EVALUATION TESTS FOR SYSTEM 1

1. It is recommended that the performance checks listed below be run on System 1 and the results made a part of the record on this equipment. The information obtained will be of value (a) to evaluate the equipment's capability, (b) as an aid in interpretation of the data obtained with the equipment, and (c) as a necessary aid for the adequate maintenance of the equipment.

2. The following bench tests are recommended:

a. Sensitivity Checks: Data shall be collected to plot a curve of minimum detectable signal versus radio frequency of the signal. This shall be done using an X-band antenna and amplifier with minimum detectable signal defined as that incident energy in watts/unit area needed in the plane of the aperature of the dish to produce a 2 to 1 signal to noise ratio at the output of the amplifier. The frequency range shall be sufficient to create a 40 db. change in minimum detectable signal strength on both the upper and lower side of the mid-frequency. At mid-frequency (frequency of maximum sensitivity), data should be taken using various input energy levels to show the over-all dynamic range of the antenna and amplifier. These tests can be done with a calibrated signal generator output fed to either a calibrated antenna or into an antenna that is a duplicate of the one under test. It is recommended that a one microsecond pulse at 1,000 pulses per second be used as the modulation for the above sensitivity checks.

Data should be taken from which to produce a curve of the minimum detectable signal sensitivity of the system at mid-frequency for pulse widths from .1 microsecond to 10 microseconds using 1,000 pulses per second. Additional data should be taken from which to produce a curve of minimum detectable signal sensitivity of the system at mid-frequency for pulse repetition rates from 100 to 10,000 using 1 microsecond pulse widths.

b. Antenna patterns: Antenna patterns should be run with the antenna mounted in a mock up of the plane nose. These patterns should be run in a plane (a) perpendicular to the dipoles, (b) at 45 degrees to the dipoles, and (c) at 90 degrees to the dipoles. These patterns should be 360 degree patterns.

3. Tests of Paragraph 2, a and b above shall be repeated using the S-band antennas. In addition, as a part of the sensitivity check, data should be taken to determine the minimum detectable signal at frequencies $\pm$ 20% of the third harmonic of the mid-frequency of the system. It is also desired that the minimum detectable signal energy level be measured for the mid-frequency at the crystal. This can be done by removing the S-band antenna and feed a calibrated signal generator output through a coax line directly to the crystal holder.

4. The exact nature of the flight tests will be determined after the bench tests are completed. The following list of flight tests are the tests likely to be desired:

a. An S-band flight test should be conducted against a signal of known peak power (AN-CPS-6 would be a good source). All flights should be at maximum practical altitude. (Test 1) the plane should directly overfly the source. In this flight, recording should start 30 miles from the source and continue after the source is passed over until the signal is no longer detectable.
(Test 2) The plane should fly a path that misses the source by 60 miles but otherwise parallel to Test 1. This flight should be a round trip (i. e., from 30 miles on one side of the source to the point where the signal disappears and return on the same path).
(Test 3) The plane should fly parallel to the above flights but at a distance so that the dish is directed directly at the source when the plane is along side of the source. This flight should also be a round trip.
Should any of the above tests not be practical due to operational difficulties or new data arising from the bench tests above, alternates will be prepared.

b. The above tests will be repeated for X-band.

MISSING PAGE

ORIGINAL DOCUMENT MISSING PAGE(S):

Enclosure