

TSAN 055 HiPR-900® Site Survey Dataradio Technical Support

For additional assistance: www.dataradio.com

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|-------------------|----------------|---------------|----------------|
| Within the U.S.A. | 1-800-992-7774 | International | 1-507-833-8819 |
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Product: HiPR-900

Application: This document contains the information necessary to perform a site survey using the HiPR-900.

Figure 1 shows a sample system.

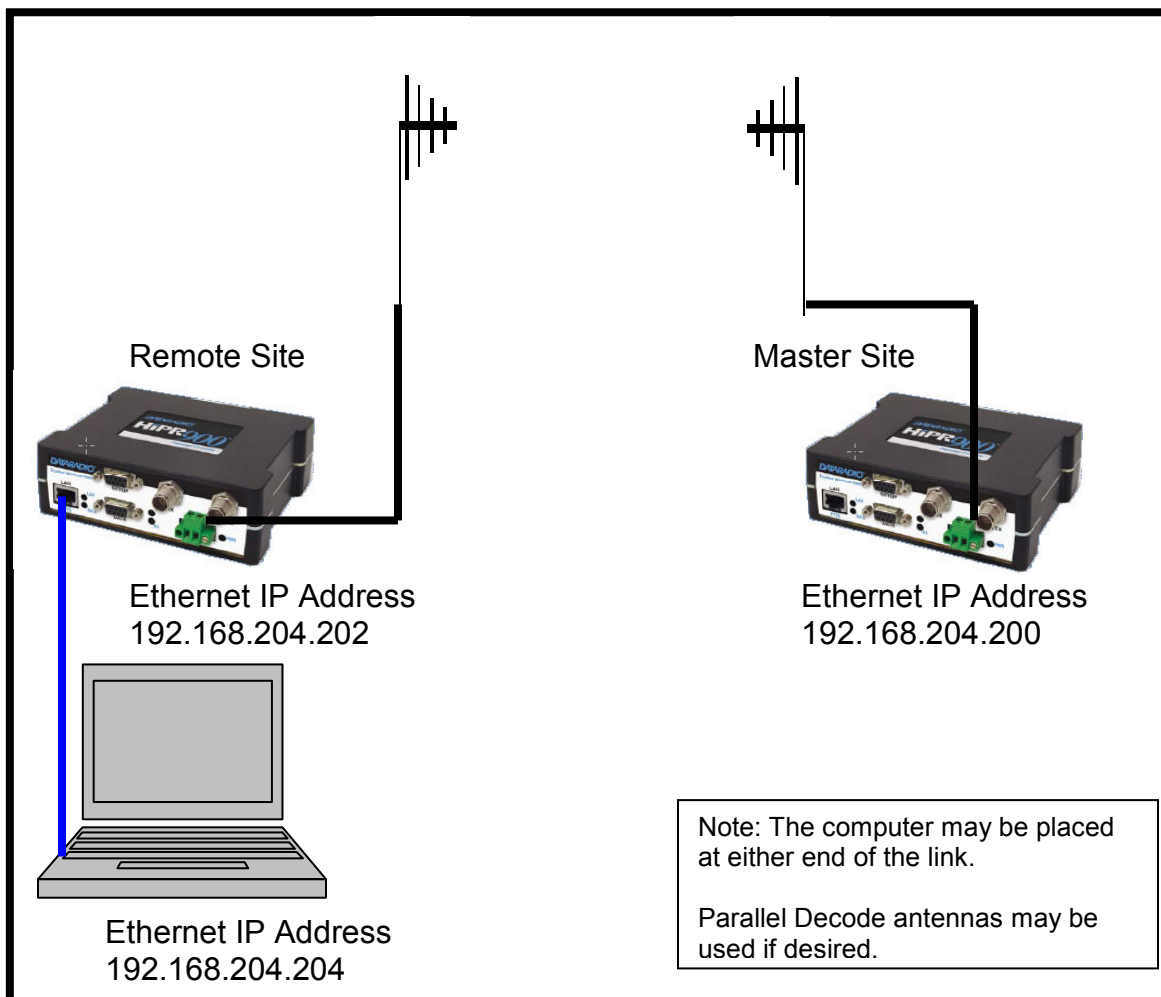


Figure 1

The site survey information can be gathered by using the HiPR Online Diagnostics in conjunction with the Ethernet "Ping" command.

1. Set the HiPR Online Diagnostics for the desired thinning value. A Thinning Value of 10 or more is recommended. The Online Diagnostics screen is located in the HiPR Setup (Basic), Online Diagnostics menu (Figure 2).

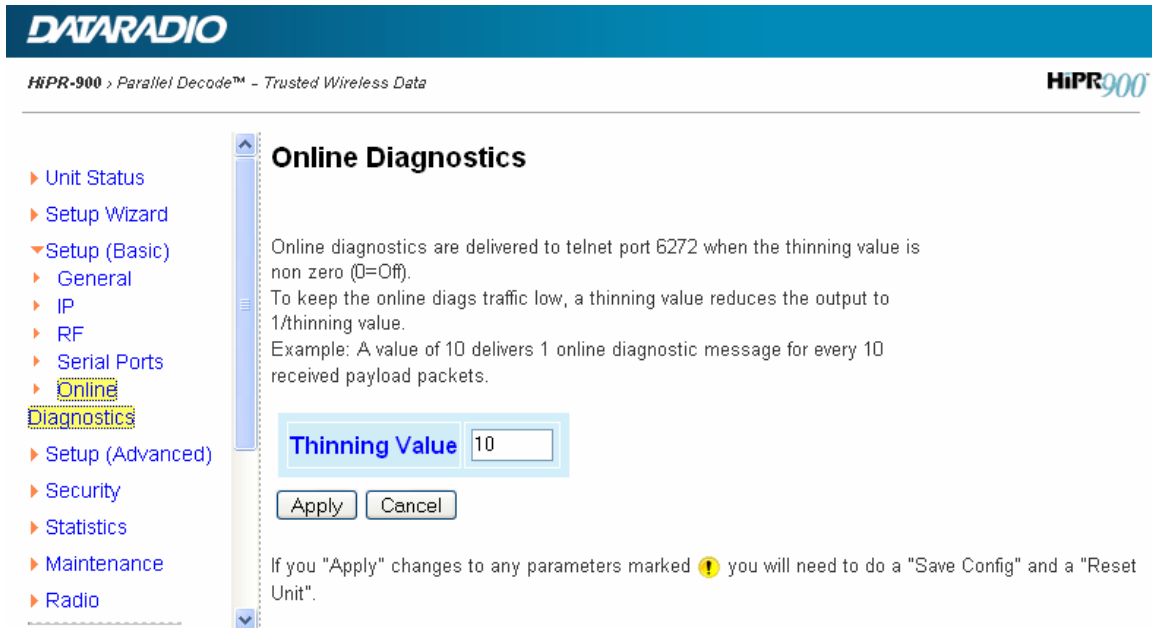


Figure 2

2. Start the Hyper Terminal on the PC. Hyper Terminal is located on the Start Menu > Accessories > Communications. Open a telnet connection (Figure 3). This is done by selecting TCP/IP (Winsock) in the Connect Using box. Enter the IP address for the radio (Figure 4). Set the Port number to 6272.

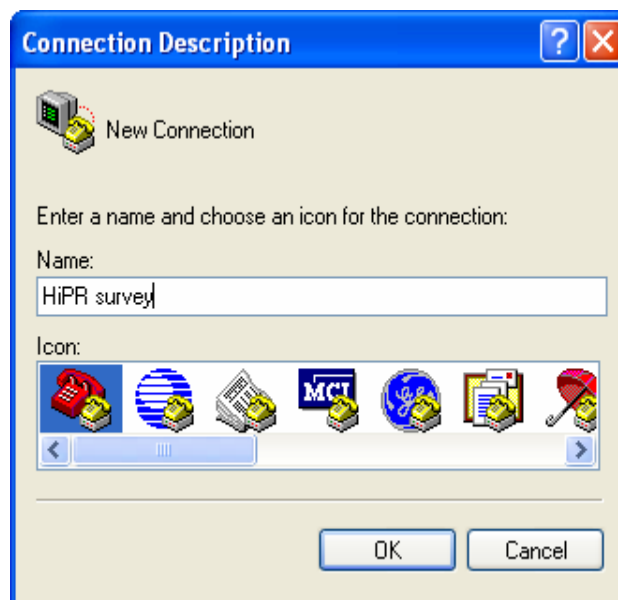


Figure 3

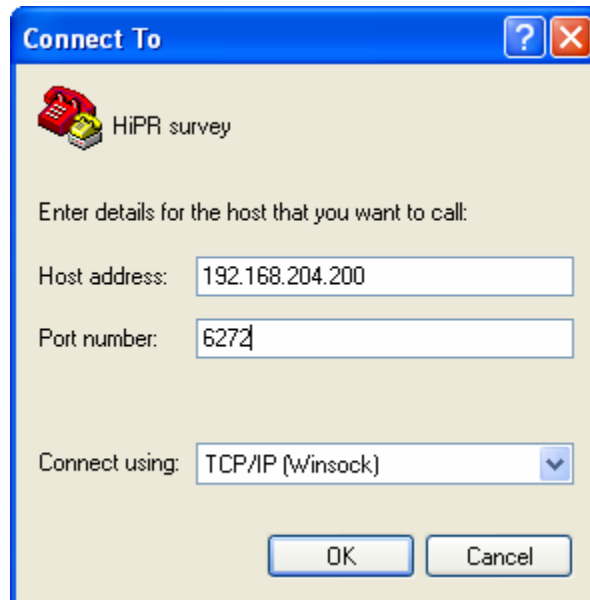


Figure 4

3. Start the "Ping". Go to the Start menu on the computer, select "Run", type cmd in the box and click OK. The computer will respond with the Command window (Figure 5). Enter the "ping" command. Use the IP address of the unit which is not connected to the computer. The -t (minus t) at the end of the line will allow the ping to run continuously. The ping is ended by using the <CTRL> C command. Figure 6 shows an example of a Ping command as it is running.

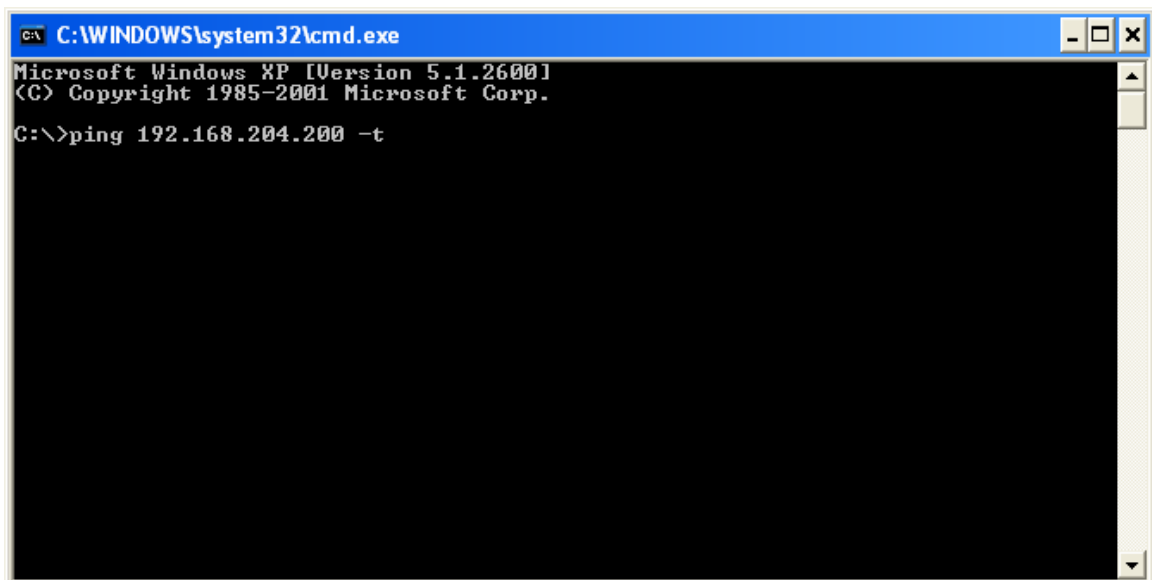
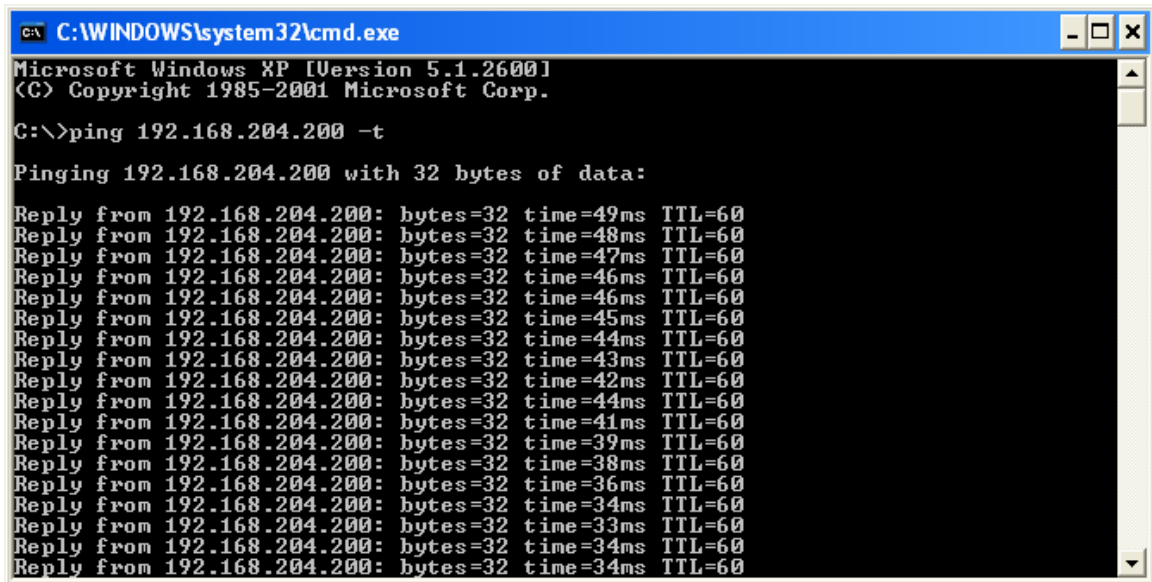


Figure 5



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

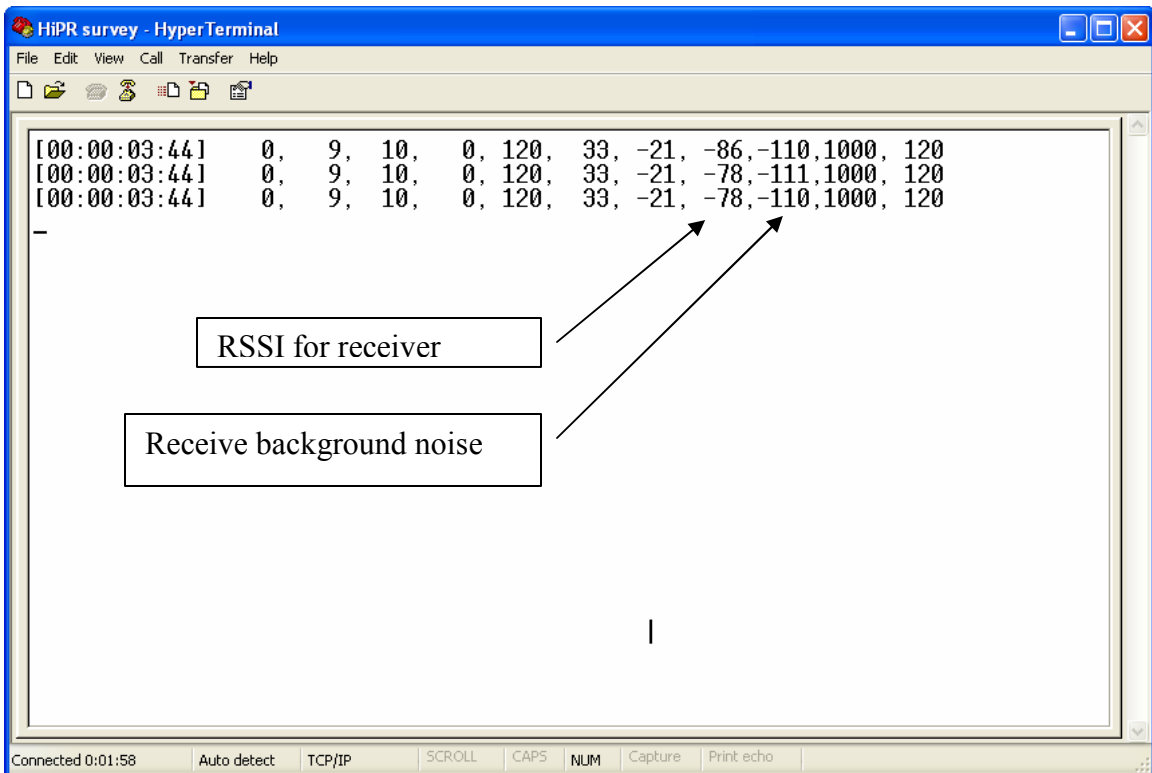
C:\>ping 192.168.204.200 -t

Pinging 192.168.204.200 with 32 bytes of data:

Reply from 192.168.204.200: bytes=32 time=49ms TTL=60
Reply from 192.168.204.200: bytes=32 time=48ms TTL=60
Reply from 192.168.204.200: bytes=32 time=47ms TTL=60
Reply from 192.168.204.200: bytes=32 time=46ms TTL=60
Reply from 192.168.204.200: bytes=32 time=46ms TTL=60
Reply from 192.168.204.200: bytes=32 time=45ms TTL=60
Reply from 192.168.204.200: bytes=32 time=44ms TTL=60
Reply from 192.168.204.200: bytes=32 time=43ms TTL=60
Reply from 192.168.204.200: bytes=32 time=42ms TTL=60
Reply from 192.168.204.200: bytes=32 time=44ms TTL=60
Reply from 192.168.204.200: bytes=32 time=41ms TTL=60
Reply from 192.168.204.200: bytes=32 time=39ms TTL=60
Reply from 192.168.204.200: bytes=32 time=38ms TTL=60
Reply from 192.168.204.200: bytes=32 time=36ms TTL=60
Reply from 192.168.204.200: bytes=32 time=34ms TTL=60
Reply from 192.168.204.200: bytes=32 time=33ms TTL=60
Reply from 192.168.204.200: bytes=32 time=34ms TTL=60
```

Figure 6

- Return to the Hyper Terminal screen. The diagnostics will appear as each diagnostic packet is generated (Figure 7). On the bottom line of this example -78 is the RSSI for receiver and -110 is the receive background noise. Refer to HiPR-900 User Manual for detailed information regarding the diagnostic output. The format is ASCII text, comma delimited. This format allows the diags to be imported into programs such as Excel.



```
HiPR survey - HyperTerminal
File Edit View Call Transfer Help

[00:00:03:44] 0, 9, 10, 0, 120, 33, -21, -86, -110, 1000, 120
[00:00:03:44] 0, 9, 10, 0, 120, 33, -21, -78, -111, 1000, 120
[00:00:03:44] 0, 9, 10, 0, 120, 33, -21, -78, -110, 1000, 120

RSSI for receiver
Receive background noise

Connected 0:01:58 Auto detect TCP/IP SCROLL CAPS NUM Capture Print echo
```

Figure 7

The Hyper terminal file may be captured by selecting Transfer and Capture Text (Figure 8).

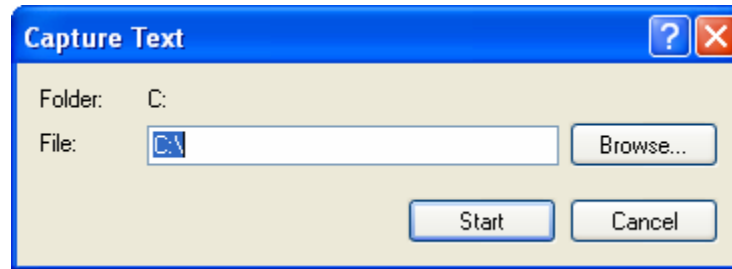


Figure 8

5. The Spectrum analyzer in the HiPR may be used to check for interference. Select Maintenance > Spectrum Analyzer (Figure 9).

Spectrum Analyser

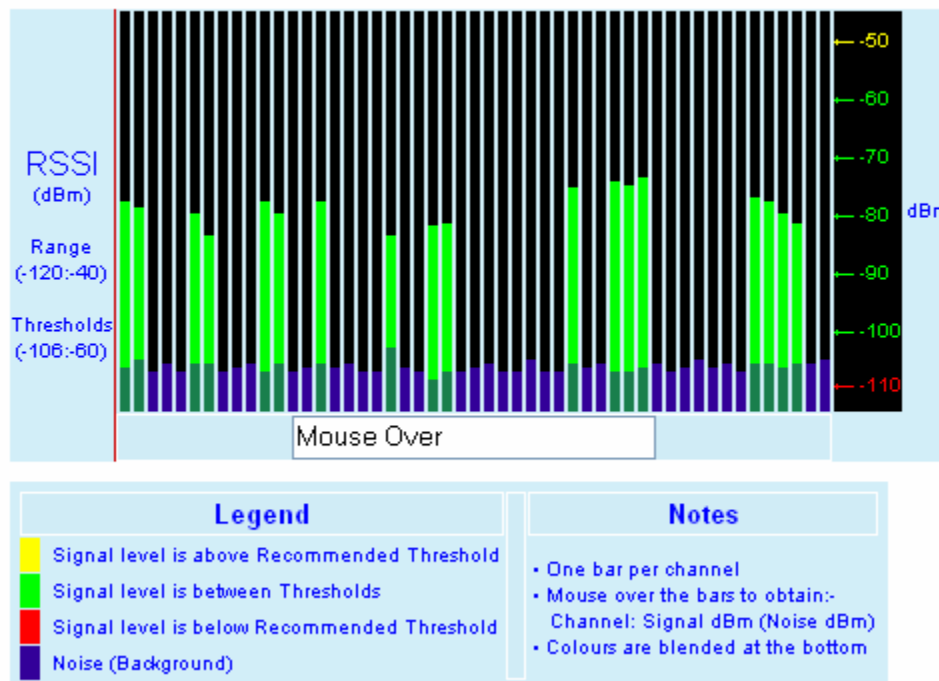


Figure 9

There are two main visual characteristics to the display (see Figure 9):

1. The noise floor –

Indicates how much RF interference is present. Other system(s) with different System ID's, and any other signals in this shared band, can and will increase the noise floor and could necessitate a stronger signal to achieve desired system throughput. A rough noise floor that changes every few seconds likely indicates that other hopping or spreading signals are present in the band.

2. System's Received Signal Strength –

Ideally, the system's signal strength should be *at least* 20dB above the floor noise (*more is always better*). Smooth but irregular RSSI level variations across the RF band relate to how much multi-path signals are interfering with reception at this location. A flat level indicates a better signal path than an uneven level.

Multi-path Interference

Achieving RF band flatness from an antenna system is a function of the type and quality of antenna used and how well a direct line-of-sight transmission path is realized. Try using directional antenna to reduce multi-path reflections, aiming away from noise sources by changing antenna directions slightly, by changing antenna polarization, changing the dual antennas position relative to each other or changing their location.

Note: *Minimum separation for a diversity reception is 5/8 wavelength (approximately 8 inches – 21cm) for fixed applications.*

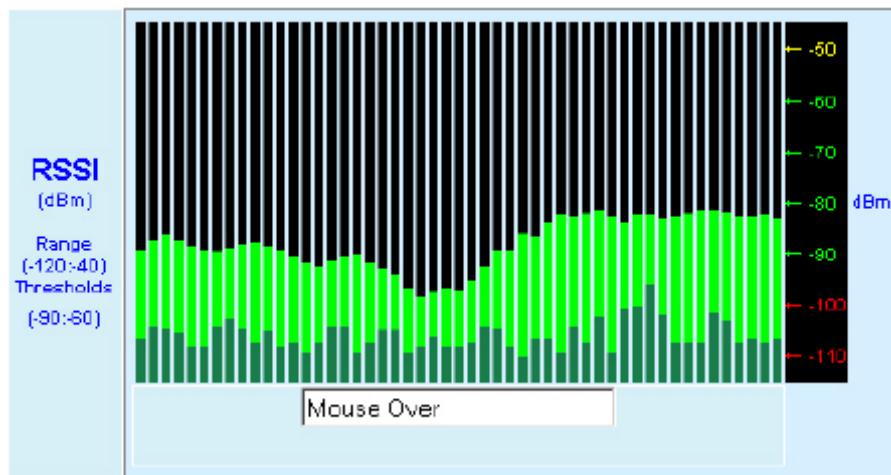


Figure 10 - Representative Multi-path Spectrum Example