Submission to: IEEE P802.11 Wireless LANS

Title: **Empirical Benchmarks ,High Rate PHY Example**

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Test Description

The objective of the testing is to give an indication of the range performance, multipath impact and diversity effectiveness of the radio implementation of the Harris proposed waveform waveform in an actual indoor office environment. The data also provides throughput data for long and short packets assuming the low rate preamble defined by the IEEE802.11 DS PHY is used.

Test Configuration

The tests are conducted with one PCMCIA radio evaluation platform operating as transmitter in a fixed position in the dense office environment of the second floor of Building 62A at the Harris Semiconductor campus in Palm Bay, Florida. A second PCMCIA radio evaluation platform, acting as receiver, is stationed at several distinct locations on this floor, therein forming a link to the fixed transmitting platform at different levels of path obstructions. The platform for second PCMCIA radio platform is capable of rotating at an uniform rate of approximately one rotation every 78 seconds.

The Harris PCMCIA radio Evaluation Program is used to evaluate the packet error rate (PER) and throughput on the link between the platforms, as measurement parameters of packet size, nominal data rate, antenna diversity, receiver location, and the number of receiver platform rotations.

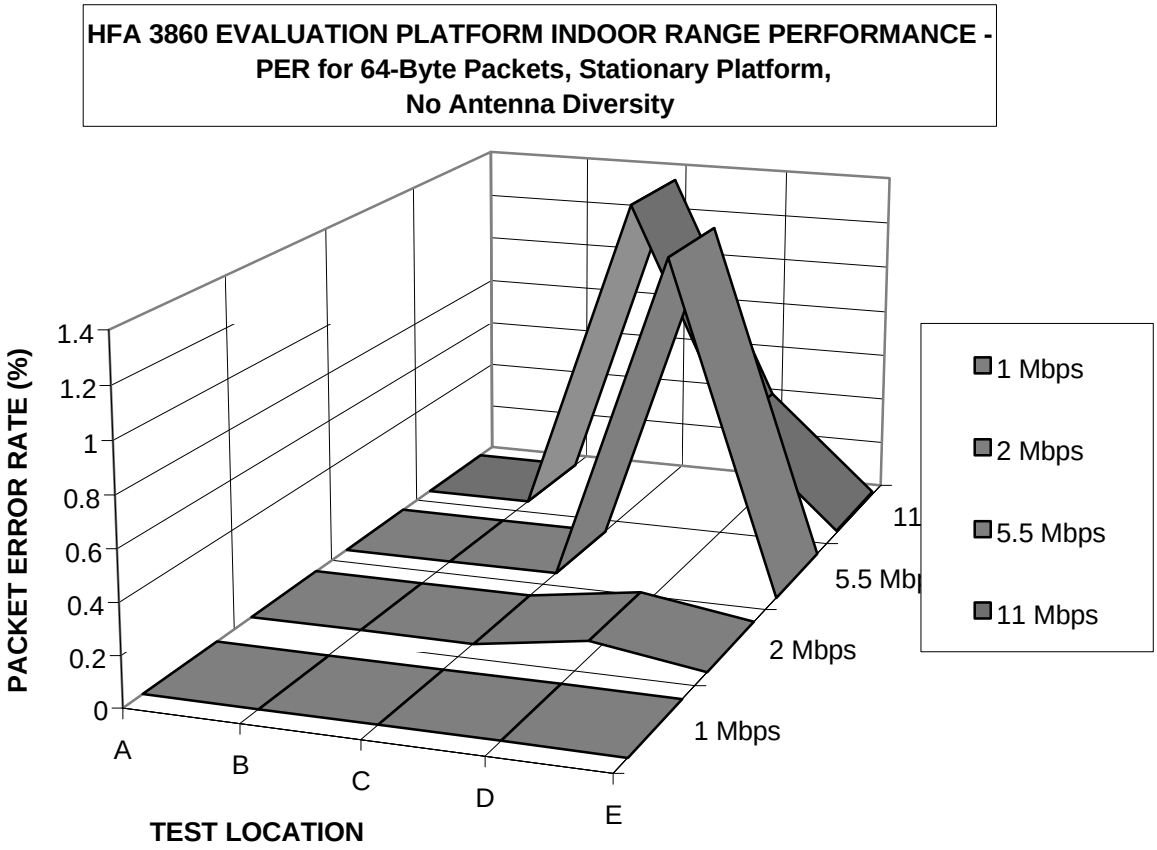
Procedure

The receiver PCMCIA radio platform is moved to one of five distinct locations, at 50, 75, 90 and 100 feet from the transmitter, in the obstructed office environment. A measurement of PER and throughput on the active link is taken using the PCMCIA radio Evaluation Program. At each receiver location, PER and throughput is measured for packet size at the extremes of 64 bytes and 1024 bytes, at the nominal data rates of 1 Mbps, 2 Mbps, 5.5 Mbps, and 11 Mbps, with antenna diversity on or off, and the receiving platform stationary or rotating to account for the average impact of multipath at each test location.

Test Results

The results of the PER and throughput measurements at each of the four nominal data rates are summarized in the next attached figures. Each chart displays the PER or throughput at the five locations at the extremes of packet size, antenna diversity and platform rotation. The robust throughput at the nominal 11-Mbps rate is displayed at all locations.

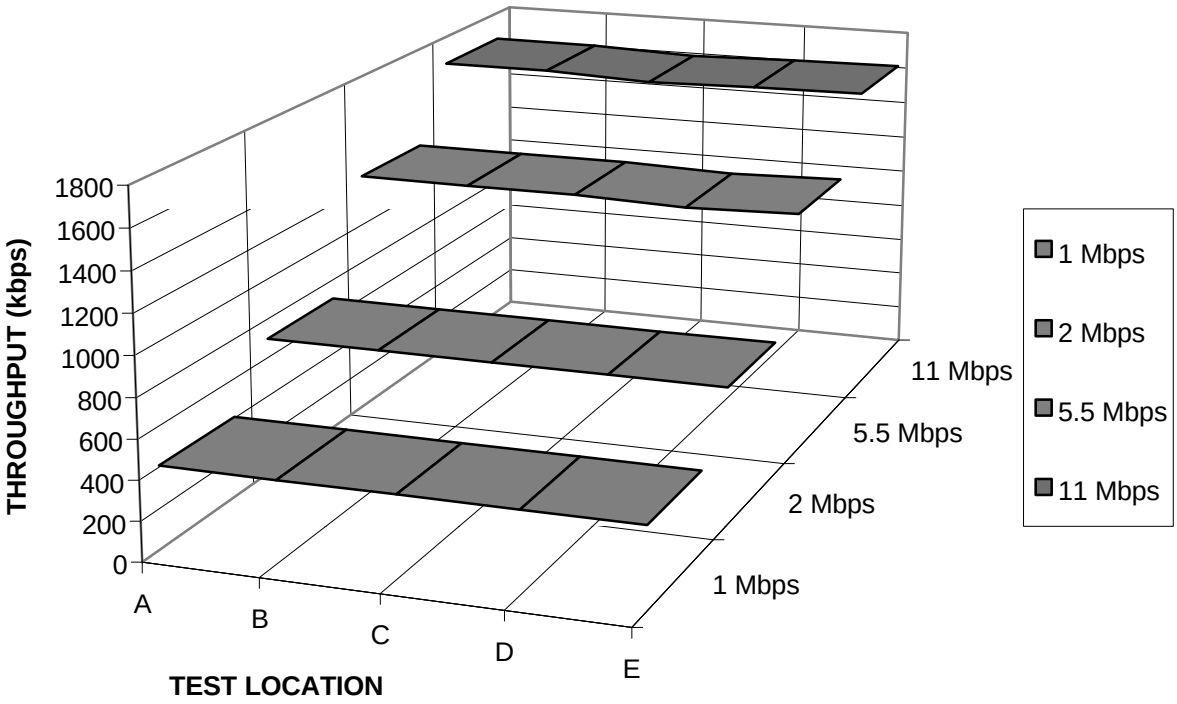
The conclusions from the test samples are that the waveform can meet comfortably at least 100 ft. of range within an office environment. The performance is although impacted to a great extend by multipath. Diversity can be an effective mechanism to mitigate the impact of multipath. The low rate preamble erases the potential throughput advantages of the high rate PHY when short packets are used (i.e 64 bytes) it does not have such an impact though for larger packets (i.e 1024 bytes).



LOCATION	RANGE (FT)	NUMBER OF WALLS, PATH OBSTRUCTIONS
A	100	2, Path Includes Hallway, Row of Metal Shelves with Test Equipment
B	90	0, Unobstructed Hallway
C	50	5, Path Includes Hallway and Traverses Four Offices
D	100	5, Path Includes Hallway, Edge of Office Wall, 3 Offices, Second Hallway and Half the Distance of the Conference Room
E	75	6, Path Includes Hallway, 6 Offices and Second Hallway

MEASUREMENT PARAMETERS	
Packet Size (Bytes)	64
CRC Length (MPDU) (Bits)	16
Packet Gap (µS)	20
Preamble Overhead (Bits)	128
# of Platform Revolutions	0 (Stationary)
Averaging Period (Sec)	160
Ideal Throughput (Mbps)	1,2, 5.5, or 11
S/W Diversity	Off

HFA3860 EVALUATION PLATFORM INDOOR RANGE PERFORMANCE - Throughput for 64-Byte Packets, Stationary Platform, No Antenna Diversity



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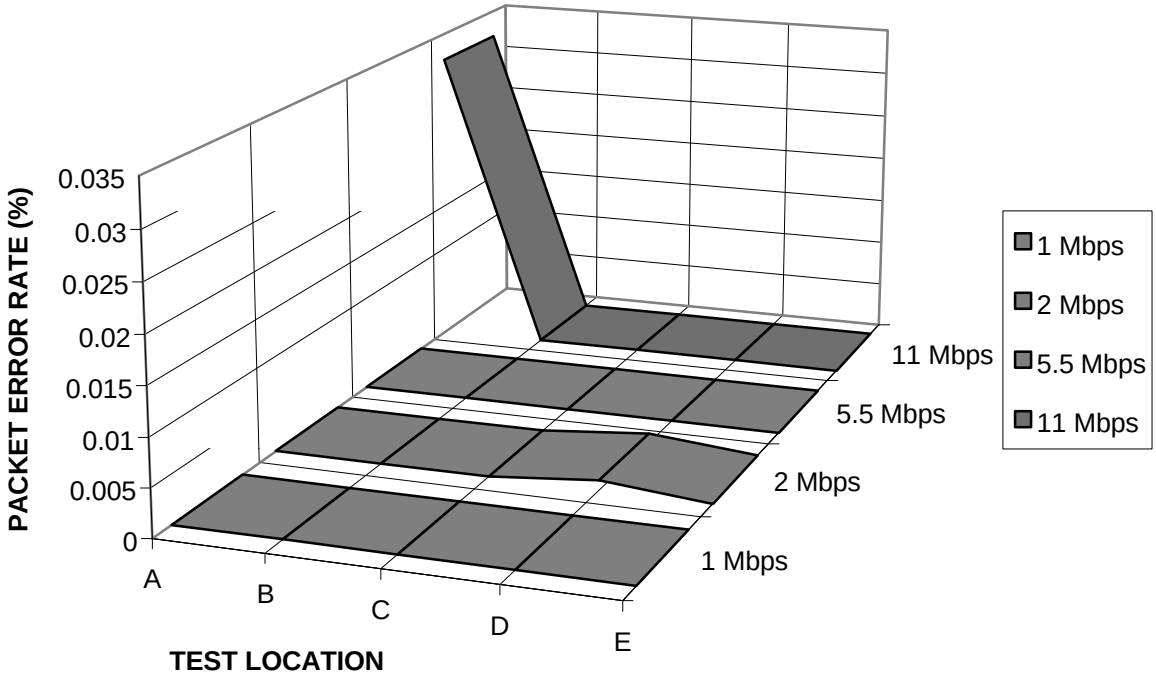

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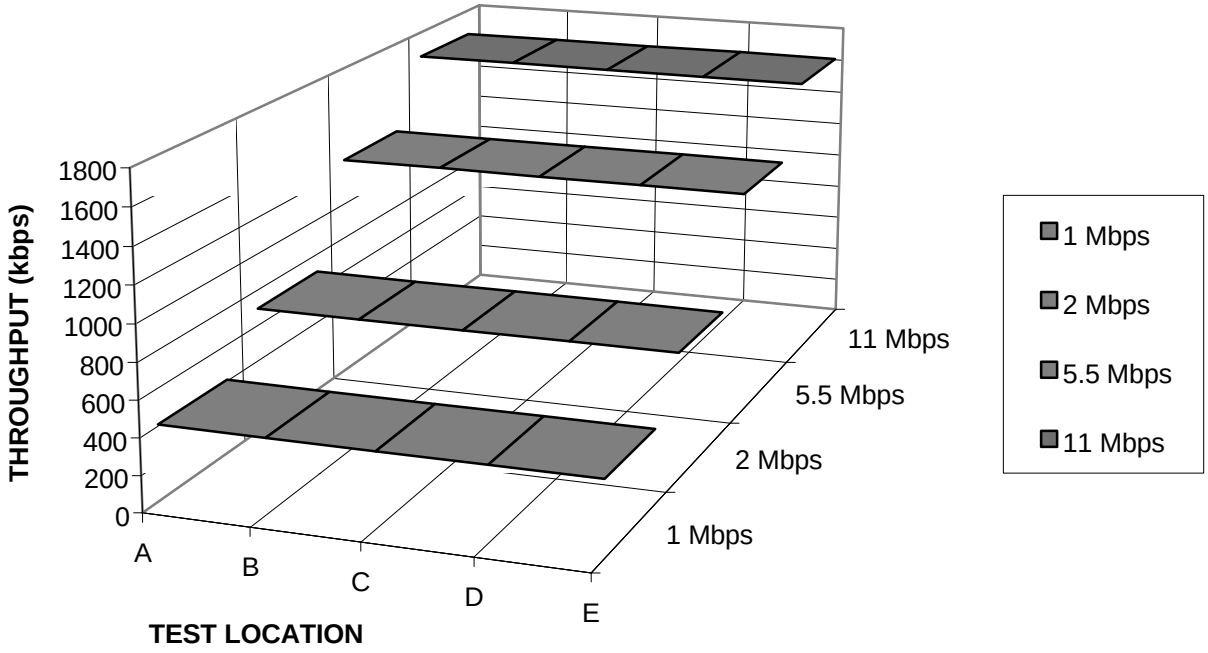

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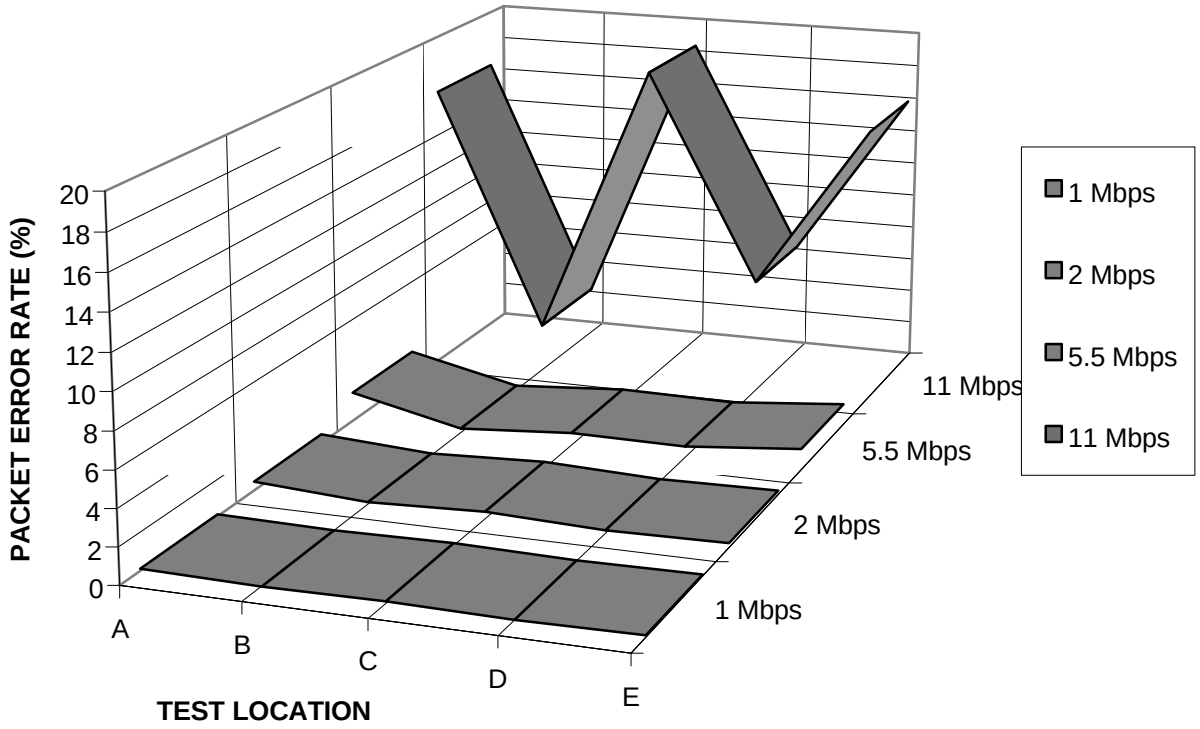
PER for 64-Byte Packets, No Antenna Diversity, Rotating Platform**



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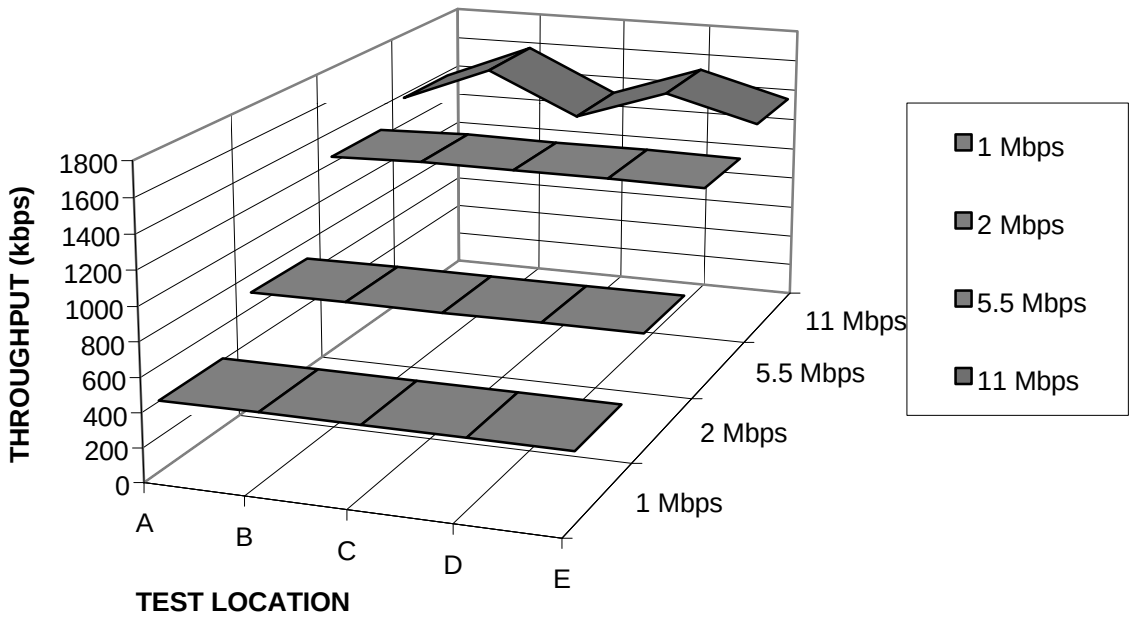

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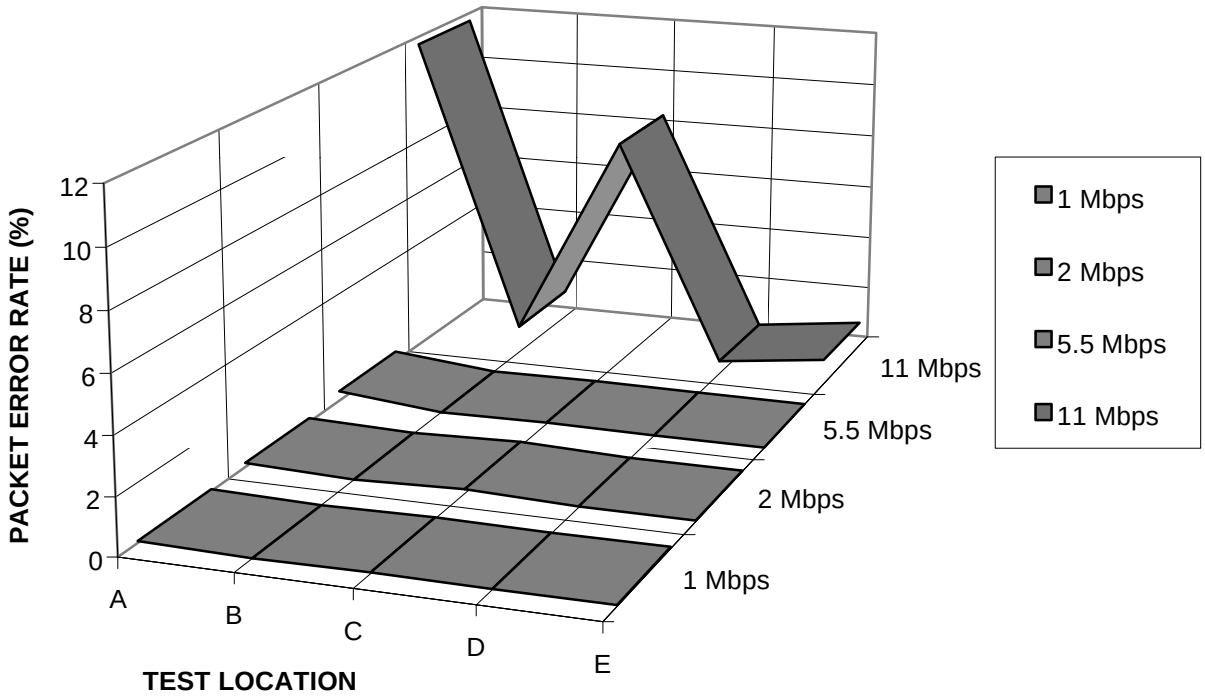

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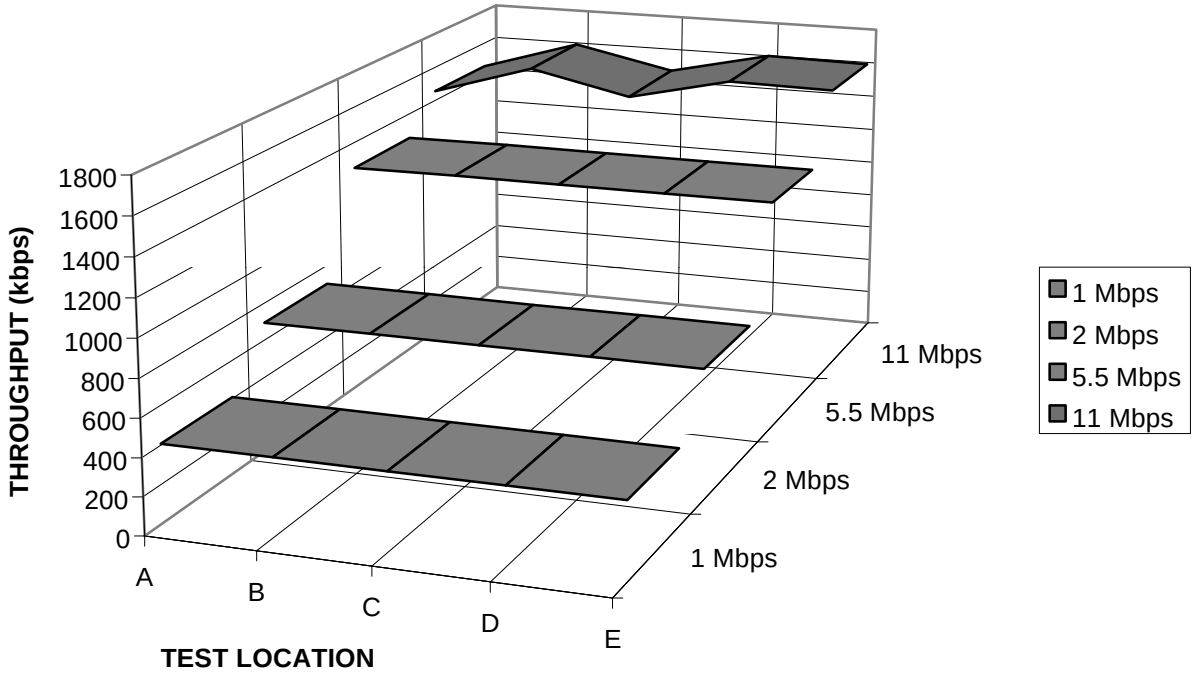

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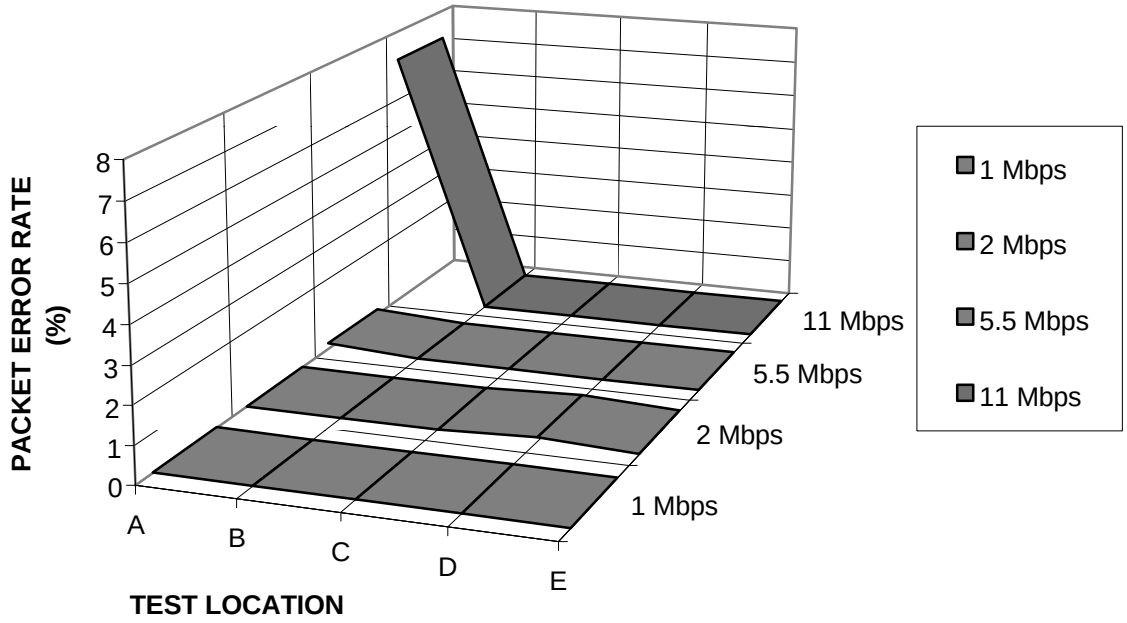
PER for 1024-Byte Packets, S/W Diversity On, Stationary Platform



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S/W Diversity	On

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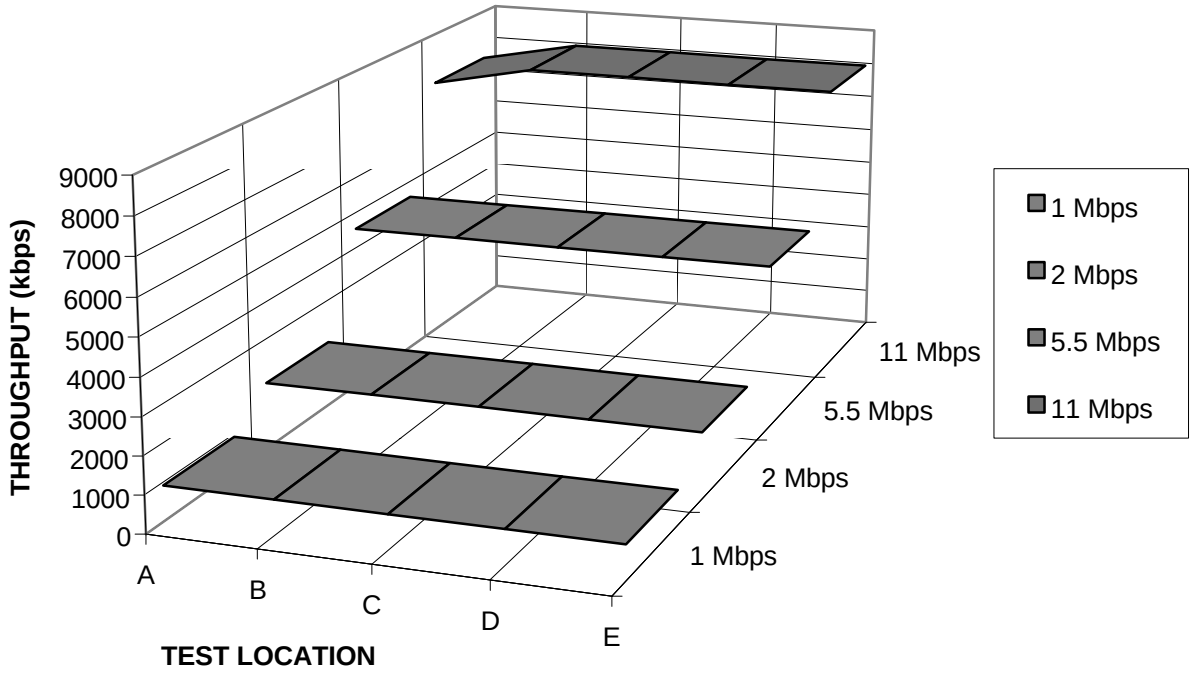

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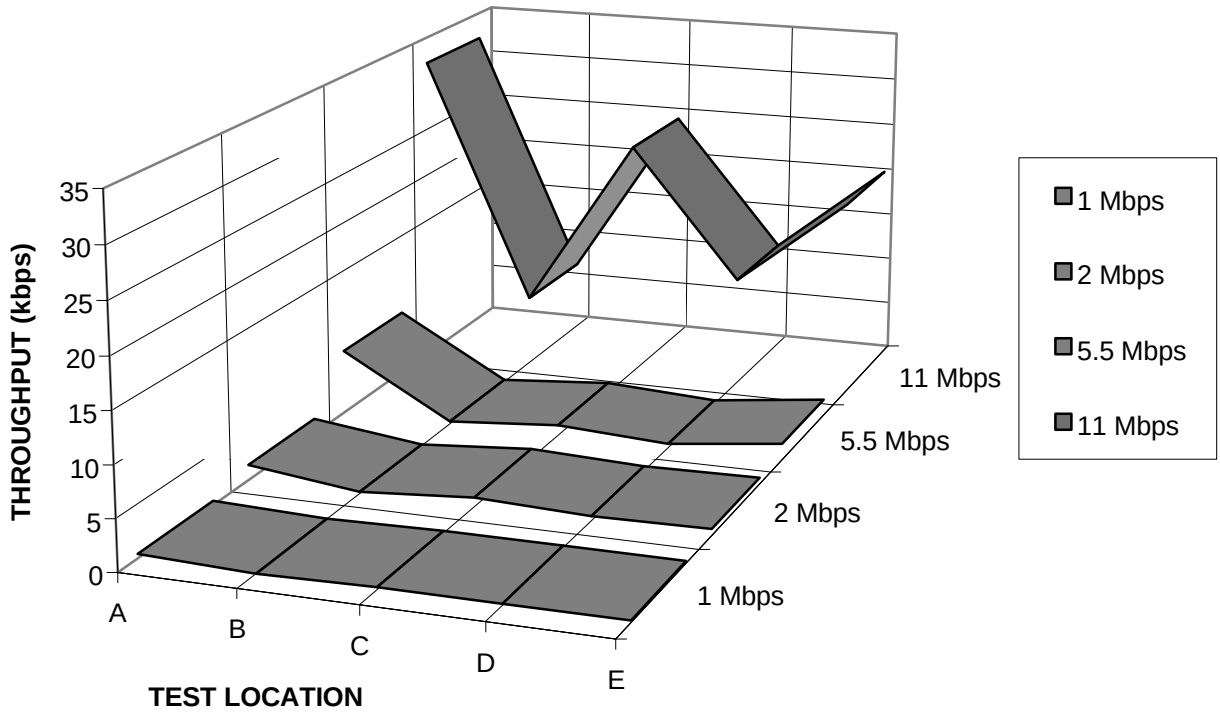

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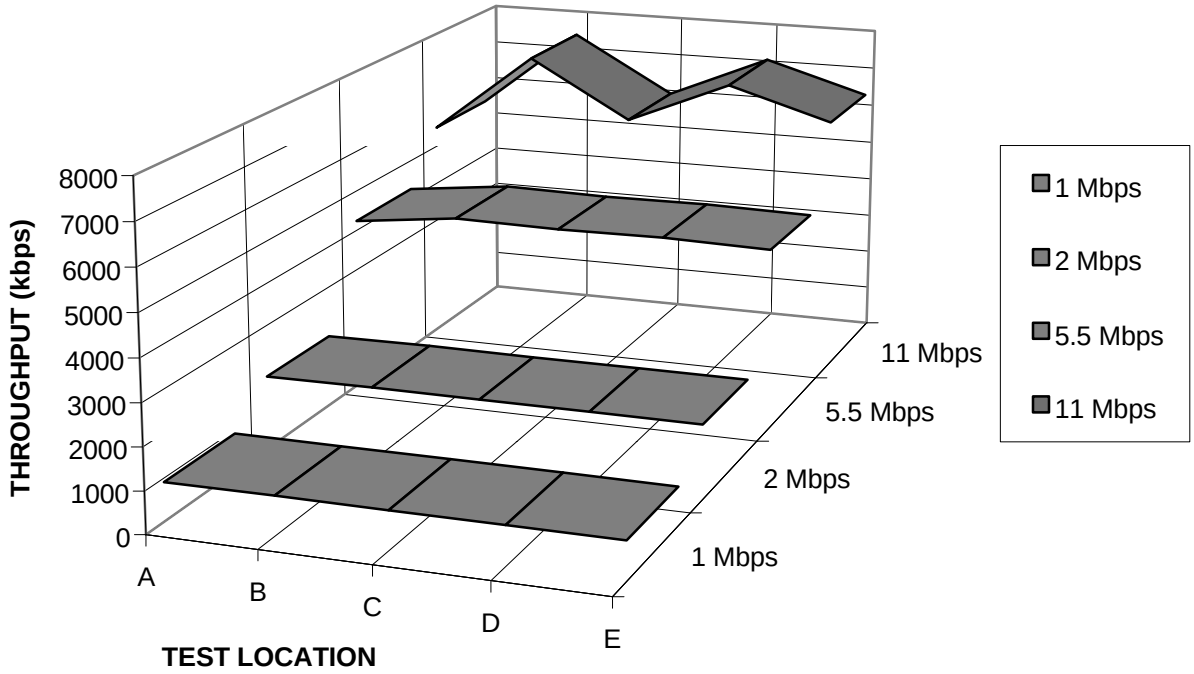

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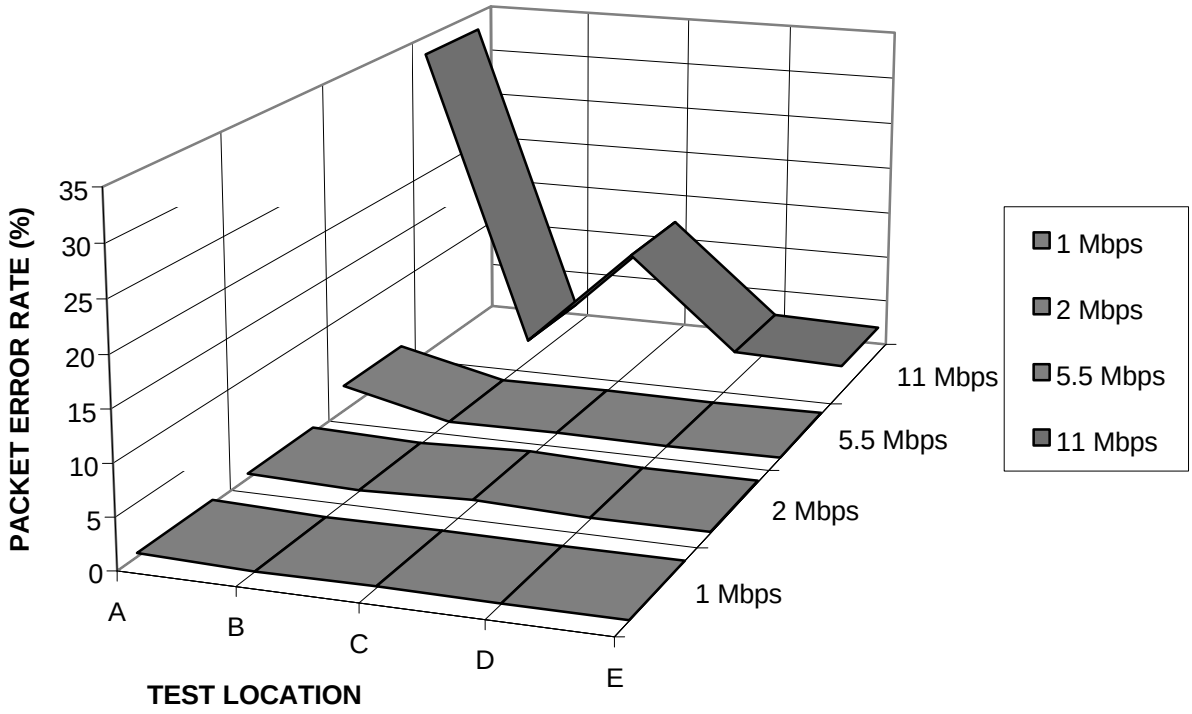

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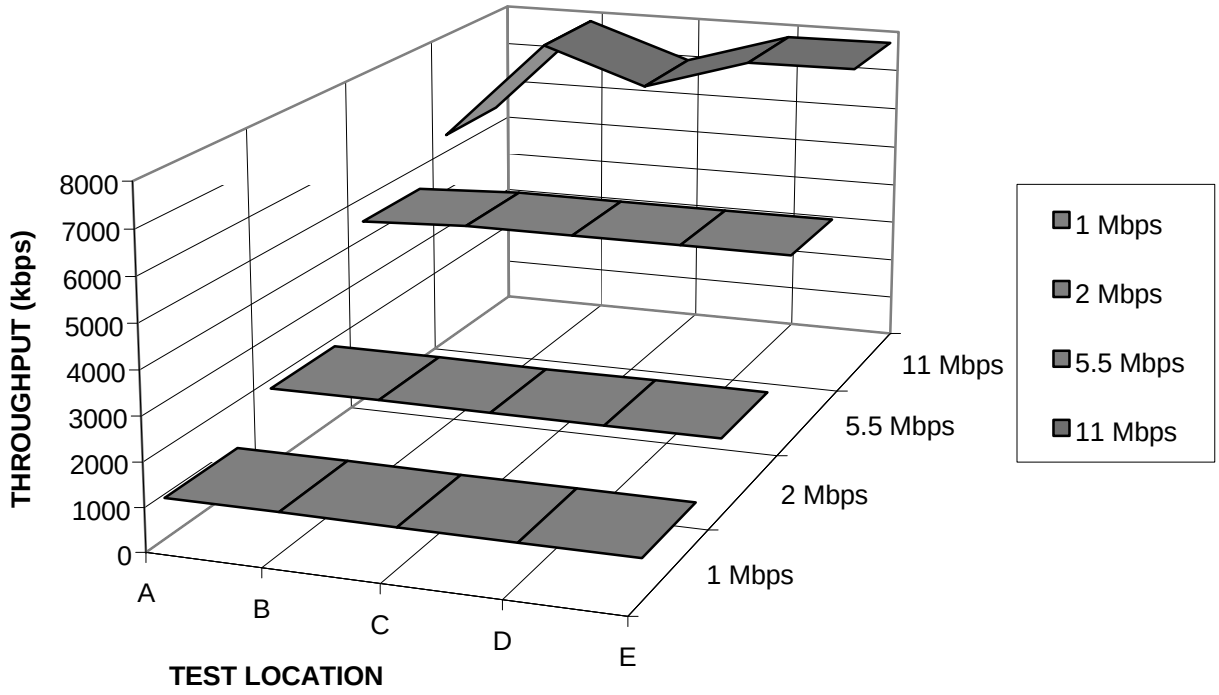

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