

5. REFERENCES

- Barsis, A. P., P. L. McQuate, and M. J. Miles (1964), Initial results of VHF field strength measurements over irregular terrain using low antenna heights, NBS Report 8296 (NTIS Access No. AD 456 273).
- Barsis, A. P., and M. J. Miles (1965), Cumulative distributions of VHF field strength over irregular terrain using low antenna heights, NBS Report 8891, also Miles and Barsis (1966) Report IER 10-ITSA 10 (NTIS Access No. 645 023).
- Barsis, A. P., M. E. Johnson, and M. J. Miles (1969), Analysis of propagation measurements over irregular terrain in the 76 to 9200 MHz range. ESSA Tech. Report ERL 114-ITS 82 (NTIS Access No. AD 699 072).
- Bergman, C. W., and H. C. Vivian (1970), Long-range patrol communications, Final Report, JPL Doc. 650-109, for NASA.
- Black, D. M., and D. O. Reudink (1972), Some characteristics of mobile radio propagation at 836 MHz in the Philadelphia area. IEEE Trans VT 21, 45-51.
- CCIR (1969)*, Influence of irregular terrain on tropospheric propagation, Field strength measurements in urban areas for the land mobile service. Documents of the XIIth Plenary Assembly, New Delhi (1970), Document V/136, Poland.
- CCIR (1970a)*, Measurement of field strength for VHF and UHF broadcast services, including television, Report 228-1, Vol. II, Pt. 1, XIIth Plenary Assembly, New Delhi.
- CCIR (1970b)*, VHF and UHF propagation curves for the frequency range from 30 MHz to 1000 MHz. Recommendation 370-1, Vol. II, Pt. 1, XIIth Plenary Assembly, New Delhi.
- Egli, J. J. (1957), Radio propagation above 40 MHz over irregular terrain. Proc. IRE 45, 1383-1391.
- Hause, L. G., F. G. Kimmett, and J. M. Harman (1969), UHF propagation data for low antenna heights. ESSA Tech. Rept. ERL 134-ITS 93, Vols. I & II.
- Head, H. T., and O. L. Prestholdt (1960), The measurement of television field strengths in the VHF and UHF bands, Proc. IRE 48, 1000-1008.
- Hufford, G. A., and J. L. Montgomery (1966), On the statistics of VHF field strength measurements using low antenna heights 1, NBS Report 9223 (NTIS Access No. AD 487 672).
- Hutton, D. B. (1963), Report on mobile field strength measurements New York City UHF-TV Project, FCC Report No. R-6302.

*Published by the International Telecommunication Union, Geneva, Switzerland.

Jansky and Bailey Res. Engr. Dept. (1965), Tropical Propagation Research, Report No. 6, Atlantic Res. Corp., Alexandria, Va.

Johnson, M. E., M. J. Miles, P. L. McQuate, and A. P. Barsis (1967), Tabulations of VHF propagation data obtained over irregular terrain at 20, 50 and 100 MHz, ESSA Tech. Rept. IER 38-ITSA 38, parts I, II and III (NTIS Access Nos. AD 655 854, 662 713 and 667 530).

Kirby, R. S. (1957), Measurement of service area for television broadcasting, IRE Trans BTS 7, 23-30.

Kirby, R. S., and F. M. Capps (1956), Correlation in VHF propagation over irregular terrain, IRE Trans AP 4, 77-85.

Kirby, R. S., H. T. Dougherty, and P. L. McQuate (1956), VHF propagation measurements in the Rocky Mountain region, IRE Trans VC 6, 13-19.

Longley, A. G., and P. L. Rice (1968), Prediction of tropospheric radio transmission loss over irregular terrain, a computer method - 1968. ESSA Tech. Rept. ERL 79-ITS 67 (NTIS Access No. 676 874).

Longley, A. G., and R. K. Reasoner (1970), Comparison of propagation measurements with predicted values in the 20 to 10,000 MHz range. ESSA Tech. Rept. ERL 148-ITS 97 (NTIS Access No. AD 703 579).

Longley, A. G., and G. A. Hufford (1975), Sensor path loss measurements, analysis and comparison with propagation models, OT Report 75-74.

McQuate, P. L., J. M. Harman, and A. P. Barsis (1968), Tabulations of propagation data over irregular terrain in the 230 to 9200 MHz frequency range, ESSA Tech. Rept. ERL 65-ITS 58, Parts I, II, and III (NTIS Access Nos. AD 671 271, 689 708, and 715 753).

McQuate, P. L., J. M. Harman, and M. E. McClanahan (1971), Tabulations of propagation data over irregular terrain in the 230 to 9200 MHz frequency range, Part IV receiver site in grove of trees. OT/TRER 19.

Neham, E. A. (1974), An approach to estimating land mobile radio coverage. IEEE Trans VT 23, 135-138.

Okumura, Y., E. Ohmori, T. Kawano, and K. Fukuda (1968), Field strength and its variability in VHF and UHF land-mobile radio service. (Tokyo) Rev. Elec. Com. Lab. 16, 825-873.

Reudink, D. O., and M. F. Wazowicz (1973), Some propagation experiments relating foliage loss and diffraction loss at X-band and UHF frequencies. IEEE Trans Com. 21, 1198-1206.

Saxton, J. A., and B. N. Harden (1954), Ground wave field strength surveys at 100 and 600 Mcs. Proc. IEE 101, part III, 215-221.

Waldo, G. V. (1963), Report on the analysis of measurements and observations New York City UHF-TV Project, IEEE Trans BC 9, No. 2, 7-36.

BIBLIOGRAPHIC DATA SHEET

	1. PUBLICATION OR REPORT NO. OTR 76-87	2. Gov't Accession No.	3. Recipient's Accession No.
4. TITLE AND SUBTITLE LOCATION VARIABILITY OF TRANSMISSION LOSS LAND MOBILE AND BROADCAST SYSTEMS		5. Publication Date May 1976	6. Performing Organization Code OT
7. AUTHOR(S) Anita G. Longley		9. Project/Task/Work Unit No. 9106520	
8. PERFORMING ORGANIZATION NAME AND ADDRESS Department of Commerce Office of Telecommunications Institute for Telecommunication Sciences Boulder, Colorado 80302		10. Contract/Grant No.	
11. Sponsoring Organization Name and Address		12. Type of Report and Period Covered Research	
13.			
14. SUPPLEMENTARY NOTES			
15. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.) This report summarizes the results of a number of studies of path-to-path, or location, variability of transmission loss at 20 MHz to 10 GHz. The studies show that such variability appears to be normally distributed and can, therefore, be represented by a standard deviation. Location variability increases with increased frequency and terrain irregularity, the standard deviation increasing from about 5 to 25 dB. For non-urban areas an expression is given which defines location variability in terms of radio frequency and terrain irregularity. The effects of tall buildings in highly built-up urban areas, and of trees are discussed.			
16. Key words (Alphabetical order, separated by semicolons) Broadcast systems; irregular terrain; location variability; mobile systems; radio transmission loss; urban communications; vegetation.			
17. AVAILABILITY STATEMENT <input checked="" type="checkbox"/> UNLIMITED. <input type="checkbox"/> FOR OFFICIAL DISTRIBUTION.	18. Security Class (This report) Unclassified	20. Number of pages 21	
	19. Security Class (This page) Unclassified	21. Price:	