5. CONCLUSIONS

Figures 54 through 57 compare mean and 95th percentile channel, bit, and packet error rates for the four environments including and excluding out-of-sync data. The STIC system performed most reliably in the rural plains environment and similarly in the urban low-rise environment. These two environments were relatively clear of significant natural or man-made obstacles. In these environments, STIC performance degradation was due to occasional severe signal shadowing by local geographic obstacles, such as hills or locally dense clusters of buildings. These encounters with severe signal shadowing often resulted in the STIC system losing synchronization.

STIC performance was degraded by 15 to 20 dB when operated in the urban high-rise environment; performance degraded by 27 to 42 dB in the rural mountain environment. This performance degradation was with respect to the rural plains environment. In the rural mountain environment, the proximity of the receiver to the transmitter was not an issue, ranging from 2-48 miles, but the signal power vs. distance scatter plot (Figure 29) shows that the effect of local terrain shadowing was significant. Proximity of receiver to transmitter may have been an issue in the analysis of the urban high-rise data. Figures 44 through 51 show a significant increase in STIC performance vs. received signal power when operated in the urban high-rise environment. As mentioned in Section 4.3.4, the Denver urban high-rise environment may not be typical of the reception environment of most high-rise areas. A typical FM transmitter, located atop a tall building in a high-rise sector, may present a greater signal level than a transmitter located 26 miles away and produce significantly improved system performance.

The primary culprit in the degradation of STIC system performance in all environments was loss of synchronization. While it can be argued that the system was initializing during this period, it was also true that the system had to first lose synchronization before this resynchronization was necessary. During the resynchronization period (approximately 15 seconds), the STIC CER, BER, and PER were at a maximum and a significant performance reduction was inflicted. Discussions with MITRE personnel suggested that the STIC synchronization performance would have improved if the x2 interleaver was used instead of the x1 interleaver.

Comparisons of measurements with predictions of received signal power were made using data from two paths for the STIC field test measurements. The results are shown in Figures D-1 and D-2 of Appendix D show that for these environments where the STIC system will be used, the NTIA/ITS Communication System Performance Model (CSPM) can be used for reliable coverage predictions.

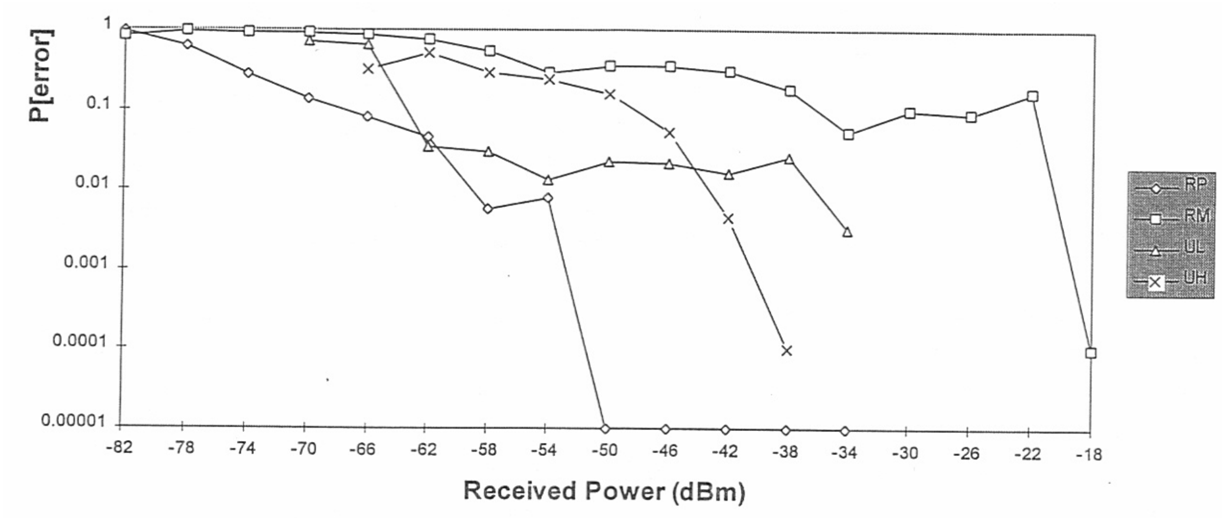

Figure 54. Mean packet error rates vs. received signal power for four environments.

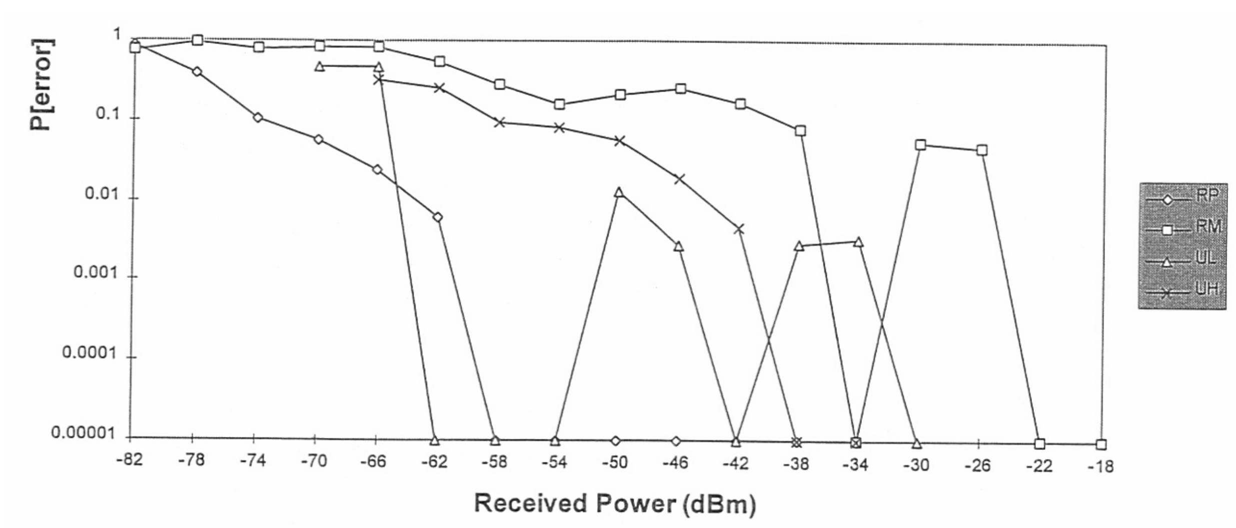

Figure 55. Mean packet error rates vs. received signal power for four environments (SYNC data).

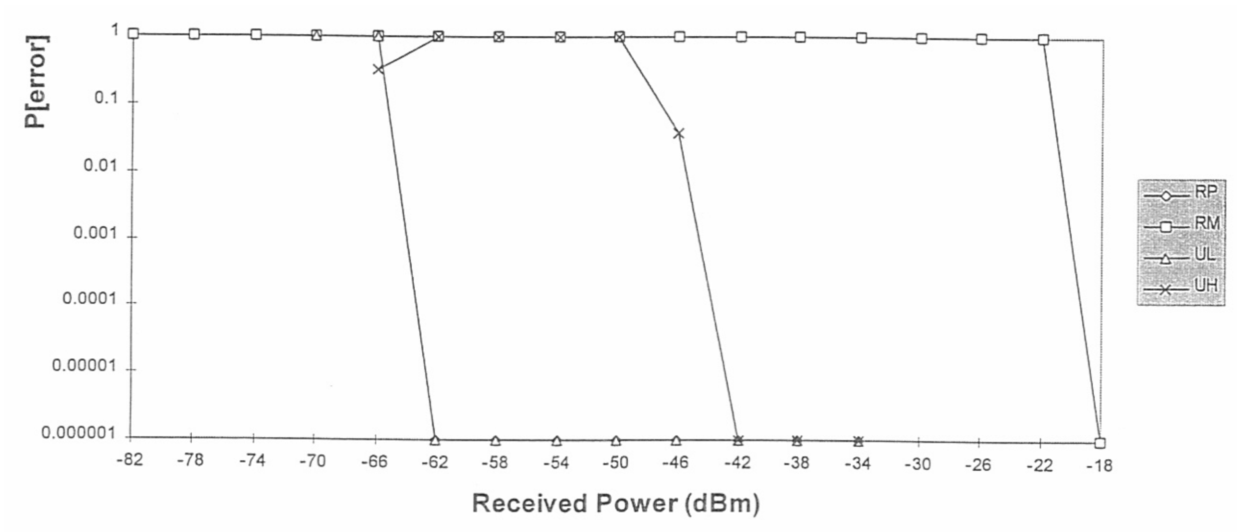

Figure 56. 95th percentile packet error rates vs. received signal power for four environments.

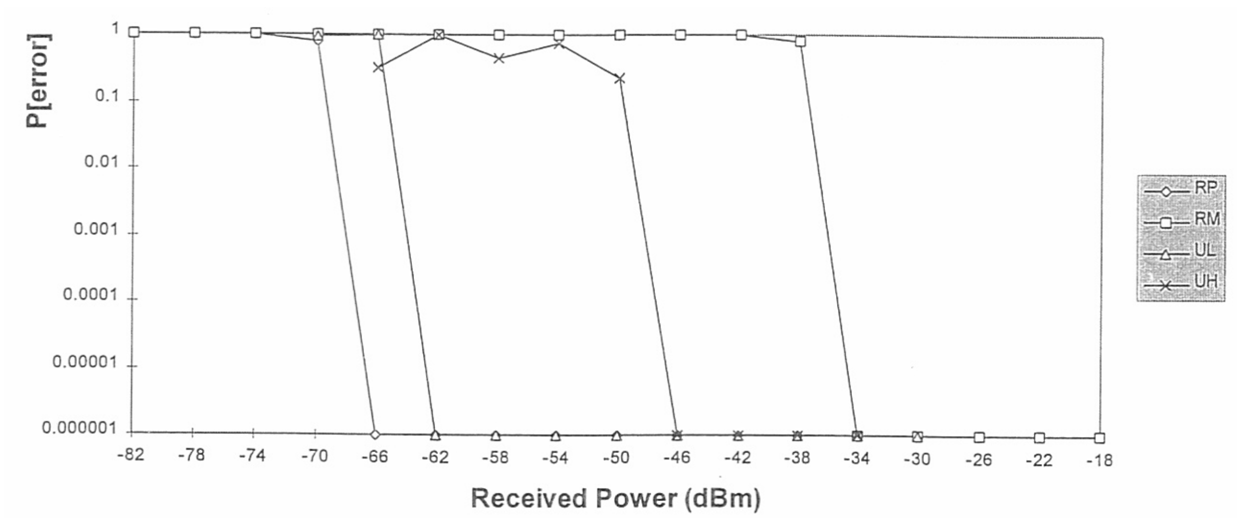

Figure 57. 95th percentile PERs vs. received signal power for four environments (SYNC data).