EXHIBIT 1

General Information

The antenna test range for which this Experimental License application is being submitted is intended to test antenna designs for cellular, PCS and similar communications applications in the following frequency ranges:

800 MHz - 1000 MHz
1400 MHz - 1600 MHz
1700 MHz - 2000 MHz

The design, development and verification requires radiation pattern and gain measurements using horizontal, vertical and slant 45 degree polarizations.

EMS Wireless will further the radio art through the development of various antennas which offer unique solutions to the cellular, PCS and similar communication services. EMS Wireless antennas address design issues such as pattern shaping (null fill and reduction of upper sidelobes), polarization diversity techniques (reducing the number of antennas required per cell site) and reduction in passive intermodulation products while providing significant cost, size, weight, installation and zoning advantages.

Description of Antenna Test Range

The physical configuration of the antenna test range is shown in Figure 1 of this exhibit. A Scientific Atlanta model tower mounted on an azimuth over elevation positioner rotates the antenna-under-test (AUT). The AUT is used as the receive antenna during pattern and gain measurements. The antenna positioner is physically located on the roof of the EMS Technologies building at 660 Engineering Drive in Norcross, Georgia. The combined height of the building, positioner and model tower is 18.3 meters above ground level.

The transmitting antenna is 2.4 meters above ground level and located 49.4 meters from the AUT as indicated in Figure 1. The transmit antenna is pointed at an elevation angle of 16.5 degrees. Standard Gain Horns having maximum azimuth and elevation half-power beamwidths of 39 degrees are used for transmitting antennas. A diffraction fence (4.9 meters high by 11 meters long), constructed of metal hardware cloth stretched over a metal frame, is placed at the specular point to prevent undesired ground reflections and to prevent horizontal radiation of energy.

The electrical block diagram of the antenna range is given in Figure 2 of this exhibit. The rf source is a Hewlett Packard HP-8341A synthesized sweep generator. An HP-8510B Network Analyzer is used to control the rf source and process the received signal from the AUT. The unmodulated rf signal from the HP-8341A is fed into a Mini-Circuits 3 dB power splitter. Output port 1 of the power splitter is connected to the reference channel of the HP-8510B while port 2 is connected to the input port of the Amplifier Research model 1S1G4 amplifier through a 153 meter length of

Times LMR-600 coaxial cable. The output port of this amplifier is connected to the Standard Gain Horn transmit antenna.
Amplitude and phase data representing the measured antenna pattern(s) is collected from the HP-8510B via the IEEE Bus to the computer for storage and manipulation. Radiation patterns are typically measured at multiple frequencies across the band of interest in order to fully characterize the AUT. The complete frequency sweep is accomplished in approximately 10 milliseconds thus reducing the probability of interference to other services operating on or near the same frequencies.

EXHIBIT 1
Figure 1
Antenna Range Physical Layout

Note: Drawing not to scale

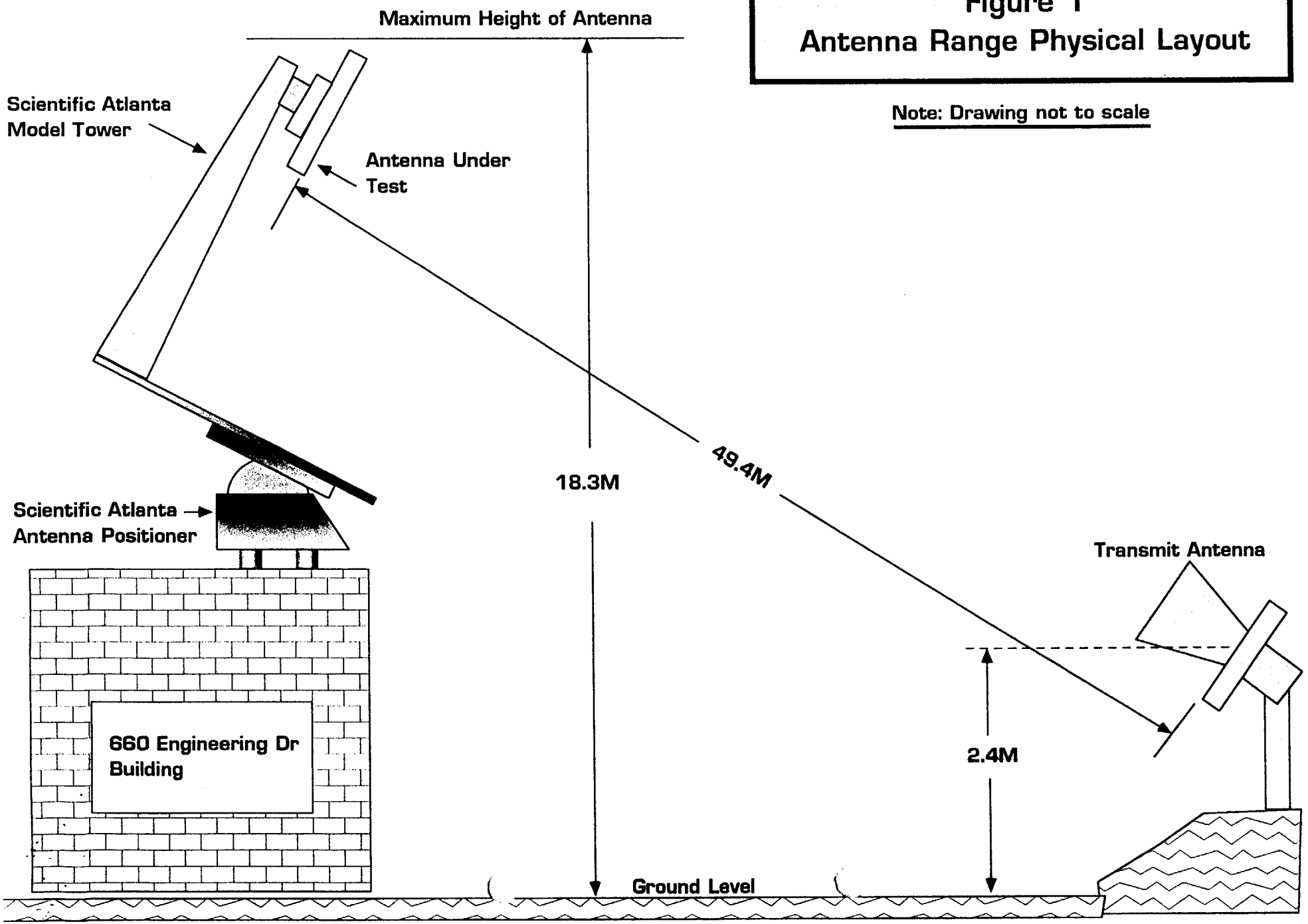

EXHIBIT 1
Figure 2
Antenna Range Electrical Block Diagram

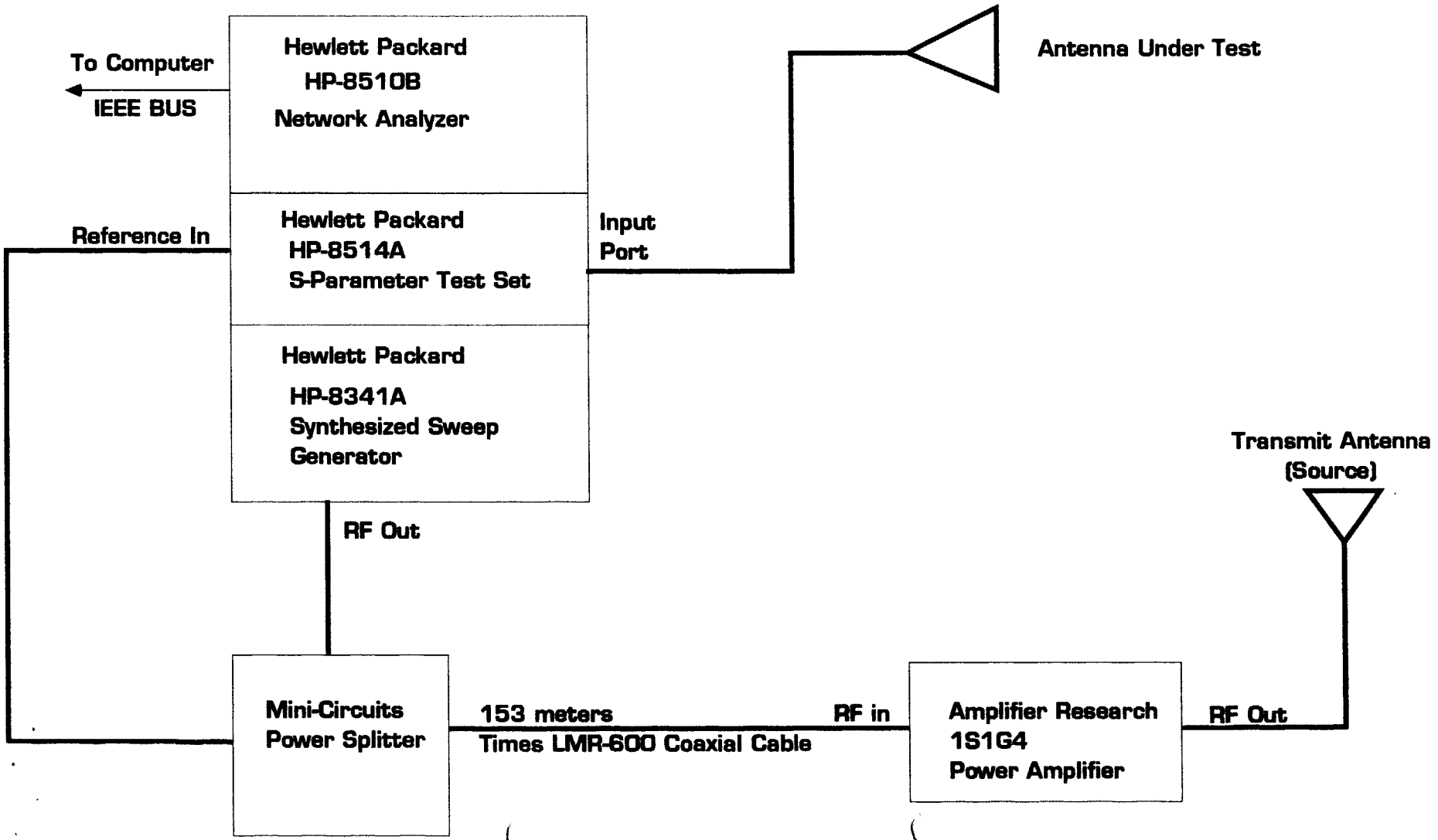

EXHIBIT 2
Vertical Profile
Antenna Test Range

Note: Drawing not to scale