



CEPT Report 18

Report from CEPT to the European Commission
in response to the Mandate on:

EU harmonisation of the band 1452 – 1479.5 MHz (lower part of L-band) to allow
flexible use by mobile multimedia technologies

Final Report on 30 March 2007 by the



Electronic Communications Committee (ECC)
within the European Conference of Postal and Telecommunications Administrations (CEPT)

Report on the EC Mandate regarding the 1.5 GHz band

SUMMARY

This report contains the CEPT response to the EC mandate on EU harmonisation of the band 1452 – 1479.5 MHz to allow flexible use by mobile multimedia technologies. It provides background information on the regulatory status of this band, a short overview about the current usage within CEPT and a list of some digital broadcasting systems.

The MA02 Special Arrangement provides a certain degree of flexibility for the introduction of mobile multimedia services. In particular, it allows the implementation of T-DAB networks for portable indoor reception, the implementation of those mobile multimedia services that use the same bandwidth and have similar technical characteristics as T-DAB, and flexible spectrum usage within parts of a country.

The current framework of the MA02 Special Arrangement would allow without any change an early entry of some mobile multimedia services without any delay or uncertainty. In fact, provisions that rule the introduction of some services other than T-DAB by contracting administrations are already contained in the MA02 Special Arrangement. In addition, the existing rights derived from the MA02 Plan will be retained.

CEPT is of the opinion that further flexibility could be achieved to implement new mobile multimedia services in the 1452 – 1479.5 MHz band within the framework of the MA02 Special Arrangement by partially revising the MA02 Special Arrangement with a view to adding regulatory and technical provisions specifically to allow for:

- the application of an interference envelope concept similar to that in the GE06 Agreement,
- a possibility to aggregate T-DAB blocks in order to enable the operation of systems requiring a larger bandwidth.

Such a partial revision to the MA02 Special Arrangement can be quickly realized. This approach protects the existing allotments in the MA02 Plan, while providing additional flexibility to introduce mobile multimedia services.

Moreover, CEPT is of the opinion that any substantial revision of the MA02 Special Arrangement, in particular re-planning, is unnecessary and would lead to undesirable delays in the early introduction of mobile multimedia services.

CEPT is of the opinion that the partial revision of the MA02 Special Arrangement is desirable noting that the earliest completion date would be July 2007.

Therefore, CEPT recommends a partial revision of the MA02 Special Arrangement according to the conclusions as described in the report, in order to facilitate early entry of mobile multimedia services and flexible use of the 1452 - 1479.5 MHz band. In particular, this partial revision should include provisions for:

- the application of the envelope concept;
- the aggregation of T-DAB blocks to accommodate mobile multimedia services with wider bandwidths.

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1 INTRODUCTION

Within the European Conference of Postal and Telecommunications Administrations (CEPT) 36 administrations have signed the “Special Arrangement of the European Conference of Postal and Telecommunications Administrations (CEPT) relating to the use of the band 1452-1479.5 MHz for Terrestrial Digital Audio Broadcasting (T-DAB)” Maastricht 2002 (MA02 Special Agreement) {1} in order to govern the spectrum usage for T-DAB in the band 1452 - 1479.5 MHz. Currently, in this band T-DAB networks are existing and planned in some European countries.

The Radio Spectrum Policy Group (RSPG) of the European Commission (EC) in October 2006 issued an opinion “The introduction of multimedia services in particular in the frequency bands allocated to the broadcasting services”, where a high interest was shown in a number of bands, including the 1.5 GHz band for mobile multimedia services {2}. Consequently, feasibility studies for the implementation of such mobile multimedia services in the 1.5 GHz band are needed. This is particularly the case for systems with bandwidths that are not compatible with the existing T-DAB channelling scheme.

The technical basis of the MA02 Special Arrangement may need a partial revision in order to facilitate the early introduction of mobile multimedia services.

This report looks at the feasibility of implementing mobile multimedia in the 1.5 GHz band. The question if a revision to the MA02 Special Arrangement would be appropriate and if so what form such a revision could take is addressed. Relevant issues in that context such as portable indoor reception and flexible use of the band are discussed.

2 MANDATE TO CEPT

There is a broad range of activities taking place around Europe to enable the introduction of mobile multimedia services in a number of bands. These activities are summarized in the RSPG opinion on “The Introduction of Multimedia Services in particular in the frequency bands allocated to the broadcasting services” {2}.

In particular, that opinion, drawn on the basis of a public consultation, considers various frequency bands as options for the introduction of mobile multimedia services, namely 174-230 MHz, 470-862 MHz, 1452-1492 MHz, 1800 MHz, IMT2000 2 GHz, 2 GHz MSS and 2500 - 2690 MHz.

The EC has mandated CEPT {4} to carry out activities relating to the MA02 Special Arrangement, in particular to:

- make an assessment of the technical regulatory conditions for the band 1452 to 1479.5 MHz, which may need reconsideration in case the band will also be used by a range of mobile multimedia service technologies, in addition to T-DAB;
- recommend relevant provisions allowing initial introduction of these services while still acting in accordance with the MA02 Special Arrangement.

3 REGULATORY AND TECHNICAL FEATURES OF THE 1452 – 1492 MHz BAND

3.1 ITU frequency allocation

The ITU RR allocate the band 1452 – 1492 MHz band to the Broadcasting Satellite, Broadcasting, Fixed and Mobile (except aeronautical mobile) Services on a co-primary basis in all three ITU regions and for aeronautical services (aeronautical telemetry only) in some countries in region I in accordance with RR 5.342 on a primary basis (further details can be found of Annex 1).

The World Administrative Radio Conference in 1992 (WARC-92) allocated the 1452 - 1492 MHz band globally on a primary basis for use by the Broadcasting Satellite Service for the purposes of digital sound broadcasting via satellite. The use of this band is subject to a number of ITU RR footnotes and Resolutions {3} (see Annex 1).

3.2 CEPT regulatory basis

In the 1452 – 1479.5 MHz band the CEPT developed and established the “Special Arrangement of the European Conference of Postal and Telecommunications Administrations (CEPT) relating to the use of the 1452 – 1479.5 MHz band for Terrestrial Digital Audio Broadcasting (T-DAB)”, (Special Arrangement Maastricht 2002), that entered into force on 01 September 2002. It contains a frequency plan for T-DAB and takes into account the protection of other primary services used in some European countries.

Based on the Decision ECC (03)02 of the CEPT, “ECC Decision of 17 October 2003 on the Designation of the Frequency Band 1479.5 – 1492 MHz for use by Satellite Digital Audio Broadcasting Systems”, the band 1479.5 – 1492 MHz is designated exclusively for S-DAB systems.

3.3 Current usage of the 1452 – 1479.5 MHz band within CEPT

The 1452 – 1479.5 MHz band (27.5 MHz) has been planned in Europe by two CEPT T-DAB Planning Meetings. The resulting frequency Plan as associated with the MA02 Special Agreement uses 16 x 1.7 MHz T-DAB blocks to provide 1-3 nation-wide coverage(s) per country for mobile reception {1}. Annex 2 provides a short overview of the allotments currently registered in the MA02 Plan.

The MA02 Special Arrangement sets down the basic characteristics of T-DAB allotments and established sharing criteria of T-DAB service versus other services. With reference to ITU RR No. 5.342 the coordination requirement for T-DAB allotments with the aeronautical telemetry services was established for a large number of European countries. In accordance to Annex 1 of the MA02 Special Arrangement Ukraine will phase out step-by-step the aeronautical telemetry service up to the year 2020.

The conditions of usage of 1452 - 1492 MHz band are changed from the 1st April 2007, taking into account the following statement of the ITU RR 5.342 “as of 1 April 2007, the use of the band 1452 - 1492 MHz is subject to agreement between the administrations concerned”. It could be interpreted as from 1st April 2007 not only T-DAB assignments must be coordinated

with the aeronautical telemetry service, but the usage of aeronautical telemetry stations must be agreed with the administrations using T-DAB.

Consequently, additional bilateral agreements between countries listed in RR 5.342 and affected/concerned countries concerning usage of spectrum between radio services may be needed.

The 1452 – 1479.5 MHz band is sparsely used in most CEPT countries. The usage of the band for T-DAB in countries neighbouring those listed in RR 5.342 is severely restricted by aeronautical mobile (telemetry) services operating under ITU RR 5.342. Apart from Germany where the band is widely used, there are only a few operational T-DAB networks.

Furthermore, consultations have been conducted recently in several countries for multimedia services, including digital radio {5, 6}. In some countries there are other services in operation in this band.

3.4 Digital Broadcasting Systems

There are several digital broadcasting systems that may be accommodated in the 1452 – 1479.5 MHz band some of which are listed in table 1.

The MA02 Special Arrangement foresees the implementation of T-DAB only. T-DAB uses a channel bandwidth of 1.536 MHz, accommodated in 16 frequency blocks referred to in this text as 1.7 MHz blocks. Since T-DMB and DAB-IP use the same bandwidth and have similar technical characteristics as T-DAB they can already be accommodated in accordance with MA02 Special Arrangement as it is. In contrast, other systems as shown in table 1 may require a wider bandwidth.

System	Required block/channel bandwidth	Related standards
T-DAB	1.7 MHz	ETSI – EN 300 401 {7} ETSI – TR 101 496-3 {8}
T-DMB	1.7 MHz	ETSI – EN 300 401 {7} ETSI – TS 102 428 {9}
DVB-H	5, 6, 7 or 8 MHz	ETSI – TR 102 377 {10}
DAB-IP	1.7 MHz	ETSI – EN 300 401 {7} ETSI - ES 201 735 {11}
Media-FLO	5, 6, 7 or 8 MHz	TIA 1099 {12} ¹

Table 1: Terrestrial Multimedia Broadcasting systems

¹ The current standard of MediaFlo does not cover the 1.5 GHz band. However, there are studies in progress to include this frequency band.

Taking into account the ongoing development of satellite digital radio services in some countries in the frequency band 1479.5 – 1492 MHz on the premises of CEPT Decision ECC/(03)/02 {13}, some interest has been expressed in favour of the potential introduction of satellite or satellite hybrid services in the band 1467 – 1479.5 MHz noting that filings have already been submitted to ITU for this purpose. Possible standards for such an accommodation are listed in table 2.

System	Required block/channel bandwidth	Related standards
S-DAB	1.7 MHz	ETSI – EN 300 401 {8} ETSI – TR 101 496-3 {9}
SDR	1.7 MHz	ETSI – TR 102 525 {14}

Table 2: Satellite Multimedia Broadcasting systems

4 FLEXIBLE USE OF THE 1452 – 1479.5 MHZ BAND

In order to allow the introduction of mobile multimedia services in the 1.5 GHz band the following three alternatives have been identified:

- using the MA02 Special Arrangement as it is;
- a partial revision of MA02 by including necessary provisions to allow for more flexibility and
- a substantial revision of MA02 which may include a full-scale re-planning.

4.1 Flexibility within the framework of the current MA02 Special Arrangement

4.1.1 Implementation of T-DAB networks for portable indoor reception

The MA02 Plan was developed using planning parameters suitable for mobile reception. The “Final Acts of the Regional Radiocommunication Conference for planning of the digital terrestrial broadcasting service in parts of Region 1 and 3 in the frequency bands 174-230 MHz and 470-862 MHz (RRC-06)” (the GE06 Agreement) {15} make provisions for portable indoor T-DAB reception in the band III. Therefore, it seems likely that portable indoor reception might also be requested in the 1.5 GHz band for T-DAB.

In accordance with the MA02 Special Arrangement T-DAB networks for any reception mode can be implemented without coordination within the limits of an existing Plan entry in accordance with Annex 1 of the MA02 Special Arrangement, i.e. in the case that no protection of other services is required. Otherwise, the Article 4 procedure of the MA02 Special Arrangement needs to be applied.

Article 4 contains a procedure to modify the Plan. A modification may consist of a change in the characteristics of a Plan entry, inclusion of a new Plan entry or the suppression of a Plan entry.

4.1.2 Implementation of mobile multimedia services

The MA02 Special Arrangement provides inherent flexibility to implement mobile multimedia services, which can lead to a more flexible usage of the spectrum, beyond the strict

implementation of Plan entries. To some extent this can be accomplished without the need for coordination with neighbouring administrations. This is valid as long as other administrations are not affected.

The potential introduction of satellite or satellite hybrid systems to provide mobile multimedia services in the range 1467 - 1479.5 MHz will require current and future MA02 allotments to be protected and, consequently, administrations wishing to introduce such satellite or satellite hybrid systems must comply with provisions in the arrangement regulating the introduction of radio-communication services other than T-DAB.

Apart from implementing networks for portable indoor reception for T-DAB other systems could be implemented as well. In particular, T-DMB and DAB-IP use the same bandwidth and have similar technical characteristics as T-DAB. Therefore, they can be accommodated in accordance with the MA02 Special Arrangement as it is.

4.1.3 Flexible spectrum usage within a country

In order to introduce mobile multimedia services using systems with larger bandwidth than T-DAB, contiguous T-DAB frequency blocks could be aggregated in a given area, provided that such contiguous blocks exist already in the MA02 Plan or could be added using the provisions of the MA02 Special Arrangement.

4.1.3.1 Existence of contiguous frequency blocks in the MA02 Plan

Contiguous T-DAB blocks in the same area exist to a very limited extent in the MA02 Plan. Analysis of the MA02 Plan shows that there are very few geographical areas in which two or three contiguous T-DAB blocks have been allotted in the Plan. In order to properly judge the result it should be noted that there are only a few countries which possess three layers of Plan entries. For further details see Annex 2.

In cases where such contiguous blocks cannot be found in the Plan, the MA02 Special Arrangement contains procedures for the modification of the Plan which allow for the addition of allotments in order to obtain contiguous blocks, as described in the next section.

4.1.3.2 Potential addition of new contiguous blocks in a given area

The MA02 Special Arrangement contains procedures for the addition or modification of an allotment (Annex 4, section 3 of the MA02 Special Arrangement) which enable addition of new contiguous blocks in a given area.

Co-ordination is necessary if a new allotment would:

- a. cause field strengths greater than or equal to 38 dB(μ V/m) at the boundary of any other administration; or,
- b. with regard to any other services, cause field strengths greater than or equal to the maximum allowable interfering field strengths at the boundary of any other administration.

No coordination is required where the above limits are not exceeded. In practice, this corresponds to those parts of a country which are separated from the boundary of each neighbouring administration by a certain distance. This distance depends on:

- the reference network associated with a particular allotment;

- the type of service to be provided;
- the existence of other services in the neighbouring administration and
- the type of propagation path (Land, Cold Sea, Warm Sea or mixed) between the boundary of the new allotment and the boundary of each neighbouring administration.

4.1.3.3 Aggregation of contiguous frequency blocks

Once the necessary contiguous frequency blocks are available in the same area, their aggregation in order to implement a wider-band system would require coordination of the guard-bands between the T-DAB blocks, on the basis of the protection of other administrations' plan entries or other services assignments. As MA02 Special Arrangement does not contain provisions for such coordination, bi- or multilateral agreements would be required.

4.2 Partial Revision of the MA02 Special Arrangement

In addition to the flexibility described in section 4.1 some partial revisions to the MA02 Special Arrangement may be necessary in order to provide for a greater flexibility. The following possibilities are to be considered amongst others:

- to incorporate other reception modes for T-DAB,
- to adopt an interference envelope concept similar to that in the GE06 Agreement and
- to aggregate T-DAB blocks in order to enable the operation of systems requiring a larger bandwidth.

It has to be borne in mind that the MA02 Special Arrangement takes into account the protection needs of other services using the 1.5 GHz band. These constraints will also need to be considered.

At the same time, the MA02 Special Arrangement also provides procedures to ensure that allotments in the Plan are not affected by stations brought into use in other radio-communication services by contracting administrations.

4.2.1 Technical elements to be considered

4.2.1.1 Other reception modes for T-DAB

In addition to the mobile reception mode provided for in the MA02 Plan further provisions may need to be developed in order to introduce Plan entries specifically referring to other T-DAB reception modes (for example portable indoor or handheld reception). However, these new provisions shall not affect the existing rights of any administration based on the MA02 Plan.

Applications other than T-DAB can also be deployed under the provision of the interference envelope concept described in sections 4.2.1.2 and 4.2.1.3 below.

4.2.1.2 Interference Envelope Concept

The 1452 – 1479.5 MHz band could be used for mobile multimedia services provided that

- the bandwidth of the proposed system is less than or equal to the T-DAB bandwidth of 1.536 MHz; and

- the proposed system shall neither claim more protection nor produce more interference than the T-DAB Plan entry.

Such an interference envelope concept has already been defined in § 5.1.3 of the GE06 Agreement {15} and was extended by a majority of CEPT administrations, including all Member States of the European Union, through Declaration 42:

“At the time of signing the Final Acts of the Regional Radiocommunication Conference for planning of the digital terrestrial broadcasting service in parts of Regions 1 and 3, in the frequency bands 174-230 MHz and 470-862 MHz (Geneva, 2006), the delegations of the above-mentioned countries formally declare that their administrations may use their digital Plan entries for broadcasting or other terrestrial applications with characteristics that may be different from those appearing in the Plan within the envelope of their digital Plan entries under the provisions of the GE06 Agreement and the Radio Regulations, and that their administrations agree that any such use will be afforded protection to the levels defined by the interfering field strengths as arising from their digital Plan entries, taking into account any relevant bilateral agreements.”

A similar provision should be included in the MA02 Special Arrangement.

4.2.1.3 Aggregation of contiguous frequency blocks

In the case where in a given geographical area there are several contiguous T-DAB blocks available, the total bandwidth could be used for wider bandwidth (i.e. greater than 1.7 MHz) mobile multimedia services, provided a suitable provision is added to the MA02 Special Arrangement. Figure 3 sketches the situation.

Within the MA02 Special Arrangement it is already possible to notify and coordinate an aggregated set of T-DAB allotments in contiguous blocks across the same geographical area. The frequency band created by aggregation of individual T-DAB blocks can be used for wider bandwidth systems if the guard bands between those blocks can be used. This is possible if transmissions within the guard bands do not exceed the same limits as within each of the aggregated blocks as given by the blue line in figure 1.

The necessary modifications may require in particular a relaxation of the application of the T-DAB spectrum mask between the contiguous T-DAB blocks. This relaxation of the T-DAB spectrum mask would increase interference to other T-DAB transmissions within any of the aggregated frequency blocks. However, such interference is not necessarily harmful. But in any case, this would need to be considered on a case by case basis under the condition that the Plan entries of other administrations should remain protected.

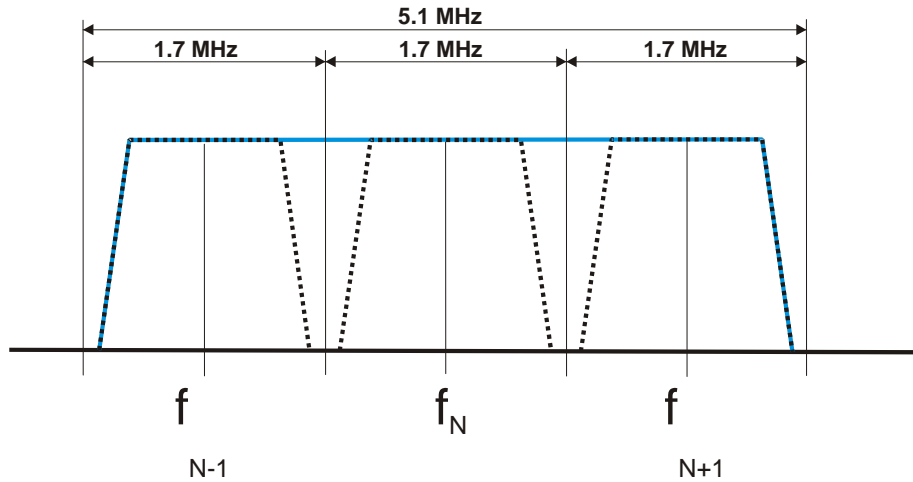


Figure 1: Example of three contiguous T-DAB blocks that could be used for 5MHz signals.

4.2.1.4 Propagation prediction model

There are differences between the propagation prediction model used in the MA02 Special Arrangement and the current ITU-R Recommendation P.1546 {16}.

CEPT has considered the benefits of changing the propagation prediction model used in the MA02 Special Arrangement. However, these benefits do not appear to justify the costs in terms of delay and uncertainty. Keeping the existing propagation prediction model does not inhibit the early introduction of mobile multimedia services. More details can be found in Annex 4.

4.2.2 Regulatory Elements to be considered for a partial revision of the MA02 Special Arrangement

A partial revision of the MA02 Special Arrangement should provide for

- application of the envelope concept;
- aggregation of T-DAB blocks to accommodate mobile multimedia services with wider bandwidths.

For other possibilities discussed in sections 4.1 and 4.2.1 the provisions of the existing MA02 Special Arrangement are sufficient.

4.3 Substantial Revision of the MA02 Special Arrangement

The introduction of mobile multimedia services in the 1.5 GHz band could be accomplished in terms of a substantial revision of the MA02 Special Arrangement which may consist of

- addition of technical planning parameters for a range of mobile multimedia services;
- establishing a new allotment Plan based on T-DAB and/or other mobile multimedia services;
- abrogation of the existing MA02 Special Arrangement without providing a new Plan. In such a case a set of rules would need to be agreed that govern the use of spectrum;

The mandate from EC asks CEPT to look for options within framework of the MA02 Special Arrangement. However, CEPT has also considered issues relating to a substantial revision of the MA02 Special Arrangement. Within CEPT there is a consensus view that substantial revision would lead to undesirable delays to the early introduction of mobile multimedia services.

CEPT has in particular considered the issue of a possible re-planning of the 1.5 GHz band. The total available bandwidth for re-planning would not be sufficient to provide for even one allocation of 5 MHz everywhere across Europe. However, this does not preclude the possibility for several neighbouring countries to jointly generate a new plan for their countries on the basis of keeping all other Plan entries as a fixed boundary condition. A more detailed consideration concerning re-planning can be found in Annex 3.

5 CONCLUSIONS

5.1 Assessment of the flexibility within the framework of the current MA02 Special Arrangement

The current MA02 Special Arrangement provides a certain degree of flexibility for the introduction of mobile multimedia services. In particular, it allows the implementation of T-DAB networks for portable indoor reception, the implementation of those mobile multimedia services that use the same bandwidth and have similar technical characteristics as T-DAB, and flexible spectrum usage within a country.

It is possible for administrations to re-structure their national frequency Plan by virtue of the Article 4 procedure. For allotments sufficiently away from borders international coordination may not be required.

The MA02 Special Arrangement does not allow for the implementation of mobile multimedia services that require different bandwidth or have significantly different characteristics than T-DAB.

Making no changes to the MA02 Special Arrangement would allow the limited introduction of some mobile multimedia services without any delay or uncertainty. In addition, the existing rights derived from the MA02 Plan will be retained.

5.2 Assessment of partially revising the MA02 Special Arrangement

Greater flexibility can be achieved by partially revising the MA02 Special Arrangement in order to allow for

- other reception modes for T-DAB,
- an application of an interference envelope concept similar to that in the GE06 Agreement and
- a possibility for systems with a larger bandwidth to operate within aggregated T-DAB blocks including the guard-bands between them.

In principle, the introduction of a partial revision of the MA02 Special Arrangement can be quickly realized. This approach protects the existing allotments in the MA02 Plan, while providing additional flexibility to introduce mobile multimedia services.

It is assumed that the channel raster in terms of T-DAB blocks is retained in case the MA02 Special Arrangement is partially revised. Consequently, if mobile multimedia services are to be implemented whose bandwidth is not a multiple of one T-DAB block inefficient use of spectrum may result.

Some of the above-mentioned measures can be constrained in some CEPT countries because of the additional primary allocation according to ITU RR 5.342.

5.3 Assessment of substantial revision of the MA02 Special Arrangement

A substantial revision to the MA02 Special Arrangement could take a number of different forms ranging from abrogation of the Arrangement to generating a totally new allotment Plan. This approach may offer to accommodate some mobile multimedia services more easily, for example by allowing for different channel bandwidths during the construction of the Plan itself.

In any case, a substantial revision could be based on the requirements for the mobile multimedia services known at the time of the revision only.

Any substantial revision will need a significant time to be carried out. As a first estimation, the preparation for a planning conference at the European level would require between one and two years of preparation.

Protection of other services may reduce efficiency of the spectrum usage if the bandwidth of a frequency block is increased.

If a substantial revision includes the establishment of a new allotment Plan, the capacity of the 1452 – 1479.5 MHz band is not sufficient to provide even one 5 MHz block everywhere across Europe.

In case of the generation of a new allotment Plan, the existing networks may impose severe constraints on the planning. If they are not protected in the planning process, they are likely to be subject to a transition process from the existing MA02 Plan to the new Plan.

6 RECOMMENDATIONS

CEPT is of the opinion that further flexibility could be achieved to implement new mobile multimedia services in the 1452 – 1479.5 MHz band within the framework of the MA02 Special Arrangement by partially revising the MA02 Special Arrangement with a view to adding regulatory and technical provisions.

CEPT is of the opinion that the partial revision of the MA02 Special Arrangement is desirable noting that the earliest completion date would be July 2007.

Moreover, CEPT is of the opinion that any substantial revision of the MA02 Special Arrangement, in particular re-planning, is unnecessary and would lead to undesirable delays in the early introduction of mobile multimedia services.

Therefore, CEPT recommends the support of a partial revision of the MA02 Special Arrangement according to the conclusions as described in section 5 above, in order to facilitate early entry of mobile multimedia services and flexible use of the 1452 - 1479.5 MHz band. In particular, this partial revision should include provisions for

- the application of the envelope concept;
- the aggregation of T-DAB blocks to accommodate mobile multimedia services with wider bandwidths.

ANNEX 1

EXTRACT FROM THE ITU RR

Table A1.1 provides an extract from Article 5 of the ITU RR for the frequency range 1452 -1492 MHz.

Allocations to services		
Region 1	Region 2	Region 3
1 452-1 492 FIXED MOBILE except aeronautical mobile BROADCASTING 5.345 5.347 BROADCASTING-SATELLITE 5.345 5.347 5.347A 5.341 5.342	1 452-1 492 FIXED MOBILE 5.343 BROADCASTING 5.345 5.347 BROADCASTING-SATELLITE 5.345 5.347 5.347A 5.341 5.344	

Table A1.1: Allocations in the frequency range 1452 - 1492 MHz

- 5.341** In the bands 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz, passive research is being conducted by some countries in a programme for the search for intentional emissions of extraterrestrial origin.
- 5.342** *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Uzbekistan, Kyrgyzstan and Ukraine, the band 1 429-1 535 MHz is also allocated to the aeronautical mobile service on a primary basis exclusively for the purposes of aeronautical telemetry within the national territory. As of 1 April 2007, the use of the band 1 452-1 492 MHz is subject to agreement between the administrations concerned. (WRC-2000)
- 5.345** Use of the band 1452-1492 MHz by the broadcasting-satellite service, and by the broadcasting service, is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (WARC-92)** *.
- 5.347** Different category of service: in Bangladesh, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Cuba, Denmark, Egypt, Greece, Ireland, Italy, Mozambique, Portugal, Serbia and Montenegro, Sri Lanka, Swaziland, Yemen and Zimbabwe, the allocation of the band 1 452-1 492 MHz to the broadcasting-satellite service and the broadcasting service is on a secondary basis until 1 April 2007. (WRC-03)

* *Note by the Secretariat:* This Resolution was revised by WRC-03.

5.347A In the bands:
1 452-1 492 MHz,
1 525-1 559 MHz,
1 613,8-1 626,5 MHz,
2 655-2 670 MHz,
2 670-2 690 MHz,
21.4-22 GHz,

Resolution **739 (WRC-03)** applies. (WRC-03)

ANNEX 2

OVERVIEW OF THE MA02 ALLOTMENT PLAN

The Plan established in 1995 at Wiesbaden (WI95) provided two T-DAB layers on the basis of national requirements either in the 1.5 GHz band (see figures A2.1 and A2.2) and/or VHF. At Maastricht 2002 one additional T-DAB layer was planned in the 1452 – 1479.5 MHz band (see figure A2.3). Furthermore, a new Special Arrangement was established, namely the MA02 Special Arrangement.

The allotment Plan associated with the MA02 Special Arrangement consists of two parts.

- Part 1 contains T-DAB allotments transferred from the original WI95 Plan in the 1.5 GHz band, whereas
- part 2 contains the allotments originating at the MA02 planning conference.

Following the two planning conferences WI95 and MA02 a few countries have three T-DAB layers in the 1.5 GHz band and no T-DAB in VHF, most countries have two T-DAB layers in the 1.5 GHz band and one VHF layer, while some only have one T-DAB layer in the 1.5 GHz band and two VHF layers.

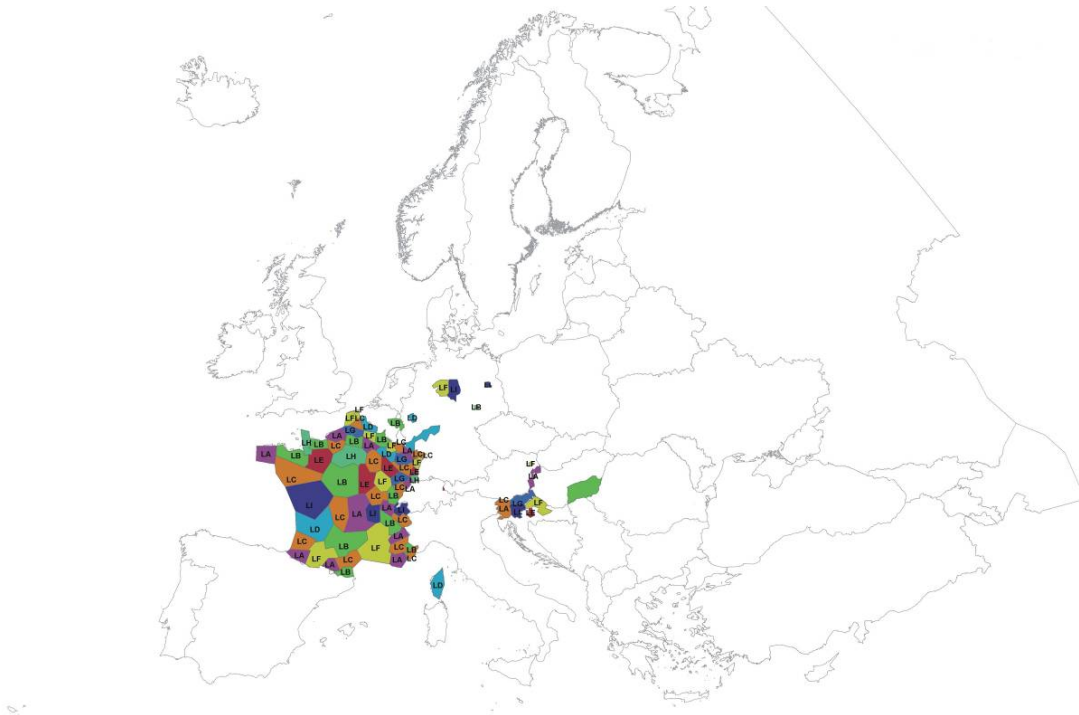


Figure A2.1 : T-DAB layer 1 in the 1.5 GHz band originating from WI95

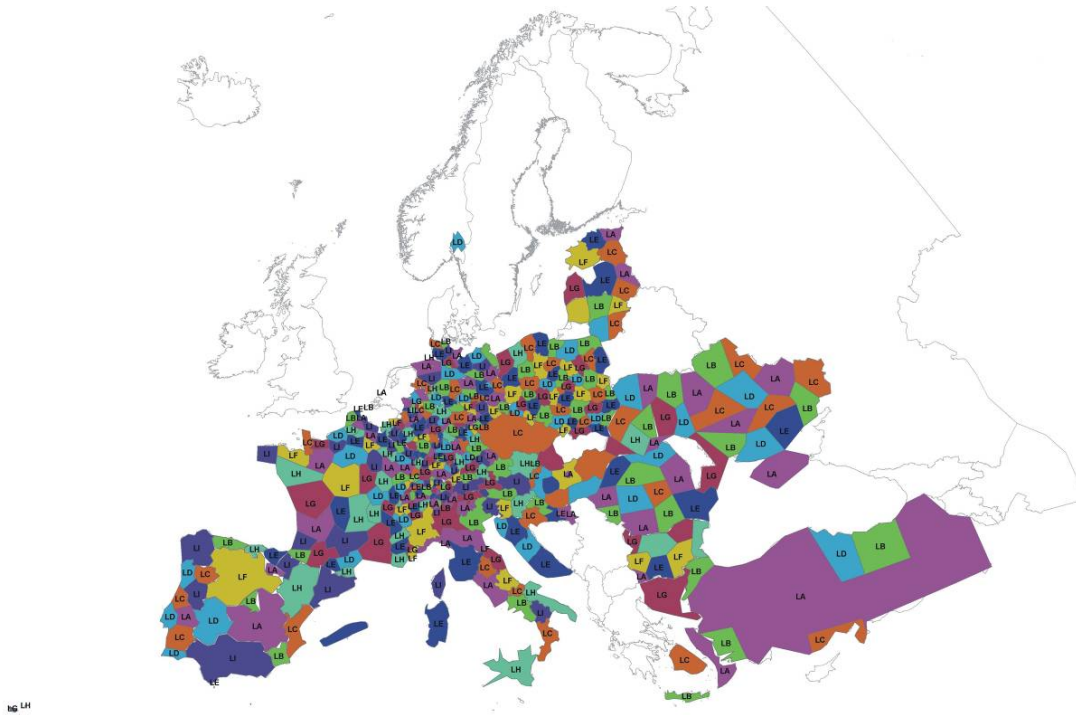


Figure A2.2 : T-DAB layer 2 in the 1.5 GHz band originating from WI95

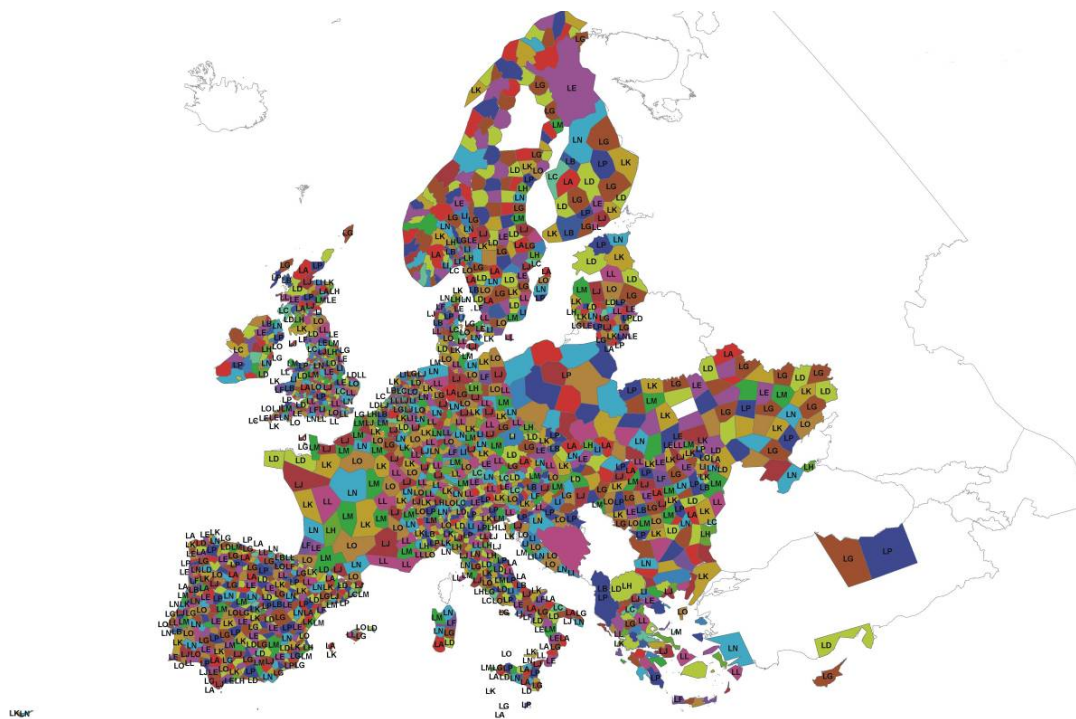


Figure A2.3 : T-DAB layer 3 in the 1.5 GHz band originating from MA02

ANNEX 3

CONSIDERATIONS REGARDING POSSIBLE RE-PLANNING OF BAND 1452–1479.5 MHz

The 1452–1479.5 MHz band comprises a total of 27.5 MHz of spectrum. The current subdivision is seen on top of figure A3.1. However, this is adapted to the usage of T-DAB in the 1452–1479.5 MHz band.

Allocating spectrum to other systems may require consideration of the possibility of re-planning of this band. In case this is considered there are a large number of issues that need to be clarified including:

- In the case that a new frequency plan for the 1452–1479.5 MHz band is to be produced, the planning objects which are to represent requirements relating to relevant systems have to be carefully designed. This would require appropriate reference planning configurations and reference networks to be developed (as has been done for the GE06 Agreement). These would need to be properly adapted to the technical characteristics of the systems to be taken into account in the re-planning process.
- The protection criteria to be applied need to be specified in detail. In addition, the details of the associated envelope concept would need to be elaborated.
- The possibility of using a slightly different channel raster to pave the way for an alternative usage of the available spectrum.
- In some countries there are T-DAB networks licensed and already in operation in the 1.5 GHz band. It has to be clarified under what conditions they can be granted protection in case re-planning is envisaged. There may be additional networks by the time any re-planning will be carried out.

A3.1 Channel Raster

If other systems are to employ this part of the spectrum subdivisions other than 1.7 MHz could be considered. It is possible that some candidate systems employ bandwidths that would allow them to share the available spectrum. Systems that can be operated using a 5 MHz bandwidth can be subdivided into three frequency blocks of around 1.7 MHz appropriate for narrower bandwidth systems. However, other subdivisions could be feasible as well. For example a 7 MHz block suitable for DVB-H as well could be subdivided into four 1.75 MHz blocks once again appropriate for narrower bandwidth systems. Figure A3.1 sketches the existing and some conceivable channel rasters.

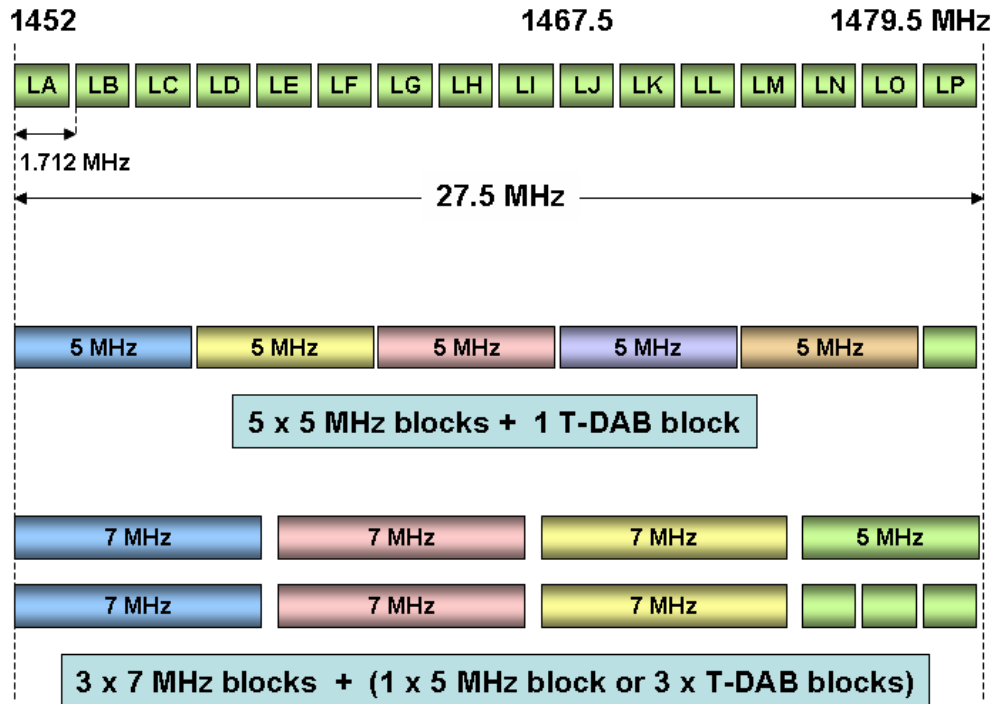


Figure A3.1: Example channel rasters for the 1452–1479.5 MHz band

Depending on their size, the use of channel rasters wider than T-DAB blocks have different implications on planning. However, all suffer from the same fundamental drawback, i.e. in the 1452–1479.5 MHz band only 5 or even only 3 ‘large’ spectrum blocks appropriate to accommodate other systems could be allocated, as shown in the above chart. This might not be enough to even plan for a single full area coverage across Europe as spectrum demand studies carried out in the preparation of the RRC-06 and experience have shown.

As an indication, the MA02 Plan employs 16 T-DAB blocks to provide on average for two layers across Europe noting that there are areas where one layer and other areas where three layers are provided. As a further example, in case of the GE06 Plan for the UHF band the available spectrum allowed to accommodate seven nation-wide layers for each country corresponding roughly to about seven channels required for each layer.



ANNEX 4

PROPAGATION PREDICTION MODEL

The MA02 Special Arrangement uses a specified propagation prediction model for any field strength calculations relating to Article 4 (Plan modification) or Article 6 (implementation of Plan entries) activities. However, in the meantime a new ITU-R recommendation is available for field strength predictions, namely ITU-R Rec. P.1546 {16}. This formed the basis for the wave propagation model used during the Regional Radio Conference in 2006 (RRC06) while establishing the GE06 Agreement and Plan. Compared to the model in the MA02 Special Arrangement this model is likely to be more accurate, in particular in relation to sea propagation and negative effective heights of transmitter sites.

Giving the desire to introduce new services in the 1452 –1479.5 MHz band it is reasonable to ask which wave propagation model should be used in the future. There are three alternatives, namely

- the existing MA02 model could be retained;
- a new model (ITU-R Recommendation P.1546) could be used; or
- two models could be used depending on whether interaction between existing Plan entries or new ones is to be assessed.

In preparing for the RRC06 similar situation existed for the T-DAB in band III and operational DVB-T services. In that case the decision was taken to use an adaptation of ITU-R Recommendation P.1546. However, this was possible as the impact of this decision was taken into account when developing the GE06 Agreement.

Under the existing conditions and constraints the situation might be more complicated in relation to supplementing the existing MA02 Arrangement assuming that the original Arrangement is still valid and needs to be applied in case an existing T-DAB Plan entry is modified (Article 4), or a new T-DAB Plan entry for mobile reception is added (Article 4), or an existing T-DAB Plan entry is implemented (Article 6). In these cases it would be mandatory to proceed along the procedures and technical criteria given in the MA02 Arrangement text including the application of the MA02 wave propagation model. For any other activity relating to non-mobile T-DAB services a different wave propagation model could be used if this is foreseen in the supplement to the MA02 Arrangement.

As a consequence, it is not possible to switch to the new wave propagation model ITU-R Recommendation P.1546 unless the MA02 Arrangement is fundamentally changed. On the other hand, the usage of two different wave propagation models within the same frequency planning framework does not seem to be reasonable as it would lead to ambiguous positions where the two models lead to different results. Therefore, the only feasible solution would be to apply the existing MA02 model. This would also apply to the protection of any other services.

It should be noted, however, that the propagation model is only a basis for the initial bi- or multilateral discussions for the modification of or addition of plan entries. If all affected Administrations agree that they wish to take the discussions forward on the basis of a different propagation model then there is nothing to stop them doing so.

ANNEX 5

LIST OF REFERENCES

- {1} Maastricht 2002 Special Arrangement
- {2} RSPG opinion 2006 “The introduction of multimedia services in particular in the frequency bands allocated to the broadcasting services”,
- {3} ITU Radio Regulations, edition of 2004 (www.itu.int)
- {4} EC Mandate, “Mandate to CEPT: EU harmonisation of the band 1452 – 1479.5 MHz (lower part of L-band) to allow flexible use by mobile multimedia technologies”
- {5} UK Ofcom: Award of available spectrum: 1452 – 1492 MHz, 31 March 2006 (<http://www.ofcom.org.uk/consult/condocs/1452-1492/>)
- {6} France, Culture : „Une consultation publique sur les normes de la radio numérique en France“, http://www.ddm.gouv.fr/article.php3?id_article=1115
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France, CSA : „Une consultation publique relative aux modalités de lancement de la radio numérique en France“
http://www.csa.fr/actualite/communiqués/communiqués_detail.php?id=121962
- {7} ETSI EN 300 401: Radio Broadcasting Systems; Digital Audio Broadcasting (DAB) to mobile, portable and fixed receivers (www.etsi.org)
- {8} ETSI TR 101 496-3: Digital Audio Broadcasting (DAB); Guidelines and rules for implementation and operation; Part 3: Broadcast network (www.etsi.org)
- {9} ETSI TS 102 428: Digital Audio Broadcasting (DAB); DMB video service; User Application Specification (www.etsi.org)
- {10} ETSI TR 102 377: Digital Video Broadcasting (DVB); DVB-H Implementation Guidelines (www.etsi.org)
- {11} ETSI ES 201 735: Digital Audio Broadcasting (DAB); Internet Protocol (IP) datagram tunneling (www.etsi.org)
- {12} TIA 1099: Forward Link Only Air Interface Specification for Terrestrial Mobile Multimedia Multicast
- {13} CEPT Decision ECC/(03)/02, “ECC Decision of 17. October 2003 on the Designation of the Frequency Band 1479.5 – 1492 MHz for use by Satellite Digital Audio Broadcasting Systems”
- {14} TR 102 525: Satellite Earth Stations and Systems (SES); Satellite Digital Radio (SDR) service; Functionalities, architecture and technologies (www.etsi.org)
- {15} GE06 Agreement, “Final Acts of the Regional Radiocommunication Conference for planning of the digital terrestrial broadcasting service in parts of Region 1 and 3 in the frequency bands 174-230 MHz and 470-862 MHz (RRC-06)”, (www.itu.int)
- {16} Recommendation ITU-R P.1546: Method for point-to-area predictions for terrestrial services in the frequency range 30 MHz to 3 000 MHz