

IEEE Standard Measurement Procedure for Field-Disturbance Sensors (rf Intrusion Alarms)

Sponsor
**Standards Committee
of the
IEEE Electromagnetic Compatibility Society**

Approved May 21, 1981
Reaffirmed June 14, 1994

IEEE Standards Board

Approved July 20, 1983
American National Standards Institute

© Copyright 1983 by

**The Institute of Electrical and Electronics Engineers, Inc
345 East 47th Street, New York, NY 10017**

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

IEEE Standards documents are developed within the Technical Committees of the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Board. Members of the committees serve voluntarily and without compensation. They are not necessarily members of the Institute. The standards developed within IEEE represent a consensus of the broad expertise on the subject within the Institute as well as those activities outside of IEEE which have expressed an interest in participating in the development of the standard.

Use of an IEEE Standard is wholly voluntary. The existence of an IEEE Standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE Standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change brought about through developments in the state of the art and comments received from users of the standard. Every IEEE Standard is subjected to review at least once every five years for revision or reaffirmation. When a document is more than five years old, and has not been reaffirmed, it is reasonable to conclude that its contents, although still of some value, do not wholly reflect the present state of the art. Users are cautioned to check to determine that they have the latest edition of any IEEE Standard.

Comments for revision of IEEE Standards are welcome from any interested party, regardless of membership affiliation with IEEE. Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments.

Interpretations: Occasionally questions may arise regarding the meaning of portions of standards as they relate to specific applications. When the need for interpretations is brought to the attention of IEEE, the Institute will initiate action to prepare appropriate responses. Since IEEE Standards represent a consensus of all concerned interests, it is important to ensure that any interpretation has also received the concurrence of a balance of interests. For this reason IEEE and the members of its technical committees are not able to provide an instant response to interpretation requests except in those cases where the matter has previously received formal consideration.

Comments on standards and requests for interpretations should be addressed to:

Secretary, IEEE Standards Board
345 East 47th Street
New York, NY 10017
USA

Foreword

[This Foreword is not a part of IEEE Std 475-1983, IEEE Standard Measurement Procedure for Field-Disturbance Sensors (rf Intrusion Alarms).]

This standard describes a test procedure for measurement of radio-frequency (rf) emission from intrusion-alarm, microwave-type field-disturbance sensors to assist manufacturers, standards laboratories, and test engineers in determining compliance with established technical specifications.

The Institute of Electrical and Electronics Engineers (IEEE) Standards Board authorized Standards Project P475: Measurement Procedure for Field-Disturbance Sensors to meet a continuing need for this type of sensor; the Radio Transmitters Subcommittee (27.4), IEEE Standards Committee (27.0) completed the first draft of IEEE Project No P475. The second draft, P475/D2, was issued June 1978, after review by IEEE Electromagnetic Compatibility Society (EMCS) Standards Committee members; the third draft, P475/D3, was issued January 1980 for additional review and comment; a fourth draft, P475/D4 was issued July 1980 for final ballot.

Suggestions for improvement of this standard should be forwarded to:

Secretary
IEEE Standards Board
Institute of Electrical and Electronics Engineers
345 East 47th Street
New York, NY 10017.

This standard was prepared by the Radio Transmitters Subcommittee (27.4) of the IEEE/EMCS Standards Committee (27.0), which had the following membership:

R. E. Taylor, Chair

H. Garlan

J. C. Klouda
A. W. Paul

L. W. Thomas, Sr

When the IEEE Standards Board approved this standard on May 21, 1981, it had the following membership:

I. N. Howell, Jr, Chair
Irving Kolodny, Vice Chair
Sava I. Sherr, Secretary

G. Y.R. Allen
J. J. Archambault
J. H. Beall
J. T. Boettger
Edward Chelotti
Edward J. Cohen
Len S. Corey

Jay Forster
Kurt Greene
Loering M. Johnson
Joseph L. Koepfinger
J. E. May
Donald T. Michael*
J. P. Riganati

F. Rosa
R. W. Seelbach
J. S. Stewart
W. E. Vannah
Virginus N. Vaughan, Jr
Art Wall
Robert E. Weiler

*Member emeritus

CLAUSE	PAGE
1. Scope	1
1.1 Specific Types of Field-Disturbance Sensors to Which this Standard Applies	1
1.2 Definitions.....	1
1.3 Frequency Range and Characteristics	2
2. References	2
3. Standard Test Conditions and Data Report	3
3.1 Standard Test Conditions	3
3.2 Data Report	3
4. Measurement Test Procedure	4
4.1 General	4
4.2 Measurement of Frequency.....	4
4.3 Measurement of Field Strength.....	4
4.4 Powerline Measurement of Electromagnetic-Noise Power	12

IEEE Standard Measurement Procedure for Field-Disturbance Sensors (rf Intrusion Alarms)

1. Scope

This standard defines test procedure for field-disturbance sensors to measure radio-frequency (rf), radiated field strength of the fundamental frequency, including second and third harmonics, and of any nonharmonic spurious emission within the frequency range from 0.3 GHz to 40.0 GHz. In addition, powerline measurement of electromagnetic emission within the frequency range from 30 MHz to 300 MHz is specified.

Perimeter protection systems that employ a balanced transmission line around the property being protected are not covered by this standard.

1.1 Specific Types of Field-Disturbance Sensors to Which this Standard Applies

- 1) rf intrusion detector
- 2) Production-line counter detector
- 3) Anti-shoplifting detector

1.2 Definitions

1.2.1 field-disturbance sensor: A device that employs a *point source* of rf energy to detect motion in the vicinity of the source, and in which the emitter and the receiver (or detector) are essentially at the same point, that is, a space-protected system.

1.2.2 Other Definitions: For definitions of other terms used see ANSI/IEEE Std 100-1977 [4]¹.

1.2.3 Characteristics of Typical Field-Disturbance Sensors: A typical single-channel, microwave field-disturbance sensor operates at a nominal radiated center frequency of 0.915 GHz, 2.450 GHz, 5.800 GHz, 10.525 GHz or 24.125 GHz. It commonly employs a Gunn-type diode as the microwave oscillator, mounted in a waveguide cavity and coupled to a horn antenna or other directional radiator. It establishes a radio-frequency (rf) field which, when perturbed by the motion of an intruder or reflecting object in this field, causes a change (Doppler shift) in the frequency of the

¹The numbers in brackets correspond to the references listed in Section 3. of this standard.