

LOSS MEASUREMENT OF FRONT-END WAVEGUIDE

VLA TEST MEMORANDUM NO. 145

Paul A. Lilie

September 9 1985

Insertion-loss measurements were made at 20, 6, 2, and 1.3 cm on antenna 14 (picked at random) to determine the loss of the polarization transducer and waveguide from the feed to the dewar input.

Measurements were made using an H.P. 8755 scalar network analyzer by placing a short at the common port of the polarization transducer and measuring the insertion loss through all the waveguide and transducer, from the RCP (AB) output flange to the LCP (CD) output flange. This gives the sum of the R and L side losses. Where practical, insertion losses of the waveguide runs and polarization transducer were measured separately.

The following table gives the insertion losses determined at upper and lower band edges and at evenly-spaced points in the band. The R+L loss at C-band was low enough that no attempt was made to measure separate components.

"R" and "L" indicate the corresponding waveguide runs; "P" indicates the polarization transducer. "Temp." is the added noise temperature due to the loss. Accuracy is about +/- .03 dB.

	Low	-----freq.-----				High	Avg. (dB)	Temp. (K)
21 cm:								
R	.18	.20	.22	.20	.18	.20	15	
L	.22	.22	.22	.22	.25	.23	18	
P	.08	.06	.08	.05	.05	.06	5	
R+P	.25	.26	.30	.25	.22	.26	20	
L+P	.30	.29	.30	.28	.30	.29	23	
6 cm:								
L+P	.18	.11	.06	.04	.08	.11	8	
R+P	.18	.11	.06	.04	.08	.11	8	
2 cm:								
L	.17	.14	.20	.20	.18	.16	16	
R	.19	.13	.10	.15	.18	.16	14	
P	.12	.14	.12	.09	.09	.11	9	
L+P	.30	.28	.32	.29	.26	.29	26	
R+P	.31	.27	.22	.24	.26	.27	24	
1.3 cm:								
L	.4	.46	.54	.45	.40	.45	71	
R	.31	.38	.45	.38	.32	.37	58	
P	.09	.09	.09	.09	.09	.09	14	
L+P	.49	.56	.63	.54	.49	.54	86	
R+P	.40	.47	.54	.46	.41	.46	73	