COMSAT RSI
Attenuation Analysis at Sterling, Virginia Plant

I. INTRODUCTION

In order to determine how much shielding is provided by the structure of COMSAT RSI's Sterling, VA, plant, the following field strength measurements were made in late November 1995.

II. ANALYSIS

A High Gain OPA (HGOPA) was located in the center of the testing area facing the front of the building. As many pieces of hardware as possible (other antenna array frames, etc.) were moved away from the HGOPA. Table 1 is a summary of the measured data of the HGOPA with a +10 dBm input power level from a HP-8753 Network Analyzer, along with the corrected data which accounts for the antenna gain and cable loss. The antenna factor used for the measurements was extrapolated from the calibration data since the antenna was calibrated up to only 1000 MHz. This antenna is commonly used for E-Field type measurements and since these measurements are for reference only, the error in extrapolating the values instead of re-calibrating the antenna should be very small. The measurements were performed at 1090 MHz, however it is not anticipated that the data within the band 962 - 1215 MHz would vary from the values in Table 1 by more than several dB. It should be noted that the sensitivity of the Spectrum Analyzer (HP8555A) used was approximately 18 μV/m.

TABLE 1
Measured Field Strengths of a HGOPA at 1090 MHz

	Measured Field Strength (dBm)	Corrected Field Strength (dBm)	Distance (m) to 1μV/sq-m (no additional shielding)	Corrected Power Density Data (mW/sqcm)
Noise floor inside building	-100	-71.82	--	8.73E-14
50 Ft in front of HGOPA	-30	-1.82	3544.05	8.73E-08
Parking lot side of building, door closed	-110	-81.82	--	8.73E-14
Parking lot side of building, door open	-70	-41.82	35.44	8.73E-10

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	Measured Field Strength (dBm)	Corrected Field Strength (dBm)	Distance (m) to 1μV/sq-m (no additional shielding)	Corrected Power Density Data (mW/sqcm)
Shipping side of building, door closed	-110	-81.82	--	8.73E-14
Shipping side of building, door open	-70	-41.82	35.44	8.73E-10
Roof of shop at hatch, hatch open	-75	-46.82	19.93	2.78E-10
Roof of shop at hatch, hatch closed	-110	-81.82	--	8.73E-14
Roof of shop, closest skylight to hatch	-90	-61.82	3.54	8.73E-12
Roof of shop, skylight over EM	-85	-56.82	6.30	2.76E-11

The measurements show that the attenuation outside the building is at least 40 dB in the horizontal direction with the doors open. In the vertical direction, the attenuation is at least 45 dB. Accordingly, the potential for interference to airborne antennas operating in the 962 - 1215 MHz band can be considered very small when the EIRP of the Network Analyzer is at a maximum of 1 watt.