



Tech Notes

PSM-512/1500/2100/2100L/4900 and M4000/M5000
Carrier Frequency Doppler Tracking Capabilities

Datum Systems satellite modems have been tested to determine the maximum Doppler rate they can tolerate and maintain lock and performance. The Doppler rate is the rate that the receive carrier changes frequency due to any cause. This is usually due to Doppler effect caused by movement of the satellite.

Tables of Eb/No verses Doppler Rate for Different Modem Modes.

BPSK, Rate 1/2, 32 kbps

4.0dB	2.5 kHz/sec
5.0dB	2.5 kHz/sec
6.0dB	2.5 kHz/sec
8.0dB	2.5 kHz/sec
10.0dB	2.5 kHz/sec

QPSK, Rate 1/2, 32 kbps

4.0dB	19 Hz/sec
5.0dB	31 Hz/sec
6.0dB	156 Hz/sec
8.0dB	313 Hz/sec
10.0dB	391 Hz/sec

QPSK, Rate 3/4, 32 kbps

5.0dB	75 Hz/sec
6.0dB	200 Hz/sec
7.0dB	300 Hz/sec
9.0dB	300 Hz/sec
11.0dB	300 Hz/sec

QPSK, Rate 3/4, 128 kbps

5.0dB	1.2 kHz/sec
6.0dB	3.2 kHz/sec
7.0dB	4.8 kHz/sec
9.0dB	4.8 kHz/sec
11.0dB	4.8 kHz/sec

BPSK, Rate 1/2, 256 kbps

4.0dB	160 kHz/sec
5.0dB	160 kHz/sec
6.0dB	160 kHz/sec
8.0dB	160 kHz/sec

10.0dB 160 kHz/sec

QPSK, Rate 1/2, 256 kbps

4.0dB 1.2 kHz/sec

5.0dB 2.0 kHz/sec

6.0dB 10 kHz/sec

8.0dB 20 kHz/sec

10.0dB 25 kHz/sec

QPSK, Rate 3/4, 64 kbps

5.0dB 300 Hz/sec

6.0dB 800 Hz/sec

7.0dB 1.2 kHz/sec

9.0dB 1.2 kHz/sec

11.0dB 1.2 kHz/sec

Notes:

These are maximum rates for reliable acquisition and < 0.2 dB BER degradation.

The tracking range is equal to the programmed sweep range, up to +/- 1.250 MHz.

Rapidly changing carrier levels and converter phase noise will degrade the above table values.

For applications requiring fast tracking, the modem should be tested in a representative system under actual working conditions for final approval.

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