
Methods of measurement on receiving antennas for satellite broadcast transmissions in the 12 GHz band -- Part 1: Electrical measurements on DBS receiving antennas (IEC 61114-1:1992)

Methods of measurement on receiving antennas for satellite broadcast transmissions in the 12 GHz band -- Part 1: Electrical measurements on DBS receiving antennas

Meßverfahren für Empfangsantennen für Satelliten-Rundfunkübertragung im 12 GHz-Bereich -- Teil 1: Elektrische Meßverfahren für Satelliten-Empfangsantennen

Méthodes de mesure pour les antennes de réception des émissions de radiodiffusion par satellite dans la bande 12 GHz -- Partie 1: Mesures électriques sur les antennes de réception des émissions de radiodiffusion par satellite

Ta slovenski standard je istoveten z: EN 61114-1:1993

ICS:

33.060.20	Sprejemna in oddajna oprema	Receiving and transmitting equipment
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EUROPEAN STANDARD

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ENGLISH VERSION

Methods of measurement on receiving antennas for
satellite broadcast transmissions in the 12 GHz
band

Part 1: Electrical measurements on DBS receiving
antennas

(IEC 1114-1:1992)

Méthodes de mesure pour les
antennes de réception des
émissions de radiodiffusion par
satellite dans la bande 12 GHz
Partie 1: Mesures électriques
sur les antennes de réception,
des émissions de radiodiffusion
par satellite

(CEI 1114-1:1992)

Meßverfahren für
Empfangsantennen für
Satelliten-Rundfunkübertragung
im 12 GHz-Bereich

Teil 1: Elektrische
Meßverfahren für
Satelliten-Empfangsantennen

(IEC 1114-1:1992)

SIST EN 61114-1:1999

This European Standard was approved by CENELEC on 1991-12-10.
CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations
which stipulate the conditions for giving this European Standard the status of
a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards
may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German).
A version in any other language made by translation under the responsibility of
a CENELEC member into its own language and notified to the Central Secretariat
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Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg,
Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B-1050 Brussels

FOREWORD

The text of document 12A(CO)152 and 152A, as prepared by sub-committee 12A: Receiving equipment, of IEC technical committee 12: Radiocommunications, was submitted to the IEC-CENELEC parallel vote in May 1991.

The reference document was approved by CENELEC as EN 61114-1 on 10 December 1991.

The following dates were fixed:

- latest date of publication of an identical national standard (dop) 1993-12-01
- latest date of withdrawal of conflicting national standards (dow) 1993-12-01

Annexes designated "normative" are part of the body of the standard. Annexes designated "informative" are given only for information. In this standard, annexes A, C, D and E are informative, annexes B and ZA are normative.

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ENDORSEMENT NOTICE

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The text of the International Standard IEC 1114-1:1992 was approved by CENELEC as a European Standard without any modification.

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD
WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

When the international publication has been modified by CENELEC common modifications, indicated by (mod), the relevant EN/HD applies.

IEC Publication	Date	Title	EN/HD	Date
50(712)	1992	International Electrotechnical Vocabulary (IEV) Chapter 712: Antennas	-	-
169-15	1979	Radio-frequency connectors Part 15: R.F. coaxial connectors with inner diameter of outer conductor 4,13 mm (0,163 in) with screw coupling Characteristic impedance 50 ohms (Type SMA)	-	-
1079-1	1992	Methods of measurements on receivers for satellite broadcast transmissions in the 12 GHz band - Part 1: Radio-frequency measurements on outdoor units	-	-

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Other publications

SIST EN 61114-1:1999

<https://standards.iteh.ai/catalog/standards/sist/9cdb2044-5be0-4fd9-ab3a-07c4dcb0025/sist-en-61114-1-1999>

WARC BS-77: World administrative radio conference for the planning of the
broadcasting-satellite service (Geneva, 1977)

RARC SAT-83: Regional administrative radio conference for the planning in
region 2 of the broadcasting-satellite service (Geneva, 1983)

Note: These two documents are available from the International Telecommunications
Union (ITU)

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Méthodes de mesure pour les antennes
de réception des émissions de radiodiffusion
par satellite dans la bande 12 GHz

Partie 1:

Mesures électriques sur les antennes de réception
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Methods of measurement on receiving antennas
for satellite broadcast transmissions
in the 12 GHz band

Part 1:

Electrical measurements on DBS receiving antennas

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International Electrotechnical Commission
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**METHODS OF MEASUREMENT ON RECEIVING ANTENNAS
FOR SATELLITE BROADCAST TRANSMISSIONS
IN THE 12 GHz BAND**

**Part 1: Electrical measurements on
DBS receiving antennas**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international cooperation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

International Standard IEC 1114-1 has been prepared by sub-committee 12A: Receiving Equipment, of IEC technical committee 12: Radiocommunications.

The text of this standard is based on the following documents:

DIS	Report on Voting
12A(CO)152 and 152A	12A(CO)167

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

Annex B forms an integral part of this standard.

Annexes A, C, D and E are for information only.

METHODS OF MEASUREMENT ON RECEIVING ANTENNAS FOR SATELLITE BROADCAST TRANSMISSIONS IN THE 12 GHz BAND

Part 1: Electrical measurements on DBS receiving antennas

1 Scope

This part of IEC 1114 applies to receiving antennas for satellite broadcast transmissions in the 12 GHz band. The frequency ranges of the band are those defined by WARC BS-77 and RARC SAT-83.

The object of this part is to define the conditions and methods of measurement to be applied. This part does not specify performance requirements.

The receiving antenna constitutes an outdoor unit of a satellite receiver together with an SHF converter. Methods of measurement of the SHF converter are described in Part 1 of IEC 1079.

In some measurements in this part it is assumed that the SHF converter will be removed from the antenna, leaving access to an RF port of the antenna.

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2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 1114. At the time of publication of this standard, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 1114 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50(712): 1992, *International Electrotechnical Vocabulary (IEV) – Chapter 712: Antennas*

IEC 169-15: 1979, *Radio-frequency connectors – Part 15: R.F. coaxial connectors with inner diameter of outer conductor 4,13 mm (0,153 in) with screw coupling – Characteristic impedance 50 ohms (type SMA)*

IEC 1079-1: 1992, *Methods of measurement on receivers for satellite broadcast transmissions in the 12 GHz band – Part 1: Radio frequency measurements on outdoor units*

WARC BS-77: *World Administrative Radio Conference for the Planning of the Broadcasting-Satellite Service (Geneva, 1977)*

RARC SAT-83: *Regional Administrative Radio Conference for the Planning in Region 2 of the Broadcasting-Satellite Service (Geneva, 1983)*

NOTE - These two documents are available from the International Telecommunications Union (ITU).

3 General explanation of terms

For the purpose of this part of IEC 1114, the following definitions apply.

3.1 DBS receiving antenna: A small-sized SHF antenna intended for use in individual and collective reception of satellite broadcast signals.

This part mainly applies to paraboloidal reflector antennas, which include offset paraboloidal reflector antennas, Cassegrain reflector antennas and other similar ones. However, it may also apply to planar array antennas.

A paraboloidal reflector antenna usually comprises a main reflector, a primary radiator, a circular polarizer, an SHF converter, supporting structures for a primary radiator and pointing structures. The supporting structures, however, are not included in this part. A radome is also excluded.

3.2 standard antenna: An antenna which is used as a gain reference for receiving antennas under test.

3.3 source antenna: An antenna which is used as a transmitting antenna for measurements.

4 General notes on measurements

4.1 General conditions

4.1.1 Introduction

Measurements should be carried out in accordance with the following conditions to ensure repeatable results. <https://standards.iteh.ai/catalog/standards/sist/9cdb2044-5be0-4fd9-ab3a-09fc4dcbcb23/sist-en-61114-1-1999>

4.1.2 Test site

Measurements shall be carried out at a facility where external radio interference and reflections from the ground and from surrounding structures have been minimized and their residual effects have been measured.

4.1.3 Environmental conditions

Under consideration.

4.1.4 Power supply

If an SHF converter is used as an integral part of the antenna, a power supply equivalent to the rated voltage of the converter shall be used. The fluctuation of the power supply voltage during the tests shall not exceed $\pm 2\%$.

4.1.5 Accuracy of measuring instruments

Requirements for the accuracy of measurements are not included in this part of IEC 1114 because they depend only on the purpose for which the measurements are required. The accuracy of the measuring instruments used, if known, shall either be stated as a percentage or in decibels, as appropriate. Alternatively, the precision class may be quoted as stated in relevant publications (under consideration).

4.1.6 Residual standing wave ratio (SWR) of test instruments

The residual SWR of the test instruments shall be less than 1,1 for measuring the antenna gain and the impedance matching and less than 1,5 for measuring the radiation pattern and the cross-polar pattern.

4.1.7 Stabilization period

Unless otherwise specified, measurements should be started once stabilization of the characteristics is obtained.

4.2 Test signal and test frequencies

Unless otherwise specified, the test signal shall be a c.w. signal and its frequency shall be the lowest, mid and highest frequencies in the 12 GHz band as specified by the standard of the country or countries for which the antenna under test was designed.

If there is interference at these frequencies, the test frequency can be shifted slightly to avoid disturbance.

If the characteristics of the antenna are strongly frequency-dependent, the measurements shall also be carried out at those frequencies where significant changes occur.

4.3 Arrangement of source and receiving antennas

4.3.1 Antenna distance

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The distance R between the aperture planes of the source antenna and the antenna under test shall satisfy the following equations: EN 61114-1:1999

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$$R > 2D_1^2 / \lambda \quad (\text{m})$$

$$R > D_1 D_2 / 0,32 \lambda \quad (\text{m})$$

where

D_1 is the largest aperture diameter of the antenna under test (m);

D_2 is the largest aperture diameter of the source antenna (m);

λ is the free space wavelength at the test frequency (m).

4.3.2 Spatial variation of the field

The spatial variation of the field at the aperture plane of the antenna under test shall be minimized. The variation in the power received from a standard antenna shall be within $\pm 0,5$ dB on the aperture plane of the antenna. The method of measurement of the variation is described in 5.1.

If a larger variation is observed, the position and height of the antenna should be changed to obtain the value specified above.

4.3.3 Environmental conditions for G/T measurement

When the measurement of figure of merit G/T is made (see 5.6), the following conditions shall be maintained:

- the sky shall be clear;
- there shall be no noise sources such as the sun, a satellite, buildings and trees within 10° around the beam axis of the antenna under test.