(2) For a telephone that is not hearing aid-compatible, as defined in §68.316 of these rules:
(i) Notice that FCC rules prohibit the use of that handset in certain locations; and
(ii) A list of such locations (see §68.112).
(c) When approval is revoked for any item of equipment, the responsible party must take all reasonable steps to ensure that purchasers and users of such equipment are notified to discontinue use of such equipment.

[66 FR 7585, Jan. 24, 2001]

§ 68.224 Notice of non-hearing aid compatibility.

Every non-hearing aid compatible telephone offered for sale to the public on or after August 17, 1989, whether previously-registered, newly registered or refurbished shall:
(a) Contain in a conspicuous location on the surface of its packaging a statement that the telephone is not hearing aid compatible, as is defined in §§68.4(a)(3) and 68.316, or if offered for sale without a surrounding package, shall be affixed with a written statement that the telephone is not hearing aid-compatible, as defined in §§68.4(a)(3) and 68.316; and
(b) Be accompanied by instructions in accordance with §68.218(b)(5) of the rules.


Subpart D—Conditions for Terminal Equipment Approval


SOURCE: 45 FR 20353, Mar. 31, 1980, unless otherwise noted.

§ 68.300 Labeling requirements.

(a) Terminal equipment approved as set out in this part must be labeled in accordance with the requirements published by the Administrative Council for Terminal Attachments and with requirements of this part for hearing aid compatibility and volume control.

(b) As of April 1, 1997, all registered telephones, including cordless telephones, as defined in §15.3(j) of this chapter, manufactured in the United States (other than for export) or imported for use in the United States, that are hearing aid compatible, as defined in §68.316, shall have the letters “HAC” permanently affixed thereto. “Permanently affixed” shall be defined as in paragraph (b)(5) of this section. Telephones used with public mobile services or private radio services, and secure telephones, as defined by §68.3, are exempt from this requirement.


§ 68.316 Hearing aid compatibility: Technical requirements.

A telephone handset is hearing aid compatible for the purposes of this section if it complies with the following standard, published by the Telecommunications Industry Association, copyright 1983, and reproduced by permission of the Telecommunications Industry Association:

ELECTRONIC INDUSTRIES ASSOCIATION RECOMMENDED STANDARD RS-504 MAGNETIC FIELD INTENSITY CRITERIA FOR TELEPHONE COMPATIBILITY WITH HEARING AIDS

[Prepared by EIA Engineering Committee TR-41 and the Hearing Industries Association’s Standards and Technical Committee]

TABLE OF CONTENTS

List of Illustrations

1 INTRODUCTION
2 SCOPE
3 DEFINITIONS
4 TECHNICAL REQUIREMENTS
4.1 General
4.2 Axial Field Intensity
4.3 Radial Field Intensity
4.4 Induced Voltage Frequency Response
Appendix A—Bibliography

List of Illustrations

Figure Number

1 Reference and Measurement Planes and Axes
2 Measurement Block Diagram
3 Probe Coil Parameters
4A Induced Voltage Frequency Response for receivers with an axial field that exceeds –19 dB
4B Induced Voltage Frequency Response for receivers with an axial field that exceeds –22 dB but is less than –19 dB

400
§ 68.316 Magnetic Field Intensity Criteria for Telephone Compatibility With Hearing Aids

(From EIA Standards Proposal No. 1652, formulated under the cognizance of EIA TR-41 Committee on Voice Telephone Terminals and the Hearing Industries Association’s Standards and Technical Committee.)

1 Introduction

Hearing-aid users have used magnetic coupling to hearing aids to participate in telephone communications since the 1940’s. Magnetic pick-ups in hearing-aidss have provided for coupling to many, but not all, types of telephone handsets. A major reason for incompatibility has been the lack of handset magnetic field intensity requirements. Typically, whatever field existed had been provided fortuitously rather than by design. More recently, special handset designs, e.g., blue grommet handsets associated with public telephones, have been introduced to provide hearing-aid coupling and trials were conducted to demonstrate the acceptability of such designs. It is anticipated that there will be an increase in the number of new handset designs in the future. A standard definition of the magnetic field intensity emanating from telephone handsets intended to provide hearing-aid coupling and trials were conducted to demonstrate the acceptability of such designs. It is anticipated that there will be an increase in the number of new handset designs in the future. A standard definition of the magnetic field intensity emanating from telephone handsets intended to provide hearing-aid coupling and trials were conducted to demonstrate the acceptability of such designs.

1.1 This standard is one of a series of technical standards on voice telephone terminal equipment prepared by EIA Engineering Committee TR-41. This document, with its companion standards on Private Branch Exchanges (PBX), Key Telephone Systems (KTS), Telephones and Environmental and Safety Considerations (Refs: A1, A2, A3 and A4) fills a recognized need in the telephone industry brought about by the increasing use of telephone handsets in the future. A standard definition of the magnetic field intensity emanating from telephone handsets intended to provide hearing-aid coupling and trials were conducted to demonstrate the acceptability of such designs. It is anticipated that there will be an increase in the number of new handset designs in the future. A standard definition of the magnetic field intensity emanating from telephone handsets intended to provide hearing-aid coupling and trials were conducted to demonstrate the acceptability of such designs.

1.2 This standard is intended to be a living document, subject to revision and updating as warranted by advances in network and terminal equipment technology and changes in the FCC Rules and Regulations.

2 Scope

2.1 The purpose of this document is to establish formal criteria defining the magnetic field intensity presented by a telephone to which hearing aids can couple. The requirements are based on present telecommunication plant characteristics at the telephone interface. The telephone will also be subject to the applicable requirements of EIA RS-470, Telephone Instruments with Loop Signaling for Voiceband Applications (Ref: A3) and the environmental requirements specified in EIA Standards Project PN-1361, Environmental and Safety Considerations for Voice Telephone Terminals, when published (Ref: A4).

2.2 A telephone complies with this standard if it meets the requirements in this standard when manufactured and can be expected to continue to meet these requirements when properly used and maintained. For satisfactory service a telephone needs to be capable, through the proper selection of equipment options, of satisfying the requirements applicable to its marketing area.

2.3 The standard is intended to be in conformance with part 68 of the FCC Rules and Regulations, but it is not limited to the scope of those rules (Ref: A5).

2.4 The signal level and method of measurement in this standard have been chosen to ensure reproducible results and permit comparison of evaluations. The measured magnetic field intensity will be approximately 15 dB above the average level encountered in the field and the measured high-end frequency response will be greater than that encountered in the field.

2.5 The basic accuracy and reproducibility of measurements made in accordance with this standard will depend primarily upon the accuracy of the test equipment used, the care with which the measurements are conducted, and the inherent stability of the devices under test.

3 Definitions

This section contains definitions of terms needed for proper understanding and application of this standard which are not believed to be adequately treated elsewhere. A glossary of telephone terminology, which will be published as a companion volume to the series of technical standards on Telephone Terminals For Voiceband Applications, is recommended as a general reference and for definitions not covered in this section.

3.1 A telephone is a terminal instrument which permits two-way, real-time voice communication with a distant party over a network or customer premises connection. It converts real-time voice and voiceband
§ 68.316

acoustic signals into electrical signals suitable for transmission over the telephone network and converts received electrical signals into acoustic signals. A telephone which meets the requirements of this standard also generates a magnetic field to which hearing-aids may couple.

3.2 The telephone boundaries are the electrical interface with the network, PBX or KTS and the acoustic, magnetic and mechanical interfaces with the user. The telephone may also have an electrical interface with commercial power.

3.3 A hearing aid is a personal electronic amplifying device, intended to increase the loudness of sound and worn to compensate for impaired hearing. When equipped with an optional inductive pick-up coil (commonly called a telecoil), a hearing aid can be used to amplify magnetic fields such as those from telephone receivers or induction-loop systems.

3.4 The reference plane is the planar area containing points of the receiver-end of the handset which, in normal handset use, rest against the ear (see Fig 1).

3.5 The measurement plane is parallel to, and 10 mm in front of, the reference plane (see Fig 1).

3.6 The reference axis is normal to the reference plane and passes through the center of the receiver cap (or the center of the hole array, for handset types that do not have receiver caps).

3.7 The measurement axis is parallel to the reference axis but may be displaced from that axis, by a maximum of 10 mm (see Fig 1). Within this constraint, the measurement axis may be located where the axial and radial field intensity measurements, are optimum with regard to the requirements. In a handset with a centered receiver and a circularly symmetrical magnetic field, the measurement axis and the reference axis would coincide.

3.8 The reference plane is the planar area containing points of the receiver-end of the handset which, in normal handset use, rest against the ear (see Fig 1).

3.9 The measurement plane is parallel to, and 10 mm in front of, the reference plane (see Fig 1).

3.10 The reference axis is normal to the reference plane and passes through the center of the receiver cap (or the center of the hole array, for handset types that do not have receiver caps).

3.11 The measurement axis is parallel to the reference axis but may be displaced from that axis, by a maximum of 10 mm (see Fig 1). Within this constraint, the measurement axis may be located where the axial and radial field intensity measurements, are optimum with regard to the requirements. In a handset with a centered receiver and a circularly symmetrical magnetic field, the measurement axis and the reference axis would coincide.
relaxation in the frequency response is permitted (See 4.4.1).

4.3  **Radial Field Intensity.**

When measured as specified in 4.1.2, radial components of the magnetic field as measured at four points 90° apart, and at a distance ≥16 mm from the measurement axis (as selected in 4.2), shall be greater than −27 dB relative to 1 A/m, for an input of −10 dBV at 1000 Hz (see Fig 2).

4.4  **Induced Voltage Frequency Response.**

The frequency response of the voltage induced in the probe coil by the axial component of the magnetic field as measured in 4.2, shall fall within the acceptable region of Fig 4A or Fig 4B (see 4.4.1 and 4.4.2), over the frequency range 300-to-3300 Hz.

4.4.1 For receivers with an axial component which exceeds −19 dB relative to 1 A/m, when measured as specified in 4.1.2, the frequency response shall fall within the acceptable region of Fig 4A.

4.4.2 For receivers with an axial component which is less than −19 dB but greater than −22 dB relative to 1 A/m, when measured as specified in 4.1.2, the frequency response shall fall within the acceptable region of Fig 4B.
TYPICAL PARAMETERS OF PROBE COIL

DC RESISTANCE: 900 \( \Omega \)
INDUCTANCE: 140 mH
SENSITIVITY: -60.5 dBV/(A/m)

FIG 3 PROBE COIL PARAMETERS
FIG 4A  INDUCED VOLTAGE FREQUENCY RESPONSE FOR RECEIVERS WITH AN AXIAL FIELD THAT EXCEEDS -19 dB
FIG 4B  INDUCED VOLTAGE FREQUENCY RESPONSE FOR RECEIVERS WITH AN AXIAL FIELD THAT EXCEEDS -22 dB
§ 68.317 Hearing aid compatibility volume control: technical standards.

(a) An analog telephone complies with the Commission’s volume control requirements if the telephone is equipped with a receive volume control that provides, through the receiver in the handset or headset of the telephone, 12 dB of gain minimum and up to 18 dB of gain maximum, when measured in terms of Receive Objective Loudness Rating (ROLR), as defined in paragraph 4.1.2 of ANSI/EIA–470–A–1987 (Telephone Instruments With Loop Signaling). The 12 dB of gain minimum must be achieved without significant clipping of the test signal. The phone also shall comply with the limits on the range for ROLR given in paragraph 4.3.2.2 of ANSI/EIA–470–A–1987 when the receive volume control is set to its normal unamplified level.

(b) The ROLR of an analog telephone shall be determined over the frequency range from 300 to 3300 Hz using the method described in paragraph 4.3.2.1 of ANSI/EIA–470–A–1987. No variation in loop conditions is required for this measurement since the receive level of a digital telephone is independent of loop length.

(c) A digital telephone complies with the Commission’s volume control requirements if the telephone is equipped with a receive volume control that provides, through the receiver of the handset or headset of the telephone, 12 dB of gain minimum and up to 18 dB of gain maximum, when measured in terms of Receive Objective Loudness Rating (ROLR), as defined in paragraph 4.3.2.2 of ANSI/EIA–470–A–1987 when the receive volume control is set to its normal unamplified level.

(d) The ROLR of a digital telephone shall be determined over the frequency range from 300 to 3300 Hz using the method described in paragraph 4.3.2.1 of ANSI/EIA–470–A–1987. No variation in loop conditions is required for this measurement since the receive level of a digital telephone is independent of loop length.

Note to paragraph (a): Paragraph 4.1.2 of ANSI/EIA–470–A–1987 identifies several characteristics related to the receive response of a telephone. It is only the normal unamplified ROLR level and the change in ROLR as a function of the volume control setting that are relevant to the specification of volume control as required by this section.

(b) The ROLR of an analog telephone shall be determined over the frequency range from 300 to 3300 Hz for short, average, and long loop conditions represented by 0, 2.7, and 4.6 km of 26 AWG nonloaded cable, respectively. The specified length of cable will be simulated by a complex impedance. (See Figure A.) The input level to the cable simulator shall be −10 dB with respect to 1 V open circuit from a 900 ohm source.

(c) A digital telephone complies with the Commission’s volume control requirements if the telephone is equipped with a receive volume control that provides, through the receiver of the handset or headset of the telephone, 12 dB of gain minimum and up to 18 dB of gain maximum, when measured in terms of Receive Objective Loudness Rating (ROLR), as defined in paragraph 4.3.2.2 of ANSI/EIA–470–A–1987 when the receive volume control is set to its normal unamplified level.

Note to paragraph (a): Paragraph 4.1.2 of ANSI/EIA–470–A–1987 identifies several characteristics related to the receive response of a telephone. It is only the normal unamplified ROLR level and the change in ROLR as a function of the volume control setting that are relevant to the specification of volume control as required by this section.