

**NORME  
INTERNATIONALE**

**CEI  
IEC**

**INTERNATIONAL  
STANDARD**

**61000-4-3**

**Edition 1.1  
1998-11**

Edition 1:1995 consolidée par l'amendement 1:1998  
Edition 1:1995 consolidated with amendment 1:1998

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**Compatibilité électromagnétique (CEM) –**

**Partie 4-3:  
Techniques d'essai et de mesure –  
Essai d'immunité aux champs électromagnétiques  
rayonnés aux fréquences radioélectriques**

**Electromagnetic compatibility (EMC) –**

**Part 4-3:  
Testing and measurement techniques –  
Radiated, radio-frequency, electromagnetic field  
immunity test**

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

CODE PRIX  
PRICE CODE

**W**

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- *Class 3*: Severe electromagnetic radiation environment. Portable transceivers (2 W rating or more) are in use relatively close to the equipment but not less than 1 m. High power broadcast transmitters are in close proximity to the equipment and ISM equipment may be located close by. A typical industrial environment.
- *Class x*: x is an open level which might be negotiated and specified in the product standard or equipment specification.

### F.3 Test levels related to the protection against RF emissions from digital radio telephones

The test levels should be selected in accordance with the expected electromagnetic field, i.e. considering the power of the radio telephone equipment and the likely distance between its transmitting antenna and the equipment to be tested. Usually, mobile stations will give rise to more severe requirements than base stations (because mobiles tend to be located much closer to potentially susceptible devices than base stations).

The cost for establishing the required immunity and the consequences of failure should be borne in mind when selecting the test level to be applied. A higher level should only be considered if the consequences of failure are large.

Higher exposures than the selected test level may occur in practice with a lower rate of occurrence. In order to prevent unacceptable failures in those situations, it may be necessary to perform a second test at a higher level and accept a reduced performance (i.e. defined degradation accepted).

Table F.1 gives examples of test levels, performance criteria and the associated protection distances. The protection distance is the minimum acceptable distance to a digital radio telephone, when testing has been performed at the stated test level. These distances are calculated from equation F.1, using  $k = 7$  and assuming testing is carried out with an 80 % sinusoidal AM.

**Table F.1 – Examples of test levels, associated protection distances and suggested performance criteria**

Test level	Carrier field strength V/m	Maximum RMS field strength V/m	Protection distance for			Performance criteria (note 3)	
			2W GSM m	8W GSM m	¼W DECT m	Example 1 (note 1)	Example 2 (note 2)
1	1	1,8	5,5	11	1,9	-	-
2	3	5,4	1,8	3,7	0,6	a	-
3	10	18	0,6	1,1	~ 0,2 <sup>1)</sup>	b	a
4	30	54	~ 0,2 <sup>1)</sup>	0,4	~ 0,1 <sup>1)</sup>	-	b

NOTE 1 – Equipment where the consequences of failure are not severe.  
 NOTE 2 – Equipment where the consequences of failure are severe.  
 NOTE 3 – According to clause 9.

<sup>1)</sup> At these and closer distances, the far field equation F.1 is not accurate.

The following issues were considered when formulating the above table:

- for GSM, most terminals on the market today are of class 4 (maximum ERP 2 W). A substantial number of mobile terminals in operation are classes 3 and 2 (maximum ERP 5 W and 8 W, respectively). The ERP of GSM terminals is often lower than maximum except in areas of poor reception;
- the coverage indoors is worse than outdoors, which implies that the ERP indoors may more often than not adjust to the maximum of the class. This is the worst case situation from an EMC point of view since most of the victim equipment is also concentrated indoors;
- as described in annex A, the immunity level of an item of equipment is well correlated with the maximum RMS value of the modulated field. For that reason, the maximum RMS field strength has been inserted into equation F.1 instead of the carrier field strength to calculate the protection distance;
- the estimated minimum distance for safe operation, also called protection distance, has been calculated with  $k = 7$  in equation F.1 and does not take into account the statistical fluctuations of the field strength, due to reflections from walls, floor and ceiling which are in the order of  $\pm 6$  dB;
- the protection distance according to equation F.1 depends on the effective radiated power of the digital radio telephone and not on its operating frequency.