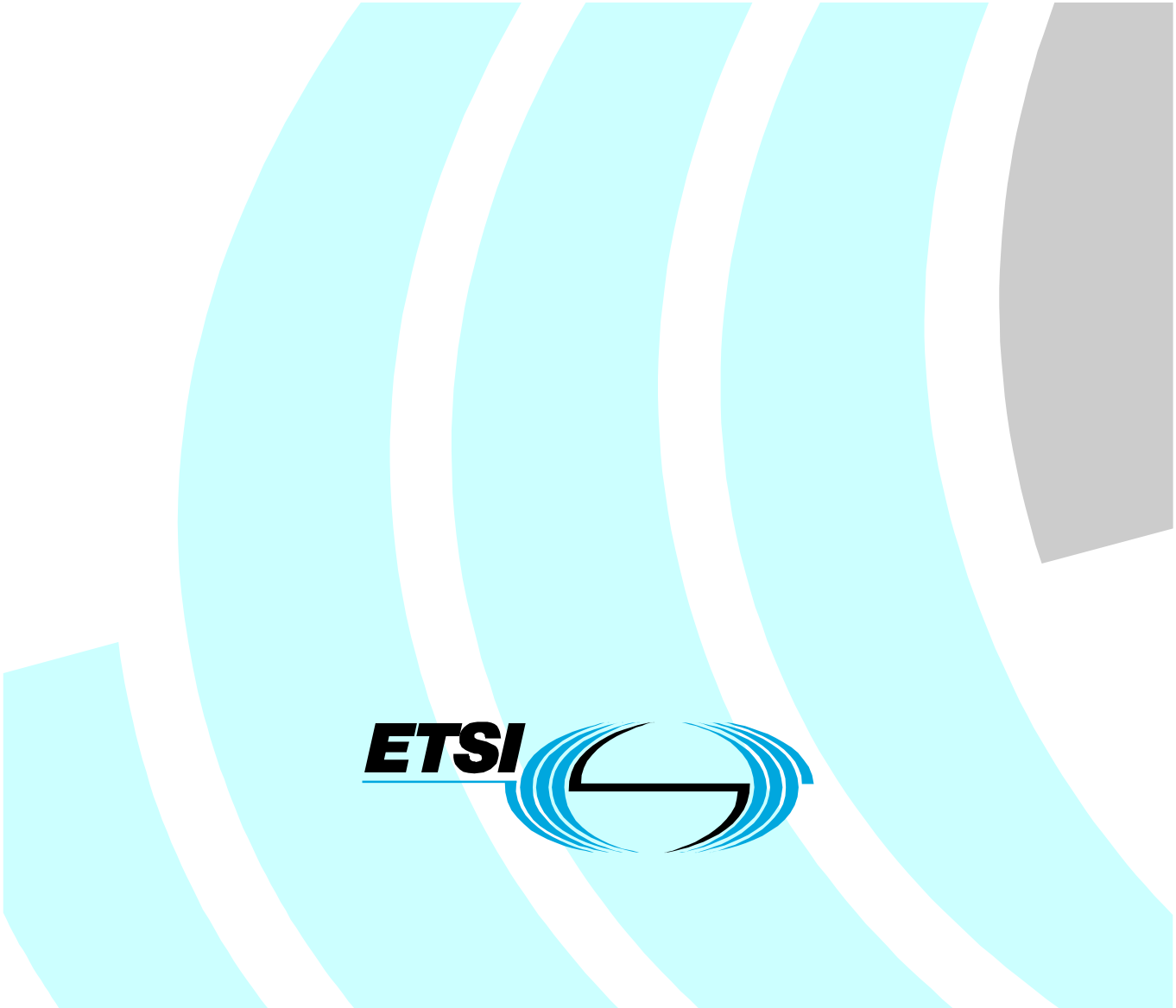
Final draft ETSI EN 301 997-2 V1.1.1 (2003-07)

Candidate Harmonized European Standard (Telecommunications series)

**Transmission and Multiplexing (TM);
Multipoint equipment;
Radio equipment for use in
Multimedia Wireless Systems (MWS)
in the frequency band 40,5 GHz to 43,5 GHz;
Part 2: Essential requirements under article 3.2
of the Directive 1999/5/EC**



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Foreword

This Candidate Harmonized European Standard (Telecommunications series) has been produced by ETSI Technical Committee Transmission and Multiplexing (TM), and is now submitted for the Vote phase of the ETSI standards Two-step Approval Procedure.

The present document has been produced by ETSI in response to a mandate from the European Commission issued under Council Directive 98/34/EC (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 [1] 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").

The present document is part 2 of a multi-part deliverable covering the Transmission and Multiplexing (TM); Multipoint equipment; Radio equipment for use in Multimedia Wireless Systems (MWS) in the frequency band 40,5 GHz to 43,5 GHz, as identified below:

Part 1: "General requirements";

Part 2: "Essential requirements under article 3.2 of the Directive 1999/5/EC".

Multimedia Wireless Systems (MWS) in the band 40,5 GHz to 43,5 GHz are described in EN 301 997-1 [13]. Antenna systems suitable for use in MWS are described in EN 301 215-3 [3].

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	18 months after doa

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 [1]. Each standard is a module in the structure. The modular structure is shown in figure 1.

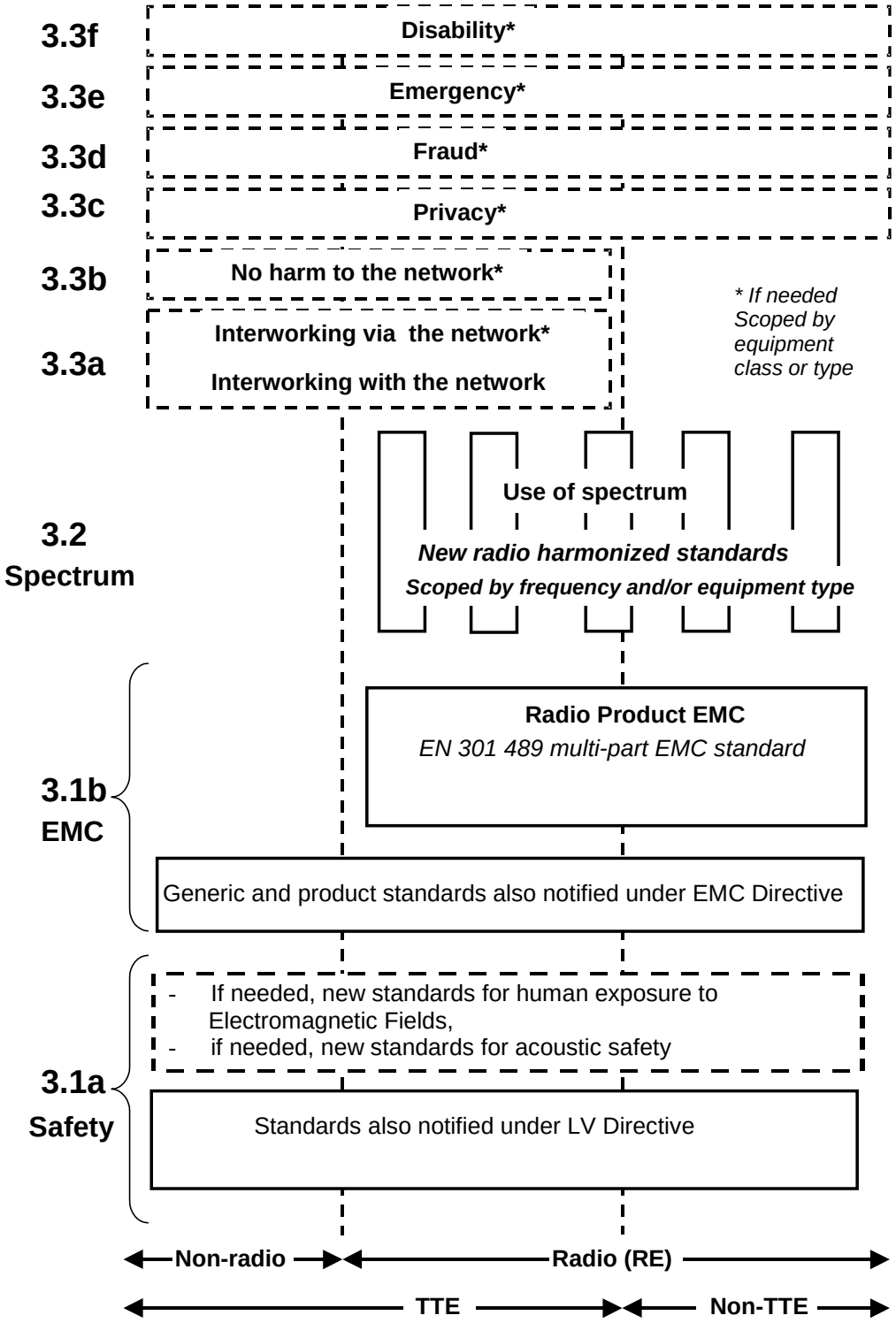

Figure 1: Modular structure for the various standards used under the R&TTE directive

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

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.

For article 3.1a the diagram shows the existing safety standards currently used under the LV Directive 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 [1] 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 [1] 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.

1 Scope

The present document applies to Multimedia Wireless Systems (MWS) in the band 40,5 GHz to 43,5 GHz, which operate in block assignments, according to ECC/REC 01-04 [19]. It includes those parameters considered to be essential under article 3.2 of the Directive 1999/5/EC [1], 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". Where equipment is intended for operation other than as specified in ECC/REC 01-04 [19] there may be additional requirements outside the scope of the present document.

The relevant equipment parameters in EN 301 997-1 [13] are referenced as well as antenna parameters in EN 301 215-3 [3]. These standards also contain other requirements that are not considered essential for the R&TTE Directive [1], but are nevertheless recommended on a voluntary basis to meet relevant network performance objectives as defined by international standardizing bodies.

A wide range of Multimedia Wireless Systems (MWS) is possible. The present document covers a range of alternatives, for which the access methods and corresponding test requirements are specified in available relevant ETSI standards and referred to in EN 301 997-1 [13]. Similarly, antennas other than those specified in available and relevant ETSI standards may also be proposed.

A range of antenna and equipment types and corresponding test methods are covered by the present document. However, it should be noted that, national regulatory bodies, according to article 7.2 of Directive 1999/5/EC [1] may, for the purpose of local licensing, limit the options permitted.

For system variants that do not use the access methods or do not meet the ETSI specified parameters for equipment in EN 301 213-1 [14], EN 301 213-2 [15], EN 301 213-3 [16], EN 301 213-4 [17], EN 301 213-5 [18] or antennas in EN 301 215-1 [2], EN 301 215-3 [3], CE marking may also be possible via one of the alternative routes described in the Directive 1999/5/EC [1].

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 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).

[2] ETSI EN 301 215-1 (V1.2.1): "Fixed Radio Systems; Point to Multipoint Antennas; Antennas for point-to-multipoint fixed radio systems in the 11 GHz to 60 GHz band; Part 1: General aspects".

[3] ETSI EN 301 215-3 (V1.1.1): "Fixed Radio Systems; Point to Multipoint Antennas; Antennas for point-to-multipoint fixed radio systems in the 11 GHz to 60 GHz band; Part 3: Multipoint Multimedia Wireless System in 40,5 GHz to 43,5 GHz".

[4] ETSI EN 301 126-2-1 (V1.1.1): "Fixed Radio Systems; Conformance testing; Part 2-1: Point-to-Multipoint equipment; Definitions and general requirements".

[5] ETSI EN 301 126-2-2 (V1.1.1): "Fixed Radio Systems; Conformance testing; Part 2-2: Point-to-Multipoint equipment; Test procedures for FDMA systems".

[6] ETSI EN 301 126-2-3 (V1.1.1): "Fixed Radio Systems; Conformance testing; Part 2-3: Point-to-Multipoint equipment; Test procedures for TDMA systems".

[7] ETSI EN 301 126-2-4 (V1.1.1): "Fixed Radio Systems; Conformance testing; Part 2-4: Point-to-Multipoint equipment; Test procedures for FH-CDMA systems".

[8] ETSI EN 301 126-2-5 (V1.1.1): "Fixed Radio Systems; Conformance testing; Part 2-5: Point-to-Multipoint equipment; Test procedures for DS-CDMA systems".

[9] ETSI EN 301 126-2-6 (V1.1.1): "Fixed Radio Systems; Conformance testing; Part 2-6: Point-to-Multipoint equipment; Test procedures for Multi Carrier Time Division Multiple Access (MC-TDMA) systems".

[10] ETSI EN 301 126-3-1 (V1.1.2): "Fixed Radio Systems; Conformance testing; Part 3-1: Point-to-Point antennas; Definitions, general requirements and test procedures".

[11] ETSI EN 301 126-3-2 (V1.1.1): "Fixed Radio Systems; Conformance testing; Part 3-2: Point-to-Multipoint antennas - Definitions, general requirements and test procedures".

[12] ETSI EN 301 390 (V1.1.1): "Fixed Radio Systems; Point-to-point and Point-to-Multipoint Systems; Spurious emissions and receiver immunity at equipment/antenna port of Digital Fixed Radio Systems".

[13] ETSI EN 301 997-1 (V1.1.1): "Transmission and Multiplexing (TM); Multipoint equipment; Radio Equipment for use in Multimedia Wireless Systems (MWS) in the frequency band 40,5 GHz to 43,5 GHz; Part 1: General requirements".

[14] ETSI EN 301 213-1 (V1.1.2): "Fixed Radio Systems; Point-to-multipoint equipment; Point-to-multipoint digital radio systems in frequency bands in the range 24,25 GHz to 29,5 GHz using different access methods; Part 1: Basic parameters".

[15] ETSI EN 301 213-2 (V1.3.1): "Fixed Radio Systems; Point-to-multipoint equipment; Point-to-multipoint digital radio systems in frequency bands in the range 24,25 GHz to 29,5 GHz using different access methods; Part 2: Frequency Division Multiple Access (FDMA) methods".

[16] ETSI EN 301 213-3 (V1.4.1): "Fixed Radio Systems; Point-to-multipoint equipment; Point-to-multipoint digital radio systems in frequency bands in the range 24,25 GHz to 29,5 GHz using different access methods; Part 3: Time Division Multiple Access (TDMA) methods".

[17] ETSI EN 301 213-4 (V1.1.1): "Fixed Radio Systems; Point-to-multipoint equipment; Point-to-multipoint digital radio systems in frequency bands in the range 24,25 GHz to 29,5 GHz using different access methods; Part 4: Direct Sequence Code Division Multiple Access (DS-CDMA) methods".

[18] ETSI EN 301 213-5 (V1.1.1): "Fixed Radio Systems; Point-to-multipoint equipment; Point-to-multipoint digital radio systems in frequency bands in the range 24,25 GHz to 29,5 GHz using different access methods; Part 5: Multi-Carrier Time Division Multiple Access (MC-TDMA) methods".

[19] ECC/REC 01-04: "Recommended guidelines for the accommodation and assignment of Multimedia Wireless Systems (MWS) in the frequency band 40.5 - 43.5 GHz".

[20] ITU-R Recommendation F.746: "Radio-frequency arrangements for fixed service systems".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

allocated radio frequency band: entry in the table of frequency allocations of a given frequency band for the purpose of its use by one or more terrestrial or space radiocommunication services or the radio astronomy service under specific conditions

NOTE: This term shall also be applied to the frequency band concerned (ITU Radio Regulations article 1, No. 17).

Automatic Transmit Power Control (ATPC): function to offer a dynamic power control that delivers the maximum power only during deep fading activity; in this way, for most of the time, the interference is reduced and the transmitter operates in a higher linearity mode

NOTE: When this function is used the transmit power is dynamically changed and follows the propagation condition. In principle when ATPC is implemented three different level of power may be identified:

- Maximum available power (delivered only in a condition of deep fading).
- Maximum nominal and maximum available power levels may be coincident or in case of multi-state modulation formats the maximum available power may be used to overdrive the transmitter (losing linearity but gaining fade margin when the fade conditions have already impaired the expected RBER). Performance prediction is usually made with the highest "available power".
- Maximum nominal power (useable on permanent base when ATPC is disabled); it should be noted that this power is "nominal for the equipment" and has not to be confused with the "nominal level set link by link" by the frequency co-ordination body, eventually achieved through passive RF attenuators or RTPC function.
- Minimum power (delivered in unfaded condition).

conformity assessment procedure: See Directive 1999/5/EC [1], annexes II, III, IV and V.

environmental profile: range of environmental conditions under which equipment, within the scope of the present document, is required to comply with the provisions of EN 301 997-2

essential phenomenon: radio frequency phenomenon related to the essential requirements under article 3.2 of the Directive 1999/5/EC that is capable of expression in terms of quantifiable technical parameters

harmonized radio frequency band: commonly referred as a portion of the frequency spectrum that CEPT/ERC allocates to a specific service through a CEPT/ERC Decision (proper definition is currently under study by CEPT/ERC)

NOTE: Presently radio frequency bands allocated to Fixed Service are not harmonized.

maximum available power: See Automatic Transmit Power Control (ATPC).

maximum nominal power: See Automatic Transmit Power Control (ATPC).

national radio frequency channel arrangement: predefined centre frequencies raster for a number of radio frequency channels covered by a national regulation in a not harmonized frequency band used in a country (it may all or in part overlap with other national or recommended radio frequency channel arrangements)

operating frequency range: range(s) of radio frequency channels covered by the Equipment Under Test (EUT) without any change of HW units

radio equipment: product or relevant component thereof capable of communication by means of the emission and/or reception of radio waves utilizing the spectrum allocated to terrestrial/space radio communication

NOTE: See article 2 of Directive 1999/5/EC [1].

radio frequency channel: portion of a radio frequency band where a radio frequency channel arrangement has been established, dedicated to one fixed radio link (or a P-MP system sector)

radio frequency channel arrangement: predefined centre frequencies raster for a number of radio frequency channels used by administrations for co-ordination in the same geographical area

NOTE: Radio frequency channels are defined by ITU-R Recommendation F.746 [20].

recommended radio frequency channel arrangement: predefined centre frequencies raster for a number of radio frequency channels, covered by a CEPT/ERC Recommendation in a not harmonized frequency band (not used for the same purpose by all administrations) that is recommended to the member countries in the case they use the relevant frequency band for Fixed Service

NOTE: Currently, CEPT does not recommend a radio frequency channel arrangement for the 40 GHz frequency band.

Remote Frequency Control (RFC): function allowing to change and control the transmit/receive centre frequency/channel either by a local monitoring terminal connected to the system or a by a remote network management terminal

NOTE: The frequency variation is static and usually made to adapt the frequency of the link to the interference scenario in the same geographical area. It is also used at the activation or re-commissioning of links in order to easily obtain the licensed frequency assigned by the co-ordinator body to the network operator for that link.

Remote Transmit Power Control (RTPC): function allowing to change and control the transmitter output power either by a local monitoring terminal connected to the system or a by a remote network management terminal

NOTE: The transmitter power variation is static and usually made at the activation or re-commissioning of links in order to easily obtain the EIRP required by the frequency co-ordination body for that link to control co-channel and adjacent channel interference in the same geographical area. In principle, this function is equivalent to the requirement of power regulation capability (e.g. by fixed attenuators) commonly required in fixed systems.

3.2 Symbols

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

dBm	decibel ratio relative to 1 milliWatt
dBW/MHz	spectral power density relative to 1 Watt in 1 MHz bandwidth

3.3 Abbreviations

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

ATPC	Automatic Transmit Power Control
DS-CDMA	Direct Sequence Code Division Multiple Access
EIRP	Equivalent Isotropically Radiated Power
EUT	Equipment Under Test
FDMA	Frequency Division Multiple Access
FDRS	Fixed Digital Radio Systems
FH-CDMA	Frequency Hopping Code Division Multiple Access
HW	Hard Ware
IF	Intermediate Frequency
MC-TDMA	Multi-Carrier Time Division Multiple Access
MP-MP	MultiPoint-to-MultiPoint
MWS	Multimedia Wireless System
PFD	Power Flux Density
P-MP	Point-to-MultiPoint
R&TTE	Radio equipment and Telecommunications Terminal Equipment Directive
RBER	Residual Bit Error Ratio
RF	Radio Frequency

RFC	Remote Frequency Control
RPE	Radiation Pattern Envelope
RTPC	Remote Transmit Power Control
Rx	Receiver
SW	Soft Ware
TDMA	Time Division Multiple Access
Tx	Transmitter

4 Essential requirements

With reference to article 3.2 of Directive 1999/5/EC [1] the phenomena in this clause have been identified as relevant to the essential requirements. The requirements stated in the following clauses identify these essential requirements with reference to the applicable clauses of the specific ETSI standards reported in the scope of the present document.

NOTE: Test methods referenced below are only those considered essential for the assessment of conformity to article 3.2 (i.e. for the reproducibility of the results).

4.1 Phenomena description

Guidance and description of the phenomena is given by EG 201 399 and specific applications and descriptions for FDRS are given by TR 101 506 (see bibliography).

4.2 Environmental specifications and tests

The technical requirements of the present document apply under the environmental profile for intended operation of the equipment and or antennas, which shall be declared by the manufacturer or person responsible for placing the apparatus on the market.

The environmental profile may be determined by the environmental class of the equipment and antennas according to the guidance given in clause 4.4 of EN 301 126-2-1 [4].

The environmental profile of the equipment and antennas shall be declared by the manufacturer or person responsible for placing the apparatus on the market.

The equipment and antennas shall comply with all of the requirements of the present document at all times, when operating within the boundary limits of the required declared operational environmental profile.

Any test carried out in order to generate the test report and/or declaration of conformity, required to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1] for radio equipment, shall be carried out with the same principles and procedures for both reference and extreme conditions reported in clause 4.4 of EN 301 126-2-1 [4]. The requirement for testing at reference or extreme conditions is reported in any relevant clauses of the present document, according to the principles for similar requirements in EN 301 126-2-1 [4].

Any test carried out in order to generate the test report and/or declaration of conformity, required to fulfil any conformity assessment procedure foreseen by the R&TTE Directive [1] for integral or stand-alone antennas, shall be carried out with the same principles and procedures for both reference and extreme conditions reported in clause 4.4 of EN 301 126-2-1 [4]. The requirement for testing at reference or extreme conditions is reported in any relevant clauses of the present document, according to the principles for similar requirements in EN 301 126-2-1 [4].

The test report shall be produced according to the procedure foreseen by article 10 of the Directive 1999/5/EC [1].

4.3 Radio-frequency range for which specifications and tests for equipment are applicable

4.3.1 Radio equipment

Even if radio frequency front-ends for MWS are commonly designed for covering all or part(s) of the possible operating channels within a specific radio frequency channel arrangement, equipment can provide single radio frequency channel operation (e.g. when the RF duplexer filters are tuned to a specific channel) or offer a wider operating frequency range (e.g. wide-band RF duplexer and frequency agility by the RFC function). The equipment shall comply with all the requirements of the present document at any possible operating frequency.

The tests shall be carried-out in the following way to produce the test report and/or declaration of conformity required (Directive 1999/5/EC [1]):

1) In the case where the equipment is intended for single channel operation the test report shall be produced for one radio frequency channel arbitrarily chosen by the supplier.

2) In the case where the equipment is intended for covering an operating frequency range the test report shall be produced for the lowest, intermediate and highest possible radio frequency channel within that operating frequency range.

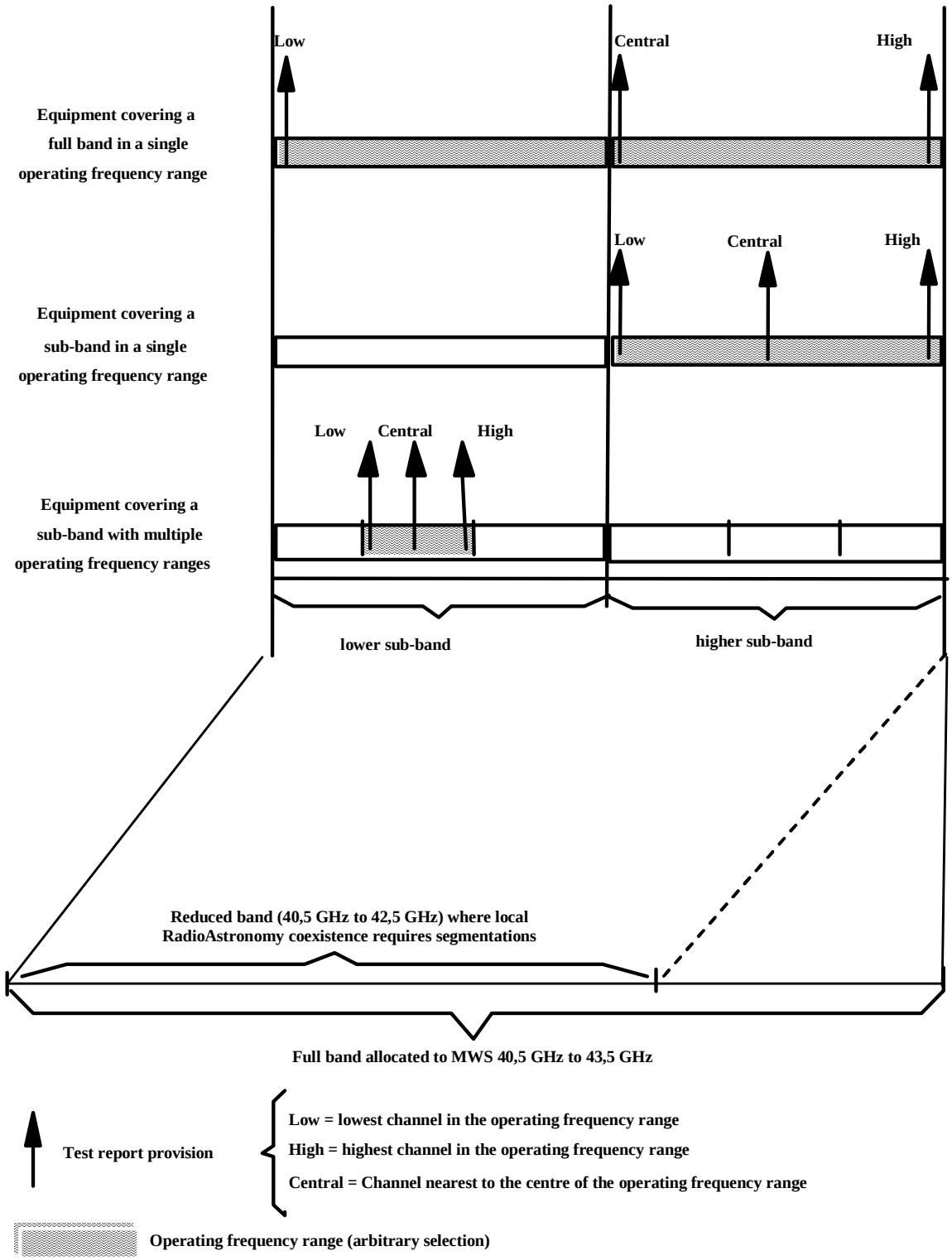

Figure 2: Test report frequency requirements for equipments intended for covering an operating frequency range within MWS allocated band (40,5 GHz to 43,5 GHz and/or 40,5 GHz to 42,5 GHz)

4.3.2 Antennas for MWS

Commonly, antennas cover an operating frequency range declared by the supplier. The antenna parameters shall comply with all the requirements of the present document within the declared operating frequency range. The tests shall be carried out at the lowest, middle and highest frequency of the relevant frequency range to produce the test report and/or declaration of conformity required (Directive 1999/5/EC [1]).

Furthermore, the tests shall be carried out according to EN 301 126-3-1 [10] and EN 301 126-3-2 [11] as applicable to the chosen antenna type.

4.4 Multi-rate/multi-format covering equipment specification and tests

MWS equipment can cover a number of different payload-rates and/or different modulation formats. In such cases the equipment shall comply with all the requirements of the present document at the intended payload operation or at each of the major variants of payload combinations.

The tests shall be carried out for the transmitting phenomena (see clause 4.5) at any intended bit-rate and modulation format operation, while the receiving phenomena (see clause 4.7) shall be tested only at the lowest and the highest bit-rate for any modulation format to produce the test report and/or declaration of conformity required (Directive 1999/5/EC [1]).

4.5 Transmitting phenomena

4.5.1 Frequency error/stability (Radio frequency tolerance)

The requirements for RF tolerance shall be as follows:

> The maximum RF tolerance shall be less than 30 ppm around the intended nominal channel centre frequency. The manufacturer or person responsible for placing the apparatus on the market shall declare the actual RF tolerance. The declared RF tolerance shall be such that the equipment emission does not exceed the emission boundary of the Block Edge Mask when operating over the full range of the declared environmental conditions and at the minimum frequency spacing from the block edge, as declared by the manufacturer or person responsible for placing the apparatus on the market.

Tests shall be carried out at reference and extreme climatic conditions according to EN 301 126-2-1 [4], clause 4.2, table 1 to produce the test report and/or declaration of conformity required (Directive 1999/5/EC [1]).

4.5.2 Transmitter maximum EIRP density limit

The maximum EIRP density referred to in EN 301 997-1 [13], annex B shall be declared by the manufacturer or person responsible for placing the apparatus on the market.

The relevant parts of annex B in EN 301 997-1 [13] are included in annex A for information.

The block edge mask shall be in accordance with ECC/REC 01-04 [19]. The current version is reproduced in annex A. The limits shown are absolute maximum and intended to include output power tolerances and any ATPC range.

The tests shall be carried out at reference and extreme climatic conditions according to EN 301 126-2-1 [4], clause 4.2, table 1 to produce the test report and/or declaration of conformity required (Directive 1999/5/EC [1]).

4.5.3 Adjacent channel power (EIRP density mask)

4.5.3.1 Spectrum mask

There are no mandatory requirements for the EIRP density mask. However, it is recommended that the manufacturer or person responsible for placing the apparatus on the market should declare which of the ETSI voluntary masks the equipment meets, or alternatively provide a plot of the actual mask met by the equipment, in order to assist administrations and operators in the planning of networks.

The test method and pro forma for declaration of results are reported in EN 301 126-2-1 [4].

4.5.3.2 Block Edge minimum frequency spacing

The manufacturer or person responsible for placing the apparatus on the market shall declare the minimum frequency spacing from the block edge(s) of each proposed type of transmitting channel, operating at maximum power, in order to fulfil the requirements referred to in EN 301 997-1 [13], clause 5.5.4.2. The test method and proforma for declaration of results are reported in EN 301 126-2-1 [4].

The tests shall be carried out at reference and extreme climatic conditions according to EN 301 126-2-1 [4], clause 4.2, table 1 to produce the test report and/or declaration of conformity required (Directive 1999/5/EC [1]).

Furthermore, for the tests shall be carried out according to EN 301 126-2-1 [4], EN 301 126-2-2 [5], EN 301 126-2-3 [6], EN 301 126-2-4 [7], EN 301 126-2-5 [8], EN 301 126-2-6 [9] as applicable to the different access method(s) used in the MWS.

4.5.3.3 Automatic and Remote Transmit Power Control (ATPC and RTPC)

From the point of view of hardware implementation, the functions of both ATPC and RTPC (see clause 4.5.3.4) are made by an attenuator implemented along the transmitting chain (e.g. at IF or at RF level or at both) and can be realized in a mixed configuration.

EXAMPLE: ATPC is implemented only.
RTPC is implemented only.
ATPC + RTPC are implemented with separate attenuator functions.
ATPC + RTPC are implemented with a single attenuator providing both functions via different commands (either in SW or HW) and the ranges of both may be traded off from a maximum available attenuation.

4.5.3.4 Automatic Transmit Power Control (ATPC)

ATPC is mandatory for TS transmitters that have a maximum Tx power density greater than 0,5 dBm/MHz. Annex D of EN 301 997-1 [13] shows typical implementation details. Equipment with ATPC will be subject to manufacturer declaration of the ATPC ranges and related tolerances. When required, testing for conformance shall be carried out with output power level corresponding to:

- ATPC set manually to a fixed value for system performance;
- ATPC set at maximum provided output power for Tx spectral emissions.

The correct operation of ATPC function according to the supplier's declaration shall be tested according to the test method described in the general requirements of EN 301 126-2-1 [4] and the test procedures in EN 301 126-2-2 [5], EN 301 126-2-3 [6], EN 301 126-2-4 [7], EN 301 126-2-5 [8], EN 301 126-2-6 [9] as applicable to the different access method(s) used in the MWS.

The equipment shall comply with the requirements of spectrum masks of clause 4.5.3.1 with ATPC operating in the range between maximum nominal power and minimum nominal power including the attenuation introduced by RTPC function (if any).

The tests shall be carried out to produce the test report and/or declaration of conformity required (Directive 1999/5/EC [1]) with ATPC set at the maximum available output power of the equipment.

The tests shall be carried-out at reference climatic conditions according to EN 301 126-2-1 [4] clause 4.2, table 1.

4.5.3.5 Remote Transmit Power Control (RTPC)

RTPC is an optional feature. The use of RTPC may depend on the access scheme. Equipment with RTPC will be subject to manufacturer declaration of RTPC range(s) and related tolerance(s). When required, testing for conformance shall be carried out with power level corresponding to:

- ATPC set manually to a fixed value for system performance;
- ATPC set at the maximum provided output power for Tx spectral emissions.

The equipment shall comply with the requirements of EIRP density of clause 4.5.2 with RTPC operating in the range between maximum nominal power and minimum nominal power.

Tests shall be carried out at reference and extreme climatic conditions according to EN 301 126-2-1 [4] clause 4.2, table 1 to produce the test report and/or declaration of conformity required (Directive 1999/5/EC [1]). Furthermore, the tests shall be carried out according to the general requirements of EN 301 126-2-1 [4] and the test procedures in EN 301 126-2-2 [5], EN 301 126-2-3 [6], EN 301 126-2-4 [7], EN 301 126-2-5 [8] and EN 301 126-2-6 [9] as applicable to the different access method(s) used in the MWS.

In some cases, the actual tests might fall outside the available sensitivity of test instruments currently available on the market. In this event the supplier shall produce an attachment to the test report containing:

- the calculated evidence that the noise floor of the actual test bed is higher than the requirement;
- the calculated evidence that the actual noise floor, generated by the transmitter according its noise figure and its implemented amplification/attenuation chain; is lower than the requirement.

4.5.4 Spurious emissions

The equipment shall comply with the requirements of clauses 4.1 and 4.1.1 of EN 301 390 [12] in any setting conditions of ATPC and RTPC, if any. Test methods shall be in accordance with clause 4.2.9 of EN 301 126-2-2 [5], EN 301 126-2-3 [6], EN 301 126-2-4 [7], EN 301 126-2-5 [8] and EN 301 126-2-6 [9] as applicable to the different access methods.

The tests shall be carried out to produce the test report and/or declaration of conformity required (Directive 1999/5/EC [1]) with ATPC if any, set to maximum available power. The RTPC, if any, shall be set at minimum attenuation. The actual test shall be limited to the practical frequency ranges foreseen by clause A.1 of EN 301 390 [12].

The test shall be carried out at reference climatic conditions according to EN 301 126-2-1 [4] clause 4.2, table 1.

4.6 Directional phenomena

4.6.1 Off-axis EIRP density (Radiation Pattern Envelope)

A wide range of Multimedia Wireless Systems is possible. Antennas for MWS meeting the requirements of the present document shall conform to the general requirements of EN 301 215-1 [2] and to the requirements of EN 301 215-3 [3]. The Radiation Pattern Envelope (RPE) shall be tested in accordance with EN 301 126-3-1 [10], clause 5.1.2 and EN 301 126-3-2 [11], clause 6.1.

4.6.2 Antenna gain

Antenna gain shall conform to the minimum antenna gain requirements of EN 301 215-3 [3] and the supplier shall declare the antenna gain. The test methods shall comply with EN 301 126-3-1 [10], clause 6.3.

4.7 Receiving phenomena

When operating in accordance with the ECC block edge requirements, the only essential receiving phenomena are related to spurious emissions.

Annex A (informative): Maximum transmitter EIRP

ECC/REC 01-04 [19] considers that maximum EIRP density is generally set by administrations in order to define Power Flux Density (PFD) levels as a co-ordination trigger between different geographical areas or for cross-border agreements. However, it introduces table A.1 giving guidance, for possible maximum limits, based on currently available technology which already takes into account an allowance for future development of higher power transmitters.

Table A.1: Maximum allowed transmitter EIRP spectral density

Station Type (see note 1)	Max EIRP spectral density (dBW/MHz) (Including tolerances and ATPC range)	Typical informative assumptions for deriving the EIRP limits (see note 2)	
		Maximum Power Spectral Density at antenna port	Maximum Antenna Gain
CS (and RS down-links)	+5	+15 dBm/MHz	20 dB
TS (and RS up-links)	+30	+15 dBm/MHz	45 dB
NOTE 1: From the point of view of applying the appropriate EIRP density and block edge mask, whenMP-MP systems are considered, the mean value of the EIRP density, shown above for CS and TS, will apply. In addition, any MP-MP station providing co-frequency coverage to a defined area, without addressing any specific TS (in terms of antenna radiation pattern), should be considered as CS. NOTE 2: In actual applications trade off in these values is possible provided that EIRP limits are met.			

Clause B.3 of EN 301 997-1 [13] states that the main considerations of the Tx EIRP spectral density block mask from ECC/REC 01-04 [19], shown in figure A.1, are as follows:

1) A trade-off has been made between presently available Tx technology and the degree of protection against the occurrence probability of interference.

2) Coherence with EN 301 390 [12] requirements for spurious emissions at the antenna port.

3) A methodology with a decaying out-of-block emission mask to balance the conflict between narrow band and wide band systems, operating close to the block edge.

4) Consideration of in-block EIRP to allow for realistic antenna gain.

5) A "drop down corner" within the transmit block to ease the "matched" block-edge Rx selectivity, at 43 dB above the out-of-block floor.

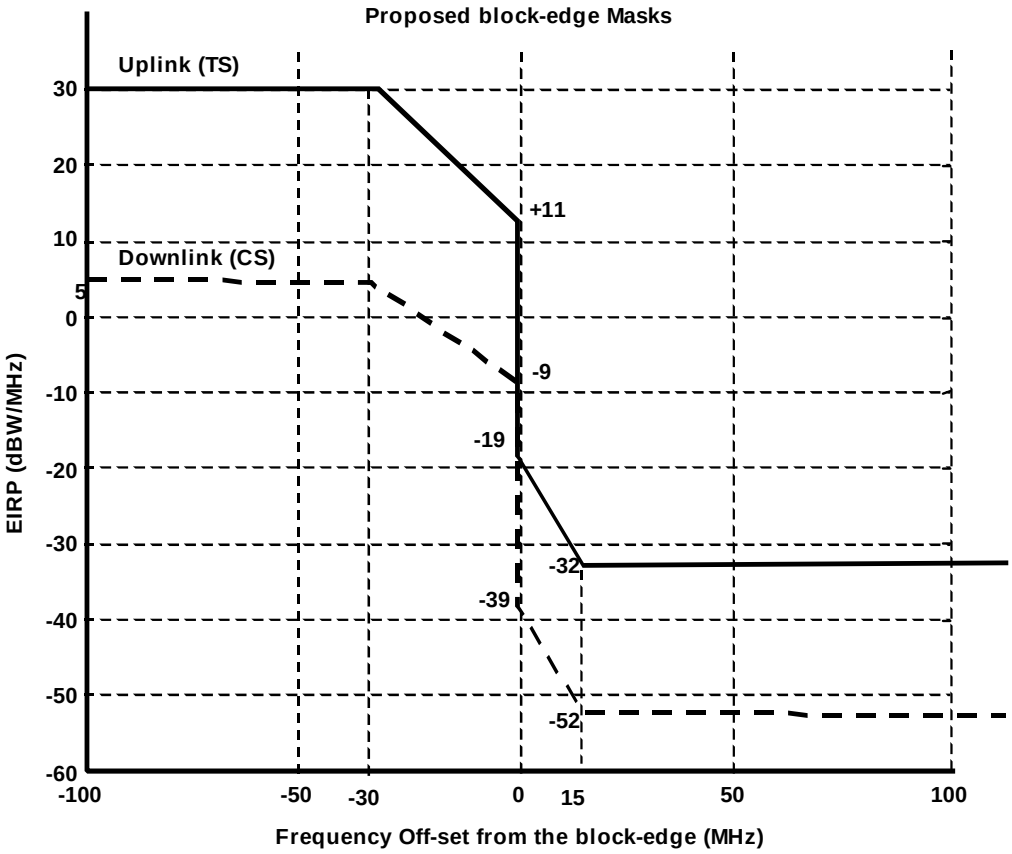

Figure A.1: Tx EIRP spectral density block mask from ECC/REC 01-04 [19]

Annex B (informative): Bibliography

ETSI EG 201 399 (V1.3.1): "Electromagnetic compatibility and Radio spectrum Matters (ERM); A guide to the production of candidate Harmonized Standards for application under the R&TTE Directive".

ETSI TR 101 506 (V1.1.1): "Fixed Radio Systems; Generic definitions, terminology and applicability of essential requirements under the article 3.2 of 99/05/EC Directive to Fixed Radio Systems".

History

Document history				
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