

1.1. Feasibility Study: Path Profiles

1.1.1. Description

Path Profiles show a “side-view” of a single radio link. A Path Profile provides a means to visually evaluate path conditions including centerline clearance and Fresnel Zone obstruction with respect to terrain and clutter.

GE MDS will perform path profiles using Propagation Simulation Software, SignalPro 8.2, and provide documentation in PDF format.

1.1.2. Key Assumptions

- Hardware is fully specified: radio model / throughput required / feed line / antenna model(s) / antenna heights. Where specifications are not defined, GE MDS will provide default specifications.
- Ground clutter models are not sufficiently accurate to guarantee minimum antenna heights for a successful link.
- External interference will not be predicted.
- GE MDS strongly recommends physical link testing to determine signal levels based on actual ground clutter conditions before installing any equipment. Customer assumes all risks if radio links are installed based only on feasibility studies

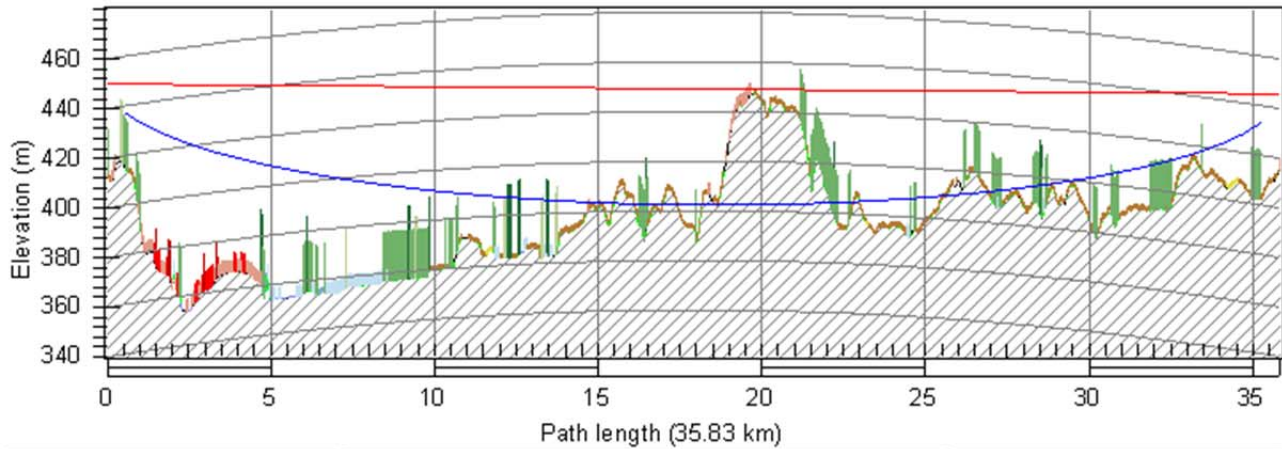
1.1.3. Key Requirements of Deliverables

- Radio link(s) will be visually represented with respect to terrain elevation and ground clutter (where ground clutter is available).
- Signal strength prediction in dBm for each site or link.
- Availability prediction in percent per calendar for each link.
- Mitigation or possible solutions for paths that do not meet minimum requirements.

1.1.4. Deliverables

- Documentation in PDF format will include model assumptions, location info, site maps referencing site locations to terrain elevation data and ground clutter, and individual path profiles with link budgets.
- Predicted signal strength and annual 2-way availability percentage will be given for each site, provided the link meets the minimum availability requirement.
- For more than 12 paths, a summary table will be given instead of individual link budgets.

1.1.5. Sample Path Profile



Site A
 Latitude 34 57 09.30 N
 Longitude 089 35 51.42 W
 Azimuth 261.16°
 Elevation 412 m ASL
 Antenna CL 38.1 m AGL

Frequency (MHz) = 440.0
 K = 1.33
 %F1 = 60.00

Site B
 Latitude 34 54 07.68 N
 Longitude 090 02 45.06 W
 Azimuth 80.84°
 Elevation 416 m ASL
 Antenna CL 30.5 m AGL

	Site A	Site B
Latitude	34 57 09.30 N	47 54 07.68 N
Longitude	089 35 51.42 W	090 02 45.06 W
True azimuth (°)	326.04	146.06
Vertical angle (°)	-0.13	0
Elevation (m)	1231.97	1278.01
Antenna model	Omnidirectional (TR)	Yagi (TR)
Antenna gain (dBi)	9.2	10
Antenna height (m)	40	15
TX line model	FSJ450B	FSJ450B
TX line unit loss (dB/100 m)	8.73	8.73
TX line length (m)	48	18
TX line loss (dB)	4.19	1.57
Connector loss (dB)	0.5	0.5
Frequency (MHz)	440	
Polarization	Vertical	
Path length (km)	18.35	
Free space loss (dB)	109.34	
Diffraction loss (dB)	14.7	
Net path loss (dB)	111.65	111.65
Radio model	MDS SD4	MDS SD4
TX power (dBm)	36.99	36.99
EIRP (dBm)	39.35	42.77
RX threshold criteria	BER 10-6	BER 10-6
RX threshold level (dBm)	-112	-112
Receive signal (dBm)	-74.66	-74.66
Thermal fade margin (dB)	37.34	37.34
Worst month multipath availability (%)	99.99999	99.99999
Worst month multipath unavailability (sec)	0.28	0.28
Annual multipath availability (%)	100	100
Annual multipath unavailability (sec)	0.87	0.87
Annual 2 way multipath availability (%)	99.99999	
Annual 2 way multipath unavailability (sec)	1.74	