

Report to EC-Meeting IARU Region 1 Oman April 2001 respectfully submitted by  
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DARC Standards Group

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## **Pacemaker Situation in Germany**

The german Draft Standard DIN/VDE 0848 Part 2 of 1991 has been the first to contain limits for pacemakers. These limits were expressed as the peak-to-peak voltage ( $V_{ss}$ ) across the input electrodes of the pacemaker, and formulas were also given to convert this voltage into peak fieldstrength ( $V_{ss}$  into  $V_s/m$ ). For further conversion into effective fieldstrength ( $V_{eff}/m$ ) the  $V_s/m$  value still has to be divided by the square root of 2.

These limits cover the frequency range from 50 kHz to 50 Mhz, starting with 15.11  $V_{eff}/m$  at 1.8 MHz and sloping down to 2.76  $V_{eff}/m$  at 29 MHz and just 1.66  $V_{eff}/m$  at 50 MHz. Above 50 MHz the normal fieldstrength limit of 27.5  $V_{eff}/m$  for the protection of human beings is valid.

### **Present situation**

The administration decree of 1997 containing these old levels, applicable for all transmitters with a power of more than 10 watts E.I.R.P., and the resulting restrictions for the HF range reported earlier are still valid. The new FTEG law, including the german regulations derived from the european R&TTE (Radio & Telecommunications Terminal Equipment) Directive, has already been published, but contains a general paragraph only concerning a new regulation on EMF. This new regulation is still missing and expected for the end of the year 2001. It has been emphasized by the administration, however, that an EMF self-declaration based on the old limits has still to be submitted by every newly licenced radio amateur, by any radio amateurs having changed their QTH, and in cases of radio amateurs involved in EMC problems. For all other radio amateurs, however, the deadline to submit the self-declaration has been shifted to the end of the year 2001, when the new EMF regulation is expected to have been published. This situation has eased the frustration of many radio amateurs concerning the EMF issue but in reality the problem has been postponed only.

### **DARC research on pacemaker sensitivity successful**

A revised draft of the pacemaker standard DIN/VDE 0848 Part 3-1, covering all frequencies between 0 Hz and 2,5 GHz, has been put for national inquiry by the german standards organisation DKE. In a new annex "Special Modulations" this draft contains the results of the DARC research concerning the improvements which could be gained by investigating the typical amateur radio modes SSB, CW, and FM compared to AM, TV, and GSM modulation considered so far in the first draft. It has been elaborated that permissible fieldstrengths for safe operation of pace makers would relate in factors of about 100% - 18% - 14% - 7% relative to FM - SSB - CW - AM. This would mean that the majority of VHF/UHF FM operators will not need to obey any pacemaker restrictions but have to meet the ICNIRP levels only. The limits for SSB operators, however, will be about 11 V/m at 144 MHz, 18 V/m at 28 MHz and 24 MHz, and 23 V/m at 21 MHz. For lower frequencies the ICNIRP levels will be relevant. The LF range 135.7 - 137.8 kHz is exempted from the EMF self-declaration because of the 1 watt E.R.P. limit.

DARC hopes that in the course of the year this draft will become effective and that the german administration will succeed to incorporate it into the new EMF regulations before the end of this year 2001, and that german radio amateurs will be allowed to reference to this annex "Special Modulations" in their EMF self-declarations. It should

be mentioned that still another "coupling model" between EMF and pacemaker has been regarded within the German standards organisation DKE which would result in lower field strengths especially for the VHF range, but for the time being it is not likely to be introduced into standardization.

DARC will extend its EMF pacemaker investigations to modern digital modes such as PSK31, Amtor and Clover. The DARC investigation has also shown, however, that just 2% of all pacemaker models are as sensitive as the new draft standard pretends. 98% of all pacemakers would not need any special immunity standard, the ICNIRP limits for the protection of human beings would be sufficient. Therefore it is still the political aim of DARC is to have these low immunity pacemakers eliminated, and to prohibit their further implantation. The total costs of this project will be, when finished, about 100.000 Sfr.

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**Probable new Pacemaker limits in V/m**

| <b>Band</b> | <b>SSB</b> | <b>CW</b> | <b>FM</b> |
|-------------|------------|-----------|-----------|
| 160m        | 149        | 112       | -         |
| 80m         | 168        | 107       | -         |
| 40m         | 109        | 83        | -         |
| 30m         | 68         | 57        | -         |
| 20m         | 42         | 37        | -         |
| 17m         | 30         | 22        | -         |
| 15m         | 23         | 18        | -         |
| 12m         | 18         | 16        | -         |
| 10m         | 18         | 14        | 98        |
| 6m          | -          | -         | 98        |
| 2m          | 11         | -         | 69        |
| 70cm        | -          | -         | -         |