



Recommendation WG 4.88.015

RFI TEST METHODS
REPORT FORMAT AND SURVEYING CONSIDERATIONS
for
INTERFERENCE PATHS BETWEEN EARTH STATIONS
and
TERRESTRIAL STATIONS

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RECOMMENDATION

Subject Area: RFI Testing

Title: Report format and surveying considerations for interference paths between earth stations and terrestrial stations.

1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide path surveyors with a standard procedure for surveying and documenting the pertinent blocking points along the RF path from the earth station to the microwave terrestrial site. This document will aid in standardizing the reporting procedures of this information to the coordination industry.

1.2 Background

In the past, path surveyors have not been provided with formal guidelines relating to the type of blockage information that is required by frequency coordination industry. A standardized report format is required along with a comprehensive description of the location, form, and boundaries of any path obstructions. This standardized reporting will aid the frequency coordination engineers in determining the RF attenuation properties for the various obstructions described in each of the reports. Previously, we only received a minimum of photographs and notes from the surveyors, however, more documentation is needed to unequivocally clear an earth station case.

It must be remembered that, in some cases, path loss measurements will be performed to determine actual path blockage existing. In these cases it is very important that the survey information provide a complete and accurate description of all blockage. The measurement results must be correlated with the path survey data to provide a high degree of confidence in the amount of blockage provided.

2.0 SURVEYING PROCEDURES

2.1 Preliminary Survey

Prior to the actual field survey the actual interference case should be reviewed by the surveyor. An O-H path loss calculation based upon 1/4 million terrain data or 7.5 minutes map data for each interference path should be provided. This information will be used by the surveyors to plot the locations of the terrestrial sites, earth stations, and any high elevation terrain points along the paths. These plots will be on 7.5 minute quadrangles for best detail. Photocopies of the 7.5 minutes quadrangles depicting the earth stations and proposed terrestrial site should be included in the final report.

2.2 Survey

The surveyor should go to each earth station and photograph the path radial view from the earth station to the terrestrial site and each *of* the major compass headings of north, east, south, and west. A photograph showing the earth station in respect to the path radial should also be included to provide a good aspect of near in shielding effects. These photographs will be included in the final report. The surveyors should then photograph a full panoramic view of the surrounding terrain from the earth station.

These photographs should be kept on file. All close-in and on path obstructions should also be carefully documented. This documentation should include the following information:

2.2.1 Pictorial Documentation:

Including the photographs previously discussed, the following photographs or sketches are required:

One showing the center of the path looking into the obstacle. One adjacent to the obstacle showing the depth and height and one on path looking into the opposite side of the obstacle. In a situation where it is not possible to take photographs which adequately depicts the obstacle, a sketch may be included.

2.2.2 Obstacle Type and Pertinent Information

Trees Type: Evergreen or Deciduous (sheds leaves annually)

Depth: Indicate in detail the distance and density. It is important to know whether there is a single row or a group of

approximately 100, 20 feet deep by 40 feet wide.

Height: Average height of group of trees in feet

Width: Total and relative to center path, in feet (left and right of center)

Distance from Earth Station: Feet or Miles

Point Where Path Intersect. Trees: Mark Photograph

Buildings and Misc.

Type of Construction: Brick, wood frame, steel and glass

Depth: Feet

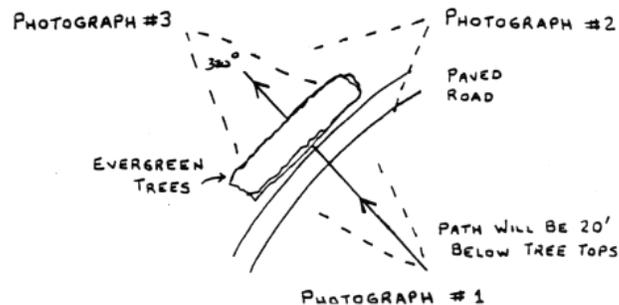
Width: Total and relative to center path, in feet

Height: Feet and number of stories

Distance from Earth Station: Feet or Miles

Point Where Path Intersects the Building: Mark Photograph

Example: An obstruction to the 320° radial is located 1,000 feet from the earth station. The obstruction is a large stand of evergreen trees 200 feet wide, 50 feet deep with an average height of 60 feet. The trees are tightly grouped, and the path intersects approximately 40 feet from the northeast corner. Photograph 1 shows the center of the path looking into the trees, and Photograph 2 is a view from the northeast corner showing the depth, height, and width of the obstruction. Photograph 3 shows the center of the path looking into the opposite side of the trees at 140°. A sketch is included for detail.



2.3 Survey Documentation

A final report detailing the observed findings at the earth station and any obstructions at points along the RF path should be provided. Emphasis will be placed in a detailed description of any obstruction that may afford partial or full blockage in terms of sufficient width, dense material, height, and proximity to the earth station. Because a radio signal propagates as a series of expanding wave fronts, it is important to determine whether an obstacle blocks the path in the horizontal as well as vertical plane. This is why all obstacle photographs and sketches should be clearly marked with an arrow indicating center path and a description given of the width as well as the height of the obstacle. Included in the report should be enough photographs to clearly illustrate the type and extent of the obstruction. These should be mounted on the attached form Path Survey Photograph. Hand drawn sketches may also be included if photographs cannot clearly depict the location and extent of the obstruction.

Include photographs or descriptions of close in buildings or fences even if the microwave path clears these by 5 or 10 feet. It may be deemed necessary to construct shielding to obtain the desired blockage needed to clear the earth station case.

The frequency coordination engineers will be able to make a reasonable judgment on the amount of attenuation each obstruction will afford when they receive a detailed visual and written final report.

2.4 Survey Report

The following items should be included in the survey report:

- A. Photocopies of 7.5 minute maps depicting the earth station and terrestrial locations and an arrow showing path direction.
- B. Path data sheet which includes terrain elevation, distance along path, and vertical heights of any potential obstruction.
- C. An earth station plot depicting location and relative surroundings.
- D. One photograph each at 0°, 90°, 180°, 270° (Major compass headings)
- E. All relevant path survey photograph forms depicting blockage, including sketches.
- F. Any written description of the earth station site or obstacles not adequately covered on path survey photograph forms.

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