

**Amplifiers and active antennas for  
TV broadcast reception in domestic premises;  
Harmonised Standard covering the essential  
requirements of article 3.2 of Directive 2014/53/EU  
(ETSI EN 303 354 V1.1.1 (2017-03))**

---

**Medieninhaber und Hersteller:**

OVE Österreichischer Verband für Elektrotechnik  
Austrian Standards Institute

**ICS** 33.160.10

**Copyright © OVE/Austrian Standards Institute – 2017.**

**Alle Rechte vorbehalten!** Nachdruck oder  
Vervielfältigung, Aufnahme auf oder in sonstige Medien  
oder Datenträger nur mit Zustimmung gestattet!

**Ident (IDT) mit** ETSI EN 303 354 V1.1.1 (2017-03)

**zuständig** OVE/Komitee  
TK IT-EG  
Informationstechnologie, Telekommunikation und  
Elektronik

**Verkauf von in- und ausländischen Normen und  
technischen Regelwerken durch**

Austrian Standards Institute  
Heinestraße 38, 1020 Wien  
E-Mail: [sales@austrian-standards.at](mailto:sales@austrian-standards.at)  
Internet: [www.austrian-standards.at](http://www.austrian-standards.at)  
Webshop: [www.austrian-standards.at/webshop](http://www.austrian-standards.at/webshop)  
Tel.: +43 1 213 00-300  
Fax: +43 1 213 00-818

Alle Regelwerke für die Elektrotechnik auch erhältlich bei  
OVE Österreichischer Verband für Elektrotechnik  
Eschenbachgasse 9, 1010 Wien  
E-Mail: [verkauf@ove.at](mailto:verkauf@ove.at)  
Internet: [www.ove.at](http://www.ove.at)  
Webshop: [www.ove.at/webshop](http://www.ove.at/webshop)  
Tel.: +43 1 587 63 73  
Fax: +43 1 587 63 73 - 99

## Nationales Vorwort

Diese Europäische Norm EN 303 354 V1.1.1:2017 hat sowohl den Status von ÖSTERREICHISCHEN BESTIMMUNGEN FÜR DIE ELEKTROTECHNIK gemäß ETG 1992 als auch den einer ÖNORM gemäß NG 1971. Bei ihrer Anwendung ist dieses Nationale Vorwort zu berücksichtigen.

Für den Fall einer undatierten normativen Verweisung (Verweisung auf einen Standard ohne Angabe des Ausgabedatums und ohne Hinweis auf eine Abschnittsnummer, eine Tabelle, ein Bild usw.) bezieht sich die Verweisung auf die jeweils neueste Ausgabe dieses Standards.

Für den Fall einer datierten normativen Verweisung bezieht sich die Verweisung immer auf die in Bezug genommene Ausgabe des Standards.

Der Rechtsstatus dieser ÖSTERREICHISCHEN BESTIMMUNGEN FÜR DIE ELEKTROTECHNIK/ÖNORM ist den jeweils geltenden Verordnungen zum Elektrotechnikgesetz zu entnehmen.

Bei mittels Verordnungen zum Elektrotechnikgesetz verbindlich erklärten ÖSTERREICHISCHEN BESTIMMUNGEN FÜR DIE ELEKTROTECHNIK/ÖNORMEN ist zu beachten:

- Hinweise auf Veröffentlichungen beziehen sich, sofern nicht anders angegeben, auf den Stand zum Zeitpunkt der Herausgabe dieser ÖSTERREICHISCHEN BESTIMMUNGEN FÜR DIE ELEKTROTECHNIK/ÖNORM. Zum Zeitpunkt der Anwendung dieser ÖSTERREICHISCHEN BESTIMMUNGEN FÜR DIE ELEKTROTECHNIK/ÖNORM ist der durch die Verordnungen zum Elektrotechnikgesetz oder gegebenenfalls auf andere Weise festgelegte aktuelle Stand zu berücksichtigen.
- Informative Anhänge und Fußnoten sowie normative Verweise und Hinweise auf Fundstellen in anderen, nicht verbindlichen Texten werden von der Verbindlicherklärung nicht erfasst.

Europäische Normen (EN) werden durch Veröffentlichung eines identen Titels und Textes in das Gesamtwerk der ÖSTERREICHISCHEN BESTIMMUNGEN FÜR DIE ELEKTROTECHNIK/ÖNORMEN übernommen, wobei der Nummerierung der Zusatz ÖVE/ÖNORM bzw. ÖNORM vorangestellt wird.

Der von ETSI übermittelte Normentext wird in englischer Sprache veröffentlicht, da davon ausgegangen werden kann, dass die Anwender der Norm über ausreichende englische Sprachkenntnisse verfügen.

# ETSI EN 303 354 V1.1.1 (2017-03)



HARMONISED EUROPEAN STANDARD

**Amplifiers and active antennas for  
TV broadcast reception in domestic premises;  
Harmonised Standard covering the essential requirements  
of article 3.2 of Directive 2014/53/EU**

---

**Reference**

---

DEN/ERM-TG17-16

---

**Keywords**

---

amplification, antenna, broadcasting,  
harmonised standard**ETSI**

---

650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Important notice**

The present document can be downloaded from:  
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at  
<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

If you find errors in the present document, please send your comment to one of the following services:  
<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

---

**Copyright Notification**

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.  
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2017.  
All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.  
**3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.  
**GSM®** and the GSM logo are Trade Marks registered and owned by the GSM Association.

# Contents

Intellectual Property Rights .....	5
Foreword.....	5
Modal verbs terminology.....	5
Introduction .....	5
1 Scope .....	6
2 References .....	6
2.1 Normative references .....	6
2.2 Informative references.....	6
3 Definitions, symbols and abbreviations .....	7
3.1 Definitions .....	7
3.2 Symbols.....	7
3.3 Abbreviations .....	7
4 Technical requirements specifications .....	8
4.1 Environmental profile.....	8
4.2 General conditions of measurement .....	8
4.2.1 General.....	8
4.2.2 Equipment configuration .....	8
4.2.3 Test conditions.....	8
4.2.3.1 General .....	8
4.2.3.2 Normal test conditions .....	9
4.2.3.2.1 Normal temperature and humidity.....	9
4.2.3.2.2 Extreme temperatures.....	9
4.3 General assessment.....	9
4.4 Equipment categorization.....	9
4.4a RF Connectors.....	10
4.5 Conformance requirements .....	10
4.5.1 Gain .....	10
4.5.1.1 Definition .....	10
4.5.1.2 Limits .....	10
4.5.1.3 Conformance.....	11
4.5.2 Noise figure .....	11
4.5.2.1 Definition .....	11
4.5.2.2 Limits.....	11
4.5.2.3 Conformance.....	12
4.5.3 Amplifier intermodulation.....	12
4.5.3.1 Definition .....	12
4.5.3.2 Limits.....	12
4.5.3.3 Conformance.....	12
4.5.4 Return loss .....	12
4.5.4.1 Definition .....	12
4.5.4.2 Limits.....	13
4.5.4.3 Conformance.....	13
4.5.5 Selectivity .....	13
4.5.5.1 Definition .....	13
4.5.5.2 Classification 1.....	13
4.5.5.3 Classification 2.....	14
4.5.5.4 Classification 3.....	15
4.5.5.5 Classification 4.....	15
4.5.5.6 Conformance.....	16
4.5.6 Active antenna gain .....	16
4.5.6.1 Definition .....	16
4.5.6.2 Limits.....	16
4.5.6.3 Conformance.....	17
4.5.7 Active antenna figure of merit .....	17

4.5.7.1	Definition .....	17
4.5.7.2	Limits .....	17
4.5.7.3	Conformance.....	17
4.5.8	Active antenna intermodulation.....	17
4.5.8.1	Definition .....	17
4.5.8.2	Limits .....	17
4.5.8.3	Conformance.....	18
4.5.9	Internal immunity .....	18
4.5.9.1	Definition .....	18
4.5.9.2	Limits .....	18
4.5.9.3	Conformance.....	18
5	Testing for compliance with technical requirements.....	18
5.1	Environmental conditions for testing .....	18
5.2	Interpretation of the measurement results .....	18
5.3	Methods of measurement .....	19
5.3.1	Amplifier gain.....	19
5.3.2	Noise figure .....	19
5.3.3	Amplifier intermodulation .....	21
5.3.4	Return loss .....	22
5.3.5	Selectivity .....	22
5.3.6	Active antenna gain .....	23
5.3.7	Active antenna figure of merit.....	23
5.3.8	Active antenna intermodulation.....	24
5.3.9	Internal immunity .....	24
5.3.9.1	Method of measurement.....	24
<b>Annex A (informative):</b>	<b>Relationship between the present document and the essential requirements of Directive 2014/53/EU .....</b>	<b>25</b>
<b>Annex B (informative):</b>	<b>Active Antenna Theory .....</b>	<b>26</b>
<b>Annex C (informative):</b>	<b>Change History .....</b>	<b>28</b>
History .....		29

---

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org/>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

---

## Foreword

This Harmonised European Standard (EN) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.4] to provide one voluntary means of conforming to the essential requirements of Directive 2014/53/EU on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC [i.1].

Once the present document is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of the present document given in table A.1 confers, within the limits of the scope of the present document, a presumption of conformity with the corresponding essential requirements of that Directive and associated EFTA regulations.

Other Union legislation may be applicable to the product(s) falling within the scope of the present document.

National transposition dates	
Date of adoption of this EN:	20 January 2017
Date of latest announcement of this EN (doa):	30 April 2017
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 October 2017
Date of withdrawal of any conflicting National Standard (dow):	31 October 2018

---

## 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.

---

## Introduction

The present document is a Harmonised Standard for amplifiers and active antennas used for broadcast TV reception from 470 MHz to 790 MHz and VHF (174 MHz to 230 MHz).

The primary purpose of the present document is to specify technical parameters to limit the interfering effects caused by unwanted signals on TV reception.

---

# 1 Scope

The present document covers amplifiers and indoor active antennas for broadcast TV and sound reception at UHF (470 MHz to 790 MHz) and at VHF (174 MHz to 230 MHz).

The present document covers the essential requirements of article 3.2 of Directive 2014/53/EU [i.1] under the conditions identified in annex A.

---

## 2 References

### 2.1 Normative references

References are specific, identified by date of publication and/or edition number or version number. Only the cited version applies.

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

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 necessary for the application of the present document.

- [1] CENELEC EN 50083-2:2012: "Cable networks for television signals, sound signals and interactive services - Part 2: Electromagnetic compatibility for equipment".

### 2.2 Informative 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 referenced document (including any amendments) applies.

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] Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive 1999/5/EC.
- [i.2] Rohde & Schwarz Application Note 1MA78-0E: "The Y Factor Technique for Noise Figure Measurements", May 2012.
- [i.3] Agilent Technologies Application note 1439 5988-8571EN: "Measuring Noise Figure with a Spectrum Analyzer", 2003.
- [i.4] Commission Implementing Decision C(2015) 5376 final of 4.8.2015 on a standardisation request to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards radio equipment in support of Directive 2014/53/EU of the European Parliament and of the Council.
- [i.5] Kraus, J. D.: "Antennas", second edition, McGraw-Hill International 1988.
- [i.6] ETSI TR 100 028 all parts (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".