

Figure 33. Area coverage survey: CDF average Δ excess path loss/channel, transmitter height 16 meters.

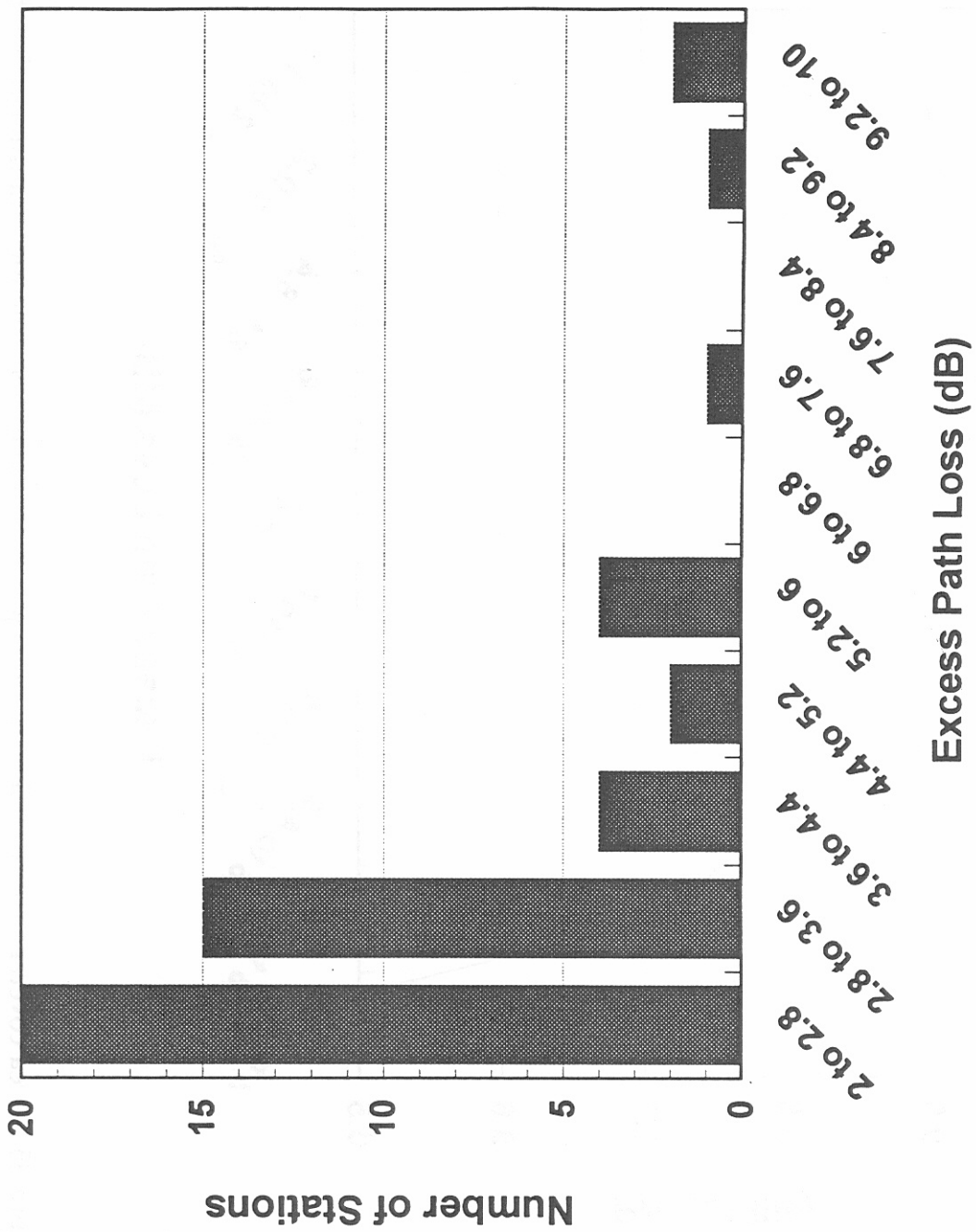


Figure 34. Area coverage survey: histogram of average Δ excess path loss/channel, transmitter height 40 meters.

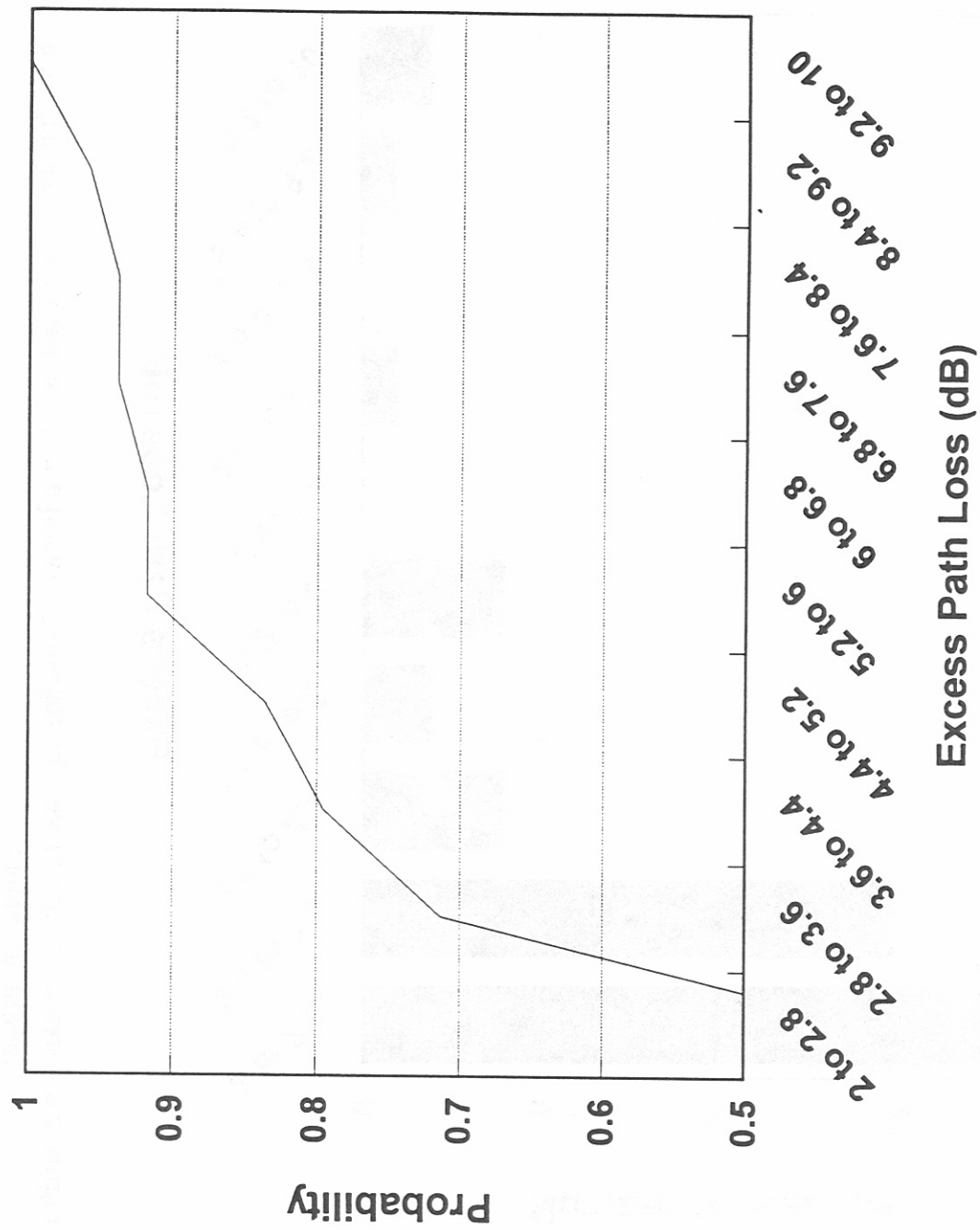


Figure 35. Area coverage survey: CDF of average Δ excess path loss/channel, transmitter height 40 meters.

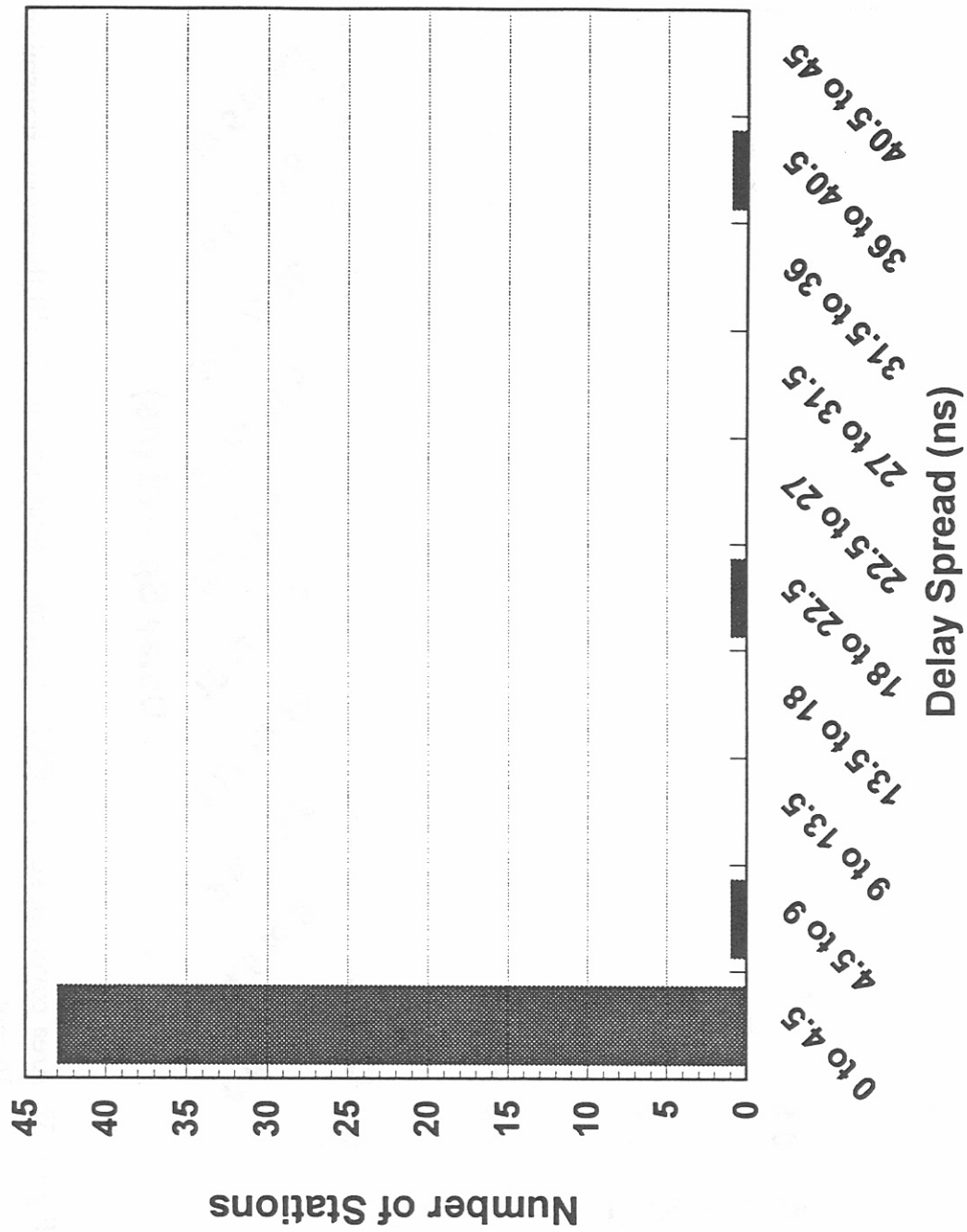


Figure 36. Area coverage survey: histogram of average delay spread, 10 dB threshold, transmitter height 16 meters.

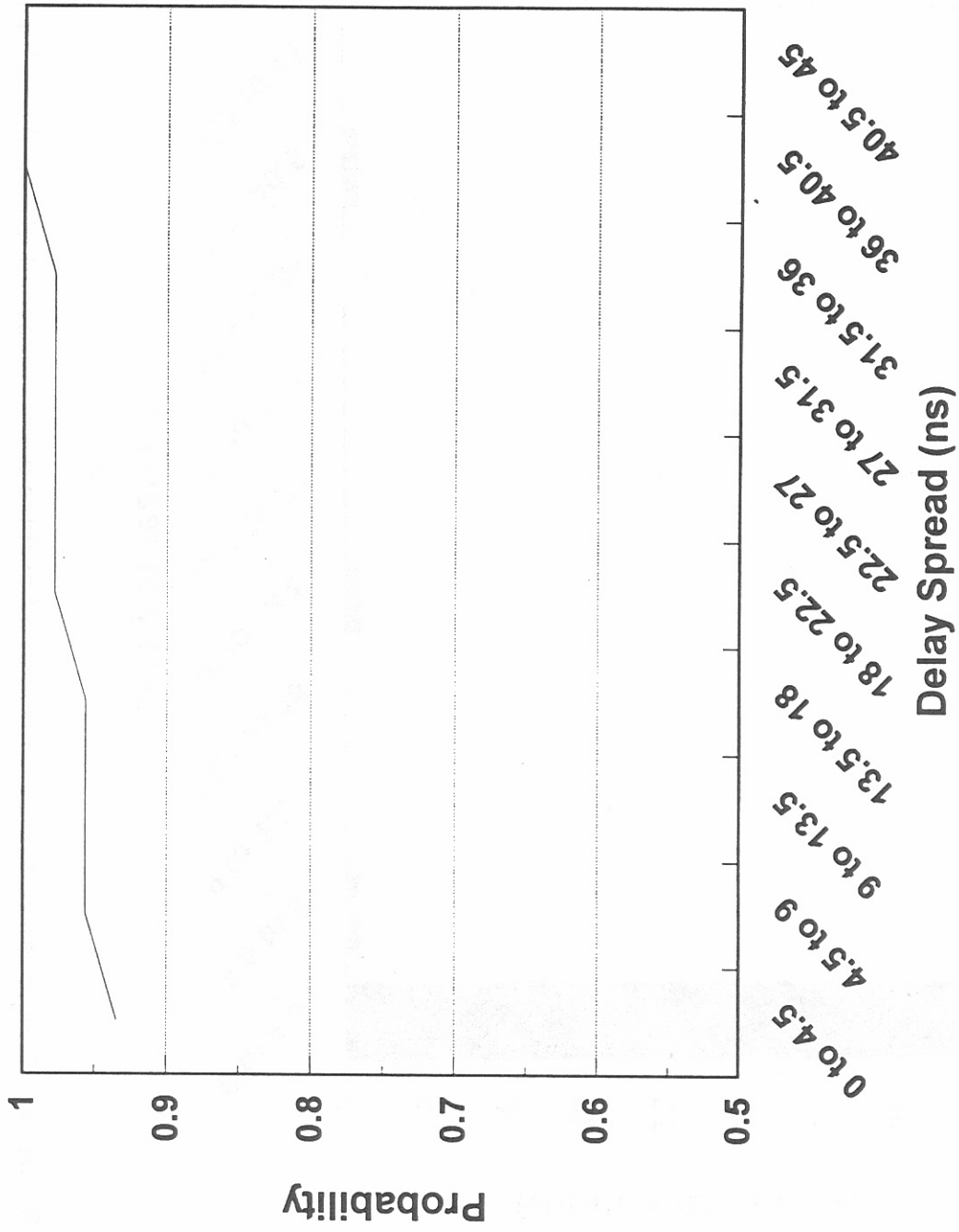


Figure 37. Area coverage survey: CDF of average delay spread, 10 dB threshold, transmitter height 16 meters.

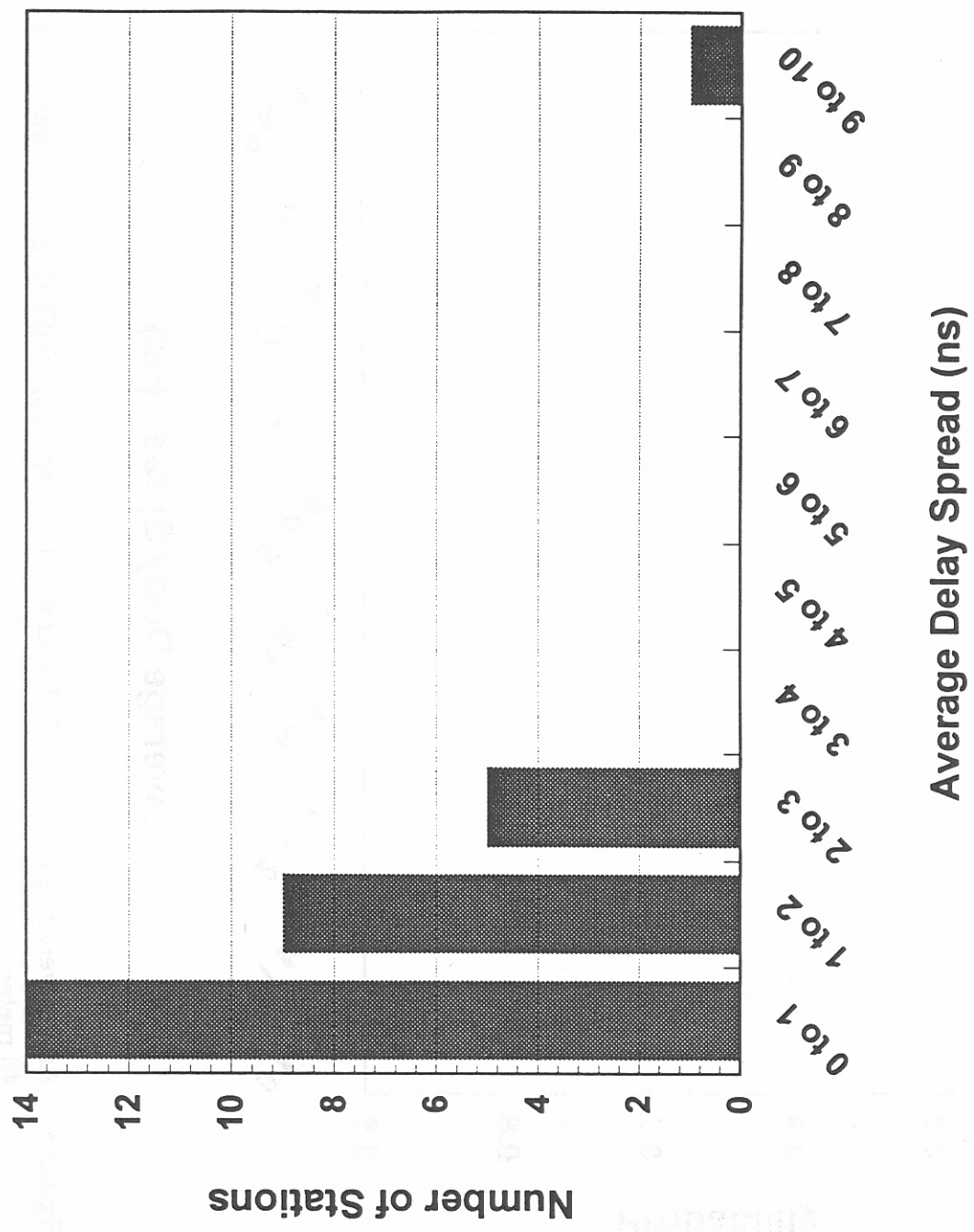


Figure 38. Area coverage survey: distribution of average delay spread, 10 dB threshold, transmitter height 40 meters.

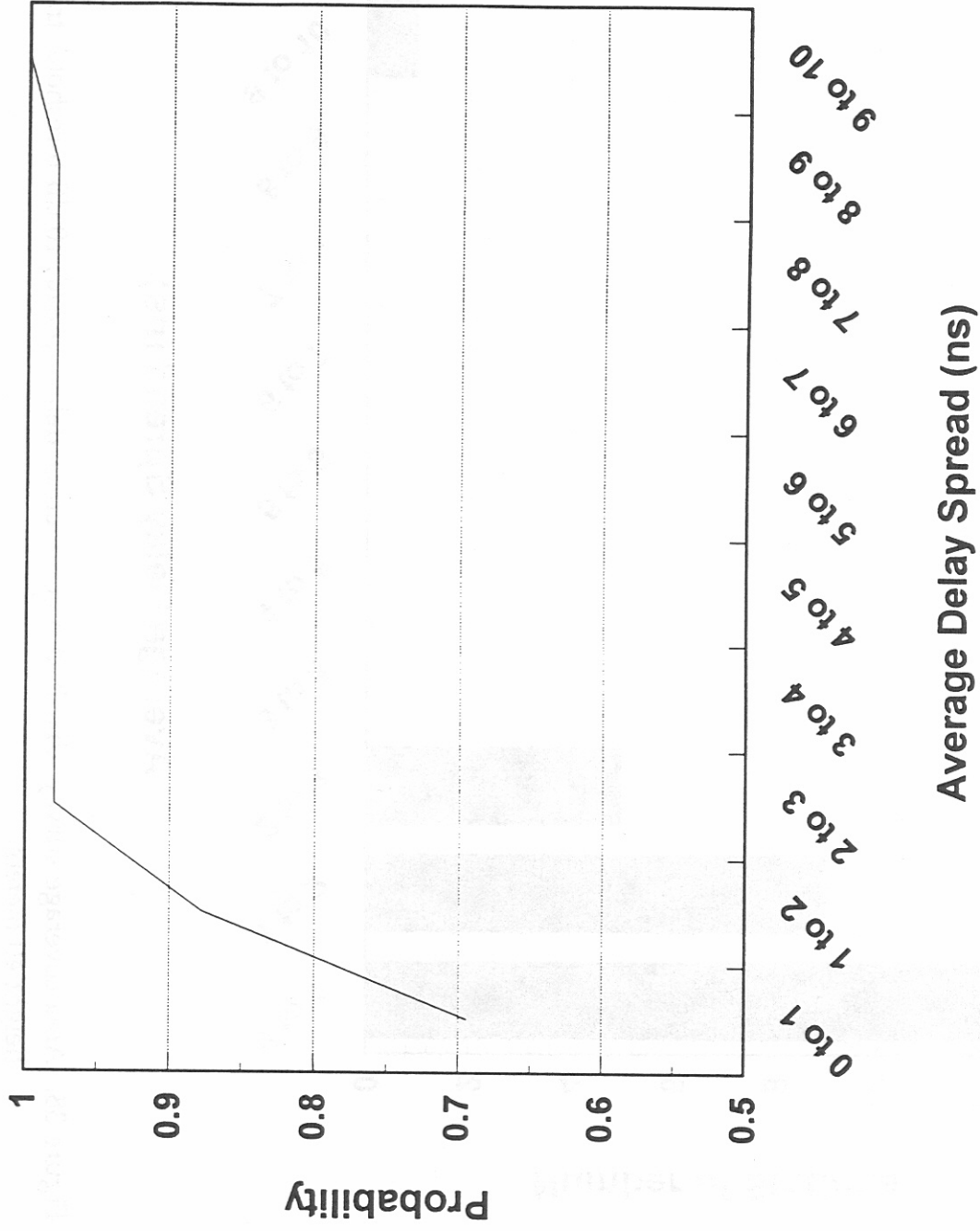


Figure 39. Area coverage survey: CDF of average delay spread, 10 dB threshold, transmitter height 40 meters.

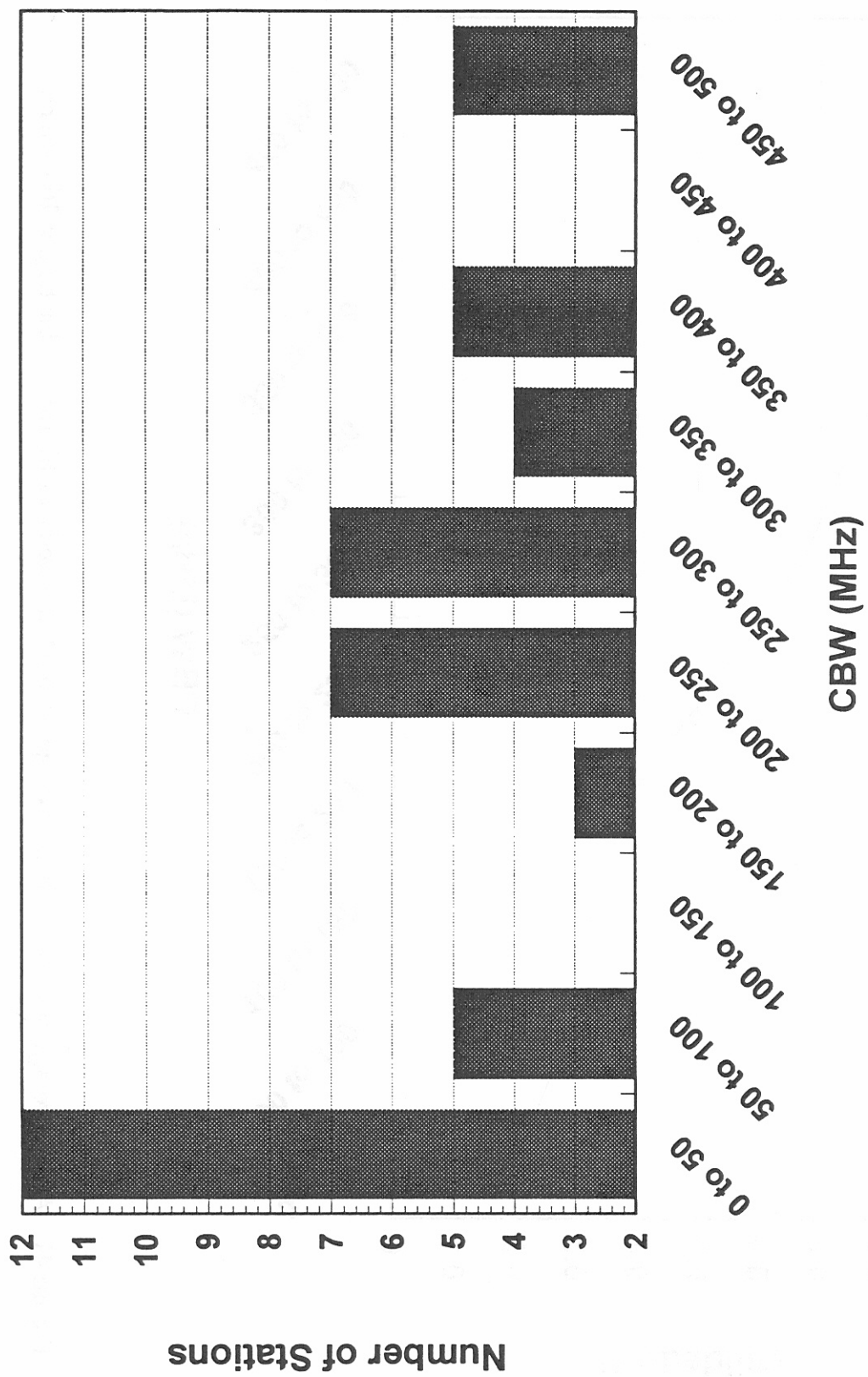


Figure 40. Area coverage survey: distribution of average correlation bandwidth, transmitter height 16 meters.

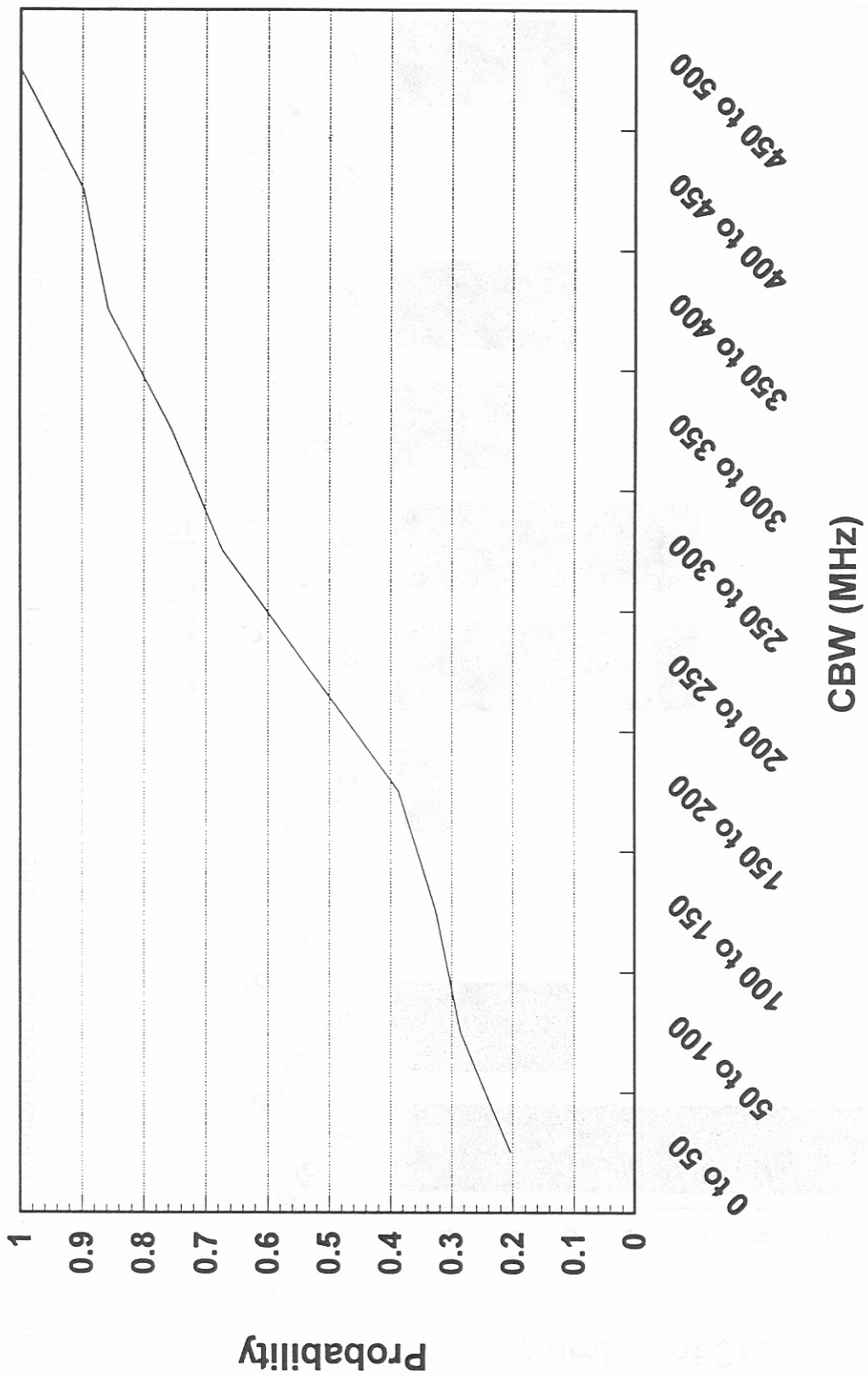


Figure 41. Area coverage survey: CDF of average correlation bandwidth, transmitter height 16 meters.

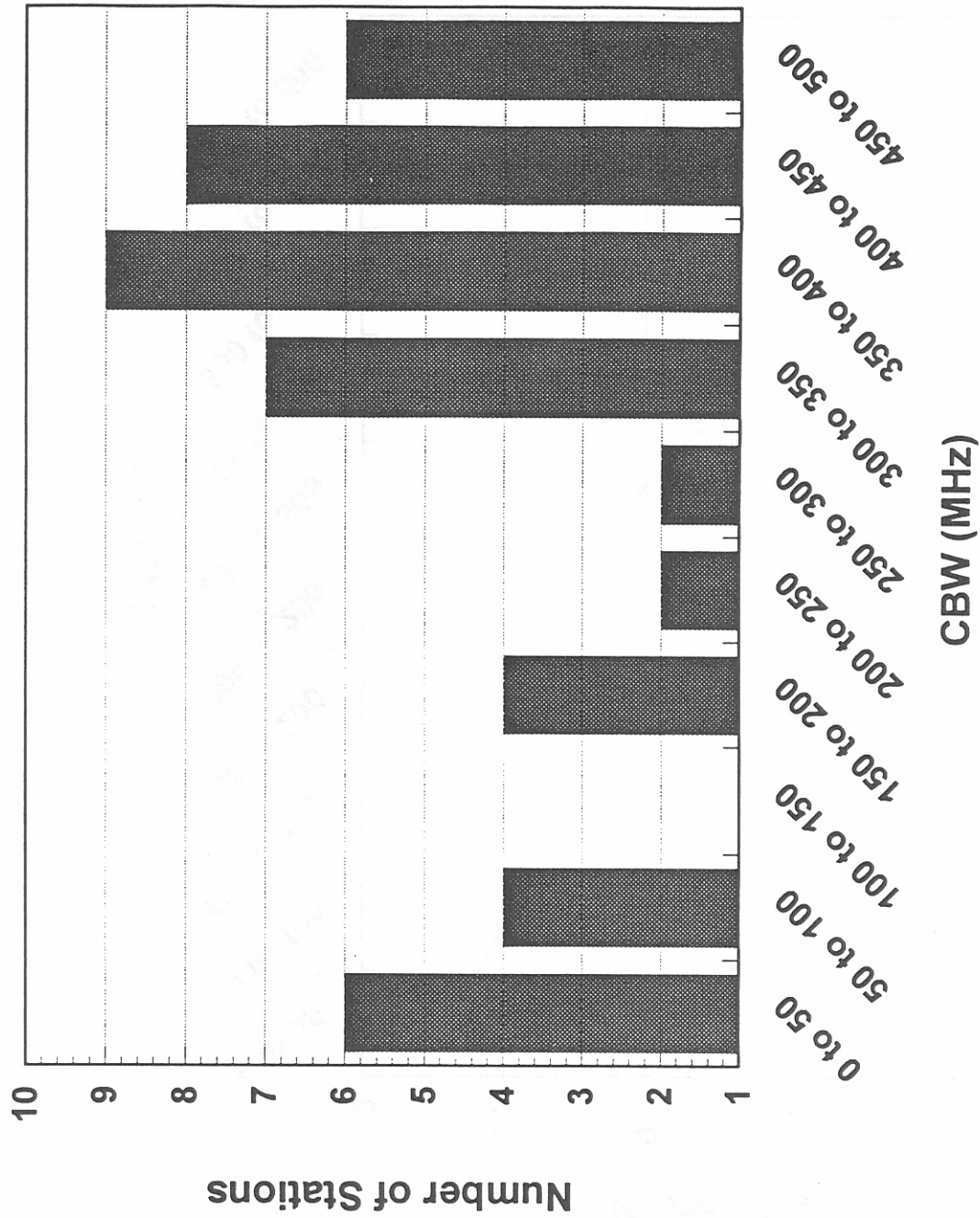


Figure 42. Area coverage survey: distribution of average correlation bandwidth transmitter height 40 meters.

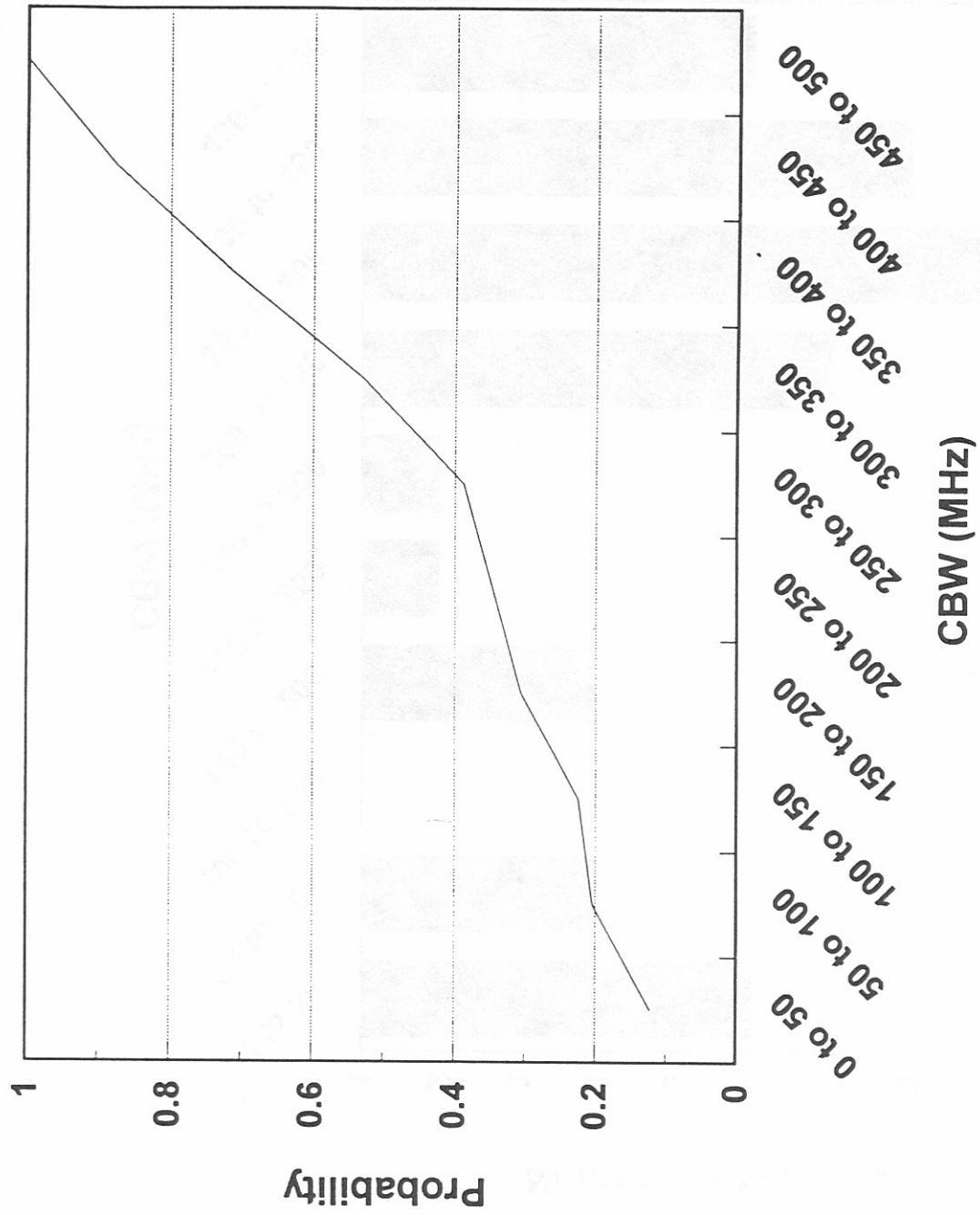


Figure 43. Area coverage survey: CDF of correlation bandwidth, transmitter height 40 meters.

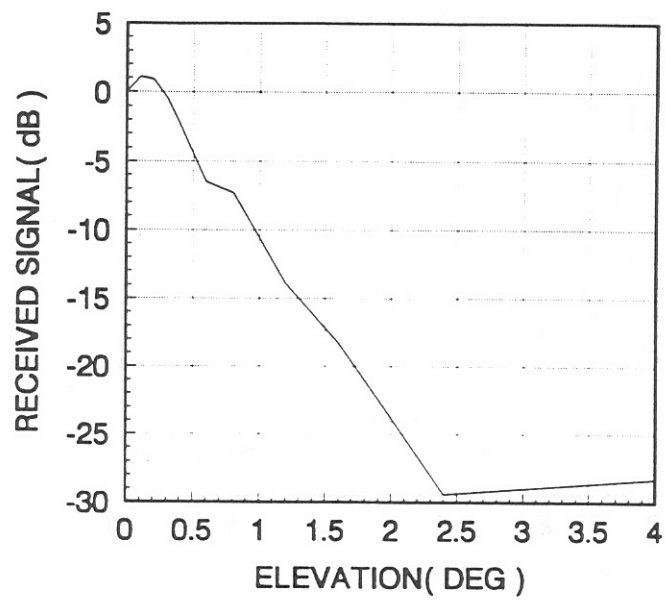


Figure 44. Antenna pattern, elevation, for 1.2 m² flat plate reflector at 28.8 GHz.

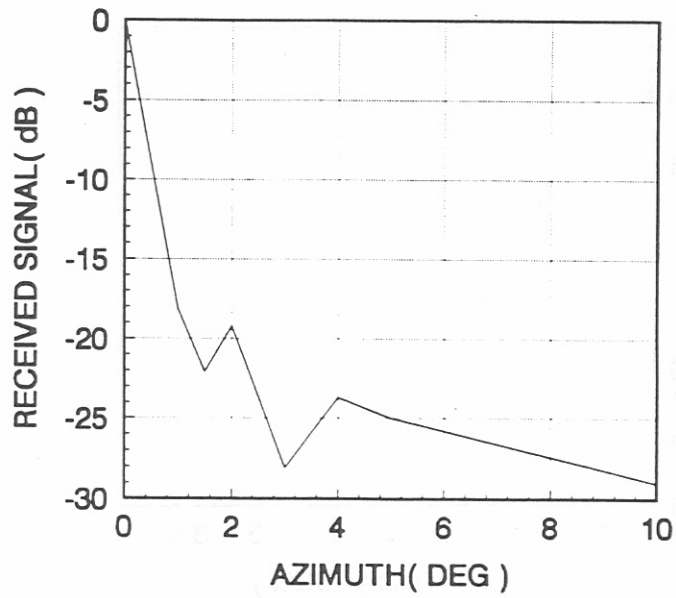


Figure 45. Antenna pattern, azimuth, for 1.2 m² flat plate reflector at 28.8 GHz.

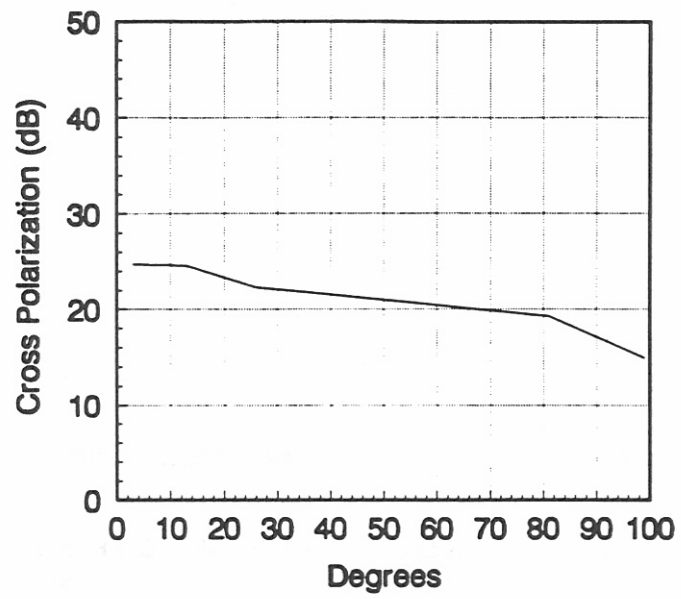


Figure 46. Cross polarization for 1.2 m² flat plate reflector at 28.8 GHz.

Table 4. Narrowband Passive Repeater Study Data

Station	Date	Transmitter Williams Towers 5th Floor		OLOS (b)	File	Code	PHI (deg)	A (dB)	A cal (dB)	DS (ns)	CBW (MHz)
		Rx Elev(ft)	Rx D(ft)								
46	1/5/93	5293	5931	1	u4p1	s	5.0	31.0	36.0	3.1	57.0
2	12/18/92	5279	9000	1	u1p4	l	0.4	30.0	20.5	2.3	2.0
47	1/5/93	5293	10106	1	u4p7	s	-0.02	35.0	5.0	4.5	11.0
6	12/18/92	5321	14550		u1p17	s	-0.46	9.0	0.0	0.9	359.0

Legend

Transmitter Height = 52 ft for Williams Towers 5th floor.

A = average excess path loss

A cal = calculated value using knife edge diffraction model

DS = delay spread

OLOS(b) = obstructed line of site, building

CBW = correlation bandwidth

PHI = diffraction angle

Code: s = short, l = long

Table 5. Broadband Diffraction Study Data

Path Angle (degrees)	TxPower (dbm)	Sys Gain (db)	FS Loss (db)	Rec Signal (dbm)	Cal Rep Gain (db)	Rep Loss (db)
3	17.8	73.9	207.8	-17.6	104.5	6
13	17.8	73.9	206.4	-16.3	104.4	6
26	17.8	73.9	205.9	-15.1	104.3	5.8
81	17.8	73.9	206.4	-16.9	102.1	4.3
109	17.8	73.9	206.8	-19.5	99.8	4.2

*Note - Repeater was 1.2 m square aluminum plate mounted on a tripod.

BIBLIOGRAPHIC DATA SHEET

	1. PUBLICATION NO. 94-315	2. Gov't Accession No.	3. Recipient's Accession No.
4. TITLE AND SUBTITLE Initial Study of the Local Multipoint Distribution System Radio Channel		5. Publication Date	
		6. Performing Organization Code NTIA/ITS	
7. AUTHOR(S) Peter B. Papazian, Mike Roadifer, George A. Hufford		9. Project/Task/Work Unit No. 910 4108	
8. PERFORMING ORGANIZATION NAME AND ADDRESS National Telecommunications & Information Administration Institute for Telecommunication Sciences 325 Broadway Boulder, CO 80303		10. Contract/Grant No.	
11. Sponsoring Organization Name and Address NTIA Herbert Hoover Bldg. 14th & Constitution Ave, NW Washington, DC 20230		12. Type of Report and Period Covered	
		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.) A broadband millimeter wave study was completed to characterize the radio channel for Local Multipoint Distribution Systems in Boulder, Colorado. The study determined characteristics for proposed 20-MHz channels centered at 30.3 GHz using two transmitter heights in a suburban environment. Distributions of delay spread, correlation bandwidth, frequency selective fading and scatter plots of signal loss are presented. The median signal loss for the 40-m transmitter height was 15 dB. Maximum delay spreads for this height were below 10 ns with a median value of less than 1 ns. Data was also collected to characterize a flat plate reflector proposed for use at 28.8 GHz. Cross cell interference and signal diffraction measurements were also made.			
16. Key Words (Alphabetical order, separated by semicolons) Key words: broadband, delay spread, local multipoint distribution system, radio channel			
17. AVAILABILITY STATEMENT <input checked="" type="checkbox"/> UNLIMITED. <input type="checkbox"/> FOR OFFICIAL DISTRIBUTION.		18. Security Class. (This report)	20. Number of pages 71
		19. Security Class. (This page)	21. Price: