

JEITA-ITR-3004

GUIDELINES FOR
LOW FREQUENCY ELECTRIC AND MAGNETIC FIELDS
EMITTED FROM VIDEO DISPLAY TERMINALS
FOR INFORMATION TECHNOLOGY EQUIPMENT
(3rd edition)

Feb. 2004

Japan Electronics and Information Technology Industries Association
Japan Business Machine and Information System Industries Association

This English version is published unofficially. Any disputes as to the meaning, wording, figures, etc., of any portion of the English version of the guideline shall be governed and construed in accordance with the original Japanese version.

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1. PREFACE

Standards for electromagnetic fields emitted from video display terminals (VDTs) designed and used for Information Technology Equipment (ITE) and similar apparatus have been published by many countries or organizations as so-called EMI regulations.

Recently, besides the above EMI regulations, exposure guidelines or recommendations for electromagnetic fields, including low levels in lower frequency bands, are now being published and drafted. Sweden was the first country to publish guidelines when it specified measurement procedures and recommended values for low-frequency electromagnetic fields emitted by VDTs in 1990 (MPR-II). Since that time, EMI regulations have been debated and drawn up in various nations especially in Europe and North America.

In light of these trends, the Japan Electronics and Information Technology Industries Association (JEITA), in cooperation with the Japan Business Machine and Information System Industries Association (JBMIA) has published Guidelines concerning low-frequency radiation caused by VDTs designed and manufactured for ITE purposes.

In drafting the Guidelines, we considered present global trends in this field, costs, and technical issues, with a mind to the responsibility our industry takes in this field as low as possible, and where possible tried to harmonize the Guidelines with others published or drafted overseas. Compared to certain guidelines based on scientific and medical research, such as those published by the World Health Organization (WHO), those contained herein have been set as low as technically possible, and thus our recommended values fall below those contained in the aforementioned guidelines.

As with the Guidelines for Electrostatic Fields Emitted by VDTS (1st edition issued October 1991, 4th edition in Feb. 2004), this Guideline is intended to act as a standard for industry associations and will be revised when necessary (for example, when additional international standards are proposed or enacted, or new scientific evidence is published, etc.).

2. OBJECTIVES

VDTs used for ITE contain relatively high-voltage circuits and circuits with various types of coils. High-voltage circuits may emit electric fields and coils may emit magnetic fields. These guidelines specify the measurement procedures and recommended values for emissions (electric and magnetic fields).

3. SCOPE

The Guidelines apply to all Video Display Terminals (VDTs) used for ITE that may emit low-frequency electric and magnetic fields (such as CRT displays, liquid crystal displays, plasma displays etc.).

All VDTs (including imported ones) to be used for ITE shipped to the Japanese market by member companies of the two organizations listed on the cover sheet are to be governed by the Guidelines.

The term Information Technology Equipment (ITE) is defined as any apparatus designed for the following purposes;

(1) Data input (periodic binary pulse) through data input lines, keyboard, or similar device,

or

(2) Data processing such as the performance of arithmetic calculations, data conversion, data storage, and data transfer,

or

(3) Output of processed data through data output lines or to a VDT.

Note that VDTs with screen sizes of 28 inches or greater waiver from the Guidelines due to the nature of their use and viewing distance.

4. DEFINITIONS

4-1 Alternating Electric Field

As with other electric and electronic devices, VDTs may emit electric fields of various strengths depending on the apparatus.

The electric fields emitted by VDTs can be separated into the following two groups depending on their frequency spectrum:

(1) Electric fields in the frequency range 50 Hz to 2 kHz, caused by the power supply and/or vertical deflection unit of a VDT.

(2) Electric fields in the frequency range 15 kHz to 400 kHz, caused by the horizontal deflection unit and/or switched-mode power supplies of the VDT.

In this guideline, the term 'electric field' is defined as the strength of an electric field detected by a measuring probe in units of volts per meter (V/m) in root-means-square (RMS).

Considering (1) and (2) above, we specify Band I and Band II as follows:

Band I: 5 Hz to 2 kHz

Band II: 2 kHz to 400 kHz

4-2 Magnetic Field

VDTs may emit magnetic fields from internal components that carry an electric current, such as coils and transistors, in various strengths depending on the apparatus. In the case of VDTs using Cathode Ray Tubes (CRT), magnetic fields may be emitted from the deflection coils, high-voltage transformers, power supply circuits, and other internal circuits. These magnetic fields may partially leak outside the VDT.

Except for the 50/60 Hz spectrum from the AC power supply, these fields are generally formed in

non-sinusoidal time variations and thus have many harmonics. These magnetic fields should be measured using a suitable instrument over a wide frequency range. The magnetic field is a vector quantity for which the amplitude and direction vary over time.

In the Guidelines, the term 'magnetic field' is defined as the density of magnetic flux, measured in Tesla (T) in the RMS-value of the magnetic flux density vector.

Magnetic fields are measured in the following two frequency bands:

Band I: 5 Hz to 2 kHz

Band II: 2 kHz to 400 kHz

4-3 Center-center point

The point on the screen surface is both the horizontal and vertical mid-point.

4-4 Tangential Plane

The plane is tangent to the surface of the VDT screen at the center-center point. For a flat screen, the plane is its surface.

4-5 Screen Surface

The screen surface is the outermost surface of the visual screen of the VDT. When a screen filter is added, the screen surface is the external surface of the filter.

5. RECOMMENDED VALUES

The electric and magnetic fields emitted by VDTs should be less than or equal to the recommended values below.

Compared to certain guidelines based on scientific and medical research, such as those published by the World Health Organization (WHO), those contained herein have been set as low as technically possible, and thus our recommended values fall below those contained in the aforementioned guidelines. These values were proposed after considering the lowest levels possible with available technology and in attempting to harmonize the values with those contained in already published and/or drafted guidelines.

(1) Alternating Electric Field

Band I: 5 Hz to 2 kHz

Class I devices 50 V/m

Class II devices 250 V/m

Band II: 2 kHz to 400 kHz

Class I devices 10 V/m

Class II devices 10 V/m

(2) Magnetic Field

Band I: 5 Hz to 2 kHz 250nT

Band II: 2 kHz to 400 kHz 25nT

*Note 1: Class I and Class II Devices

For details concerning Class I and Class II devices, refer to IEC950 (revised to IEC60950) or JIS-C6950 instead of previous JEIDA-37 "Safety Regulations for Information Technology Equipment".

*Note 2

Based on research conducted so far, it was concluded that the electric fields found in normal/current residential environments may not cause adverse health affects. The Environmental Health Criteria 35 (Extremely Low Frequency (ELF) Fields; WHO 1984) states that after studying research and regulations worldwide, it is safe to say that "there is no proven evidence for adverse health affects", but advises that electric fields should be kept as low as possible below in the 1 to 10kV/m range.

As for magnetic fields, based on research conducted so far, no proven evidence has been found to indicate that in a normal/current residential environments magnetic fields cause adverse health affect. Documents such as WHO's Environmental Health Criteria 69 states 5mT (50G) or less does not cause biological problems; the International Radiation Protection Association's (IRPA) Interim Guidelines state the continuous exposure limit is 0.1mT (1G).

6. MEASUREMENT PROCEDURES

6-1 Alternating Electric Field

The conditions (including the surrounding environment, measuring instrument, etc.) under which the strength of an electric field emitted from a VDT should be maintained so that it is able to be measured the following range at least:

Band I: 10V/m to 1000V/m

Band II: 1V/m to 100V/m

The field strength of an electric field in RMS value is measured at the measuring probe. For Band I, measurement is taken in front only of the equipment under testing (EUT); for Band II, measurement is taken in four directions.

The measurement geometry is illustrated in Fig. 1 below, and measurement points are mathematically defined.

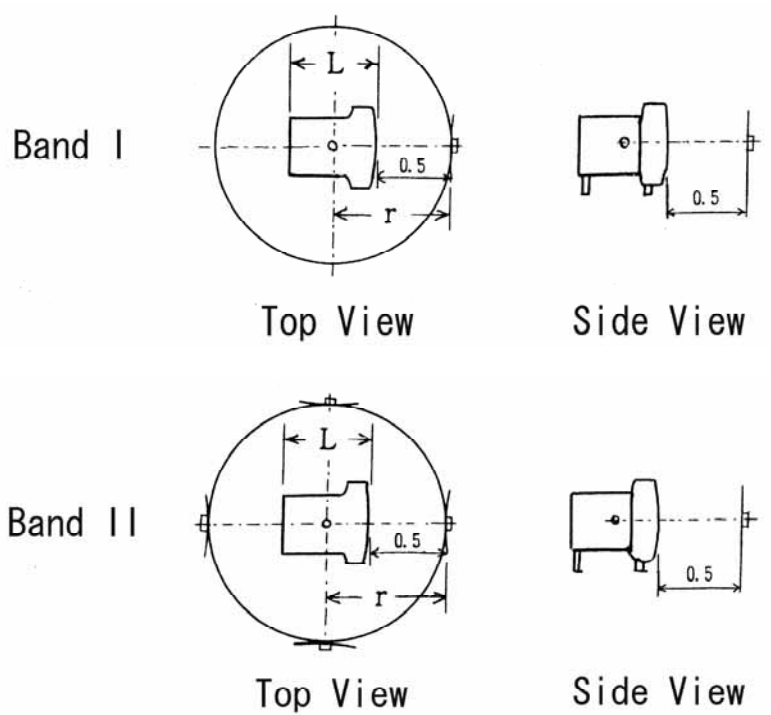


Figure 1: Measurement geometry for measuring Band I and Band II (unit: meters)

The EUT should be positioned so that the tangential plane is perpendicular to the horizontal plane (Note 1). The greatest perpendicular angle distance along tangential plane through the center-center point of the screen and the back of the VDT is called L. The origin of the cylindrical coordinate system is chosen to be situated at a distance of $L/2$ behind the screen surface on the normal to the tangential plane through the center-center point (Note 2). The Z axis is perpendicular to the horizontal surface. The angular reference direction is along the above mentioned normal plane in the direction pointing outwards from the screen. An angle (δ) is positive in the counter-clockwise direction. Measurements shall be made at all points that have a minimum clearance of 0.3 meters from the outer surface of the VDT (Note 3) with the coordinate system below (Note 5).

Distances are given in meters and angles are given in degrees. Coordinates are given for the center of the measuring probe. The plane of the probe must be kept perpendicular, within 5 degrees, to the radial axis.

$$z = 0$$

$$r = L/2 + 0.5 \text{ (tolerance: } \pm 2\%)$$

For Band I: $\delta = 0$ degree

For Band II: $\delta = 0$ degree, 90 degree, 180 degree, and 270 degree

Note 1: Even if the EUT is provided with a tilt and swivel pan, test only when the EUT is positioned vertically at a 90 degree angle.

When the front surface of the VDT is fixed at an angle other than 90 degree to the horizontal surface, test only at that fixed angle. There is no need to check the monitor at differing angles.

Note 2: For flat displays, the center of rotation is the point at the distance half the depth from the center of the display device/part.

Note 3: If the size or particular shape of a VDT makes it impossible to maintain a minimum clearance of 0.3 meters when it is rotated, maintain a clearance of 0.3 meters only at that position. Note that clearance implies the distance between the outer surface of the EUT and the surface of the measuring probe.

Note 4: The Guidelines apply only to stand-alone VDTs or the video display portion of a particular system. However, when VDTs are part of a configuration or single unit from which they cannot be physically removed, they may be measured as they are. For large-scale systems that incorporate a number of VDTs, one VDT may be selected for measurement.

Note 5: Measure by rotating the EUT as shown in Figures 1 and 2; it is also acceptable to measure by moving the measuring equipment around the EUT.

The EUT and measuring probe should both be kept at least one meter away from any metal structures or objects in the surrounding area that might affect the measurements (Note 6).

Note 6: Notes on the Measuring Environment

- (1) Objects which may affect measurement are floor, walls, ceiling, etc.
- (2) The testing stand used should be made of wood or other non-metallic material and should be approximately 0.8 to 1 meter high. When it is physically impossible to test the EUT at a height of 0.8 to 1 meters, it is acceptable to measure the EUT in the position in which it is typically used or designed.
- (3) Take care to ensure that the operator or anyone else's body doesn't affect the readings (avoid the so-called 'body effect').
- (4) Take care to avoid reading errors caused by static electricity from a person's body, EUT, or the measuring equipment.

When there are additional components or cables present that are necessary to properly operate the EUT but are not part of the EUT are connected to or placed near the EUT, they should be kept away from the EUT. Electric fields emitted by such components or cables may cause errors in measurement. When such components are placed with a minimum clearance of one meter, it is acceptable to shield them.

The measuring probe shall be grounded, and the cables connecting the measuring probe to the body of the measuring instrument should be placed so they do not affect the readings (Note 7).

Note 7: Notes on Grounding

- (1) One side of the AC power supply should be grounded.
- (2) The grounding conditions for the EUT or a signal generator driving the EUT depends upon the EUT

design.

During measurement, the EUT should be kept under the following conditions:

- a. The screen should display any combination of the following:
 - (1) Capital letter H or similar letters.
 - (2) Hankaku (alphanumeric characters) or Zenkaku (2-bite shift-JIS characters) letters.
- b. Choose the background or foreground colors (i.e., light characters on a dark background or dark characters on a light background) depends on the actual conditions, use or design of the EUT.
- c. Display in white for color displays.
- d. Fill the entire screen with letters according to the specifications of the EUT.
- e. Testing conditions of the EUT should be recorded.
- f. Multi-mode resolution EUT may be measured for only one mode that will be most frequently used. However, it is recommended to confirm in other modes.

The brightness and contrast controls should be set to their mechanical center positions. However, screen brightness should be kept in an acceptable range during actual use.

In general, other user-controls should be set to their factory settings. If provided with the horizontal size control, screen width should be set in a range of +/-10 mm of the manufacturer's nominal value.

If the EUT is provided with a standby mode which nothing is displayed on the screen, measurements should be repeated for both modes.

If a removable screen filter is provided on the EUT, record the type, construction, and dimensions of the filter.

If a screen filter can be easily removed without tools, the manufacturer of the VDT shall clearly notify the user that the filter should be used, and shall clearly state the type number and vendor's name of the filter and other relevant details in the catalog, operation manual, or other materials for the user. This notice should not conflict with Chapter 9, Section 9-2 of this guideline.

The strength of the background electrical field (noise generated by the internal components of the measurement equipment and/or external power lines, etc.) should not exceed 4 V/m for Band I or 0.8 V/m for Band II at the testing site.

Also note the following concerning the background electrical field:

- (1) When measuring the background electrical field, the EUT may not be present at all, or it may be on the stand as long as the power is off; either is possible.
- (2) Due to the possible high level of the background electrical field, we recommend that measurements should be done in a screened room.
- (3) Sometimes, the level of the background electrical field may exceed over the recommended values stipulated in

the Guidelines (One objective of this guideline is to obtain a method of measurement and readings that can be easily reproduced.)

The AC input voltage to the EUT should be within +/-3% of its nominal value. The nominal value of the AC input voltage, the measured value, and the frequency of the power supply should be recorded in the test report.

When Band I is measured for a EUT that has a power cord with a two-prong plug, try inserting the plug both ways (with the polarity switched) and record the measurements with the plug inserted the way for which the highest voltage is obtained.

The EUT should be connected to the AC power supply source using the power cord supplied by the manufacturer as part of the EUT. It should be laid out horizontally 0.1 meter extending from the EUT and then vertically downwards for at least 1 meter.

Note the following regarding power cords.

- (1) When the power cord is less than 1.1 meters long, use an equivalent cord to extend it.
- (2) Keep away the power cord from the measuring probe as so that it does not affect measurement readings.

6-2 Magnetic Field

The conditions (including the environment, measuring instrument, etc.) under which the density of a magnetic field emitted from the EUT should be maintained so that at least measurements in the following range are capable:

Band I: 200nT to 5,000nT

Band II: 10nT to 1,000nT

The density of the background magnetic field (noise generated by the internal components of the equipment and/or external power lines, etc.) should not exceed 40nT for Band I or 5nT for Band II at the testing site.

The RMS values of the amplitude of the density vector of magnetic flux are measured for Band I and II at forty-eight points along the surface of an imaginary cylinder around the EUT.

The measuring geometry is illustrated in Figure 2 below, and the measurement points are mathematically defined.

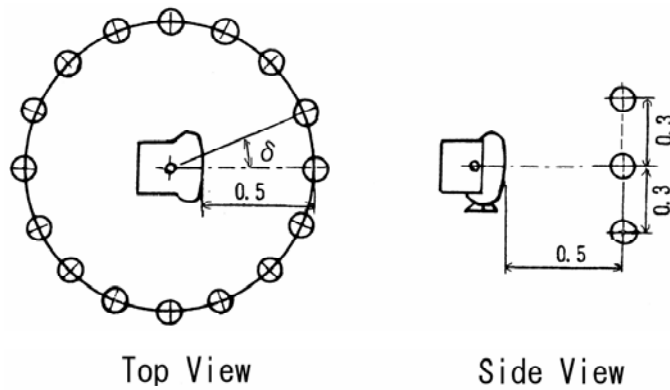


Figure 2 Measuring Geometry (unit: meters)

The EUT shall be positioned so that the tangential plane is perpendicular to the horizontal plane (Note 1). The largest perpendicular distance along the nominal to the tangential plane through the center-center point between the surface of the screen and the back of the VDT is called L. The origin of the cylindrical coordinate system is to be situated at a distance of L/2 behind the screen surface on the normal to the tangential plane through the center-center point (Note 2). The Z-axis is perpendicular to the horizontal surface.

The angular reference direction is along the above-mentioned normal plane in the direction pointing outwards from the screen. An angle (δ) is positive in the counter-clockwise direction. Measurements shall be made at all points that have a minimum clearance of 0.3 meters from the outer surface of the VDT (Note 3) following the coordinate system below (Note 5).

Distances are given in meters and angles are in degrees.

$$z = -0.3, z = 0, z = 0.3$$

$$r = L/2 + 0.5 \text{ (tolerance: } \pm 2\%)$$

$$\delta = p \times 22.5$$

(p: represents all integers where $0 < p < 15$)

Note 1: Even if the EUT is provided with a tilt and swivel pan, test only when the EUT is positioned vertically at a 90 degree angle. When the front surface of the VDT is fixed at an angle other than 90 degree to the horizontal surface, test only at that fixed angle. There is no need to check the EUT at differing angles.

Note 2: For flat type displays, the center of rotation is the point at the distance half the depth from the center of the display device/part.

Note 3: If the size or particular shape of a VDT makes it impossible to maintain a minimum clearance of 0.3 meters when it is rotated, maintain a clearance of 0.3 meters only at that position.

Note that clearance implies the distance between the outer surface of the EUT and the surface of the measuring probe.

Note 4: The Guidelines apply only to stand-alone VDTs or the video display portion of a particular system. However, when VDTs are part of a configuration or single unit from which they cannot be physically removed, they may be measured as they are. For large-scale systems that incorporate a number of VDTs, one VDT may be selected for measurement.

Note 5: Measure by rotating the EUT as shown in Figures 1 and 2; it is also acceptable to measure by moving the measuring equipment around the EUT.

During measurement, the measuring coil should be kept stable and there should be no vibrations or shocks that might affect the readings.

During measurement, the EUT should be kept under the following conditions:

- a. The screen should display any combination of the following:
 - (1) Capital letter H or similar letters.
 - (2) Hankaku (alphanumeric characters) or Zenkaku (2-bite shift-JIS characters) letters.
- b. Choose the background or foreground colors (i.e., light characters on a dark background or dark characters on a light background) depends on the actual conditions, use, or design of the EUT.
- c. Display in white for color displays.
- d. Fill the entire screen with letters according to the specifications of the EUT.
- e. Testing conditions of the EUT should be recorded.
- f. Multi-mode resolution EUT may be measured for only one mode that will be most frequently used. However, it is recommended to confirm in other modes.

The brightness and contrast controls should be set to their mechanical center positions. However, brightness should be kept in an acceptable range during actual use.

In general, other user-controls should be set to their factory settings. If provided with the horizontal size control, screen width should be set in a range of +/-10 mm of the manufacturer's nominal value.

When Band I is measured for a EUT that has a power cord with a two-prong plug, try inserting the plug both ways (with the polarity switched) and record the measurements with the plug inserted the way for which the highest voltage is obtained.

If the EUT is provided with a standby mode for which nothing is displayed on the screen, measure for $z = 0$ and $\delta = 0$ in both modes. If the reading at this point for the two modes differs more than +/-5%, repeat all tests in both modes.

7. MEASURING EQUIPMENT

The measurement should be carried out using an appropriate instrument.

Note: For details concerning the measuring system and calibration procedure, refer to items 1), 2), 3) and 4) in Section 10-3 of the Appendix.

8. RECORDING MEASUREMENTS

8-1 Alternating Electric Field

Results must be recorded in rms values of the alternating electric field strength in volts per meter (V/m). For Band I, if the results for the standard mode and the standby mode are different, the measured values for both must be recorded separately. For Band II, if the results for the standard mode and the standby mode are different, the values measured at the front of the VDT and the maximum measured value should be recorded for both modes.

If a value measured for Band I is less than 10 V/m, the value may be recorded as “less than 10 V/m”. If a value measured for Band II is less than 1 V/m, the value may be recorded as “less than 1V/m”.

8-2 Magnetic Field

Results shall be recorded in rms values of the magnetic flux density in nano-Tesla (nT) for the two frequency bands. If the values measured at the front of the display screen and the maximum values and positions differ between standard mode and standby mode, these values should be recorded for both modes.

If a value measured for Band I is less than 200nT, the value can be recorded as “less than 200nT”. If a value measured for Band II is less than 10nT, the value may be recorded as “less than 10nT”.

8-3 Temperature and Humidity

It is recommended that temperature and humidity conditions are recorded at the time of the test.

8-4 Measurement Instability

Note the following in regard to fluctuations in the readings.

- 1) It is recommended to perform measurements at least twenty minutes after turning on the EUT.
- 2) When fluctuations occur even after 20 minutes “warm-up”, take the average over at least ten readings.

8.5 Influence by waveform from AC power source

In some cases, harmonics of 50/60Hz may be observed in the reading. It may be difficult to judge as to whether they arise from the EUT or from ambient sources. A true sine wave from a stable power supply which produces harmonics of less than 1% is recommended, and should be kept away from the EUT to exclude its effect.

9. GUIDELINE IMPLEMENTATION

9-1 Effective Date

The Guidelines apply to newly designed VDTs and should be applied in the following manner:

- (1) The Guidelines should start to apply, to new product(s) shipped by member companies after January 1996 at last. The period before this time may be considered as a preparation period, and it is recommended that member companies apply the Guidelines to their products where possible.
- (2) After January 1998, the Guidelines should apply to all newly shipped products.

9-2 Marking

Following marking may be used.

- 1) The following Japanese wording may be used in the owner manual.

“本製品（もしくはモデル等）は社団法人 電子情報技術産業協会、（もしくは社団法人 ビジネス機械・情報システム産業協会）が定めた「情報処理機器用表示装置の低周波電磁界に関するガイドライン」に適合している。”

(English translation)

“This product confirms to the GUIDELINES FOR LOW-FREQUENCY ELECTRIC AND MAGNETIC FIELDS EMITTED BY VIDEO DISPLAY TERMINALS USED BY INFORMATION TECHNOLOGY EQUIPMENT, issued by the Japan Electronics and Information Technology Industries Association (JEITA) (or the Japan Business Machine and Information System Industries Association (JBMIA)).

- 2) The following Japanese wording may be used on the catalogue or leaflets for sales promotions.

“本製品（もしくはモデル等）は社団法人 電子情報技術産業協会、（もしくは社団法人 ビジネス機械・情報システム産業協会）が定めた「情報処理機器用表示装置の低周波電磁界に関するガイドライン」に適合している。”

(English translation)

“This product confirms to the GUIDELINES FOR LOW-FREQUENCY ELECTRIC AND MAGNETIC FIELDS EMITTED BY VIDEO DISPLAY TERMINALS USED BY INFORMATION TECHNOLOGY EQUIPMENT, issued by the Japan Electronics and Information Technology Industries Association (JEITA) (or the Japan Business Machine and Information System Industries Association (JBMIA)).

- 3) If product is also complies the with JEITA ITR-3003 GUIDELINE OF ELECTROSTATIC FIELD EMITTED FROM VISUAL DISPLAY TERMINALS FOR INFORMATION TECHNOLOGY EQUIPMENT, the following sample wording may be used instead of 1) and 2) above.

“本製品（もしくはモデル等）は社団法人 電子情報技術産業協会、（もしくは社団法人 ビジネス機械・情報システム産業協会）が定めた表示装置の静電気および低周波電磁界に関するガイドラインに適合している。”

(English translation)

“This product confirms to the GUIDELINES FOR ELECTROSTATIC and LOW-FREQUENCY ELECTRIC AND MAGNETIC FIELDS EMITTED BY VIDEO DISPLAY TERMINALS USED BY INFORMATION

TECHNOLOGY EQUIPMENT, issued by the Japan Electronics and Information Technology Industries Association (JEITA)” (or the Japan Business Machine and Information System Industries Association (JBMIA)).

Note 1: JEITA or JBMIA are used appropriately according to the product and the industry association it falls under.

Note 2: Manufactures shall not use the following expressions even if products comply with the Guidelines;

- 1) Resolving any adverse health effects, or
- 2) Being safe, healthy or similar wording, or
- 3) Product is superior in safety to the user than other products (or models) that do not comply with the Guidelines.

10. APPENDIX

10.1 Measuring Equipment

We recommend the use of MFM or EFM Series instrument produced by Convinova. Inc.

10.2 Measuring Conditions

One of the main objectives of the Guidelines is to propose a method of measurement that can be accurately reproduced. Therefore, there may be cases in which the measuring conditions specified in the Guidelines do not duplicate the maximum emission conditions for particular VDTs measured.

The Guidelines also take into consideration the environment (viewing distance, etc.) in which the VDT for ITE is typically used.

10.3 References

- 1) ECMA (European Computer Manufacturers Association) Standard ECMA-172, 1st. ed. 1992 "Procedure for Measurement of Emissions of Electric and Magnetic Fields from VDTs from 5 Hz to 400 kHz"
- 2) IEEE; P-1140 Draft, "Standard Procedure for the Measurement of Electric and Magnetic Fields from Video Display Terminals (VDTs) from 5 Hz to 400 kHz"
- 3) SWEDAC; Test Methods for Visual VDTs MPR 1990-12-01
- 4) SWEDAC; User's Handbook for Evaluating Visual VDTs MPR-1990-12-31

To better use and understand the Guidelines, we recommend that readers refer to the above listed reference materials.

Revisions:

1st Edition in Japanese: Issued as JEIDA-G-15 Oct. 1993

2nd Edition in Japanese: Revised Aug. 1996

3rd Edition in Japanese: Revised as JEITA ITR-3004 Feb. 2004

3rd Edition in English: Issued Sept. 2006

Member List: VDT WG of EMF Committee

EMF Committee Chairman	Yoshihiko Nakano	Oki Electric Industry Co. Ltd.
VDT WG Chairman	Takanori Ochiai	Fujitsu Ltd.
Coordinator	Shoetsu Miura	EMF Bio-effect consultant
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	Hiroataka Kihara	Sharp Corp.
	Hiroshi Karima	Seiko Epson Corp.
	Hedeo Tsurufusa	Toshiba Corp.
	Eizo Yamamuro	IBM Japan ,Ltd.
	Akihisa Sakurai	IBM Japan, Ltd.
	Hitoshi Yokota	Hitachi, Ltd.
	Hisashi Yoshinaga	Fujitsu Ltd.
	Shigetoshi Yamamoto	Mitsubishi Electric Corp.
	Haruyoshi Nagasawa	Voluntary Control Council for Information Technology Equipment
	Shigenori Mizuno	Japan Business Machine and Information System Industries Association
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