# SLOVENSKI STANDARD
# oSIST prEN 301 598 V2.2.0:2022

**01-februar-2022**

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**TV naprave za kanalske presledke (TVWSD) - Brezžični dostopovni sistemi, ki delujejo v TV sprejemnem kanalu od 470 MHz do 694 MHz - Harmonizirani standard za dostop do radijskega spektra**

TV White Space Devices (TVWSD) - Wireless Access Systems operating in the 470 MHz to 694 MHz TV broadcast band - Harmonised Standard for access to radio spectrum

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**Ta slovenski standard je istoveten z: ETSI EN 301 598 V2.2.0 (2021-12)**

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**ICS:**

| | | |
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## TV White Space Devices (TVWSD); Wireless Access Systems operating in the 470 MHz to 694 MHz TV broadcast band; Harmonised Standard for access to radio spectrum

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# Foreword

This draft Harmonised European Standard (EN) has been produced by ETSI Technical Committee Broadband Radio Access Networks (BRAN), and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

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The present document has been prepared under the Commission's standardisation request C(2015) 5376 final [i.13] 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.3].

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# Introduction

The present document covers TV band high performance Wireless Access Systems (WAS) including RLAN equipment which is used in wireless local area networks. Such networks provide high speed data communications in between devices connected to the wireless infrastructure. The present document also covers ad-hoc networking where devices communicate directly with each other, without the use of a wireless infrastructure.

The methods and principles used in the present document for the operation of TV White Space devices in the band 470 MHz to 694 MHz are taken from the ECC Report 186 [i.6], which explains the regulatory principles under which it is envisaged such devices will be permitted to operate in Europe. This approach is also explained in further detail in chapter 9 of "Dynamic White Space Spectrum Access" [i.12].

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# 1 Scope

The present document specifies technical characteristics and methods of measurements for TV White Space Devices (TVWSDs) controlled by a TV White Space DataBase (TVWSDB) and which operate in the TV broadcast band 470 MHz to 694 MHz.

The present document applies to the following radio equipment categories:

1) Primary TV white space device.

2) Secondary TV white space device.

The present document applies to TVWSDs with integral, dedicated or external antennas, where TVWSDs using external antennas is covered only in the case of fixed use.

NOTE: The relationship between the present document and essential requirements of article 3.2 of Directive 2014/53/EU [i.3] is given in annex A.

# 2 References

## 2.1 Normative references

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

[1] IETF RFC 4122 (July 2005): "A Universally Unique IDentifier (UUID) URN Namespace".

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[i.4] ETSI TR 100 028-1 (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1".

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[i.5] ETSI TR 100 028-2 (V1.4.1) (12-2001): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2".

[i.6] ECC Report 186: "Technical and operational requirements for the operation of white space devices under geo-location approach", January 2013.

[i.7] ETSI TR 102 273-2: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 2: Anechoic chamber".

[i.8] ETSI TR 102 273-3: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 3: Anechoic chamber with a ground plane".

[i.9] ETSI TR 102 273-4: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Improvement on Radiated Methods of Measurement (using test site) and evaluation of the corresponding measurement uncertainties; Part 4: Open area test site".

[i.10] ETSI TR 103 231: "White Space Devices (WSD); Wireless Access Systems operating in the 470 MHz to 790 MHz TV broadcast band; Information on weblistings of TV White Space Databases (TVWSDBs)".

[i.11] ECC Report 159: "Technical and operational requirements for the possible operation of cognitive radio systems in the "white spaces" of the frequency band 470-694 MHz", January 2011.

[i.12] William Webb and contributors: "Dynamic White Space Spectrum Access".

NOTE: Available at http://www.webbsearch.co.uk/publications/.

[i.13] 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.14] NIMA Technical Report TR8350.2 (1984, including amendment 1 of 03 January 2000 and amendment 2 of 23 June 2004): "Department of Defense World Geodetic System 1984. Its Definition and Relationships with Local Geodetic Systems".

[i.15] ITU GE06: "Final Acts of the Regional Radiocommunication Conference for planning of the digital terrestrial broadcasting service in parts of Regions 1 and 3, in the frequency bands 174-230 MHz and 470-862 MHz".

NOTE: Available at https://www.itu.int/dms_pub/itu-r/opb/act/R-ACT-RRC.14-2006-PDF-E.pdf.

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# 3 Definition of terms, symbols and abbreviations

## 3.1 Terms

For the purposes of the present document, the terms given in ECC Report 159 [i.11], Directive 2014/53/EU [i.3] and the following apply:

**Adjacent Channel Leakage Ratio (ACLR):** ratio of the in-band transmit power measured in an 8 MHz TV channel, to the out-of-band emission measured in 100 kHz in an adjacent TV channel

**altitude:** height above the reference level defined by WGS84 [i.14]

**association:** process whereby a secondary TVWSD provides its device parameters to a primary TVWSD and initially identifies itself to its serving primary TVWSD

**authentication:** ability to verify the identity of a server, and that a message was truly sent by the primary TVWSD

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**channel usage parameters:** parameters sent by a TVWSD to inform the TVWSDB of the actual radio resources that will be used by both the primary and the secondary TVWSDs

**dedicated antenna:** removable antenna supplied and assessed with the radio equipment, designed as an indispensable part of the equipment

**device emission class:** classification specified by the manufacturer that identifies the level of ACLR for the device

**device parameters:** parameters that specify the technical characteristics of an individual TVWSD, and its location

**Digital Terrestrial Television (DTT):** platform for the delivery of digital TV content via terrestrial broadcasting

**DTT channel:** 8 MHz channel in accordance with the European harmonised DTT channel raster

**external antenna:** removable antenna which is designed for use with a broad range of radio equipment and has not be designed for use with a specific product

NOTE: An external antenna is not assessed together with the equipment against the requirements of the present document.

**generic operational parameters:** transmission parameters communicated by a primary TVWSD to any secondary TVWSD within the coverage area of that primary TVWSD to allow the secondary TVWSD to operate as required

**geographic validity:** geographic area within which the operational parameters for a geo-located TVWSD are valid

**geo-location capability:** capability of a TVWSD to determine and report the latitude, longitude and altitude coordinates of its antenna

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**geo-location uncertainty:** 3D position error defined by the difference in meters between the point reported by the TVWSD device to the TVWSDB and the actual position of the TVWSD antenna

**horizontal geo-location capability:** capability of a TVWSD to determine and report the latitude and longitude coordinates of its antenna

**in-block emissions:** intended emissions that fall within a single or multiple DTT channel(s)

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**integral antenna:** antenna designed as a fixed part of the equipment, without the use of an external connector, which cannot be disconnected from the equipment by a user with the intent to connect another antenna

NOTE: An integral antenna may be fitted internally or externally. In the case where the antenna is external, a non-detachable cable can be used.

**integrity:** capability to protect messages against accidental or malicious changes during transit

**out-of-block emissions:** unwanted emissions that fall within the 470 MHz to 694 MHz band

**Packet Error Rate (PER):** number of incorrectly received data packets divided by the total number of received packets

**primary operational parameters:** transmission parameters communicated from a TVWSDB to a primary TVWSD to allow the primary TVWSD to operate as required

**primary TVWSD:** geo-located TVWSD that is able to access a TVWSDB through either a direct or an indirect connection to the Internet and to communicate with TVWSDs

**regulatory domains:** geographical area where a set of regulatory rules applies

NOTE: This is normally a country.

**reverse intermodulation attenuation:** measure of the capability of the transmitter to inhibit the generation of intermodulation signals in its non-linear components caused by the presence of the transmitter wanted signal and an unwanted signal reaching the transmitter via the antenna

**reverse intermodulation attenuation improvement:** measure of the improvement in reverse intermodulation attenuation beyond the minimum value required, as a function of in-block transmitter power

**secondary operational parameters:** transmission parameters communicated from a TVWSDB via a primary TVWSD to enable a secondary TVWSD to operate as required

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**secondary TVWSD:** TVWSD that is only able to communicate with other TVWSDs, when under the control of a primary TVWSD

**sleep mode:** mode of operation for which the TVWSD is inactive but is not powered-down

**specific operation parameters:** transmission parameters communicated from a TVWSDB to a specific TVWSD (primary or secondary), taking account of the device parameters of that specific TVWSD

**test equipment:** equipment that provides the means to operate and control a UUT for the purposes of testing against the requirements contained in the present document

**test primary TVWSD:** test equipment that emulates the functionalities of a primary TVWSD for the purposes of testing a secondary TVWSD against the requirements contained in the present document

**test secondary TVWSD:** test equipment that emulates the functionalities of a secondary TVWSD for the purposes of testing a primary TVWSD against the requirements contained in the present document

**test white space database:** test equipment that emulates the functionalities of a TVWSDB for the purposes of testing a TVWSD against the requirements contained in the present document

**time validity:** period of time when a set of operational parameters is valid, determined by the $T_{ValStart}$ and $T_{ValEnd}$ parameters contained in the said operational parameter set

**TV white spaces:** frequencies within the 470 MHz to 694 MHz band which have been identified by a TVWSDB for use by a TVWSD

**TV White Space Database (TVWSDB):** database system approved by the relevant national regulatory authority which can communicate with TVWSDs and provide information on TV white space availability

**TV White Space Device (TVWSD):** TV band high performance wireless access systems (WAS) including RLAN equipment which is used in wireless local area networks and controlled by a TVWSDB

**UHF TV band:** 470 MHz to 694 MHz band

NOTE: This corresponds to DTT channels 21 to 48

**vertical geo-location capability:** capability of a TVWSD to determine and report the altitude of its antenna

**weblisting:** publicly available Internet listing of approved TVWSDB(s) relevant to a regulatory domain, and which is hosted by, or on behalf of the national regulatory authority for that regulatory domain

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## 3.2 Symbols

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

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| $A_{ch}$ | Number of active transmit chains |
| dB | decibel |
| dBc | decibel relative to carrier |
| dBm | decibel relative to 1 milliwatt |
| dBi | decibel relative to isotropic radiator |
| f | Frequency of measurement |
| $f_c$ | Centre frequency of the assigned channel |
| $f_{l,i}$ | Frequency at the lower edge of the $i^{th}$ channel |
| $f_{u,i}$ | Frequency at the upper edge of the $i^{th}$ channel |
| $f_{un}$ | Centre frequency of the unwanted signal |
| $f_w$ | Centre frequency of the wanted signal |
| *i* | DTT channel number |
| $P_{0,i}$ | Maximum mean EIRP in a given ($i^{th}$)100 kHz channel |
| $P_{1,i}$ | Maximum mean EIRP in a given ($i^{th}$) 8 MHz channel |
| $P_{IB}$ | Measured in block EIRP spectral density over 8 MHz |
| $P_{IBk}$ | An intermediate ($k^{th}$) value of $P_{IB}$ |