



M-Unit Setup and Site Survey Test Instructions

Doc-ZigbeeSiteSurvey-rev3

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1 History

Revision	Date	Description	Written by
1.00	Jan 12, 2012	First Release.	Daniel Heisler
2.00	Jan 23, 2015	Acceptable RSSI Value Change	Daniel Heisler
3.00	May 4, 2018	Pixel Lock RSSI Requirement	Daniel Heisler

2 Introduction

2.1 Scope

This document describes how to modify an Oracod M-Unit (P/N 064-512880-AW) for site survey use, details the site survey process, and covers how to use the M-Unit in site survey mode. The document also mandates what the acceptable RSSI value will be when conducting a site survey.

2.2 Intended audience

Engineering and Messenger installation teams of Dormakaba should review this document.

2.3 Definitions

Term	Description
M-Unit	Device used to take RSSI readings for site survey
RSSI	Received Signal Strength Indication
PCB	Printed Circuit Board

3 M-Unit Conversion (To be performed at Saflok)

- A. **Saflok only** --M-Unit Conversion. You will need a Dormakaba Oracod M-Unit (P/N 064-512880-AW) with a minimum firmware version of 1.16.



Figure 1 ó Dormakaba M-Unit

- B. **Saflok only**--This base unit will need to be modified to configure it for site survey mode. The modification entails installing the correct (order dependent) Zigbee RF board (P/N A28780-XMZ or A28780-EAZ) that has been trimmed to fit inside the open PCB slot of the unit. See Figure 2 below. The RF board must also be at the following minimum firmware levels: avr 1.060, ember 3.4.17. The unit should then be labeled with the correct part number ó 75500-02 for Europe/China or 75500-03 for the North American application.

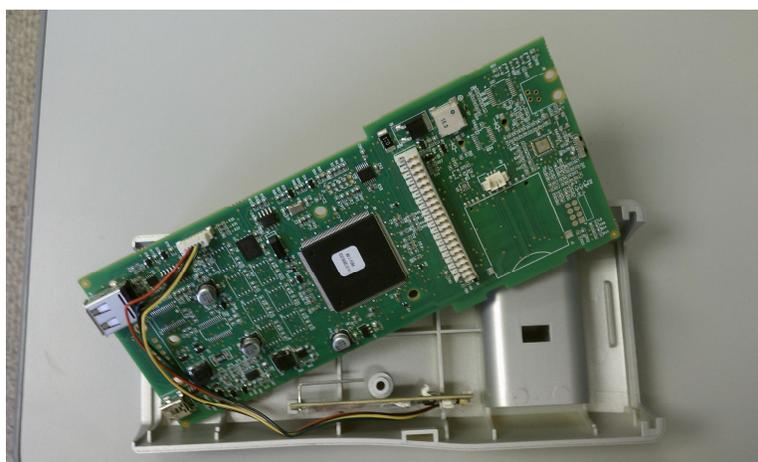


Figure 2 ó Dormakaba M-Unit with modified Zigbee RF board installed

- C. **Saflok only**--To verify the unit is configured for site survey mode power on the unit. The screen, during the boot up process, should indicate the firmware version, display the Dormakaba logo, and then display the Saflok logo. After the unit has booted up it will default to the Wireless M-Unit test screen, see Figure 3. The unit should now be tested using a Messenger hub to verify functionality.



Figure 3 Wireless M-Unit Test Screen (Home Screen)

- D. **Saflok only** The M-Unit is used for multiple applications so the carrying bag is open at the top. A strip of Velcro can be used to help secure the M-Unit to the bag for the site survey application. Take 1 strip of Velcro (P/N A27760-Black) and place one side of the Velcro strip on the back of the M-Unit, centered on the battery pack door see Figure 4.



Figure 4 Velcro placement on M-Unit

- E. **Saflok only**--Place the other half of the Velcro strip on the inside of the M-Unit carrying bag where it will match up with the Velcro attached to the M-Unit (see Figure 5). Verify that the Velcro pieces line up with each other when M-Unit is fully seated in the bag. Adjust Velcro on bag if necessary.



Figure 5 – Velcro placement on Bag

- F. **Saflok only** – A complete Saflok Site Survey kit can now be assembled and prepared for stock or shipped if required. The Saflok Complete Site Survey kit contains the following.

Saflok Zigbee Site Survey North America Kit P/N - CSMUN	Saflok Zigbee Site Survey Europe/China Kit P/N - CSMUE
Site Survey M-Unit for North America P/N 6 75500-03	Site Survey M-Unit for Europe/China P/N 6 75500-02
Zigbee Hub for NA 6 71563-ZBW	Zigbee hub for Europe/China 6 71562-ZBW
Hub Power Supply - 73261	Hub Power Supply - 73261
Hub Power Supply Cable - 737611	Hub Power Supply Cable - 737611
M-Unit Carrying Bag 6 999-513684	M-Unit Carrying Bag - 999-513684
M-Unit Charger 6 126-513412	M-Unit Charger - 126-513412
USB Cable 6 011-512884	USB Cable - 011-512884
Doc-ZigbeeSiteSurvey	Doc-ZigbeeSiteSurvey
Battery Pack (installed in M-Unit) -132-512886	Battery Pack (installed in M-Unit) -132-512886

3.1 Site Survey Setup Instructions

Introduction

The purpose of the Messenger¹ ZigBee Site Survey is to assist in determining the locations, and quantity of hubs for the property. It is important to conduct an in-person site survey to finalize the hub quantity.

A. Equipment

- Saflok Site Survey kit (P/N CSMUN for North America or P/N CSMUE for Europe/China, See Page 7)
- A drawing/diagram of the property's floor plan
- Paper clip or similar tool

B. Survey Guidelines

- For new construction properties, perform the site survey when the building is as close to finished as possible. This is to avoid inaccurate results caused by building material that may be added after a site survey is performed.
- One hub should not exceed 25 locks.
- When performing the survey, position the hub in the intended location and orientation.
 - a. Attached to a J-box on the ceiling (horizontal and exposed)
 - b. Attached to a J-box on the wall (vertical and exposed)
 - c. Concealed behind a panel or above ceiling tiles
- The survey needs to be performed on multiple floors (split hotel into 3 or 4 zones), even when floor plans are equivalent.
- Give consideration to metallic RF obstacles like ducts, elevator shafts, stair wells, fire walls, steel door, conduit, electrical panels and deck flooring as these affect range.
- Give consideration to hydro RF obstacles like water pipes (even if PVC), waterfalls/fountains, and also seasonal high humidity conditions, as these will affect range.
- Give consideration to existing (or planned) RF emitters like Wi-Fi access points, cell phone antennas, or DAS systems, as these will potentially jam the Zigbee messages if hubs are located within 6 feet, or if they are in any line of sight path from a lock to a hub.
- The ZigBee signal does not bend around corners constructed of concrete and/or metal framing. You may need to place a hub on each side of a corner. (see figure 16, page 15)
- If the hubs are to be installed inside a room, perform the site survey with the room's entry door closed.
- If you are placing the hub inside of an existing access panel, ensure that the panel is closed and the hub is in the correct position before testing.

C. Hub Setup

Note: The hub must be in Factory Mode in order to use Site Survey mode. If the hub was configured with an IP address previously, or if you are unsure, see section [Resetting the Hub to Factory Mode](#). If the hub is already in Factory Mode, proceed with the section below, [Putting the Hub in Site Survey Mode](#).

Putting the Hub in Site Survey Mode

1. Connect power to the hub. After initializing, the Green LED will be solid and the Red LED will turn off. Any other LED pattern may indicate that the hub needs to be reset to Factory Mode.

Note: The hub can be powered using 2 different methods: An AC adapter plugged into wall outlet or connected to a laptop with a USB A to mini-B cable (cable is supplied in kit).

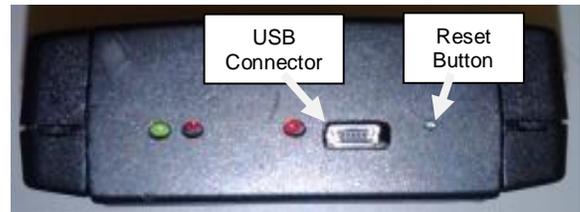


Fig. 6

Note: The Red LED may blink slowly if Ethernet is connected. Disconnect any Ethernet connections before continuing.

2. Press and release the Reset button (see Fig. 6) once using a paper clip or similar tool. The Green LED will turn off, and the Red LED will illuminate for 1-2 seconds while a ZigBee network is being formed. It may take up to two minutes to form the network. Do not press the Reset button again until the cycle has completed.
3. When Site Survey mode is ready, both Red and Green LEDs will turn on and stay solid.

D. Resetting the Hub to Factory Mode

1. Disconnect all power to the hub (USB, power supply, and PoE).
2. Press and hold the recessed **Reset** button next to mini-USB connector on side of hub using a paper clip or similar tool, then connect the power source. See Figure 7.
3. Release the button immediately after the hub powers on to Reset the hub to factory configuration. The Red & Green LEDs will blink momentarily while the hub is Resetting to Factory Mode.

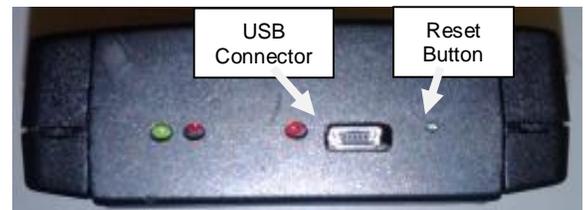


Fig. 7

4. After factory Reset has been completed, the Red LED will turn off and the Green LED will turn solid. The hub is now ready to be put into Site Survey mode.

4 Site Survey Test Overview—Basic Steps

1. Place the hub in the desired orientation and location, and then connect power to it. Press the Reset button to put it into Site Survey mode.
2. Move down the hallway/corridor with the M-Unit device. While holding the M-Unit close to an installed lock position use the Ping test to ensure that you receive a sufficient RSSI value.
3. Record the RSSI values.
4. Note the maximum range of the hub on a drawing/diagram/ of the hotel's layout or notepad.
5. Determine the number of hubs the property will need, based on the typical range of each hub. Place the hubs in the areas where they will communicate with the most locks.

4.1 Site Survey “Ping Network” Test

The following illustrations demonstrate how to Use the M-Unit to retrieve RSSI values. Ensure you conduct your test as close to the final lock RF board placement as possible. To get more accurate readings you must perform the survey from inside the room and behind the door. This is where the RF module is typically located. This is a very important step that should not be bypassed. Also, give consideration to yourself and other people present; being that we are mostly made of water our presence can be an obstruction to the RF signal. For best results, do not stand in the path between the lock location and the hub.

- A. Select Zigbee (see Figure 3) on the home screen and then select “Ping Network” and press Enter.

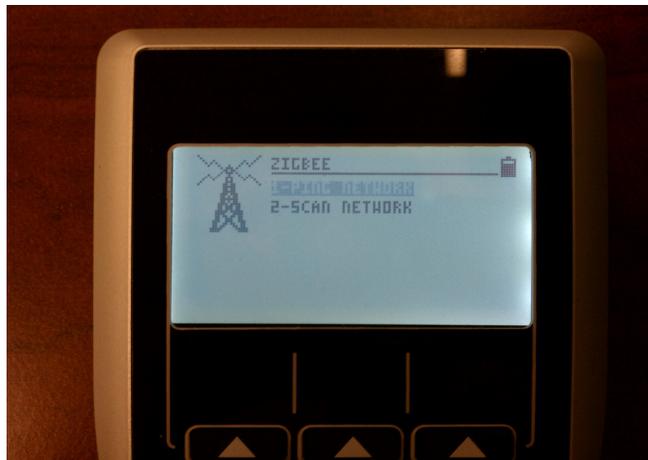


Figure 8 “Ping Network”

- B. Holding the unit with your left hand (as shown below, Figure 9) while testing will orient the antenna in the correct position.



Figure 9

- C. Hold the unit as still as possible and select Ping (Figure 10) at the Wireless Site Survey screen.



Figure 10 Ping Wireless Site Survey Screen

D. The unit will then attempt to ping a hub in site survey mode, see Figure 11.

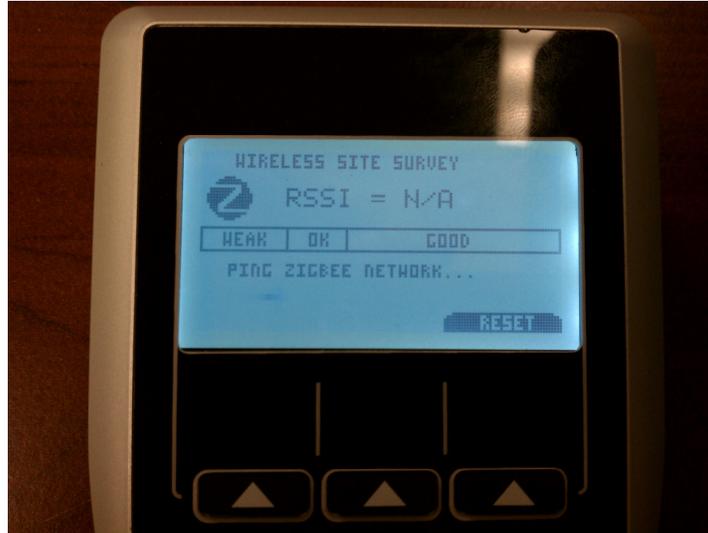


Figure 11 6 Scanning for Zigbee Network

E. If no network is found you will briefly see a 'No Zigbee Network Found' message displayed.

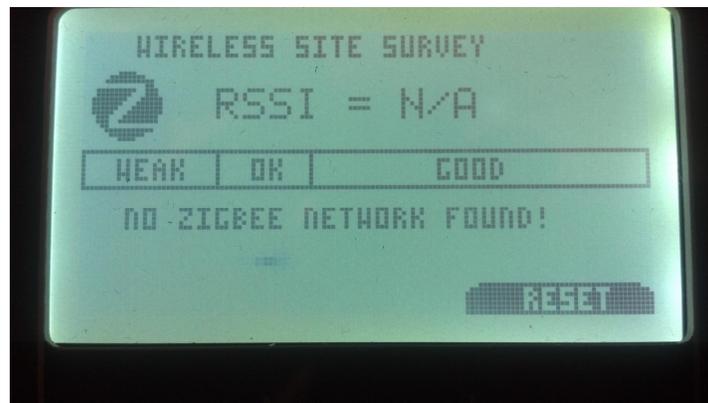


Figure 12 6 No Zigbee Network Found message

- F. The unit will return to the ping test screen see Figure 13.



Figure 13 ó No Zigbee Network found, returns to Site Survey Screen

- G. If you have received this response you are either out of range, your test hub has no power, or the hub is not in site survey mode. Verify your hub is set up properly and within range. Repeat the test.
- H. If the test continues to fail and you are sure you are in range and the hub is in site survey mode, try selecting Reset and repeat the test.
- I. If the ping test is successful the unit will return a valid RSSI value see Figure 14.

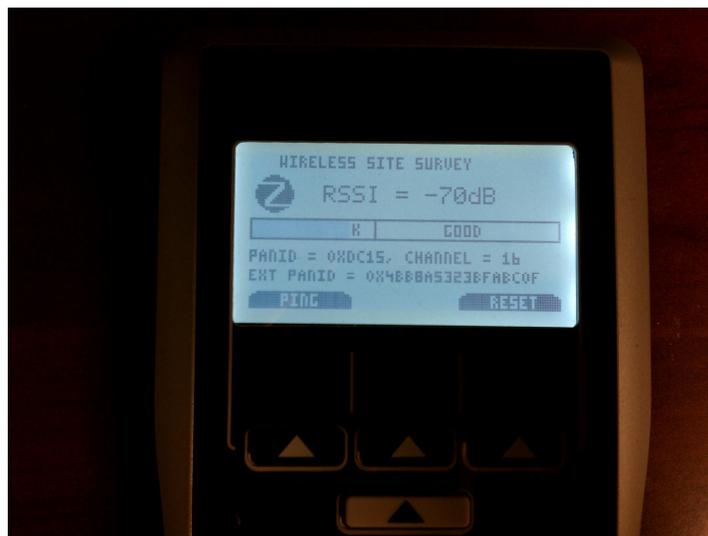


Figure 14 ó Successful Ping Test

- J. The acceptable RSSI value is -74 RSSI or greater. A reading of -75 or lower (-76, -77, -80, etc.) is not acceptable.

PIXEL LOCK NOTE – For Pixel lock only the value must be -64 RSSI or greater. A reading of -65 or lower (-66, ...-77...-80, etc.) is not acceptable.

It is recommended that you take at least three readings to generate some confidence in your results. You may encounter readings that can easily vary +/- 4 RSSI, even if the readings are taken from the exact same location. Variance can be greater if you hold the unit in a different orientation/location or if an object passes in between the unit and the hub during the test. If testing continues to fail refer to the troubleshooting section on page 17.

***Important Note: Every time you change hub locations, the hub will need to be powered off and put back into site survey mode in its new location. FAILURE TO POWER DOWN THE HUB AND RESET IT FOR EVERY NEW LOCATION WILL RESULT IN INACCURATE INFORMATION.**

- K. Once your site survey is completed, the hub layout and quantity must be approved by SAFLOK Messenger Team.

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5 Sample Hub Locations

5.1.1 The following examples illustrate suggested hub locations. All final hub locations must be tested by a site survey.

5.1.2 The property illustrated in Fig 15 is a standard wing.

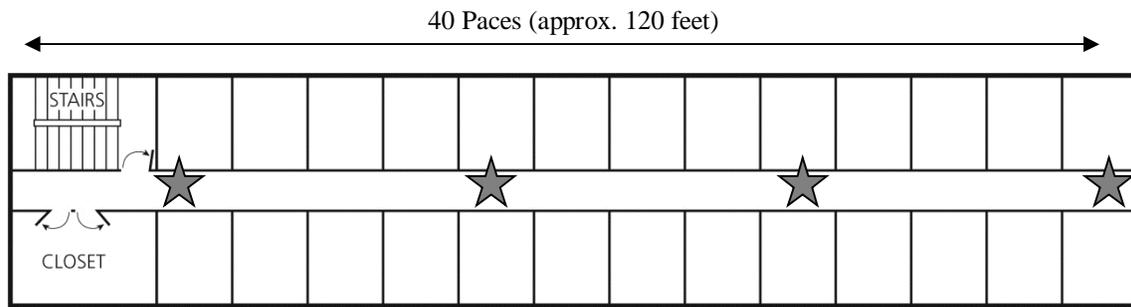


Fig 15 6 Standard Wing

5.1.3 The property illustrated in Fig. 16 features floors shaped like an L-shape.

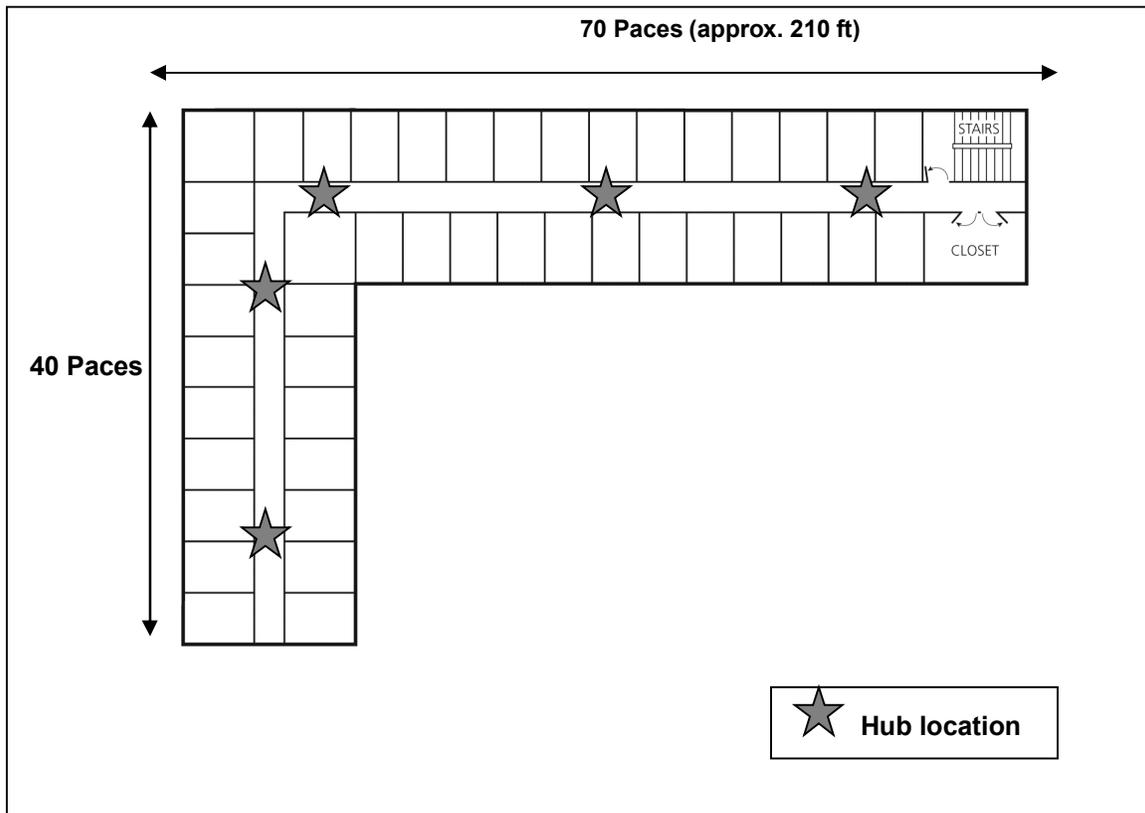


Figure 16 . L shaped floor

5.1.4 The property illustrated in Fig. 17 features a floor with a large elevator shaft in the center of the building.

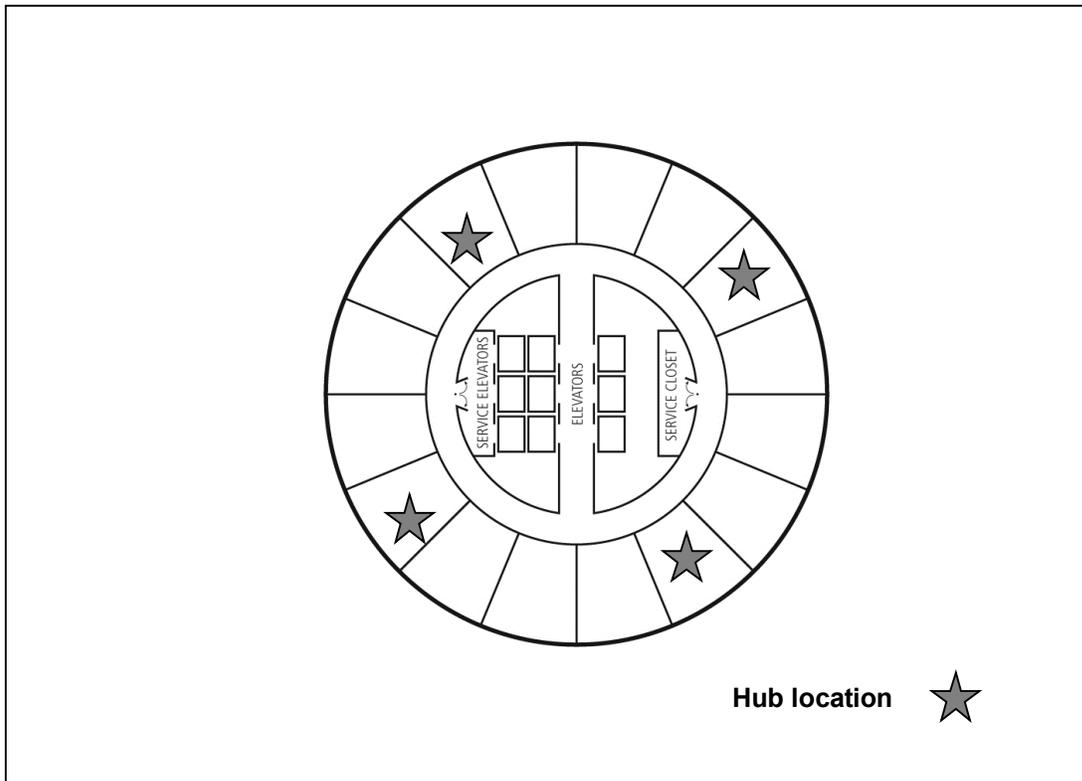


Figure 17 . Circular lay out

5.1.5 The properties illustrated in Fig. 18 feature special cases such as recessed rooms or a floor that contains foyer suites.

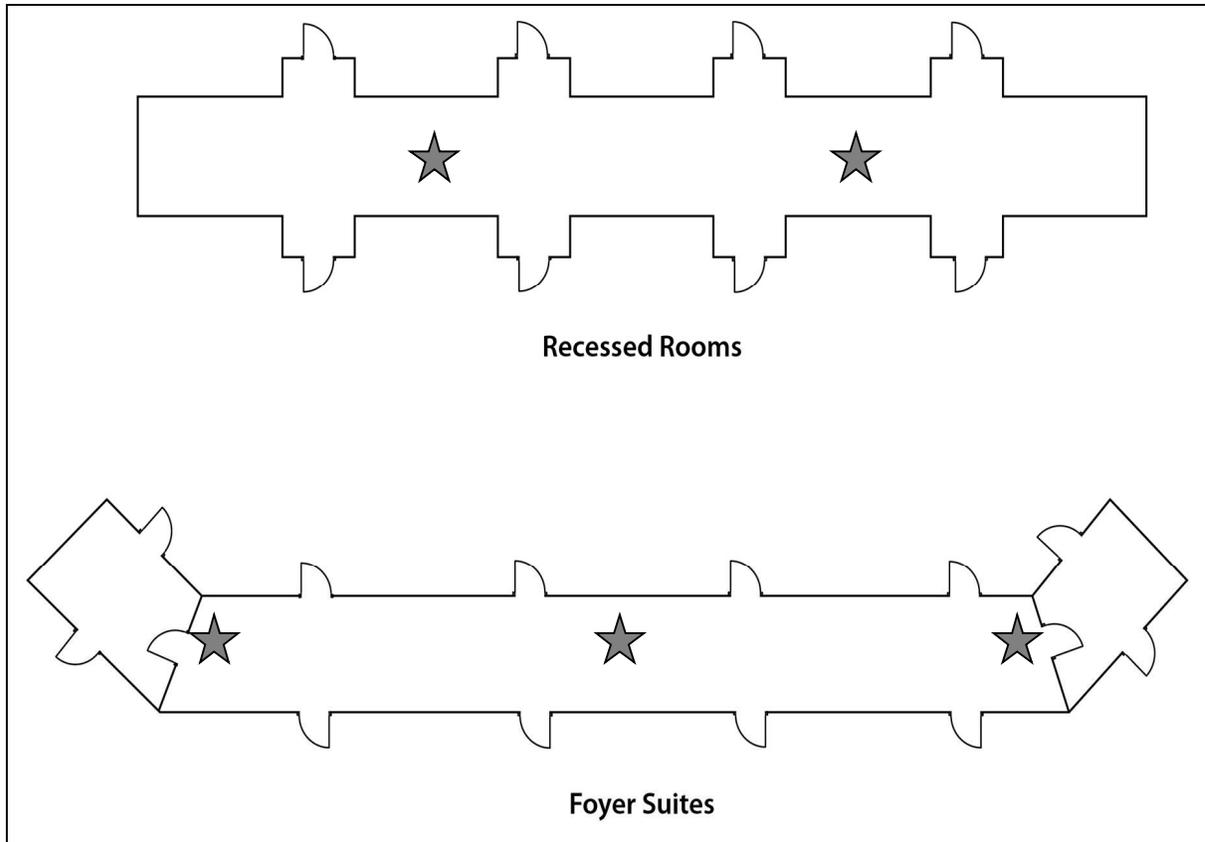


Figure 18 . Recessed Rooms and Foyer Suites

6 Range Notes

Typical Range for the following power levels.

158 mW XMZ (*Americas, Australia, Hong Kong, Singapore*) 40 . 55 meters (130 . 180 ft)

10 mW EAZ (*Europe & China*) 20 . 30 meters (65 . 98 ft)

85 mW IMZ (Special International) 30 . 45 meters (98 - 147 ft) – **REQUIRES SPECIAL ORDER SITE SURVEY KIT**

Note - These ranges are just estimates based on site surveys and do not take into account the interference that may be present including obstructions, other RF devices, metal, elevator shafts, steel decking, curved hallways and etc.

7 Troubleshooting

7.1 Limited Range/No Communication

In the event that you find very limited range or no communication at all, check the following:

- If you are using a USB rechargeable battery to power the hub, is it charged?
- Is the hub placed on or near a large metal structure?
- What is the construction of the building? Steel and concrete (e.g., elevator shafts, steel framing, large metal sculptures, etc.) can decrease range.
- Hub is not in site survey mode or has not been reset.
- Try Selecting Reset at the site survey home screen and retest.

8 M-Unit User Interface Settings

Battery life on the M-Unit can vary greatly depending on the user interface settings. Use these settings to maximize the power on time of the M-Unit. You can help preserve M-Unit battery life by powering off the unit when moving the hub to a new test location. Charge the unit whenever possible by plugging it into your laptop or by using the provided AC powered charger.

At the home screen select Tools
Select User Interface
Select Power Settings
Set Backlight Timeout 10 seconds
Set Power off Timeout 5 minutes