

# THE VDE OR FTZ RFI REQUIREMENTS — TENTH ANNUAL REVIEW

Each issue of ITEM presented a review of the West-German VDE specifications since 1975. To a large extent, each new article repeated information from the one previous. Since ITEM readers continued to express great interest in VDE, however, the publishers of ITEM considered it important to repeat the material. Since 1978, the FTZ/VDE specifications have considerably stabilized; consequently, the 1979-83 VDE articles are still pertinent. Also, the FCC Part 15, Subpart J requirements have acquainted the US manufacturer and exporter of equipment with the similarity of the VDE and FCC limits. For these reasons, and starting with this issue of ITEM, only a summary of the VDE limits and new developments will be presented. The reader is encouraged to review the previous issues of ITEM for additional details.

## FTZ and VDE

Contrary to popular belief, the VDE is not a regulatory agency of the West-German government. The regulatory agency is the Deutsche Bundespost, the German Postal Service. The International Telecommunication Union Treaty of 1947 is the foundation of the "Law for the Operation of High Frequency Apparatus," dated 9 August 1949. This is generally known as "H Fr G" law and it assigns the responsibility of interference control to the Minister fuer das Post und Fernmeldewesen (DP-FTZ). The FTZ, Referat S-24, Am Kavaleriesand, D-6100 Darmstadt, is the administrative office. This office handles all regulatory matters related to RFI. In 1982, the licensing and permit procedures for RFI matters were assigned to a new office: Deutsche Bundespost, Zentralamt fur Zulassungen des Fernmeldewesens (ZZF), Referat: T-4 (for transmitters and HF equipment) Talstrasse 34-42, D-6600 Saarbrucken. The VDE Testing and Approvals Institute is the recognized testing agency of the FTZ.

The interrelationships of VDE specifications, individual permits, general permits and the H Fr G Law were explained in the

1983 issue of ITEM. In summary, there are two RFI Limit Classes:

1. "A" Limit is applicable from 150 kHz to 1000 MHz. Compliance with the limits assures an "URKUNDE" with the FTZ Series Test Number which must be affixed to the equipment. Each equipment location must be registered via postcard.
2. "B" Limit is applicable from 10 kHz to 1000 MHz. Compliance with the limits assures a "General Permit" and (for a fee) the VDE Radio Protection Mark.

It is important to realize that the VDE specifications show the limits and the measurement procedures. However, regulatory RFI requirements are given in FTZ laws. A comparison of the laws and the VDE specifications is indicated in Table 1.

## The "B" Limit

To obtain a "General Permit" for a computer device requires compliance with the conducted and radiated "B" Limit starting at 10 kHz. Even though VDE 0871 implies that compliance below 150 kHz is only recommended, the FTZ Vfg 1115/1982 law mandates compliance with the "B" Limit for "Stand-Alone" equipment. In this category are printers that can also be used as typewriters, home computers, word processors, ultrasonic diagnostic equipment, microprocessor controlled equipment, etc. The FTZ Vfg 1115/1982 also mandates that the RFI power on any cable longer than one meter shall not exceed 33 dBpW at 30 MHz and linearly increasing to 43 dBpW at 300 MHz. This limit is equivalent to the VDE 0875N limit minus 12 dB since it is for narrowband RFI. The radiated RFI may be measured at 3 meters (instead of the 30 meters required in VDE 0871) with a limit of 91.5 dBuV/m at 10 kHz, decreasing to 51.5 dBuV/m at 1 MHz, and decreasing to 41 dBuV at 30 MHz.

Law FTZ Post-Verfugung	Limit and Test VDE Specification	Notes
Vfg 523/1969 Limit "A"	VDE 0871 Limit "A"	Individual Permit FTZ Series Test No.
Vfg 1115/1982 Limit "B"	VDE 0871 Limit "B"	General Permit VDE Mark
Vfg 560/1977	VDE 0875 82/499/EEC	Household Equipment Broadband Noise
Vfg 694/1979	VDE 0879	Motor Vehicles

Table 1. VDE and FTZ Limits

It must be noted that if the "B" Limit appears to be too stringent the equipment need comply only with the "A" Limit for commercial applications, but each equipment or system requires registration with the FTZ.

The following discussions are some of the latest VDE measurement procedures.

#### RFI Voltage and the Ground Wire

One of the lesser known measurement procedures for RFI voltages is defined in Section 9.2.4.1 of VDE 0877, Part 1.

*The RFI voltage is measured twice — Once, with the ground wire of the power cord connected to the LISN; and once, with the ground wire disconnected at the LISN.*

#### Radiated RFI Test Setup

The draft of VDE 0877 Part 2 specifies that any cable connected to an Equipment Under Test must be arranged horizontally for 1.5 meter; at a minimum height of 0.8 meter for table-top equipment; and at 0.1 meter for floor-mounted equipment. Beyond the 1.5 meter distance the cables are routed vertically to the ground and may be routed under the ground plane. If the cable is shorter than 1.5 meters and cannot easily be extended by the user, the test is performed with the supplied cable.

The test site attenuation is calibrated in the same way as for the FCC requirements. However, the antenna factor and cable loss is subtracted from the measured attenuation.

During the test, fixed antenna heights may be used if the measurement distance is at least 10 times the maximum dimension of the Equipment Under Test. For example, if the Equipment Under Test is 30 cm wide and the measurement distance is 3 m, a fixed antenna height can be used. If the measurement distance is shorter, the antenna height must be varied from one to four meters. Both horizontal and vertical antenna polarizations must be used. The maximum radiation potential of the Equipment Under Test must be measured. If this requires rotation of the Equipment, the Equipment must be placed on a turntable.

#### The 50 Ohm and 150 Ohm LISN

The broadband RFI is usually measured with a 150 Ohm LISN and must comply with the Limit "N" of VDE 0875. However, West Germany has accepted the European Economic Community Directive 82/499/EEC, which is essentially the same as VDE 0875, except that the measurements are performed with a 50 Ohm LISN and a lower limit is specified. Consequently, the 150 Ohm LISN of VDE 0875 is no longer required. A 50 Ohm LISN may be used; however, the lower limit as shown in Figure 1 must be complied with.

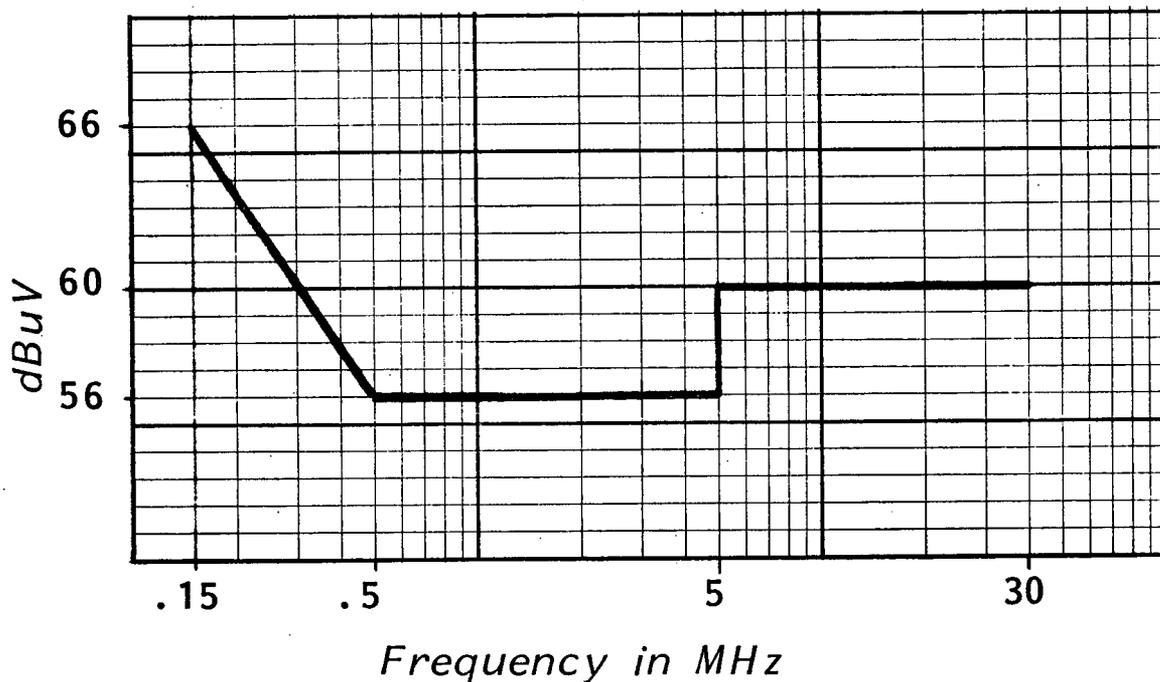


Figure 1. RFI Voltage Limit with 50 Ohm LISN per 82/499/EEC.

*This article was prepared for ITEM '84 by Herbert K. Mertel, EMACO, Inc., San Diego, CA.*

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