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COMMENTS ON CHANNEL SIMULATION TECHNIQUES.(U)
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TECHNICAL MEMORANDUM

COMMENTS ON CHANNEL SIMULATION TECHNIQUES

25 May 1982

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Prepared by:
S.L. Adams

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JAYCOR
205 South Whiting Street
Alexandria, Virginia 22304

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1.0 Introduction

Several approaches to channel simulation have been discussed recently. This memorandum comments on their shortcomings relative to an ideal channel simulation.

2.0 Simulation Techniques

Three channel simulation techniques are described in this paragraph.

2.1 Tapped Delay Line

Time delayed versions of the complex envelope of the transmitted narrowband waveform are each multiplied by statistically independent complex Gaussian variates to produce frequency selective, time flat fading. If the multipliers are realizations of a complex Gaussian random process, then a combination of time and frequency spread can be implemented.

2.2 Amplitude Multiplier

The baseband signal is multiplied by a Gaussian random process.

2.3 Reproduction Through a Low Quality Tape Recorder

The baseband signal is recorded and played back through a low quality tape recorder. This process produces a time varying travel time on a single path.

3.0 Discussion

The tapped delay line produces the desired time and frequency spread channel, if the signal is narrowband.

The amplitude multiplier produces no phase variation, only an amplitude wander.

The tape recorder technique produces a travel time wander.

The only realistic simulation of the 3.5 kHz propagation channel uses the tapped delay line.