MILITARY SPECIFICATION

ACTUATOR, ELECTROMECHANICAL, LINEAR

This specification is approved for use within the Naval Air Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification establishes the requirements for the manufacture and inspection of one type of electromechanical linear actuator. The test limits in this specification define minimum acceptable capabilities.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

MILITARY

MIL-T-7743	Testing, Store Suspension and Release Equipment, General Specification for
MIL-E-17555	Electronic and Electrical Equipment, Accessories and Repair Parts, Packaging and Packing of

Beneficial comments, (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to the Naval Air Engineering Center, Systems Engineering and Standardization Department (Code 93), Lakehurst, NJ 08733-5100, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 1095

STANDARDS

MILITARY

DOD-STD-100	Engineering Drawing Practices
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-143	Standards and Specifications, Order of Precedence for the Selection of
MIL-STD-454	Standard General Requirements for Electronic Equipment
MIL-STD-704	Electric Power, Aircraft, Characteristics and Utilization of
MIL-STD-810	Environmental Test Methods and Engineering Guidelines
MIL-STD-831	Test Reports, Preparation of
MIL-STD-1250	Corrosion, Prevention and Deterioration, Control in Electronic Components and Assemblies

(Copies of specification, standards, and drawings required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B46.1	Surface Texture (Surface Roughness Waviness and Lay)

(Applications for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, New York 10018).

(Nongovernment standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3.1, 6.2.1, and 6.3).

3.2 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

3.3 Design and construction. The design and construction of the actuator shall be in accordance with the requirements specified herein.

3.3.1 Materials. The materials shall be entirely suitable for the purpose intended. Materials shall be selected on the basis of strength, workability and compatibility with other materials in the item to minimize galvanic action (see MIL-STD-1250). Mounting interfaces shall be constructed of materials that are compatible with the cadmium plated steel bolts and cadmium plated steel frame.

3.3.2 Finishes. Finishes shall be applied to all materials, whenever applicable, and shall be entirely suitable for the purpose intended, such as corrosion resistance and increased durability.

3.3.3 Surface texture. Surface texture shall be not greater than 250 microinches measured in accordance with ANSI B46.1. There shall be no sharp edges or burrs.

3.3.4 Interchangeability. All actuators having the same vendor part number shall be internally and externally identical.

3.3.5 Marking. All parts shall be marked as specified on the applicable drawing or in accordance with MIL-STD-130 if not specified on the drawing. The item identification and part number requirements of DOD-STD-100 shall govern the part numbers and changes thereto.

3.3.6 Nameplates. Identification for actuators shall be in accordance with the applicable drawing for the actuator being procured.

3.3.7 Envelope.

3.3.7.1 Dimensions. The actuator envelope dimension shall be in accordance with the applicable drawing for the actuator being procured.

3.3.7.2 Electrical interface. The actuator cable interface shall be in accordance with the applicable drawing for the actuator being procured.

3.3.8 Weight. The weight of the actuator shall be not greater than 2 pounds.

3.3.9 Lubrication. Lubricants shall not be toxic or cause injury to personnel.

3.3.10 Power requirements.

3.3.10.1 Input power. The actuator shall operate from a 28 volt direct current (VDC) power source with the characteristics and limits defined in MIL-STD-704, except that the actuator shall operate over a range of 20 to 32 VDC. The rated voltage of the actuator shall be 28 VDC. The actuator shall operate when voltage is applied for a minimum of 20 milliseconds and a maximum of 15 seconds. The total maximum "on" time shall be 15 seconds at a 20% duty cycle.

3.3.10.2 Current. The current drawn by the actuator shall be not greater than 5.0 amperes at 28 VDC at room temperature. The actuator shall be capable of a steady current draw not greater than 0.25 ampere, without any movement of the release plunger or mechanism or damage to the unit (see 4.6.2.5).

3.3.11 Electromagnetic interference controls. The electrical portion of the system shall be designed for electromagnetic interference (EMI) free operation in accordance with 4.6.3 and as specified in the appendix.

3.3.12 Plunger force. The actuator plunger thrust force shall be not less than 45 pounds after 1/16 inch travel or not less than 18 pounds during the full length of travel when tested in accordance with 4.6.2.2.

3.3.13 Operating stroke. The operating stroke shall be as specified in the applicable drawing for the actuator being procured.

3.3.14 Time of release. The travel time of the actuator plunger, from initiation of release voltage at the actuator connector interface to full extension of the actuator plunger, shall be not greater than 30 milliseconds when tested in accordance with 4.6.2.3.

3.3.15 Speed of transfer switch. The total transfer time of the actuator switch, when power is removed, shall be not greater than 20 milliseconds including decay time, breaking of contacts, and chatter (see 4.6.2.4).

3.3.16 Service life. The actuator shall operate through 5,000 cycles without failure or readjustment of any parts (see 4.6.12).

3.3.17 Leakage. The actuator shall not show evidence of leakage above 0.7 standard liters per minute (SLPM) when tested in accordance with 4.6.2.6.

3.3.18 Operating environment. The actuator performance shall comply with the requirements of the applicable conditions specified in MIL-STD-810 and MIL-T-7743 and other conditions specified herein.

3.3.19 Workmanship. The workmanship displayed in fabrication and assembly of the actuator shall ensure, within design limitations, ability of the actuator to meet performance requirements under all applicable environmental conditions specified herein. Unauthorized repair, welding, heavy burrs, or parts assembled by introduction of high stresses not prescribed in design are typical signs of inferior workmanship and shall be cause for rejection. The standards of workmanship exhibited in the approved first article sample, subject to any qualification stated in the Government's notice of approval, shall be determinative of the requirements of the contract relative to workmanship. All electrical components and wiring shall be installed in accordance with MIL-STD-454.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.3).

b. Quality conformance inspection (see 4.4).

4.3 First article inspection. First article inspection shall consist of all the inspections listed in Table I. First article inspection report format shall be in accordance with MIL-STD-831 (see 6.2.2).

TABLE I. First article inspection - schedule and sequence. 1/

Inspection	Method paragraph	Sample (see 4.3.1) A	B	C	D	E
Actuator inspection	4.6.1	1	1	1	1	1
Plunger force	4.6.2.2	2	2	2	2	2
Current	4.6.2.5	3	3	3	3	3
Temperature rise	4.6.6	4	4	4	4	4
Time of release	4.6.2.3	5	5	5	5	5
Speed of transfer switch	4.6.2.4	6	6	6	6	6
Operation of indicator circuit	4.6.2.4.3	7	7	7	7	7
Dielectric breakdown	4.6.7	8	8	8	8	8
Electromagnetic compatibility	4.6.3	9	9	9	9	9
Operational check	4.6.2.1	10	10	10	10	10
Leakage	4.6.2.6	11	11	11	11	11
Vibration, low frequency	4.6.11.2	12	12	12	12	12
High temperature	4.6.5	13	13	13	13	13
Insulation resistance	4.6.8	14	14	14	14	14
Low temperature	4.6.4	15	15	15	15	15
Acceleration	4.6.9	X	X	16	X	16
Vibration, resonance search	4.6.11.3	X	16	X	X	17
Vibration, resonance dwell	4.6.11.4	X	17	X	X	18
Salt fog	4.6.10	16	X	X	16	X
Shock	4.6.13	X	X	17	17	X
Service life	4.6.12	17	X	18	18	X
Post test	4.6.14	18	18	19	19	19

1/ Inspection sequence is denoted by the number in the same columns. An X denotes inspection is not required.

4.3.1 Sample. First article actuator sample shall consist of the first five actuators manufactured on contract. The actuators shall be permanently labeled A, B, C, D and E for ease of identification. Failure of the actuators to pass any of the first article inspections shall be cause for rejection (see 6.2.1h).

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the following inspections:

a. Individual inspections (see 4.4.1).

b. Sampling inspections (see 4.4.2).

Quality conformance inspection report format shall be in accordance with MIL-STD-831 (see 6.2.2).

4.4.1 Individual inspections. Individual inspections are those inspections conducted on each actuator in accordance with the inspections listed in Table II, Group 1. Failure to pass any of these inspections shall be cause for rejection of the actuator.

TABLE II. Quality conformance inspection - schedule and sequence. 1/

Inspection	Method paragraph	Samples				
Group 1		All actuators (see 4.4.1) All samples (see 4.4.2) 2/				
Actuator inspection	4.6.1	1				
Plunger force	4.6.2.2	2				
Current	4.6.2.5	3				
Time of release	4.6.2.3	4				
Speed of transfer switch	4.6.2.4	5				
Operation of indicator circuit	4.6.2.4.3	6				
Dielectric breakdown	4.6.7	7				
Operational check 2/	4.6.2.1	8				
Leakage 2/	4.6.2.6	9				
Vibration, low frequency 2/	4.6.11.2	10				
Group 2		All samples (see 4.4.2) A	B	C	D	E
Electromagnetic compatibility	4.6.3	1	1	1	1	1
Temperature rise	4.6.6	2	2	2	2	2
High temperature	4.6.5	3	3	3	3	3
Insulation resistance	4.6.8	4	4	4	4	4
Low temperature	4.6.4	5	5	5	5	5
Acceleration	4.6.9	6	X	6	X	X
Vibration, resonance search	4.6.11.3	X	6	X	X	6
Vibration, resonance dwell	4.6.11.4	X	7	X	X	7
Salt fog	4.6.10	7	X	X	6	X
Shock	4.6.13	X	8	X	7	X
Service life	4.6.12	8	X	6	8	X
Operation of indicator circuit	4.6.2.4.3	9	9	7	9	8
Post test	4.6.14	10	10	9	10	9

1/ Inspection sequence is denoted by the numbers in the sample column. An X denotes inspection is not required.

2/ The operational, leakage, and low frequency vibration tests shall not be included in the sampling inspections (see 4.4.2).

4.4.2 Sampling inspections. A random sampling of actuators shall be selected by the acquiring activity from each production lot in accordance with Table III and shall be subjected to the inspections listed in Table II, Groups 1 and 2. Group 1 inspections shall be conducted prior to Group 2 inspections. Failure of any sample to pass any of these inspections shall be cause for rejection of the entire lot (see 6.2.1d, 6.2.1e, and 6.2.1i).

TABLE III. Sample inspection.

Production lot size	Number of samples to be tested
75 or less	2
76 to 125	3
126 to 300	5
301 or more	1/

1/ Number of samples shall be in multiples of 2. The acquiring activity shall specify the number of samples and the inspection sequence each unit shall be subjected to for lots in excess of 300 units (see 6.2.1g).

4.5 Inspection conditions. Unless otherwise specified, all inspections shall be performed under the following conditions:

a. Room temperature. Room ambient of 77° ± 18°F indicated.

b. Test temperature. All parts of the test item shall be stabilized at the specified temperature ± 5°F indicated prior to conducting any tests. Unless otherwise specified, temperature stabilization will have been attained when the indicated temperature of the surface of the largest mass of the test item does not change more than ± 5°F per hour.

4.6 Methods of inspection.

4.6.1 Actuator inspection. The actuator shall be inspected as follows.

4.6.1.1 First article and quality conformance inspections.

a. Each actuator shall be thoroughly examined to determine conformance to all of the requirements specified herein.

b. Each actuator shall be inspected to ensure that it has been properly assembled and that the workmanship is as specified herein (see 3.3.17).

c. The actuator shall be examined to ascertain that the packaging conforms to contract requirements (see section 5 and 6.2.1c).

4.6.2 Functional tests. The actuator shall be subjected to the following checks. All checks shall be performed with the actuator mounted as intended by the applicable drawing.

4.6.2.1 Operational check. The actuator shall be subjected to 50 cycles of operation. Each cycle shall consist of cocking and then energizing the actuator with 28 VDC. A 28 VDC lamp shall be connected in the transfer circuit (L_3 of Figure 1) and the firing circuit shall be energized twice in succession for each firing cycle; the first to activate the actuator and the second to light the lamp. Lighting of the lamp during the first pulse or failure to light during the second pulse shall be considered a failure. The duty cycle for the actuator shall be 20% on and 80% off (see 3.3.10.1). At the completion of this test, the actuator shall be tested in accordance with 4.6.2.3 and 4.6.2.4.

4.6.2.2 Plunger force. The actuator plunger thrust force shall meet the requirements of 3.3.12 when measured after the release of the actuator plunger.

4.6.2.3 Time of release. The actuator time of release shall meet the requirements of 3.3.14 when the actuator is energized with a 20 VDC, 20 millisecond pulse. This test shall be done a total of five times.

4.6.2.4 Speed of transfer switch.

4.6.2.4.1 20 VDC operation. The actuator shall be energized with a 20 VDC. The speed of transfer, measured from the time the actuating voltage is removed, shall meet the requirements of 3.3.15. This test shall be done a total of five times.

4.6.2.4.2 32 VDC operation. The actuator shall be subjected to the tests of 4.6.2.3 and 4.6.2.4.1 except the voltage shall be 32 VDC.

4.6.2.4.3 Operation of indicator circuit. The actuator shall be cocked and the plunger protrusion shall be measured. The actuator shall then be electrically connected as shown in Figure 1 and energized by moving the firing switch to position A. The switch shall then be placed in position B and the plunger pushed back toward the cocked position only until the "cocked" indicator lamp, L_2, illuminates. The distance shall be measured. The difference between the two distances shall not exceed 1/8 inch, +0 -1/32 inch. This test shall be done a total of five times.

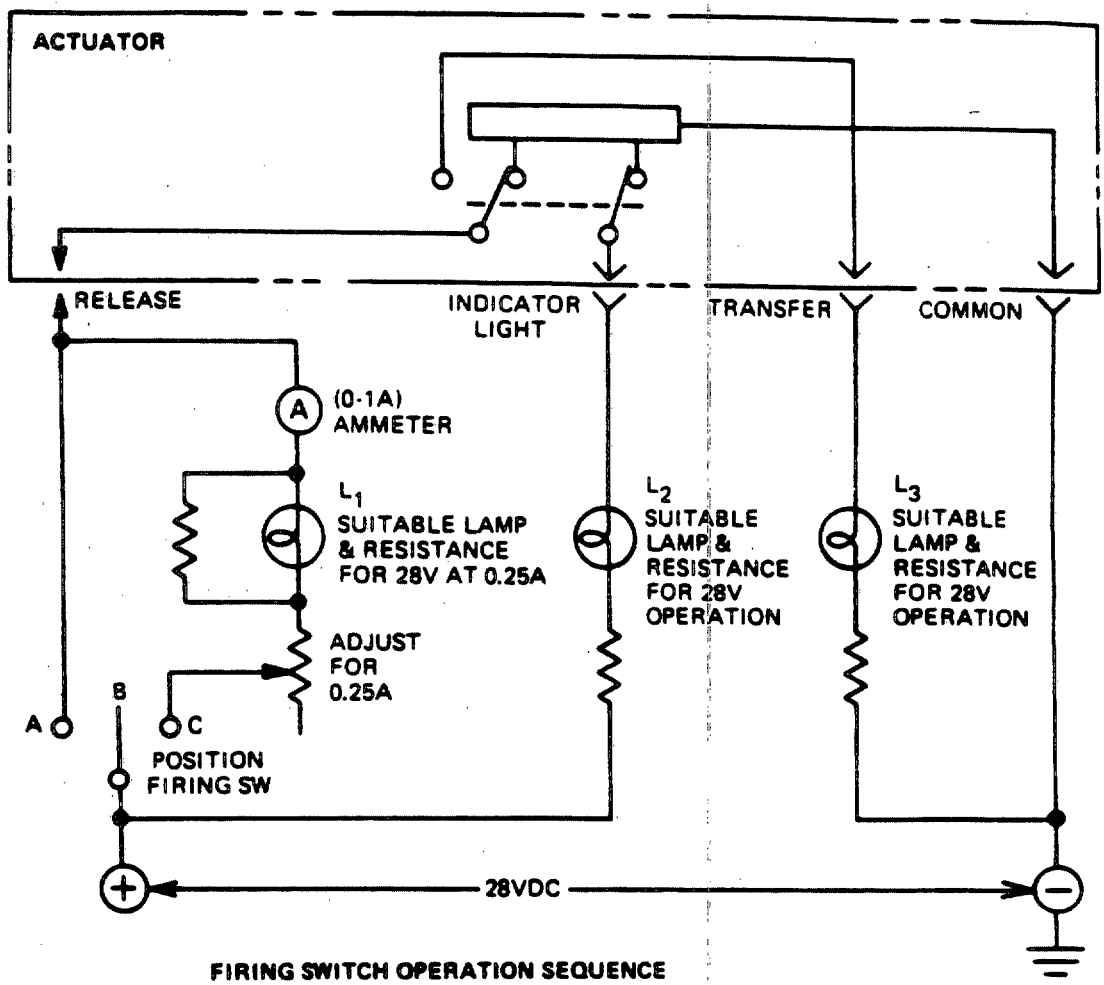
4.6.2.5 Current.

4.6.2.5.1 Maximum non-operating current. The actuator shall be subjected to a steady current not greater than 0.25 amperes. The actuator plunger or mechanism shall not exhibit any motion.

4.6.2.5.2 Maximum current draw. The actuator shall be electrically energized with a 28 VDC at room temperature. The current drawn shall not exceed the requirements of 3.3.10.2.

4.6.2.5.3 Minimum length of impulse. The actuator shall be subjected to a pulse of 20 VDC, 20 milliseconds duration. The actuator shall operate regardless of the test environment.

4.6.2.6 Leakage. Each actuator shall be leakage tested at 5 pounds per square inch gage (psig) internal air pressure using clean, dry air or an inert medium. The end cap shall be suitably modified to permit introduction of the internal pressure. A suitable measurement system shall be utilized so that moisture shall not be introduced within the actuator. All flow data shall be corrected to standard liters per minute. The actuator shall be tested in both the non-release and released condition. Leakage shall not exceed the requirements of 3.3.17. Actuators, tested by the contractor which fail to meet the requirements, may be disassembled, repaired, and retested prior to government testing.



FIRING SWITCH OPERATION SEQUENCE

NON–RELEASE MODE

POSITION "C" - L_1 AND L_2 ON, 0.25A. FLOWS THROUGH COIL – NO MOVEMENT OF ANY PARTS OR ANY LAMP FLICKER ALLOWED.

RELEASE MODE AND SEQUENCE

POSITION "A" – FIRING RELEASE, L_1 OUT, L_2 MUST STAY ON.
POSITION "B" – TRANSFER – L_2 OUT.
POSITION "A" – CHECK – L_3 ON.
POSITION "B" – OFF.

FIGURE 1. Typical test setup wiring diagram.

4.6.3 Electromagnetic compatibility (EMC). The actuator shall be tested for electromagnetic emission and susceptibility characteristics in accordance with the appendix. The test results shall conform to all the requirements specified in the appendix.

4.6.4 Low temperature. The actuator shall be stabilized at -70 F. The actuator shall then be subjected to the tests of 4.6.2.3, 4.6.2.4, and 4.6.2.5. If it is necessary to remove the units from the test chamber to conduct the tests, testing shall be completed within 1 minute after removal.

4.6.5 High temperature. The actuator shall be stabilized at +200 F. The actuator shall then be subjected to the tests of 4.6.2.3 and 4.6.2.4. If it is necessary to remove the units from the test chamber to conduct the tests, testing shall be completed within 1 minute after removal.

4.6.6 Temperature rise. The actuator shall be subjected to the temperature rise test of MIL-T-7743 for intermittent duty electromagnetic units. The actuator shall meet Class A insulation requirements.

4.6.7 Dielectric breakdown. The actuator shall be subjected to the dielectric breakdown tests of MIL-T-7743.

4.6.8 Insulation resistance. The actuator shall be subjected to the insulation resistance test of MIL-T-7743.

4.6.9 Acceleration. The actuator shall be subjected to an acceleration of 25 g's in both directions of three mutually perpendicular axes. The actuator shall be cocked and mounted on an accelerator by means of a rigid fixture. After being subjected to the test levels for 1 minute, the actuator shall be released by energizing it with a 20 VDC, 20 millisecond pulse. Release or failure of the actuator shall be cause for rejection.

4.6.10 Salt fog. The actuator shall be subjected to the salt fog test of MIL-STD-810, Method 509.2, Procedure 1. The exposure time shall be 120 hours. While subjected to these conditions, the electrical connector plug shall be suitably protected and the actuator shall be cocked. At the completion of the test, the unit shall be tested in accordance with 4.6.2.3 and 4.6.2.5.3 (at room temperature only).

4.6.11 Vibration.

4.6.11.1 Low frequency and resonant vibration. This information applies to both the low frequency and resonant vibration tests. The resonant vibration tests shall be performed in each of the three mutually perpendicular axes, not in any specific order. All testing shall be completed in one axis prior to testing in the next axis. The low frequency vibration test shall be conducted in the one direction as indicated. The test parameter tolerances shall be as follows: Amplitude: $\pm$ 10%, frequency: $\pm$ 2% or $\pm$ 1/2 Hertz (Hz) below 20 Hz, acceleration: $\pm$ 10%. The actuator shall be mounted to the vibration exciter table by means of a rigid fixture utilizing the mounting area as intended by the applicable drawing. The control accelerometer shall be mounted on the test fixture, adjacent to the mounting area of the actuator. The external circuit for operation of the actuator shall be in accordance with Figure 1. During any vibration test with the actuator in a cocked position, 0.25 ampere shall continually pass through the external circuit and actuator shown in

Figure 1. Inadvertent actuation of the actuator plunger, failure of the actuator to function, momentary indications of the test circuit monitoring components (ie, lamps), failure of the monitoring components to follow the operational sequence of Figure 1, or structural damage to the actuator shall be cause for rejection.

4.6.11.2 Low frequency. The actuator, in the cocked position, shall be subjected to a sinusoidal vibration sweep test within the frequency range of 8 to 50 Hz. The test level shall be 0.060 double amplitude (D.A.) and the sweep time shall be 30 seconds. The vibration excitation shall be applied at right angles to the switch housing and plunger travel. At the completion of the vibration sweep, specifically at 50 Hz, the actuator shall be vibrated for an additional 30 seconds. At this time, the actuator shall be activated in the sequence shown in Figure 1 utilizing 28 VDC. Immediately after activation, the test frequency shall be reduced to 8 Hz and the test panel shall be observed for flickering of lamps.

4.6.11.3 Resonance search. The actuator shall be subjected to a sinusoidal vibration resonance search in each of the three mutually perpendicular axes. The frequency range shall be 8 to 2,000 Hz. The test level shall be 0.060 D.A. or 10 g's whichever is less. The sweep time shall be 1 octave per minute. All resonant frequencies shall be determined. This test shall be conducted with the actuator in each of its two modes; cocked and uncocked. At the completion of each resonance search test, the actuator shall be activated in the sequence shown in Figure 1, utilizing 28 VDC.

4.6.11.4 Resonance dwell. The actuator shall be subjected to a sinusodial vibration resonance dwell test in each of three mutually perpendicular axes. The test level shall be 0.060 D.A. or 10 g's whichever is less. The total number of cycles in each axis shall be 540,000 cycles. The number of cycles shall be divided equally among the resonant points determined in 4.6.11.3 (see example). The actuator shall be vibrated at the four most severe resonant frequencies. If no resonant frequencies are noted, the actuator shall be vibrated at 50 Hz for 3 hours in each axis. The test shall be repeated for each of the two actuator modes, cocked and uncocked. The total test time shall be 18 hours for the 50 Hz dwell test.

Example:

Given: Total number of cycles per axis required: 540,000 cycles
Number of resonant frequencies determined per axis: 2, 1.200 Hz
2.500 Hz

Calculated: Number of cycles per resonant point: $\frac{540,000}{2}$ = 270,000 cycles

Test time at 200 Hz: $\frac{270,000 \text{ cycles}}{200 \text{ Hz} \times 60 \text{ sec/min}}$ = 22.5 minutes

Test time at 500 Hz: $\frac{270,000 \text{ cycles}}{500 \text{ Hz} \times 60 \text{ sec/min}}$ = 9.0 minutes

Total test time = 31.5 minutes

4.6.12 Service life. The actuator shall be subjected to 5,000 cycles of operation. The actuator shall be mounted as indicated by the applicable drawing. The firing circuit shall be energized twice in succession for each cycle, the first to activate the actuator and the second to light the lamp (L_3 of Figure 1). Lighting of the lamp during the first pulse or failure to light during the second pulse shall be cause for rejection. The duty cycle for the actuator shall be 20% on and 80% off (see 3.3.10.1). After every 500 cycles, the actuator shall be subjected to the tests of 4.6.2.3 and 4.6.2.4. The last 1,000 cycles shall be conducted with the actuator plunger striking the lever of a test fixture which offers a 20 pound resistance. The fixture shall be designed so that the actuator plunger shall contact the 20 pound load after it moves 1/16 inch. The actuator shall be subjected to the tests of 4.6.2.3 and 4.5.2.4 after the completion of 5,000 cycles.

4.6.13 Shock.

4.6.13.1 Shock pulses. The actuator shall be subjected to the shock pulses in each of the three mutually perpendicular axes, not in any specific order. The test parameter tolerances shall be as follows: acceleration: ± 10%, pulse duration: + 1 millisecond. The actuator shall be mounted to the shock table by means of a rigid fixture utilizing the mounting area as indicated by the applicable drawing. The control accelerometer shall be mounted on the test fixture, adjacent to the mounting area of the actuator. The external circuit for operation of the actuator shall be in accordance with Figure 1. Inadvertent activation of the actuator plunger, failure of the actuator to function, momentary indication of the test circuit monitoring components (ie, lamp), failure of the mounting components to follow the operational sequence of Figure 1 or structural damage to the actuator shall be cause for rejection.

4.6.13.2 Test. The actuator, in the cocked position, shall be subjected to two half-sine shock pulses in each axis. The acceleration level shall be 125 g's with a pulse duration of 11 milliseconds. The first shock pulse test shall be conducted without any current flowing through the actuator. The second shock pulse test (in the same axis) shall be conducted with 0.25 ampere passing through the external circuit and actuator shown in Figure 1.

4.6.14 Post test.

4.6.14.1 Salt fog, internal. All of the internal surfaces and internal parts shall be subjected to salt fog tests, while assembled, in accordance with MIL-STD-810, Method 509.2, Procedure I. The exposure time shall be 24 hours. At the completion of the test exposure, all parts shall be inspected for corrosion. Any evidence of corrosion shall be cause for rejection.

4.6.14.2 Disassembly. The actuator shall be disassembled and shall be inspected for corrosion, excessive wear, and condition of lubricant. There shall be no evidence of corrosion, particle contamination, galling, severely worn parts, or deterioration of lubricant.

5. PACKAGING

5.1 Preservation, packing, and marking. All major units and parts of the equipment shall be preserved, packed, and marked for the level of shipment specified in the contract or purchase order in accordance with MIL-E-17555 (see 6.2.1c).

6. NOTES

6.1 Intended use. The actuator covered by this specification is intended for use as a release mechanism on bomb racks of the types specified by the acquiring activity.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification.

b. Applicable detail drawing.

c. Applicable levels of preservation, packing, and marking (see 5.1).

d. Samples subjected to sampling inspection shall not be considered or accepted as part of the contract (see 4.4.2).

e. Sampling inspection selection (see 4.4.2).

f. A statement which requires the contractor to notify the acquiring activity of any changes in design and construction after the actuator has passed first article inspection. In all cases, configuration control of the actuator shall be governed by the requirements of MIL-STD-480 and as directed by the acquiring activity.

g. Number of samples and inspection sequence for production lots in excess of 300 units (see Table III).

h. A requirement that prior to submission, the contractor shall inspect the first article samples to the degree necessary to assure that they conform to the requirements of the contract and submit an inspection report with the samples, including statements of findings and certification of conformance of materials and tests of paragraphs 4.6.1, 4.6.14, 4.6.2.2, 4.6.2.5, 4.6.6, 4.6.2.3, 4.6.2.4, 4.5.2.4.3, 4.6.7, 4.6.2.1, and 4.6.11.2 as listed in Table I.

i. Name and location of government representative responsible for random selection of inspection samples (see 4.4.2).

j. Items of data required (see 6.2.2) and where they are to be forwarded.

k. Name and location of Government approved test laboratory.

6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DOD FAR Supplement, Part 27, Sub-Part 27.410-6 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraphs.

Paragraph No.	Data requirement title	Applicable DID No.	Option
4.3, 4.4	Inspection Test Reports	DI-T-5329	----

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DOD 5010.12-L, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer).

6.3 First article. When a first article inspection is required, the item should be a first article sample. The first article should consist of the first five actuators manufactured on contract. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserve the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

6.4 Quality assurance definitions. Definitions for quality assurance terms are in accordance with MIL-STD-109.

6.5 Subject term (key word) listing.

Actuator, electromechanical, linear
Actuator, inspection
Actuator, plunger force

6.6 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision due to the extensiveness of the changes.

Preparing activity:
Navy - AS
(Project No. 1095-N234)

APPENDIX

ELECTROMAGNETIC INTERFERENCE (EMI) TEST LIMITS

10. SCOPE

10.1 Scope. This appendix details the procedures for the control of electromagnetic emission and susceptibility characteristics. This appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

20. APPLICABLE DOCUMENTS

20.1 Government documents.

20.1.1 Standards. The following standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

STANDARDS

MILITARY

MIL-STD-461	Electromagnetic Interference Characteristics Requirements for Equipment
MIL-STD-462	Military Standards Electromagnetic Interference Characteristics, Measurements of

30. ELECTROMAGNETIC COMPATIBILITY (EMC)

30.1 Tests. The actuator shall be tested in accordance with MIL-STD-461, Class A1b, using methods described in MIL-STD-462. The following tests are applicable: CE01, CE03, RE02, CS01, CS02, CS06, RS01, RS02, RS03. The test results shall conform to the requirements of 30.1.1 and 30.1.2.

30.1.1 Electromagnetic emission. Conducted and radiated emission levels from the actuator shall not exceed those depicted in Figures 2 through 4. The actuator's signal lead (pin C) shall be tested as applicable in CE01 and CE03.

30.1.2 Electromagnetic susceptibility. No degradation or malfunctions shall occur during susceptibility tests when subjected to the power levels depicted in Figures 5 through 12. The actuator shall be cocked for all susceptibility tests. The actuator shall be monitored for susceptibility in the following modes:

a. Actuation that was not intentionally initiated.

b. Failure to actuate when power is applied.

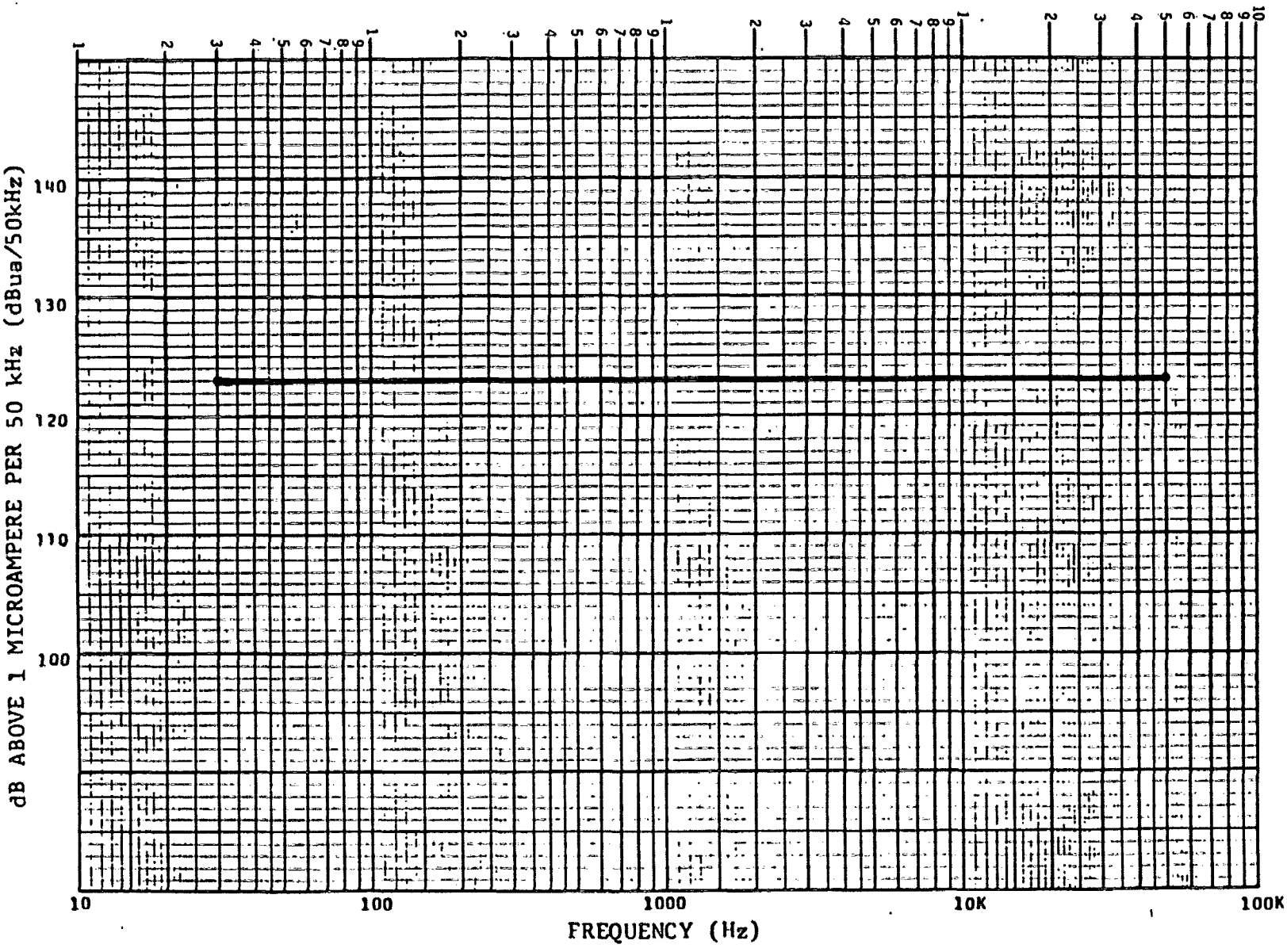


FIGURE 2. Specification limit for CE01 broadband emissions.

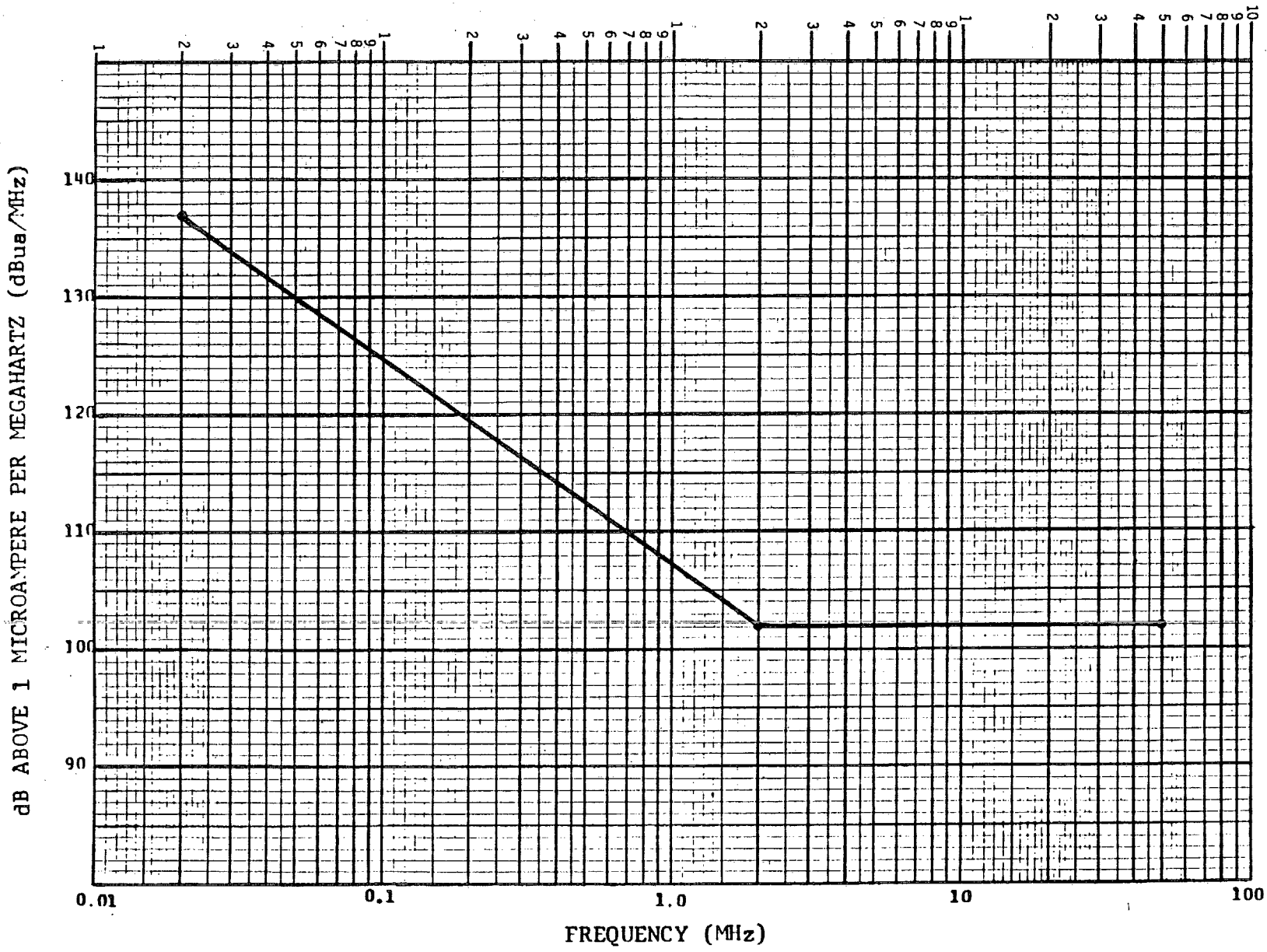


FIGURE 3. Specification limit for CE03 broadband emissions.

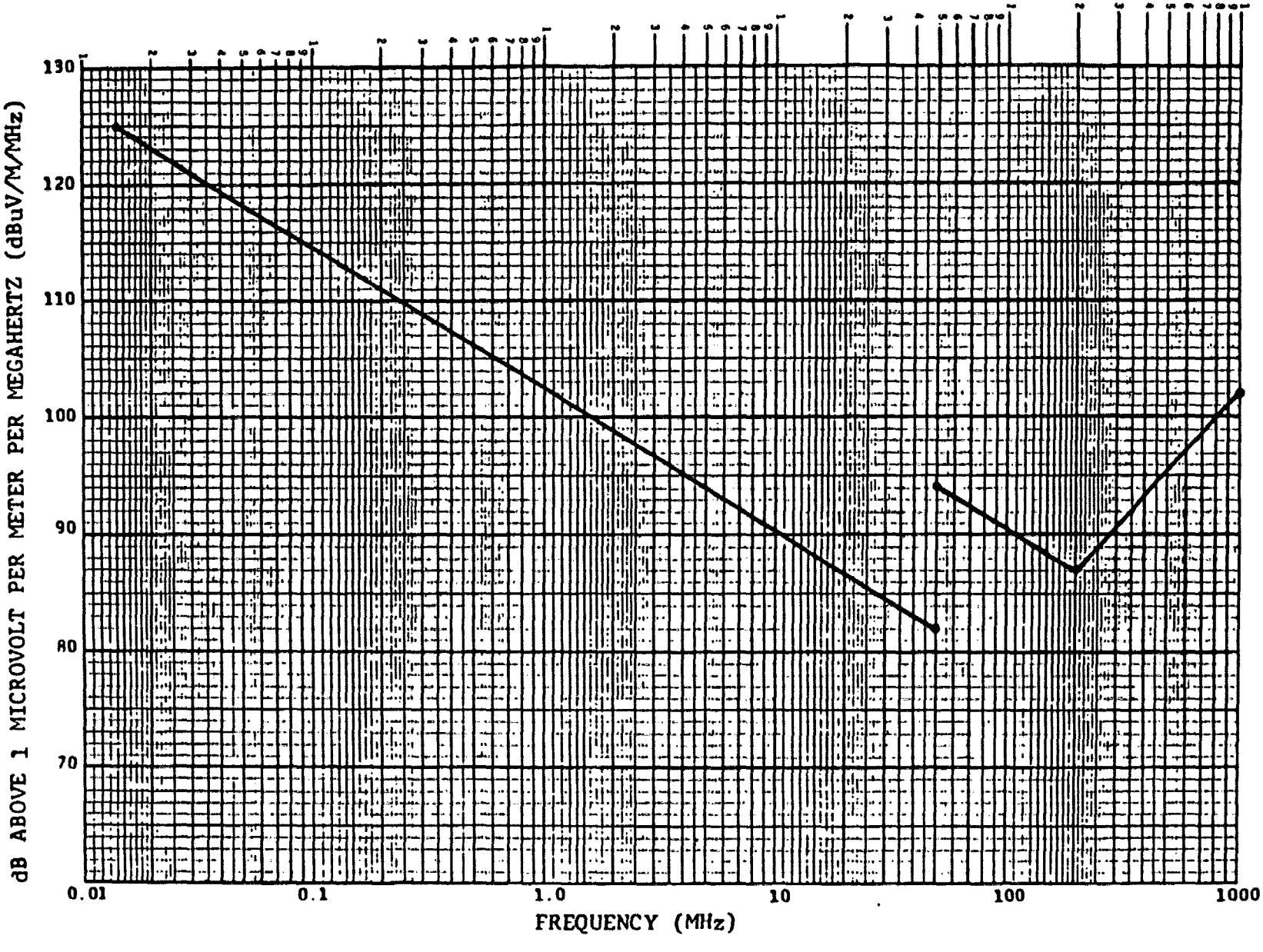


FIGURE 4. Specification limit for RE02 broadband emissions.

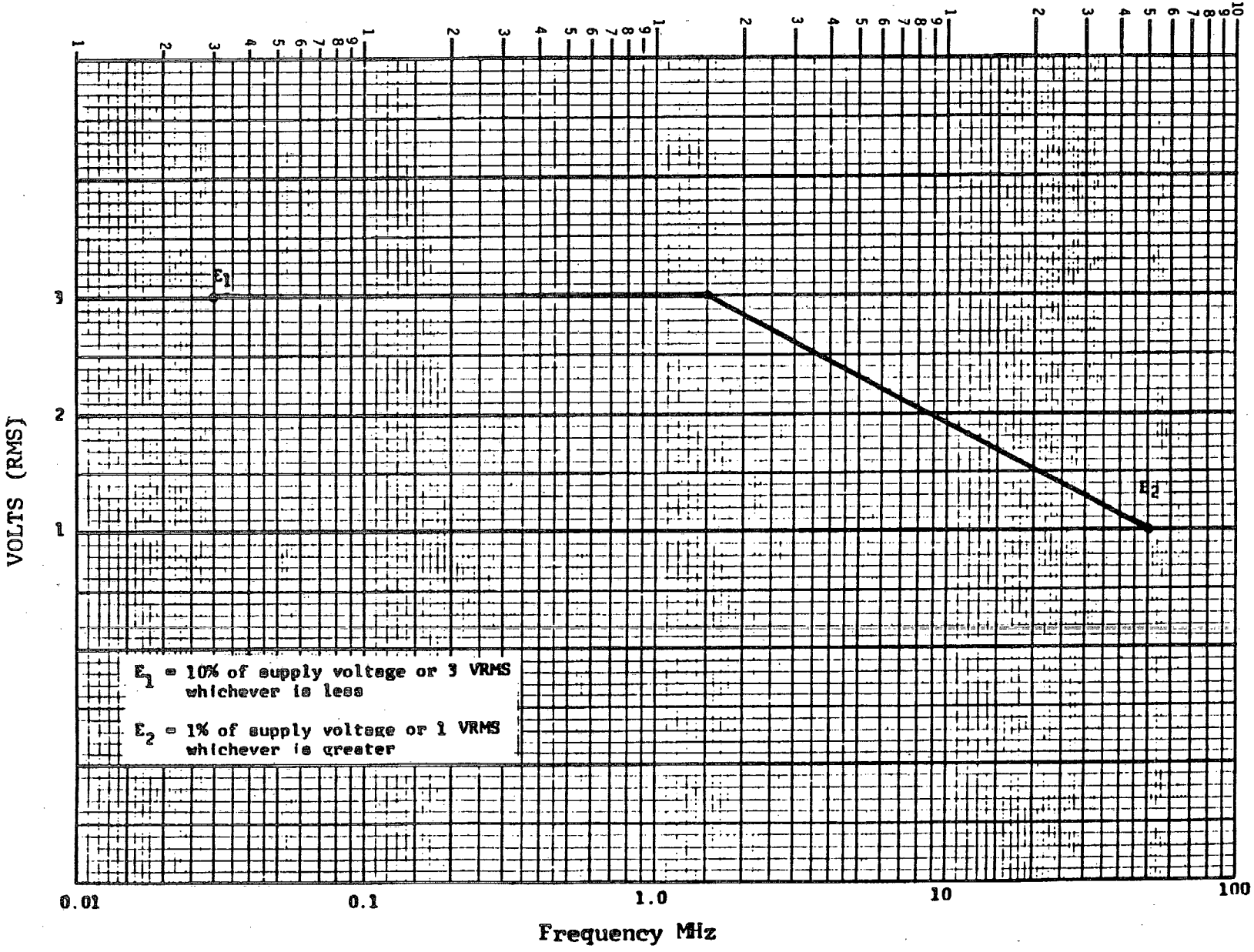


FIGURE 5. Required susceptibility level for CS01 conducted susceptibility.

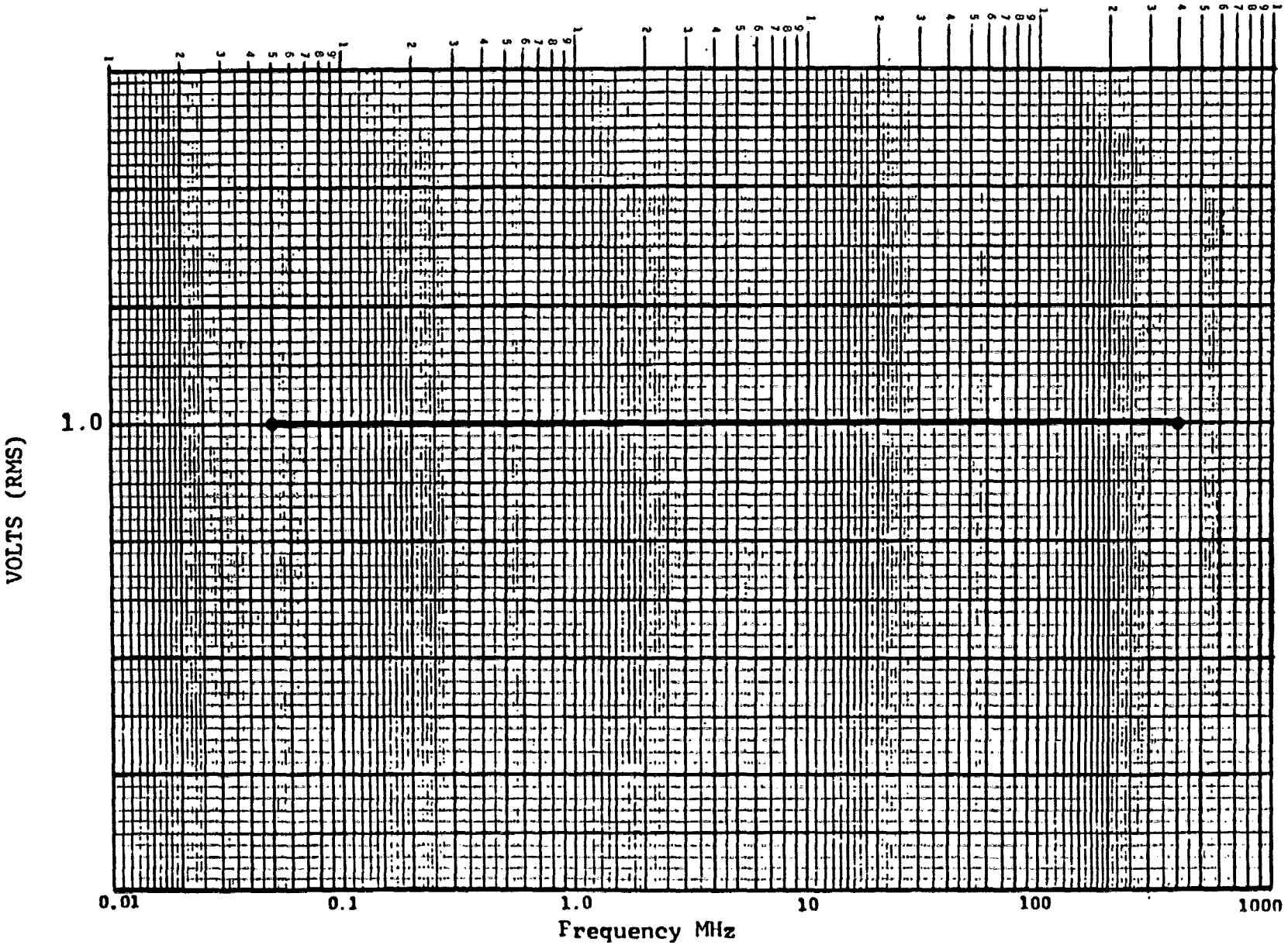


FIGURE 6. Required susceptibility level for CS02 conducted susceptibility.

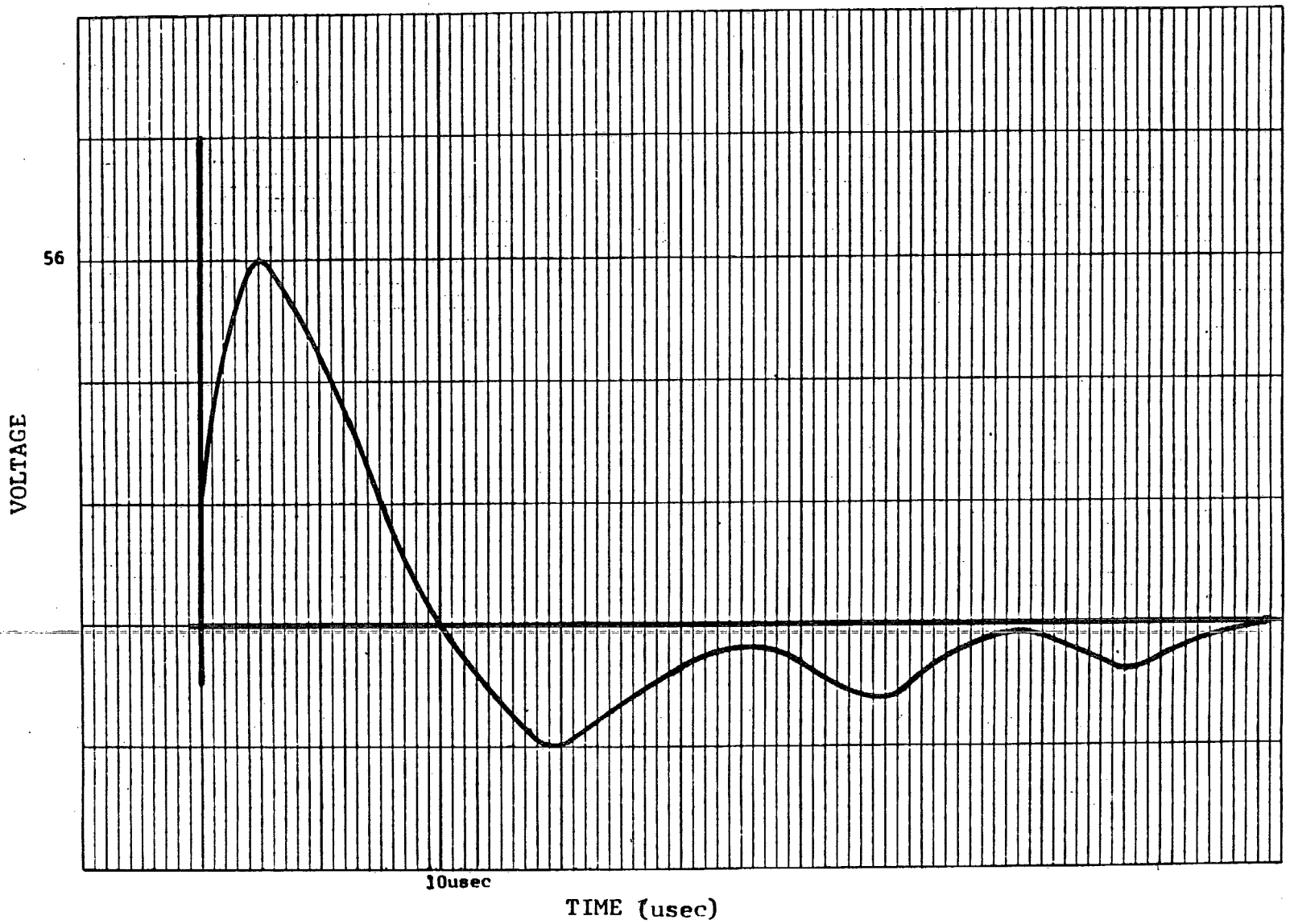


FIGURE 7. Required susceptibility level for CS06 conducted susceptibility.

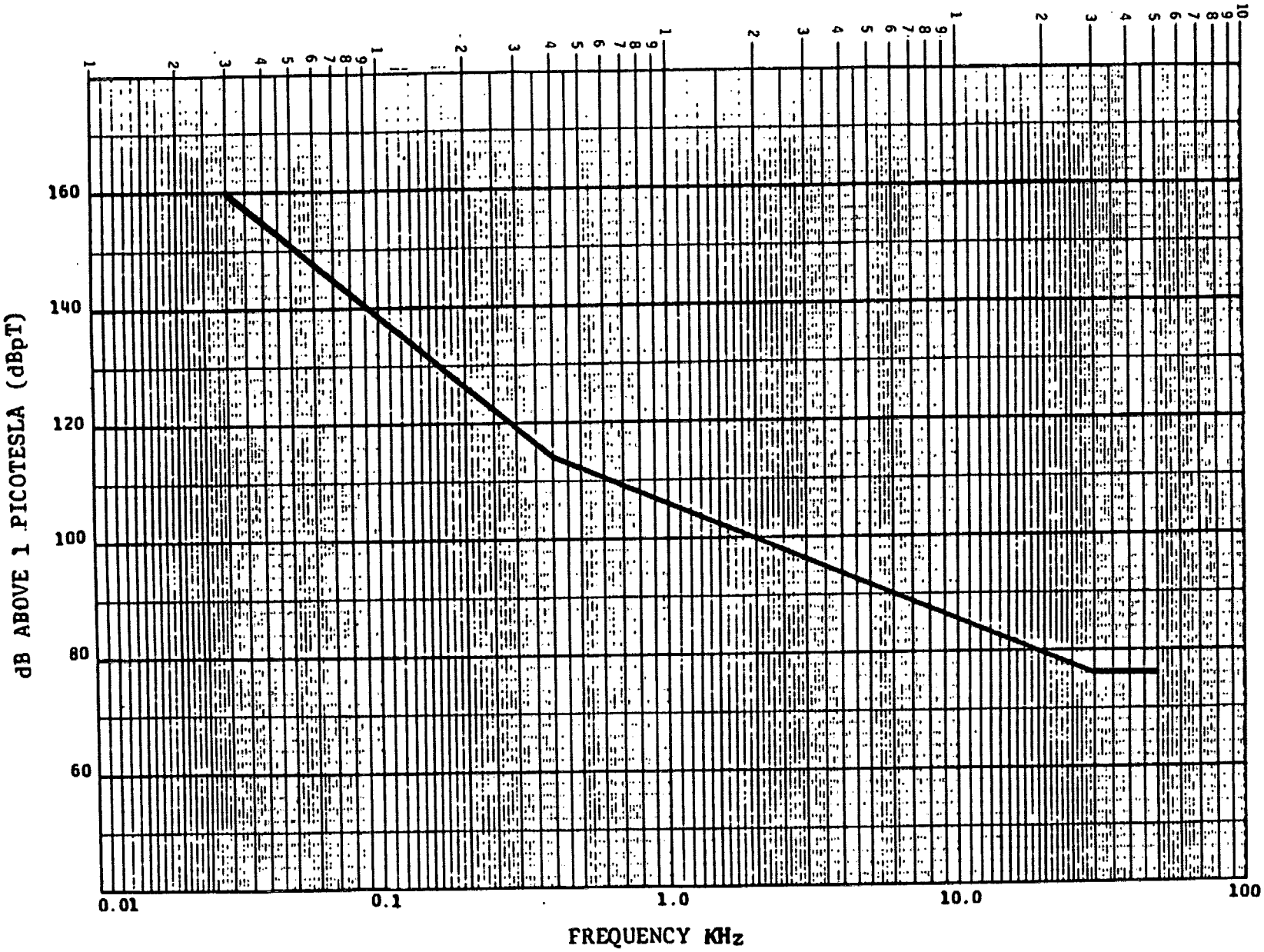


FIGURE 8. Required susceptibility level for RS01 radiated susceptibility.

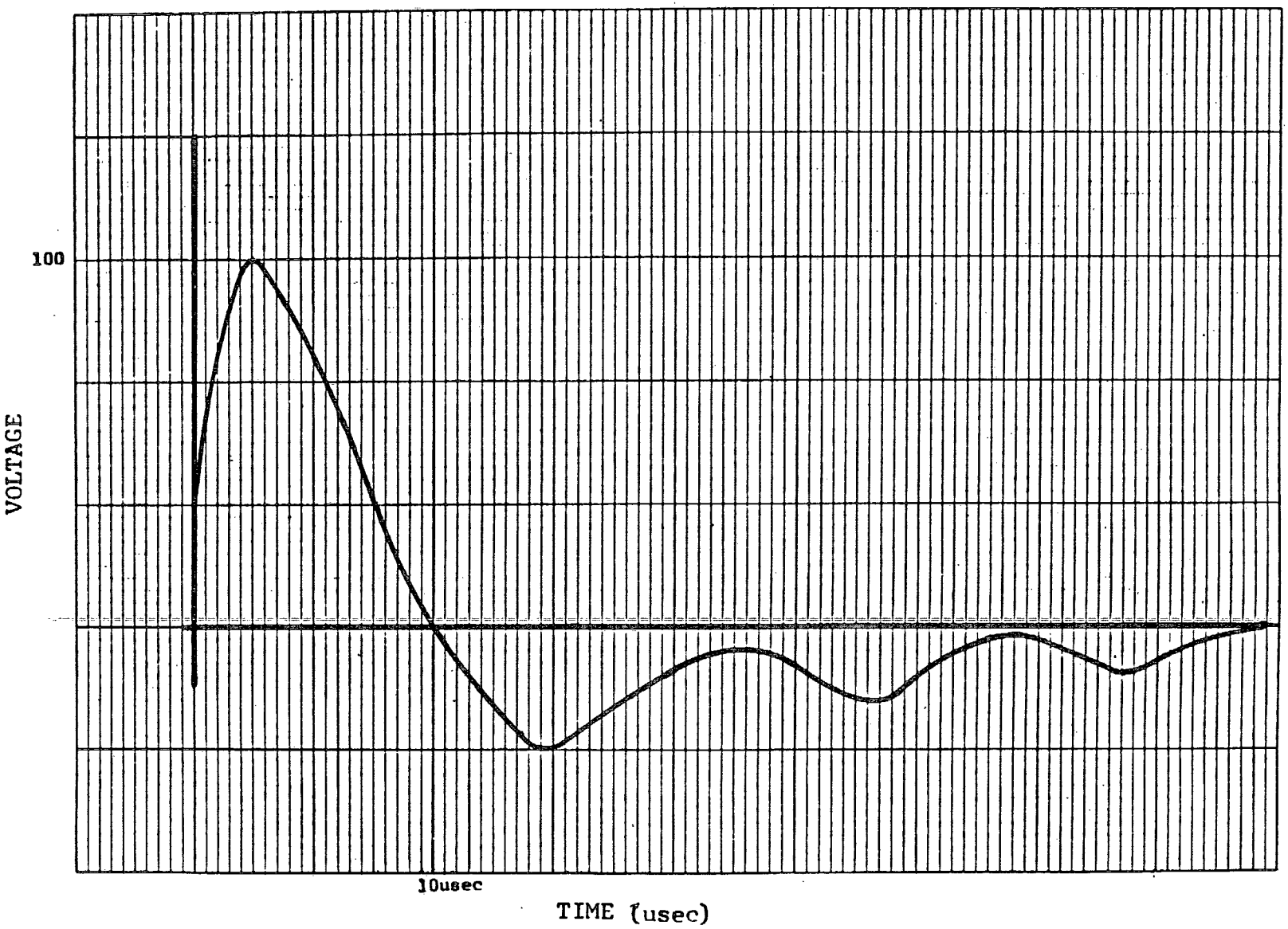


FIGURE 9. Required susceptibility level for RS02 radiated susceptibility.

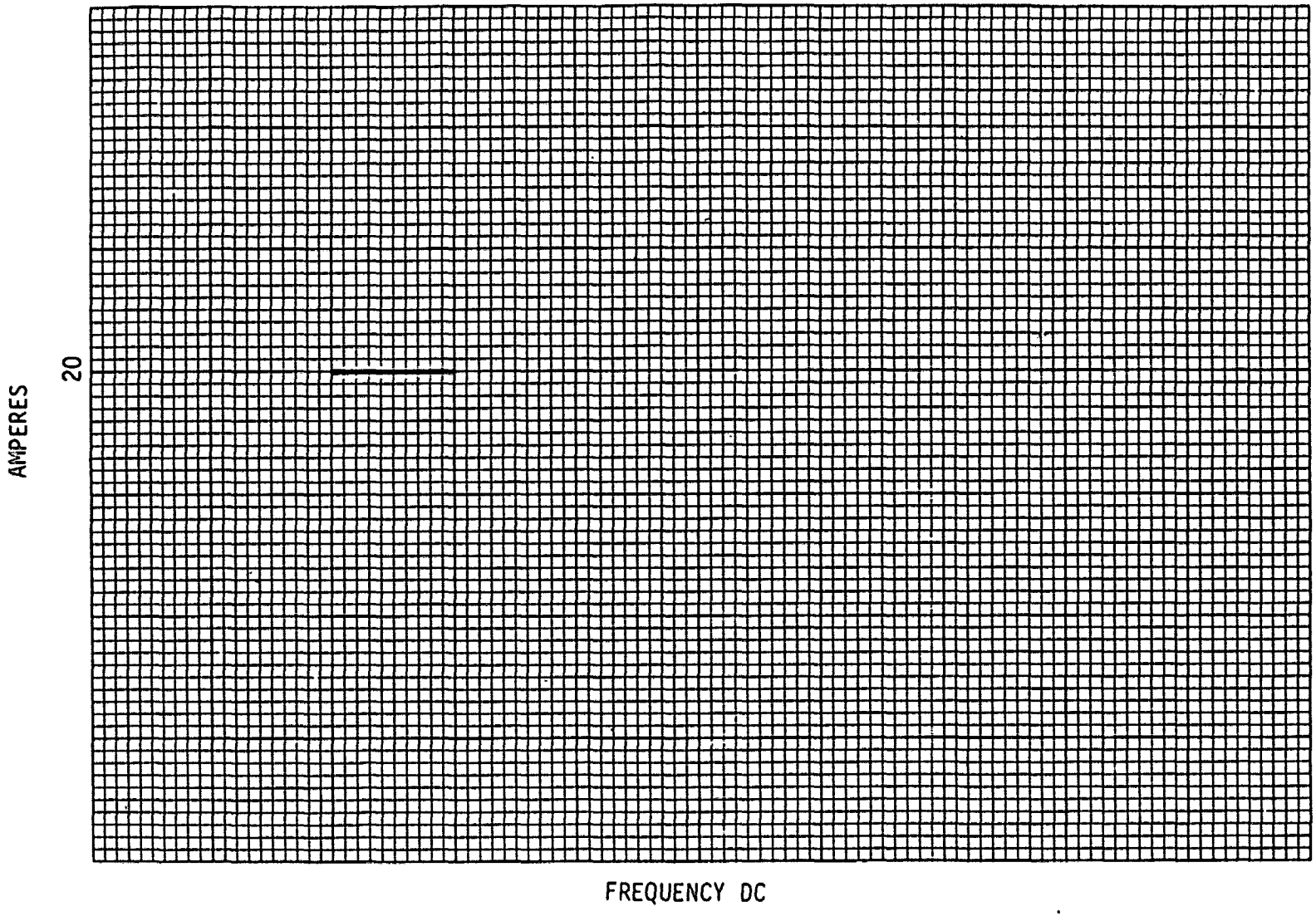


FIGURE 10. Required susceptibility level for RS02 radiated susceptibility.

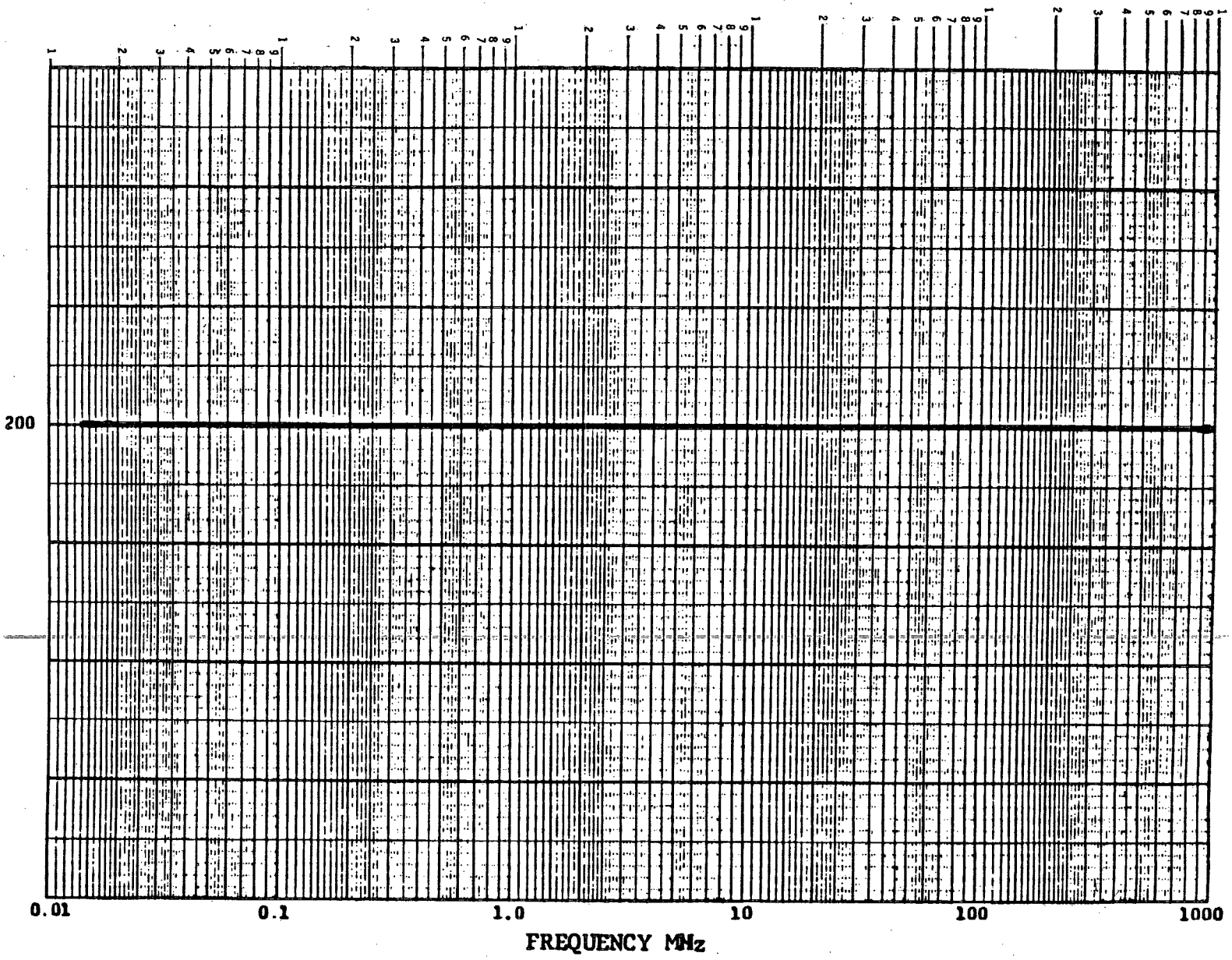


FIGURE 11. Required susceptibility level for RS03 radiated susceptibility.

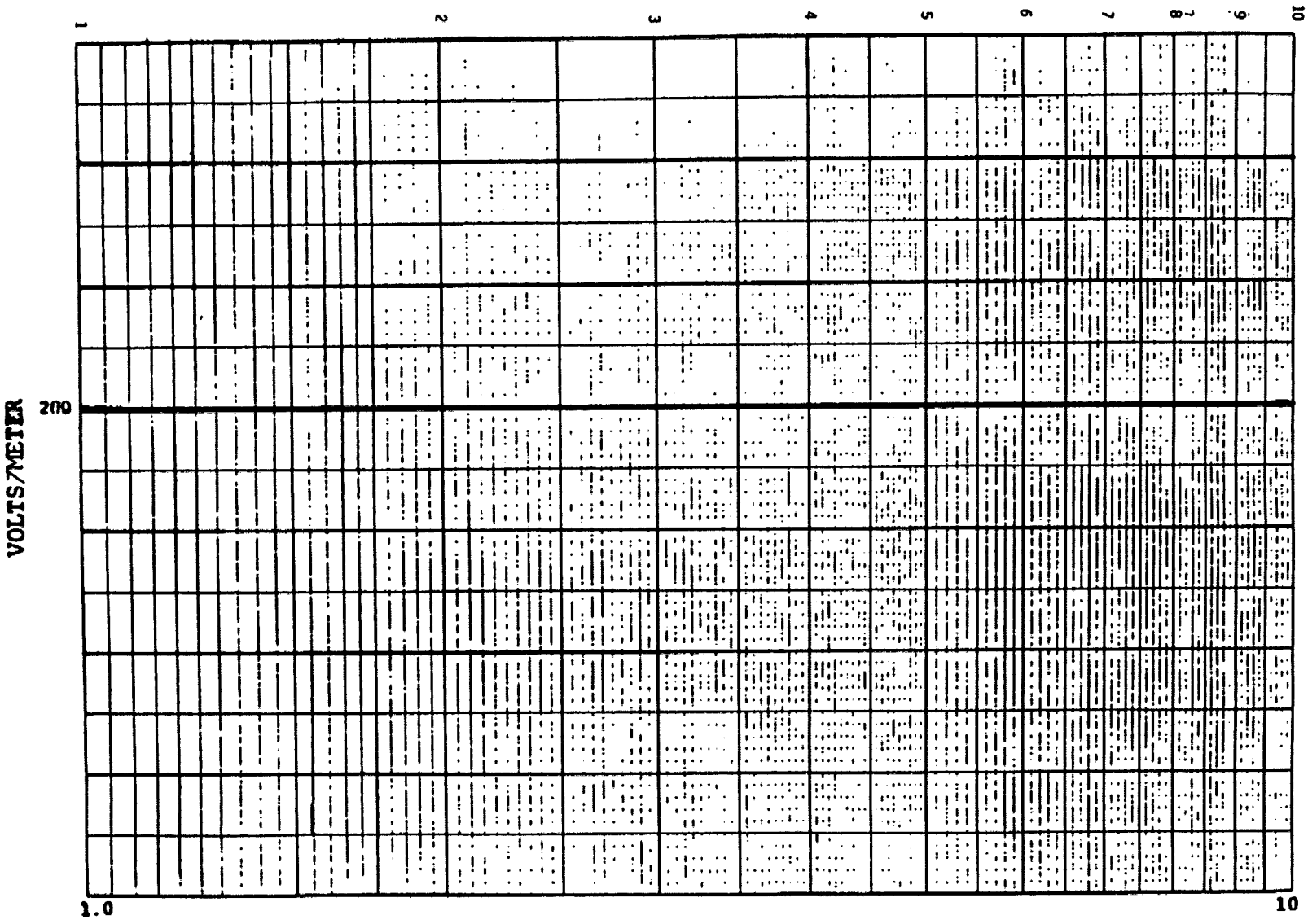


FIGURE 12. Required susceptibility level for RS03 radiated susceptibility.

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