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System Reference document (SRdoc);
Technical characteristics and parameters for
Wireless Multichannel Audio Systems (WMAS)

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Electromagnetic compatibility and Radio spectrum Matters (ERM).

Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Executive summary

This Technical Report (TR) provides information on Wireless Multichannel Audio Systems (WMAS), which are one possible new technology for the next generation of audio Programme Making and Special Events (PMSE) equipment employing new wideband modulation techniques to support the transmission of multiple audio links in one single wideband radio channel.

As part of its 2015-2020 strategic plan [i.22], the ECC intends to identify the necessary spectrum for PMSE, taking into account the recent evolutions in their spectrum, the possibility to use also higher frequencies and to implement digital technology and cognitive sharing solutions, in conjunction with the need to maintain and, where possible, improve upon existing production quality.

In addition the Radio Spectrum Policy Group (RSPG) is considering a long-term strategy on spectrum requirements addressing the future needs and use of wireless audio and video PMSE applications from 2020.

WMAS:

- implement digital technology for audio PMSE applications and provide one transmission platform required for enabling cognitive sharing operation in future;
- are, in general, frequency neutral and designed to operate in all frequency ranges currently identified for audio PMSE. The harmonized standard ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3] already includes requirements for WMAS-based audio PMSE equipment;

- use has not been considered in previous CEPT studies/reports; e.g. ECC Report 191 [i.6], ECC Report 204 [i.7], ECC Report 221 [i.11] and ECC Report 245 [i.12];
- can be considered to have comparable or better compatibility to other systems/services previously studied by the ECC than narrowband PMSE equipment (see clause 7.2.2.1);
- offer a standard mode for higher spectral efficiency (3 audio links per MHz spectrum, which means 50 % more audio channels compared to typical narrowband PMSE systems);
- have out-of-band and spurious emissions which are expected to be the same or better than narrowband PMSE systems (see clause 7.2.2.2).

Once introduced to the market, WMAS will share the market with narrowband PMSE systems and will operate primarily in professional, multi-channel PMSE deployments, enabling flexible use and assignment of multiple audio channels.

Furthermore, WMAS employ a future-oriented wireless technology, which provides the technical foundation for supporting uncompressed audio transmission for high quality sound productions and for operation in possible new frequency bands, e.g. under database-driven sharing solutions including Licensed Shared Access (LSA) [i.8]. Hence, a single WMAS-based audio PMSE system is likely to replace several narrowband PMSE systems, but will also enable new applications and markets.

The present document kindly requests CEPT ECC (WGFM) to consider:

- WMAS operation in all frequency ranges currently listed in ERC Recommendation 70-03 (Annex 10) [i.4] and ERC Recommendation 25-10 [i.21] for audio PMSE operation;
- endeavours to recommend a harmonisation of national implementations and radio interface descriptions in the CEPT member states concerning WMAS operation;
- WMAS-based audio PMSE operation in future compatibility/interference studies;
- new studies for adoption of WMAS in possible new frequency bands, possibly under LSA framework [i.8]; and
- new studies for adoption of PMSE, including WMAS, under the LSA framework [i.8].

Introduction

The present document includes necessary information to support the co-operation under the MoU between ETSI and the Electronic Communications Committee (ECC) of the European Conference of Post and Telecommunications Administrations (CEPT).

Wireless Multichannel Audio Systems (WMAS) are one possible new technology for the next generation of audio Programme Making and Special Events (PMSE) equipment employing new wideband modulation techniques to support the transmission of multiple audio links in one single wideband radio channel. WMAS will provide a more efficient use of radio spectrum by supporting a higher number of audio links being transmitted per MHz when compared with current narrowband PMSE systems. In addition, WMAS support a more flexible approach to audio and RF link parameters to meet requirements defined either by application or RF environment. One upcoming challenge is the support of uncompressed audio transmission for high quality sound productions, which will be fulfilled using WMAS-based equipment.

WMAS and current narrowband PMSE systems can operate in the same frequency ranges. The current narrowband PMSE systems are able to use small portions of free gaps in the radio spectrum, whereas WMAS will require a wider free range of contiguous radio spectrum. The RF bandwidth of WMAS can be scaled, depending on the used frequency bands or on the region of operation, for example 8 MHz in EU or 6 MHz in US. Currently, the maximum bandwidth is limited to 20 MHz.

ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3] includes specific requirements for WMAS. The out-of-band and spurious emissions of WMAS are expected to be the same or better than narrowband PMSE systems (see clause 7.2.2.2).

WMAS is a new kind of audio PMSE platform, which has not been considered in current CEPT studies/reports; e.g. ECC Report 191 [i.6], ECC Report 204 [i.7], ECC Report 221 [i.11] and ECC Report 245 [i.12]. Nevertheless, due to its technical properties, WMAS can be considered to have comparable or better compatibility to other systems/services than narrowband PMSE equipment (see clause 7.2.2.1).

The present document has been created by ETSI TC ERM TG17 WG3.

1 Scope

The present document describes the necessary technical background information on Wireless Multichannel Audio Systems (WMAS), which may require a change in the present regulatory frame work for the proposed band(s) to enable these wideband systems to operate.

It includes in particular:

- Market information.
- Technical information including expected sharing and compatibility issues.
- Regulatory issues.

2 References

2.1 Normative references

Normative references are not applicable in the present document.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI EN 300 422-1 (V2.1.1): "Wireless Microphones; Audio PMSE up to 3 GHz; Part 1: Class A Receivers; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

[i.2] ETSI EN 300 422-2 (V2.1.1): "Wireless Microphones; Audio PMSE up to 3 GHz; Part 2: Class B Receivers; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

[i.3] ETSI EN 300 422-3 (V2.1.1): "Wireless Microphones; Audio PMSE up to 3 GHz; Part 3: Class C Receivers; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU".

[i.4] ERC Recommendation 70-03: "Relating to the use of Short Range Devices (SRD)".

[i.5] ECC Report 18: "Complementary Report to ECC Report 159, Further definition of technical and operational requirements for the operation of white space devices in the band 470-790 MHz".

[i.6] ECC Report 19: "Adjacent band compatibility between MFCN and PMSE audio applications in the 1785-1805 MHz frequency range".

[i.7] ECC Report 204: "Spectrum use and future requirements for PMSE".

[i.8] ECC Report 205: "Licensed Shared Access (LSA)".

[i.9] ECC Report 207: "Adjacent band co-existence of SRDs in the band 863-870 MHz in light of the LTE usage below 862 MHz".

[i.10] ECC Report 220: "Compatibility/sharing studies related to PMSE, DECT and SRD with DA2GC in the 2 GHz unpaired bands and MFCN in the adjacent 2 GHz paired band".

[i.11] ECC Report 221: "Adjacent band compatibility between MFCN and PMSE audio applications in the 700 MHz frequency band".

[i.12] ECC Report 245: "Compatibility studies between PMSE and other systems/services in the band 1350 - 1400 MHz".

[i.13] ECC Report 253: "Compatibility studies on audio PMSE at 1492-1518 MHz and 1518-1525 MHz".

[i.14] CEPT Report 32: "Recommendation on the best approach to ensure the continuation of existing Program Making and Special Events (PMSE) services operating in the UHF (470-862 MHz), including the assessment of the advantage of an EU-level approach".

[i.15] CEPT Report 50: "Technical conditions for the use of the bands 821-832 MHz and 1785-1805 MHz for wireless radio microphones in the EU".

[i.16] ERC Report 42: "Handbook on Radio Equipment and Systems Radio Microphones and Simple Wide Band Audio Links".

[i.17] ERC Report 62: "Compatibility analysis regarding possible sharing between the UIC system and radio microphones in the frequency ranges 876 - 880 MHz and 921 - 925 MHz".

[i.18] ERC Report 63: "Introduction of radio microphone applications in the frequency range 1785 - 1800 MHz" .

[i.19] ERC Report 88: "Compatibility and sharing analysis between DVB-T and radio microphones in bands IV and V".

[i.20] Recommendation ITU-R BT.1871-1: "User requirements for wireless microphones".

[i.21] ERC Recommendation 25-10 (2016): "Frequency ranges for the use of terrestrial audio and video programme making and special events (PMSE) applications".

[i.22] ECC Strategic Plan: "ECC Strategic Plan for the period 2015-2020", 28 November 2014.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3] apply.

3.2 Symbols

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

dB	decibel; logarithmic unit to express ratio between two quantities
dBc	power quantity relative to carrier power level
dBm	power quantity relative to 1 mW
f_c	Centre frequency
GHz	gigahertz
kHz	kilohertz
MHz	megahertz
mW	milliwatt
$N_{min\ audio\ channels}$	minimum number of audio channels
nW	nanowatt

3.3 Abbreviations

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

B	declared channel Bandwidth
CEPT	Commission of European Post and Telecommunications
FDMA	Frequency Division Multiple Access
HD	High Definition
LSA	Licensed Shared Access
PMSE	Programme Making and Special Events
RBW	Resolution Band Width
RF	Radio Frequency
RMS	Root Mean Square
RSPG	Radio Spectrum Policy Group
$Rx_{sensitivity}$	Receiver
TC	Technical Committee
TDD	Time Division Duplex
TDMA	Time Division Multiple Access
TV	Television
US	United States
WGFM	Working Group Frequency Management
WMAS	Wireless Multichannel Audio Systems

4 Comments on the System Reference Document

None.

5 Wireless Multichannel Audio Systems

Wireless Multichannel Audio Systems (WMAS) are wideband systems (modulated bandwidth is significantly larger than wireless channel's coherence bandwidth) that provide multi-channel audio transmission capabilities. As wideband systems, they are designed for scenarios, where an area of contiguous spectrum is available and multiple wireless audio channels are necessary. In contrast to current narrowband audio PMSE, WMAS do not follow a link-based approach but pursues a centralized one. A single base station manages all mobile terminals of one professional application, such as handheld microphones, body worn microphones, in-ear monitors, or conference units, and provides all audio inputs and outputs for the supported wireless audio links. All audio mixing and processing can be done in a computer device attached to the WMAS base station, by the base station itself, by a mixing console or by any equivalent device with audio mixing capability.

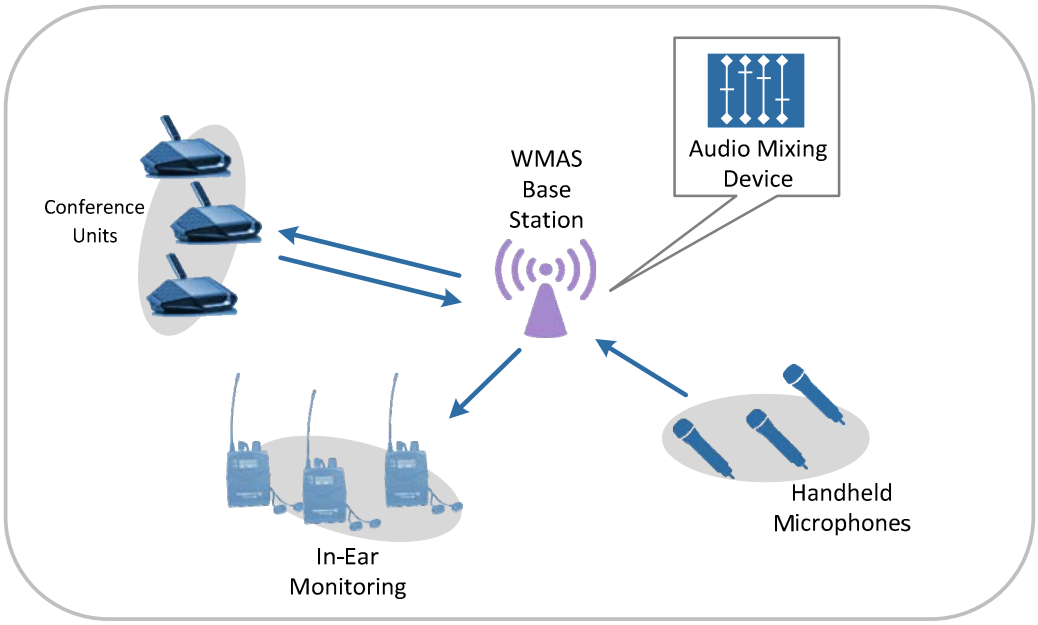

Figure 1: Exemplary WMAS topology

Figure 1 shows an exemplary topology of different WMAS applications:

- handheld microphones, each representing one audio link, which transmits audio data to the WMAS base station;
- in-ear monitors receiving different audio streams from the WMAS base station;
- conference units transmitting single audio streams to the WMAS base station and receiving one or more audio channels.

All audio links of one application share the same physical wideband RF channel. The wideband system may separate the audio links by time (TDMA) or by frequency (FDMA) and make use of Time-Division Duplexing (TDD) as multiplexing mechanism. Other channel access methods or duplex systems can be implemented in WMAS as well.

6 Market information

PMSE equipment serves the market for the creative and culture industry, and as such shows a significant socio-economic impact within the European market and markets world-wide.

ECC Report 204 [i.7] already highlights many applications and deployments of PMSE equipment. WMAS, as a new technology for audio PMSE, fulfils new customer demands towards variable audio quality, transmission quality, reliability, flexibility, scalability, and ease of use.

Once introduced to the market, WMAS will share the market with narrowband PMSE systems and will serve mainly in professional, multi-channel PMSE deployments, enabling flexible use and assignment of multiple audio channels. Furthermore, WMAS employ a future-oriented wireless technology, which provides the technical foundation for supporting uncompressed audio transmission for high quality sound productions and for operation in possible new frequency bands, e.g. under database-driven sharing solutions including LSA [i.8].

Hence, a single WMAS-based audio PMSE system is likely to replace several narrowband PMSE systems, but will also enable new applications and markets.

An audio PMSE system based on WMAS comprises, for example, a fixed/nomadic base unit and several portable parts, operating as in-ear monitors and/or wireless microphones. In general, the form factors especially of the portable parts are assumed to be similar to current audio PMSE equipment on the market. The base unit is likely to have a more compact form factor than multiple rack-mounted narrowband audio PMSE receivers or transmitters, which are currently deployed.

7 Technical information

7.1 Detailed technical description

Wireless Multichannel Audio Systems (WMAS) are wideband systems that provide multi-channel audio transmission capabilities by allocating one shared wideband RF channel for all audio links. The wideband approach offers the following advantages over narrowband systems:

- wideband transmission is more robust against indoor fading;
- due to the cell-based architecture more flexibility and scalability is given;
- the efficiency of spectrum use is higher.

Efficiency of spectrum usage or spectral efficiency is defined as the number of audio links transmitted per MHz of occupied spectrum. It is ensured by requiring that WMAS have at least one mode, defined as the Standard Mode, which supports a minimum of three audio links per MHz, defined as:

$N_{min\ audio\ channels}$ = B/1 MHz × 3, where $N_{min\ audio\ channels}$ = minimum number of audio channels and B = occupied bandwidth in Hz

EXAMPLES:
- B = 6 MHz (TV channel in US) → $N_{min\ audio\ channels}$ = 18
- B = 8 MHz (TV channel in EU) → $N_{min\ audio\ channels}$ = 24
- B = 10 MHz → $N_{min\ audio\ channels}$ = 30

In comparison to narrowband systems the increase in efficiency is approx. 50 % assuming that 16 audio links, which make use of 200 kHz occupied bandwidth each, can be placed in one 8 MHz TV channel today. Currently, the number of 16 narrowband professional audio links placed in 8 MHz free spectrum is the maximum value, where operational robustness can be maintained in typical scenarios.

In the future, support of HD sound productions will be necessary. Therefore, WMAS may offer different audio quality modes depending on the wireless application and the user's needs. Due to its digital nature and the centralized approach, WMAS provide the technical platform to achieve this required flexibility and scalability, which will always be a trade-off between higher or lower audio quality, greater or lesser robustness, greater or lesser working range and finally the number of simultaneously operated audio links.

7.2 Technical parameters and implications on spectrum

7.2.1 Status of technical parameters

7.2.1.1 Current ITU and European Common Allocations

Please refer to:

- ERC Recommendation 70-03 [i.4].
- Recommendation ITU-R BT.1871-1 [i.20].
- ERC Recommendation 25-10 [i.21].

7.2.1.2 Sharing and compatibility studies (if any) already available

Please refer to:

- ECC Report 185 [i.5].
- ECC Report 191 [i.6].
- ECC Report 204 [i.7].

- ECC Report 205 [i.8].
- ECC Report 207 [i.9].
- ECC Report 220 [i.10].
- ECC Report 221 [i.11].
- ECC Report 245 [i.12].
- ECC Report 253 [i.13].
- CEPT Report 32 [i.14].
- CEPT Report 50 [i.15].
- ERC Report 42 [i.16].
- ERC Report 62 [i.17].
- ERC Report 63 [i.18].
- ERC Report 88 [i.19].

7.2.1.3 Sharing and compatibility issues still to be considered

WMAS are a new kind of audio PMSE equipment, which has not been considered in current CEPT ECC studies/reports; e.g. ECC Report 191 [i.6], ECC Report 204 [i.7], ECC Report 221 [i.11] and ECC Report 245 [i.12]. Nevertheless, due to its technical properties, WMAS can be considered to have comparable or better compatibility to other systems/services than current narrowband PMSE equipment (see clause 7.2.2.1).

ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3] already include specific requirements for WMAS. The out-of-band and spurious emissions of WMAS are the same or better compared to narrowband PMSE systems (see clause 7.2.2.2).

The present document informs CEPT ECC on WMAS for inclusion in future and currently running compatibility/interference studies and requests new studies for adoption of WMAS in possible new frequency bands for audio PMSE, and consideration of use under the LSA framework.

7.2.2 Transmitter parameters

7.2.2.1 Transmitter Output Power/Radiated Power

The transmitter output power of WMAS will conform to Annex 10 of ERC Recommendation 70-03 [i.4] or National regulation.

In case of WMAS the total output power is spread over the shared wideband RF channel resulting in a lower power spectral density in comparison to narrowband systems. For example, WMAS operating in an 8 MHz wideband channel will have a power spectral density of -2 dBm/100 kHz = -22 dBm/1 kHz, narrowband systems have a power spectral density of 14 dBm/100 kHz = -6 dBm/1 kHz, assuming that both systems have a maximum output power of 50 mW. Therefore, WMAS can be considered to have comparable or better compatibility to other systems/services than current narrowband PMSE equipment.

7.2.2.2 Transmitter mask, Out of band emissions

The new WMAS transmission mask, according to ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3], is shown in Figure 2. The related methods of measurement are described in ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3], clause 8.3.4.

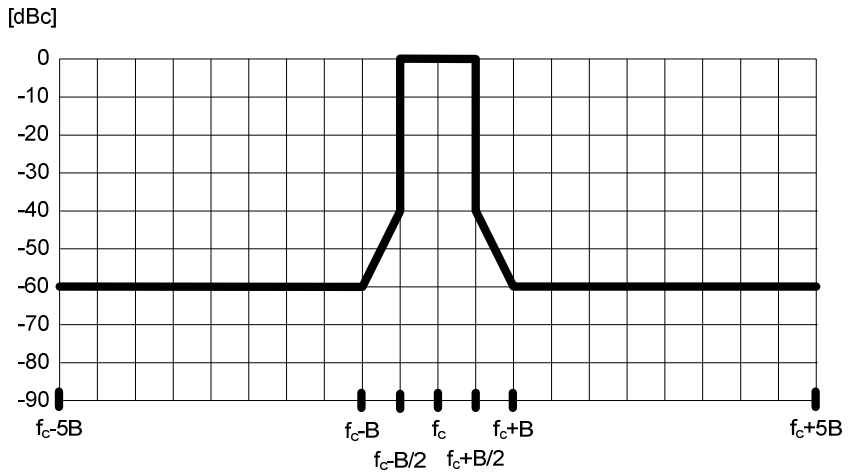

Figure 2: Spectrum mask for WMAS

To allow a comparison with the long-time established narrowband transmission masks in ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3] for analogue and digital systems below 2 GHz (shown in Figure 3 and Figure 4), the following measuring conditions have to be taken into account:

- RBW = 100 kHz for WMAS vs. RBW = 1 kHz for narrowband systems
- Detector = Max PEAK for WMAS vs. Detector = RMS for narrowband systems.

In the following paragraphs, legacy narrowband systems (mostly limited to 200 kHz bandwidth) will be compared to new systems operating in the WMAS regime. These two positions in frequency are considered:

1) wideband noise emitted inside tuning range (in-band at $f_c \pm 1$ MHz for analogue systems, at $f_c \pm 5$ B for digital systems and at $f_c \pm$ B for WMAS)

2) adjacent channel interference at fc ± B/2.

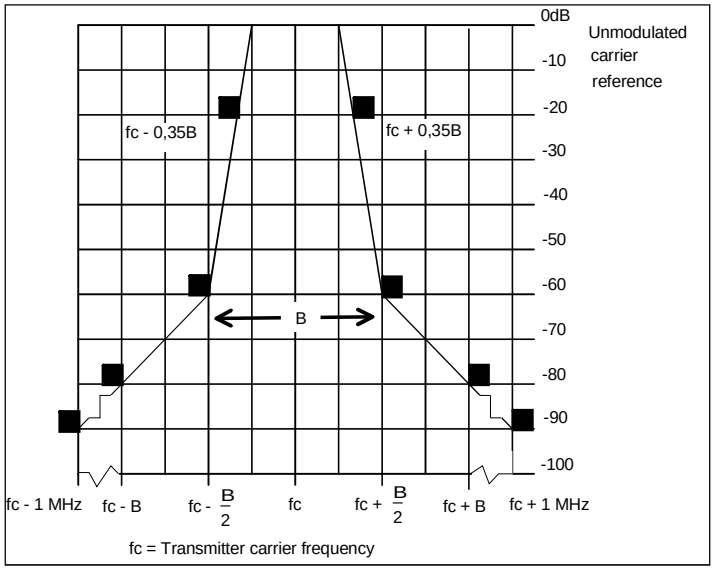

Figure 3: Spectrum mask for analogue systems

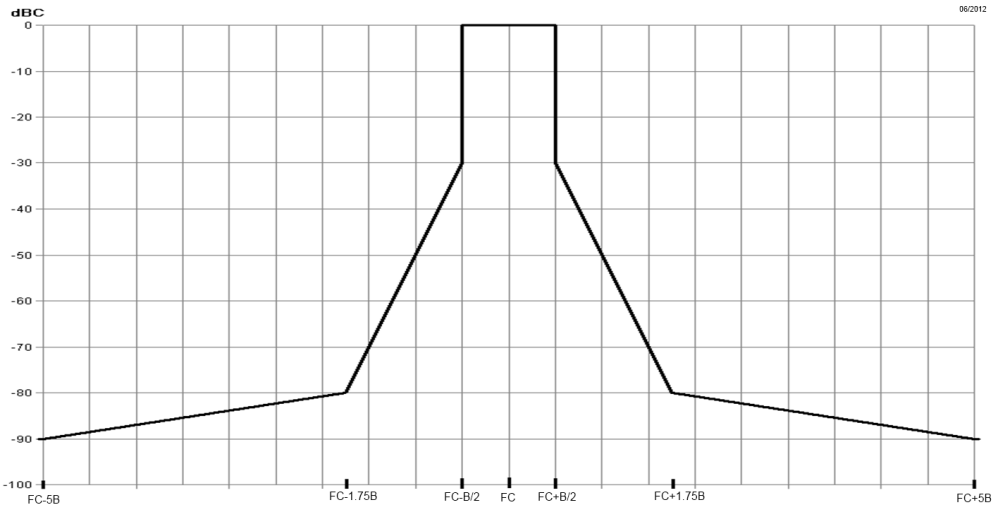

Figure 4: Spectrum mask for digital systems below 2 GHz

Legacy Systems:

ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3] specify a transmit spectrum mask for analogue wireless systems and digital wireless systems below 2 GHz carrier frequency (see Figure 3 and Figure 4). Both spectrum masks use an RMS detector. This detector averages receive signals during spectrum sweep.

Both spectrum masks (Figure 3 and 4) allow a maximum in-band wideband noise spectral density of -90 dBc/1 kHz.

Analogue systems are allowed to emit -60 dBc/1 kHz of adjacent channel interference. Digital systems have a much higher maximum allowed adjacent channel interference of -30 dBc/1 kHz.

WMAS:

In addition, ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3] propose a new WMAS spectrum mask (see Figure 2). The maximum of the mask is normalized to the average power (RMS) of a continuous transmission, which is a special test mode of WMAS. The change from RMS detector to PEAK detector adds the crest factor of the transmit signal at the corresponding frequency to the spectrum trace.

WMAS spectrum mask allows a maximum in-band wideband noise spectral density of:

-60 dBc/100 kHz = -80 dBm/1 kHz.

Assuming a typical noise crest factor of 10 dB, the in-band wideband noise using RMS detector will reach the same level as in the spectrum masks of legacy narrowband systems:

-80 dBc/1 kHz - 10 dB = -90 dBc/1 kHz.

WMAS spectrum mask allows an adjacent channel interference of:

-40 dBc/100 kHz = -60 dBm/1 kHz.

With a typical signal crest factor of 10 dB, the adjacent channel interference with RMS detector is expected to be

-60 dBc/1 kHz - 10 dB = -70 dBc/1 kHz.

This is 10 dB better than legacy analogue systems and 40 dB better than narrowband digital systems.

To make all three transmit masks (Figure 2 to Figure 4) comparable, Figure 5 summarizes the necessary translations of the WMAS transmit mask: conversion from 100 kHz towards 1 kHz resolution bandwidth and PEAK detector towards RMS detector.

NOTE: The upper limit of the WMAS transmission mask is 0 dBc, measured with PEAK detector and RMS = 100 kHz. Therefore, it scales down with the change of the detector and the decrease of RBW.

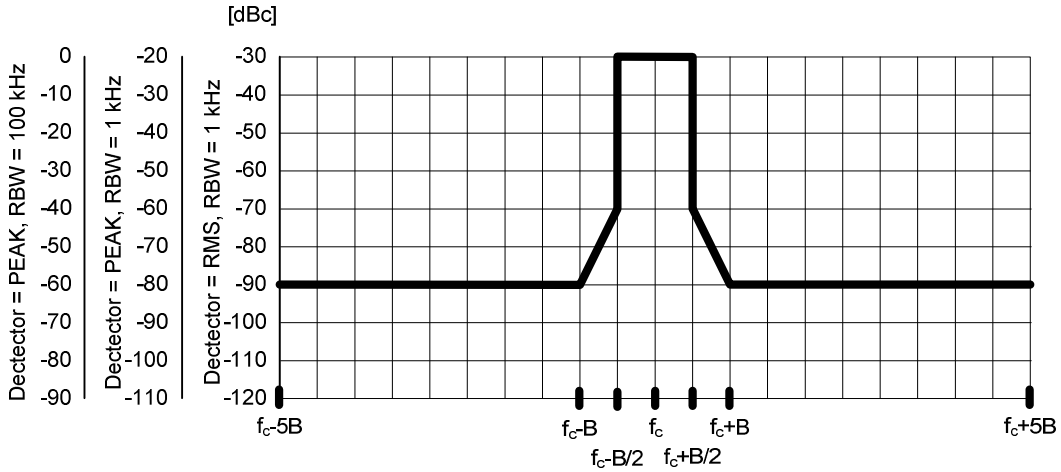

Figure 5: Conversion of WMAS transmit mask towards RMS detector and RBW = 1 kHz

Furthermore, fast transient wideband emissions, which can occur during ramping times, may interrupt coexisting services for short periods of time. These transients are detected significantly more reliable due to the usage of a PEAK detector during mask measurement.

7.2.2.3 Operating Frequency

WMAS and current narrowband PMSE systems are proposed to operate in the same frequency ranges.

Therefore, WMAS allocations will conform to Annex 10 of ERC Recommendation 70-03 [i.4] and to ERC Recommendation 25-10 [i.21] and National allocations.

Frequency accuracy and stability of WMAS are specified in ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3], and are identical to legacy narrowband systems.

7.2.2.4 Bandwidth

According to ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3], WMAS may use a bandwidth (B) of up to 20 MHz. The relevant spectrum mask is shown in Figure 2, and the correspondent methods of measurement can be found in clause 8.3.4 of the standard.

7.2.2.5 Spurious emissions

Table 1 lists the unwanted emissions, which are identical to the limits of the narrowband systems. These limits apply at frequencies beyond the limit of 250 % of the necessary bandwidth above and below the centre frequency of the emission.

Table 1: Unwanted emissions

State	Frequency		
	47 MHz to 74 MHz 87,5 MHz to 137 MHz 174 MHz to 230 MHz 470 MHz to 862 MHz	Other Frequencies below 1 000 MHz	Frequencies above 1 000 MHz
Operation	4 nW	250 nW	1 µW
Standby	2 nW	2 nW	20 nW

7.2.3 Receiver parameters

All relevant receiver parameters and a detailed description are listed in ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3]. In the following, only the limits of the receiver parameter are summarized.

Receiver sensitivity:

Table 2: Limits of receiver sensitivity

Receiver category	Limits
A	-115 dBm < $Rx_{sensitivity}$ ≤ -90 dBm
B	-90 dBm < $Rx_{sensitivity}$ ≤ -70 dBm
C	-70 dBm < $Rx_{sensitivity}$ ≤ -50 dBm

Receiver adjacent channel selectivity:

Table 3: Limits of receiver adjacent channel selectivity

Receiver category	Limits
A	30 dB
B	25 dB
C	15 dB

Receiver blocking:

Table 4: Limits of receiver blocking

Receiver category	Limits
A	40 dB
B	30 dB
C	20 dB

7.2.4 Channel access parameters

ERC Recommendation 70-03 (Annex 10) [i.4] and ERC Recommendation 25-15 [i.21] do not require any channel access parameters. According to ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3], no channel access parameters are specified for WMAS.

7.3 Information on relevant standard(s)

ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3] are the relevant standards and have been updated to include requirements from the RE-D and already include WMAS.

8 Radio spectrum request and justification

As part of its 2015-2020 strategic plan [i.22], the ECC intends to identify the necessary spectrum for PMSE, taking into account the recent evolutions in their spectrum, the possibility to also use also higher frequencies and to implement digital technology and cognitive sharing solutions, as well as the need to maintain existing production quality.

WMAS implement digital technology for audio PMSE applications and provide a transmission platform required for enabling cognitive sharing operation in future.

WMAS are, in general, frequency neutral and designed to operate in all frequency ranges currently allowed by regulations for audio PMSE. The harmonized standard ETSI EN 300 422 part 1 to 3 [i.1], [i.2] and [i.3] already include requirements for WMAS audio PMSE equipment.

Relevant studies undertaken at CEPT for audio PMSE consider mainly narrowband operation for audio PMSE. Some national implementations and radio interface descriptions exhibit a 200 kHz bandwidth limit for audio PMSE.

The present document kindly requests CEPT ECC (WGFM) to consider:

- WMAS operation in all frequency ranges currently listed in ERC Recommendation 70-03 (Annex 10) [i.4] and ERC Recommendation 25-10 [i.21] for audio PMSE operation, namely 174 - 216 MHz, 470 - 786 MHz, 786 - 789 MHz, 823 - 826 MHz, 826 - 832 MHz, 1 350 - 1 400 MHz, 1 492 - 1518 MHz, 1 518 - 1 525 MHz, 1 785 - 1 795 MHz, 1 795 - 1 800 MHz, 1 800 - 1 804,8 MHz; and
- new studies for adoption of WMAS also in possible new frequency bands, possibly under the LSA framework [i.8].

9 Regulations

9.1 Current regulations

ERC Recommendation 70-03 (Annex 10) [i.4] and ERC Recommendation 25-10 [i.21] are the prime recommendations.

9.2 Proposed regulation and justification

The present document kindly requests CEPT ECC (WGFM) to consider:

- WMAS operation in all frequency ranges currently listed in ERC Recommendation 70-03 (Annex 10) [i.4] and ERC Recommendation 25-10 [i.21] for audio PMSE operation, namely 174 - 216 MHz, 470 - 786 MHz, 786 - 789 MHz, 823 - 826 MHz, 826 - 832 MHz, 1 350 - 1 400 MHz, 1 492 - 1 518 MHz, 1 518 - 1 525 MHz, 1 785 - 1 795 MHz, 1 795 - 1 800 MHz, 1 800 - 1 804,8 MHz;
- endeavours to recommend a harmonisation of national implementations and radio interface descriptions in the CEPT member states concerning WMAS operation;
- to consider WMAS-based audio PMSE operation in future compatibility/interference studies; and
- new studies for adoption of PMSE, including WMAS, under the LSA framework [i.8].

History

Document history		
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