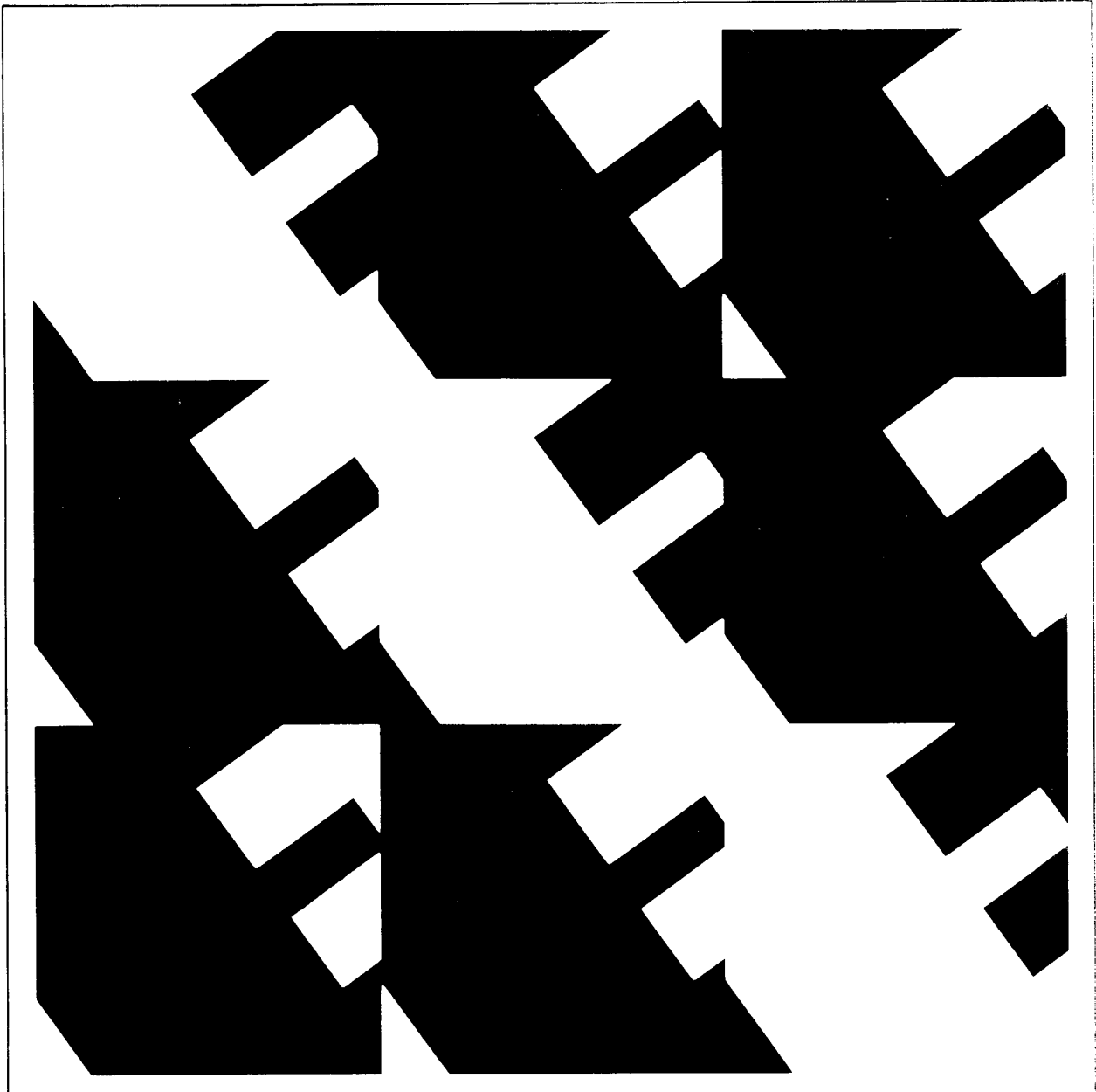


Standards on Radio Receivers: Open Field Method of Measurement of Spurious Radiation from Frequency Modulation and Television Broadcast Receivers



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1. INTRODUCTION

Modern broadcast radio receivers of the super-heterodyne type are frequently sources of spurious radiation from the local oscillator, which radiation may cause severe interference with other services. In addition, in the case of television broadcast receivers, there may be radiation of power from other sources beside the local oscillator. This Standard describes the potential sources of spurious radiation from frequency modulation and television broadcast receivers and sets up methods of measurement whereby the strength of some of these radiations may be determined. Where the methods for the two classes of receivers differ, the specifications for each are outlined.

2. SOURCES OF SPURIOUS RADIATION

2.1 The local oscillator fundamental and harmonics.

2.2 Intermediate-frequency amplifiers which may radiate spurious signals at the fundamentals, and harmonics or combinations of the intermediate frequencies.

2.3 In some television receivers, the high voltage for the cathode-ray tube is obtained by means of a radio-frequency oscillator, which is then a potential source of radiation at its fundamental and harmonic frequencies.

2.4 In television receivers the sweep circuits may radiate harmonics of their fundamental frequencies.

2.5 In television receivers the video amplifier and any nonlinear circuit elements which may produce signals by demodulation of the radio or intermediate-frequency signals.

3. MODES OF RADIATION OF SPURIOUS SIGNALS

3.1 Spurious signals emanating from any source, such as those described in Section 2, may appear on the receiver antenna terminals and be radiated from an antenna system attached thereto. Such signals may be balanced or unbalanced to ground.

3.2 Radiation from the sources enumerated in Section 2 may occur in the vicinity of the receiver due to direct electric and/or magnetic fields created by the components assembled on or within the chassis, or by cavity resonances of the chassis itself.

3.3 Radiation from any of the sources may be propagated through the power supply cord. Such radiation may be due to balanced or unbalanced currents flowing in the line cord. This Standard does not cover measurement of spurious radiation from this source.

4. METHODS OF MEASUREMENT

4.1 General

This Standard establishes a system whereby the radiation described above may be measured, and sets up operating conditions and specifications for equipment for accomplishing these measurements. In this method, the receiver and measuring equipment are set up under reproducible conditions as described below, and the field strengths of the various radiations are measured under specified conditions.

The method described herein is primarily applicable to the measurement of spurious radiation in the uhf and vhf bands from those sources producing an ap-

preciable field at 100 feet. For sources producing radiation in other bands or those producing comparatively insignificant fields at 100 feet other methods of measurement may be necessary.

4.2 Equipment Required and Setup Details

4.2.1 Receiver Platform and Antenna

The platform upon which the receiver under test is to be mounted shall be located on relatively level ground, free of any obstruction to a distance of at least 100 feet from both the receiver and the field strength meter, and away from reflecting objects. This platform shall carry a nonconducting rotatable antenna mast. For convenience, it may be desirable to have the mast and the platform rotatable as a unit. This mast shall carry at a height of 30 feet a single straight dipole antenna constructed of $\frac{1}{2}$ -inch od tubing. A transmission line of the type and characteristic impedance for which the receiver under test is designed, shall be attached to this dipole at its center and shall be vertically disposed under the center of the dipole with the plane of the maximum cross sectional dimension of the transmission line parallel to the dipole. This transmission line shall be secured to the pole at sufficiently frequent intervals to insure mechanical stability against movement.

When testing receivers designed for use with unbalanced shielded transmission line, the antenna may be connected to the transmission line through a balanced-to-unbalanced transformer of the type, if any, specified by the manufacturer. If the receiver is designed to operate from either an unbalanced transmission line or a 300-ohm balanced line, the latter shall be used in these measurements.

If the receiver under test is a table model, it shall be placed upon a table, the top of which is 48 inches above ground. If the receiver is a floor model, it shall be located on a platform, the top of which is 18 inches above ground. In the case of those receivers where the lead-in does not reach the antenna terminals when mounted in accordance with Section 4.2.1.3, the receiver shall be raised the necessary amount. The plane of the front panel of the cabinet shall be parallel to the dipole, and the center of the cabinet shall be directly below the center of the dipole.

4.2.1.1 For vhf television receivers the dipole antenna shall measure 88 inches from end to end. For uhf television receivers the length shall be 12 inches from end to end.

4.2.1.2 For frequency modulation receivers having terminals for an external dipole, the length shall be 58 inches from end to end.

4.2.1.3 Disposition of Transmission Line. The transmission line shall be 28 feet in length and shall proceed horizontally directly back from the antenna terminals of the receiver, then vertically upward to a height of 84

inches above ground, and finally, again horizontally, to a position vertically disposed under the center of the dipole; and after the first bend, shall not approach closer than six inches to the cabinet at any point. Fig. 1 illustrates a possible method of routing the transmission line.

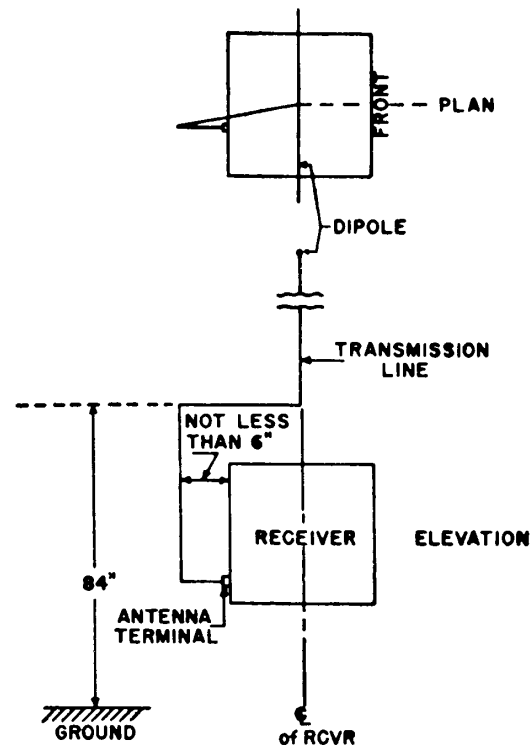


Fig. 1—Possible method of routing transmission line.

4.2.2 Field-Strength Meter

A suitable field-strength meter shall be provided, equipped with an antenna capable of being adjusted for horizontal or vertical polarization. The field-strength-meter antenna shall be located at a distance of 100 feet horizontally from the antenna of the receiver under test.

The transmission line from the field-strength-meter antenna shall be disposed horizontally for a distance of 24 inches in a direction directly away from the receiver under test, then dropped approximately vertically to the field strength meter.

Provision shall be incorporated whereby the height of the antenna above ground may be varied from seven feet to twenty feet.

4.2.3 Power Supply

Power lines to both the receiver under test and the field strength meter shall be buried to a depth of 12 inches or more, and the power outlet at each location