



SLOVENSKI STANDARD
oSIST-TP CLC/prTR 50538:2009
01-julij-2009

Vodilo za skladnost opreme za vojaške namene z direktivo EMC

Guide to EMC Directive conformity of equipment designed for military purposes

Ta slovenski standard je istoveten z: CLC/prTR 50538:2009

ICS:

33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
95.020	Vojaška tehnika. Vojaške zadeve. Orožje	Military engineering. Military affairs. Weapons

oSIST-TP CLC/prTR 50538:2009 **en**

TECHNICAL REPORT
RAPPORT TECHNIQUE
TECHNISCHER BERICHT

DRAFT
CLC/prTR 50538

May 2009

ICS

Will supersede R210-008:2002

English version

**Guide to EMC Directive conformity
of equipment designed for military purposes**

This draft Technical Report is submitted to CENELEC members for comments prior to the voting meeting.
Deadline for CENELEC: 2009-09-04.

It has been drawn up by CLC/TC 210.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Warning : This document is not a Technical Report. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a Technical Report.

<https://standards.iteh.ai/catalog/standards/sist/dba2e8b7-dc13-431b-9b1d-b2474bedad36/sist-tp-clc-tr-50538-2011>

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: Avenue Marnix 17, B - 1000 Brussels

1 **Foreword**

2 This draft Technical Report was prepared by the Technical Committee CENELEC TC 210,
3 Electromagnetic compatibility (EMC).

4 It is circulated for comments prior to the voting meeting foreseen on 2009-12-03 in accordance with
5 the Internal Regulations, Part 2, Subclause 11.4.3.2 (simple majority).

6 This document will supersede R210-008:2002.

7

iTeh Standards
(<https://standards.itech.ai>)
Document Preview

[SIST-TP CLC/TR 50538:2011](https://standards.itech.ai/catalog/standards/sist/dba2e8b7-dc13-431b-9b1d-b2474bedad36/sist-tp-clc-tr-50538-2011)

<https://standards.itech.ai/catalog/standards/sist/dba2e8b7-dc13-431b-9b1d-b2474bedad36/sist-tp-clc-tr-50538-2011>

Contents

8			
9	Introduction.....		5
10	1 Scope		6
11	2 Directives for EMC conformity		6
12	2.1 EMC Directive.....		6
13	2.2 Automotive Directive.....		6
14	2.3 Marine Equipment Directive		7
15	2.4 Radio & Telecommunication Terminal Equipment Directive		7
16	3 Introduction to apparatus and installations.....		7
17	4 Apparatus		8
18	4.1 Conformity assessment procedure.....		8
19	4.2 EMC assessment		8
20	4.3 Gap analysis		9
21	4.4 Operating conditions and configurations		10
22	4.5 Technical documentation.....		10
23	4.6 Notified body involvement		11
24	4.7 Declaration of conformity.....		11
25	4.8 CE marking		11
26	5 Fixed installations		11
27	5.1 Conformity assessment procedure.....		11
28	5.2 Essential requirements for fixed installations		12
29	5.3 Specific apparatus		12
30	5.4 Responsible person.....		12
31	Annex A Article 296 of the Treaty (TEC)		13
32	A.1 Legal basis		13
33	A.2 Security interests and treaty obligations.....		13
34	A.3 Conditions of applications of Article 296 TEC (according to interpretative		
35	communication COM(2006) 779 final		14
36	A.4 How to apply Article 296 TEC		14
37	Annex B Council Decision 255/58 – EC Council list of items defining the scope of		
38	Article 223 of the Treaty of Rome		15
39	Annex C Environments.....		17
40	C.1 Military standards and environments.....		17
41	C.2 Harmonised standards and environments.....		18
42	C.3 Selection of applicable standards for the EMC assessment.....		19
43	Annex D Flow diagram for apparatus		21
44	Annex E Flow diagram for fixed installation/specific apparatus		22
45	Annex F Read across tables between military and harmonised standards (Test method		
46	level).....		23
47	Annex G Comparison of EMC test methods.....		24
48	Annex H Examples of gap analysis.....		33
49	Annex I Case studies		35
50	Bibliography.....		36
51	Standards.....		36
52	Other documents		37

54 **Figures**

55	Figure D.1 – Flow diagram for apparatus	21
56	Figure E.1 – Flow diagram for fixed installation/specific apparatus	22
57	Figure H.1 – Example of Radiated Emissions Gap Analysis between AECTP501 NRE02.1 Land	
58	army and Class A Emissions where the Military Standard is more onerous (Class A limit	
59	modified for comparison)	33
60	Figure H.2 – Example Radiated Emissions Gap Analysis between AECTP501 NRE02.1 Sea	
61	Below Deck and Class B Emissions where the Military Standard is less onerous (Class B	
62	limit modified for comparison)	33
63	Figure H.3 – Example of Radiated Immunity Gap Analysis between AECTP501 NRS02.1 Ground	
64	and 'Industrial' Immunity Limit where the Military Standard is more onerous (Industrial limit	
65	modified for comparison)	34
66	Figure H.4 – Example of Power/Signal Port Conducted Immunity Gap Analysis between	
67	AECTP501 NCS07.1 Ground and 'Industrial' Immunity Limit where the Military Standard is	
68	less onerous over part of the frequency range (Industrial limit modified for comparison)	34

69

70 **Tables**

71	Table F.1 – Factors to be considered during an EMC gap analysis	23
72	Table G.1 – Comparison of EMC test methods	24
73	Table G.2 – Detailed comparison of EMC test methods	25

74

75

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

SIST-TP CLC/TR 50538:2011

<https://standards.iteh.ai/catalog/standards/sist/dba2e8b7-dc13-431b-9b1d-b2474bedad36/sist-tp-clc-tr-50538-2011>

76 Introduction

77 CENELEC R210-008:2002 has been updated and revised with regard to the EMC Directive
78 2004/108/EC to create this new Technical Report, CLC/TR 50538 "*Guide to EMC Directive conformity*
79 *of equipment designed for military purposes*". The EU Interpretative Communication COM (2006) 779
80 final [5] on the application of Article 296 TEC to military equipment has also been used to clarify the
81 current position regarding possible exemption by derogation.

82 Guidance is provided on EMC Directive conformity to manufacturers, suppliers, importers,
83 procurement authorities, those taking equipment into service and Member States.

84 This Technical Report has been prepared by reviewing all currently available relevant documentation
85 as listed in Bibliography.

86 A Technical Report was produced by CLC/TC 210 (EMC) in 1998 in order to provide guidance to
87 manufacturers of military equipment comply with the EMC Directive 89/336/EEC [6]. Under this
88 Directive 89/336/EEC there were exceptions at Member State level which resulted in a non-
89 harmonised application of the directive by military equipment manufacturers across the EU.

90 The current EMC Directive, 2004/108/EC [13], does not contain any reference to military equipment
91 and therefore the rules of the 'Treaty' have to be consulted with respect to application of the EMC
92 Directive.

93 An interpretative communication was issued in late 2006 which addressed the issue above and
94 removed any ambiguity. It concludes that all military equipment is subject to the rules of the EU
95 regarding the procurement of equipment unless the application of a given directive has been
96 derogated on the basis of the 'essential interests of National security'.

97 The conclusion from the Commission lawyers (validated in a court case between the Commission and
98 a Member State) is very specific and concludes that the exceptions are very few. They will have to be
99 assessed on a case-by-case basis by the contracting authority.

100 Given the Commission interpretation, the vast majority of military equipment requires CE marking and
101 as a consequence CLC/TR 50538 will become an important guide for European defence equipment
102 manufacturers.

SIST-TP CLC/TR 50538:2011

<https://standards.iteh.ai/catalog/standards/sist/dba2c8b7-dc13-431b-9b1d-b2474bedad36/sist-tp-clc-tr-50538-2011>

1 Scope

This Technical Report is applicable to any equipment used for military purposes.

It applies only to non-battlefield environments.

It considers the situation where derogation has not been granted and covers only aspects related to EMC as covered by the EMC Directive 2004/108/EC and other directives that address EMC. In this respect there is no distinction between civilian and defence equipment.

For the purpose of this Technical Report the term “military” is equivalent to the term “defence”.

Annex A describes Article 296 and Annex B provides the associated EC Council List of items under Article 296 [6].

The definitions in EMC Directive 2004/108/EC of “apparatus” and “fixed installations” as applied to military equipment are considered and guidance is given on applicability with the use of flow diagrams.

For apparatus, the use of military standards to demonstrate compliance with the EMC Directive together with a “gap” analysis tool for comparison with harmonised standards is presented. Potential shortfalls are identified.

For fixed installations using military equipment, the use of good engineering practices, to comply with the essential protection requirements of EMC Directive 2004/108/EC additionally the impact on neighbouring environments is covered.

The CEN WS 10 EG7 E3¹⁾ has been reviewing the EU Electromagnetic Environment for inclusion in the “*European Handbook for Defence Procurement*” (CWA 15517 [3]). The information contained in their report has been used and incorporated where applicable.

The conformity assessment procedures of EMC Directive 2004/108/EC have been reviewed and guidance given on the applicability and contents of a technical file.

Annex I includes some case studies to help clarify the extent and use of this Technical Report.

2 Directives for EMC conformity

2.1 EMC Directive

The EMC Directive applies to the majority of military equipment. The conformity procedures are detailed in 4.1 and 5.1.

The EMC Directive makes specific exemptions for radio equipment and telecommunications terminal equipment covered by Directive 1999/5/EC [9], aircraft or equipment fitted to aircraft referred to in Regulation (EC) No. 1592/2002 [10], radio amateur equipment and inherently benign equipment.

2.2 Automotive Directive

In the case of vehicles intended for use on public roads, the Automotive EMC Directive 2004/104/EC [12] applies to cars, trailers and their electronic sub-assemblies, and in time other on-highway vehicles. Compliance with Directive 2004/104/EC is demonstrated by affixing ‘e-marking’ to the equipment or vehicle.

¹⁾ CEN: European Committee for Standardisation, Workshop 10: Standardization for Defence Procurement, EG7: Expert Group 7: Electromagnetic Environment

2.3 Marine Equipment Directive

In the case of marine equipment, the Directive 96/98/EC [8] amended by Directives 98/85/EC, 2001/53/EC and 2002/75/EC applies International Maritime Organisation (IMO) standards to assess the compliance of equipment related to safety at sea (navigation and radio communications) and pollution prevention. This is a type approval process and compliance with the directive is demonstrated by affixing "wheelmark" to such equipment. All non-safety and pollution prevention equipment are assessed following the EMC Directive 2004/108/EC.

2.4 Radio & Telecommunication Terminal Equipment Directive

As noted above, all equipment in the scope of the R&TTE Directive 1999/5/EC [9] is excluded from the EMC Directive. The EMC aspects of equipment within the scope of the R&TTE Directive are covered by that Directive. It follows that equipment that falls outside the scope of the R&TTE Directive is therefore within the scope of the EMC Directive.

In particular, the R&TTE Directive does not apply to apparatus exclusively used for activities concerning public security, defence, state security and activities of the state in the area of criminal law. Accordingly, military radios used solely by state armed forces are subject to the EMC Directive. It is important to note that such use must be exclusive. If these radios are also sold to private security operations or to disposal for public use, they are regulated under the R&TTE Directive and not the EMC Directive. For example, TETRA systems that are widely used by public authorities are subject to the R&TTE Directive because they are not exclusively used for the activities excluded from its scope.

3 Introduction to apparatus and installations

In order for military equipment to comply with the EMC Directive it is first important to understand the different types of products covered. In essence the EMC Directive covers equipment which is divided in apparatus and fixed installations and defines a different regime for these two categories.

The following definitions are extracted from the EMC Directive 2004/108/EC, Article 2, for clarification on the two types of equipment/system covered by the directive:

(b) 'apparatus' means any finished appliance or combination thereof made commercially available as a single functional unit, intended for the end user and liable to generate electromagnetic disturbance, or the performance of which is liable to be affected by such disturbance. Apparatus is subject to the full provisions of the directive including a Declaration of Conformity (DoC) and CE marking;

(c) 'fixed installation' means a particular combination of several types of apparatus and, where applicable, other devices, which are assembled, installed and intended to be used permanently at a predefined location;

Fixed installations do not require a DoC or CE Marking but must meet the protection requirements.

In the special case of apparatus intended for incorporation into a specific fixed installation which is otherwise not commercially available the provision of Article 13(1) of the EMC Directive may be applied. This apparatus does not need to be CE marked but must be supplied with installation instructions that ensure the essential protection requirements. This provision is only for an individual apparatus intended for a specific fixed installation.

The protection requirements of the directive are the same for both apparatus and fixed installations such that

a) the electromagnetic disturbance generated does not exceed the level above which radio and telecommunications equipment or other equipment cannot operate as intended,

b) it has a level of immunity to the electromagnetic disturbance to be expected in its intended use which allows it to operate without unacceptable degradation of its intended use.

Mobile installations are defined as a combination of apparatus intended to be moved and operated in a range of locations. All provisions of the EMC Directive, as defined for apparatus, apply to mobile installations.

Mobile installations may be interpreted to include demountable rack offload and pickup system (DROPS) containers, portable generators, vehicles, ships, submarines and military aircraft.

4 Apparatus

4.1 Conformity assessment procedure

This subclause describes the conformity assessment procedure for military apparatus falling within the scope of the EMC Directive.

The conformity assessment procedure for apparatus is described in Article 7 of the EMC Directive 2004/108/EC. Comprehensive guidance is provided in the “*Guide for the EMC Directive 2004/108/EC*” [14].

This conformity assessment procedure applied to military apparatus is given in Figure D.1. The flowchart illustrates the normal conformity assessment procedure for apparatus including the use of harmonised standards and also highlights the opportunity to perform a gap analysis between military compliance and EMC Directive essential requirements to prevent unnecessary duplication of testing.

4.2 EMC assessment

The EMC Directive requires an EMC assessment of the apparatus to determine if the protection requirements are met. The EMC assessment is described in the conformity assessment procedure for apparatus given in Article 7 and Annexes I, II and III of the EMC Directive 2004/108/EC.

According to the “*Guide for the EMC Directive 2004/108/EC*” [14], three methods are possible for the EMC assessment and their application in the context of military equipment is discussed below:

- use of harmonised standards;
- mixed EMC assessment;
- detailed technical EMC assessment.

4.2.1 Use of harmonised standards

Harmonised standards are published in the Official Journal of the EU. Apparatus that complies with harmonised standards has a presumption of conformity with the protection requirements of the EMC Directive. However there are currently no harmonised standards specifically for military equipment. An alternative is to select relevant harmonised standards based on the equipments use. These are discussed in Annex C.

4.2.2 Mixed EMC assessment

A mixed EMC assessment is where parts of a harmonised standard have been applied together with a technical assessment to demonstrate that all the protection requirements are met. A more detailed description of the technical EMC assessment is given in 4.2.3. The technical assessment may include a gap analysis between the military compliance and EMC Directive protection requirements. Gap analysis is described in 4.3.

4.2.3 Detailed technical EMC assessment

A detailed technical EMC assessment is where no harmonised standard has been applied but a detailed assessment performed instead.

Annex IV(1) of the EMC Directive 2004/108/EC, states that this includes

- steps taken to meet the protection requirements,
- description of the electromagnetic assessment,
- results of design calculations (it is suggested by this guide that this could include modelling and simulation),
- examinations carried out,
- test reports.

229 The “*Guide for the EMC Directive 2004/108/EC*” [14] adds that the assessment required will depend
230 on several factors, such as

- 231 • nature of apparatus,
- 232 • intended use,
- 233 • location of use,
- 234 • EMC environment,
- 235 • types of disturbance created by or affecting the apparatus,
- 236 • environmental conditions,
- 237 • performance criteria for immunity.

238 The technical assessment may include a gap analysis between the military standards and harmonised
239 standards applicable to meeting the EMC Directive protection requirements. Gap analysis is described
240 in 4.3.

241 **4.3 Gap analysis**

242 The gap analysis process may be used in the mixed and detailed technical EMC assessment and
243 identifies any shortfalls in the EMC performance of the military equipment against the EMC Directive
244 protection requirements. In order to achieve this, the EMC standards, test methods and limits applied
245 to the military equipment must be identified and compared to the equivalent harmonised standard, test
246 methods and limits that represent the intended environments in which the military equipment is
247 operated. The first stage is therefore to align test methods that address similar EMC phenomena.

248 The “*Report of the CEN WS 10 EG7 ‘Electromagnetic environment’*” [4] provides such a comparison
249 table in its Appendix C. The table has been updated in this Technical Report and included in Annex G
250 (see Table G.1).

251 The detailed comparison of test methods is complex and guidance on the relevant factors to be
252 considered is given in Annex F (see Table F.1).

253 The comparison factors must be quantified and then used to modify the test methods and limits being
254 compared. Either the military standard or harmonised standard limit is modified to allow both sets of
255 limits to be presented on a single graph or table using common units of frequency/amplitude or
256 time/amplitude.

257 From this comparison the differences in frequency range, time scale or amplitude can be quantified.
258 Examples of gap analysis are shown in Annex H.

259 Where the military test method and limit is more onerous than the harmonised standard equivalent
260 then this demonstrates that the military equipment is in conformity with the harmonised standard test
261 method and limit.

262 Where the military test method and limit is less onerous than the harmonised standard equivalent then
263 this demonstrates a shortfall or gap against the required conformity with the harmonised standard test
264 method and limit.

265 Note that for emission tests a shortfall identified by comparing military and harmonised standard test
266 method and limits may be mitigated by considering the actual military equipment test result and the
267 margin by which it is below the emissions limit. If this margin is greater than the shortfall at the relevant
268 frequencies then this information demonstrates that the harmonised standard test method and limit
269 would have been met.

270 Once the gaps and missing tests have been identified, they can be addressed by application of
271 relevant harmonised standards or basic standards through test or analysis of the military equipment.

272 The gap analysis and any additional test or analysis against harmonised standards should then
273 demonstrate overall that the military equipment is in conformity with the protection requirements of the
274 EMC Directive for all relevant EMC phenomena.