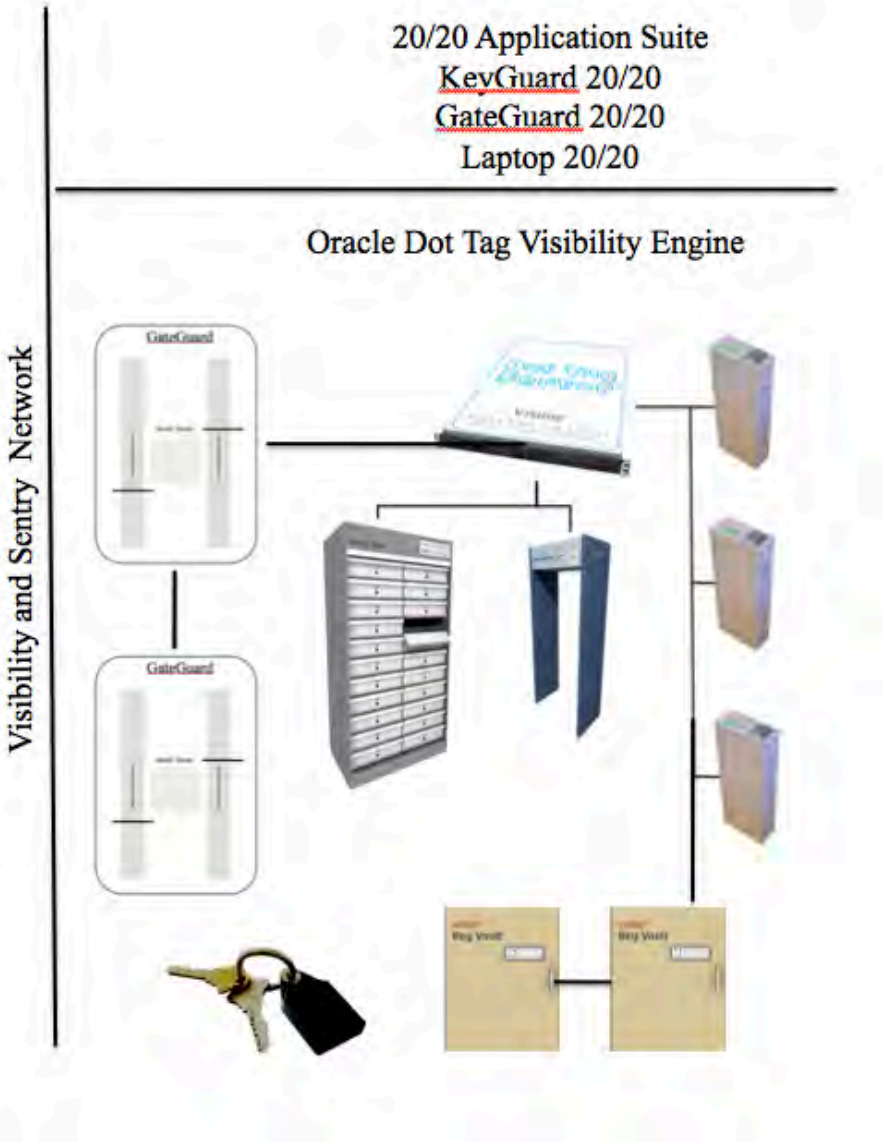
Oracle Dot-Tag and 20/20 applications mange all RuBee applainces once connected to the network. We provide Visibility functions that include real-time physical inventory and audit trials of asstes on racks and shelves. We provide “sentry” functions as a 24 hour guard for events, alarms and other functions that ar not pemitted (e.g missing laptop, wrong laptop with ID).

3.5 RuBee Laptop Visibility Networks Expand with GateGuard



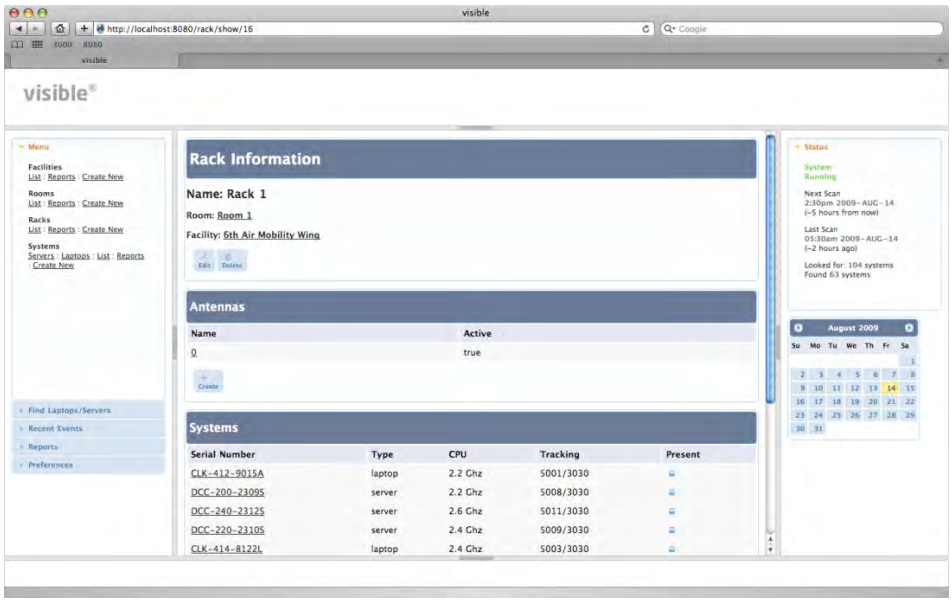
GateGuard is an outdoor system for control of vehicles entry exit. GateGuard can detect any RuBee tag inside of a vehicle entering or leaving the premises. GateGuard operates as another RuBee appliance that plugs into the existing network. The GateGuard Appliance uses a large loop antenna buried under the road, with several auxiliary antennas on the side of a vehicle. It can read ID cards inside a vehicle, and detect RuBee tagged assets, even if they are hidden in the engine block, tire well or other spots in the vehicle.

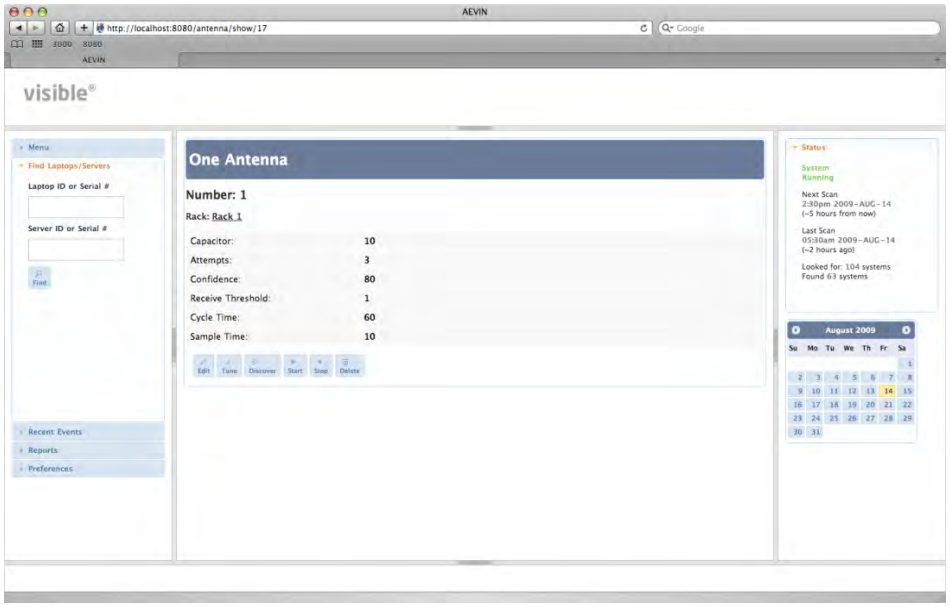
3.6 RuBee Laptop Visibility Networks Expand with KeyGuard



KeyGuard 20/20 manages mission critical keys within a facility. Records and an provides audit trails of key use and key removal, user IDs from Key Vault, as well as all events when keys pass by a Muster Station. Each Key has a RuBee Tag and ID attached.

4 RuBee 20/20 Oracle Application Software





Over the course of four years we have learned what it takes to make a Visibility Network useful. Just like an accounting systems, all visibility systems and asset management networks have many

standard requirements - full custom is not necessary. Visible Assets and Oracle have teamed up to create 20/20 Visibility application builder with most of the key common required features built in and configurable. Users interact with the network through a web based thin-client software application. This means that the information is available anywhere in the world that is on the same secure network as the appliances and Dot Tag Visibility Engine. This system provides real-time inventory information and DoD 5015.2-compliant audit trails. It also provides real-time user-defined alerts – for example, if a number of laptops go missing without being checked out officially, or a user takes items not assigned, etc. The 20/20 Visibility application builder is built on the Oracle Dot Tag Visibility Engine. There is an API to the data in the Dot Tag Visibility Engine to facilitate integration with external systems. In addition, the ability to export reconciliation results in an audit log file for use in a data miner, spreadsheet or report.

5 RuBee IEEE 1902.1

RuBee is a long wavelength, inductive, active protocol with a ten-year battery life and a range of 1 to 100 feet with optional sensors. RuBee tags are smart and have a full microprocessor built into each tag, with static memory (1 Kbyte), date/time and ability to encrypt and decrypt data. RuBee tags overcome many of the technological problems seen with RFID near steel and water, and are field-proven in harsh environments. RuBee is a worldwide IEEE standard, 1902.1, with 19 corporate members in the workgroup (Epson, Motorola, Microsoft, GE, GM, LG Electronics, Bearing Point, RFTechnologies, and many smaller companies). The standard received unanimous approval from the voting members of the workgroup in July 2007. RuBee has been approved by the US Department of Energy (DOE) for use in high security areas. In July 2006, the FDA classified 1902.1 as a Non-Significant Risk (NSR) Class 1 device in medical visibility applications. In April 2007, the FDA issued a warning that HF and UHF RFID may have an untoward effect on implantable devices. In May 2007, a peer-reviewed study was published by the Mayo Clinic showing that RuBee has no affect on pacemakers or ICDs. The company has started independent laboratory tests and expects its RuBee tags to meet the Intrinsically Safe ANSI 913-88 standard in a Zone 0 or Zone 1 explosive atmosphere.

6 RuBee Security, Tempest, Eavesdropping, Target Issues

RuBee is different in many ways from other wireless technologies such as RFID, Wi-Fi, Bluetooth, and ZigBee. For security, the most important difference is that RuBee systems have a controlled range. For example, the shelves in an Evidence Room are engineered to have a field range that extends volumetrically around the shelving. Beyond the range, the signal cannot be detected. This means that not only can your communications not be interpreted (with RuBee you can optionally have packet encryption as you can in some other wireless technologies), it also means that no-one will know that there is a system there unless they are in the field area that you have defined. For example, it is not possible to drive a van up to the perimeter of an evidence facility and detect any RuBee signal. This controlled range also means that RuBee tags do not present a target or tempest risk.

The difference between RuBee and all other wireless technologies is based on the fact that radio signals from any RF source can travel many miles. These radio signals may be used to secretly carry

information away from a secure site (known as a tempest threat) or signals may be listened to remotely by an unauthorized individual (eavesdropping), or, most critically, the radio signal might be used as a target in remote areas. RuBee tags provide a range of up to 100 feet, but because RuBee is magnetic, it overcomes many of the problems seen with RFID in harsh environments and works well near steel and water. However, an unexpected benefit of near field, long wavelength physics is that unauthorized eavesdropping, and signal interdiction are blocked. Eavesdropping, considered the major security risk in any wirelesses network, is totally eliminated as a risk in RuBee networks. In addition, RuBee signals offer no significant tempest or target threat and RuBee has an optional full two-way packet security with optional public private key authentication, with One-Time Pad (OTP), One-Time Key (OTK) options linked to each tag's internal real-time clock. RuBee is now in active use in some of the most secure facilities in the USA as an asset visibility system.

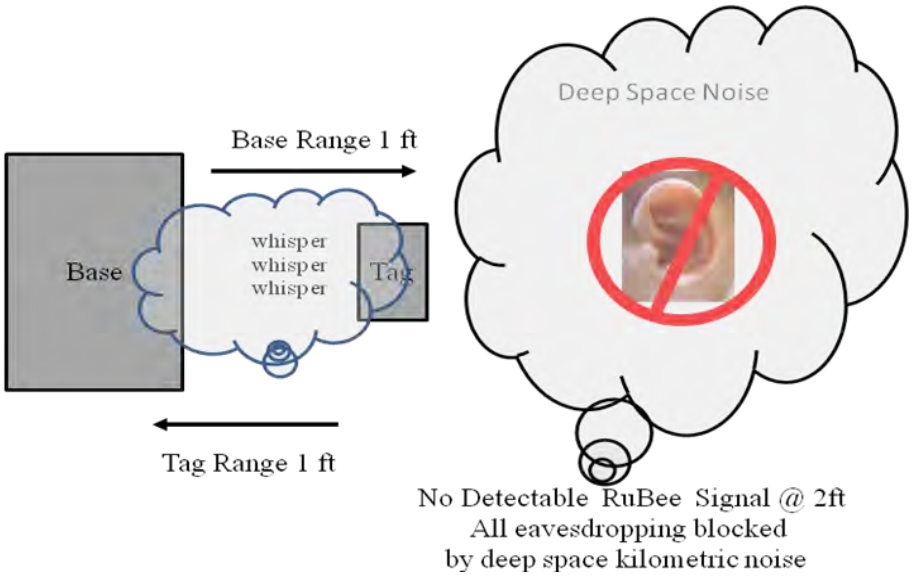


Figure 14. RuBee Range Management makes eavesdropping impossible.

7 Worldwide RuBee RF Licensing Considerations

RuBee operates on a very low frequency, 131kHz, and emits about 40 nano Watts total RF energy and 600 mGauss magnetic energy. It meets US FCC Part15b for an unlicensed intentional radiator, and is far below all known worldwide power limits that would require a site-specific license, or any other license to use in the field.

8 About Visible Assets

Visible Assets is a US company headquartered in Stratham, NH. Visible Assets is a small business focused on developing and delivering innovative solutions based on RuBee, IEEE 1902.1. RuBee is a worldwide IEEE standard for wireless communications and is particularly well suited to metal and water environments that can cause problems for other wireless technologies. RuBee is also ideal for high-security environments, as the controlled range of RuBee signals eliminates eavesdropping, target, and tempest risks. RuBee systems are deployed in high-security government locations, and RuBee partners/ licensees are in industries including weapons, mission-critical tools, oil & gas, and healthcare.

http://www.rubee.com