



Site Survey Report

Prepared for:

Viracon



GE60/FE60/AR60



GE60X/FE60X/AR60X

For the attention of:

Nic Johnson
IT Manager
800 Park Drive
Owatonna, MN 55060

Tel: 507-444-3223

SystemSupportSolutions, Inc.

994 Hunt Farm Road – Orono – MN – 55356 (952) 745-1111

www.GigabitRF.com

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Subject: RF Fixed Wireless Link Site Survey Report and Installation Considerations

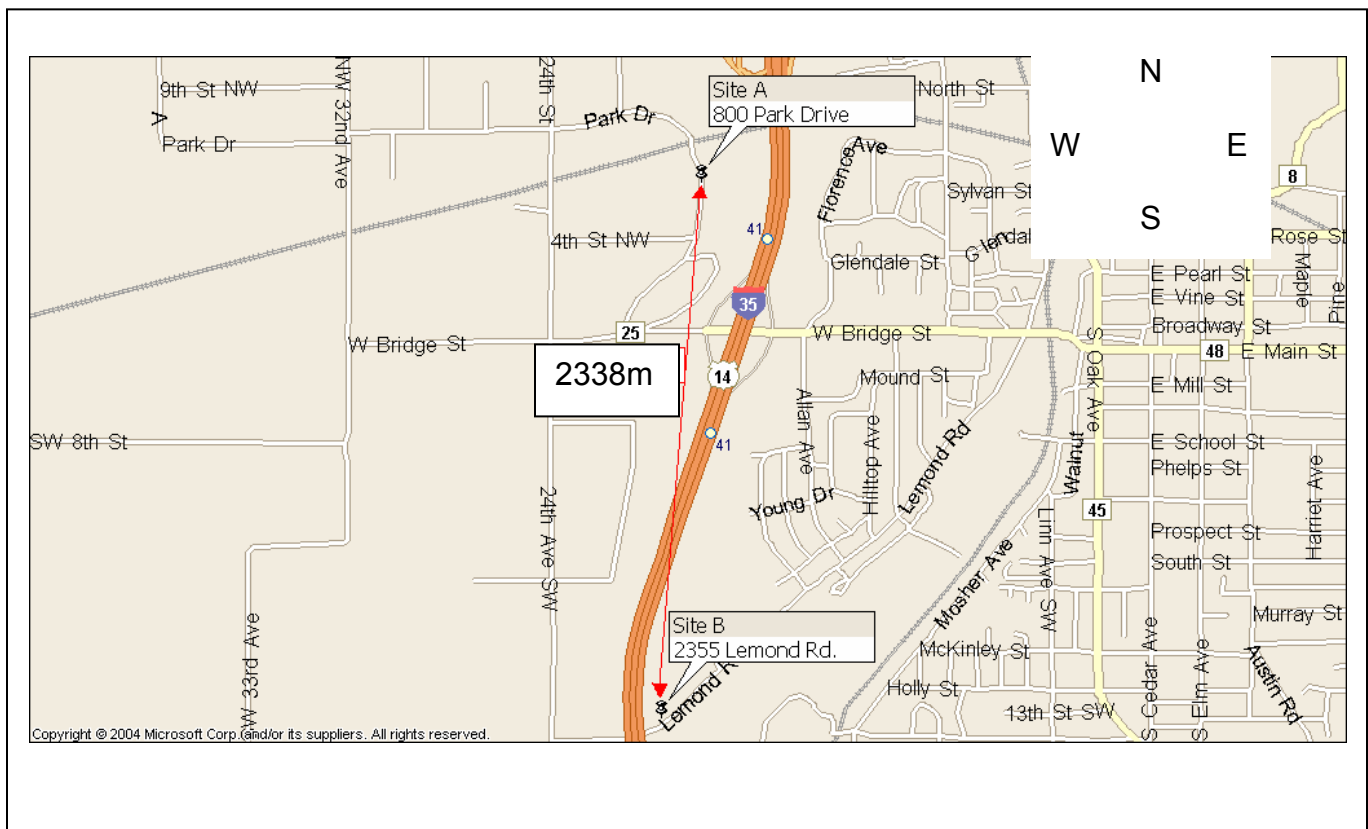
Date: October 13, 2006

System Support Solutions staff present: Peter Schoon (Virtual)

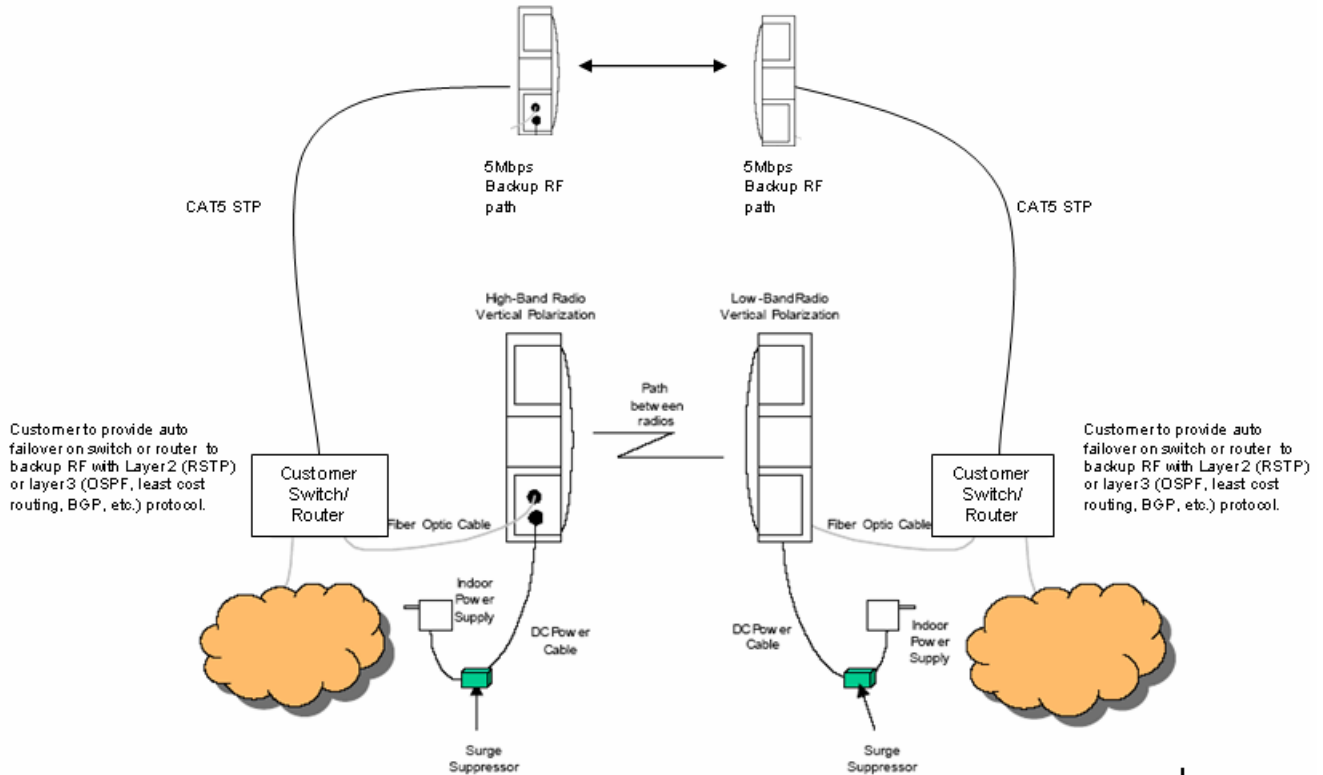
Company Staff Present: Nic Johnson

Purpose: Data + Voice, 99.9% availability required

Sketch of general structure positions, equipment locations, link distance and orientation



General Network Diagram:



Site A

- Viracon
- 800 Park Drive
- Owatonna, MN

Line of sight: Clear with absolutely no obstructions.

Range and Location:

- Distance: 2338 meters Distance Units: Earth model:
- Number of links: 2 (BridgeWave FE60 FastE + RAD RF Backup)
- Elevation angle: <5 degrees

Input Data

Lat1		Lon1	
44:5.36	N	93:14.96	W
Lat2		Lon2	
44:4.12	N	93:15.289	W

Output

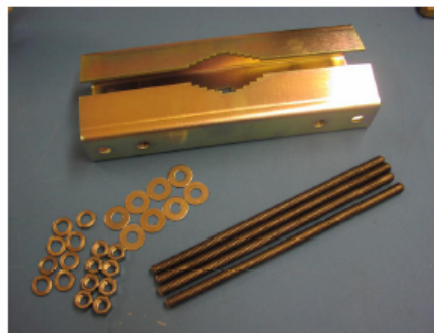
Course 1-2	Course 2-1	Distance
190.829851	10.8260368	2.337977493

Mounts (System Support Solutions, Inc. to provide and install):

Pole mount kit plus HD Rohn Non-penetrating mount

GE60 Pole Mount Kit Parts List

Item	Description	Qty.
1	Pole Clamp	4
2	3/8-16x9in Threaded Rod	4
3	3/8 Split Lock Washer	14 (3 spare)
4	3/8 Flat Washer	14 (3 spare)
5	3/8-16 Hex Nut	12 (1 spare)
6	3/8-16 x 3/4 bolts	6 (2 spare)



Also included in the Installation Kit:

SystemSupportSolutions, Inc.

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Installation kit also includes:

- Rain tight J-Box with a 6-strand fiber bulkhead
- 2m SC/LC MM fiber patch cable
- 2m CAT5 Management cable



- **BridgeWave power cabling (Viracon to provide):**

The GE60 radio includes a 100-240 VAC power adaptor suitable for indoor operation that converts the AC voltage from the standard electrical outlet in the wall to DC voltage. Our radio requires a minimum of 15.0 VDC (24.0 VDC maximum) up the power cable to the radio to function properly. When planning the cable run from the indoor mounted AC power adaptor to the radio unit, it is critical to use the cable gauge (AWG) indicated below to ensure adequate voltage at the radio. The electrical cable that is used outside the building must be outdoor rated (i.e., weather-protected) providing a single pair of wires necessary to power the equipment. The required DC power cable is 12 gauge, 2 wire (i.e., 12/2) rated for outdoor use.

DC Cable Length	Minimum Cable Size	
	Outside Diameter of DC Cable Jacket (min-max)*	Conductor size
Up to 250 meters	0.17 – 0.45 inches (4.3 – 11.9 mm)	12 AWG

Table 2-4: Minimum DC Cable Size

**Note: Specification is for the outdoor weather-protected portion of the DC cable entering the radio enclosure. The indoor portion of the DC cable must comply with local building and/or electrical codes in your area.*

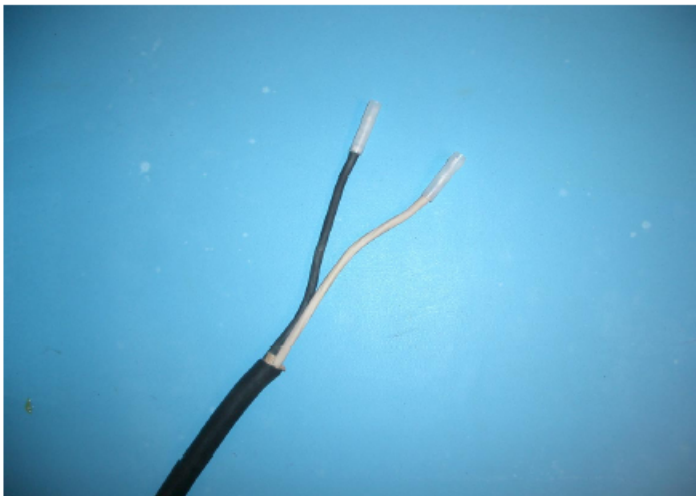


Figure 2-3 (left) details a standard 12-gauge wire that has been fitted with the power connectors (provided) for the radio’s internal power supply necessary to mate with the provided power cord. A standard crimping/splicing tool (not provided) is required to terminate the power connectors onto the 12-gauge cable required for use with the GE60.

2.7 Grounding & Lightning Protection

WARNING!

Proper grounding of the outdoor equipment reduces electromagnetic interference, provides lightning protection, and protects against electrical discharge. The source and connection points for the building-to-earth ground in the vicinity of the antenna location should be determined.

It is recommended to integrate the radio ground into the building ground utilizing the pole mount hardware. For wall or ungrounded pole mounts connect a grounding wire to the grounding point on the radio. Select the size of the ground wire based on the National Electrical Code.

In addition to grounding the equipment, **BridgeWave strongly recommends**, and local building codes may require, the DC electrical cable to be protected from lightning strikes. You may use a Polyphaser surge suppressor, model # IS-PSP-24 (or equivalent model from another manufacturer). The surge suppressor must be installed at the point where the DC electrical cable exits/enters the building.

Data Cabling (Viracon to provide):

Fiber:

A multi-mode fiber optic cable is to be run for the rooftop transceivers. Six (6) strand 850nm mm fiber cable is used, 2 for data, and 4 for redundancy and equipment diagnostics. The fiber should be terminated with SC connectors.

At the rooftop, the fiber run will be plugged into the provided 6-strand fiber bulkhead in the provided rain tight Hoffman J-box we will pre-ship to you. When we arrive onsite, we will run an SC/LC 2m fiber optic mm patch cable from the Hoffman J-Box to the BridgeWave transceiver.

CAT5:

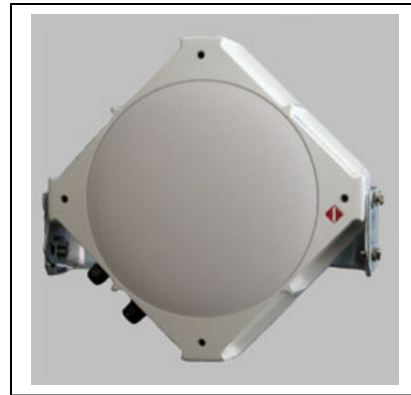
Two CAT5 cables are to be run: one for the BridgeWave out-of-band management interface, and one for the RAD backup RF. The RAD RF CAT5 must be shielded TP with special end caps. We will pre-ship 100' to you for the RAD rooftop cable run). Lightning protection is required for both CAT5 cables.



Equipment:

BridgeWave 60GHz RF Link:

- Type of unit: BridgeWave Unlicensed 60GHz RF
- Communication protocol: Fast Ethernet
- Is a new fiber optic interface required for switch?
 - 850nm
 - 1000BaseSX Multi-Mode
- Data Rate: 100Mbps Full Duplex



RAD RF Backup:

- Type of unit: RAD RF
- Communication protocol: Ethernet
 - Interface: 10/100BTX RJ45
- Data Rate: 5Mbps





Site B

- Viracon
- 2355 Lemond Rd
- Owatonna, MN

Line of sight: Clear with absolutely no obstructions.

Range and Location:

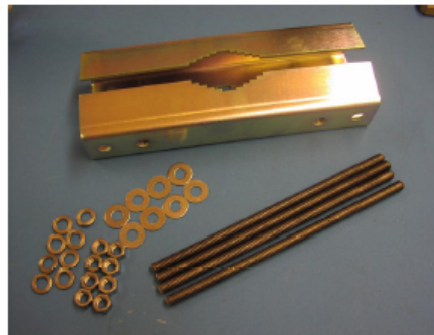
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- Number of links: 2 (BridgeWave FE60 FastE + RAD RF Backup)
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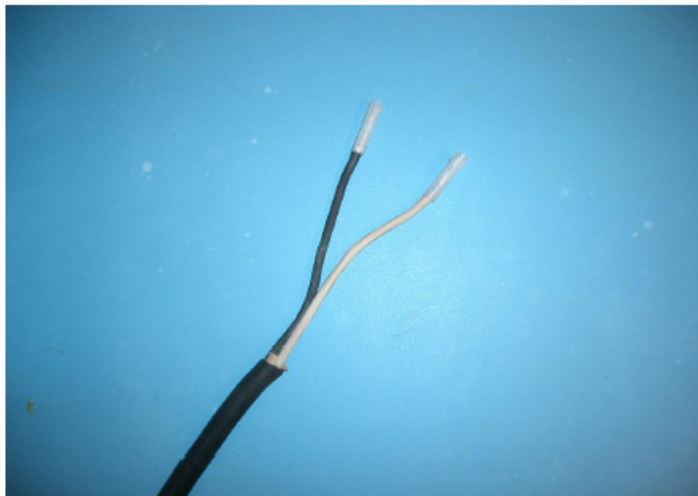


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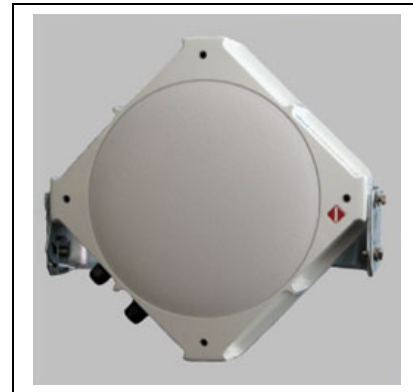


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- Communication protocol: Ethernet
 - Interface: 10/100BTX RJ45
- Data Rate: 5Mbps





Visuals:

Building front view



Site A Street View



Site A

**Antenna position
viewed from street
level**



Site A mount Location

Site A

**Rooftop line-of-sight
view looking at Site B**



Site A rooftop line-of-site view looking at Site B

Site A

**Rooftop view of
mount location**



Site A mount Location

Site A

**Rooftop penetration
location**



Site A rooftop penetration location



Site B

**Antenna position
viewed from street
level**



Site B mount Location

Site B

**Rooftop line-of-sight
view looking at Site A**



Site B rooftop line-of-site view looking at Site A

Site B
**Rooftop view of
mount location**



Site B mount Location

Site B
**Rooftop penetration
location**



Site B rooftop penetration location

Pre-Installation requirements for Viracon:

(Note: when completed, please check-off, sign and fax to 952-473-0260, Attn: Peter Schoon)

- Fiber J-Boxes installed
- 6-strand MM Fiber optic cabling installed both sides
- Fiber optic cabling tested
- Two CAT5 cable runs installed each side (one for RAD backup, one for BridgeWave Mgt.)
- CAT5 cabling tested
- Two Pair 12 AWG copper cable installed for BridgeWave transceivers 24VDC power
- 110VAC UPS protected power outlets available in building for 110VAC/24VDC inverters
- Appropriate switch interfaces installed
 - BridgeWave: 100BaseFX FastE FO MM 1310nm each side).
 - BridgeWave 10/100BTX RJ45 for out-of-band management
 - RAD: 10/100BTX RJ45 each side
- Appropriate auto failover protocol implemented for BridgeWave fail down to RAD backup
- All keys, permissions, ladders, etc. available onsite

Verified by: _____ Date: _____

Please note:

- If cabling is not installed and certified prior to the deployment, the link(s) will be installed and certified, but connectivity down to the premise equipment will be customer responsibility. Often, issues arise that could have been more effectively identified if switch-to-switch connectivity could have been verified while we were on site.
- If site access issues, lack of power in close proximity, or other customer responsibilities cause significant delays, an additional day of on-site time will be billed (\$1,200) plus actual travel cost increases (up to approximately \$500 for air re-ticketing + room + car).
- It is better to reschedule your installation appointment rather than install prior to completion of the above listed customer tasks. If rescheduling becomes necessary, you must advise us of your schedule change a minimum of 5 business days prior to your installation date. You will then normally only be responsible for air re-ticketing costs, usually \$100.