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*Candidate Harmonized European Standard (Telecommunications series)*

**Electromagnetic compatibility  
and Radio spectrum Matters (ERM);  
Transmitting equipment for the  
Terrestrial - Digital Audio Broadcasting (T-DAB) service;  
Part 2: Harmonized EN under article 3.2  
of the R&TTE Directive**

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**Reference**

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DEN/ERM-TG17WG2-002-2

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**Keywords**

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audio, broadcasting, DAB, digital, radio,  
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## Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

The present document is part 2 of a multi-part deliverable covering the Electromagnetic compatibility and Radio spectrum Matters (ERM); Transmitting equipment for the Terrestrial - Digital Audio Broadcasting (T-DAB) service, as identified below:

Part 1: "Technical characteristics and test methods";

**Part 2: "Harmonized EN under article 3.2 of the R&TTE Directive".**

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC [1] (as amended) laying down a procedure for the provision of information in the field of technical standards and regulations.

The present document is intended to become a Harmonized Standard, the reference of which will be published in the Official Journal of the European Communities referencing the Directive 1999/5/EC [2] of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity ("the R&TTE Directive").

<b>National transposition dates</b>	
Date of adoption of this EN:	21 January 2005
Date of latest announcement of this EN (doa):	30 April 2005
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 October 2005
Date of withdrawal of any conflicting National Standard (dow):	31 October 2006

## Introduction

The present document is part of a set of standards designed to fit in a modular structure to cover all radio and telecommunications terminal equipment under the R&TTE Directive [2]. Each standard is a module in the structure. The modular structure is shown in figure 1.

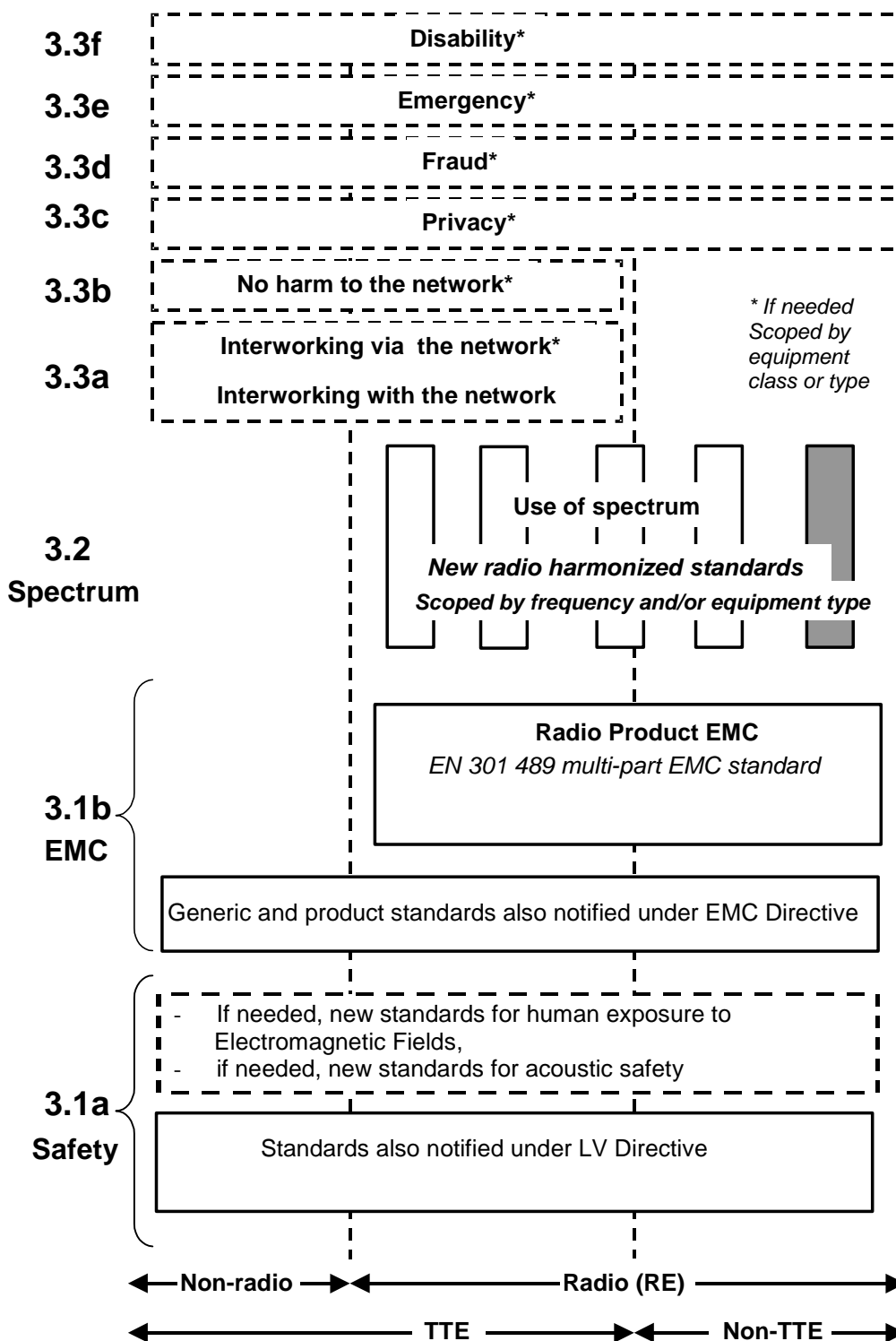


Figure 1: Modular structure for the various standards used under the R&TTE Directive [2]

The left hand edge of the figure 1 shows the different clauses of article 3 of the R&TTE Directive [2].

For article 3.3 various horizontal boxes are shown. Dotted lines indicate that at the time of publication of the present document essential requirements in these areas have to be adopted by the Commission. If such essential requirements are adopted, and as far and as long as they are applicable, they will justify individual standards whose scope is likely to be specified by function or interface type.

The vertical boxes show the standards under article 3.2 for the use of the radio spectrum by radio equipment. The scopes of these standards are specified either by frequency (normally in the case where frequency bands are harmonized) or by radio equipment type.

For article 3.1b the diagram shows EN 301 489, the multi-part product EMC standard for radio used under the EMC Directive [3].

For article 3.1a the diagram shows the existing safety standards currently used under the LV Directive [4] and new standards covering human exposure to electromagnetic fields. New standards covering acoustic safety may also be required.

The bottom of the figure shows the relationship of the standards to radio equipment and telecommunications terminal equipment. A particular equipment may be radio equipment, telecommunications terminal equipment or both. A radio spectrum standard will apply if it is radio equipment. An article 3.3 standard will apply as well only if the relevant essential requirement under the R&TTE Directive [2] is adopted by the Commission and if the equipment in question is covered by the scope of the corresponding standard. Thus, depending on the nature of the equipment, the essential requirements under the R&TTE Directive [2] may be covered in a set of standards.

The modularity principle has been taken because:

- it minimizes the number of standards needed. Because equipment may, in fact, have multiple interfaces and functions it is not practicable to produce a single standard for each possible combination of functions that may occur in an equipment;
- it provides scope for standards to be added:
  - under article 3.2 when new frequency bands are agreed; or
  - under article 3.3 should the Commission take the necessary decisions without requiring alteration of standards that are already published;
- it clarifies, simplifies and promotes the usage of Harmonized Standards as the relevant means of conformity assessment.

Other document directly associated with the present document:

- EN 302 077-1 [5];
- EN 301 489-11 [6].

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# 1 Scope

The present document applies to the following radio telecommunications terminal equipment types:

- Terrestrial - Digital Audio Broadcast equipment used in the sound broadcasting service.

NOTE 1: At the time the present document was drafted the following bands were allocated to T-DAB (Wiesbaden agreement, Maastricht agreement (see bibliography)):

- 47 MHz to 68 MHz;
- 174 MHz to 240 MHz;
- 1 452 MHz to 1 492 MHz.

The present document is intended to cover the provisions of article 3.2 of Directive 1999/5/EC [2] (R&TTE Directive), which states that "... radio equipment shall be so constructed that it effectively uses the spectrum allocated to terrestrial/space radio communications and orbital resources so as to avoid harmful interference".

In addition to the present document, other ENs that specify technical requirements in respect of essential requirements under other parts of article 3 of the R&TTE Directive [2] may apply to equipment within the scope of the present document.

NOTE 2: A list of such ENs is included on the ETSI web site at <http://www.etsi.org>.

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# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest 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>.

- [1] Directive 98/34/EC of the European Parliament and of the Council of 22 June 1998 laying down a procedure for the provision of information in the field of technical standards and regulations.
- [2] Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity (R&TTE Directive).
- [3] Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility (EMC Directive).
- [4] Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits (LV Directive).
- [5] ETSI EN 302 077-1: "Electromagnetic compatibility and Radio spectrum Matters (ERM); Transmitting equipment for the Terrestrial - Digital Audio Broadcasting (T-DAB) service; Part 1: Technical characteristics and test methods".
- [6] ETSI EN 301 489-11: "Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 11: Specific conditions for terrestrial sound broadcasting service transmitters".

- [7] CENELEC EN 55022: "Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement".
- [8] CENELEC EN 55011: "Industrial, scientific and medical (ISM) radio-frequency equipment - Radio disturbance characteristics - Limits and methods of measurement".
- [9] IEC 60489-1 amendment 2: "Methods of measurement for radio equipment used in the mobile services. Part 1: General definitions and standard conditions of measurement".
- [10] ETSI TR 100 028 (all parts): "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics".

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## 3 Definitions, symbols and abbreviations

### 3.1 Definitions

For the purposes of the present document, the terms and definitions given in the R&TTE Directive [2] and the following apply:

**antenna port:** port of an apparatus which is designed, in normal operation, to be connected to an antenna using coaxial cable

**broadcasting service:** radiocommunication service in which the transmissions are intended for direct reception by the general public

NOTE: This service may include sound transmissions, television transmissions or other types of transmission.

**cabinet radiation:** radiation from an enclosure containing, equipment, excluding radiation from connected antennas or cables

**class of emission:** set of characteristics of an emission, designated by standard symbols, e.g. type of modulation of the main carrier, modulating signal, type of information to be transmitted, and also, if appropriate, any additional signal characteristics

**dBc:** decibels relative to the unmodulated carrier power of the emission

NOTE: In the cases which do not have a carrier, for example in some digital modulation schemes where the carrier is not accessible for measurement, the reference level equivalent to dBc is decibels relative to the mean power P.

**enclosure port:** physical boundary of the apparatus through which electromagnetic fields may radiate or impinge

NOTE: In the case of integral antenna equipment, this port is inseparable from the antenna port.

**environmental profile:** the range of environmental conditions under which equipment within the scope of the present document is required to comply with the provisions of the present document

**exclusion band:** band of radio frequencies where no measurements are made

**harmonic:** component of order greater than 1 of the Fourier series of a periodic quantity

**harmonic number:** integral number given by the ratio of the frequency of a harmonic to the fundamental frequency (2<sup>nd</sup> harmonic = 2 x fundamental frequency)

**intermodulation products:** unwanted frequencies resulting from intermodulation between carriers or harmonics of emission, or between any oscillations generated to produce the carrier

**L-band:** for the purpose of these document L-band is defined as the frequency range from 1 452 MHz to 1 492 MHz

**mean power:** average power supplied to the antenna port by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation envelope taken under normal operating conditions



**necessary bandwidth:** for a given class of emission, the width of the frequency band which is sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions

**out-of-band emissions:** emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emissions

**rated output power:** power that the transmitter or transposer shall deliver at its output under specified conditions of operation

**reference bandwidth:** bandwidth in which the spurious and out-of-band emission levels are specified

**spurious emissions:** emissions on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out-of-band emissions.

**unwanted emissions:** consist of spurious emissions and out-of-band emissions

## 3.2 Symbols

For the purposes of the present document, the following symbol applies:

μ                      micro

## 3.3 Abbreviations

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

COFDM	Coded Orthogonal Frequency Division Multiplex
EUT	Equipment Under Test
IEC	International Electrotechnical Commission
m	metre
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
T-DAB	Terrestrial - Digital Audio Broadcast
VHF	Very High Frequency
W	Watt

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# 4 Technical requirements specifications

## 4.1 Environmental profile

The environmental profile for operation of the equipment shall be declared by the supplier. The equipment shall comply with all the technical requirements of the present document at all times when operating within the boundary limits of the required operational environmental profile.

## 4.2 Antenna port measurements

### 4.2.1 Spurious emissions

#### 4.2.1.1 Definition

Emission on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products but exclude out of band emissions.

For the purposes of the present document spurious emissions are emissions at frequencies outside the frequency range  $f_0 \pm 3$  MHz, where  $f_0$  is the centre frequency of the transmission, irrespective of the number of carriers employed.

#### 4.2.1.2 Method of measurement (essential test suite)

##### 4.2.1.2.1 Initial conditions

Test environment:

The normal operating environment, as declared by the equipment manufacturer.

Test frequencies:

- a) the lowest operating frequency of the EUT;
- b) the highest operating frequency of the EUT;
- c) a frequency mid-way between a) and b) above.

Test arrangement: (see figure A.1)

- 1) all ports unused at the time of testing shall be correctly terminated;
- 2) connect the EUT to the Test Load, via the Coupling Device or via the attenuator;
- 3) connect the measuring device to the Coupling Device or attenuator.

##### 4.2.1.2.2 Procedure

- 1) operate the EUT at each of the test frequencies as defined in clause 4.2.1.2.1;
- 2) measure the results on the Spectrum Analyser.

##### 4.2.1.2.3 Test requirements

The results obtained shall be compared to the limits in clause 4.2.1.3 in order to demonstrate compliance.

#### 4.2.1.3 Limit

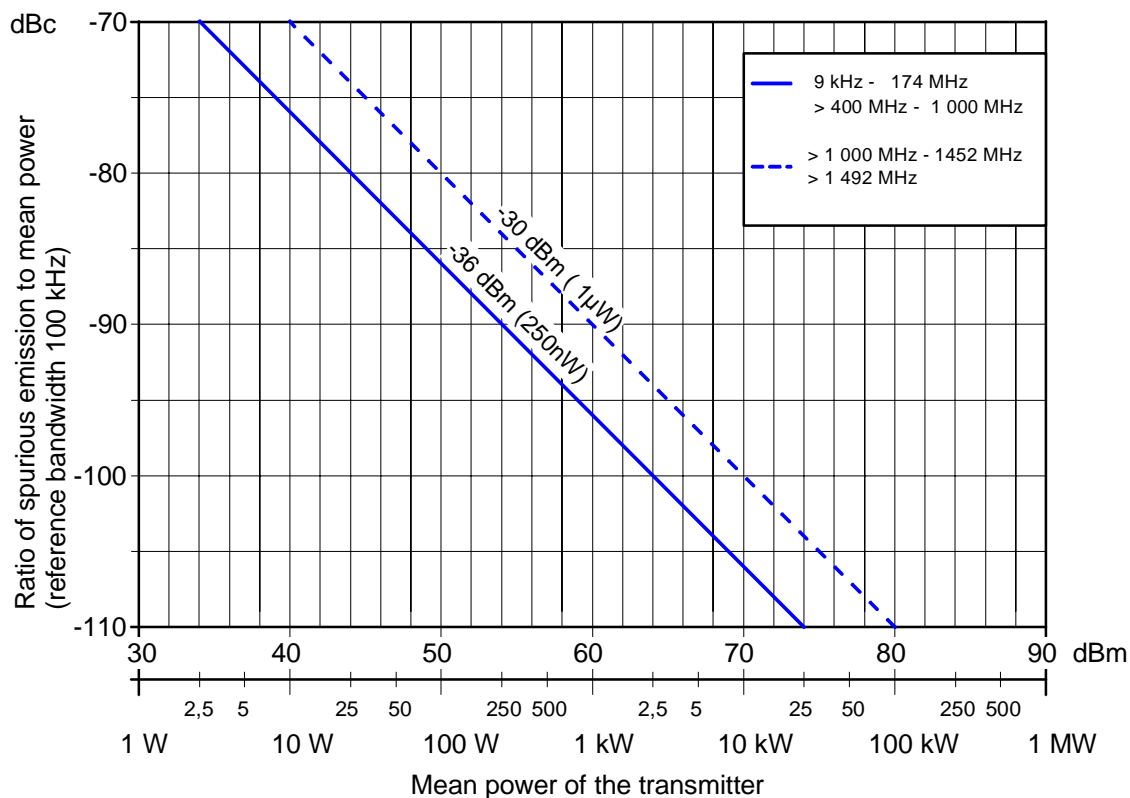
Spurious emissions shall not exceed the values set out in table 4.1, shown additionally in figures 4.1 and 4.2, for the frequency range 9 kHz to 1 GHz or 3<sup>rd</sup> Harmonic whichever is higher.

NOTE: In the case of a T-DAB transmitter supplied without an internal bandpass output filter, the manufacturer shall specify the characteristics of the filter necessary to fulfil the spurious emission limits defined in table 4.1. The manufacturer shall include this information in their test report.

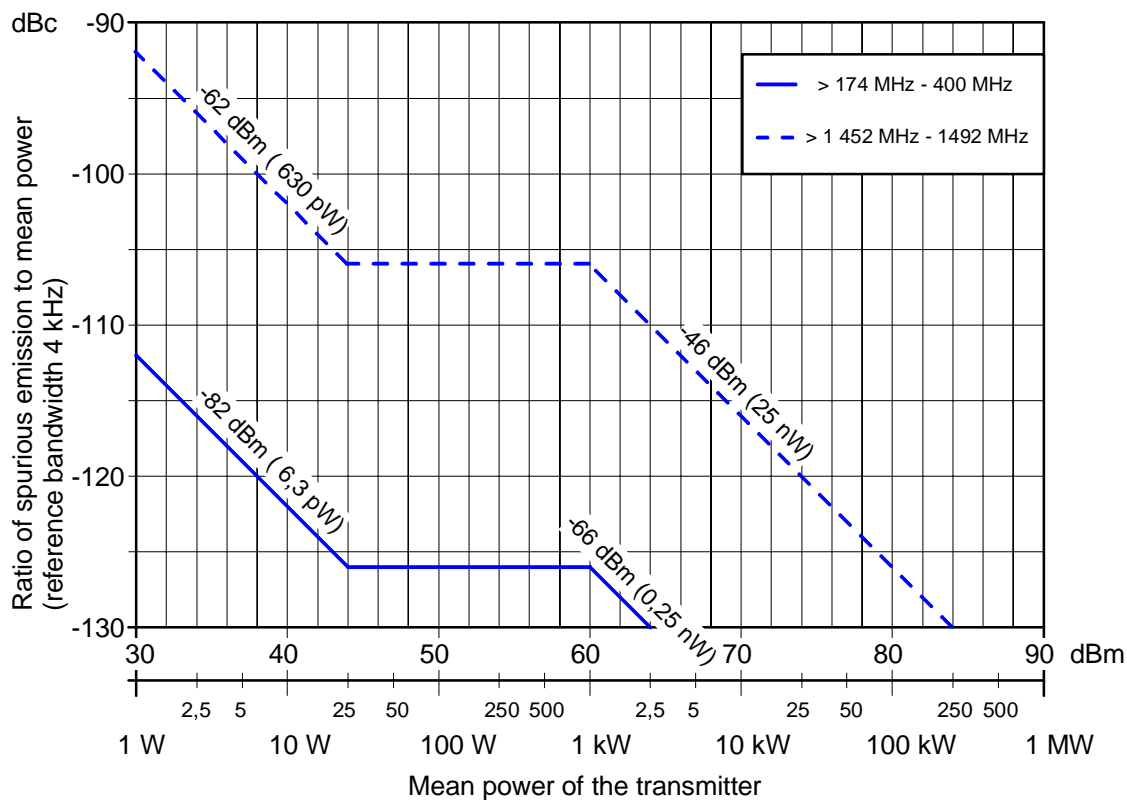
**Table 4.1: Spurious emissions limits**

Frequency range of the spurious emission (MHz)	Limits of the spurious emission	Reference bandwidth (kHz)	Figure
9 kHz - 174	-36 dBm (250 nW)	100	4.1
> 174 - 400	-82 dBm, for $P \leq 25$ W -126 dBc, for $25$ W < $P \leq 1\ 000$ W -66 dBm, for $1\ 000$ W < $P$	4	4.2
> 400 - 1 000	-36 dBm (250 nW)	100	4.1
> 1 000 - 1 452	-30 dBm (1 $\mu$ W)	100	4.1
> 1 452 - 1 492	-62 dBm, for $P \leq 25$ W -106 dBc, for $25$ W < $P \leq 1\ 000$ W -46 dBm, for $1\ 000$ W < $P$	4	4.2
> 1 492	-30 dBm (1 $\mu$ W)	100	4.1

NOTE: P = mean power of the transmitter.



**Figure 4.1: Spurious emissions limits for T-DAB transmitters (100 kHz reference bandwidth)**



**Figure 4.2: Spurious emissions limits for T-DAB transmitters (4 kHz reference bandwidth)**

## 4.2.2 Out-of-band emissions

### 4.2.2.1 Definition

Emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excludes spurious emissions.

For the purposes of the present document out-of-band emissions are emissions at frequencies outside the necessary bandwidth and within the frequency range  $f_0 \pm 3$  MHz, where  $f_0$  is the centre frequency of the transmission, irrespective of the number of carriers employed.

### 4.2.2.2 Method of measurement (essential test suite)

#### 4.2.2.2.1 Initial conditions

Test environment:

The normal operating environment, as declared by the equipment manufacturer.

Test frequencies:

- a) the lowest operating frequency of the EUT;
- b) the highest operating frequency of the EUT;
- c) a frequency mid-way between a) and b) above.

Test arrangement: (see figure A.2).

#### 4.2.2.2.2 Procedure

- 1) all ports unused at the time of testing shall be correctly terminated;
- 2) operate the EUT at each of the test frequencies as defined in clause 4.2.2.2.1 and in each relevant T-DAB operating mode;
- 3) measure the results on the Spectrum Analyser.

#### 4.2.2.2.3 Test requirements

The results obtained shall be compared to the limits in clause 4.2.2.3 in order to demonstrate compliance.

### 4.2.2.3 Limit

Out-of-band emissions shall not exceed the limits specified in tables 4.2 and 4.3, additionally shown in figures 4.3 and 4.4.

Out-of-band emissions limits are given as mean power level measured in a 4 kHz bandwidth, where 0 dB corresponds to the mean output power.

Unless otherwise declared by the manufacturer it shall be assumed that the EUT conforms to the non-critical case (case2).

- Case 1: The solid line mask shall apply to VHF T-DAB transmitters operating in areas critical for adjacent channel T-DAB to T-DAB interference, and in any case when it is necessary to protect other services operating on adjacent frequencies on a primary basis.
- Case 2: The dashed line mask shall apply to VHF T-DAB transmitters in other cases and to 1,5 GHz T-DAB transmitters.
- Case 3: The solid line mask shall apply to VHF T-DAB transmitters in exceptional circumstances to protect safety services.

Case 4: The chain dotted line mask shall apply to VHF T-DAB transmitters operating in channel 12D and on a case by case basis in certain areas.

NOTE: In the case of a T-DAB transmitter supplied without an internal bandpass output filter, the manufacturer shall specify the characteristics of the filter necessary to fulfil the out-of-band emission masks defined in tables 4.2 and 4.3. The manufacturer shall include this information in their test report.

**Table 4.2: Transmitters operating with output power between 25 W and 1 000 W**

Classification accordingly the frequency assignment	1,54 MHz block, frequency difference from the centre frequency (MHz)	Relative level
		(dBc)
VHF T-DAB transmitters operating in uncritical cases or in the L-band (case 2)	±0,97	-26
	±0,97	-56
	±3,0	-106
VHF T-DAB transmitters operating in critical cases (case 1)	±0,77	-26
	±0,97	-71
	±1,75	-106
	±3,0	-106
VHF T-DAB transmitters operating in exceptional circumstances to protect safety services (case 3)	±0,77	-26
	±0,97	-71
	±2,2	-126
	±3,0	-126
VHF T-DAB transmitters operating in the channel 12D and certain areas (case 4)	±0,77	-26
	±0,97	-78
	±2,2	-126
	±3,0	-126

**Table 4.3: Transmitters operating with output power < 25W and > 1 000 W**

Classification accordingly the frequency assignment	1,54 MHz block, frequency difference from the centre frequency (MHz)	Absolute level (dBm)	
		for transmitter with output power	
		< 25 W	> 1 000 W
VHF T-DAB transmitters operating in uncritical cases or in the L- band (case 2)	±0,97	18	34
	±0,97	-12	4
	±3,0	-62	-46
VHF T-DAB transmitters operating in critical cases (case 1)	±0,77	18	34
	±0,97	-27	-11
	±1,75	-62	-46
	±3,0	-62	-46
VHF T-DAB transmitters operating in exceptional circumstances to protect safety services (case 3)	±0,77	18	-34
	±0,97	-27	-11
	±2,2	-82	-66
	±3,0	-82	-66
VHF T-DAB transmitters operating in the channel 12D and certain areas (case 4)	±0,77	18	-34
	±0,97	-34	-18
	±2,2	-82	-66
	±3,0	-82	-66

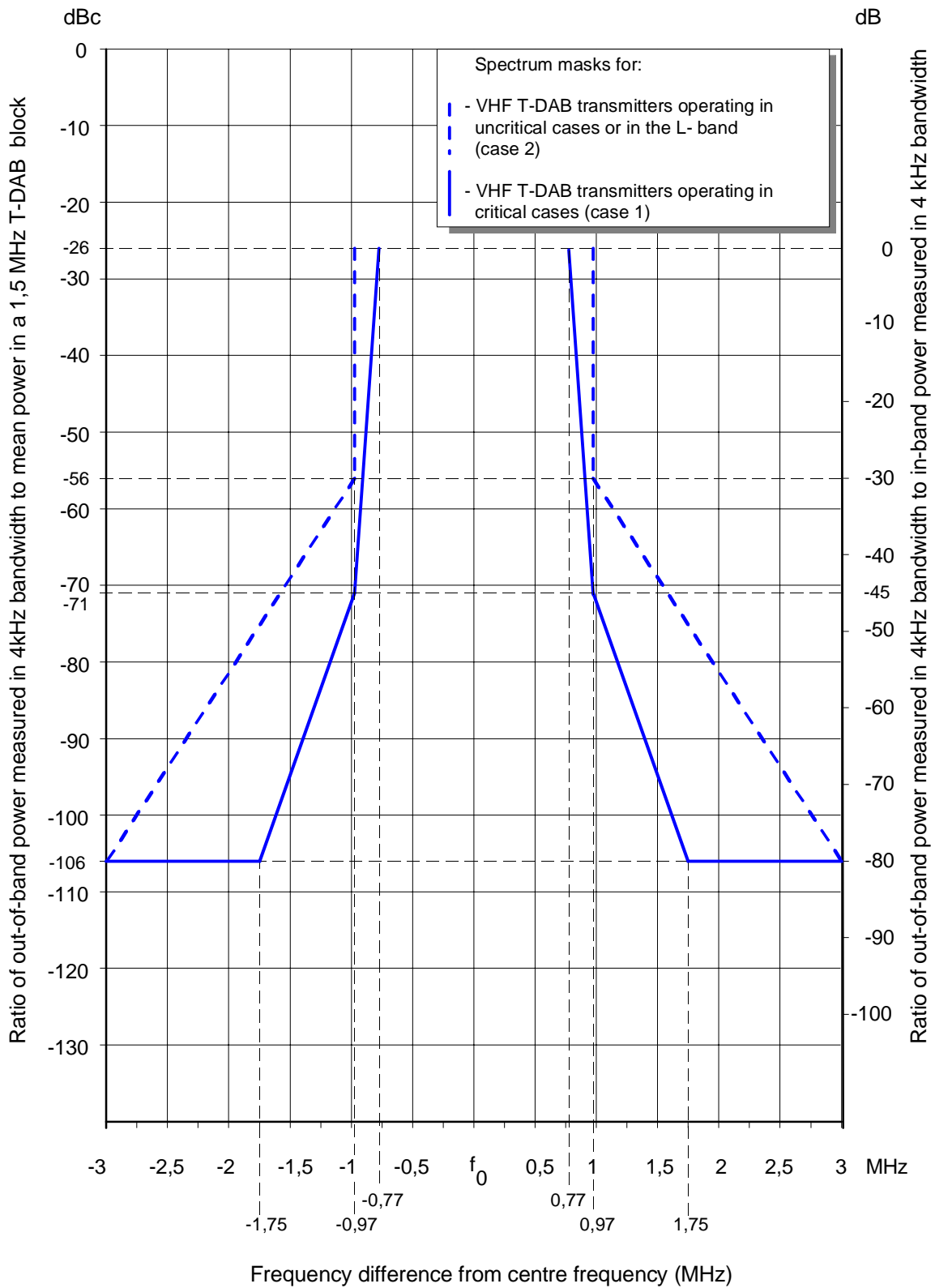


Figure 4.3: Spectrum masks for T-DAB out-of-band emissions (case 1 and case 2)

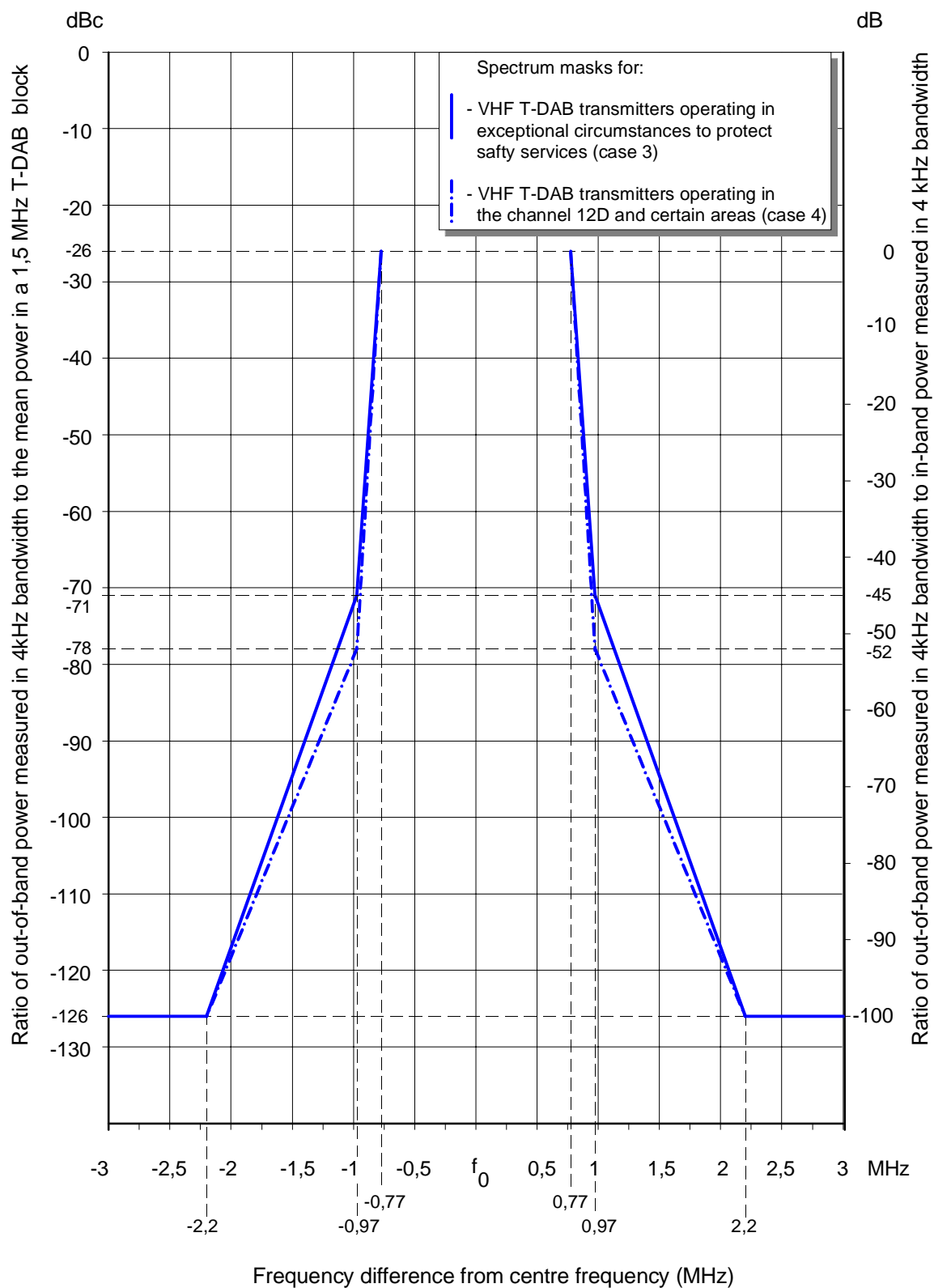


Figure 4.4: Spectrum masks for T-DAB out-of-band emissions (case 3 and case 4)

## 4.3 Enclosure port measurements (radiated emissions)

### 4.3.1 Cabinet radiation

#### 4.3.1.1 Definition

Emissions from the equipment, radiated from the enclosure port, other than those present at the antenna port.

#### 4.3.1.2 Method of test (essential test suite)

##### 4.3.1.2.1 Initial conditions

Test environment:

The normal operating environment, as declared by the equipment manufacturer.

Test frequencies:

- a) the lowest operating frequency of the EUT;
- b) the highest operating frequency of the EUT;
- c) a frequency mid-way between a) and b) above.

Test arrangement: (see figure A.3).

For the purposes of this test no test signal is required, the manufacturer shall ensure that the full rated output power of the transmitter will be maintained during this test.

##### 4.3.1.2.2 Procedure

The test method shall be in accordance with EN 55022 [7], unless physical size is a restriction, in which case the test method shall be in accordance with EN 55011 [8].

- measurements shall be made outside the exclusion band (see table 4.4);
- measurements shall be made in the operational mode producing the largest emission in the frequency band being investigated consistent with normal applications;
- the equipment shall be configured in a manner which is representative of a normal/typical operation, where practical;
- an attempt shall be made to maximize the detected radiated emission, e.g. by moving the cables of the equipment;
- the configuration and mode of operation during measurements shall be precisely noted in the test report;
- RF input/output ports shall be correctly terminated;
- the tests shall be carried out at a point within the specified normal operating environmental range and at the rated supply voltage for the equipment.

##### 4.3.1.2.3 Test requirements

The results obtained shall be compared to the limits in clause 4.3.1.3 in order to demonstrate compliance.



### 4.3.1.3 Limit

Radiated emissions shall not exceed the values set out in table 4.4, shown additionally in figure 4.5, for the frequency range 30 MHz to the upper limit.

This test shall be performed at a distance of 10 m, where feasible. When size and/or power requirements necessitate testing in a manufacturing facility, other distances may be used (see notes 1 to 3). Tests shall not be carried out in the exclusion band (see note 2 in table 4.4).

**Table 4.4: Cabinet radiation limits**

Quasi-peak limits (dB $\mu$ V/m) at 10 m (see notes 1 and 2)	Frequency range
$30 \text{ dB}\mu\text{V/m} \leq 60 + 10 \log_{10} (P_0/2\ 000) \leq 70 \text{ dB}\mu\text{V/m}$	30 MHz to 230 MHz
$37 \text{ dB}\mu\text{V/m} \leq 67 + 10 \log_{10} (P_0/2\ 000) \leq 77 \text{ dB}\mu\text{V/m}$	> 230 MHz to Upper limit
NOTE 1: $P_0$ = RF output power in W.	
NOTE 2: The exclusion band for the transmitter extends from $F_c - 3$ MHz to $F_c + 3$ MHz, where $F_c$ is the operating frequency in MHz.	
NOTE 3: Upper frequency limit = 1 GHz or 3 <sup>rd</sup> Harmonic, whichever is higher.	

NOTE 1: The measurements can be carried out at other distances. In that case limits are modified according to the relation:

$$L(x) = L(10\text{m}) + 20 \log (10/x) \quad \text{where } x = \text{distance in meter (m)}.$$

NOTE 2: Care should be taken if measuring at test distances below 10 m as this may be in the near field.

NOTE 3: In cases of dispute the measurement distance of 10 m shall take precedence.

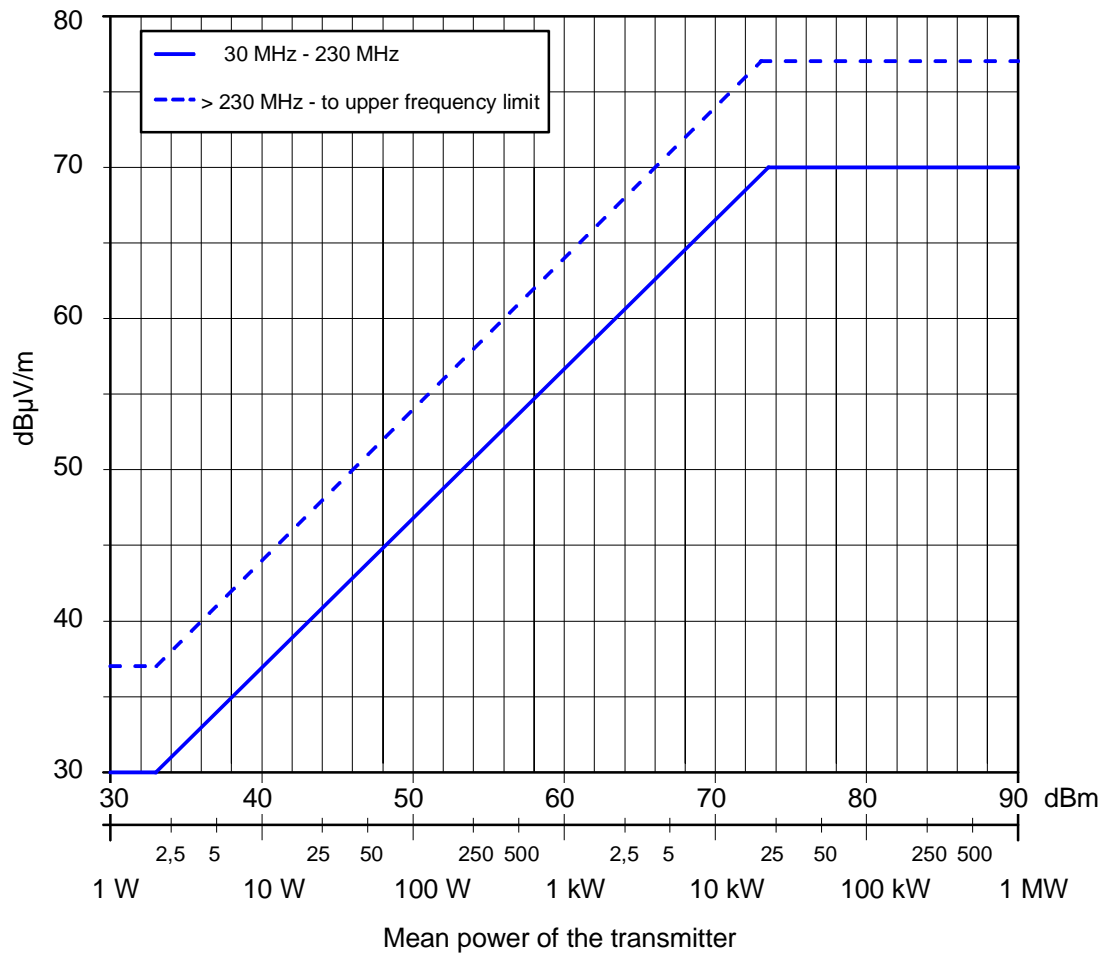


Figure 4.5: Cabinet radiation limits for T-DAB transmitters

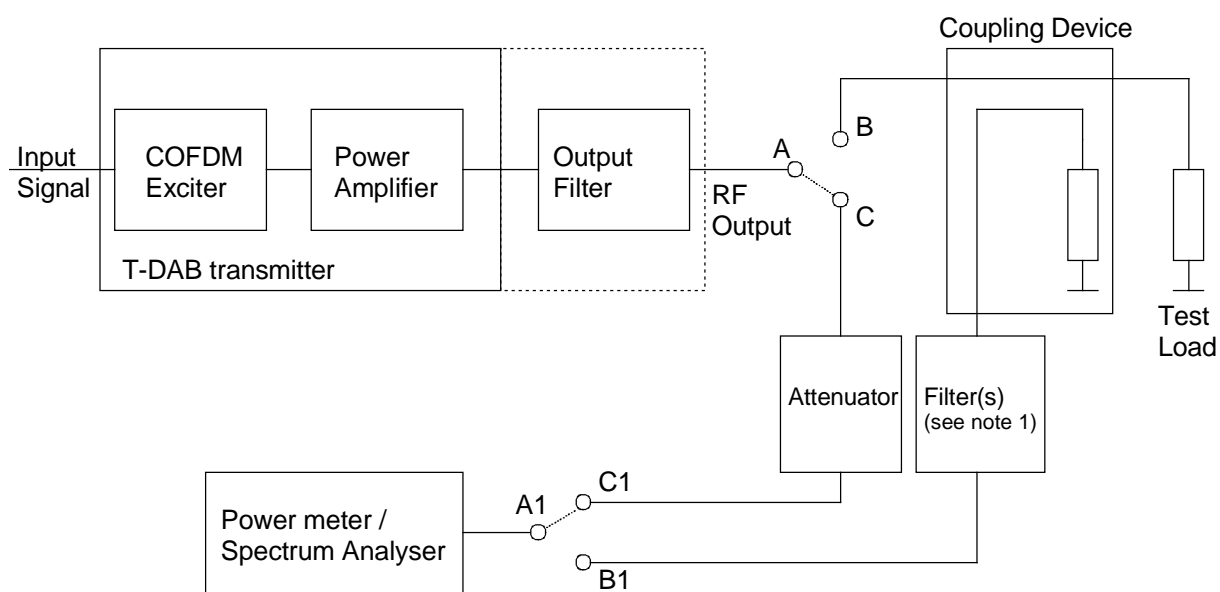
## 4.4 Measurement uncertainties

Measurement uncertainty should be calculated and techniques employed to minimize its range. This uncertainty should be applied to the limit and any measurement falling below the range is deemed acceptable [10].

## Annex A (normative): General measuring arrangements

### A.1 Testing arrangements for antenna port measurements

#### A.1.1 Spurious emissions



NOTE 1: The optional filter should suppress the output signal so that no intermodulation products are generated by the spectrum analyser. The insertion loss throughout the measuring range should be known.

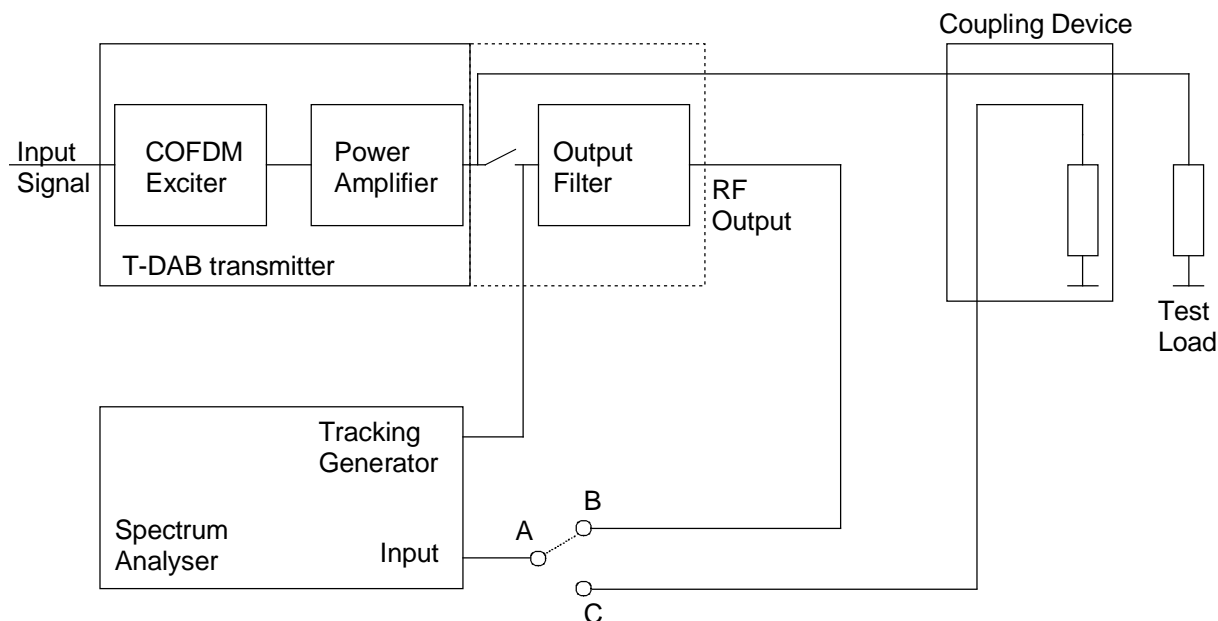
NOTE 2: For high power transmitters the preferred set up would require A to be connected to B and A1 to be connected to B1.

NOTE 3: For low power transmitters the preferred set up would require A to be connected to C and A1 to be connected to C1.

NOTE 4: If the transmitter does not include any output filter, an external filter shall be added after the transmitter for the testing arrangement. This filter shall be representative of the multiplexer or filter existing in operational conditions and viewed by the transmitted output when installed. In this case, the antenna port measurements shall be performed at the output of this extra filter.

**Figure A.1: Testing arrangement for spurious emissions**

## A.1.2 Out-of-band emissions



NOTE 1: Disconnect the power amplifier from the output filter.

NOTE 2: The frequency response of the output filter must be measured and recorded (connection A-B).

NOTE 3: The spectrum of the T-DAB signal at the output of the power amplifier must be measured and recorded (connection A-C).

NOTE 4: The out-of-band spectrum of the T-DAB signal shall be calculated by applying the recorded frequency response of the output filter to the recorded spectrum of the T-DAB signal.

NOTE 5: If the transmitter does not include any output filter, an external filter shall be added after the transmitter for the testing arrangement. This filter shall be representative of the multiplexer or filter existing in operational conditions and viewed by the transmitted output when installed. In this case, the antenna port measurements shall be performed at the output of this extra filter.

**Figure A.2: Testing arrangement for out-of-band emissions**

## A.1.3 Test frequency range

Limits on unwanted emissions for radio equipment are considered to be applicable to the range 9 kHz to 300 GHz. However, for practical measurement purposes, the frequency range of spurious emissions may be restricted. As guidance for practical purposes, the following measurement parameters in table A.1 are recommended.

**Table A.1: Test frequency range**

Transmitter fundamental frequency range	Unwanted emission frequency measurement range	
	lower frequency	upper frequency
47,936 MHz to 1 492 MHz	9 kHz	1 GHz or 3 <sup>rd</sup> Harmonic whichever is higher

The following reference bandwidths are to be used:

For Spurious Emissions:

- 100 kHz between 9 kHz and 174 MHz;
- 4 kHz between 174 MHz and 400 MHz;
- 100 kHz between 400 MHz and 1 452 MHz;

- 4 kHz between 1 452 MHz and 1 492 MHz;
- 100 kHz above 1 492 MHz.

For Out-of- band Emissions:

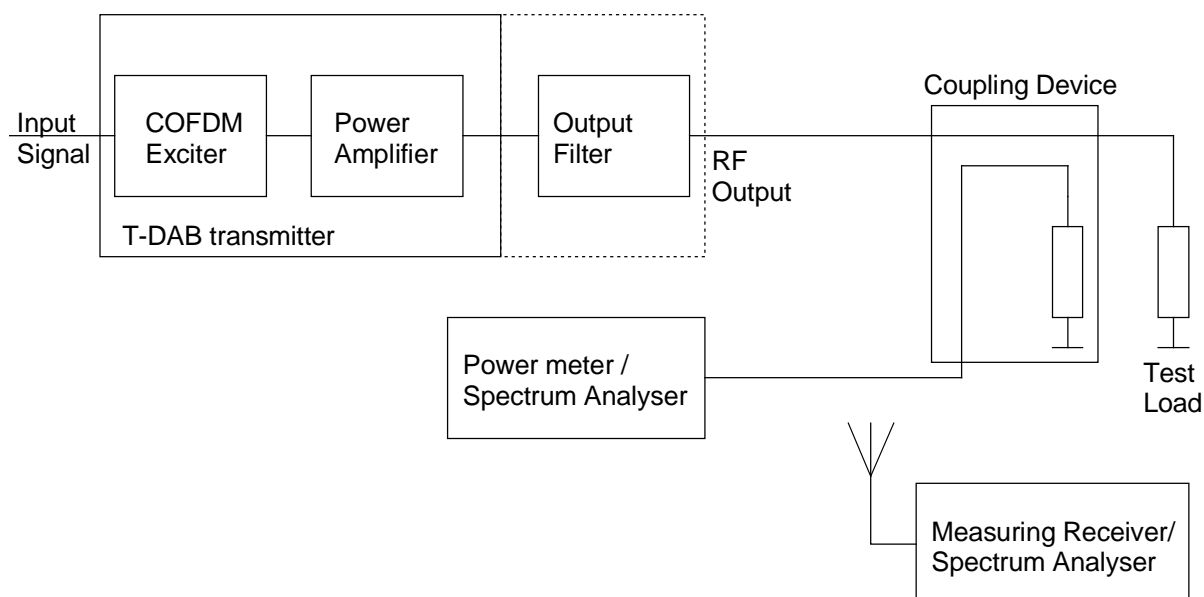
- 4 kHz.

### A.1.4 Test modulating signal

No special test signal is required, however an input signal should be provided, according to the specification of the transmitter, to obtain a valid T-DAB output signal.

## A.2 Testing arrangements for enclosure port (radiated emissions) measurements

Further guidance can be found in IEC 60489-1 amendment 2 [9].



NOTE: If the transmitter does not include any output filter, an external filter shall be added after the transmitter for the testing arrangement. This filter shall be representative of the multiplexer or filter existing in operational conditions and viewed by the transmitted output when installed.

**Figure A.3: Testing arrangement for cabinet radiation**

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## Annex B (informative): Bibliography

ETSI EN 300 401: "Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers".

CEPT/ERC/REC 74-01: "Spurious emissions".

ITU-R Recommendation SM 329-9: "Spurious emissions".

ITU-R Recommendation SM.328-10: "Spectra and bandwidth of emissions".

ITU-R Recommendation SM 1541: "Unwanted emissions in the Out-of-band domain".

ETSI ETR 290: "Digital Video Broadcasting (DVB); Measurement guidelines for DVB systems".

IEC 60244-1: "Methods of measurement for radio transmitters - Part 1: General characteristics for broadcast transmitters".

IEC 60244-6: "Methods of measurement for radio transmitters. Part 6: Cabinet radiation at frequencies between 130 kHz and 1 GHz".

IEC 61000-4-3/Am1 (2002): "Electromagnetic compatibility (EMC) Part 4-3: Testing and measurement techniques - Radiated, radio frequency, electromagnetic field immunity test".

The CEPT T-DAB planning meeting, Wiesbaden, 3rd to 21st July 1995; FINAL ACTS of the CEPT T-DAB Planning Meeting.

FINAL ACTS of the CEPT T-DAB Planning Meeting (4) Maastricht, 2002 Special Arrangement of the European Conference of Postal and Telecommunications Administrations (CEPT) relating to the use of the band 1 452 MHz - 1 479,5 MHz for Terrestrial Digital Audio Broadcasting (T-DAB).

## Annex C (informative): The EN title in the official languages

Language	EN title
Czech	Elektromagnetická kompatibilita a rádiové spektrum (ERM) – Přenosové zařízení pro službu zemského digitálního rozhlasového vysílání (T-DAB) – Část 2: Harmonizovaná EN podle článku 3.2 Směrnice R&TTE
Danish	
Dutch	
English	Electromagnetic compatibility and Radio spectrum Matters (ERM); Transmitting equipment for the Terrestrial - Digital Audio Broadcasting (T-DAB) service; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive
Estonian	Elektromagnetilise ühilduvuse ja raadiospektri küsimused (ERM); Maapealse digitaalse raadioringhäälingusüsteemi (T-DAB) raadiosaateseadmed; Osa 2: Harmoneeritud EN R&TTE direktiivi artikli 3.2 alusel
Finnish	
French	CEM et spectre radioélectrique (ERM); Equipements de transmission pour la diffusion du service de radio numérique terrestre (T-DAB); Partie 2: EN harmonisée couvrant l'article 3.2 de la Directive R&TTE
German	Elektromagnetische Verträglichkeit und Funkspektrumangelegenheiten (ERM), Sendertechnische Einrichtungen für den terrestrischen digitalen Ton-Rundfunkdienst (T-DAB); Teil2: Harmonisierte EN nach Artikel 3.2 der R&TTE Richtlinie
Greek	
Hungarian	Elektromágneses összeférhetőségi és rádióspektrumügyek (ERM). Földfelszíni digitális hangműsorszóró szolgálat (T-DAB) adóberendezése. 2. rész: Az R&TTE-irányelv 3.2. cikkelye alá tartozó, harmonizált európai szabvány
Icelandic	
Italian	
Latvian	
Lithuanian	
Maltese	
Polish	Kompatybilność Elektromagnetyczna i Zagadnienia Widma Radiowego (ERM) - Urządzenia nadawcze naziemnej radiofonii cyfrowej - Zharmonizowana EN zgodna z artykułem 3.2 dyrektywy R&TTE
Portuguese	
Slovak	Elektromagnetická kompatibilita a závislosti rádiového spektra (ERM). Vysielacie zariadenia na pozemské digitálne rozhlasové vysielanie (T-DAB). Časť 2: Harmonizovaná EN podľa článku 3.2 smernice R&TTE
Slovenian	Elektromagnetna združljivost in zadeve v zvezi z radijskim spektrom (ERM) - Oddajniška oprema za prizemno digitalno zvokovno radiodifuzijo (T-DAB) - 2. del: Harmonizirani EN v skladu s členom 3.2 direktive R&TTE
Spanish	
Swedish	

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## History

<b>Document history</b>			
V1.1.1	April 2004	Public Enquiry	PE 20040827: 2004-04-28 to 2004-08-27
V1.1.1	November 2004	Vote	V 20050121: 2004-11-22 to 2005-01-21
V1.1.1	January 2005	Publication	