

1971 No. 1675

TELEGRAPHS**The Wireless Telegraphy (Control of Interference from Radio-Frequency Heating Apparatus) Regulations 1971**

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|-------------------------------|-------|-------------------|
| <i>Made</i> | - - - | 14th October 1971 |
| <i>Laid before Parliament</i> | | 21st October 1971 |
| <i>Coming into Operation</i> | | 21st October 1972 |

The Minister of Posts and Telecommunications, in the exercise of his powers under section 10 of the Wireless Telegraphy Act 1949(a), by the said section as extended to the Channel Islands by the Wireless Telegraphy (Channel Islands) Order 1952(b) and by the said section as extended to the Isle of Man by the Wireless Telegraphy (Isle of Man) Order 1952(c), and of every other power enabling him in that behalf, hereby makes the following Regulations:—

Citation and Commencement

1. These Regulations may be cited as the Wireless Telegraphy (Control of Interference from Radio-Frequency Heating Apparatus) Regulations 1971, and shall come into operation on 21st October 1972.

Interpretation

2.—(1) In these Regulations, except so far as the contrary is provided or the context otherwise requires, the following expressions have the meanings hereby respectively assigned to them:

“the Act” means the Wireless Telegraphy Act 1949;

“the British Islands” means the area comprised by the United Kingdom, the Channel Islands, and the Isle of Man;

“radio-frequency heating apparatus” means apparatus, not being electro-medical apparatus, scientific apparatus, or arc-welding apparatus, which is designed to produce a heating effect by the use of radio-frequency energy and which, or any part of which, generates or is liable to generate electro-magnetic energy at frequencies of three million megahertz or less when it is in operation, and includes any switchgear or controlling apparatus forming part of or directly associated with that apparatus and any induction cables, attachment, electrodes and connecting leads used or designed to be used with that apparatus;

“kilohertz” has the same meaning as kilocycles per second, i.e. one thousand cycles per second;

“megahertz” has the same meaning as megacycles per second, i.e. one million cycles per second;

“electric supply lines” means electric lines for transmitting electric power to a radio-frequency heating apparatus;

(a) 1949 c. 54.

(b) S.I. 1952/1900 (1952 III, p. 3414).

(c) S.I. 1952/1899 (1952 III, p. 3418).

“terminal voltage” means the radio-frequency voltage present between each electric supply line terminal of a radio-frequency heating apparatus and the screening of the measuring apparatus referred to in Regulation 5 ;

expressions used in Schedule 2 have the meanings respectively assigned to them in Part 1 of Schedule 2 ;

and other expressions have the same meaning as they have in the Act.

(2) The Interpretation Act 1889(a) applies for the interpretation of these Regulations as it applies for the interpretation of an Act of Parliament.

Requirements

3. When any radio-frequency heating apparatus is used in the British Islands on or after the 21st October 1972 it shall comply with the following requirements for the purposes of section 10 of the Act :

- (a) the field strength of electro-magnetic energy radiated in any direction from the apparatus, as measured and computed in accordance with Regulation 5 shall not exceed the limits specified in columns 1 and 2 of Schedule 1 at any frequency within the range from 150 kilohertz to 1000 megahertz, but if the apparatus causes undue interference with any wireless telegraphy used for the purposes of any safety of life service or for any purpose on which the safety of any person or of any vessel, aircraft or vehicle may depend, the limits specified in columns 1 and 4 of Schedule 1 shall apply, and
- (b) the terminal voltage, as measured and computed in accordance with Regulation 5 shall not exceed the limits specified in columns 1 and 3 of Schedule 1 at any frequency within the range from 150 kilohertz to 30 megahertz but if the apparatus causes undue interference with any wireless telegraphy used for the purposes of any safety of life service, or for any purpose on which the safety of any person or of any vessel, aircraft or vehicle may depend, the limits specified in columns 1 and 5 of Schedule 1 shall apply.

4. Any radio-frequency heating apparatus which obtains its electric power from any supply to which dwelling houses are not also directly connected is exempt from the provisions of Schedule 1 Columns 3 and 5.

Field strength and terminal voltage measurement

5.—(1) For the purpose of measuring and computing the field strength of the electro-magnetic energy and the terminal voltage at frequencies exceeding 150 kilohertz but not exceeding 1000 megahertz the radio-frequency heating apparatus shall be tested by means of measuring apparatus of the description and having the physical and electrical characteristics and performance set out in British Standard 727 : 1967, Section 1, Pages 9-13.

(2) The tests for field strength shall be made by the method and under the conditions set out in Part 2 of Schedule 2 and the tests for terminal voltage shall be made by the method and under the conditions set out in Part 3 of Schedule 2.

(3) The said field strength and terminal voltage shall be computed as provided in Parts 2 and 3 of Schedule 2 from the readings afforded by the measuring apparatus while the radio-frequency heating apparatus is operating.

Dated 14th October 1971.

Christopher Chataway,
Minister of Posts & Telecommunications.

SCHEDULE 1

Regulations 3 and 4

The limits of field strength and terminal voltage shall be as follows:

| Col. 1 | | Col. 2 | Col. 3 | Col. 4 | Col. 5 |
|------------------------|---------------|---|--|---|--|
| Frequency Range in MHz | | Maximum radiated field strength in microvolts per metre | Maximum terminal voltage in microvolts | For protection of safety of life services | |
| Exceeding | Not Exceeding | | | Maximum radiated field strength in microvolts per metre | Maximum terminal voltage in microvolts |
| 13-533 | 13-553 | 300,000 | 5,000,000 | | |
| 13-553 | 13-567 | unlimited | unlimited | | |
| 13-567 | 13-587 | 300,000 | 5,000,000 | | |
| 26-957 | 27-283 | unlimited | unlimited | | |
| 83-996 | 84-004 | 3,000,000 | | | |
| 167-992 | 168-008 | 3,000,000 | | | |
| 886 | 906 | 1,000,000 | | | |

For all other frequencies in the ranges specified below, the limits of field strength and terminal voltage shall be as follows:

| Col. 1 | | Col. 2 | Col. 3 | Col. 4 | Col. 5 |
|--------|----------|--------|--------|--------|--------|
| 0-15 | 0-2 | 50 | 3,000 | 15 | 1,000 |
| 0-2 | 0-285 | 50 | 2,000 | 15 | 650 |
| 0-285 | 0-49 | 250 | 2,000 | 80 | 650 |
| 0-49 | 0-5 | 50 | 2,000 | 15 | 650 |
| 0-5 | 1-605 | 50 | 1,000 | 15 | 350 |
| 1-605 | 3-95 | 250 | 1,000 | 80 | 350 |
| 3-95 | 30-00 | 50 | 1,000 | 15 | 350 |
| 30-00 | 470-00 | 30 | | 10 | |
| 470-00 | 1,000-00 | 100 | | 35 | |

Regulation 5

SCHEDULE 2

PART 1

*Definition of expressions used in the Schedule**Voltage and e.m.f.*

References to the voltage or e.m.f. of a sinewave are references to its effective or root mean square value.

Decibel (abbreviated dB)

A unit of transmission giving the ratio of two powers.

If P_1 and P_2 represent two values of power, and n the number of decibels representing their ratio:

$$n = 10 \log_{10} \left(\frac{P_1}{P_2} \right)$$

If the two powers are dissipated in equal resistive impedances, their ratio in decibels may be expressed by:

$$n = 20 \log_{10} \left(\frac{V_1}{V_2} \right)$$

where V_1, V_2 are the voltages across the two resistive impedances.

Terminal voltage calibration constant

The number of decibels that must be added to the reading of the measuring apparatus, when a measurement of terminal voltage is made as prescribed, to give the terminal voltage in decibels above 1 microvolt.

Field strength calibration constant

The number of decibels that must be added to the reading of the measuring apparatus, when a measurement of field-strength is made as prescribed, to give the value of field-strength in decibels above 1 microvolt per metre.

PART 2

*Method and conditions of measuring field-strength*1. *General*

Where a radio-frequency heating apparatus is being tested for the purpose of this regulation it shall so far as is consistent with the following provisions of this Part of this Schedule, be tested under its normal conditions of installation.

2. *Attachments and load*

The radio-frequency heating apparatus must be tested in complete working form with its work circuit connected. The load employed for the test shall be similar to that which was being treated at the time of the alleged interference, and the electrodes and cables shall be disposed in the manner of their normal use.

3. *Other electrical apparatus to be disconnected*

All other electrical apparatus which is installed in proximity to the radio-frequency heating apparatus, and which in operation could appreciably affect the result of the test, shall be switched off or otherwise prevented from being energised by complete or partial electrical disconnection.

4. *Conditions for measurement*

The measuring set receiver shall be connected with an appropriate source of electric power. The receiver shall be tuned to the frequency, as indicated by the tuning dial calibrations, at which it is desired to test, and its gain shall be set, in accordance with the relevant instruction manual, to that used when the measuring set was calibrated.

5. *Input connexion of measuring apparatus, and distance and height of aerial*

(1) The receiver shall be connected to the aerial mentioned in British Standard 727:1967 clause 11.1.2, page 13 or the aerial and feeder mentioned in British Standard 727:1967 clause 11.2.1 page 13 (as the case may be).

(2) The distance between the aerial of the measuring apparatus and the nearest point on the boundary of the premises in which the radio-frequency heating apparatus is installed shall not be greater than 100 metres for measurement in the frequency range 0.15 megahertz up to and including 30 megahertz, and 30 metres for higher frequencies up to and including 1000 megahertz.

(3) For the frequency range 0.15 megahertz up to and including 30 megahertz the aerial shall be supported in a vertical plane and be rotatable about a vertical axis. The lowest point of the loop shall be 1 metre above the ground.

(4) For higher frequencies up to and including 1000 megahertz the centre of the aerial shall be supported at a height of not less than 2.8 metres and not more than 3.2 metres above the ground. Measurements shall be made in each case with the measuring aerial horizontal and vertical. When the aerial is used in the horizontal plane it shall be orientated in that plane for maximum output on the measuring set.

6. *Adjustment of radio-frequency heating apparatus*

For the purpose of the main test in paragraph 8 of this Part of this Schedule the radio-frequency heating apparatus shall be switched on, and adjusted to deliver its rated output power into the work load.

7. *Making the measurement*

(1) The measuring receiver shall be adjusted and operated in accordance with the relevant instruction manual. The field-strength shall be observed over the whole of the work cycle of the radio-frequency heating apparatus and the highest value, subject to the provisions of paragraph 9 of this Part of this Schedule, shall be taken.

(2) The frequency at which a test is being made shall be measured by means of a frequency meter incorporating a crystal controlled frequency standard having an inherent error of measurement not greater than one part in one hundred thousand.

The frequency shall be measured over the load range from the lowest power normally used to maximum power.

8. *Tests*

A set of tests shall be made in each case as follows:

- (a) A check test while the radio-frequency heating apparatus is not operating;
- (b) A main test;
- (c) A further check test as mentioned in (a).

9. If a click (as opposed to a buzz of appreciable duration) is heard in the monitoring loudspeaker or earphones at any time when any switchgear or controlling apparatus of the radio-frequency heating apparatus is operating, then provided that not more than one further click is heard during the period of two seconds immediately following the first, the readings of the

measuring apparatus appearing within that period of two seconds shall be disregarded for the purpose of these Regulations.

10. *Interpretation of results*

The field-strength expressed in decibels above 1 microvolt per metre will be given by the sum of: (a) the reading(s) of the attenuator(s), (b) the field-strength calibration constant (if any) appropriate to the frequency at which the measurement is being made, and (c) the reading of the indicating meter of the valve-voltmeter, if calibrated in decibels. If the result obtained is x decibels, the field strength expressed in microvolts per metre is given by the antilog to the base 10 of $\frac{x}{20}$

11. If the maximum reading obtained on any main test exceeds the maximum reading obtained on either of the check tests made next before or next after that main test by at least 10 dB, the readings obtained on that main test are to be regarded as not materially affected by extraneous noise or signals. Otherwise the readings obtained on that main test are to be regarded as materially affected by extraneous noise or signals, and the results of that main test shall be disregarded for the purpose of these Regulations.

PART 3

Method and conditions of measuring terminal voltage

1. *General*

- (1) Where a radio-frequency heating apparatus is being tested for the purpose of this regulation, it shall be connected with an appropriate source of electric power.
- (2) The radio-frequency heating apparatus shall be tested under its normal conditions of installation with a work load similar to that being treated at the time of the complaint.
- (3) The measurement of terminal voltage shall be made at any convenient point within the boundaries of the user's premises but as near to the boundary as practicable.

2. *Connexions to be made to the electric supply line terminals of the radio-frequency heating apparatus and the input terminals of the measuring set.*
The following connexions shall be made:

The electric supply line terminal of the radio-frequency heating apparatus which is the terminal being tested shall be connected through the isolation capacitor C and the 1450 ohm resistor shown in Fig. 1. An inductor L shall be connected between the input terminal of the measuring set and the screening of the measuring set. The impedance of the capacitor C at the frequency of measurement shall be less than 10 ohms. The impedance of the inductor L at the frequency of measurement shall be greater than 1000 ohms.

3. *Tests*

A set of tests as mentioned in sub-paragraphs (a), (b) and (c) of paragraph 8 of Part 2 of this Schedule shall be made in each case with the receiver of the testing apparatus connected with one of the electric supply line terminals of the radio-frequency heating apparatus and another set or other sets of tests as mentioned in those sub-paragraphs shall be made with the receiver of the testing apparatus connected with the other or each of the others of such terminals.

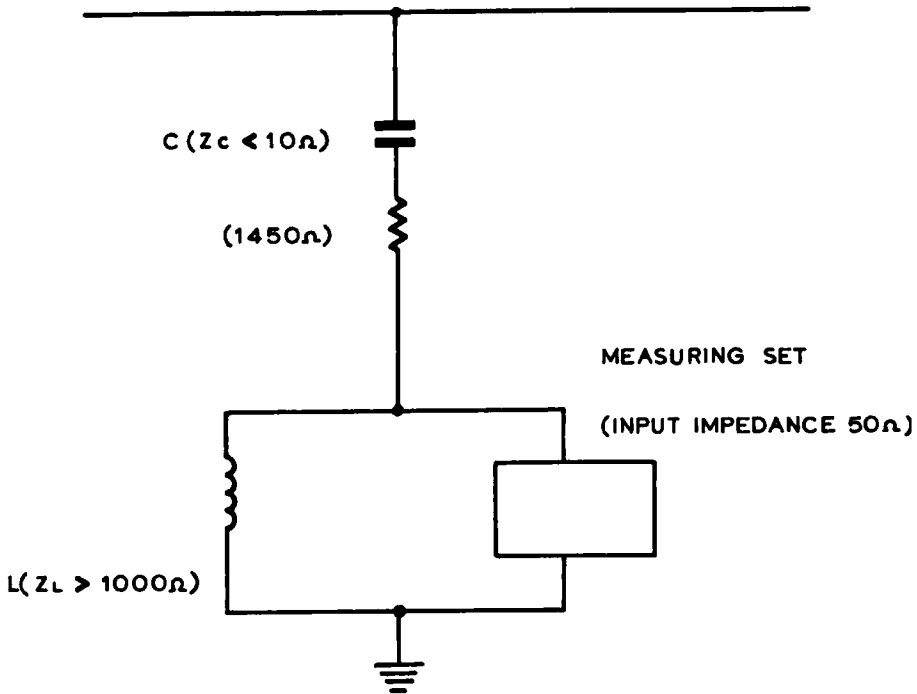
4. Paragraph 9 of Part 2 of this Schedule shall apply.

5. *Interpretation of results*

The terminal voltage, expressed in decibels above 1 microvolt, will be given by the sum of: (a) the reading(s) of the attenuator(s), (b) the terminal voltage calibration constant (if any) appropriate to the frequency at which the measurement is being made, (c) the reading of the indicating meter of the valve-voltmeter, if calibrated in decibels and (d) 30 decibels to take into account the loss in the measuring circuit shown in Fig. 1. If the result obtained is x decibels, the voltage expressed in microvolts is given by the antilog to the base 10 of $\frac{x}{20}$.

6. Paragraph 11 of Part 2 of this Schedule shall apply.

SUPPLY MAINS



CIRCUIT FOR R.F. VOLTAGE MEASUREMENT
ON SUPPLY MAINS

EXPLANATORY NOTE

(This Note is not part of the Regulations.)

These Regulations prescribe the requirements to be complied with in relation to certain radio-frequency heating apparatus used in the British Islands on or after the 21st October 1972, for the purpose of ensuring that it will not cause undue interference with wireless telegraphy.

The requirements are prescribed in terms of the maximum permitted field strength of the electro-magnetic energy radiated from the apparatus and the maximum permitted radio-frequency voltage at the supply line terminals of the apparatus at specified frequencies.

Non-compliance with the limits is not an offence, but is a ground on which the Minister of Posts and Telecommunications may serve an enforcement notice under section 11 of the Wireless Telegraphy Act 1949.

For convenience the terms "kilohertz" and "megahertz" are used in these Regulations in preference to "kilocycles per second" and "megacycles per second" since the "hertz" (equivalent to one cycle per second) is used as the unit of frequency in British and International Standards with which these Regulations are aligned.