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TECHNICAL REPORT

**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Impact of CENELEC EN 55032 on ETSI EMC Standards**

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Reference

DTR/ERM-EMC-326

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Keywords

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## Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

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## Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

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# 1 Scope

The present document is intended to review the impact of CENELEC EN 55032 [i.1] on existing ETSI EMC deliverables that reference its predecessor CENELEC EN 55022:2010 [i.2] and to recommend to ETSI TC ERM as to what (if any) changes should be made to these deliverables.

It should be noted that if changes are made to existing deliverables, then the usual procedures as per the ETSI TWP [i.16] are to be followed.

It should also be noted that the present document bases its review around edition 2 of CENELEC EN 55032 [i.1] as the first edition, a direct reference to CISPR 32 [i.3] first edition contained the very same mistakes that were present in the first edition of the CISPR document.

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## 2 References

### 2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

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The following referenced documents are necessary for the application of the present document.

Not applicable.

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NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] CENELEC EN 55032: "Electromagnetic compatibility of multimedia equipment - Emission requirements".
- [i.2] CENELEC EN 55022: "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurements".
- [i.3] CISPR 32: "Electromagnetic compatibility of multimedia equipment - Emission requirements".
- [i.4] ETSI EN 300 386: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements".
- [i.5] ETSI EN 301 489 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services".
- [i.6] ETSI EN 301 843 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for marine radio equipment and services".

- [i.7] ETSI ES 201 468: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Additional ElectroMagnetic Compatibility (EMC) requirements and resistibility requirements for telecommunications equipment for enhanced availability of service in specific applications".
- [i.8] ETSI EG 202 414: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide to the demonstration of conformity for after market Electric/electronic Sub-Assemblies (ESAs) to the motor vehicle EMC Directive 2004/104/EC".
- [i.9] ETSI TR 103 088: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Using the EN 301 489 series of EMC standards".
- [i.10] ETSI TR 101 651: "ElectroMagnetic Compatibility and Radio Spectrum Matters (ERM); Classification of the electromagnetic environment conditions for equipment in telecommunication networks".
- [i.11] ETSI TR 102 552: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Broadband Electronic Communications through Powerlines: A code of Practice relating to the Standardization of the Measurement of Emission, Data Collection and Reporting of Results".
- [i.12] CENELEC EN 55013: "Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement CISPR13:2001 (Modified)".
- [i.13] CENELEC EN 55103-1: "Electromagnetic Compatibility - Product family standard for audio, video, audio-visual and entertainment lighting control apparatus for professional use - Part 1: Emissions".
- [i.14] ETSI TR 102 070-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Guide to the application of harmonized standards to multi-radio and combined radio and non-radio equipment; Part 1: ElectroMagnetic Compatibility".
- [i.15] ETSI EN 300 127: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Radiated emission testing of physically large telecommunication systems".
- [i.16] ETSI Directives, Technical working procedures.
- [i.17] Commission Directive 2004/104/EC of 14 October 2004 adapting to technical progress Council Directive 72/245/EEC relating to the radio interference (electromagnetic compatibility) of vehicles and amending Directive 70/156/EEC on the approximation of the laws of the Member States relating to the type-approval of motor vehicles and their trailers.

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### 3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AC	Alternating Current
CISPR	Comité International Spécial des Perturbations Radioélectriques (International Special Committee on Radio Interference)
EC	European Commission
EMC	Electromagnetic Compatibility
ESA	Electric/electronic Sub-Assemblies
ITE	Information Technology Equipment
TC	Technical Committee
TWP	Technical Working Procedures

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## 4 ETSI EMC deliverables

### 4.1 Harmonised EMC standards

ETSI currently produces and maintains the following harmonised EMC standards; ETSI EN 300 386 [i.4], ETSI EN 301 489 [i.5] series and ETSI EN 301 843 [i.6] series. At the present time all of these reference CENELEC EN 55022 [i.2] for their emission limits and/or methods or measurements.

### 4.2 Other EMC Standards

#### 4.2.1 ETSI Standard ETSI ES 201 468

ETSI ERM WG EMC also produces and maintains ETSI ES 201 468 [i.7].

ETSI ES 201 468 [i.7] clause 8 references ETSI EN 300 386 [i.4] for all of its emission requirements, therefore any changes made to ETSI EN 300 386 [i.4] would automatically be carried through to the present document without requiring any work to be done on ETSI ES 201 468 [i.7].

It is therefore deemed that no action is required on ETSI ES 201 468 [i.7] as a result of the publication of CENELEC EN 55032 [i.1].

#### 4.2.2 European Norm ETSI EN 300 127

ETSI EN 300 127 [i.15] Radiated emission testing of physically large telecommunication systems. Although this is an EN it is not a harmonised standard. This standard references CENELEC EN 55022 [i.2] for both limits and methods of measurement,

### 4.3 Other ETSI deliverables relating to EMC

#### 4.3.1 Summary

ETSI has also published and maintains five guidance documents dealing with various aspects of EMC. These are; ETSI EG 202 414 [i.8], ETSI TR 103 088 [i.9], ETSI TR 101 651 [i.10], ETSI TR 102 552 [i.11] and ETSI TR 102 070-1 [i.14].

#### 4.3.2 ETSI Guide ETSI EG 202 414

ETSI EG 202 414 [i.8] provides information on the demonstration of conformity for after market Electric/electronic Sub-Assemblies (ESAs) to the motor vehicle EMC Directive 2004/104/EC [i.17].

Having carefully studied the present document it is clear that it makes no reference to CENELEC EN 55022 [i.2] and is therefore not impacted by the publication of CENELEC EN 55032 [i.1].

#### 4.3.3 Technical Report ETSI TR 103 088

ETSI TR 103 088 [i.9] is a guidance document that is designed to help the user apply the ETSI EN 301 489 [i.5] series by providing detail upon the changes between the different editions within the ETSI EN 301 489 [i.5] series and information as to the coverage of each part within the series.

Although the technical report does not specify any limits, it does highlight changes between different versions of the individual parts of the ETSI EN 301 489 [i.5] series and as a consequence could require updating once all of the changes to these parts have been completed.

#### 4.3.4 Technical Report ETSI TR 101 651

ETSI TR 101 651 [i.10] provides information on the electromagnetic environmental conditions encountered where telecommunications equipment is installed and is a compilation of data concerning electromagnetic environmental conditions.

Having carefully studied the present document it is clear that it makes no reference to CENELEC EN 55022 [i.2] and is therefore not impacted by the publication of CENELEC EN 55032 [i.1].

### 4.3.5 Technical Report ETSI TR 102 552

ETSI TR 102 552 [i.11] is a code of practice relating to the standardization of the measurement of emissions, data collection and reporting of results for powerline systems.

Having carefully studied the present document it is clear that it makes no reference to CENELEC EN 55022 [i.2] and is therefore not impacted by the publication of EN 55032 [i.1].

### 4.3.6 Technical Report ETSI TR 102 070-1

ETSI TR 102 070-1 [i.14] is a guide on the assessment of EMC in combined radio/non-radio product and multi-radio products. CENELEC EN 55022 [i.2] is quoted in an annex of the present document to show the range of standards used for different product families to detail their emission limits.

It should be noted that the conclusions and recommendations from the present document were incorporated into annex C of ETSI EN 301 489-1 [i.5].

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## 5 Comparison between CENELEC EN 55032 and CENELEC EN 55022

### 5.1 Introduction

For the purposes of the present document, comparisons are between CENELEC EN 55032 [i.1]: and CENELEC EN 55022:2010 [i.2]

### 5.2 Radiated Emissions

#### 5.2.1 Limits

Table 1 shows the radiated emissions limits from CENELEC EN 55022 [i.2] and CENELEC EN 55032 [i.1].

**Table 1: Comparison of radiated emission limits**

		80 - 230 MHz	230 - 1 000 MHz	1 - 3 GHz	3 - 6 GHz
<b>EN55022</b>	Class A	40 dB $\mu$ V/m	47 dB $\mu$ V/m	76 dB $\mu$ V/m	80 dB $\mu$ V/m
	Class B	30 dB $\mu$ V/m	37 dB $\mu$ V/m	70 dB $\mu$ V/m	74 dB $\mu$ V/m
<b>EN55032</b>	Class A	40 dB $\mu$ V/m	47 dB $\mu$ V/m	76 dB $\mu$ V/m	80 dB $\mu$ V/m
	Class B	30 dB $\mu$ V/m	37 dB $\mu$ V/m	70 dB $\mu$ V/m	74 dB $\mu$ V/m
		10 m measurement distance, quasi peak values		3 m measurement distance, peak values	

From the table above it can be seen that the radiated emission limits in CENELEC EN 55032 [i.1] are identical to those contained within CENELEC EN 55022 [i.2].

#### 5.2.2 Measurement Methods

Although the table above quotes limits for a 10 m measurements distance for both CENELEC EN 55022 [i.2] and CENELEC EN 55032 [i.1], there is also the option of conducting these tests at a 3 m measurement distance when using CENELEC EN 55032 [i.1]. Where this is used the limits are 10 dB higher for both class A and class B. It should be remembered that this option was not available under CENELEC EN 55022 [i.1] and as a result it is not possible to provide a comparison between the two standards when using this measurement distance.

#### 5.2.3 Conclusion

The information shown in clauses 5.1.1 and 5.1.2 shows that a piece of equipment meeting the requirements of CENELEC EN 55022 [i.2] for radiated emissions has a high probability of satisfying the requirements of CENELEC EN 55032 [i.1] for radiated emissions.

## 5.3 Conducted Emissions

### 5.3.1 Limits

Table 2 shows the conducted emission limits from CENELEC EN 55022 [i.2] and CENELEC EN 55032 [i.1].

**Table 2: Comparison of conducted emission limits**

		AC Mains			Signal and Control lines	
		150 - 500 KHz	0,5 - 5 MHz	5 - 30 MHz	150 - 500 KHz	0,5 - 30 MHz
<b>CENELEC EN 55022 [i.2]</b>	Class A	79 dB $\mu$ V	73 dB $\mu$ V	73 dB $\mu$ V	97-87 dB $\mu$ V	87 dB $\mu$ V
	Class B	66-56 dB $\mu$ V	56 dB $\mu$ V	60 dB $\mu$ V	84-74 dB $\mu$ V	74 dB $\mu$ V
<b>CENELEC EN 55032 [i.1]</b>	Class A	79 dB $\mu$ V	73 dB $\mu$ V	73 dB $\mu$ V	97-87 dB $\mu$ V	87 dB $\mu$ V
	Class B	66-56 dB $\mu$ V	56 dB $\mu$ V	60 dB $\mu$ V	84-74 dB $\mu$ V	74 dB $\mu$ V

NOTE: All values are quasi - peak values.

From table 2 it can be seen that the conducted emission limits in CENELEC EN 55032 [i.1] are identical to those contained within CENELEC EN 55022 [i.2].

### 5.3.2 Measurement Methods

Although the two standards are constructed in a very different manner, close examination does not reveal any significant differences in the test methods used for conducted measurements on the types of ports seen on equipment subject to ETSI standards.

## 5.4 Class A versus Class B

CENELEC EN 55022 [i.2] contains definitions for class A and class B equipment, reproduced below:

#### 4.1 Class B ITE

*Class B ITE is a category of apparatus which satisfies the class B ITE disturbance limits.*

*Class B ITE is intended primarily for use in the domestic environment and may include:*

- *equipment with no fixed place of use; for example, portable equipment powered by built-in batteries;*
- *telecommunication terminal equipment powered by a telecommunication network;*
- *personal computers and auxiliary connected equipment.*

*NOTE The domestic environment is an environment where the use of broadcast radio and television receivers may be expected within a distance of 10 m of the apparatus concerned.*

#### 4.2 Class A ITE

*Class A ITE is a category of all other ITE which satisfies the class A ITE limits but not the class B ITE limits. The following warning shall be included in the instructions for use:*

*WARNING: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.*

Whilst CENELEC EN 55032 [i.1] retains the concept of class A and class B equipment, the wording used (reproduced below) has changed substantially:

#### 4 Classification of equipment

*This standard defines Class A equipment and Class B equipment associated with two types of end-use environment.*

*Class A equipment is equipment which meets the requirements given in Table A.2, Table A.3, Table A.8, and Table A.10, using the limitations defined in Table A.1 and Table A.7.*

*Class B equipment is equipment which meets the requirements given in Table A.4, Table A.5, Table A.6, Table A.9, Table A.11 and Table A.12, using the limitations defined in Table A.1 and Table A.7.*

*The Class B requirements for equipment are intended to offer adequate protection to broadcast services within the residential environment.*

*Equipment intended primarily for use in a residential environment shall meet the Class B limits. All other equipment shall comply with the Class A limits.*

*Broadcast receiver equipment is class B equipment.*

*NOTE Equipment meeting Class A requirements may not offer adequate protection to broadcast services within a residential environment.*

For class A equipment, CENELEC EN 55032 [i.1] contains the requirement for a warning to be contained in the equipment instructions for use with the following text:

*WARNING: This equipment is compliant with Class A of EN55032. In a residential environment this equipment may cause radio interference.*

This wording is different from its equivalent in CENELEC EN 55022 [i.2].

Other than the warning text, there is no substantive difference in the definition of class A and class B between the two standards. This would mean that, warning notice aside, equipment that was class A under CENELEC EN 55022 [i.2] would be class A under CENELEC EN 55032 [i.1] and in a similar manner the situation for class B equipment also remains the same.

## 6 Impact on specific deliverables and recommendations for action

### 6.1 Harmonised EMC standards

Based upon the analysis contained within the present document it is recommended that ETSI EN 300 386 [i.4], ETSI EN 301 489 [i.5] series and ETSI EN 301 843 [i.6] series are revised as follows:

- change references from CENELEC EN 55022 [i.2] to CENELEC EN 55032 [i.1];
- incorporate the relevant limits for the 3 m measurement distance for radiated emissions below 1 GHz;
- where it is quoted within the deliverable, revise the wording of the class A warning to align with that contained within CENELEC EN 55032 [i.1].

With all of these revisions, care should be taken to ensure that the dates of cessation of presumption of conformity of the superseded editions of these harmonised standards that reference CENELEC EN 55022 [i.2] align with the date of the cessation of presumption of conformity of CENELEC EN 55022 [i.2] itself, noting that at the time of publication this is 5 March 2017.

### 6.2 Other EMC Standards

#### 6.2.1 European Norm ETSI EN 300 127

Based upon the analysis contained within the present document it is recommended that ETSI EN 300 127 [i.15] is revised as follows:

- change references from CENELEC EN 55022 [i.2] to CENELEC EN 55032 [i.1];
- incorporate the relevant limits for the 3m measurement distance for radiated emissions below 1 GHz.

### 6.3 Other ETSI deliverables relating to EMC

#### 6.3.1 Technical Report ETSI TR 103 088

As this technical report does not directly reference CENELEC EN 55022 [i.2] it is not directly impacted by the issues raised in the present document. However, it does highlight changes between different versions of the individual parts of the ETSI EN 301 489 [i.5] series and as a consequence updates to this series as a result of the recommendations of the present document will need to be captured within ETSI TR 103 088 [i.9] in the usual manner.

### 6.3.2 Technical Report ETSI TR 102 070-1

Within ETSI Technical Report ETSI TR 102 070-1 [i.14], CENELEC EN 55022 [i.2], CENELEC EN 55013 [i.12] and CENELEC EN 55103-1 [i.13] are quoted in annex A to show the range of standards used for different product families to detail their emission limits. As the scope of CENELEC EN 55032 [i.1] incorporates the scopes of CENELEC EN 55013 [i.12] and CENELEC EN 55103-1 [i.13] in addition to CENELEC EN 55022 [i.2], all of these references will need to be replaced by CENELEC EN 55032 [i.1] in order to keep the present document up to date.

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## History

<b>Document history</b>		
V1.1.1	June 2015	Publication