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700-Watt lamp	No. 700 PS-40 (6,000 h).
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¹Copies of this specification can be obtained from the Specification Activity, Building 197, Room 301, Naval Weapons Plant, 1st and N Streets, SE., Washington, D.C. 20407.

²Copies of Military specifications can be obtained by contacting the Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Ave., Attention: NPPC-105, Philadelphia, Pa. 19120.

³Copies of Federal Aviation Administration specifications may be obtained from the Chief, Configuration Control Branch, AAF-110, Department of Transportation, Federal Aviation Administration, 800 Independence Avenue SW., Washington, D.C. 20591.

⁴Copies of Federal Aviation Administration advisory circulars may be obtained from the Department of Transportation, Publications Section, TAD-443.1, 400 7th St. SW., Washington, D.C. 20590.

[33 FR 11540, Aug. 14, 1968, as amended at 40 FR 30267, July 18, 1975]

§ 17.54 Rated lamp voltage.

To insure the necessary lumen output by obstruction lights, the rated voltage of incandescent lamps used shall correspond to be within 3 percent higher than the voltage across the lamp socket during the normal hours of operation.

[42 FR 54826, Oct. 11, 1977]

§ 17.56 Maintenance of lighting equipment.

Replacing or repairing of lights, automatic indicators or automatic control or alarm systems shall be accomplished as soon as practicable.

[79 FR 56986, Sept. 24, 2014]

§ 17.57 Report of radio transmitting antenna construction, alteration, and/or removal.

The owner of an antenna structure for which an Antenna Structure Registration Number has been obtained must notify the Commission within 5 days of completion of construction (FCC Form 854-R) and/or dismantlement (FCC Form 854). The owner must also notify the Commission within 5 days of any change in structure height or change in ownership information (FCC Form 854).

[79 FR 56987, Sept. 24, 2014]

§ 17.58 [Reserved]

PART 18—INDUSTRIAL, SCIENTIFIC, AND MEDICAL EQUIPMENT

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AUTHORITY: 47 U.S.C. 4, 301, 302, 303, 304, 307.

SOURCE: 50 FR 36067, Sept. 5, 1985, unless otherwise noted.

Subpart A—General Information

§ 18.101 Basis and purpose.

The rules in this part, in accordance with the applicable treaties and agreements to which the United States is a party, are promulgated pursuant to section 302 of the Communications Act of 1934, as amended, vesting the Federal Communications Commission with authority to regulate industrial, scientific, and medical equipment (ISM) that emits electromagnetic energy on frequencies within the radio frequency spectrum in order to prevent harmful interference to authorized radio communication services. This part sets forth the conditions under which the equipment in question may be operated.

§ 18.107 Definitions.

(a) *Radio frequency (RF) energy.* Electromagnetic energy at any frequency in the radio spectrum from 9 kHz to 3 THz (3,000 GHz).

(b) *Harmful interference.* Interference which endangers the functioning of a

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radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with this chapter.

(c) *Industrial, scientific, and medical (ISM) equipment.* Equipment or appliances designed to generate and use locally RF energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of telecommunication. Typical ISM applications are the production of physical, biological, or chemical effects such as heating, ionization of gases, mechanical vibrations, hair removal and acceleration of charged particles.

(d) *Industrial heating equipment.* A category of ISM equipment used for or in connection with industrial heating operations utilized in a manufacturing or production process.

(e) *Medical diathermy equipment.* A category of ISM equipment used for therapeutic purposes, not including surgical diathermy apparatus designed for intermittent operation with low power.

(f) *Ultrasonic equipment.* A category of ISM equipment in which the RF energy is used to excite or drive an electromechanical transducer for the production of sonic or ultrasonic mechanical energy for industrial, scientific, medical or other noncommunication purposes.

(g) *Consumer ISM equipment.* A category of ISM equipment used or intended to be used by the general public in a residential environment, notwithstanding use in other areas. Examples are domestic microwave ovens, jewelry cleaners for home use, ultrasonic humidifiers.

(h) *ISM frequency.* A frequency assigned by this part for the use of ISM equipment. A specified tolerance is associated with each ISM frequency. See § 18.301.

(i) *Marketing.* As used in this part, marketing shall include sale or lease, offer for sale or lease, advertising for sale or lease, the import or shipment or other distribution for the purpose of sale or lease or offer for sale or lease. See subpart I of part 2 of this chapter.

(j) *Magnetic resonance equipment.* A category of ISM equipment in which RF energy is used to create images and

data representing spatially resolved density of transient atomic resources within an object.

NOTE: In the foregoing, sale (or lease) shall mean sale (or lease) to the user or a vendor who in turn sells (or leases) to the user. Sale shall not be construed to apply to devices sold to a second party for manufacture or fabrication into a device which is subsequently sold (or leased) to the user.

[50 FR 36067, Sept. 5, 1985, as amended at 59 FR 39472, Aug. 3, 1994]

§ 18.109 General technical requirements.

ISM equipment shall be designed and constructed in accordance with good engineering practice with sufficient shielding and filtering to provide adequate suppression of emissions on frequencies outside the frequency bands specified in § 18.301.

§ 18.111 General operating conditions.

(a) Persons operating ISM equipment shall not be deemed to have any vested or recognizable right to the continued use of any given frequency, by virtue of any prior equipment authorization and/or compliance with the applicable rules.

(b) Subject to the exceptions in paragraphs (c) and (d) of this section and irrespective of whether the equipment otherwise complies with the rules in this part, the operator of ISM equipment that causes harmful interference to any authorized radio service shall promptly take whatever steps may be necessary to eliminate the interference.

(c) The provisions of paragraph (b) of this section shall not apply in the case of interference to an authorized radio station or a radiocommunication device operating in an ISM frequency band.

(d) The provisions of paragraph (b) of this section shall not apply in the case of interference to a receiver arising from direct intermediate frequency pickup by the receiver of the fundamental frequency emissions of ISM equipment operating in an ISM frequency band and otherwise complying with the requirements of this part.

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§ 18.113 Inspection by Commission representatives.

Upon request by a representative of the Commission the manufacturer, owner, or operator of any ISM equipment shall make the equipment available for inspection and promptly furnish the Commission with such information as may be required to indicate that the equipment complies with this part.

§ 18.115 Elimination and investigation of harmful interference.

(a) The operator of ISM equipment that causes harmful interference to radio services shall promptly take appropriate measures to correct the problem.

(b) If the operator of ISM equipment is notified by the Commission's Regional Director that operation of such equipment is endangering the functioning of a radionavigation or safety service, the operator shall immediately cease operating the equipment. Operation may be resumed on a temporary basis only for the purpose of eliminating the harmful interference. Operation may be resumed on a regular basis only after the harmful interference has been eliminated and approval from the Regional Director obtained.

(c) When notified by the Regional Director that a particular installation is causing harmful interference, the operator or manufacturer shall arrange for an engineer skilled in techniques of interference measurement and control to make an investigation to ensure that the harmful interference has been eliminated. The Regional Director may require the engineer making the investigation to furnish proof of his or her qualifications.

[50 FR 36067, Sept. 5, 1985, as amended at 80 FR 53750, Sept. 8, 2015]

§ 18.117 Report of interference investigation.

(a) An interim report on investigations and corrective measures taken pursuant to § 18.115 of this part shall be filed with the Regional Director of the local FCC office within 30 days of notification of harmful interference. The final report shall be filed with the Re-

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gional Director within 60 days of notification.

(b) The date for filing the final report may be extended by the Regional Director when additional time is required to put into effect the corrective measures or to complete the investigation. The request for extension of time shall be accompanied by a progress report showing what has been accomplished to date.

[80 FR 53750, Sept. 8, 2015]

§ 18.121 Exemptions.

Non-consumer ultrasonic equipment, and non-consumer magnetic resonance equipment, that is used for medical diagnostic and monitoring applications is subject only to the provisions of §§ 18.105, 18.109 through 18.119, 18.301 and 18.303 of this part.

[59 FR 39472, Aug. 3, 1994; 60 FR 47302, Sept. 12, 1995]

Subpart B—Applications and Authorizations

§ 18.201 Scope.

This subpart contains the procedures and requirements for authorization to market or operate ISM equipment under this part.

§ 18.203 Equipment authorization.

(a) Consumer ISM equipment, unless otherwise specified, must be authorized under either the Declaration of Conformity or certification procedure prior to use or marketing. An application for certification shall be filed with the Commission on an FCC Form 731, pursuant to the relevant sections in part 2, subpart J of this chapter and shall also be accompanied by:

(1) A description of measurement facilities pursuant to § 2.948, or reference to such information already on file with the Commission.

(2) A technical report pursuant to §§ 18.207 and 18.311.

(b) Consumer ultrasonic equipment generating less than 500 watts and operating below 90 kHz, and non-consumer ISM equipment shall be subject to verification, in accordance with the relevant sections of part 2, subpart J of this chapter.

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(c) Grants of equipment authorization issued, as well as on-site certifications performed, before March 1, 1986, remain in effect and no further action is required.

[50 FR 36067, Sept. 5, 1985, as amended at 63 FR 36603 July 7, 1998]

§ 18.207 Technical report.

When required by the Commission a technical report shall include at least the following information:

(a) A description of the measurement facilities in accordance with §2.948. If such a description is already on file with the Commission, it may be included by reference.

(b) A copy of the installation and operating instructions furnished to the user. A draft copy of such instructions may be submitted with the application, provided a copy of the actual document to be furnished to the user is submitted as soon as it is available, but no later than 60 days after the grant of the application.

(c) The full name and mailing address of the manufacturer of the device and/or applicant filing for the equipment authorization.

(d) The FCC Identifier, trade name(s), and/or model number(s) under which the equipment is or will be marketed.

(e) A statement of the rated technical parameters that includes:

(1) A block and schematic diagram of the circuitry.

(2) Nominal operating frequency.

(3) Maximum RF energy generated.

(4) Electrical power requirements of equipment.

(5) Any other pertinent operating characteristics.

(f) A report of measurements, including a list of the measuring equipment used, and a statement of the date when the measuring equipment was last calibrated and when the measurements were made. The frequency range that was investigated in obtaining the report of measurements shall be indicated. See also §§18.309 and 18.311.

[50 FR 36067, Sept. 5, 1985, as amended at 63 FR 36603, July 7, 1998]

§ 18.209 Identification of authorized equipment.

(a) Each device for which a grant of equipment authorization is issued

under this part shall be identified pursuant to the applicable provisions of subpart J of part 2 of this chapter. Changes in the identification of authorized equipment may be made pursuant to §2.933 of part 2 of this chapter. FCC Identifiers as described in §§2.925 and 2.926 of this chapter shall not be used on equipment subject to verification or Declaration of Conformity.

(b) Devices authorized under the Declaration of Conformity procedure shall be labelled with the logo shown below. The label shall not be a stick-on, paper label. It shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase, as described in §2.925(d) of this chapter. *Permanently affixed* means that the label is etched, engraved, stamped, silkscreened, indelibly printed, or otherwise permanently marked on a permanently attached part of the equipment or on a nameplate of metal, plastic, or other material fastened to the equipment by welding, riveting, or a permanent adhesive. The label must be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable. The logo follows:



[63 FR 36603, July 7, 1998]

§ 18.211 Multiple listing of equipment.

(a) When the same or essentially the same equipment will be marketed under more than one FCC Identifier, equipment authorization must be requested on an FCC Form 731 for each FCC Identifier.

(b) If equipment authorization for additional FCC Identifiers is requested in the initial application, a statement shall be included describing how these additional devices differ from the basic device which was measured and stating that the report of measurements submitted for the basic device applies also to the additional devices.

(c) If equipment authorization for additional FCC Identifiers is requested

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after a grant has been issued by the FCC for the basic device, the application may, in lieu of the report of measurements, be accompanied by a statement including:

- (1) FCC Identifier of device for which measurements are on file with the FCC.
- (2) Date when equipment authorization was granted for the device(s) listed under paragraph (c)(1) of this section and the file number of such grant.
- (3) Description of the difference between the device listed under paragraph (c)(1) of this section and the additional device(s).
- (4) A statement that the report of measurements filed for the device listed under paragraph (c)(1) of this section applies also to the additional device(s).
- (5) Photographs pursuant to § 2.1033(c).

§ 18.212 Compliance information.

(a) Equipment authorized under the Declaration of Conformity procedure shall include the following compliance information in lieu of the information required by § 2.1077.

- (1) Identification of the product, e.g., name and model number.
- (2) A statement similar to the following:

This device complies with Part 18 of the FCC Rules.

(3) The name and address of the responsible party as defined in § 2.909 of the rules. This party must be located within the United States.

(b) The compliance information may be placed in the instruction manual, on a separate sheet, or on the packaging. There is no specific format for this information.

[63 FR 36603, July 7, 1998]

§ 18.213 Information to the user.

Information on the following matters shall be provided to the user in the instruction manual or on the packaging if an instruction manual is not provided for any type of ISM equipment:

- (a) The interference potential of the device or system
- (b) Maintenance of the system

(c) Simple measures that can be taken by the user to correct interference.

(d) Manufacturers of RF lighting devices must provide an advisory statement, either on the product packaging or with other user documentation, similar to the following: This product may cause interference to radio equipment and should not be installed near maritime safety communications equipment or other critical navigation or communication equipment operating between 0.45–30 MHz. Variations of this language are permitted provided all the points of the statement are addressed and may be presented in any legible font or text style.

[50 FR 36069, Sept. 5, 1985, as amended at 51 FR 17970, May 16, 1986; 64 FR 37419, July 12, 1999]

Subpart C—Technical Standards

§ 18.301 Operating frequencies.

ISM equipment may be operated on any frequency above 9 kHz except as indicated in § 18.303. The following frequency bands, in accordance with § 2.106 of the rules, are allocated for use by ISM equipment:

ISM frequency	Tolerance
6.78 MHz	±15.0 kHz
13.56 MHz	±7.0 kHz
27.12 MHz	±163.0 kHz
40.68 MHz	±20.0 kHz
915 MHz	±13.0 MHz
2,450 MHz	±50.0 MHz
5,800 MHz	±75.0 MHz
24,125 MHz	±125.0 MHz
61.25 GHz	±250.0 MHz
122.50 GHz	±500.0 MHz
245.00 GHz	±1.0 GHz

NOTE: The use of the 6.78 MHz ±15 kHz frequency band is subject to the conditions of footnote 524 of the Table of Allocations. See § 2.106.

§ 18.303 Prohibited frequency bands.

Operation of ISM equipment within the following safety, search and rescue frequency bands is prohibited: 490–510 kHz, 2170–2194 kHz, 8354–8374 kHz, 121.4–121.6 MHz, 156.7–156.9 MHz, and 242.8–243.2 MHz.

§ 18.305 Field strength limits.

(a) ISM equipment operating on a frequency specified in § 18.301 is permitted

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unlimited radiated energy in the band specified for that frequency.

(b) The field strength levels of emissions which lie outside the bands speci-

fied in §18.301, unless otherwise indicated, shall not exceed the following:

Equipment	Operating frequency	RF Power generated by equipment (watts)	Field strength limit (uV/m)	Distance (meters)
Any type unless otherwise specified (miscellaneous).	Any ISM frequency	Below 500	25	300
	Any non-ISM frequency ..	500 or more	25 × SQRT(power/500)	1300
Industrial heaters and RF stabilized arc welders.	On or below 5,725 MHz ..	Below 500	15	300
		500 or more	15 × SQRT(power/500)	1300
Medical diathermy	Any ISM frequency	Any	10	1,600
		Any non-ISM frequency ..	(²)	(²)
Ultrasonic	Below 490 kHz	Any	25	300
		Any	15	300
Induction cooking ranges	Below 490 kHz	Below 500	2,400/F(kHz)	300
		500 or more	2,400/F(kHz) × SQRT(power/500).	300
	490 to 1,600 kHz	Any	24,000/F(kHz)	30
	Above 1,600 kHz	Any	15	30
Induction cooking ranges	Below 90 kHz	Any	1,500	430
	On or above 90 kHz	Any	300	430

¹ Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment operating below 1000 MHz is not permitted the increase in field strength otherwise permitted here for power over 500 watts.

² Reduced to the greatest extent possible.

³ Field strength may not exceed 10 µV/m at 1600 meters. Consumer equipment is not permitted the increase in field strength otherwise permitted here for over 500 watts.

⁴ Induction cooking ranges manufactured prior to February 1, 1980, shall be subject to the field strength limits for miscellaneous ISM equipment.

(c) The field strength limits for RF lighting devices shall be the following:

Frequency (MHz)	Field strength limit at 30 meters (µV/m)
Non-consumer equipment:	
30-88	30
88-216	50
216-1000	70
Consumer equipment:	
30-88	10
88-216	15
216-1000	20

NOTES

1. The tighter limit shall apply at the boundary between two frequency ranges.

2. Testing for compliance with these limits may be made at closer distances, provided a sufficient number of measurements are taken to plot the radiation pattern, to determine the major lobes of radiation, and to determine the expected field strength level at 30, 300, or 1600 meters. Alternatively, if measurements are made at only one closer fixed distance, then the permissible field strength limits shall be adjusted using 1/d as an attenuation factor.

[50 FR 36070, Sept. 5, 1985, as amended at 51 FR 17970, May 16, 1986; 52 FR 43197, Nov. 10, 1987]

§ 18.307 Conduction limits.

For the following equipment, when designed to be connected to the public utility (AC) power line the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies shall not exceed the limits in the following tables. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal using a 50 µH/50 ohms line impedance stabilization network (LISN).

(a) All Induction cooking ranges and ultrasonic equipment:

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.009-0.05	110	—
0.05-0.15	90-80*	—
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

(b) All other part 18 consumer devices:

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Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

* Decreases with the logarithm of the frequency.

(c) RF lighting devices:

Frequency (MHz)	Maximum RF line voltage measured with a 50 µH/50 ohm LISN (µV)
Non-consumer equipment:	
0.45 to 1.6	1,000
1.6 to 30	3,000
Consumer equipment:	
0.45 to 2.51	250
2.51 to 3.0	3,000
3.0 to 30	250

(d) If testing with a quasi-peak detector demonstrates that the equipment complies with the average limits specified in the appropriate table in this

section, additional testing to demonstrate compliance using an average detector is not required.

(e) These conduction limits shall apply only outside of the frequency bands specified in § 18.301.

(f) For ultrasonic equipment, compliance with the conducted limits shall preclude the need to show compliance with the field strength limits below 30 MHz unless requested by the Commission.

(g) The tighter limits shall apply at the boundary between two frequency ranges.

[50 FR 36067, Sept. 5, 1985, as amended at 52 FR 43198, Nov. 10, 1987; 64 FR 37419, July 12, 1999; 67 FR 45671, July 10, 2002]

§ 18.309 Frequency range of measurements.

(a) For field strength measurements:

Frequency band in which device operates (MHz)	Range of frequency measurements	
	Lowest frequency	Highest frequency
Below 1.705	Lowest frequency generated in the device, but not lower than 9 kHz.	30 MHz.
1.705 to 30	Lowest frequency generated in the device, but not lower than 9 kHz.	400 MHz.
30 to 500	Lowest frequency generated in the device or 25 MHz, whichever is lower.	Tenth harmonic or 1,000 MHz, whichever is higher.
500 to 1,000	Lowest frequency generated in the device or 100 MHz, whichever is lower.	Tenth harmonic.
Above 1,000do	Tenth harmonic or highest detectable emission.

(b) For conducted powerline measurements, the frequency range over which the limits are specified will be scanned.

[50 FR 36070, Sept. 5, 1985, as amended at 51 FR 17971, May 16 1986]

§ 18.311 Methods of measurements.

The measurement techniques which will be used by the FCC to determine compliance with the technical requirements of this part are set out in FCC Measurement Procedure MP-5, "Methods of Measurements of Radio Noise Emissions from ISM equipment". Although the procedures in MP-5 are not mandated, manufacturers are encouraged to follow the same techniques which will be used by the FCC.

PART 19—EMPLOYEE RESPONSIBILITIES AND CONDUCT

Subpart A—General Provisions

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- 19.735–101 Purpose.
- 19.735–102 Cross-reference to ethics and other conduct related regulations.
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- 19.735–104 Delegations.
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