Chester 97

European Conference of
Postal and Telecommunications
Administrations

The Chester 1997 Multilateral Coordination Agreement relating to Technical Criteria, Coordination Principles and Procedures for the introduction of Terrestrial Digital Video Broadcasting (DVB-T)

Chester, 25 July 1997

Multilateral Coordination Agreement

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Supplementary Information

to the

Multilateral Coordination Agreement
relating to
Technical Criteria, Coordination Principles and Procedures
for the introduction of
Terrestrial Digital Video Broadcasting (DVB-T)

Flow charts for coordination procedures and compatibility analysis (These flow charts are for information purposes only and do not form part of the Agreement).

Multilateral Coordination Agreement relating to Technical criteria, Coordination Principles and Procedures for the introduction of Terrestrial Digital Video Broadcasting (DVB-T)

PREAMBLE

The Delegates of the following CEPT Administrations representing Member countries of the International Telecommunication Union (ITU):

Austria, Belgium, The Republic of Bulgaria, The Republic of Croatia, The Czech Republic, Denmark, The Republic of Estonia, Finland, France, The Federal Republic of Germany, Greece, The Republic of Hungary, Ireland, Italy, The Republic of Latvia, The Republic of Lithuania, The Grand Duchy of Luxembourg, The Republic of Moldova, The Kingdom of The Netherlands, Norway, The Republic of Poland, Portugal, Romania, The Russian Federation, The Slovak Republic, The Republic of Slovenia, Spain, Sweden, Swizerland, Ukraine, The United Kingdom of Great Britain and Northern Ireland, and The Vatican City State.

meeting in Chester, July 1997, for a DVB-T Technical Criteria, Coordination Principles and Procedures Meeting convened under the terms of Article S6 of the ITU Radio Regulations and in accordance with decisions of the ERC, have, in signing this Multilateral Coordination Agreement, adopted the following provisions concerning the broadcasting service (DVB-T) in the bands 174 to 230 MHz and 470 to 862 MHz in the Planning Area as defined in Article 1 of this Multilateral Coordination Agreement.

ARTICLE 1

Definitions

For the purposes of this Multilateral Coordination Agreement, the following terms shall have the meanings defined below:

1.1 ***ITU:*** The International Telecommunication Union.

1.2 ***Radiocommunication Bureau:*** The lTU Radiocommunication Bureau (ITU-BR).

1.3 ***Radio Regulations:*** The Simplified Radio Regulations adopted in 1995.

1.4 ***CEPT:*** The European Conference of Postal and Telecommunications Administrations.

1.5 ***ERC:*** The European Radiocommunications Committee of the CEPT.

1.6 ***ERO:*** The European Radiocommunications Office.

1.7 ***DVB-T (Terrestrial Digital Video Broadcasting):*** A system in the terrestrial Broadcasting Service as specified in the European Telecommunication Standards Institute (ETSI) Standard ETS 300-744 “Digital broadcasting systems for television, sound and data services; framing structure, channel coding and modulation”.

1.8 ***Multilateral Coordination Agreement:*** The multi-lateral agreement between CEPT administrations comprising this Chester 1997 Multilateral Coordination Agreement and its Annexes. (This may be abbreviated to ‘CH97’.)

1.9 ***Administration***: Unless otherwise indicated, the term administration designates an administration as defined in the ITU Constitution.

1.10 ***Managing Administration:*** The Administration having the responsibility for carrying out the administrative functions associated with this Agreement specified in Articles 6, 8,9,10,11 and 12. The Managing Administration shall be the United Kingdom of Great Britain and Northern Ireland.

1.11 ***Contracting Administration:*** Any administration, representing a Member of the ITU, which has approved or acceded to this Multilateral Coordination Agreement.

1.12 ***Planning Area:*** The territories of the Contracting Administrations.

1.13 ***Assignment:*** Any assignment for which the procedure of Article 4 has been successfully applied and any assignment in the Stockholm Plan (1961).

1.14 ***The Stockholm Agreement (1961):*** The "Regional Agreement for the European Broadcasting Area Concerning the Use of Frequencies by the Broadcasting Service in the VHF and UHF Bands" adopted by the European VHF/UHF Broadcasting Conference (Stockholm, 1961). (This may be abbreviated to ‘ST61’.)

1.15 ***The ST61 Plan:*** The Plan annexed to the Stockholm Agreement (1961) and all its subsequent modifications.

1.16 ***European Broadcasting Area:*** The geographical area defined in No. S5.14 of the Radio Regulations.

1.17 ***SFN (Single Frequency Network):*** A network of synchronised DVB-T stations sharing the same radio frequency channel and transmitting identical signals.

1.18 ***MFN (Multi Frequency Network):*** A network of DVB-T Stations using various radio frequency channels.

1.19 ***DVB-T Station***: A Station in the Broadcasting Service using the DVB-T system**.**

1.20 ***Analogue Assignment:*** A frequency assignment relating to a terrestrial television broadcasting station using an analogue system.

1.21 ***Analogue to Digital Conversion:*** An administrative procedure to replace one analogue assignment with one or more DVB-T assignment(s) using the same radio frequency channel.

1.22 ***Frequency Bands III, IV and V*****:**

174 to 230 MHz	Band III
470 to 582 MHz	Band IV
582 to 862 MHz	Band V

ARTICLE 2

Execution of the Multilateral Coordination Agreement

2.1 The Contracting Administrations shall apply the terms of this Agreement for their Terrestrial Digital Video Broadcasting stations (DVB-T), in the bands 174 to 230 MHz and 470 to 862 MHz.

2.2 The Contracting Administrations undertake to study and, in common agreement, to put into practice the measures necessary to eliminate any problems that might result from the application of this Multilateral Coordination Agreement.

ARTICLE 3

Annexes to the Multilateral Coordination Agreement

The Multilateral Coordination Agreement contains the following Annexes:

Annex 1: Technical criteria to be used in the coordination of DVB-T

Annex 2: Principles

Annex 3: Basic characteristics to be communicated for coordination

Annex 4: Compatibility analysis

Annex 5: Methods and criteria for assessing compatibility between DVB-T and services other than broadcasting

Annex 6: Rules for analogue to digital conversion

Annex 7: Tables of distances to be used in the application of Article 4 of the Agreement

ARTICLE 4

Procedures concerning coordination

Preamble

The following sections give procedures in addition to those given in Article 4 of the Stockholm Agreement 1961 for use in relation to DVB-T stations, including SFNs.

These procedures only deal with the frequency bands in which DVB-T is envisaged, i.e. 174 to 230 MHz and 470 to 862 MHz. In the other bands the procedures of the Stockholm Agreement apply, without additional procedures.

1 Procedure in the Frequency Bands 174 to 230 MHz, and 470 to 862 MHz

This Section 1 consists of three parts: Part A deals with the coordination of analogue television stations; Part B deals with the coordination of DVB-T stations or SFNs; and Part C deals with the coordination of stations of services other than broadcasting.

Part A: Procedure for Analogue television stations

A.1.1

When a Contracting Administration proposes to change the characteristics of an analogue television broadcasting station shown in the ST61 Plan or brought into operation in accordance with the provisions of the present Agreement, or proposes to put into operation a broadcasting station not appearing in the ST61 Plan, the following action shall be taken:

A.1.1.1

(a) If the distances from the station under consideration to the nearest points of the boundaries of other countries, the administrations of which are Contracting Administrations, are less than the limits corresponding to the proposed power of the station and other characteristics specified in Annex 7, the administrations of those countries shall be consulted about the proposal.

(b) If the frequency of the proposed station is in the bands 216 to 230 MHz, 582 to 606 MHz or 790 to 862 MHz, or if the effective antenna height is more than 1200 m, or in cases where an asterisk appears in the tables in Annex 1 of the Stockholm Agreement, the procedure given in paragraph 2.1 of this Article shall be applied in addition to the procedure in A.1.1.1(a).

A.1.1.2

In effecting the consultation of A.1.1.1(a) the administration proposing the change shall furnish all the information specified in the CEPT format (see Table A3.1 of Annex 3), preferably in electronic form. This includes the information specified in Appendix S4 of the Radio Regulations, together with the effective antenna height as defined in Annex 2 to the Stockholm Agreement, its direction characteristics and the

polarization of radiation. The administrations that are being consulted may request any other information they need to assess the probability of harmful interference to their own service.

A.1.1.2.1

If the administration consulted is responsible for a DVB-T station or SFN, the method of assessing compatibility given in Annex 4, Section A shall be used.

A.1.1.2.2

If the administration consulted is responsible for an analogue television station which may be converted into digital in the future, the method for assessing the compatibility given in Annex 4, Section A shall be used.

A.1.1.2.3

If an incompatibility resulting from A.1.1.2.1 or A.1.1.2.2 has been identified the administrations concerned should try to reach agreement.

A.1.1.3

If agreement is reached between the administrations concerned, the administration proposing the change may proceed with its project. Administrations which have been consulted in accordance with A.1.1.1(a) and have not replied within ten weeks shall be sent an urgent reminder. Administrations which have not replied within two weeks following the dispatch of the urgent reminder shall be considered to have agreed to the proposed change.

A.1.1.4

If no agreement is reached between the administrations concerned, the ITU-BR will, in accordance with the Stockholm Agreement, make any technical examination that may be requested by the administration proposing the change, or by administrations whose services may be affected by the proposed change, and will inform them of the results of such examination. If no agreement is reached between the administrations concerned, and the administration making the proposal wishes to withdraw its proposal, the consulted administrations shall be informed by the administration proposing the change.

A.1.2

The administration proposing the change may proceed with its project without consulting other administrations if:

(a) the proposed modification relates to a reduction in power or to other changes of technical characteristics which would reduce the probability of harmful interference to services of other countries, or

(b) the distances from the station under consideration to the nearest points of the boundaries of other countries, the administrations of which are Contracting Administrations, are equal to or greater than the limits corresponding to the proposed power of the station and other characteristics specified in Annex 7, and if the frequency of the proposed station is in the bands 174 to 216 MHz, 470 to 582 MHz or 606 to 790 MHz.

A.1.3

In the cases referred to in sub-paragraph A.1.1.3 and paragraph A.1.2 above, the administration proposing the change shall inform the ITU-BR of the particulars specified in sub-paragraph A.1.1.2 above and, where appropriate, of the names of the countries consulted, and inform the ERO of the station's agreed characteristics in the CEPT format in electronic form (see Table A3.1 of Annex 3).

A.1.4

In accordance with the Stockholm Agreement the ITU-BR will publish the information in a special section of its weekly circular.

Part B: Procedure for DVB-T stations or SFNs

B.1.1

When a Contracting Administration proposes to change the characteristics of a DVB-T station shown in the ST61 Plan or brought into operation in accordance with the provisions of the present Agreement the action given in B.1.1.1(a) shall be taken.

When a Contracting Administration proposes to convert an analogue television broadcasting station, shown in the ST61 Plan or brought into operation in accordance with the provisions of the present Agreement, into a DVB-T station or SFN, the action given in B.1.1.1(b) shall be taken.

When a Contracting Administration proposes to put into operation a DVB-T station or SFN, not appearing in the ST61 Plan, the action given in B.1.1.1(b) shall be taken.

In all the above cases the provisions of B.1.1.1(c) and B.1.1.2 and its sub-sections apply, excluding B.1.1.2.1, B.1.1.2.2 and B.1.1.2.3 in the case of the proposed conversion of an analogue television broadcasting station into a DVB-T station or SFN where the procedures given in Annex 6 apply.

B.1.1.1

(a) If the distances from the station under consideration (which may form part of an SFN) to the nearest points of the boundaries of other countries, the administrations of which are Contracting Administrations, are less than the limits corresponding to the proposed power of the station and other characteristics specified in Annex 7, the administrations of those countries shall be consulted about the proposal.

(b) If the distances from the station under consideration, or one of the stations forming an SFN, to the nearest points of the boundaries of other countries, the administrations of which are Contracting Administrations, are less than the limits corresponding to the proposed power of the station and other characteristics specified in Annex 7, the administrations of those countries shall be consulted regarding the station or, in the case of an SFN, all those stations of the SFN which have not already been coordinated.

In the case of a conversion of an analogue station into a single DVB-T station or an SFN, the consulted administrations shall follow the procedure given in Annex 6, in order to determine the acceptability of the proposal.

No consultation in the case of a converted analogue station into a single DVB-T station is required provided the e.r.p. is no more than the analogue e.r.p. minus 18 dB, and other technical characteristics are not changed or would reduce the probability of harmful interference.

(c) If the frequency of the proposed station is in the bands 216 to 230 MHz, 582 to 606 MHz or 790 to 862 MHz, or if the effective antenna height is more than 1200 m, or in cases where an asterisk appears in the tables in Annex 1 of the

Stockholm Agreement, the procedure given in paragraph 2.1 of this Article shall be applied in addition to the procedure of B.1.1.1(a).

B.1.1.2

In effecting the consultation of B.1.1.1(a) or B.1.1.1(b) the administration proposing the change of the ST 61 Plan shall furnish all the information specified in the CEPT format (see Table A3.2 of Annex 3), preferably in electronic form. This includes the information specified in Appendix S4 of the Radio Regulations, together with the effective height of the antenna as defined in Annex 2 to the Stockholm Agreement, its direction characteristics and the polarization of radiation. The administrations that are being consulted may request any other information they need to assess the probability of harmful interference to their own services.

B.1.1.2.1

If the administration consulted is responsible for an analogue television station, the method for assessing compatibility given in Annex 4, Section B shall be used.

B.1.1.2.2

If the administration consulted is responsible for an analogue television station which may be converted into digital in the future, the method for assessing the compatibility given in Annex 4, Section C shall be used.

B.1.1.2.3

If the administration consulted is responsible for a DVB-T station or SFN, the method for assessing compatibility given in Annex 4, Section C shall be used.

B.1.1.2.4

If the administration consulted is responsible for T-DAB as defined in the Wiesbaden Special Arrangement 1995, the relevant provisions of that Special Arrangement shall be applied with the protection criteria defined in Annex 1, Section 4.5.

B.1.1.2.5

If the administration consulted is responsible for services other than broadcasting having a primary status, the method of assessing compatibility given in Annex 4, Section D shall be used.

B.1.1.2.6

If an incompatibility resulting from B.1.1.2.1, B.1.1.2.2, B.1.1.2.3, B.1.1.2.4 or B.1.1.2.5 has been identified the administrations concerned should try to reach agreement.

B.1.1.3

If agreement is reached between the administrations concerned, the administration proposing the change may proceed with its project. Administrations which have been consulted in accordance with B.1.1.1(a) and B.1.1.1(b) and have not replied within ten weeks shall be sent an urgent reminder. Administrations which have not replied within two weeks following the dispatch of the urgent reminder shall be considered to have agreed to the proposed change.

B.1.1.4

If no agreement is reached between the administrations concerned, the ITU-BR will, in accordance with the Stockholm Agreement, make any technical examination that may be requested by the administration proposing the change, or by administrations whose services may be affected by the proposed change, and will inform them of the results of such examination. If no agreement is reached between the administrations concerned, and the administration making the proposal wishes to withdraw its proposal, the consulted administrations shall be informed by the administration proposing the change.

B.1.2

The administration proposing the change of the Plan may proceed with its project without consulting other administrations if:

(a) the proposed modification relates to a reduction in power (but not resulting from an analogue to digital conversion) or to other changes of technical characteristics which would reduce the probability of harmful interference to services of other countries, or

(b) the distances from the station under consideration to the nearest points of the boundaries of other countries, the administrations of which are Contracting Administrations, are equal to or greater than the limits corresponding to the proposed power of the station and other characteristics specified in Annex 7, and if the frequency of the proposed station is in the bands 174 to 216 MHz, 470 to 582 MHz or 606 to 790 MHz, or

(c) the proposed modification relates to the conversion of an analogue station into a single DVB-T station, provided the e.r.p. is no more than the analogue e.r.p. minus 18 dB, and other technical characteristics are not changed or would reduce the probability of harmful interference

B.1.2.1

In case B.1.2(b) no protection can be claimed for the station of the project, although the administration proposing the change may choose to consult other Contracting Administrations in order to seek protection for the station of the project.

B.1.3

In the cases referred to in sub-paragraph B.1.1.3 and paragraph B.1.2 above, the administration proposing the change shall inform the ITU-BR of the particulars specified in sub-paragraph B.1.1.2 above and, where appropriate, of the names of the countries consulted, and inform the ERO of the station's agreed characteristics in the CEPT format in electronic form (see Table A3.2 of Annex 3). In the case of conversion from an analogue station into a DVB-T station or SFN, the identification code of the DVB-T station or one of the stations of the SFN should be the same as the original analogue identification code.

B.1.4

In accordance with the Stockholm Agreement, the ITU-BR will publish the information in a special section of its weekly circular.

Part C: Procedure for stations of services other than broadcasting having primary status

C.1.1

When a Contracting Administration proposes to change the characteristics of a station of a service other than broadcasting, having primary status and which has previously been coordinated, or proposes to put into operation a new station of such a service, the following action shall be taken:

C.1.1.1

If the distances from the station under consideration to the nearest points of the boundaries of other countries, the administrations of which are Contracting Administrations, are less than:

- 900 km in the case of aeronautical radionavigation services or,

- the limits corresponding to the proposed power of the station and other characteristics specified in Annex 7 for all other services having primary status;

the administrations of those countries shall be consulted about the proposal.

C.1.1.2

In effecting the consultation of C.1.1.1 the Administration proposing the change shall furnish all the relevant information in CEPT format, preferably in electronic form. The administrations that are being consulted may request any other information they need to assess the probability of harmful interference to their own service.

C.1.1.2.1

If the administration consulted is responsible for a DVB-T station or SFN, the method of assessing compatibility given in Annex 4, Section E shall be used.

C.1.1.2.2

If the administration consulted is responsible for an analogue television station which may be converted into digital in the future, the method for assessing compatibility given in Annex 4, Section E shall be used.

C.1.1.2.3

If an incompatibility resulting from C.1.1.2.1 or C.1.1.2.2, has been identified the administrations concerned should try to reach agreement.

C.1.1.3

If agreement is reached between the administration concerned and if the provisions of paragraph 2.2 of this Article have resulted in agreement, the administration proposing the change may proceed with its project. Administrations which have been consulted in accordance with C.1.1.1 and have not replied within ten weeks shall be sent an urgent reminder. Administrations which have not replied within two weeks following the dispatch of the urgent reminder shall be considered to have agreed to the proposed change.

C.1.1.4

If no agreement is reached between the administrations concerned, and the administration making the proposal wishes to withdraw its proposal, the consulted administrations shall be informed.

C.1.2

The administration proposing the change may proceed with its project without consulting other administrations if the proposed modification relates to a reduction in power or to other changes of technical characteristics which would reduce the probability of harmful interference to services of other countries.

C.1.3

In all cases, after agreement has been reached, the administration proposing the change shall inform the ERO in CEPT format in electronic form of the station's agreed characteristics together with the names of the countries consulted. Administrations are encouraged to notify their stations of services other than broadcasting to ITU-BR.

2 Additional procedures in the Frequency Bands 216 to 230 MHz, 582 to 606 MHz and 790 to 862 MHz, and for television broadcasting stations with an effective antenna height of more than 1200 m

2.1 Procedure for Broadcasting Stations

2.1.1 Any Contracting Administration proposing to change the technical characteristics of any of its broadcasting stations appearing in the Plan or to operate broadcasting stations not appearing in the Plan, shall first inform the ITU-BR, furnishing the technical information specified in sub-paragraphs A.1.1.2 or B.1.1.2.

2.1.2 In accordance with the Stockholm Agreement, the ITU-BR will publish this information in a special section of its weekly circular, indicating that comments on such information should be sent directly to the administration originating the proposal.

2.1.3 Such comments must be received by the administration originating the proposal within the twelve weeks following the date of the weekly circular in question. Administrations which have not furnished such comments within this period shall be considered to have agreed to the proposed change.

2.1.4 If no comments have been received at the expiry of the period of twelve weeks referred to in sub-paragraph 2.1.3 above, or if agreement has been reached with the administration making these comments, the administration proposing the change may proceed with its project, and shall inform the ITU-BR in the manner specified in paragraphs A.1.3 or B.1.3.

2.2 Procedure for Stations of Services other than broadcasting

For stations of services other than broadcasting, the provisions of the Radio Regulations shall apply, taking into account the categories of service and allocations specified in Article S5 thereof. Contracting Administrations proposing to change the technical characteristics of such stations or to establish new stations of such services shall take into account the broadcasting stations appearing in the Plan or brought into use in accordance with this Agreement and shall do so after reaching mutual agreement with the administrations that may be concerned.

3 Procedure common to all Frequency Bands

3.1 If a change, although made in accordance with the provisions of Sections 1 and 2 of this Article, causes harmful interference to services of other Contracting Administrations, the administration which has made the change shall take the requisite action to eliminate such interference.

3.2 If, after application of the procedure defined in sub-paragraphs A.1.1.1, A.1.1.2 and A.1.1.3, or, B.1.1.1, B.1.1.2 and B.1.1.3, or, C.1.1.1, C.1.1.2 and C.1.1.3 on the one hand, and paragraphs 2.1 and 2.2 of this Article on the other hand, no agreement has been reached between the administrations concerned, recourse may be had to the procedures defined in Article 56 of the Constitution 'Settlement of Disputes' or in Article 41 'Arbitration Procedure' of the Convention, of the International Telecommunication Union.

ARTICLE 5

Compatibility and sharing with other radiocommunication services

5.1 Annex 5 of the Multilateral Coordination Agreement contains the methods and criteria for assessing compatibility between DVB-T and other services, to be used for the coordination of DVB-T and other primary service assignments.

5.2 Annex 5 may need to be modified to take account of further technical studies or practical experience gained during the introduction of DVB-T. Such modifications will need to be agreed to in accordance with Article 10 of this Agreement.

5.3 The procedures for the coordination of DVB-T and other primary services are contained in Article 4 of this Agreement.

ARTICLE 6

Accession to the Multilateral Coordination Agreement

6.1 Any CEPT Administration which has not signed the Multilateral Coordination Agreement may at any time deposit an instrument of accession with the Managing Administration, who shall immediately inform the other administrations.

6.2 Any administration within the European Broadcasting Area and immediate neighbouring countries may, at any time subsequent to the meeting of CEPT administrations in Chester on 25 July 1997, deposit an instrument of accession with the Managing Administration, who shall immediately inform the other administrations.

6.3 Accession to the Multilateral Coordination Agreement shall be made without reservation and shall apply to the ST61 Plan as it stands at the time of accession.

6.4 Accession to the Multilateral Coordination Agreement shall become effective on the date on which the instrument of accession is received by the Managing Administration.

ARTICLE 7

Scope of application of the Multilateral Coordination Agreement

7.1 The Multilateral Coordination Agreement shall bind Contracting Administrations in their relations with one another but shall not bind those administrations in their relations with non-Contracting Administrations.

7.2 If a Contracting Administration enters reservations with regard to any provision of this Multilateral Coordination Agreement, other Contracting Administrations shall be free to disregard such provisions in their relations with the administration which has made such reservations.

ARTICLE 8

Denunciation of the Multilateral Coordination Agreement

8.1 Any Contracting Administration may denounce this Multilateral Coordination Agreement at any time by a notification sent to the Managing Administration, who shall inform the other Contracting Administrations.

8.2 Denunciation shall become effective one year after the date on which the Managing Administration receives the notification of denunciation.

ARTICLE 9

Notification of this Multilateral Coordination Agreement to the ITU

9. In accordance with No. S6.5 of the Radio Regulations, the Managing Administration shall notify the Secretary-General of the ITU of the conclusion and content of this Multilateral Coordination Agreement and shall provide details of:

- the expiry of the Multilateral Coordination Agreement;
- any administration which accedes to this Multilateral Coordination Agreement;
- any administration which denounces this Multilateral Coordination Agreement.

ARTICLE 10

Revision of the Multilateral Coordination Agreement

10.1 No revision of this Multilateral Coordination Agreement shall be undertaken except by a meeting to which at least all the Contracting Administrations shall be invited. The Managing Administration shall convene such a meeting at the request of at least 50% of the Contracting Administrations. The Managing Administration shall, on receipt of a request from a Contracting Administration, consult all Contracting Administrations to determine whether the necessary majority exists.

10.2 When new or revised technical data are required, these may be included as part of the Multilateral Coordination Agreement by the procedure given in 10.3.

10.3 New or revised technical data may be prepared in the form of ERC Decisions, developed by the Working Groups of the ERC and approved by the ERC according to its Rules of Procedure. The provisions of any new or revised technical data shall be applied between the administrations that have committed themselves to implement the associated ERC Decision.

ARTICLE 11

Entry into force and duration of the Multilateral Coordination Agreement

11.1 This Multilateral Coordination Agreement shall enter into force on 25 September 1997, at 0001 hours UTC.

11.2 This Multilateral Coordination Agreement shall remain in force until it is abrogated by a meeting to which all the Contracting Administrations shall be invited. The Managing Administration shall convene such a meeting at the request of at least 50% of the Contracting Administrations. The Managing Administration shall, on receipt of a request from a Contracting Administration, consult all Contracting Administrations to determine whether the necessary majority exists.

ARTICLE 12

Cases where ratification or confirmation is required

12.1 In accordance with the constitutional rules in force in their respective countries, some administrations may only sign this Multilateral Coordination Agreement subject to ratification or confirmation.

12.2 The instrument of ratification or confirmation shall be deposited with the Administration of the United Kingdom of Great Britain and Northern Ireland, which shall notify the Contracting Administrations of each deposit of ratification or confirmation. Ratifying or Confirming Administrations will undertake completion of the necessary process as soon as practical.

IN WITNESS WHEREOF the undersigned Representatives of CEPT Administrations have signed the originals in each of the English, French and German languages of this Multilateral Coordination Agreement, each version being authentic. These originals shall be deposited in the archives of the Administration of the United Kingdom of Great Britain and Northern Ireland which shall forward a copy to each Contracting Administration.

Done at Chester, 25 July 1997

For the Administration of Austria:

(Gerd Lettner)

For the Administration of Belgium:

(Michaël Vandroogenbroek)

For the Administration of the Republic of Bulgaria:

(Bojidar Kojouharov)

For the Administration of the Republic of Croatia:

for

(Dominik Filipovic)

subject of Ratification

For the Administration of the Czech Republic:

(Frantisek Hesoun)

(subject to confirmation)

For the Administration of Denmark:

(Henning Andersen)

(Jørn Andersen)

(Jens Anker Heegaard)

For the Administration of the Republic of Estonia:

(Jüri Jõema)

For the Administration of Finland:

(Kari Kangas)

(Ari Lahtinen)

For the Administration of France:

(Gérard Gaucherelle)

(Jean Lemaire)

For the Administration of the Federal Republic of Germany:

(Lieselotte Weber)

(Manfred Maegele)

For the Administration of Greece:

(Andreas Garyfallos) subject to the procedures of Art. 12 and to the reservation recorded in the minutes

(Fanourios Papadimitrakis)

(Vassilios Houdzoumis) Subject to the procedures of Art. 12 and to the reservation recorded in the minutes of 25/7/1997

For the Administration of the Republic of Hungary:

(Cecilia Somodi) subject to confirmation

For the Administration of Ireland:

(John Walsh)

(Rory Hinchy)

For the Administration of Italy:

(Angelo Canzio)

For the Administration of the Republic of Latvia:

(Inārs Jekabsons)

(Karlis Bogens)

For the Administration of the Republic of Lithuania:

(Mindaugas Zilinskas)

For the Administration of the Grand Duchy of Luxembourg:

(Edouard Wangen)

For the Administration of the Republic of Moldova:

(Ion Madan)

For the Administration of the Kingdom of the Netherlands:

(Jan Ter Horst)

For the Administration of Norway:

(Stein Gudbjorgsrud)

For the Administration of the Republic of Poland:

(Marian Kislo)

For the Administration of Portugal:

(Pedro Coito)

For the Administration of Romania:

(Elena Dănilă)

For the Administration of the Russian Federation:

(Leonid Dmitriev)

For the Administration of the Slovak Republic:

(Juraj Oravec)

For the Administration of the Republic of Slovenia:

(Dušan Tercelj)
subject to ratification

For the Administration of Spain:

(Roberto Sanchez Sanchez)

For the Administration of Sweden:

(Anders Frederich)

For the Swiss Federal Administration:

(Frédéric Roth)

For the Administration of Ukraine:

(Oleksii Karpenko)

For the Administration of the United Kingdom of Great Britain and Northern Ireland:

(Keith Whittingham)

(Nigel Laffin)

(Brian Tait)

(Ahmad Atefi)

For the Administration of the Vatican City State:

(Antonio Stefanizzi)

(Pier Vincenzo Giudici)

ANNEX 1

Technical criteria to be used in the coordination of DVB-T

1. Coverage definitions for DVB-T

Digital television service coverages are characterised by a very rapid transition from near perfect reception to no reception and it thus becomes much more critical to be able to define which areas are going to be covered and which are not. However, because of the very rapid transition of the DVB-T system, there is a cost penalty if the coverage target within a small area (say, 100 m by 100 m) is set too high. This occurs because it is necessary either to increase the transmitter powers or to provide a larger number of transmitters in order to guarantee coverage to the last few percent of the worst-served small areas.

For this reason, the coverage definition of “good” has been selected as the case where 95% of the locations within a small area are covered. Similarly, “acceptable” has been defined to be the case where 70% of the locations within a small area are covered.

The definitions do not aim to describe the area where coverage is achieved under worst case conditions. They provide a description of the area where "good" or "acceptable" coverage should be achieved under representative practical conditions.

It should be borne in mind that in a given situation it may be possible to improve reception by:

- finding a better position for the receiving antenna;
- using a (more) directional receiving antenna with a higher gain;
- using a low-noise antenna amplifier (in the case of fixed antenna reception).

1.1 Fixed antenna reception

Fixed antenna reception is defined as ‘reception where a directional receiving antenna mounted at roof level is used’.

In calculating the field strength for fixed antenna reception a receiving antenna height of 10 m above ground level is considered to be representative.

1.2 Portable antenna reception

Portable antenna reception is defined as:

- Class A (outdoor) being reception where a portable receiver with an attached or built-in antenna is used outdoors at no less than 1.5 m above ground level;
- Class B (ground floor, indoor) being reception where a portable receiver with an attached or built-in antenna is used indoors at no less than 1.5 m above floor level in rooms:
    - on the ground floor;
    - with a window in an external wall.

Portable indoor reception at the first or higher floors will be regarded as class B reception with signal level corrections applied, but indoor ground floor reception is likely to be the most common case.

1.3 Coverage area

In defining the coverage area for each reception condition a three level approach is taken.

Level 1: Receiving location

The smallest unit is a receiving location. A receiving location is regarded as being covered if the level of the wanted signal is high enough to overcome noise and interference for a given percentage of the time. A value of 99% of time is recommended.

Level 2: Small area coverage

The second level is a "small area" (typically 100 m by 100 m).
In this small area the percentage of covered locations is indicated.

The coverage of this small area is classified as:

"Good" if at least 95% of receiving locations within it are covered;

"Acceptable" if at least 70% of locations within it are covered.

Level 3: Coverage area

The coverage area of a transmitter, or a group of transmitters, is made up of the sum of the individual small areas in which a given percentage (70% or 95%) of coverage is achieved.

Frequency bands to be used for DVB-T

The frequency bands for implementation of DVB-T in the European Broadcasting Area are 174 to 230 MHz and 470 to 862 MHz. However, the CEPT considers the frequency band 216 to 230 MHz as the core band for T-DAB in VHF.

1.4 Analogue television channel rasters

In Band III, different television channel rasters are used across Europe. In Eastern Europe, France and Ireland, channels are 8 MHz wide, in other countries the channel width is 7 MHz. In addition, there are different channel rasters in countries using 7 MHz channels (e.g. Italy). This means that, in the VHF Bands, there is a number of cases where channels overlap.

Within Bands IV and V, there is a single channel raster of 8 MHz, with the upper and lower edges, and vision carrier, of each channel being the same for all countries in Europe. The only differences are in the use of channels in the upper end of Band V and in the frequency separation between the sound and vision carriers.

2. Field strength prediction model

As a basis, Rec. ITU-R P.370 will be used to predict the field strength values, however:

- no correction will be applied for Δh-values other than 50 meters;
- no use will be made of a terrain clearance angle correction due to the absence of a common European topographical database;
- propagation predictions should include a mixed-path calculation with an agreed land/sea boundary being derived from the ITU-R boundary map files or some other suitable source.

On a bilateral or multilateral agreement, more detailed propagation prediction methods can be used. Such methods do not need to be specified or identified by the CEPT.

3. Signal levels for DVB-T

Due to the very rapid transition from near perfect to no reception, it is necessary that the minimum required signal level is achieved at a high percentage of locations. These percentages have been set at 95 for "good" and 70 for "acceptable" reception. Corresponding minimum median signal levels may be derived, taking account of propagation elements, to ensure that the minimum values are achieved at the specified percentage of locations. The figures are derived assuming a receiver noise figure of 7 dB.

The minimum median signal levels are calculated for:

- 8 MHz channels; for 7 MHz channels, 0.6 dB should be subtracted from the relevant results given in the tables of minimum median equivalent field strength;
- three different receiving conditions:
    - fixed antenna reception;
    - portable outdoor reception (Class A);
    - portable indoor reception at ground floor (Class B);
- frequencies representing Band III, Band IV and Band V: 200, 500 and 800 MHz;
- representative C/N ratios: 2, 8, 14, 20 and 26 dB, including an implementation margin of 3 dB

Representative C/N values are used for these examples. Results for any chosen DVB-T system variant (see Table A1.1) may be obtained by interpolation between relevant representative values. The C/N values in Table A1.1 do not include any implementation margin. Typical C/N results from laboratory tests are about 3 dB higher than the values given in Table A1.1

All minimum median equivalent field strength values are for coverage by a single transmitter only, not for Single Frequency Networks.

Table A1.1

Required C/N (dB) for non-hierarchical transmission to achieve a BER = 2. 10^{-4} after the Viterbi decoder for all combinations of coding rates and modulation types. The net bit rates after the Reed-Solomon decoder are also listed.

			Required C/N for BER=2. 10^{-4} after Viterbi (quasi error-free after Reed-Solomon, *)			Net bit rate (Mbit/s)			
System variant	Modulation	Code Rate	Gaussian channel	Ricean channel (F_1)	Rayleigh channel (P_1)	D/T_U =1/4	D/T_U =1/8	D/T_U =1/16	D/T_U =1/32
A1	QPSK	1/2	3.1	3.6	5.4	4.98	5.53	5.85	6.03
A2	QPSK	2/3	4.9	5.7	8.4	6.64	7.37	7.81	8.04
A3	QPSK	3/4	5.9	6.8	10.7	7.46	8.29	8.78	9.05
A5	QPSK	5/6	6.9	8.0	13.1	8.29	9.22	9.76	10.05
A7	QPSK	7/8	7.7	8.7	16.3	8.71	9.68	10.25	10.56
B1	16-QAM (M1 **)	1/2	8.8	9.6	11.2	9.95	11.06	11.71	12.06
B2	16-QAM	2/3	11.1	11.6	14.2	13.27	14.75	15.61	16.09
B3	16-QAM	3/4	12.5	13.0	16.7	14.93	16.59	17.56	18.10
B5	16-QAM	5/6	13.5	14.4	19.3	16.59	18.43	19.52	20.11
B7	16-QAM	7/8	13.9	15.0	22.8	17.42	19.35	20.49	21.11
C1	64-QAM (M2 **)	1/2	14.4	14.7	16.0	14.93	16.59	17.56	18.10
C2	64-QAM (M3 **)	2/3	16.5	17.1	19.3	19.91	22.12	23.42	24.13
C3	64-QAM	3/4	18.0	18.6	21.7	22.39	24.88	26.35	27.14
C5	64-QAM	5/6	19.3	20.0	25.3	24.88	27.65	29.27	30.16
C7	64-QAM	7/8	20.1	21.0	27.9	26.13	29.03	30.74	31.67

Notes: (*) Quasi error-free means less than one uncorrected error event per hour, corresponding to BER = 1. 10^{-11} at the input of the MPEG-2 demultiplexer.

(**) System modes adopted by ITU-R as representative for protection ratio assessments

To account for the number of carriers and the guard interval ratio, D/T_u, the designators given in Table A1.2 should be used. See also Table A3.2 (digital television transmitter database structure).

Table A1.2

Designator	Number of carriers	Guard interval ratio
A	2k	1/32
B	2k	1/16
C	2k	1/8
D	2k	1/4
E	8k	1/32
F	8k	1/16
G	8k	1/8
H	8k	1/4

3.1 Location variation of the received signal

Within a small area, say 100 m by 100 m, there will be a more-or-less random variation of the received signal level with location which is due to terrain irregularities. The statistics of this variation are characterised by a log-normal distribution.

For calculating the location correction factor C_l used when other than 50% locations are to be considered, a log-normal distribution of the received signal is assumed.

The location correction factor can be calculated by the formula:

$$C_l = \mu * \sigma \{dB\}$$

where:

μ is the distribution factor, being 0.52 for 70% and 1.64 for 95%;

σ is the standard deviation.

3.2 Calculation of minimum median equivalent field strength

The minimum median equivalent field strength can be calculated using the following formulas:

P_n	$= F + 10 \log_{10} (k\, T_0\, B)$	
$P_{s\,min}$	$= C/N + P_n$	
A_a	$= G + 10 \log_{10} (1.64\lambda^2/4\pi)$	
ϕ_{min}	$= P_{s\,min} - A_a + L_f$	for fixed antenna reception
ϕ_{min}	$= P_{s\,min} - A_a$	for portable reception
E_{min}	$= \phi_{min} + 120 + 10 \log_{10} (120\pi)$	
	$= \phi_{min} + 145.8$	
E_{med}	$= E_{min} + P_{mmn} + C_l$	for fixed antenna reception
E_{med}	$= E_{min} + P_{mmn} + C_l + L_h$	for portable outdoor reception
E_{med}	$= E_{min} + P_{mmn} + C_l + L_h + L_b$	for portable indoor reception

where:

P_n : Receiver noise input power {dBW}

F : Receiver noise figure {dB}

k : Boltzmann's Constant ($k = 1.38\ 10^{-23}$ {Ws/K})

T_0 : Absolute temperature ($T_0 = 290$ {K})

B : Receiver noise bandwidth ($B = 7.61\ 10^6$ {Hz})

$P_{s\,min}$: Minimum receiver input power {dBW}

C/N : RF signal to noise ratio at the receiver input required by the system {dB}

A_a : Effective antenna aperture {dBm^2}

G : Antenna gain related to half dipole {dB}

λ : Wavelength of the signal {m}

ϕ_{min} : Minimum power flux density at receiving place {dBW/m^2}

L_f : Feeder loss {dB}

E_{min} : Equivalent minimum field strength at receiving place {dBµV/m}

E_{med} : Minimum median equivalent field strength, planning value {dBµV/m}

P_{mmn} : Allowance for man made noise {dB}

C_l : Location correction factor {dB}

L_h : Height loss (10 m agl to 1.5 m agl) {dB}

L_b : Building penetration loss {dB}

3.3 Fixed reception

3.3.1 Signal level variation

Measurements of digital signals have shown that the standard deviation of the distribution will be about 5.5 dB. There will be some dependency on the environment surrounding the receiving location, for example for portable reception. The standard deviation for analogue television signals interfering with DVB-T is also taken as 5.5 dB.

3.3.2 Antennas for fixed reception

The antenna diagrams (directivity) to be used for DVB-T planning are given in Rec. ITU-R BT.419. The antenna gains (relative to half wave dipole) used in the derivation of the minimum median wanted signal levels are given in Table A1.3:

Table A1.3

200 MHz	500 MHz	800 MHz
7 dB	10 dB	12 dB

These values are considered as realistic minimum values.

Within Bands IV and V, the variation of antenna gain with frequency may be taken into account by the addition of an empirical correction term:

$$Corr = 10 \log_{10} (F_A/F_R) \{dB\}$$

where:

F_A is the actual frequency being considered;
F_R is the relevant reference frequency quoted above.

The associated feeder losses used in the derivation of the minimum wanted signal levels are given in Table A1. 4:

Table A1.4

200 MHz	500 MHz	800 MHz
2 dB	3 dB	5 dB

3.3.3 Minimum median equivalent field strength

The tables below give the minimum median equivalent field strength for 70% and 95% of location probability in Bands III, IV and V.

Within Bands IV and V, the variation of the minimum median equivalent field strength with frequency may be taken into account by the addition of an empirical correction term:

$$Corr = 20 \log_{10} (F_A/F_R) \{dB\}$$

where:

F_A is the actual frequency being considered;
F_R is the relevant reference frequency quoted in the Table.

Table A1.5

Minimum median equivalent field strength in Band III for fixed antenna reception.

Frequency	f {MHz}	200				
Minimum C/N required by system	**{dB}**	**2**	**8**	**14**	**20**	**26**
Min. equivalent receiver input voltage, 75 Ω	$U_{s\,min}$ {dBµV}	13	19	25	31	37
Feeder loss	L_f {dB}	2				
Antenna gain rel. to half wave dipole	G_D {dB}	7				
Effective antenna aperture	A_a {dBm^2}	1.7				
Min equivalent field strength at receiving place	E_{min} {dBµV/m}	20	26	32	38	44
Allowance for man made noise	P_{mmn} {dB}	1				

Location probability: 70%

Location correction factor	C_l {dB}	2.9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	24	30	36	42	48

Location probability: 95%

Location correction factor	C_l {dB}	9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	30	36	42	48	54

For 7 MHz channels, 0.6 dB is to be subtracted from the input signal voltage and field strength values given in Table A1.5.

Table A1.6

Minimum median equivalent field strength in Band IV for fixed antenna reception.

Frequency	f {MHz}	500				
Minimum C/N required by system	**{dB}**	**2**	**8**	**14**	**20**	**26**
Min. equivalent receiver input voltage, 75 Ω	$U_{s\,min}$ {dBµV}	13	19	25	31	37
Feeder loss	L_f {dB}	3				
Antenna gain rel. to half wave dipole	G_D {dB}	10				
Effective antenna aperture	A_a {dBm^2}	-3.3				
Min equivalent field strength at receiving place	E_{min} {dBµV/m}	26	32	38	44	50
Allowance for man made noise	P_{mmn} {dB}	0				

Location probability: 70%

Location correction factor	C_l {dB}	2.9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	29	35	41	47	53

Location probability: 95%

Location correction factor	C_l {dB}	9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	35	41	47	53	59

Table A1.7

Minimum median equivalent field strength in Band V fixed antenna reception.

Frequency	f {MHz}	800				
Minimum C/N required by system	**{dB}**	**2**	**8**	**14**	**20**	**26**
Min. equivalent receiver input voltage, 75 Ω	$U_{s\,min}$ {dBμV}	13	19	25	31	37
Feeder loss	L_f {dB}	5				
Antenna gain rel. to half wave dipole	G_D {dB}	12				
Effective antenna aperture	A_a {dBm^2}	-5.4				
Min equivalent field strength at receiving place	E_{min} {dBμV/m}	30	36	42	48	54
Allowance for man made noise	P_{mmn} {dB}	0				

Location probability: 70%

Location correction factor	C_l {dB}	2.9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBμV/m}	33	39	45	51	57

Location probability: 95%

Location correction factor	C_l {dB}	9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBμV/m}	39	45	51	57	63

3.4 Portable reception

3.4.1 General

The conditions for portable reception differ from fixed reception in the:

- absence of receiving antenna gain and directivity;
- reduced feeder loss;
- generally lower reception height;
- building penetration loss in the case of indoor reception.

It has been assumed that a portable receiver and a receiver for fixed reception have the same receiver noise figure, that is, 7 dB.

3.4.2 Antennas for portable reception

It is assumed that the antenna of a portable receiver is omni-directional and that the gain (relative to a λ/2 dipole) is 0 dB for a UHF antenna and -2.2 dB for a VHF antenna. A portable receiver can be assumed to have 0 dB feeder loss in all bands.

Generally, no polarisation discrimination can be expected from this type of portable reception antenna.

3.4.3 Signal level variations

Field strength variations can be divided into macro-scale and micro-scale variations. Micro-scale variations relate to areas with dimensions in the order of a wavelength and are mainly caused by multipath reflections from nearby objects. As the position of the receiving antenna for portable reception can be optimised within the order of a wavelength, micro-scale variations will not be significant for planning purposes.

The macro-scale variations relate to areas with linear dimensions of 10 m to 100 m or more and are mainly caused by shadowing and multipath reflections from distant objects. Macro-scale variations of the field strength are very important for coverage assessment. In general, a high target percentage for coverage is required to compensate for the rapid failure rate of digital television signals.

3.4.3.1 Macro-scale variations at outdoor locations

Rec. ITU-R P.370 gives a standard deviation for wide band signals of 5.5 dB. This value is used here for determining the location variation at outdoor locations.

This location variation for macro-scale variations is given in Table A1.8:

Table A1.8

Coverage target	Location variation
> 95%	9 dB
> 70%	2.9 dB

3.4.4 Height loss for received signal

For portable reception, the antenna height of 10 m above ground level generally used for planning purposes is not realistic and a correction factor needs to be introduced based on a receiving antenna near ground floor level. For this reason a receiving antenna height of 1.5 m above ground level (outdoor) or above floor level (indoor) has been assumed.

The propagation prediction method of Rec. ITU-R P.370 uses a receiving height of 10 m. To correct the predicted values for a receiving height of 1.5 m above ground level a factor called "height loss" has been introduced. At UHF, a height loss of 12 dB is used, based on measurements in the Netherlands. For VHF, a height loss of 10 dB is used, taken from Rec. ITU-R 1203.

3.4.5 Building penetration loss of the received signal

3.4.5.1 Definition

The mean building penetration loss is the difference in dB between the mean field strength inside a building at a given height above ground level and the mean field strength outside the same building at the same height above ground level. A large spread of building penetration losses is to be expected.

3.4.5.2 Building penetration loss values

Results of measurements carried out at VHF in the UK to investigate in-house reception of T-DAB have been reported in Rep. ITU-R 1203. The results indicate a median value of building penetration loss of 8 dB with a standard deviation of 3 dB.

For UHF measurements have been carried out in the Netherlands and in the UK. Based on these results building penetration loss for planning purposes is given in Table A1.9

Table A1.9

Building Penetration Loss

Band	Median value	Standard deviation
VHF	8 dB	3 dB
UHF	7 dB	6 dB

3.4.5.3 Location distribution indoors

The variation factor at indoor locations is the combined result of the outdoor variation and the variation factor due to building attenuation. These distributions are expected to be uncorrelated. The standard deviation of the indoor field strength distribution can therefore be calculated by taking the root of the sum of the squares of the individual standard deviations. At VHF, where the macro-scale standard deviations are 5.5 dB and 3 dB respectively, the combined value is 6.3 dB. At UHF, where the macro-scale standard deviations are 5.5 dB and 6 dB respectively, the combined value is 8.1 dB.

For planning purposes, the location variation at indoor locations is given in Table A1.10.

Table A1.10

Indoor Location Variation

Coverage target	VHF	UHF
> 95%	10 dB	14 dB
> 70%	3 dB	4 dB

3.4.6 Minimum median equivalent field strength

The tables below give the minimum median equivalent field strength for location probabilities of 70% and 95% in Band III, IV and V.

Table A1.11

Minimum median equivalent field strength in Band III for portable outdoor reception (Class A)

Frequency	f {MHz}	200				
Minimum C/N required by system	**{dB}**	**2**	**8**	**14**	**20**	**26**
Min. equivalent receiver input voltage, 75 Ω	$U_{s\,min}$ {dBµV}	13	19	25	31	37
Antenna gain rel. to half wave dipole	G_D {dB}	-2.2				
Effective antenna aperture	A_a {dBm^2}	-7.5				
Min equivalent field strength at receiving place	E_{min} {dBµV/m}	27	33	39	45	51
Allowance for man made noise	P_{mmn} {dB}	1				
Height loss	L_h {dB}	10				

Location probability: 70%

Location correction factor	C_l {dB}	2.9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	41	47	53	59	65

Location probability: 95%

Location correction factor	C_l {dB}	9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	47	53	59	65	71

For 7 MHz channels, 0.6 dB is to be subtracted from the input signal voltage and field strength values given in Table A1.11.

Table A1.12

Minimum median equivalent field strength in Band IV for portable outdoor reception (Class A)

Frequency	f {MHz}	500				
Minimum C/N required by system	**{dB}**	**2**	**8**	**14**	**20**	**26**
Min. equivalent receiver input voltage, 75 Ω	$U_{s\,min}$ {dBµV}	13	19	25	31	37
Antenna gain rel. to half wave dipole	G_D {dB}	0				
Effective antenna aperture	A_a {dBm^2}	-13,3				
Min equivalent field strength at receiving place	E_{min} {dBµV/m}	33	39	45	51	57
Allowance for man made noise	P_{mmn} {dB}	0				
Height loss	L_h {dB}	12				

Location probability: 70%

Location correction factor	C_{lc} {dB}	2.9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	48	54	60	66	72

Location probability: 95%

Location correction factor	C_{lc} {dB}	9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	54	60	66	72	78

Table A1.13

Minimum median equivalent field strength in Band V for portable outdoor reception (Class A)

Frequency	f {MHz}	800				
Minimum C/N required by system	**{dB}**	**2**	**8**	**14**	**20**	**26**
Min. equivalent receiver input voltage, 75 Ω	$U_{s\,min}$ {dBµV}	13	19	25	31	37
Antenna gain rel. to half wave dipole	G_D {dB}	0				
Effective antenna aperture	A_a {dBm^2}	-17.4				
Min equivalent field strength at receiving place	E_{min} {dBµV/m}	37	43	49	55	61
Allowance for man made noise	P_{mmn} {dB}	0				
Height loss	L_h {dB}	12				

Location probability: 70%

Location correction factor	C_l {dB}	2.9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	52	58	64	70	76

Location probability: 95%

Location correction factor	C_l {dB}	9				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	58	64	70	76	82

Table A1.14

Minimum median equivalent field strength in Band III for portable indoor reception at ground floor (Class B)

Frequency	f {MHz}	200				
Minimum C/N required by system	**{dB}**	**2**	**8**	**14**	**20**	**26**
Min. equivalent receiver input voltage, 75 Ω	$U_{s\,min}$ {dBµV}	13	19	25	31	37
Antenna gain rel. to half wave dipole	G_D {dB}	-2.2				
Effective antenna aperture	A_a {dBm^2}	-7.5				
Min equivalent field strength at receiving place	E_{min} {dBµV/m}	27	33	39	45	51
Allowance for man made noise	P_{mmn} {dB}	1				
Height loss	L_h {dB}	10				
Building penetration loss	L_b {dB}	8				

Location probability: 70%

Location correction factor	C_l {dB}	3				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	49	55	61	67	73

Location probability: 95%

Location correction factor	C_l {dB}	10				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	56	62	68	74	80

Note: Minimum median equivalent field strength values at 10 m agl for 50% of time and 50% of locations are estimated to be:

- 5 dB lower than the values shown if reception is required in rooms at the first floor;
- 10 dB lower than the values shown if reception is required in rooms higher than the first floor.

For 7 MHz channels, 0.6 dB is to be subtracted from the input signal voltage and field strength values given in Table A1.14.

Table A1.15

Minimum median equivalent field strength in Band IV for portable indoor reception at ground floor (Class B)

Frequency	f {MHz}	500				
Minimum C/N required by system	**{dB}**	**2**	**8**	**14**	**20**	**26**
Min. equivalent receiver input voltage, 75 Ω	$U_{s\,min}$ {dBµV}	13	19	25	31	37
Antenna gain rel. to half wave dipole	G_D {dB}	0				
Effective antenna aperture	A_a {dBm^2}	-13.3				
Min equivalent field strength at receiving place	E_{min} {dBµV/m}	33	39	45	51	57
Allowance for man made noise	P_{mmn} {dB}	0				
Height loss	L_h {dB}	12				
Building penetration loss	L_b {dB}	7				

Location probability: 70%

Location correction factor	C_l {dB}	4				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	56	62	68	74	80

Location probability: 95%

Location correction factor	C_l {dB}	14				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	66	72	78	84	90

Note: Minimum median equivalent field strength values at 10 m agl for 50% of time and 50% of locations are estimated to be:

- 6 dB lower than the values shown if reception is required in rooms at the first floor;
- 12 dB lower than the values shown if reception is required in rooms higher than the first floor.

Table A1.16

Minimum median equivalent field strength in Band V for portable indoor reception at ground floor (Class B)

Frequency	f {MHz}	800				
Minimum C/N required by system	**{dB}**	**2**	**8**	**14**	**20**	**26**
Min. equivalent receiver input voltage, 75 Ω	$U_{s\,min}$ {dBµV}	13	19	25	31	37
Antenna gain rel. to half wave dipole	G_D {dB}	0				
Effective antenna aperture	A_a {dBm^2}	-17.4				
Min equivalent field strength at receiving place	E_{min} {dBµV/m}	37	43	49	55	61
Allowance for man made noise	P_{mmn} {dB}	0				
Height loss	L_h {dB}	12				
Building penetration loss	L_b {dB}	7				

Location probability: 70%

Location correction factor	C_l {dB}	4				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	60	66	72	78	84

Location probability: 95%

Location correction factor	C_l {dB}	14				
Minimum median equivalent field strength at 10m a.g.l. 50% of time and 50% of locations	E_{med} {dBµV/m}	70	76	82	88	94

Note: Minimum median equivalent field strength values at 10 m agl for 50% of time and 50% of locations are estimated to be:

- 6 dB lower than the values shown if reception is required in rooms at the first floor;
- 12 dB lower than the values shown if reception is required in rooms higher than the first floor.

4. Protection ratios

The reference power for protection ratio evaluation is:

- for DVB-T, the average signal power (heating) of the COFDM signal measured in the system bandwidth
- for analogue television, generally, the rms power of the vision signal at the sync peak, but in the case of SECAM L, the peak white level.

The protection ratios relevant to a given interference are evaluated without noise or other interference, at the relevant quality target, and are expressed in dB.

For a wanted DVB-T signal the required protection ratios are preferably measured for a BER of $2.\,10^{-4}$ after Viterbi decoding, corresponding to a BER of $< 1.\,10^{-11}$ at the input of the MPEG-2 demultiplexer, and to approximately one uncorrected error per hour. In case of digital signals as wanted signal, all protection ratio values relate to both tropospheric and continuous interference.

For analogue television wanted signals, tropospheric interference is determined for quality grade 3 and continuous interference for quality grade 4.

For adjacent channel and overlapping channel cases the protection ratio values are related to an out-of-channel spectrum attenuation of 40 dB. This 40 dB figure is only used for protection ratio measurements and is not recommended for real DVB-T transmitters.

The ITU reference document is ITU-R Recommendation: "Planning Criteria for Digital Terrestrial Television Services in the VHF/UHF Television Bands" (at present numbered Rec. ITU-R. XYZ).

4.1 DVB-T interfered with by DVB-T

Table A1.17 gives co-channel Protection Ratios (rounded to the nearest integer), obtained by measurements or by the extrapolation method given below.

Table A1.17

Co-channel protection ratios (dB) for DVB-T interfered with by DVB-T

ITU-Mode	Modulation	Code rate	PR (*) Gaussian	PR (**) Rice	PR (**) Rayleigh
	QPSK	1/2	5	7	8
M1	16-QAM	1/2		13	14
	16-QAM	3/4	14	16	20
M2	64-QAM	1/2		18	19
M3	64-QAM	2/3	19	20	22

(*) Measurement results, IF loop, 2K mode; (**) Extrapolated result

Protection ratios for the various modes and for the various channel types (i.e. Gaussian, Ricean, or Raleigh) can be derived by the required C/N given in Table A1.1, increased by a system implementation loss Δ_1 of 3 dB. For fixed and portable reception, the figures relevant to the Ricean and Rayleigh channels respectively should be adopted.

For **adjacent and image channel interference** a protection ratio of -40 dB is assumed to be an appropriate value due to lack of data.

For **overlapping channels**, in the absence of measurement information, the protection ratio should be extrapolated from the co-channel ratio figure as follows:

$PR = PR(CCI) + 10 \log_{10} (BO / BW)$

PR(CCI) is the co-channel ratio

BO is the bandwidth (in MHz) in which the two DVB-T signals are overlapping

BW is the bandwidth (in MHz) of the wanted signal

PR = -40 dB should be used when the above formula gives PR < -40 dB

4.2 DVB-T interfered with by analogue television

The protection ratios for wanted DVB-T apply to both continuous and tropospheric interference.

In all tables the so-called non-controlled frequency conditions are used. Introducing precisely controlled frequency offsets between the analogue and digital signals, significant lower co-channel required signal to interference ratios have been measured. With precisely controlled frequency position lower protection values can be reached. Further studies of using controlled offset for DVB-T are necessary

4.2.1 Co-channel protection ratios

According to the available measurements the same protection ratio values are applicable for 2k and 8k modes.

Table A1.18

Co-channel protection ratios (dB) for DVB-T 7 and 8 MHz interfered with by analogue television and CW (non-controlled frequency condition)

	Protection Ratio														
Constellation	**QPSK**					**16QAM**					**64 QAM**				
Code Rate	**1/2**	**2/3**	**3/4**	**5/6**	**7/8**	**1/2**	**2/3**	**3/4**	**5/6**	**7/8**	**1/2**	**2/3**	**3/4**	**5/6**	**7/8**
ITU-Mode						**M1**					**M2**	**M3**			
CW and PAL/SECAM with teletext and sound carriers	-12	-8	-5	2	6	-8	-4	0	9	16	-3	4	10	17	24

The PAL/SECAM figures are valid for all sound carrier modes used in Europe, these are:

MONO FM with a single sound carrier at -10 dB referred to the vision carrier;

DUAL FM and FM + NICAM with two sound carriers at -13 dB and -20 dB level;

AM + NICAM with two sound carriers at respectively -10 dB and -27dB.

The values contained in this table represent the present knowledge of behaviour of the DVB-T systems and are derived from a limited number of measurements mainly with 2k systems. There is a general confidence that the final results will not differ by more than 3 dB.

Reference conditions for coordination are given in Annex 1 Section 8

4.2.2 Lower adjacent channel (n - 1)

Table A1.19

Protection ratios (dB) for DVB-T interfered with by analogue television in the lower adjacent channel (n - 1)

Wanted signal			Interfering signal					
System	**BW**	**Mode**	**PAL B**	**PAL G,B1**	**PAL I**	**PAL D,K**	**SECAM L**	**SECAM D,K**
DVB-T	8 MHz	M1			-43			
		M2			-38			
		M3			-34			
DVB-T	7 MHz	M1	-43					
		M2	-40					
		M3	-37					

4.2.3 Upper adjacent channel (n + 1)

Table A1.20

Protection ratios (dB) for DVB-T interfered with by analogue television in the upper adjacent channel (n + 1)

Wanted signal			Interfering signal					
System	**BW**	**Mode**	**PAL B**	**PAL B1, G**	**PAL I**	**PAL D,K**	**SECAM L**	**SECAM D,K**
DVB-T	8 MHz	M1			-46			
		M2			-40			
		M3			-38			
DVB-T	7 MHz	M1	-43					
		M2	-38					
		M3	-36					

4.2.4 Image channel

Table A1.21

Protection ratios (dB) for DVB-T interfered with by analogue television in the image channel

Wanted signal			Interfering signal					
System	BW	Mode	PAL B	PAL G,B1	PAL I	PAL D,K	SECAM L	SECAM D,K
DVB-T	8 MHz	M1			-58			
		M2			-50			
		M3			-46			

Note: the protection ratios in this table will depend on the intermediate frequency of the receiver.

4.2.5 Overlapping channels*

The frequency difference Δf is the vision carrier frequency of the analogue television signal minus the centre frequency of the DVB-T signal.

Table A1.22

Protection ratios (dB) for DVB-T 8 MHz interfered with by overlapping PAL B

DVB-T 8 MHz (ITU-M3, 64 QAM rate 2/3)													
Δf (MHz)	-9.75	-9.25	-8.75	-8.25	-6.75	-3.95	-3.75	-2.75	-0.75	2.25	3.25	4.75	5.25
PR	-37	-14	-8	-4	-2	1	4	4	4	2	-1	-29	-36

Table A1.23

Protection ratios (dB) for DVB-T 7 MHz interfered with by overlapping PAL B1, D

DVB-T 7 MHz (ITU-M3, 64 QAM rate 2/3)													
Δf (MHz) for B1	-9.25	-8.75	-8.25	-7.75	-6.25	-3.45	-3.25	-2.25	-1.25	-1.75	2.75	4.25	4.75
Δf (MHz) for D	-10.25	-9.75	-9.25	-8.75	-7.25	-3.45	-3.25	-2.25	-1.25	-1.75	2.75	4.25	4.75
PR	-37	-14	-8	-4	-2	1	4	4	4	2	-1	-29	-36

* Protection ratio values for the overlapping channel cases are provisional and will need to be confirmed within the ITU-R.
*

4.3 Analogue television interfered with by DVB-T

The values of protection ratio quoted apply to interference produced by a single source. In this section the protection ratios for a wanted analogue signal interfered with by an unwanted digital signal apply only to the interference to the vision and colour signals, i.e. excluding sound signals.

The tropospheric interference corresponds to impairment grade 3, that is, acceptable for a small percentage of the time, between 1% and 10%. The continuous interference corresponds to an impairment grade 4, that is, acceptable for 50% of time.

The protection ratio measurements for wanted analogue television signals should be made using the method given in the ANNEX of Rec. ITU-R XYZ. For the co-channel case, the digital interference from a DVB-T signal has a similar effect to Gaussian noise of equal power in the receiver bandwidth.

4.3.1 Co-channel protection ratios

Table A1.24

Protection ratios (dB) for an analogue vision signal interfered with by DVB-T 8 MHz

Wanted analogue system	Tropospheric interference	Continuous interference
PAL B, B1, G, D, K	34	40
PAL I	37	41
SECAM L	37	42
SECAM D,K	35	41

These figures are taken from Rec. ITU-R XYZ and may be updated as a result of further measurements.
Reference conditions for coordination are given in Annex1 Section 9.

Table A1.25

Protection ratios (dB) for an analogue vision signal interfered with by DVB-T 7 MHz

Wanted analogue system	Tropospheric interference	Continuous interference
PAL B	35	41

These figures are taken from Rec. ITU-R XYZ and may be updated as a result of further measurements.
Reference conditions for coordination are given in Annex1 Section 9.

4.3.2 Lower adjacent channel (n - 1)

Table A1.26

Protection ratios (dB) for an analogue vision signal interfered with by lower adjacent channel DVB-T 8 MHz

Wanted analogue system	Tropospheric interference	Continuous interference
PAL B1, G, D, K	-7	-4
PAL I	-8	-4
SECAM L	-9	-7
SECAM D,K	-5	-1

Table A1.27

Protection ratios (dB) for an analogue vision signal interfered with by lower adjacent channel DVB-T 7 MHz

Wanted analogue system	Tropospheric interference	Continuous interference
PAL B	-11	-4

4.3.3 Upper adjacent channel (n + 1)

Table A1.28

Protection ratios (dB) for an analogue vision signal interfered with by upper adjacent channel DVB-T 8 MHz

Wanted analogue system	Tropospheric interference	Continuous interference
PAL B1, G	-9	-7
PAL I	-10	-6
SECAM L	-1	-1
SECAM D, K	-8	-5
PAL D, K		

Table A1.29

Protection ratios (dB) for an analogue vision signal interfered with by upper adjacent channel DVB-T 7 MHz

Wanted analogue system	Tropospheric interference	Continuous interference
PAL B	-5	-3

4.3.4 Image channel

Table A1.30

Protection ratios (dB) for an analogue vision signal interfered with by image channel DVB-T 8 MHz

Wanted analogue system	Unwanted DVB-T channel	Tropospheric interference	Continuous interference
PAL B1, G	n + 9	-19	-15
PAL I	n + 9		
SECAM L	n - 9	-25	-22
SECAM D, K	n + 8	-16	-11
SECAM D, K	n + 9	-16	-11
PAL D, K	n + 8		
PAL D, K	n + 9		

4.3.5 Overlapping channels*

Table A1.31

Protection ratios (dB) for a PAL B1, D vision signal interfered with by overlapping channel DVB-T 7 MHz

Frequency Difference (MHz) between DVB-T and PAL signals Centre frequency of DVB-T signal minus the vision carrier frequency of the analogue television signal	Tropospheric interference	Continuous interference
-7.75	-13	-8
-4.75 channel n - 1	-10	-4
-4.25	-4	2
-3.75	14	21
-3.25	25	32
-2.75	31	37
-1.75	34	41
-0.75	35	41
2.25 co-channel n	35	41
4.25	35	41
5.25	32	38
7.25	25	34
7.75	20	29
8.25	6	13
8.75	-5	-2
9.25 channel n + 1	-7	-4
12.25	-9	-3

* Protection ratio values for the overlapping channel cases are provisional and will need to be confirmed within the ITU-R.

Table A1.32

Protection ratios (dB) for a PAL B vision signal interfered with by overlapping channel DVB-T 8 MHz

Frequency difference (MHz) between DVB-T and PAL signals	**Tropospheric interference**	**Continuous interference**
Centre frequency of DVB-T signal minus the vision carrier frequency of the analogue television signal		
-7.25	-11	-6
-5.25	-10	-1
-3.75	13	20
-3.25	24	31
-2.75	30	36
-2.25	33	40
-1.25	34	40
-0.25	34	40
2.75 co-channel n	34	40
4.75	34	40
5.75	33	39
7.75	27	35
8.25	24	33
8.75	19	28
9.25	5	12
10.75	-5	-3
12.75	-7	-2

This table is derived from Table A1.31, relating to an unwanted DVB-T 7 MHz interferer

4.4 Sound signals associated with analogue television, interfered with by DVB-T

In this section, all values quoted refer to the level of the wanted sound carrier.

The reference signal-to-noise ratios (S/N, peak-to-peak weighted) for analogue sound signals are:

- 40 dB for tropospheric interference (approximates to impairment grade 3)
- 48 dB for continuous interference (approximates to impairment grade 4)

The reference bit-error rates for NICAM digital sound signals are:

- $1.\ 10^{-4}$ for tropospheric interference (approximates to impairment grade 3)
- $1.\ 10^{-5}$ for continuous interference (approximates to impairment grade 4)

In the case of a two-sound carrier transmission, each of the two-sound signals must be considered separately.

Table A1.33

Protection ratios (dB) for a sound signal associated with analogue television, interfered with by DVB-T

Protection Ratio in dB		**Interfering signal**	
Wanted sound signal		**DVB-T 7 MHz**	**DVB-T 8 MHz**
FM	Tropospheric	6	5
	Continuous	16	15
AM	Tropospheric		
	Continuous		
NICAM System B, B1, G	Tropospheric		
	Continuous		
NICAM System L	Tropospheric		
	Continuous		
NICAM System I	Tropospheric		
	Continuous		

0 kHz frequency separation between the wanted sound carrier and the centre frequency of the DVB-T signal.

Table A1.34

Protection ratios (dB) for an analogue television FM sound signal interfered with by DVB-T 8 MHz

DVB-T 8 MHz (The frequency difference Δf is the centre frequency of DVB-T signal minus the centre frequency of FM sound signal in MHz)									
Frequency difference Δf	-5*	-4.2*	-4	-3.5	0	3.5	4	4.2	4.5
Tropospheric interference	-1	-1	4	5	5	4	2	-18	-33
Continuous interference	8	8	13	15	15	14	11	-12	-28

* the required higher protection at lower frequencies is caused by intercarrier distortions of the vision carrier

Table A1.35

Protection ratios (dB) for an analogue television FM sound signal interfered with by DVB-T 7 MHz

DVB-T 7 MHz (The frequency difference Δf is the centre frequency of DVB-T signal minus the centre frequency of FM sound signal in MHz)									
Frequency difference Δf	-5*	-3.7*	-3.5	-3	0	3	3.5	3.7	> 4
Tropospheric interference	0	0	5	6	6	5	3	-17	< -32
Continuous interference	9	9	14	16	16	15	12	-11	<-27

* the required higher protection at lower frequencies is caused by intercarrier distortions of the vision carrier

4.5 DVB-T interfered with by T-DAB

Table A1.36

Protection ratios (dB) for a DVB-T 8 MHz interfered with by T-DAB

DVB-T 8 MHz (ITU Mode M3, 64 QAM, 2/3 code rate) Δf = Centre frequency of T-DAB minus centre frequency of DVB-T									
Δf (MHz)	-5	-4.2	-4	-3	0	3	4	4.2	5
PR	-30	-6	-5	28	29	28	-5	-6	-30

Table A1.37

Protection ratios (dB) for a DVB-T 7 MHz interfered with by T-DAB

DVB-T 7 MHz (ITU Mode M3, 64 QAM, 2/3 code rate) **Δf = Centre frequency of T-DAB minus centre frequency of DVB-T**									
Δf (MHz)	**-4.5**	**-3.7**	**-3.5**	**-2.5**	**0**	**2.5**	**3.5**	**3.7**	**4.5**
PR	-30	-6	-5	28	29	28	-5	-6	-30

4.6 T-DAB interfered with by DVB-T

Table A1.38

Protection ratios (dB) for T-DAB interfered with by DVB-T 8 MHz

DVB-T 8 MHz (ITU Mode M3, 64 QAM, 2/3 code rate) **Δf = Centre frequency of DVB-T minus centre frequency of T-DAB**									
Δf (MHz)	-5	-4.2	-4	-3	0	3	4	4.2	5
PR	-50	-1	0	1	1	1	0	-1	-50

Table A1.39

Protection ratios (dB) for T-DAB interfered with by DVB-T 7 MHz

DVB-T 7 MHz (ITU Mode M3, 64 QAM, 2/3 code rate) **Δf = Centre frequency of DVB-T minus centre frequency of T-DAB**									
Δf (MHz)	-4.5	-3.7	-3.5	-2.5	0	2.5	3.5	3.7	4.5
PR	-49	0	1	2	2	2	1	0	-49

5. Unwanted emissions

5.1 Spectrum masks for DVB-T in bands shared with analogue television

The masks given in Figure A1.1 and Table A1.40 are considered to cover the minimum protection needed for co-sited analogue and digital television transmitters having equal radiated powers.

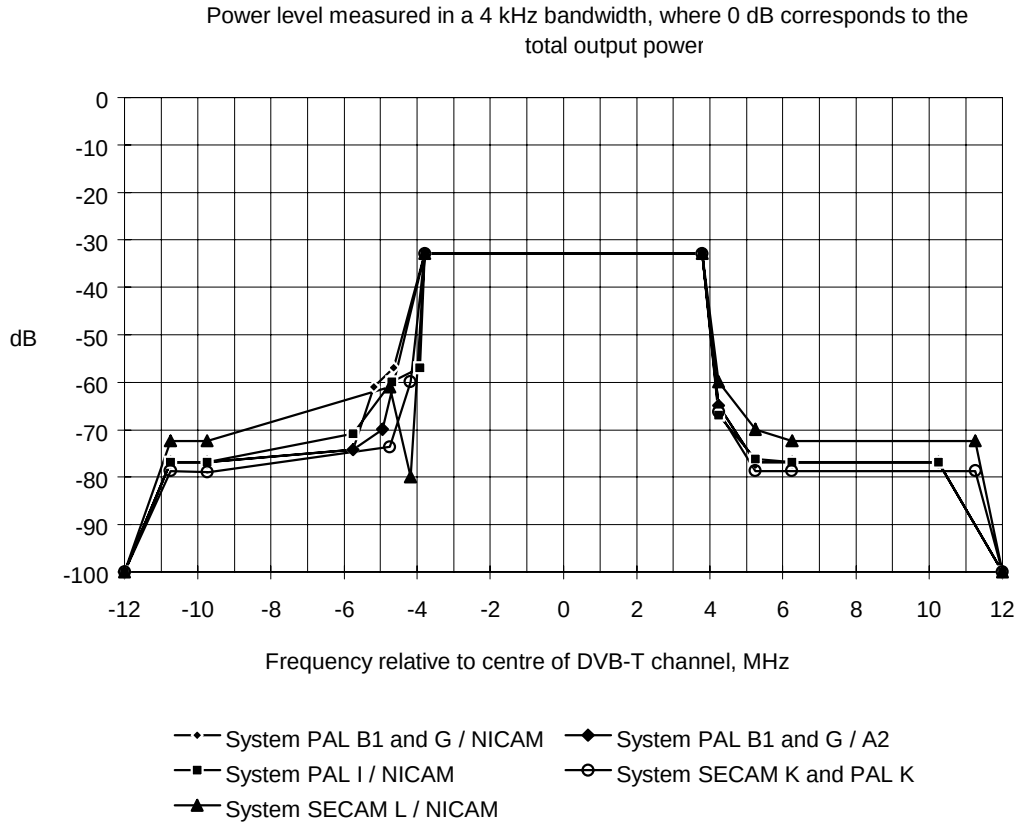


Figure A1.1

Spectrum masks for a digital terrestrial television transmitter operating on a channel adjacent to a co-sited analogue television transmitter (8 MHz channels)

Table A1.40

Breakpoints for spectrum masks in Figure A1.1

Breakpoints									
PAL B1 and G / NICAM		PAL B1 and G / A2		PAL I / NICAM		SECAM K PAL K		SECAM L/ NICAM	
rel. freq. MHz	rel. level dB	rel. freq. MHz	rel. level dB	rel. freq. MHz	rel. level dB	rel. freq. MHz	rel. level dB	rel. freq. MHz	rel. level dB
-12.0	-100.0	-12.0	-100.0	-12.0	-100.0	-12.0	-100.0	-12.0	-100.0
-10.75	-76.9	-10.75	-76.9	-10.75	-76.9	-10.75	-78.7	-10.75	-72.4
-9.75	-76.9	-9.75	-76.9	-9.75	-76.9	-9.75	-78.7	-9.75	-72.4
-5.75	-74.2	-5.75	-74.2	-5.75	-70.9	-4.75	-73.6	-4.75	-60.9
-5.185	-60.9	-5.185	n.a.	-4.685	-59.9	-4.185	-59.9	-4.185	-79.9
n.a.	n.a.	-4.94	-69.9	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
-4.65	-56.9	n.a.	n.a.	-3.925	-56.9	n.a.	n.a.	n.a.	n.a.
-3.8	-32.8	-3.8	-32.8	-3.8	-32.8	-3.8	-32.8	-3.8	-32.8
+3.8	-32.8	+3.8	-32.8	+3.8	-32.8	+3.8	-32.8	+3.8	-32.8
+4.25	-64.9	+4.25	-64.9	+4.25	-66.9	+4.25	-66.1	+4.25	-59.9
+5.25	-76.9	+5.25	-76.9	+5.25	-76.2	+5.25	-78.7	+5.25	-69.9
+6.25	-76.9	+6.25	-76.9	+6.25	-76.9	+6.25	-78.7	+6.25	-72.4
+10.25	-76.9	+10.25	-76.9	+10.25	-76.9	+11.25	-78.7	+11.25	-72.4
+12.0	-100.0	+12.0	-100.0	+12.0	-100.0	+12.0	-100.0	+12.0	-100.0

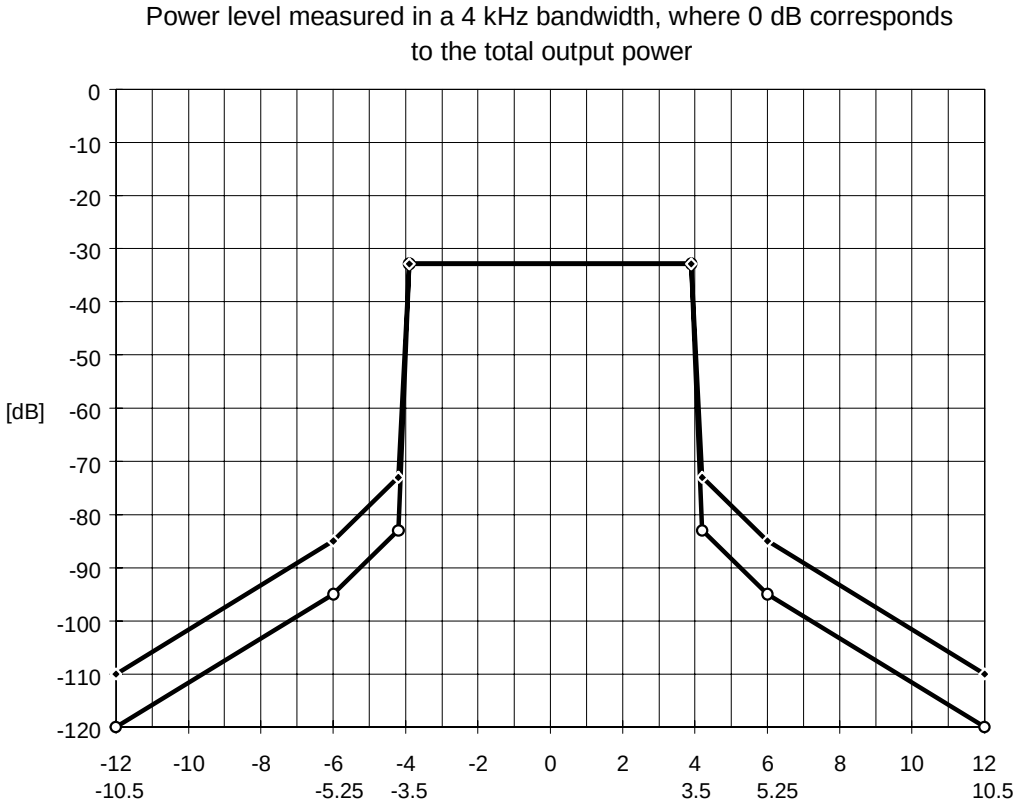
5.2 Spectrum masks for DVB-T in bands shared with other services

The out-of-band radiated signal in any 4 kHz band shall be constrained by one of the two symmetrical spectrum masks given in Figure A1.2 and Table A1.41.

Case 1: the mask having a shoulder attenuation of 40 dB is intended for non-critical cases

Case 2: the mask with a shoulder attenuation of 50 dB is intended for sensitive cases.

The mask for non-critical cases should also be used for measurements of protection ratios for analogue television interfered with by DVB-T.



Frequency relative to centre of DVB-T channel {MHz}
upper scale: 8 MHz channel, lower scale: 7 MHz channel
upper curve: non-critical cases, lower curve: sensitive cases

Figure A1.2

Symmetrical spectrum masks for non-critical and for sensitive cases

Table A1.41

Breakpoints for Figure A1.2

Breakpoints					
8 MHz channels			7 MHz channels		
	Non-critical cases	Sensitive cases		Non-critical cases	Sensitive cases
Relative Frequency MHz	Relative Level dB	Relative Level dB	Relative Frequency MHz	Relative Level dB	Relative Level dB
-12.0	-110.0	-120.0	-10.5	-110.0	-120.0
-6.0	-85.0	-95.0	-5.25	-85.0	-95.0
-4.2	-73.0	-83.0	-3.7	-73.0	-83.0
-3.9	-32.8	-32.8	-3.4	-32.8	-32.8
+3.9	-32.8	-32.8	+3.4	-32.8	-32.8
+4.2	-73.0	-83.0	+3.7	-73.0	-83.0
+6.0	-85.0	-95.0	+5.25	-85.0	-95.0
+12.0	-110.0	-120.0	+10.5	-110.0	-120.0

6. Protection of television services and equitable access

It is necessary to ensure that coordinated analogue television assignments continue to be protected and it will be equally necessary to ensure protection for the digital television services.

It is also necessary to ensure that the principle of equitable access to the limited frequency resources is maintained irrespective of the time of introduction of digital television in individual countries.

The best tool to achieve these protections is the use of test points.

6.1 Definitions of test points

Two categories of test points are needed. One category represents the coverage area for a given station, or SFN, while the other represents country boundaries.

All test points are defined by their geographical coordinates.

6.1.1 Test points representing coverage areas

The transmitter site will normally be inside the contour described by the test points, however, in special cases the transmitter can be located outside of this area.

For small stations, i.e. stations with a coverage area whose width is less than 5 km, only one test point, located at the transmitter site, may be sufficient. However, up to 36 test points can be defined if necessary. If only one test point is given, no receiving antenna directivity is assumed.

For stations with a coverage area whose width is 5 km or more up to 36 test points are used. These test points may be located on radials at 10 degree intervals.

If the contour of the coverage area crosses a country boundary, the test points in this area are located at the crossing points between a radial and the boundary unless otherwise agreed by the concerned administrations.

6.1.2 Test points at the country boundary

A maximum of 499 test points can be used to represent the boundary of a country.

The location of test points at a boundary should be agreed between the countries sharing this boundary and be used as boundary test points by all countries.

The set of test points representing the boundary of a country shall be a complete individual set, as shall a set representing a coverage area.

6.1.3 Availability of test point locations

The location of test points, i.e. their geographical coordinates, shall be commonly available to all CEPT members in order to facilitate calculations of interference into other countries or coverage areas of stations in other countries.

6.2 Calculation of the location for test points representing coverage areas

To calculate the coverage area of a television station on a given channel, two elements are necessary:

- the parameters particular to an individual transmitting station (coordinates, height of the antenna, radiated power, etc.) which are used to calculate the wanted signal;
- the system parameters such as the protection ratios, which are used to calculate the individual nuisance field strengths and the usable field strength, and the minimum median field strength.

These calculations should take into account:

- interference from analogue television assignments;
- interference from digital television assignments.

The individual nuisance field strength En is the field strength of an unwanted signal to which has been added the relevant protection ratio, propagation correction factor and receiving antenna discrimination. It is calculated as follows:

$$En = E + PR + C + A$$

where

E is the field strength of the unwanted signal. The appropriate time percentage according to the wanted signal is to be chosen (see note 1);
PR is the appropriate protection ratio (see note 1);
C is the propagation correction factor (see note 2);
A is the receiving antenna discrimination (taking into account polarisation discrimination), ($A \leq 0$);

and all quantities are expressed in dB or dB(μV/m).

note 1:
In the case of a wanted digital service the 1% time 50% location field strength of the unwanted service is to be chosen. In the case of a wanted analogue service the larger of the 1% time 50% location field strength of the unwanted signal together with the protection ratio for tropospheric interference and the 50% time 50% location field strength of the unwanted signal together with the protection ratio for continuous interference is to be chosen.

note 2:
The propagation correction factor C = (location correction factor in the case of a wanted and an unwanted signal) equals 0 dB in the case of a wanted analogue television service. In the case of a wanted digital television service it equals $\sqrt{2} \times \mu \times \sigma$, where the distribution factor μ and the standard deviation σ (in dB) are given in Annex 1 Sections 3.1 and 3.3.

The usable field strength is the minimum value of the field strength necessary to permit a desired reception quality, under specified receiving conditions, in the presence of natural and man-made noise and interference. The usable field strength is calculated by combining the individual nuisance fields and the minimum median field strength. The combination is done by means of the power sum method, given in Annex 1 Section 6.3, i.e.

$$E_u = 10 \times \log_{10}\left(10^{\frac{E_{\min}}{10}} + \sum_{i=1}^{n} 10^{\frac{En_i}{10}} \right) ,$$

where

E_u is the usable field strength (in dB(μV/m));
E_{min} is the minimum median field strength (in dB(μV/m));
En_i is the nuisance field strength of the i-th unwanted signal (in dB(μV/m));
n is the number of interferers,

and

for analogue television reception, the value of E_{min} is given in Rec. ITU-R BT. 417;
for digital television reception, the value of E_{min} is given in Annex 1 Section 8.

The test points representing a coverage area can thus be determined in three stages:

Stage 1 Calculation of noise limited coverage area

Using Rec. ITU-R P.370, the locations of the noise-limited test points are found, which represent the area that could be served if there were no interference. This area may be approximated on the basis of up to 36 radials, using the e.r.p. and the effective antenna height. For each radial, that location is determined where the field strength of the wanted transmitter equals the minimum median field strength.

Stage 2 Identification of interferers

The impact of co-channel, adjacent channel and image channel interference from other transmitters is calculated for each wanted station and each noise-limited test point from Stage 1. First, the sub-set of possible interferers is established. This consists of the stations which can produce a nuisance field which is no more than 15 dB below the minimum median field strength at any of the noise-limited test points from Stage 1.

Stage 3 Calculation of the test points for the interference limited coverage.

The individual nuisance field strength En caused by each of the interfering stations in this sub-set of interferers is calculated at each of the noise limited test points from Stage 1 (see Figure A1.3). The usable field strength is calculated for each of these test points.

In the case of no interferers the usable field strength at a test point is equal to the minimum median field strength, no further calculation is required, and the coverage radius is that of Stage 1 above (see also Figure A1.3).

If the usable field strength at a test point is greater than the minimum median field strength, it is then necessary to find the new coverage radius on this bearing at which the field strength from the wanted station equals the usable field strength.

Because, in general, the coverage radius thus calculated will not equal the radius previously calculated for the same bearing and thus the nuisance field strengths will change, the process of the previous paragraph is repeated to obtain a close approximation to the required coverage radius on each of the bearings.

It must be noted that a given station will normally have different coverage areas on different channels and that this can be important when considering the relative coverage of digital and analogue services.

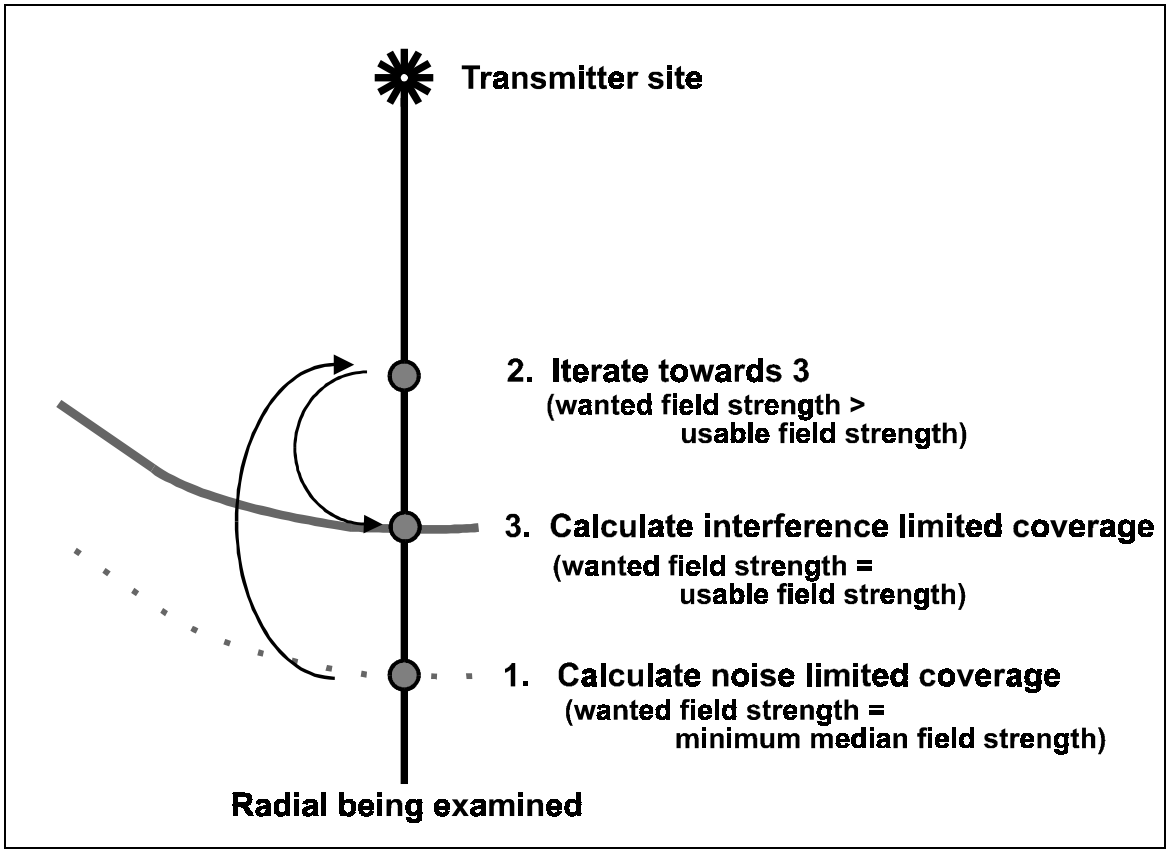


Figure A1.3
Illustration of the calculation of location of test points for the interference limited coverage

6.3 Method for combination of signals (power sum method)

The power sum method is a procedure in which individual field strengths are combined such that the power of the resultant field strength equals the sum of the powers of the individual field strengths. If the (logarithmic) field strength of a single signal is denoted by E_i and is expressed in dB(μV/m), the combined field strength E_Σ is given by:

$$E_\Sigma = 10 \times \log_{10}\left(\sum_{i=1}^{n} 10^{\frac{E_i}{10}} \right)$$

where n is the number of individual field strengths.

6.4 Protection of digital television services

Because of the rapid failure of digital reception when the level of the useful signal decreases below its "minimum" value, the target for the percentage of locations nominally covered at any edge - where edge means any transition between a covered area and a non-covered area - of the coverage area has to be much higher for digital systems than the value used for analogue television systems. For coordination, the reference conditions, including the percentage of location value, for digital coverage are given in Annex 1 Section 8.

Since the reception conditions of the **actual** implementation of a digital television service may differ from the **reference** reception conditions given in Annex 1 Section 8, the test points representing a digital assignment do not necessarily lie on the boundary of the actual coverage area of that digital assignment. The test points may lie inside or outside the actual coverage area of the digital assignment.

6.5 Test points representing the digital television coverage area resulting from a conversion

In the case of a digital assignment resulting from the conversion of an analogue assignment (see Annex 6) the location of the test points to be used is that of the test points of the analogue assignment from which the conversion was made.

6.6 Establishment of test points representing an SFN

The locations of the test points representing an SFN are derived by a simplified process which does not take account of self interference or network gain.

In this process, a set of up to 36 test points would be derived, using the method described in Annex 1 Sections 6.1 and 6.2, for each of the assignments in the SFN considered individually, that is without taking into account any signal or interference contributions from the other assignments in the SFN.

In bilateral or multilateral coordinations, administrations may agree to use more complex methods for deriving the locations of test points representing an SFN, and the interference levels at these test points.

In the case of a digital assignment forming an SFN which results from the conversion of an analogue assignment (see Annex 6) the locations of the test points to be used are those of the test points of the analogue assignment from which the conversion was made.

6.7 Test point locations and usable field strength values to be used during coordination

Two reference scenarios, a mixed-analogue-and-digital and an all-digital scenario, where test point locations and usable field strength values are established, are to be used for the compatibility analysis according to Article 4. The initial sets of test point locations and usable field strength values for both scenarios will be established for the date 25/7/97 by taking into account all coordinated analogue assignments.

The test point locations will be identical for both scenarios whereas the usable field strength values may differ in the two scenarios, as a result of differences, for example, in protection ratio and e.r.p. values.

6.7.1 Mixed-analogue-and-digital reference scenario

The mixed-analogue-and-digital reference scenario reflects the actual coodinated situation and is established in order to facilitate compatibility analyses.

6.7.1.1 Basis for the calculation

All coordinated analogue assignments will be taken into account in establishing the initial set of test point locations and usable field strength values for the mixed-digital-and-analogue reference scenario for the date 25/7/97.

For any new analogue assignment, the reference set of test point locations and usable field strength values will be established when the assignment is entered into the Plan[*] . The set of test point locations and usable field strength values will be calculated according to the mixed-analogue-and-digital reference scenario.

For any new digital assignment, the reference set of test point locations and usable field strength values will be established when the assignment is entered into the Plan. The set of test point locations (and the usable field strength values for the all-digital reference scenario, see Annex 1 Section 6.7.2.1) will be calculated according to the all-digital reference scenario. The set of usable field strength values will also be calculated according to the mixed-analogue-and-digital reference scenario; however, this set of usable field strength values is not required by the compatibility analysis according to Article 4 and is provided for information only.

When an assignment is converted from analogue to digital, its test point locations will remain those of the analogue assignment from which the conversion was made (and the usable field strength values are calculated for the all-digital reference scenario, see Annex 1 Section 6.7.2.1). The usable field strength values will also be calculated according to the mixed-analogue-and-digital reference scenario; however, this set of usable field strength values is not required by the compatibility analysis according to Article 4 and is provided for information only.

The method given in Annex 1 Sections 6.1 and 6.2 will be used for the calculation of test point locations and usable field strength values.

6.7.1.2 Radiation characteristics to be taken into account

The radiation characteristics, such as e.r.p, polarisation, antenna height and antenna diagram, for all assignments will be those which have been coordinated at the date of entry into the Plan.

In the case of digital assignments which result from the conversion of an analogue assignment, the radiation characteristics will be those of the digital assignment as coordinated. For a digital assignment converted from an analogue assignment, temporary restrictions resulting from conversion rule 4a in Annex 6 will not be taken into account.

[*] that is, when published by the ITU-BR in Part B of Special Section ST61 of the weekly circular.

6.7.1.3 Reception conditions

For digital assignments, reference reception conditions as given in Annex 1 Section 8 will be used. For analogue assignments, reference reception conditions as given in Annex 1 Section 9 will be used.

6.7.2 All-digital reference scenario

The all-digital reference scenario reflects a hypothetical situation. It is established in order to facilitate compatibility analyses and to preserve the rights of the existing digital assignments for protection and the rights of the existing analogue assignments to be converted into digital. The all-digital reference scenario is created by an artificial conversion of all analogue assignments into digital assignments using an automatic process. Thus the actual situation is transformed into an hypothetical all-digital one.

It must be noted that when the real conversion occurs, the radiation characteristics obtained after coordination with the neighbouring countries may differ from the results of the automatic process and the coordinated transmission characteristics will be entered into the Plan.

6.7.2.1 Basis for the calculation

The initial set of test point locations and usable field strength values for the all-digital reference scenario will be established for the date 25/7/97 by automatically converting all analogue assignments into hypothetical digital assignments. The test point locations will remain those of the analogue assignments according to the mixed-analogue-and-digital reference scenario. The usable field strength values will be calculated by applying a reduction of 7 dB to the e.r.p. of all analogue assignments.

Any new analogue assignment will be automatically converted into a hypothetical digital assignment. The reference set of test point locations and usable field strength values will be established when the assignment is entered into the Plan. The test point locations will remain those of the analogue assignment according to the mixed-analogue-and-digital reference scenario. A reduction of 7 dB of the e.r.p. of the new analogue assignment will be applied. The usable field strength values are calculated according to the all-digital reference scenario.

For any new digital assignment, the reference set of test point locations and usable field strength values will be established when the assignment is entered into the Plan. The set of test point locations and usable field strength values will be calculated according to the all-digital reference scenario.

The test point locations of a digital assignment resulting from the conversion of an analogue assignment according to Annex 6 will remain those of the original analogue assignment; usable field strength values remain those of the hypothetical conversion to the all-digital scenario.

In any case where the conversion of an analogue assignment is not made in accordance with Annex 6, the test point locations remain those of the orignal analogue assignment according to the mixed-analogue-and-digital reference scenario. However, the usable field strength values will be re-calculated according to the all-digital reference scenario.

The method given in Annex 1 Sections 6.1 and 6.2 will be used for the calculation of test point locations and usable field strength values.

6.7.2.2 Radiation characteristics to be taken into account

The radiation characteristics, such as e.r.p, polarisation, antenna height and antenna diagram, for all assignments will be those which apply to the all-digital scenario at the date of entry into the Plan.

In the case of a digital assignment which results from the conversion of an analogue assignment according to Annex 6, subsequent to the date of the initial reference conditions, the radiation characteristics used will be those of the digital assignment as coordinated. For a digital assignment which results from the conversion of an analogue assignment according to Annex 6, temporary restrictions resulting from conversion rule 4a in Annex 6 will not be taken into account.

6.7.2.3 Reception conditions

In the all-digital reference scenario it is only necessary to calculate the test point locations for new digital assignments. The usable field strength values of existing and new digital assignments and of digital assignments resulting from the conversion of an analogue assignment will need to be calculated. Reference reception conditions, as given in Annex 1 Section 8, will be used.

6.7.3 Test point locations and field strength values for assessing compatibility with stations of services other than broadcasting

Test point locations and usable field strength values for analogue and digital assignments are calculated for the assessment of compatibility with services other than broadcasting. Test point locations for the protection of stations other than broadcasting are specified in the data records for the stations of other services.

6.7.3.1 Basis for the calculation

The test point locations for any broadcasting assignment (digital or analogue) will be calculated using the method in Annex 1 Sections 6.1 and 6.2, but taking into consideration only the minimum median field strength value relevant to the broadcasting service (Stage 1 of Annex 1 Section 6.2).

6.7.3.2 Radiation characteristics to be taken into account

The radiation characteristics, such as e.r.p, polarisation, antenna height and antenna diagram, for all assignments will be those which apply at the date of entry into the Plan. In the case of digital assignments which result from the conversion of an analogue assignment which has already been effected, the radiation conditions used will be those of the digital assignment as coordinated. In the case of analogue assignments which have not yet been converted to digital assignments, the digital radiation characteristics will be established by subtracting 7 dB from the e.r.p. of the analogue assignment.

6.7.3.3 Reception conditions

For digital assignments, reference reception conditions as given in Annex 1 Section 8 will be used. For analogue assignments, reference reception conditions as given in Annex 1 Section 9 will be used.

7. Frequency bands and channels

7.1 Frequencies for implementation of DVB-T

The frequency bands for implementation of DVB-T in the European Broadcasting Area are 174 to 230 MHz and 470 to 862 MHz. However, the CEPT considers the frequency band 216 to 230 MHz as the core band for T-DAB in VHF.

7.2 Analogue television channel rasters

In Band III, different television channel rasters are used across Europe. In Eastern Europe, France and Ireland, channels are 8 MHz wide, in other countries the channel width is 7 MHz. In addition, there are different channel raster in countries using 7 MHz channels (e.g. Italy). This means that in the VHF Bands there is a number of cases where channels overlap.

Within Bands IV and V, there is a single channel raster of 8 MHz, with the upper and lower edges, and vision carrier, of each channel being the same for all countries in Europe.

7.3 Frequencies for television channels in the European Broadcasting Area

Information concerning the frequencies for television channels in Bands III, IV and V, in the European Broadcasting Area are given in Tables A1.42 to A1.49.

Note that following the CEPT T-DAB Planning Meeting (Wiesbaden 1995) the upper part of Band III, above 216 MHz, is now allocated to T-DAB services in many CEPT countries.

Table A1.42

VHF System B

Channel	Channel boundaries MHz		Vision carrier MHz	Sound carrier MHz	Dual FM Second Sound carrier MHz	NICAM carrier MHz
5	174	181	175.25	180.75	180.99	181.1
6	181	188	182.25	187.75	187.99	188.1
7	188	195	189.25	194.75	194.99	195.1
8	195	202	196.25	201.75	201.99	202.1
9	202	209	203.25	208.75	208.99	209.1
10	209	216	210.25	215.75	215.99	216.1
11	216	223	217.25	222.75	222.99	223.1
12	223	230	224.25	229.75	229.99	230.1

Table A1.43

VHF System B (Italy)

Channel	Channel boundaries MHz		Vision carrier MHz	Sound carrier MHz	Dual FM Second Sound carrier MHz
D	174.00	181.00	175.25	180.75	180.99
E	182.50	189.50	183.75	189.25	188.49
F	191.00	198.00	192.25	197.75	197.99
G	200.00	207.00	201.25	206.75	206.99
H	209.00	216.00	210.25	215.75	215.99
H1	216.00	223.00	217.25	222.75	222.99
H2	223.00	230.00	224.25	229.75	229.99

Table A1.44

VHF System B (Morocco)

Channel	Channel boundaries MHz		Vision carrier MHz	Sound carrier MHz
M4	162	169	163.25	168.75
M5	170	177	171.25	176.75
M6	178	185	179.25	184.75
M7	186	193	187.25	192.75
M8	194	201	195.25	200.75
M9	202	209	203.25	208.75
M10	210	217	211.25	216.75
M11	218	225	219.25	224.75

Table A1.45

VHF System B1

Channel	Channel boundaries MHz		Vision carrier MHz	Sound carrier MHz	Dual FM Second Sound carrier MHz	(NICAM carrier) MHz
R6	174	182	175.25	180.75	180.99	181.1
R7	182	190	183.25	188.75	188.99	189.1
R8	190	198	191.25	196.75	196.99	197.1
R9	198	206	199.25	204.75	204.99	205.1
R10	206	214	207.25	212.75	212.99	213.1
R11	214	222	215.25	220.75	220.99	221.1
R12	222	230	223.25	228.75	228.99	229.1

Table A1.46

VHF System D

Channel	Channel boundaries MHz		Vision carrier MHz	Sound carrier MHz	(NICAM carrier) MHz
R6	174	182	175.25	181.75	181.10
R7	182	190	183.25	189.75	189.10
R8	190	198	191.25	197.75	197.10
R9	198	206	199.25	205.75	205.10
R10	206	214	207.25	213.75	213.10
R11	214	222	215.25	221.75	221.10
R12	222	230	223.25	229.75	229.10

Table A1.47

VHF System I

Channel	Channel boundaries MHz		Vision carrier MHz	Sound carrier MHz	NICAM carrier MHz
ID	174	182	175.25	181.25	181.80
IE	182	190	183.25	189.25	189.80
IF	190	198	191.25	197.25	197.80
IG	198	206	199.25	205.25	205.80
IH	206	214	207.25	213.25	213.80
IJ	214	222	215.25	221.25	221.80
IK	222	230	223.25	229.25	229.80

Table A1.48

VHF System L

Channel	Channel boundaries MHz		Vision carrier MHz	Sound carrier MHz	NICAM carrier MHz
L5	174.25	182.75	176.00	182.50	181.85
L6	182.75	190.75	184.00	190.50	189.85
L7	190.75	198.75	192.00	198.50	197.85
L8	198.75	206.75	200.00	206.50	205.85
L9	206.75	214.75	208.00	214.50	213.85
L10	214.75	222.75	216.00	222.50	221.85

Table A1.49

UHF System G, H, I, K, L

Channel	Channel boundaries MHz		Vision carrier MHz	System G System H Sound carrier MHz	System G Dual FM Second Sound carrier MHz	System G System H System L (System K) NICAM carrier MHz	System I Sound carrier MHz	System K System L Sound carrier MHz	System I NICAM carrier MHz
21	470	478	471.25	476.75	476.99	477.1	477.25	477.75	477.8
22	478	486	479.25	484.75	484.99	485.1	485.25	485.75	485.8
23	486	494	487.25	492.75	492.99	493.1	493.25	493.75	493.8
24	494	502	495.25	500.75	500.99	501.1	501.25	501.75	501.8
25	502	510	503.25	508.75	508.99	509.1	509.25	509.75	509.8
26	510	518	511.25	516.75	516.99	517.1	517.25	517.75	517.8
27	518	526	519.25	524.75	524.99	525.1	525.25	525.75	525.8
28	526	534	527.25	532.75	532.99	533.1	533.25	533.75	533.8
29	534	542	535.25	540.75	540.99	541.1	541.25	541.75	541.8
30	542	550	543.25	548.75	548.99	549.1	549.25	549.75	549.8
31	550	558	551.25	556.75	556.99	557.1	557.25	557.75	557.8
32	558	566	559.25	564.75	564.99	565.1	565.25	565.75	565.8
33	566	574	567.25	572.75	572.99	573.1	573.25	573.75	573.8
34	574	582	575.25	580.75	580.99	581.1	581.25	581.75	581.8
35	582	590	583.25	588.75	588.99	589.1	589.25	589.75	589.8
36	590	598	591.25	596.75	596.99	597.1	597.25	597.75	597.8
37	598	606	599.25	604.75	604.99	605.1	605.25	605.75	605.8
38	606	614	607.25	612.75	612.99	613.1	613.25	613.75	613.8
39	614	622	615.25	620.75	620.99	621.1	621.25	621.75	621.8
40	622	630	623.25	628.75	628.99	629.1	629.25	629.75	629.8
41	630	638	631.25	636.75	636.99	637.1	637.25	637.75	637.8
42	638	646	639.25	644.75	644.99	645.1	645.25	645.75	645.8
43	646	654	647.25	652.75	652.99	653.1	653.25	653.75	653.8
44	654	662	655.25	660.75	660.99	661.1	661.25	661.75	661.8
45	662	670	663.25	668.75	668.99	669.1	669.25	669.75	669.8
46	670	678	671.25	676.75	676.99	677.1	677.25	677.75	677.8
47	678	686	679.25	684.75	684.99	685.1	685.25	685.75	685.8
48	686	694	687.25	692.75	692.99	693.1	693.25	693.75	693.8
49	694	702	695.25	700.75	700.99	701.1	701.25	701.75	701.8
50	702	710	703.25	708.75	708.99	709.1	709.25	709.75	709.8
51	710	718	711.25	716.75	716.99	717.1	717.25	717.75	717.8
52	718	726	719.25	724.75	724.99	725.1	725.25	725.75	725.8
53	726	734	727.25	732.75	732.99	733.1	733.25	733.75	733.8
54	734	742	735.25	740.75	740.99	741.1	741.25	741.75	741.8
55	742	750	743.25	748.75	748.99	749.1	749.25	749.75	749.8
56	750	758	751.25	756.75	756.99	757.1	757.25	757.75	757.8
57	758	766	759.25	764.75	764.99	765.1	765.25	765.75	765.8
58	766	774	767.25	772.75	772.99	773.1	773.25	773.75	773.8
59	774	782	775.25	780.75	780.99	781.1	781.25	781.75	781.8
60	782	790	783.25	788.75	788.99	789.1	789.25	789.75	789.8
61	790	798	791.25	796.75	796.99	797.1	797.25	797.75	797.8
62	798	806	799.25	804.75	804.99	805.1	805.25	805.75	805.8
63	806	814	807.25	812.75	812.99	813.1	813.25	813.75	813.8
64	814	822	815.25	820.75	820.99	821.1	821.25	821.75	821.8
65	822	830	823.25	828.75	828.99	829.1	829.25	829.75	829.8
66	830	838	831.25	836.75	836.99	837.1	837.25	837.75	837.8
67	838	846	839.25	844.75	844.99	845.1	845.25	845.75	845.8
68	846	854	847.25	852.75	852.99	853.1	853.25	853.75	853.8
69	854	862	855.25	860.75	860.99	861.1	861.25	861.75	861.8

8. Reference reception conditions for digital television coordination

The reference conditions for analogue television are given implicitly by the systems. Due to the inherent flexibility of DVB-T which can be selected to meet a given country's requirements, it is likely that various planning criteria will be used throughout the CEPT planning area.

In order to place international coordination on an equitable basis it is necessary to use a representative set of reference conditions.

The values given in Table A1.50 for the reference reception conditions represent a compromise between requirements for fixed reception and portable outdoor reception.

These values can form a basis for the initial implementation of DVB-T. As there is a significant interest in portable reception, including indoor portable reception, the values shall be reviewed at a relevant point in time.

Changes to the values in Table A1.50 should be done on a multilateral basis.

Table A1.50

Reference reception conditions for digital television

Conditions	Value			Notes
	Band III	Band IV	Band V	
Nominal receiving antenna height	10 m agl	10 m agl	10 m agl	1
Receiving antenna directivity discrimination	None	None	None	
Receiving antenna polarisation discrimination	None	None	None	
Required C/N value	20 dB	20 dB	20 dB	2
Co-channel protection ratio for DVB-T interfered with by analogue television.	8 dB	8 dB	8 dB	3
Minimum equivalent field strength at the receiving place	46 dBμV/m	56 dBμV/m at 500 MHz	60 dBμV/m at 800 MHz	4
Location correction factor	9 dB	9 dB	9 dB	5
Minimum median equivalent field strength	55 dBμV/m	65 dBμV/m at 500 MHz	69 dBμV/m at 800 MHz	6

Notes

1. This value does not imply that a receiving antenna must be at 10 m agl, it only sets a (commonly used) reference.
2. Including the implementation margin. This value is also to be used as the co-channel protection ratio value for the case of DVB-T interfering with DVB-T.
3. This value is to be used for coordination and includes the implementation margin.
4. To account for the variation of minimum equivalent field strength with frequency in Bands IV and V, the value to be used is given by $56 + 20 \log (f / 500)$ dB μV/m where f is the frequency of the digital assignment in MHz.
5. Corresponding to a target reception location probability of 95%. For the purpose of interference assessment, a propagation correction factor of 13 dB is required (see Annex 1 Section 6.2).
6. To account for the variation of minimum median equivalent field strength with frequency in Bands IV and V, the value to be used is given by $65 + 20 \log (f / 500)$ dB μV/m where f is the frequency of the digital assignment in MHz.

9. Reference reception conditions for analogue television to be used in digital television coordination

Table A1.51

Reference reception conditions for analogue television

Conditions	Value			Notes
	Band III	Band IV	Band V	
Nominal receiving antenna height	10 m agl	10 m agl	10 m agl	1
Receiving antenna directivity and polarisation discrimination	Rec. ITU-R BT.419	Rec. ITU-R BT.419	Rec. ITU-R BT.419	
Protection ratio values for the case of analogue television interfered with by analogue television	Rec. ITU-R BT.655	Rec. ITU-R BT.655	Rec. ITU-R BT.655	
Protection ratio values for the case of analogue television interfered with by DVB-T.	see note 2	see note 2	see note 2	2
Minimum median field strength to be protected in accordance with Rec. ITU-R BT.417	55 dBµV/m	65 dBµV/m	70 dBµV/m	

Notes

1. This value does not imply that a receiving antenna must be at 10 m agl, it only sets a (commonly used) reference.
2. For co-ordination purposes, the following values should be used for co-channel protection ratios for analogue television interfered with by DVB-T and for tropospheric interference :

PAL B, B1, D	35 dB	(DVB-T 7 MHz)
PAL B, B1, G, D, K	34 dB	(DVB-T 8 MHz)
PAL I	35 dB	(DVB-T 8 MHz)
SECAM L	35 dB	(DVB-T 8 MHz)
SECAM D, K	35 dB	(DVB-T 8 MHz)

The protection ratio values in all other cases can be found in Annex 1 Section 4. All of these values should be used in conjunction with an interference increase margin of 0.3 dB (see Annex 2 Section 2d). The values for PAL I and SECAM L are interim values which need to be confirmed within the ITU-R. A uniform reference method should be used for measurements of co-channel protection ratios for analogue television interfered with by DVB-T.

ANNEX 2

Principles

1. General principles

For DVB-T the following general principles should be taken into account:

a) **Frequency Bands**
The frequency bands for implementation of DVB-T in the European Broadcasting Area are 174 to 230 MHz and 470 to 862 MHz. However, the CEPT considers the frequency band 216 to 230 MHz as the core band for T-DAB in VHF.

b) **Equitable access**
All countries shall as far as practicable have equitable access to the frequency bands to be used for DVB-T. Therefore if coordination requests may have major implications on the development of DVB-T plans of other administrations, the requesting administration should inform the countries affected prior to sending out coordination requests.

c) **Unified system values**
International coordination should be based on unified system values and planning parameters throughout the planning area (this does not exclude the use of different values, on a national basis).

d) **Fixed and portable reception**
For the establishment of technical parameters for coordination, both fixed and portable reception should be considered.

e) **Single Frequency Networks**
Administrations are encouraged to use SFNs as far as practicable because of their frequency efficiency.

2. Coordination Principles

The coordination procedures needed in addition to the provisions contained in Article 4 of the Stockholm Agreement are based on the following principles:

a) **Coverage definitions**
Definition of coverage areas according to definitions given in Annex 1, Section 1.

b) **Coordination distances**
The coordination distances as given in the ST61 Plan can also be used for the coordination of digital television assignments up to 862 MHz, until further studies indicate that it is more appropriate to use other distances.

c) **Test-points**
If coordination is required the acceptability of an individual digital assignment or SFN will be assessed by means of calculations of the increase of interference at test points representing the coverage area of any affected individual assignment or SFN.

The locations of these test points will either be defined by means of the agreed method outlined in Annex 1, Section 6, or may be specified by the administration.

d) **Margin**

In general, a moderate increase in interference levels for analogue and new digital stations, at agreed test points, should normally be accepted. Generally calculations will be made using Rec. ITU-R P.370 and summation by the power sum method. For certain areas these calculations will not give realistic results and other propagation models should be considered. In such cases the values given below should be used with caution.

The margin should be applied as a trigger threshold for further investigation. This means that if the increase in the usable field strength is less than the margin the new or modified station(s) should normally be accepted. An increase of more than the margin is open to negotiations, in which more detailed calculation methods may be used.

The increase in interference level is related to a reference value which is the calculated usable field strength at an agreed point in time, that is 25 July 1997, or at a later time when a new digital or analogue assignment is entered in the Plan. The usable field strength is calculated as the power sum of all the nuisance field strengths from assignments in the updated ST61 Plan and the minimum field strength for the television system and the frequency band under consideration.

The increase in usable field strength which should normally be accepted is 0.3 dB per request in relation to the reference value. An increase of more than 0.3 dB is open to negotiations, in which more detailed calculation methods may be used.

However, in some areas and on some channels, the usable field strength for digital stations may be low, near the minimum field strength value. In these cases, a larger value of the margin might be acceptable.

In the case of a request for an SFN, the nuisance field is calculated as the power sum of the contributions from all transmitters of this SFN.

For the protection of low-power television assignments (analogue or digital) special treatment may be needed.

e) **Location of transmitters**

The nominal location of the stations is given by their geographical coordinates (longitude and latitude) expressed in degrees, minutes and seconds. A change of location should always be notified unless the site remains within 2 km of the nominal location, provided that the change in topographical conditions does not substantially increase the probability of interference to the stations of other countries.

ANNEX 3

Basic characteristics to be communicated for coordination

1. Database structure

The database consists of records separated by the “Carriage return - Line feed” (CrLf) pair of characters. The record consists of number of fields containing ASCII characters. Each field is uniquely defined by its position within the record.

The interpretation of the record is unambiguously defined by the fields “File identifier” (Field 1).

Every record in the database is uniquely defined by the combination of first 17 characters.

The following rules are applied when importing data files which deviate from the standard structures:

- non-ASCII characters are replaced by blanks (blank is the “space” character);
- records shorter than standard length are padded by blanks to the standard length;
- records longer than standard length are truncated to the standard length;
- a single Carriage return character is replaced with CrLf pair;
- a single Line feed character is replaced with CrLf pair;
- an ambiguous value of identification code (Field 3) is replaced by a new value generated by the database housekeeper.

2. Record descriptions

Table A3.1

CEPT analogue television transmitter database record

Field	Item	Start Column	Width	Type
1	File identifier, must be TVA1	1	4	A4
2	ITU code for administration responsible	5	3	A3
3	Identification code used by organisation	8	9	A9
4	Update code used by organisation	17	1	A1
5	Space reserved for serial number (e.g. ITU No.)	18	9	A9
6	Status code (**O**perating/**N**ot operating)	27	1	A1
7	Date of entry into operation (DDMMYYYY)	28	8	2I2, I4
8	ITU code for country in which transmitter is sited	36	3	A3
9	Station name	39	20	A20
10	Latitude (in degrees, N/S, min., sec.)	59	7	I2, A1, 2I2
11	Longitude (in degrees, E/W, min., sec.)	66	8	I3, A1, 2I2
12	Height of site (m asl; as sign followed by a number)	74	5	I5
13	Television system (**B**/**D**, ... etc.)	79	2	A2
14	Colour system (**P**al, **S**ecam, or **N**TSC)	81	1	A1
15	Channel	82	3	A3
16	Vision offset value (in 1/12 line units; as sign followed by a number)	85	4	I4
17	Nominal vision carrier frequency in MHz (including decimal point)	89	9	F9.3
18	Vision offset value in Hz (as sign followed by a number)	98	8	I8
19	Offset type (**U**nspecified /**N**ormal/**P**recision/**S**ynchronised)	106	1	A1
20	Maximum vision e.r.p. of horizontally polarised component (in dBW; as sign followed by a number including a decimal point)	107	5	F5.1
21	Maximum vision e.r.p. of vertically polarised component (in dBW; as sign followed by a number including a decimal point)	112	5	F5.1
22	Nominal primary sound carrier frequency minus nominal vision carrier frequency in MHz (as a number including a decimal point; if value is negative, e.g. System L at VHF, include sign in first column of field)	117	4	F4.1
23	Primary Sound carrier offset (zero, unless a special sound offset is in use) value in Hz (for system L only)	121	7	I7
24	Vision to primary sound carrier power ratio (in dB)	128	2	I2
25	Nominal secondary sound carrier frequency minus nominal vision carrier frequency in MHz (as a number including a decimal point; if value is negative, e.g. System L at VHF, include sign in first column of field)	130	6	F6.2
26	Unused columns	136	6	
27	Secondary sound system (**F**M/**N**icam; leave blank if no secondary sound system)	142	1	A1
28	Vision to secondary sound carrier power ratio (in dB)	143	2	I2
29	Polarisation (**H**/**V**/**M**)	145	1	A1

Field	Item	Start Column	Width	Type
30	Height of antenna (m a.g.l.)	146	3	I3
31	Directional? (**D**irectional/**N**on-directional)	149	1	A1
32	36 values of e.r.p. reduction (in dB) of the horizontally polarised component in the horizontal plane relative to the maximum e.r.p. of the horizontally polarised component as given in field 20 (at 10 degrees intervals, starting at North)	150	72	36I2
33	36 values of e.r.p. reduction (in dB) of the vertically polarised component in the horizontal plane relative to the maximum e.r.p. of the vertically polarised component as given in field 21 (at 10 degrees intervals, starting at North)	222	72	36I2
34	Elevation angle of the horizontally polarised component (in degrees, negative if above the horizontal)	294	4	F4.1
35	Unused columns	298	2	
36	Elevation angle of the vertically polarised component (in degrees, negative if above the horizontal)	300	4	F4.1
37	Unused columns	304	2	
38	Unused column	306	1	
39	Maximum effective antenna height (m)	307	5	I5
40	36 values of effective antenna height (in m, at 10 degrees intervals, starting at North)	312	180	36I5
41	Organisation name or code	492	5	A5
42	Programme identifier	497	5	A5
43	Date of last change to data on file (DDMMYYYY)	502	8	2I2, I4
44	Designation of emission for the vision signal	510	9	A9
45	Designation of emission for the primary sound signal	519	9	A9
46	Designation of emission for the secondary sound signal	528	9	A9
47	Unused columns. May be used for comments	537	231	
99	Reserved for database housekeeping purposes	768	32	A32

Table A3.2

CEPT digital television transmitter database record

Field	Item	Start Column	Width	Type
1	File identifier, must be TVD1	1	4	A4
2	ITU code for administration responsible	5	3	A3
3	Identification code used by organisation	8	9	A9
4	Update code used by organisation	17	1	A1
5	Space reserved for serial number (e.g. ITU No.)	18	9	A9
6	Status code (**O**perating/**N**ot operating)	27	1	A1
7	Date of entry into operation (DDMMYYYY)	28	8	2I2, I4
8	ITU code for country in which transmitter is sited	36	3	A3
9	Station name	39	20	A20
10	Latitude (in degrees, N/S, min., sec.)	59	7	I2, A1, 2I2
11	Longitude (in degrees, E/W, min., sec.)	66	8	I3, A1, 2I2
12	Height of site (m asl; as sign followed by a number)	74	5	I5
13	Digital Television system, from Table A1.1	79	2	A2
14	Carrier and guard interval, from Table A1.2	81	1	A1
15	Channel	82	3	A3
16	Unused	85	4	A4
17	Block centre frequency in MHz (including decimal point)	89	9	F9.3
18	Offset value in Hz (as sign followed by a number)	98	8	I8
19	Offset type (**U**nspecified/**N**ormal/**P**recision)	106	1	A1
20	Maximum e.r.p. of horizontally polarised component (in dBW; as sign followed by a number including a decimal point)	107	5	F5.1
21	Maximum e.r.p. of vertically polarised component (in dBW; as sign followed by a number including a decimal point)	112	5	F5.1
22	Identifier for SFN	117	5	A5
23	Relative timing of transmitter within an SFN (micro sec)	122	6	I6
24	Unused	128	17	A17
29	Polarisation (**H**/**V**/**M**)	145	1	A1
30	Height of antenna (m a.g.l.)	146	3	I3
31	Directional? (**D**irectional/**N**on-directional)	149	1	A1
32	36 values of e.r.p. reduction (in dB) of the horizontally polarised component in the horizontal plane relative to the maximum e.r.p. of the horizontally polarised component as given in field 20 (at 10 degrees intervals, starting at North)	150	72	36I2
33	36 values of e.r.p. reduction (in dB) of the vertically polarised component in the horizontal plane relative to the maximum e.r.p. of the vertically polarised component as given in field 21 (at 10 degree intervals, starting at North)	222	72	36I2
34	Elevation angle of the horizontally polarised component (in degrees, negative if above the horizontal)	294	4	F4.1
35	Unused columns	298	2	
36	Elevation angle of the vertically polarised component (in degrees, negative if above the horizontal)	300	4	F4.1

Field	Item	Start Column	Width	Type
37	Unused columns	304	2	
38	Unused column	306	1	
39	Maximum effective antenna height (m)	307	5	I5
40	36 values of effective antenna height (in m, at 10 degrees intervals, starting at North)	312	180	36I5
41	Transmission provider	492	5	A5
42	Service provider	497	5	A5
43	Date of last change to data on file (DDMMYYYY)	502	8	2I2, I4
44	Designation of emission	510	9	A9
45	Unused columns. May be used for comments	519	249	249
99	Reserved for database housekeeping purposes	768	32	A32

Table A3.3

CEPT other services database record

Field	Item	Start Column	Width	Type
1	File identifier, must be OS01	1	4	A4
2	ITU code for administration responsible	5	3	A3
3	Other service type code, from Annex 5	8	3	A3
4	Record for **T**ransmit/**R**eceive/**B**oth operation. The same Identification code is used for a given station of an other service if described in two records	11	1	A1
5	Identification code used by administration	12	5	I5
6	Name. Up to 20 alphanumeric characters	17	20	A20
7	Year in which this requirement may be brought into service. This field is not used by the planning software	37	4	I4
8	Field strength to be protected in dB μV/m Use value 999 for Transmitting-only service where reception parameters are specified in a separate record	41	3	I3
9	Percentage of time for which protection is sought	44	4	F4.1
10	Transmitter site Co-ordinates (longitude and latitude) in degrees and minutes. Example 017E1645N23 is co-ordinate 17E16, 45N23	48	11	I3, A1, I2, I2, A1, I2
11	Center Frequency in kHz	59	7	I7
12	Maximum effective radiated power (e.r.p.) in dBW. Use value -99 for Receiving-only service where transmission parameters are specified in a separate record	66	3	I3
13	Height of site (m asl; as sign followed by a number)	69	5	I5
14	Height of antenna (m a.g.l.)	74	3	I3
15	Effective transmitting antenna height 1. Put "**U**" if the effective height of the antenna is the same in all directions. Otherwise put "**N**"	77	1	A1
16	Effective transmitting antenna height 2. If the preceding field contains "U" give the effective height. Otherwise, give 36 values of effective height at 10° intervals, starting at north	78	180	36I5
17	Polarisation (**H**/**V**/**M**)	258	1	A1
18	Azimuth of maximum antenna gain in degrees from North	259	3	I3
19	Receiving or transmitting antenna pattern 1. Put "**N**" if the antenna is non-directional or the width of the main lobe is greater than 99 degrees. Otherwise put "**D**"	262	1	A1
20	Receiving or transmitting antenna pattern 2. If the previous field contains "D", give 36 value of the reduction of antenna gain (for a receiving antenna) or e.r.p. (for a transmitting antenna), relative to the maximum value, at 10 degrees interval, starting at north	263	72	36I2
21	Width of main lobe of receiving antenna (3 dB) in degrees	335	2	I2
22	Reduction outside main lobe of receiving antenna in dB	337	2	I2

Field	Item	Start Column	Width	Type
23	Test points 1. Enter "**B**" if test points for whole country is to be used. Otherwise leave blank	339	1	A1
24	Test points 2. If previous field is blank, enter number of test points (max. 36)	340	2	I2
25	Test points 3. Up to 36 co-ordinates (longitude and latitude) in degrees and minutes. Example 017E1645N23 is co-ordinate 17E16, 45N23	342	396	36(I3, A1, I2, I2, A1, I2)
26	Date of last change to data on file (DDMMYYYY)	738	8	2I2, I4
27	Unused columns. May be used for comments	746	22	
99	Reserved for database housekeeping purposes	768	32	A32

ANNEX 4

Compatibility Analyses

SECTION A: Compatibility analysis for DVB-T interfered with by analogue television

1 Following a request for the coordination of a proposed analogue station, a compatibility analysis should be undertaken to assess the impact on DVB-T services. Such a proposal may consist of:

1.1 a new analogue station, or

1.2 a modification of an analogue station.

2 The propagation prediction method described in Annex 1, Section 2, which is based on Rec. ITU-R P.370, should be used unless agreed otherwise.

2.1 If a propagation prediction method based on Rec. ITU-R P.370 is not used, the administrations concerned should decide on the calculation method used to determine if the interference resulting from the proposed station is acceptable.

3 In the case of a low power DVB-T station to be protected (less than 10 Watts e.r.p.); and

3.1 if special treatment is required, for instance because of geographical conditions, or in the case of relay receivers,

3.2 treatment should be on a case by case basis in which more detailed calculation methods may be used.

4 The following calculations should be made to determine:

(a) the location of the test points.
- With regard to affected DVB-T stations not resulting from the conversion of an analogue station into digital according to Annex 6, the method described in Annex 1, Section 6.7.2, is to be used, or
- with regard to affected DVB-T stations resulting from the conversion of an analogue station into digital according to Annex 6, the method described in Annex 1, Section 6.7.2 is to be used, or
- with regard to affected analogue stations that may be converted into digital in the future, the method described in Annex 1, Section 6.7.2 is to be used.

and

(b) the reference usable field strengths.

The reference value at each test point is the calculated usable field strength according to Annex 1, Section 6.7.2. The reference date for the reference value is 25 July 1997 or, for a new station, the date at which it is entered in the Plan.

and

(c) the resulting usable field strength in the case of a new analogue station.
This is found from the power summation at each test point of the reference value in 4(b) and the nuisance field strength of the proposed station artificially converted to digital by subtracting 7 dB from the e.r.p.

and

(d) the resulting usable field strength in the case of a modified analogue station.
This is found from the power summation at each test point of the reference value in 4(b) with the contribution of the original station suppressed, and the nuisance field strength of the modified station artificially converted to digital by subtracting 7 dB from the e.r.p.

5 If the difference 4(c) minus 4(b), in the case of a new analogue station and if the difference 4(d) minus 4(b) in the case of a modified analogue station is not more than 0.3 dB at any test point the request should normally be accepted. The station is then considered to be compatible.

5.1 If in special cases (e.g. topographical conditions; many previous small increases of interference) an increase of 0.3 dB or less is not acceptable, or

5.2 the increase is more than 0.3 dB at one or more test points, or

5.3 the criteria defined by the Administrations according to 2.1 or 3.2 are not satisfied,

5.4 the consulted administration should consider if the proposed station is nevertheless acceptable, taking into account practical circumstances, for example in cases where the usable field strength is near the minimum usable field strength, and therefore compatible.

5.5 If the considerations in 5.4 indicate that the increase of interference is not acceptable, the station is considered to be incompatible.

SECTION B: Compatibility analysis for Analogue television interfered with by DVB-T

1 Following a request for the coordination of a proposed DVB-T station or SFN, a compatibility analysis should be undertaken to assess the impact on analogue television services. Such a proposal may consist of:

1.1 a new DVB-T station or SFN, or

1.2 a modification of a DVB-T station or SFN, or

1.3 a conversion of an analogue television station, if the conditions of Annex 6 are not fulfilled.

2 The propagation prediction method described in Annex 1, Section 2 which is based on Rec. ITU-R P.370, should be used unless agreed otherwise.

2.1 If a propagation prediction method based on Rec. ITU-R P.370 is not used, the administrations concerned should decide on the calculation method used to determine if the interference resulting from the proposed DVB-T station or SFN is acceptable.

3 In the case of a low power analogue station to be protected (less than 100 Watts e.r.p.); and

3.1 if special treatment is required, for instance because of geographical conditions, or in the case of relay receivers,

3.2 treatment should be on a case by case basis in which more detailed calculation methods may be used.

4 The following calculations should be made to determine:

(a) the location of the test points.
The method described in Annex 1, Section 6.7.1 is to be used.

and

(b) the reference usable field strengths.
The reference value at each test point is the calculated usable field strength according to Annex 1, Section 6.7.1. The reference date for the reference value is 25 July 1997 or, for a new station, the date at which it is entered in the Plan.

and

(c) the resulting usable field strength in the case of a new DVB-T station or SFN.
This is found from the power summation at each test point of the reference value in 4(b) and the nuisance field strength of the proposed DVB-T station or SFN.

and

(d) the resulting usable field strength in the case of a modified DVB-T station or SFN.
This is found from the power summation at each test point of the reference value in 4(b), with the contribution of the original station or SFN suppressed, and the nuisance field strength of the modified station or SFN.

and

(e) the resulting usable field strength in the case of a conversion from an analogue station if the conditions of Annex 6 are not fulfilled.
This is found from the power summation at each test point of the reference value in 4(b) with the contribution of the original station suppressed and the nuisance field strength of the station or SFN resulting from the conversion.

5 If the difference 4(c) minus 4(b), in the case of a new DVB-T station or SFN and if the difference 4(d) minus 4(b) in the case of a modified DVB-T station or SFN and if the difference 4(e) minus 4(b) in the case of a conversion from an analogue station when the conditions of Annex 6 are not fulfilled, is not more than 0.3 dB at any test point, the request should normally be accepted. The station or SFN is then considered to be compatible.

5.1 If in special cases (e.g. topographical conditions; many previous small increases of interference) an increase of 0.3 dB or less is not acceptable, or

5.2 the increase is more than 0.3 dB, or

5.3 the criteria defined by the Administrations according to 2.1 or 3.2 are not satisfied,

5.4 the consulted administration should consider if the proposed station is nevertheless acceptable, taking into account practical circumstances, and therefore compatible.

5.5 If the considerations in 5.4 indicate that the increase of interference is not acceptable, the station is considered to be incompatible.

SECTION C: Compatibility analysis for DVB-T interfered with by DVB-T

1 Following a request for the coordination of a proposed DVB-T station or SFN, a compatibility analysis should be undertaken to assess the impact on DVB-T services. Such a proposal may consist of:

1.1 a new DVB-T station or SFN, or

1.2 a modification of a DVB-T station or SFN, or

1.3 a conversion of an analogue television station, if the conditions of Annex 6 are not fulfilled.

2 The propagation prediction method described in Annex 1, Section 2, which is based on Rec. ITU-R P.370, should be used unless agreed otherwise.

2.1 If a propagation prediction method based on Rec. ITU-R P.370 is not used, the administrations concerned should decide on the calculation method used to determine if the interference resulting from the proposed DVB-T station or SFN is acceptable.

3 In the case of a low power DVB-T station to be protected (less than 10 Watts e.r.p.); and

3.1 if special treatment is required, for instance because of geographical conditions, or in the case of relay receivers,

3.2 treatment should be on a case by case basis in which more detailed calculation methods may be used.

4 The following calculations should be made to determine:

(a) the location of the test points.

- With regard to affected DVB-T stations not resulting from the conversion of an analogue station into digital according to Annex 6, the method described in Annex 1, Section 6.7.2 is to be used, or
- with regard to affected DVB-T stations resulting from the conversion of an analogue station into digital according to Annex 6, the method described in Annex 1, Section 6.7.2 is to be used, or
- with regard to affected analogue stations that may be converted into digital in the future, the method described in Annex 1, Section 6.7.2 is to be used.

and

(b) the reference usable field strengths.

The reference value at each test point is the calculated usable field strength according to Annex 1, Section 6.7.2. The reference date for the reference value is 25 July 1997 or, for a new station, the date at which it is entered in the Plan.

and

(c) the resulting usable field strength in the case of a new DVB-T station or SFN.
This is found from the power summation at each test point of the reference value in 4(b) and the nuisance field strength of the proposed station or SFN.

and

(d) the resulting usable field strength in the case of a modified DVB-T station or SFN.
This is found from the power summation at each test point of the reference value in 4(b) with the contribution of the original station or SFN suppressed and the nuisance field strength of the modified DVB-T station or SFN.

and

(e) the resulting usable field strength in the case of a conversion from an analogue station if the conditions of Annex 6 are not fulfilled.
This is found from the power summation at each test point of the reference value in 4(b) with the contribution of the original station suppressed and the nuisance field strength of the station or SFN resulting from the conversion.

5 If the difference 4(c) minus 4(b), in the case of a new DVB-T station or SFN and if the difference 4d) minus 4b) in the case of a modified DVB-T station or SFN and if the difference 4e) minus 4b) in the case of a conversion of an analogue station when the conditions of Annex 6 are not fulfilled, is not more than 0.3 dB at any test point the request should normally be accepted. The station or SFN is then considered to be compatible.

5.1 If in special cases (e.g. topographical conditions; many previous small increases of interference) an increase of 0.3 dB or less is not acceptable, or

5.2 the increase is more than 0.3 dB at one or more test points, or

5.3 the criteria defined by the Administrations according to 2.1 or 3.2 are not satisfied,

5.4 the consulted administration should consider if the proposed station is nevertheless acceptable, taking into account practical circumstances, for example in cases where the usable field strength is near the minimum usable field strength and therefore compatible.

5.5 If the considerations in 5.4 indicate that the increase of interference is not acceptable, the station is considered to be incompatible.

SECTION D: Compatibility analysis for services other than broadcasting having primary status interfered with by DVB-T.

1 Following a request for the coordination of a proposed DVB-T station or SFN, a compatibility analysis should be undertaken to assess the impact on services other than broadcasting having primary status. Such a proposal may consist of:

1.1 a new DVB-T station or SFN, or

1.2 a modification of a DVB-T station or SFN, or

1.3 a conversion of an analogue television station.

2 The propagation prediction method described in Annex 1, Section 2 which is based on Rec. ITU-R P.370 or free-space, as appropriate, should be used unless agreed otherwise.

2.1 If a propagation prediction method based on Rec. ITU-R P.370 or free-space, as appropriate, is not used, the administrations concerned should decide on the calculation method used to determine if the interference resulting from the proposed DVB-T station or SFN is acceptable.

3 The nuisance field strength of the proposed DVB-T station or SFN should be calculated, using the protection criteria specified in Annex 5, Section 2, at each of the test points specified for the station of the other service (see Annex 1, Section 6.7.3).

4 If the nuisance field strength in 3) at any test point is not more than the field strength to be protected as defined in Annex 5, Section 2 the request should normally be accepted. The station is then considered to be compatible.

4.1 In the case of a conversion of an analogue station, if the nuisance field strength calculated in 3) at any test point is not more than the nuisance field strength of the original analogue station the station is considered to be compatible.

5 If the nuisance field strength is more than the field strength to be protected at one or more test points, or

5.1 the criteria defined by the Administrations according to 2.1 are not satisfied,

5.2 the consulted administration should consider if the proposed station is nevertheless acceptable, taking into account practical circumstances, and therefore compatible.

5.3 If the considerations in 5.2 indicate that the interference is not acceptable, the station is considered to be incompatible.

SECTION E: Compatibility analysis for DVB-T interfered with by services other than broadcasting having primary status

1 Following a request for the coordination of a proposed station of a service other than broadcasting having primary status, a compatibility analysis should be undertaken to assess the impact on DVB-T services. Such a proposal may consist of:

1.1 a new station, or

1.2 a modification of a station.

2 The propagation prediction method described in Annex 1, Section 2, which is based on Rec. ITU-R P.370 or free-space, as appropriate, should be used unless agreed otherwise.

2.1 If a propagation prediction method based on Rec. ITU-R P.370 or free-space, as appropriate, is not used, the administrations concerned should decide on the calculation method used to determine if the interference resulting from the proposed station is acceptable.

3 In the case of a low power DVB-T station to be protected (less than 10 Watts e.r.p.); and

3.1 if special treatment is required, for instance because of geographical conditions, or in the case of relay receivers,

3.2 treatment should be on a case by case basis in which more detailed calculation methods may be used.

4 The following calculations should be made to determine:

(a) the location of test points.
- With regard to affected DVB-T stations not resulting from the conversion of an analogue station into digital according to Annex 6, the method described in Annex 1, Section 6.7.3 for a noise limited coverage, is to be used, or
- with regard to affected DVB-T stations resulting from the conversion of an analogue station into digital according to Annex 6, the method described in Annex 1, Section 6.7.3, for noise limited coverage, is to be used.
- with regard to affected analogue stations that may be converted into digital in the future, the method described in Annex 1, Section 6.7.3 is to be used.

and

(b) the nuisance field strengths.
The nuisance field strength of the proposed station of the service other than broadcasting should be calculated at each of these test points .

5 If the nuisance field strength 4(b) at any test point is not more than the minimum median equivalent field strength of the DVB-T service as specified in Annex 1, Section 8 the request should normally be accepted. The station is then considered to be compatible.

5.1 if the nuisance field strength is more than the minimum median equivalent field strength at one or more test points, or

5.2 the criteria defined by the Administrations according to 2.1 or 3.2 are not satisfied,

5.3 the consulted administration should consider if the proposed station is nevertheless acceptable, taking into account practical circumstances, and therefore compatible.

5.4 If the considerations in 5.3 indicate that the interference is not acceptable, the station is considered to be incompatible.

ANNEX 5

Methods and criteria for assessing compatibility between DVB-T and services* other than broadcasting

1. Other services and sharing situations

Broadcasting does not have exclusive access to the frequency bands allocated to the broadcasting service. A number of sharing situations exist and these vary from one country to another, both in terms of the 'other service' involved and its status in Radio Regulatory terms.

The sharing situations include:

- radiodetermination in the UK in channel 36;
- radioastronomy in channel 38;
- various military (ground and airborne) services in Band V up to channel 69;
- services ancillary to broadcasting and programme making (SAB/SAP);
- any other service sharing with television in Bands III, IV and V up to channel 69.

When considering sharing, the status of services has to be taken into account. In this context, Radio Astronomy is a special case; although allocated on a secondary basis the Radio Regulations urge that other radio services take measures to protect Radio Astronomy observations.

[1]Methods and criteria for sharing situations which involve only broadcasting services are dealt with in Annex 1.

1.1 Lists of other services

Lists of other services in the Bands III, IV and V are given in Tables A5.1 and A5.2. These lists are provided for information only and may not be complete.

The letter Y (Yes) in the 'information available' column indicates that tables of parameters are given in Sections 2 and, or 3.

In Annex 5 Sections 2 and 3 the 'service identifiers**' shown in Tables A5.1 and A5.2 are followed by the numbers 7 or 8 to indicate whether the protection ratios given relate to 7 or 8 MHz DVB - T services.

* Reference to services in this Annex is used in the general sense and does not necessarily reflect the definition of Services in the Radio Regulations.

** The 'service identifier' used in this Annex has no correspondence with the class of stations as used in the Radio Regulations.

Table A5.1

List of other services in Band III

Service	Frequency (MHz)	Country	Service Identifier	Information available (Y/N)
SAP/SAB	173.7 - 230	UK	NR, NS, NT	Y, Y, Y
SAP/SAB	174 - 223	Germany	NR	Y
SAP/SAB	175.5 - 178.5 183.5 - 186.5	France	NX	N
SAP/SAB	181 - 216	Netherlands	NR, NS, NT	Y, Y, Y
SAP/SAB	174.3 - 178.5	Sweden	NY	N
SAP/SAB	174 - 230	Italy	NR	Y
SAP/SAB	174 - 195	Spain	NR	Y
SAP/SAB	174 - 230	Belgium	NR	Y
SAP/SAB	174 - 230	Switzerland	NR	Y
SAP/SAB	174 - 230	Portugal	NR	Y
SAP/SAB	174 - 230	Slovak Republic	NW	N
SAP/SAB	174 - 223	Luxembourg	NR	Y
Medical Telemetry	218 - 221	Netherlands	LA	Y
Medical Telemetry	174 - 230	Switzerland	LA	Y
Medical Telemetry	174 - 176	Belgium	LA	Y
Hearing Aids	174 - 223	Germany	LB	Y
Hearing Aids	173.35 - 175.02	UK	LB	Y
Short Range Devices	223.5 - 225	France	LC	Y
PMR Trunked Systems	174 - 217	UK	MT	Y
PMR Trunked System	223 - 230	Spain	MT	Y
Mobile System	174 - 223	France	MM	Y
Mobile System	174 - 230	Italy	MM	Y
Mobile System	174 - 181	Netherlands	MM	Y
Military Radio Relays	174 - 223	East Europe	FX	N
Defence Systems	225 - 230	Belgium	XE	N
Military Services	223 - 230	France	XF	N
Military Services	223 - 225	Luxembourg	XF	N

Table A5.2

List of other services in Bands IV and V

Mobile service:
470 to 790 MHz, secondary in some countries according to S5.296
790 to 862 MHz, primary in some countries according to S5.316

Service	Frequency (MHz)	Country	Service Identifier	Information available (Y/N)
SAP/SAB	468 - 862 with geographical restrictions	UK	NR, NS, NT	Y, Y, Y
SAP/SAB	470 - 608 614 - 790 798 - 830	Germany	NR, NS, NT	Y, Y, Y
SAP/SAB	470 - 830	France	NA	N
SAP/SAB	800 - 820	Denmark	NR, NS	Y, Y
SAP/SAB	800 - 814 471 - 476.45 854 - 862	Sweden	NR	Y
SAP/SAB	800 - 820	Norway	NR	Y
SAP/SAB	470 - 790	Netherlands	NR, NS, NT	Y, Y, Y
SAP/SAB	470 - 790 830 - 862	Spain	NR, NT	Y, Y
SAP/SAB	470 - 862	Switzerland	NR	Y
SAP/SAB	470 - 790	Austria	NR	Y
SAP/SAB	470 - 478 486 - 494 800.1 - 819.9 855.5 - 861.875	Finland	NR	Y
SAP/SAB	470 - 862	Italy	NR	Y
SAP/SAB	470 - 790	Belgium	NT, NS	Y, Y
SAP/SAB	470 - 862	Portugal	NR	Y
SAP/SAB	470 - 530 570 - 630	Slovak Republic	ND	N
Land Mobile/ENG	470 - 790	Switzerland	NE	N
Land Mobile/ENG	470 - 478	Norway	NF	N
Video Cameras	790 - 862	Switzerland	NG	N
Tactical Radio Relay	790 - 862	Germany	MF	Y
Tactical Radio Relay	830 - 862	France	MF	Y
Tactical Radio Relay	790 - 862 (10 MHz within the Band)	Denmark	MF	Y
Tactical Radio Relay	790 - 798 798 - 806 846 - 854 854 - 862	Netherlands	MD	Y
Tactical Radio Relay	838 - 854	Portugal	MC	N
Tactical Radio Relay	838 - 862	Greece	MF	Y
Tactical Radio Relay	840 - 862	Belgium	MA	N
Tactical Radio Relay	790 - 854	Luxembourg	MA	N

Mobile service:
470 to 790 MHz, secondary in some countries according to S5.296
790 to 862 MHz, primary in some countries according to S5.316

Service	Frequency (MHz)	Country	Service Identifier	Information available (Y/N)
Military Mobile	790 - 800.1 819.9 - 855.5 861.875 - 862	Finland	MG	N
Mobile Links	830 - 862	Spain	MH	Y

Fixed service:
470 to 790 MHz: no allocation in RR
790 to 862 MHz: primary

Service	Frequency (MHz)	Country	Service Identifier	Information available (Y/N)
Fixed links	790 - 862	Norway	FA	Y
Fixed links	790 - 862	Belgium	FB	N
Fixed (receive only)	852 - 860	Norway	FC	N
Fixed links (Studio to Transmitter)	790 - 862	Norway	GN	N
Fixed links (Studio to Transmitter)	838.75 - 852.25	Portugal	GP	Y
Fixed Links (Studio to Transmitter)	830 - 862	Spain	GS	Y
Fixed links military	822 - 862	Portugal	FM	Y
Point -to-Multipoint	845 - 849	Czech Republic	EC	N
Point-to-Multipoint	824 - 830	Poland	EP	N

Aeronautical radio navigation:
Primary under footnote S5.312 in 645 to 862 MHz in some countries

Service	Frequency (MHz)	Country	Service Identifier	Information available (Y/N)
Aeronautical Radio Navigation	800 - 808	Hungary	AA	Y
Aeronautical Radio Navigation	734 - 742 796 - 808	Czech Republic	AA	Y
Aeronautical Radio Navigation	645 - 862	Russia	AA	Y
Aeronautical Radio Navigation	645 - 862	Ukraine	AA	Y
Aeronautical Radio Navigation	645 - 862	Moldova	AA	Y
Aeronautical Radio Navigation (RSBN)	790 - 814	Poland	AA	Y
Aeronautical Radio Navigation (RSP)	830 - 880	Poland	AB	N
Aeronautical Radio Navigation	645 - 862	Romania	AA	Y
Aeronautical Radio Navigation	790 - 808	Slovak Republic	AA	Y
IFF	654 - 678	Hungary	BA	N
IFF	646 - 686	Poland	BB	N

Aeronautical radio navigation: **Primary under footnote S5.312 in 645 to 862 MHz in some countries**				
Service	**Frequency (MHz)**	**Country**	**Service Identifier**	**Information available (Y/N)**
Identification System (active response)	730 - 750	Poland	BC	N
Identification System (active response)	734 - 742	Slovak Republic	BD	N
Identification System (active response)	730 - 750	Hungary	BC	N

Radar: **Primary under footnotes S5.302 and S5.312**				
Service	**Frequency (MHz)**	**Country**	**Service Identifier**	**Information available (Y/N)**
Radar	590 - 598	UK	XG	Y
Radar	838 - 862	Czech Republic	XZ	N
Radar	838 - 862	Slovak Republic	XY	N
Radar	810 - 862	Romania	XX	N
Radar	825 - 835	Hungary	XY	N

Radioastronomy: **Secondary, to be protected by footnote S5.149**				
Service	**Frequency (MHz)**	**Country**	**Service Identifier**	**Information available (Y/N)**
Radioastronomy	608 - 614	UK	XA, XC	Y, Y
Radioastronomy	608 - 614	Germany	XC	Y
Radioastronomy	608 - 614	Poland	XA	Y
Radioastronomy	608 - 614	Netherlands	XA, XB, XC	Y, Y, Y
Radioastronomy	608 - 614	Belgium	XA	Y
Radioastronomy	608 - 614 (projected)	France	XA	Y

1.2 Protection needs of other services

In addition to the parameters:

- centre frequency;
- signal level to be protected;
- protection ratio as a function of frequency separation between digital television and the other service centre frequencies;
- percentage time for which protection is required;
- other service receiving antenna orientation and discrimination (if relevant),

it is also necessary to determine the area or the locations for which the protection of the other service is required.

The latter may conveniently be done by specifying a set of test point locations (as longitude, latitude and height above ground level, or sea level, as appropriate) which represent either:

- the boundary of the area within which protection is required; or,
- the actual locations at which a receiving installation is, or may be, installed.

In order to avoid some ambiguities which have created difficulties in the past, special care needs to be taken when specifying information about receiving antenna characteristics for stations of other services:

- in the case of mobile reception, it is assumed that there is neither directivity nor polarisation discrimination and;
- in the case of fixed reception, it is necessary to specify the orientation of the antenna, as well as its co- and cross-polar discrimination as a function of relative bearing.

1.3 Technical elements of other services needed for compatibility calculations

The parameters which are needed for compatibility calculations are for transmitting and/or receiving terminals:

- modulation;
- frequency;
- bandwidth;
- maximum radiated power;
- azimuthal radiation pattern;
- polarisation;
- polarisation discrimination;
- site co-ordinates and height information(longitude, latitude and height above ground level, or sea level, as appropriate).;
- protection ratio as a function of frequency separation;
- minimum signal level to be protected for a given installation;
- time percentage to be protected;
- coverage area defined by calculation test points (up to 36).

1.4 Calculation of the protection of other services

A calculation should be made for each of the test points used in the definition of the other service. This calculation should take into account:

- the protection ratio for the frequency difference between the other service and the digital television service;
- the signal level from the interfering assignment;
- other service receiving antenna discrimination (polarisation and directivity), where relevant.

From the above information, the nuisance field strength (at each of the test-points) may be calculated for the other service.

The nuisance field strength, En, is defined as:

$$En = E_i + PR + A$$

where, expressed in dB:

E_i = field strength value of DVB-T assignment
PR = relevant protection ratio
A = relevant receiving antenna discrimination ($A \leq 0$)

During any necessary co-ordination discussions, the nuisance field strength (at each of the test points) may be compared with the minimum signal level to be protected for the other service. (See Annex 4 Section D)

The calculation of the interfering signal level is dependent upon the other service being considered. Rec. ITU-R P.370 (for individual transmitters) or a statistical method (for SFNs) may be used for terrestrial other services, taking into account the relevant percentage of time. However, free-space calculations will be needed for aeronautical (or satellite) services if a line-of-sight condition between other service receiver and interfering transmitter exists.

1.5 Calculation of the protection of digital television

A calculation should be made for each of the test points used in the definition of a digital television coverage area. This calculation should take into account:

- the protection ratio for the frequency difference between the other service and the digital television service;
- the signal level from the other service transmitter;
- the digital television service receiving antenna discrimination (in the case of fixed antenna reception).

From the above information, the nuisance field strength (at each of the boundary test-points) may be calculated for the digital television service.

The nuisance field strength, En, is defined as:

$$En = E_i + PR + C + A$$

where, expressed in dB:

E_i = field strength value of the other service assignment
PR = relevant protection ratio
C = propagation correction factor (to achieve a location probability of 95% instead of 50%). See also Annex 1 Section 6.2.
A = relevant receiving antenna discrimination ($A \leq 0$)

During any necessary co-ordination discussions, the nuisance field strength (at each of the boundary test points) may be compared with the minimum signal level of the digital television service. (See Annex 4 Section E)

2. Protection criteria for other services

Where values are given for the field strength to be protected and receiving antenna height these are default values for the service which **may** be used in the co-ordination procedure if no values are shown in the ‘other service station record’. Values 999 or -99 in these boxes indicate that specific values **must** be given in the ‘other service station record’. Where the required values have not been included, their development is the subject of further work in accordance with Resolution 3.

Δf is the difference between the centre frequencies of the unwanted and wanted signals ($f_{unwanted}$ - f_{wanted}). In the case of Radioastronomy the wanted signal frequency is the centre of the allocated band.

For SAB/SAP equipment which could operate in the range 470-862 MHz, the default field strength to be protected is shown at 650MHz. The default field strength to be protected (E) may be derived at any other frequency (f) from:

$$E(f) = E(650) + 20\log_{10}(f/650),$$

where

f = frequency in MHz,
E(650) = field strength at a frequency of 650 MHz,
E(f) = field strength at frequency f.

The number 7 or 8 in the 'service identifier' code indicates 7 MHz or 8 MHz DVB-T as the unwanted service.

Wanted:	Aero Radio Nav RSBN		Default field strength to be protected (dBμV/m)			42	Default Receiving antenna height (m)			10
Service Identifier	AA8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-12.0	-6.0	-4.2	-3.8	0.0	3.8	4.2	6.0	12.0	
PR (dB)	-87.2	-62.2	-50.2	0.0	0.0	0.0	-50.2	-62.2	-87.2	

Wanted:	Fixed Link		Default field strength to be protected (dBμV/m)			26	Default Receiving antenna height (m)			-99
Service Identifier	FA8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-10.0	-5.0	-4.0	-3.0	0.0	3.0	4.0	5.0	10.0	
PR (dB)	-55.0	-4.0	6.0	8.5	9.0	8.5	6.0	-4.0	-55.0	

Wanted:	Military fixed		Default field strength to be protected (dBμV/m)			18	Default Receiving antenna height (m)			35
Service Identifier	FM8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-10.0	-5.0	-4.0	0.0	4.0	5.0	10.0			
PR (dB)	-50.0	1.0	11.0	14.0	11.0	1.0	-50.0			

Wanted:	Studio Transmitter Link		Default field strength to be protected (dBμV/m)			66	Default Receiving antenna height (m)			21
Service Identifier	GP8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-12.0	-10.0	-8.0	-6.0	-4.2	-3.8	-3.6	0.0	3.6	3.8
PR (dB)	-18.0	-17.0	-12.0	-9.0	-5.0	36.0	43.0	43.0	43.0	36.0
Δf (MHz)	4.2	6.0	8.0	10.0	12.0					
PR (dB)	-5.0	-9.0	-12.0	-17.0	-18.0					

Wanted:	Studio Transmitter Link		Default field strength to be protected (dBµV/m)			60.5	Default Receiving antenna height (m)			21
Service Identifier	GS8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-12.0	-10.0	-8.0	-6.0	-4.2	-3.8	-3.6	0.0	3.6	3.8
PR (dB)	-18.0	-17.0	-12.0	-9.0	-5.0	36.0	43.0	43.0	43.0	36.0
Δf (MHz)	4.2	6.0	8.0	10.0	12.0					
PR (dB)	-5.0	-9.0	-12.0	-17.0	-18.0					

Wanted:	Medical telemetry		Default field strength to be protected (dBµV/m)			999	Default Receiving antenna height (m)		1.5
Service Identifier	LA7								
Unwanted	DVB-T/7 MHz								
Δf (MHz)	-4.0	-3.4	0.0	3.4	4.0				
PR (dB)	-60.0	-12.0	-12.0	-12.0	-60.0				

Wanted:	Medical Telemetry		Default field strength to be protected (dBµV/m)			999	Default Receiving antenna height (m)		1.5
Service Identifier	LA8								
Unwanted	DVB-T/8 MHz								
Δf (MHz)	-4.5	-3.9	0.0	3.9	4.5				
PR (dB)	-60.0	-13.0	-13.0	-13.0	60.0				

Wanted:	Hearing Aids		Default field strength to be protected (dBµV/m)				Default Receiving antenna height (m)		1.5
Service Identifier	LB7								
Unwanted	DVB-T/7 MHz								
Δf (MHz)	-4.0	-3.4	0.0	3.4	4.0				
PR (dB)									

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted:	Hearing Aids		Default field strength to be protected (dBµV/m)				Default Receiving antenna height (m)		1.5
Service Identifier	LB8								
Unwanted	DVB-T/8 MHz								
Δf (MHz)	-4.5	-3.9	0.0	3.9	4.5				
PR (dB)									

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted:	Short Range Devices		Default field strength to be protected (dBµV/m)				Default Receiving antenna height (m)		
Service Identifier	LC7								
Unwanted	DVB-T/7 MHz								
Δf (MHz)	-4.0	-3.4	0.0	3.4	4.0				
PR (dB)	-22.0	22.0	22.0	22.0	-22.0				

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted:	Short Range Devices		Default field strength to be protected (dBµV/m)				Default Receiving antenna height (m)		
Service Identifier	LC8								
Unwanted	DVB-T/8 MHz								
Δf (MHz)	-4.5	-3.9	0.0	3.9	4.5				
PR (dB)	-22.0	21.0	21.0	21.0	-22.0				

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted:	Tactical Radio Relay		Default field strength to be protected (dBµV/m)			27	Default Receiving antenna height (m)		10
Service Identifier	MD8								
Unwanted	DVB-T/8 MHz								
Δf (MHz)	-4.23	-3.77	0.0	3.77	4.23				
PR (dB)	-48.0	2.0	2.0	2.0	-48.0				

Wanted:	Tactical Radio Relay		Default field strength to be protected (dBµV/m)			27	Default Receiving antenna height (m)		17
Service Identifier	MF8								
Unwanted	DVB-T/8 MHz								
Δf (MHz)	-6.5	-5.0	-3.5	0.0	3.5	5.0	6.5		
PR (dB)	-40.7	-20.7	-0.7	-0.7	-0.7	-20.7	-40.7		

Wanted:	Mobile Link		Default field strength to be protected (dBµV/m)			25.5	Default Receiving antenna height (m)		5
Service Identifier	MH8								
Unwanted	DVB-T/8 MHz								
Δf (MHz)	-12.0	-10.0	-8.0	-6.0	-4.2	-3.8	-3.6	0.0	3.6	3.8
PR (dB)	-50.0	-50.0	-45.0	-40.0	-35.0	7.0	12.0	12.0	12.0	7.0
Δf (MHz)	4.2	6.0	8.0	10.0	12.0					
PR (dB)	-35.0	-40.0	-45.0	-50.0	-50.0					

Wanted:	Mobile System		Default field strength to be protected (dBµV/m)			999	Default Receiving antenna height (m)		1.5
Service Identifier	MM7								
Unwanted	DVB-T/7 MHz								
Δf (MHz)	-4.0	-3.4	0.0	3.4	4.0				
PR (dB)	-60.0	6.0	6.0	6.0	-60.0				

Wanted:	Mobile System		Default field strength to be protected (dBµV/m)			999	Default Receiving antenna height (m)		1.5
Service Identifier	MM8								
Unwanted	DVB-T/8 MHz								
Δf (MHz)	-4.5	-3.9	0.0	3.9	4.5				
PR (dB)	-60.0	5.0	5.0	5.0	-60.0				

Wanted:	PMR, Trunked Systems		Default field strength to be protected (dBµV/m)			24	Default Receiving antenna height (m)		1.5
Service Identifier	MT7								
Unwanted	DVB-T/7 MHz								
Δf (MHz)	-4.0	-3.4	0.0	3.4	4.0				
PR (dB)	-58.0	-18.0	-18.0	-18.0	-58.0				

Wanted:	PMR, Trunked Systems		Default field strength to be protected (dBµV/m)			24	Default Receiving antenna height (m)			1.5
Service Identifier	MT8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-4.5	-3.9	0.0	3.9	4.5					
PR (dB)	-58.0	-19.0	-19.0	-19.0	-58.0					

Wanted:	Radiomicrophone (Companded)		Default field strength to be protected (dBµV/m)			68	Default Receiving antenna height (m)			1.5
Service Identifier	NR7		at Frequency (MHz)			650				
Unwanted	DVB-T/7 MHz									
Δf (MHz)	-10.5	-8.75	-7.0	-5.25	-3.68	-3.32	-3.15	0.0	3.15	3.32
PR (dB)	-49.0	-49.0	-44.0	-39.0	-34.0	8.0	13.0	13.0	13.0	8.0
Δf (MHz)	3.68	5.25	7.0	8.75	10.5					
PR (dB)	-34.0	-39.0	-44.0	-49.0	-49.0					

Wanted:	Radiomicrophone (Companded)		Default field strength to be protected (dBµV/m)			68	Default Receiving antenna height (m)			1.5
Service Identifier	NR8		at Frequency (MHz)			650				
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-12.0	-10.0	-8.0	-6.0	-4.2	-3.8	-3.6	0.0	3.6	3.8
PR (dB)	-50.0	-50.0	-45.0	-40.0	-35.0	7.0	12.0	12.0	12.0	7.0
Δf (MHz)	4.2	6.0	8.0	10.0	12.0					
PR (dB)	-35.0	-40.0	-45.0	-50.0	-50.0					

Wanted:	OB link, (stereo non-companded)		Default field strength to be protected (dBµV/m)			86	Default Receiving antenna height (m)			10
Service Identifier	NS7		at Frequency (MHz)			650				
Unwanted	DVB-T/7 MHz									
Δf (MHz)	-10.5	-8.75	-7.0	-5.25	-3.68	-3.32	-3.15	0.0	3.15	3.32
PR (dB)	-17.0	-16.0	-11.0	-8.0	-4.0	37.0	44.0	44.0	44.0	37.0
Δf (MHz)	3.68	5.25	7.0	8.75	10.5					
PR (dB)	-4.0	-8.0	-11.0	-16.0	-17.0					

Wanted:	OB link (stereo, non-companded)		Default field strength to be protected (dBµV/m)			86	Default Receiving antenna height (m)			10
Service Identifier	NS8		at Frequency (MHz)			650				
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-12.0	-10.0	-8.0	-6.0	-4.2	-3.8	-3.6	0.0	3.6	3.8
PR (dB)	-18.0	-17.0	-12.0	-9.0	-5.0	36.0	43.0	43.0	43.0	36.0
Δf (MHz)	4.2	6.0	8.0	10.0	12.0					
PR (dB)	-5.0	-9.0	-12.0	-17.0	-18.0					

Wanted:	Talkback (Non-Companded)		Default field strength to be protected (dBµV/m)			31	Default Receiving antenna height (m)			1.5
Service Identifier	NT7		at Frequency (MHz)			650				
Unwanted	DVB-T/7 MHz									
Δf (MHz)	-10.5	-8.75	-7.0	-5.25	-3.68	-3.32	-3.15	0.0	3.15	3.32
PR (dB)	-96.0	-91.0	-84.0	-79.0	-69.0	-19.0	-13.0	-13.0	-13.0	-19.0
Δf (MHz)	3.68	5.25	7.0	8.75	10.5					
PR (dB)	-69.0	-79.0	-84.0	-91.0	-96.0					

Wanted:	Talkback (Non-companded)		Default field strength to be protected (dBµV/m)			31	Default Receiving antenna height (m)			1.5
Service Identifier	NT8		at Frequency (MHz)			650				
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-12.0	-10.0	-8.0	-6.0	-4.2	-3.8	-3.6	0.0	3.6	3.8
PR (dB)	-97.0	-92.0	-85.0	-80.0	-70.0	-20.0	-14.0	-14.0	-14.0	-20.0
Δf (MHz)	4.2	6.0	8.0	10.0	12.0					
PR (dB)	-70.0	-80.0	-85.0	-92.0	-97.0					

Wanted:	Radio Astronomy CH38 single telescope		Default field strength to be protected (dBµV/m)			-39	Default Receiving antenna height (m)			50
Service Identifier	XA8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-9.0	-7.0	-6.8	0.0	6.8	7.0	9.0			
PR (dB)	-66.2	-45.8	-1.2	-1.2	-1.2	-45.8	-66.2			

Wanted:	Radio Astronomy CH38 interferometer		Default field strength to be protected (dBµV/m)			-33	Default Receiving antenna height (m)			10
Service Identifier	XB8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-9.0	-7.0	-6.8	0.0	6.8	7.0	9.0			
PR (dB)	-66.2	-45.8	-1.2	-1.2	-1.2	-45.8	-66.2			

Wanted:	Radio Astronomy CH38 VLBI		Default field strength to be protected (dBµV/m)			3	Default Receiving antenna height (m)			50
Service Identifier	XC8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-9.0	-7.0	-6.8	0.0	6.8	7.0	9.0			
PR (dB)	-66.2	-45.8	-1.2	-1.2	-1.2	-45.8	-66.2			

Wanted:	CH36 Airport Radars (UK)		Default field strength to be protected (dBµV/m)			-12	Default Receiving antenna height (m)			7
Service Identifier	XG8									
Unwanted	DVB-T/8 MHz									
Δf (MHz)	-5.0	-4.0	-3.0	0.0	3.0	4.0	5.0			
PR (dB)	-79.0	-40.0	0.0	0.0	0.0	-40.0	-79.0			

3. Protection criteria for DVB-T

Where values are given for the effective radiated power and antenna height these are default values for the service which **may** be used in the co-ordination procedure if no values are shown in the 'other service station record'. Values of 999 or -99 in these boxes indicate that specific values **must** be given in the 'other service station record'. Where the required values have not been included, their development is the subject of further work in accordance with Resolution 3.

Δf is the difference between the centre frequencies of the unwanted and wanted signals ($f_{unwanted} - f_{wanted}$).

All the protection ratios given relate to the system mode used for the reference receiving conditions in Annex 1 Section 8, that is with a required C/N value of 20 dB.

The number 7 or 8 in the 'service identifier' code indicates 7 MHz or 8 MHz DVB-T as the wanted service.

Wanted	DVB-T/8 MHz								
Unwanted	Aero Radio Nav RSBN		Default e.r.p. (dBW)		27		Default Transmitting antenna height (m)		10 000
Service Identifier	AA8								
Δf (MHz)									
PR (dB)									

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted	DVB-T/8 MHz								
Unwanted	Fixed Link		Default e.r.p. (dBW)		18		Default Transmitting antenna height (m)		-99
Service Identifier	FA8								
Δf (MHz)									
PR (dB)									

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted	DVB-T/8 MHz								
Unwanted	Military Fixed Link		Default e.r.p. (dBW)		4		Default Transmitting antenna height (m)		35
Service Identifier	FM8								
Δf (MHz)									
PR (dB)									

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted	DVB-T/8 MHz								
Unwanted	Studio Transmitter Link		Default e.r.p. (dBW)		15		Default Transmitting antenna height (m)		21
Service Identifier	GP8								
Δf (MHz)	-12	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/8 MHz								
Unwanted	Studio Transmitter Link		Default e.r.p. (dBW)		10		Default Transmitting antenna height (m)		21
Service Identifier	GS8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/7 MHz								
Unwanted	Medical Telemetry		Default e.r.p. (dBW)		999		Default Transmitting antenna height (m)		1.5
Service Identifier	LA7								
Δf (MHz)	-10.5	-4.0	-3.4	0.0	3.4	4.0	10.5		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/8 MHz								
Unwanted	Medical Telemetry		Default e.r.p. (dBW)		999		Default Transmitting antenna height (m)		1.5
Service Identifier	LA8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/7 MHz								
Unwanted	Hearing Aids		Default e.r.p. (dBW)		-20		Default Transmitting antenna height (m)		1.5
Service Identifier	LB7								
Δf (MHz)	-10.5	-4.0	-3.4	0.0	3.4	4.0	10.5		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/8 MHz								
Unwanted	Hearing Aids		Default e.r.p. (dBW)		-20		Default Transmitting antenna height (m)		1.5
Service Identifier	LB8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/7 MHz								
Unwanted	Short Range Devices		Default e.r.p. (dBW)				Default Transmitting antenna height (m)		
Service Identifier	LC7								
Δf (MHz)	-10.5	-4.0	-3.4	0.0	3.4	4.0	10.5		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted	DVB-T/8 MHz								
Unwanted	Short Range Devices		Default e.r.p. (dBW)				Default Transmitting antenna height (m)		
Service Identifier	LC8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted	DVB-T/8 MHz								
Unwanted	Tactical Radio Relay		Default e.r.p. (dBW)		20		Default Transmitting antenna height (m)		10
Service Identifier	MD8								
Δf (MHz)									
PR (dB)									

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted	DVB-T/8 MHz								
Unwanted	Tactical Radio Relay		Default e.r.p. (dBW)		16		Default Transmitting antenna height (m)		17
Service Identifier	MF8								
Δf (MHz)									
PR (dB)									

Missing values need to be provided, according to the procedure in Resolution 3.

Wanted	DVB-T/8 MHz								
Unwanted	Mobile Link		Default e.r.p. (dBW)		3		Default Transmitting antenna height (m)		5
Service Identifier	MH8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/7 MHz								
Unwanted	Mobile System		Default e.r.p. (dBW)		999		Default Transmitting antenna height (m)		1.5
Service Identifier	MM7								
Δf (MHz)	-10.5	-4.0	-3.4	0.0	3.4	4.0	10.5		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/8 MHz								
Unwanted	Mobile System		Default e.r.p. (dBW)		999		Default Transmitting antenna height (m)		1.5
Service Identifier	MM8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/7 MHz								
Unwanted	PMR, Trunked Systems		Default e.r.p. (dBW)		999		Default Transmitting antenna height (m)		1.5
Service Identifier	MT7								
Δf (MHz)	-10.5	-4.0	-3.4	0.0	3.4	4.0	10.5		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/8 MHz								
Unwanted	PMR, Trunked Systems		Default e.r.p. (dBW)		999		Default Transmitting antenna height (m)		1.5
Service Identifier	MT8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/7 MHz								
Unwanted	Radiomic Companded		Default e.r.p. (dBW)		-13		Default Transmitting antenna height (m)		1.5
Service Identifier	NR7								
Δf (MHz)	-10.5	-3.94	-3.40	0.0	3.40	3.94	10.5		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/8 MHz								
Unwanted	Radiomic (Companded)		Default e.r.p. (dBW)		-13		Default Transmitting antenna height (m)		1.5
Service Identifier	NR8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/7 MHz								
Unwanted	OB link (stereo, non-companded)		Default e.r.p. (dBW)		14		Default Transmitting antenna height (m)		10
Service Identifier	NS7								
Δf (MHz)	-10.5	-3.94	-3.40	0.0	3.40	3.94	10.5		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/8 MHz								
Unwanted	OB link (stereo, non-companded)		Default e.r.p. (dBW)		14		Default Transmitting antenna height (m)		10
Service Identifier	NS8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/7 MHz								
Unwanted	Talkback (Non-companded)		Default e.r.p. (dBW)		0		Default Transmitting antenna height (m)		5
Service Identifier	NT7								
Δf (MHz)	-10.5	-3.94	-3.40	0.0	3.40	3.94	10.5		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/8 MHz								
Unwanted	Talkback (Non-companded)		Default e.r.p. (dBW)		0		Default Transmitting antenna height (m)		5
Service Identifier	NT8								
Δf (MHz)	-12.0	-4.5	-3.9	0.0	3.9	4.5	12.0		
PR (dB)	-32.0	-27.0	4.0	4.0	4.0	-27.0	-32.0		

Wanted	DVB-T/8 MHz								
Unwanted	CH36 Airport Radar (UK)		Default e.r.p. (dBW)		999		Default Transmitting antenna height (m)		7
Service Identifier	XG8								
Δf (MHz)									
PR (dB)									

Missing values need to be provided, according to the procedure in Resolution 3.

ANNEX 6

Rules for analogue to digital conversion

1 Following a request for the conversion of an analogue assignment into a DVB-T assignment or SFN a conversion analysis shall be undertaken.

2 The propagation prediction method described in Annex 1, Section 2, which is based on Rec. ITU-R P.370, should be used unless agreed otherwise.

3 The following calculations shall be made:

3.1 (a) The nuisance field strength of the original analogue assignment at the test points of all potentially affected analogue assignments, using the method described in Annex 1, Section 6 for determining the test points; and,

(b) The nuisance field strength of the proposed DVB-T assignment or the power sum of the nuisance field strengths of the assignments forming the SFN at the same test points; and,

3.2 (a) The field strength (50, 1) of the original analogue assignment at the test points of all potentially affected analogue assignments as in 3.1, irrespective of whether or not they have been converted; and,

(b) The field strength (50, 1) of the digital assignment resulting from the conversion, or the power sum of the (50, 1) field strengths of the assignments forming the SFN resulting from the conversion, at the same test points as in 3.1; and,

3.3 a) The field strength (50, 1) of the original analogue assignment at test points to be agreed on the potentially affected country's borderline, as described in Annex 1 , Section 6.1.2; and,

(b) The field strength (50, 1) of the digital assignment resulting from the conversion, or the power sum of the (50, 1) field strengths of the assignments forming the SFN resulting from the conversion, at the same test points.

4 With regard to television broadcasting, the conversion of the analogue assignment into a DVB-T assignment or SFN shall be accepted, unless otherwise agreed between administrations, if the following three conditions are fulfilled at all the relevant test points. However, according to the coordination procedure of Part B of Article 4 a compatibilty analysis is still needed with regard to T-DAB and other services with primary status.

The value of 3.1(b) is not more than the value of 3.1(a) or the value of 3.2(b) is not more than 10 dBμV/m in Band III or $20 + 20 \log_{10} (f/500)$ dBμV/m in Bands IV and V (where f is the centre frequency in MHz of the digital assignment). This condition has only to be fulfilled if the potentially affected analogue assignment has not yet been converted; and,

The value of 3.2(b) is not more than the value of 3.2(a) minus 7 dB or the value of 3.2(b) is not more than 10 dBμV/m in Band III or $20 + 20 \log_{10} (f/500)$ dBμV/m in Bands IV and V (where f is the centre frequency in MHz of the digital assignment); and,

The value of 3.3(b) is not more than the value of 3.3(a) minus 7 dB or the value of 3.3(b) is not more than 10 dB μV/m in Band III or $20 + 20 \log_{10} (f/500)$ dBμV/m in Bands IV and V (where f is the centre frequency in MHz of the digital assignment).

5 If these conditions are not fulfilled then the proposal should be treated as a new proposal following the compatibility analysis method of Section B and Section C of Annex 4.

ANNEX 7

Tables of distances to be used in the application of Article 4 of the Agreement

The following tables give, for each frequency band, as a function of the effective radiated power, the effective antenna height (h) and the nature of the path under consideration, the limiting distances to be taken into account in the application of Article 4 of the Agreement.

For powers different from the values given in the tables, the limiting distance shall be determined by linear interpolation.

For antenna heights different from the values given in the tables, the limiting distance corresponding to the next higher height shall be used.

For mixed paths in the case of Band III, no consultation is necessary if:

a) the total length of the path is equal to or greater than the limiting distance quoted in the table for a sea path; or

b) the total length of those parts of the path lying over land is equal to or greater than the limiting distance quoted in the table for a land path.

For mixed paths in the case of Bands IV and V, where the percentage of sea path is different from the values quoted in the tables, the distance corresponding to the next higher percentage shall be used.

For effective antenna heights greater than 1200 m a limiting distance of 1060 km should be applied. In these cases and where an asterisk appears in the tables, the procedure given in Section 2.1 of Article 4 of the Stockholm Agreement shall be applied additionally.

Table A7.1

Band III (174 to 230 MHz)

Effective radiated power (e.r.p.)	Limiting distances in km for different effective antenna heights h								
	h = 75 m			h = 300 m			h = 1200 m		
	Land	Sea generally	Sea Mediterranean	Land	Sea generally	Sea Mediterranean	Land	Sea generally	Sea Mediterranean
300 kW	580	810	1000	620	850	1060	690	930	1060 *)
100	530	720	910	560	750	950	630	820	1030
30	470	610	810	510	650	850	580	720	930
10	420	520	720	450	550	750	520	630	820
3	360	430	610	400	470	650	470	540	720
1	310	350	520	340	390	550	410	460	630
300 W	260	280	430	290	320	470	360	390	540
100	210	220	350	240	250	390	320	330	460
30	160	160	280	190	190	320	270	270	390
10	120	120	220	150	150	250	230	230	330
3	90	90	160	120	120	190	190	190	270
1	60	60	120	90	90	150	160	160	230
300 mW	45	45	90	70	70	120	130	130	190
100	30	30	60	55	55	90	110	110	160
30	25	25	45	45	45	70	90	90	130
10	20	20	30	35	35	55	75	75	110
3	20	20	25	25	25	45	60	60	90
1	20	20	20	20	20	35	45	45	75

*) See last paragraph on page 1.

Table A7.2

Band IV (470 to 582 MHz) and Band V (582 to 862 MHz)
h ≤ 75 m

Effective radiated power (e.r.p.)		Limiting distances in km										
		Land path	Mixed path - General					Mixed paths - Mediterranean area				
			Proportion of path lying over sea					Proportion of path lying over sea				
Band IV	Band V	all areas	20%	40%	60%	80%	100%	20%	40%	60%	80%	100%
1000 kW	-	465	490	540	650	945	1060 *)	500	595	750	1060 *)	1060 *)
300	1000 kW	410	430	490	600	895	1060 *)	450	555	690	1000	1060 *)
100	300	360	390	440	555	830	1060 *)	400	475	620	945	1060 *)
30	100	310	340	395	510	775	1060 *)	350	415	565	865	1060 *)
10	30	270	295	350	460	710	1060 *)	300	375	525	805	1060 *)
3	10	230	250	310	410	640	1060 *)	255	320	440	730	1060 *)
1	3	185	210	255	360	570	980	210	260	375	650	1060 *)
300 W	1	150	170	210	305	505	850	170	210	315	585	1060 *)
100	300 W	110	130	170	250	440	725	135	180	265	515	980
30	100	80	100	140	205	385	620	105	145	230	460	850
10	30	60	75	110	175	340	510	80	125	200	415	725
3	10	45	60	90	155	310	410	65	100	180	380	620
1	3	35	50	75	140	290	315	50	85	160	340	510
300mW	1	25	40	65	130	235	235	40	70	145	320	410
100	300mW	20	30	55	120	155	155	30	60	130	300	315
-	100	15	25	50	105	105	105	25	50	120	235	235

*) See last paragraph on page 1.

Table A7.3

Band IV (470 to 582 MHz) and Band V (582 to 862 MHz)
75 m < h ≤ 300 m

Effective radiated power (e.r.p.)		Limiting distances in km										
		Land path	Mixed path - General					Mixed paths - Mediterranean area				
			Proportion of path lying over sea					Proportion of path lying over sea				
Band IV	Band V	all areas	20%	40%	60%	80%	100%	20%	40%	60%	80%	100%
1000 kW	-	500	520	570	700	990	1060 *)	550	645	815	1060 *)	1060 *)
300	1000 kW	445	470	525	650	920	1060 *)	485	575	735	1060 *)	1060 *)
100	300	395	420	475	600	860	1060 *)	435	515	665	970	1060 *)
30	100	345	380	430	540	795	1060 *)	390	455	610	900	1060 *)
10	30	300	330	385	490	715	1060 *)	340	415	545	835	1060 *)
3	10	260	285	335	440	665	1060 *)	305	380	495	770	1060 *)
1	3	220	235	285	380	585	980	260	335	450	700	1060 *)
300 W	1	185	200	245	330	520	850	215	280	395	630	1060 *)
100	300 W	150	165	205	285	455	725	180	235	340	565	980
30	100	125	140	170	240	395	620	150	195	290	510	850
10	30	100	115	145	200	350	510	125	165	250	450	725
3	10	80	90	120	175	310	410	95	140	215	395	620
1	3	65	75	95	140	290	315	80	115	185	350	510
300mW	1	50	60	85	135	235	235	65	95	160	325	410
100	300mW	40	50	70	125	155	155	50	80	140	305	315
-	100	30	40	60	105	105	105	40	65	125	235	235

*) See last paragraph on page 1.

Table A7.4

Band IV (470 to 582 MHz) and Band V (582 to 862 MHz)
300 m < h ≤ 1200 m

Effective radiated power (e.r.p.)		Limiting distances in km											
		Land path	Mixed path - General					Mixed paths - Mediterranean area					
			Proportion of path lying over sea					Proportion of path lying over sea					
Band IV	Band V	all areas	20%	40%	60%	80%	100%	20%	40%	60%	80%	100%
1000kW	-	575	610	685	820	1060 *)	1060 *)	620	710	875	1060 *)	1060 *)
300	1000kW	520	560	635	755	1000	1060 *)	565	650	810	1060 *)	1060 *)
100	300	470	505	575	690	930	1060 *)	510	600	750	1060 *)	1060 *)
30	100	420	455	515	625	865	1060 *)	460	555	700	965	1060 *)
10	30	375	400	455	570	775	1060 *)	410	490	625	895	1060 *)
3	10	330	360	415	510	705	1060 *)	365	435	565	830	1060 *)
1	3	290	315	370	455	640	980	325	395	510	755	1060 *)
300W	1	250	275	330	410	575	850	285	350	455	680	1060 *)
100	300W	215	235	285	365	515	730	250	310	410	610	980
30	100	185	205	250	320	455	620	220	270	360	540	850
10	30	160	180	220	285	410	510	185	230	315	485	725
3	10	135	150	185	245	355	410	160	200	275	440	620
1	3	115	130	160	205	305	315	140	175	245	390	510
300mW	1	100	115	135	175	235	235	120	155	215	345	410
100	300mW	85	95	110	140	155	155	100	135	190	310	315
-	100	70	75	90	105	105	105	85	115	160	235	235

*) See last paragraph on page 1.

RESOLUTION 1

Invitation to the CEPT European Radiocommunications Committee (ERC) to assign tasks to the European Radiocommunications Office (ERO)

The Multilateral Coordination Meeting, Chester, 25 July 1997,

considering

a) that, in accordance with its agenda, it has adopted a Multilateral Coordination Agreement relating to Technical Criteria, Coordination Principles and Procedures for the introduction of DVB-T in Europe in the frequency bands 174 to 230 MHz and 470 to 862 MHz;

b) that the assistance of the ERO should be sought to assist in implementing the procedures of the Agreement, in particular to carry out the following tasks:

i) collecting data on television stations from administrations, performing validation checks and resolving format problems;

ii) collecting data on other services from administrations, performing validation checks and resolving format problems;

iii) maintaining databases of television stations and stations of other services relevant to DVB-T planning;

iv) providing software support to administrations to facilitate data collection;

v) co-operating with the EBU on compatibility calculations to allow administrations to utilise the results of these calculations and to gain access to principal software blocks used for calculations;

vi) providing software support to administrations to facilitate basic compatibility calculations; and

vii) circulating data contained in the databases to administrations;

noting

that any request for assistance from the ERO will have resource implications;

resolves

to invite the CEPT/ERC to consider assigning to the ERO the tasks identified in *considering* b) above.

RESOLUTION 2

Follow-up CEPT activities in advance of a possible future ITU Conference to revise ST61

The Multilateral Coordination Meeting, Chester, 25 July 1997,

considering

a) that, in accordance with its agenda, it has adopted a Multilateral Coordination Agreement relating to Technical Criteria, Coordination Principles and Procedures for the introduction of DVB-T in Europe in the Frequency Bands 174 to 230 MHz and 470 to 862 MHz;

b) that DVB-T will be introduced by coordination of assignments on the basis of the above Criteria or by conversion of analogue television assignments into digital television assignments;

c) that analogue television and DVB-T will co-exist in a transition period;

d) that in some countries the channels above channel 60 will be a very important means for the introduction of DVB-T;

e) that administrations having no assignments in ST61 for channels above channel 60 may wish to coordinate such assignments on the basis of equitable access;

noting

that the implementation of DVB-T on the basis of the Stockholm Plan, including extrapolations to this Plan, may not lead to an optimum solution with respect to frequency efficiency (including SFNs), reception conditions and network economy;

resolves

1 that the CEPT should follow the growth of DVB-T and arrange a preparatory planning meeting as soon as practicable when a significant degree of penetration has been reached;

2 that the CEPT preparatory planning meeting should prepare for the establishing of a frequency plan for DVB-T only, including the rules for the transition to all-digital terrestrial television.

RESOLUTION 3

Further studies on the technical criteria to be used in the coordination of DVB-T and the methods and criteria for assessing compatibility between digital terrestrial television broadcasting and services other than broadcasting

The Multilateral Coordination Meeting, Chester, 25 July 1997,

considering

a) that, in accordance with its agenda, it has adopted a Multilateral Coordination Agreement relating to Technical Criteria, Coordination Principles and Procedures for the introduction of DVB-T in Europe in the frequency bands 174 to 230 MHz and 470 to 862 MHz;

b) that Annex 1 of the Agreement contains technical criteria to be used in the coordination of DVB-T and Annex 5 of the Agreement contains the methods and criteria for assessing compatibility between digital terrestrial television and services other than broadcasting, to be used for the coordination of digital terrestrial television and other primary services;

c) that further study could provide updated technical criteria for DVB-T and improved methods and more detailed information on the criteria for assessing compatibility;

d) that it may be necessary to consider additional systems of other services and develop the associated methods and criteria for assessing their compatibility with digital terrestrial television;

e) that a provision for revising the technical data is contained in Article 10 of the Agreement;

resolves

1 to invite the CEPT/ERC to continue its studies on technical criteria for DVB-T and the methods and criteria for assessing compatibility between digital terrestrial television broadcasting and other services;

2 to invite the CEPT/ERC to make this material available, in the form of ERC Decisions or other documentation, that could be used to revise the technical data in accordance with Article 10 of the Agreement.

RESOLUTION 4

Invitation to the CEPT European Radiocommunications Committee to consider a change to its Rules of Procedure to enable administrations outside CEPT to commit themselves to apply ERC Decisions

The Multilateral Coordination Meeting, Chester, 25 July 1997,

considering

a) that, in accordance with its agenda, it has adopted a Multilateral Coordination Agreement relating to Technical Criteria, Coordination Principles and Procedures for the introduction of DVB-T in Europe in the frequency bands 174 to 230 MHz and 470 to 862 MHz;

b) that Article 6 of the Agreement contains provisions for certain non-CEPT administrations to accede to the Agreement at any time subsequent to the Chester Meeting, 25 July 1997;

c) that Article 10 of the Agreement contains provisions for new or revised technical data to be included as part of the Agreement by means of ERC Decisions;

d) that, at present, the CEPT/ERC Rules of Procedure do not permit non-CEPT administrations the opportunity to commit themselves to apply ERC Decisions;

noting

1 that non-CEPT administrations may adopt CEPT Recommendations;

2 that non-CEPT administrations may participate in the public consultation procedures for ERC Decisions;

resolves

to invite the CEPT/ERC to consider a change to its Rules of Procedure to enable administrations outside CEPT to commit themselves to apply ERC Decisions.

RESOLUTION 5

Time schedule for the submission of data to the ERO and for the calculation of reference interference situations

The Multilateral Coordination Meeting, Chester, 25 July 1997,

considering

a) that, in accordance with its agenda, it has adopted a Multilateral Coordination Agreement relating to Technical Criteria, Coordination Principles and Procedures for the introduction of DVB-T in Europe in the frequency bands 174 to 230 MHz and 470 to 862 MHz;

b) that, to facilitate implementation of that Agreement, databases will need to be established containing:

transmitter data and coverage area test points for broadcasting assignments;

country boundary test points; and

transmitter and receiver data and test point data for stations for services other than broadcasting.

c) that such databases will take some time to establish;

d) that it may be desirable to restrict access to the information in the databases, at least until it is confirmed and finalised.

noting

that the Chester Meeting has requested, in Resolution 1, the ERC to assign tasks to the ERO;

resolves

1 that the procedures detailed in the Annex to this Resolution should be implemented;

2 that the ERC be invited to consider the question of external access to the information held by the ERO.

Annex to Resolution 5

Time schedule for submission of data to the ERO and for the calculation of reference interference situations

1. Reference date for calculation of reference situations

For all coordinated television stations (including stations contained in ST61) within the relevant frequency bands the reference interference situation is calculated on the basis of the situation at 25/7/97. After submission of all relevant and approved data, as described below, to the ERO, a final reference calculation is done after 31/10/98 based on the submitted data and the interference situation at 25/7/97.

2. Television assignment data and test points

Databases containing transmitter data, coverage area test points and country boundary test points will take some time to establish. Therefore the following course of action is proposed:

1. All data exchange will be done by electronic means.

2. The ERO will send to all administrations a copy of the updated ST61 Plan, in the CEPT format, by 1/9/97. On the same date, the ERO will send to all administrations a set of software intended to assist in the preparation of the data files which administrations will need to send to the ERO.

3. Data in accordance with the CEPT data format should be sent to the ERO for as many as possible of all coordinated television stations (including stations contained in ST61) before 30/11/97. This will permit initial calculation of test points and detection of errors. Data for all television assignments should be sent to the ERO before 31/1/98. These data are sent by the ERO to the administrations of all countries for checking and agreement. Cases where there are disagreements should be clarified between the administrations concerned and cases where data errors were detected and corrected by the administration concerned should be sent to the ERO before 30/6/98.

4. Country boundary test points will be provisionally chosen by the ERO on the basis of the ITU Digital World Map before 30/11/97 and sent to all administrations. The country boundary test points will be checked, modified where appropriate and finally agreed as common boundary test points by the administrations sharing any given boundary. After bilateral acceptance the test points will be sent to the ERO before 31/3/98.

5. An initial set of coverage area test points for all assignments will be generated automatically by the ERO in cooperation with the EBU and sent to all administrations before 31/12/97. A revised set of coverage area test points will be generated before 31/8/98 on the basis of the final assignment data and taking account any comments received from administrations.

6. The revised set of coverage area test points calculated under 5 will be checked by the administrations concerned and any modifications to the test point locations, will be sent to the ERO before 31/10/98.

3. Data and test points for stations of services other than broadcasting

Databases containing receiver and transmitter data and test points will take some time to establish. Therefore the following course of action is proposed:

1. All data exchange will be done by electronic means.

2. Data in accordance with the CEPT data format should be sent to the ERO for as many as possible of all stations of services other than broadcasting before 30/11/97, including the locations of test points. This will permit initial detection of errors. Data for all other service stations should be sent to the ERO before 31/1/98. These data are sent by the ERO to the administrations of all countries for checking and agreement. Cases where there are disagreements should be clarified between the administrations concerned and cases where data errors were detected and corrected by the administration concerned should be sent to the ERO before 30/6/98.

RESOLUTION 6

Action to develop, within the ITU Radiocommunication Study Groups, an ITU-R Recommendation concerning the coordination of DVB-T stations

The Multilateral Coordination Meeting, Chester, 25 July 1997,

considering

a) that, in accordance with its agenda, it has adopted a Multilateral Coordination Agreement relating to Technical Criteria, Coordination Principles and Procedures for the introduction of DVB-T in Europe in the frequency bands 174 to 230 MHz and 470 to 862 MHz;

b) that Article 4 of the Agreement contains procedures for Contracting Administrations to coordinate their digital terrestrial broadcasting stations with the stations of other Contracting Administrations;

c) that some Contracting Administrations have borders with countries that are not Contracting Administrations;

d) that, in such cases, the provisions of the Radio Regulations or other regional agreements are applicable but, at present, these do not take into account the technical criteria developed especially for digital terrestrial television broadcasting;

resolves

1 to invite the CEPT/ERC to take appropriate action, within the ITU-R Study Groups, for the preparation of an ITU-R Recommendation that could be used by the ITU-BR to develop a Rule of Procedure to deal with DVB-T assignments within the Stockholm Agreement and to establish technical standards to be used in response to requests from administrations.

Supplementary information

Flow charts for coordination procedures and compatibility analysis

Contents

The flow charts are for information purposes only and do not form part of the Agreement

1. Explanatory note concerning flow charts for coordination procedures

The flow charts are for information only and do not form part of the Chester Agreement. To assist in the application of the Article 4 procedures flow charts have been developed for the coordination of:

Service to be coordinated	**Coordination procedure**	**Flow chart**
Analogue television	Art. 4 part A	A
DVB-T	Art. 4 part B	B
T-DAB	-	none
Other Service	Art. 4 part C	C

Furthermore there is a flow chart for the conversion procedure contained in Annex 6.

Part of the coordination procedure is a compatibility analysis in which the service to be coordinated is tested against all four services to be protected. The compatibility analyses, as far as appropriate, are shown in separate flow charts contained in this supplementary information.

The matrix in Table S1 gives the numbering of the flow charts of the compatibility analyses. Eleven of the 16 possible combinations do not relate to the coordination of DVB-T assignments, these are either covered by the Stockholm Agreement, indicated as ST61, the Wiesbaden Arrangement indicated as WI95, or by the Radio Regulations indicated as RR.

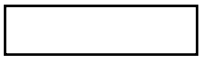
The numbering of the flow charts is consistent with the section numbers of Annex 4.

Table S1
Numbering of flow charts for the compatibility analysis of DVB-T with other services

Service to be protected	Service to be coordinated			
	Analogue television	DVB-T	T-DAB	Any other services
	Art. 4 part A	Art. 4 part B	-	Art. 4 part C
1. Analogue television	ST61	B	WI95	ST61
2. DVB-T including conversions	A	C	WI95[1]	E
3. T-DAB	WI95	WI95[1]	WI95	WI95
4. Any other services	ST61	D	WI95	RR

[1] With appropriate protection criteria as specified in Annex 1.

The shadings in the flow charts of coordination procedure A, B, and C have the following meaning:



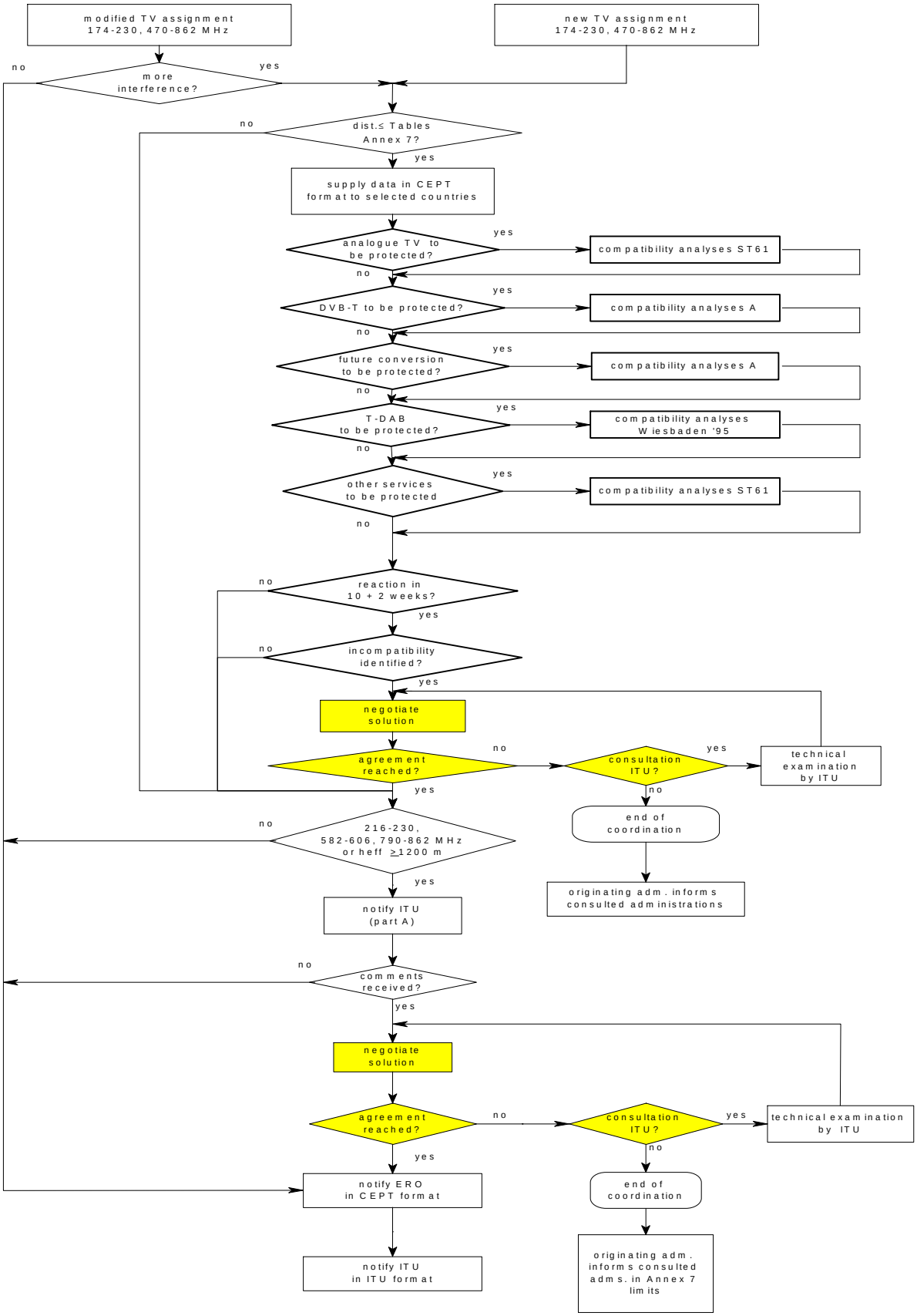
Action by the administration requesting the new assignment or allotment.

Action by the administration consulted.

Common action of requesting and consulted administration.

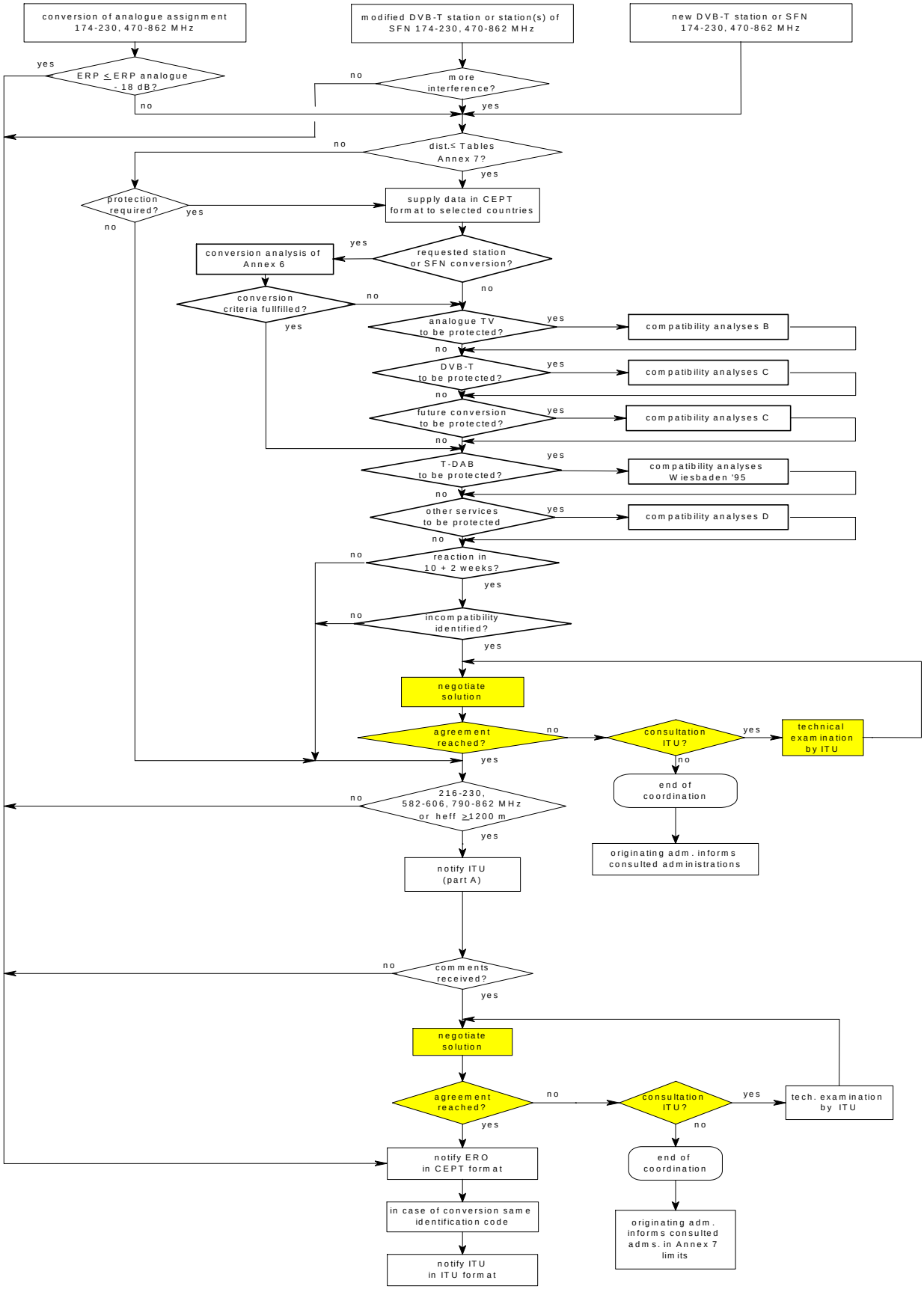
The flow charts A, B and C, the conversion flow chart and the compatibility analysis flow charts are given in this supplementary information.

2. Coordination Procedure A: Procedure for analogue television stations (Article 4 Part A)



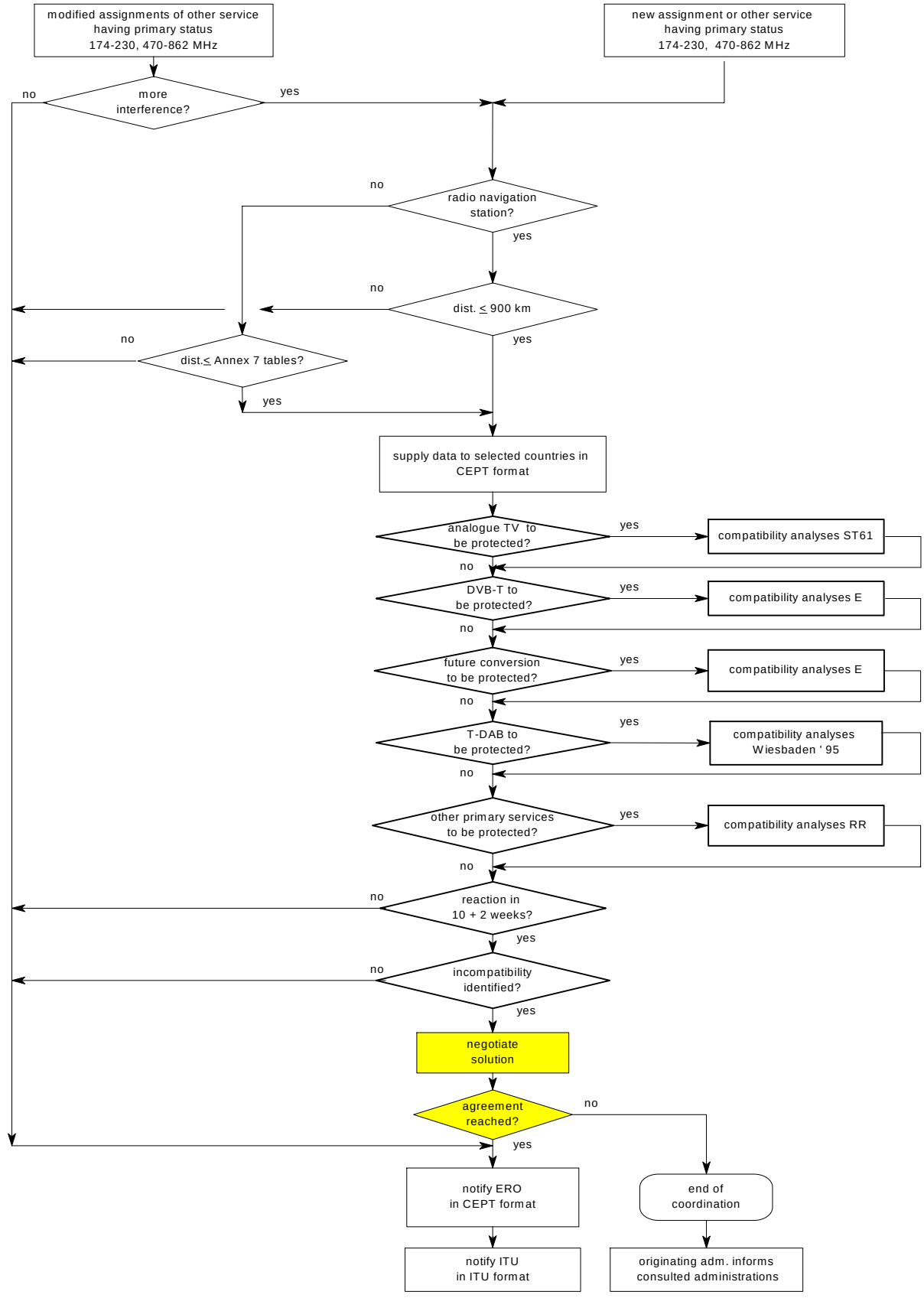
The flow charts are for information purposes only and do not form part of the Agreement

3. Coordination Procedure B: Procedure for DVB-T stations or SFNs (Article 4 Part B)



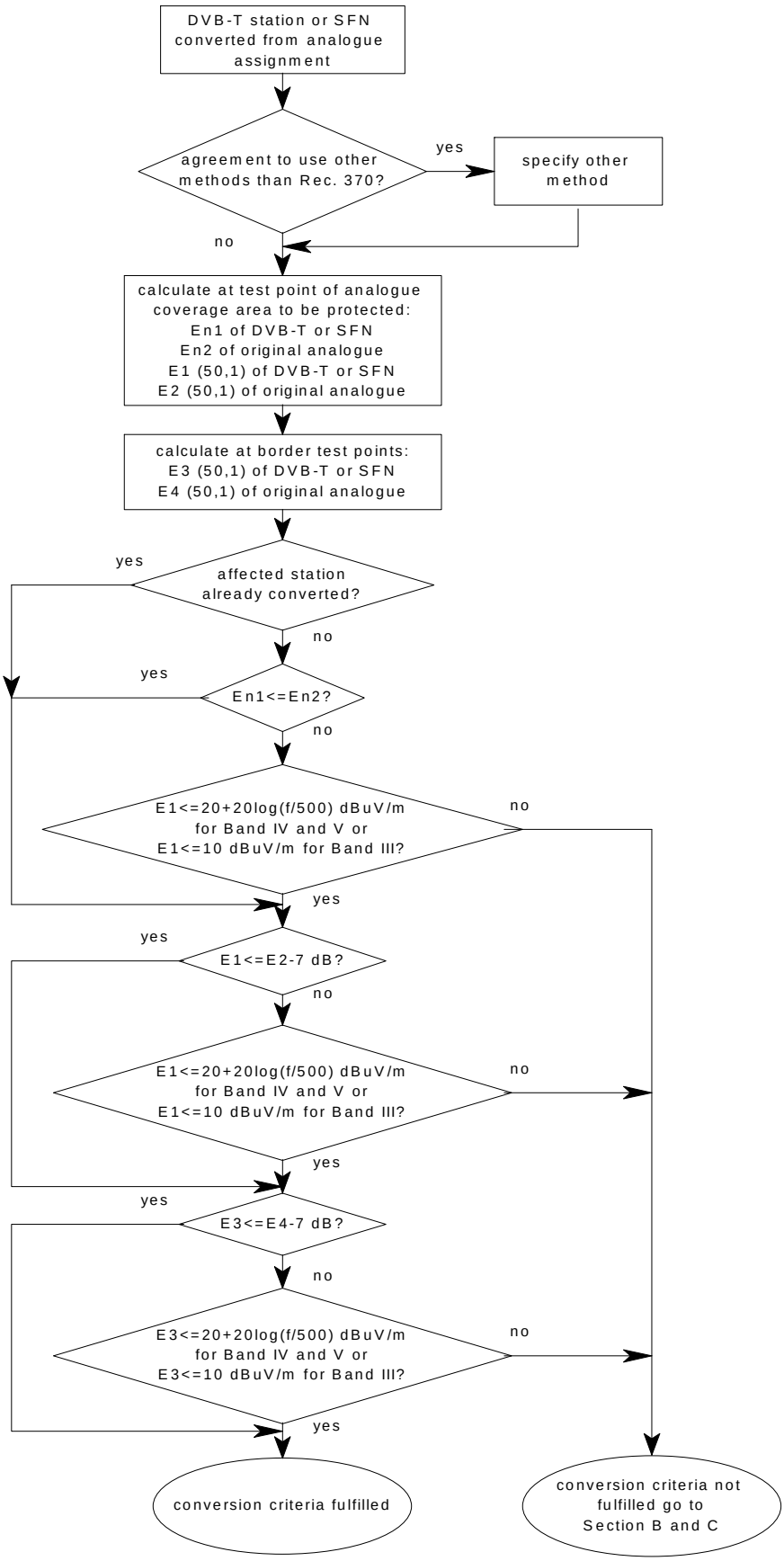
The flow charts are for information purposes only and do not form part of the Agreement

4. Coordination procedure C: Procedure for stations of services other than broadcasting having primary status (Article 4 Part C)



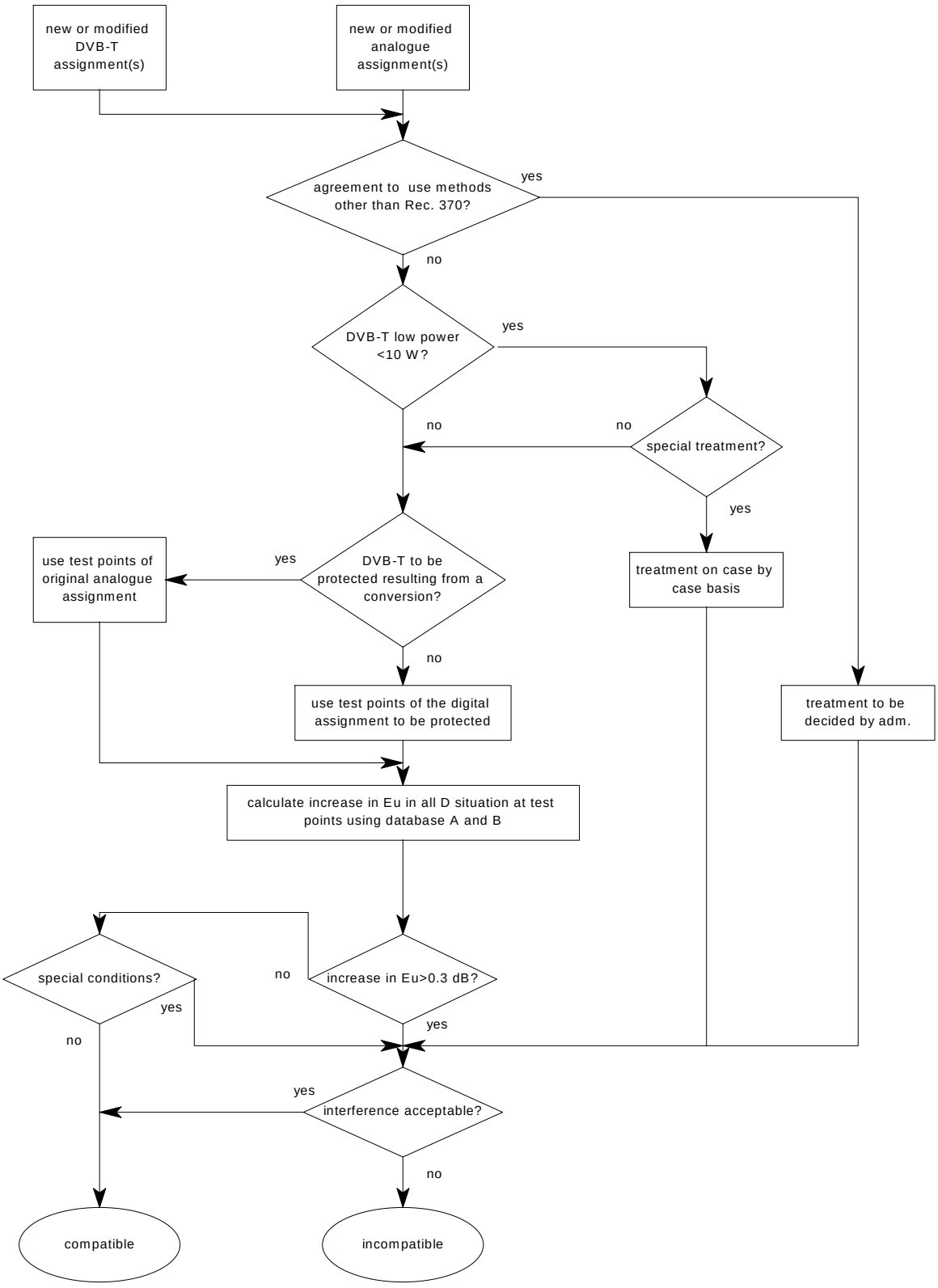
The flow charts are for information purposes only and do not form part of the Agreement

5. Conversion of an analogue assignment into a DVB-T station or SFN (Annex 6)



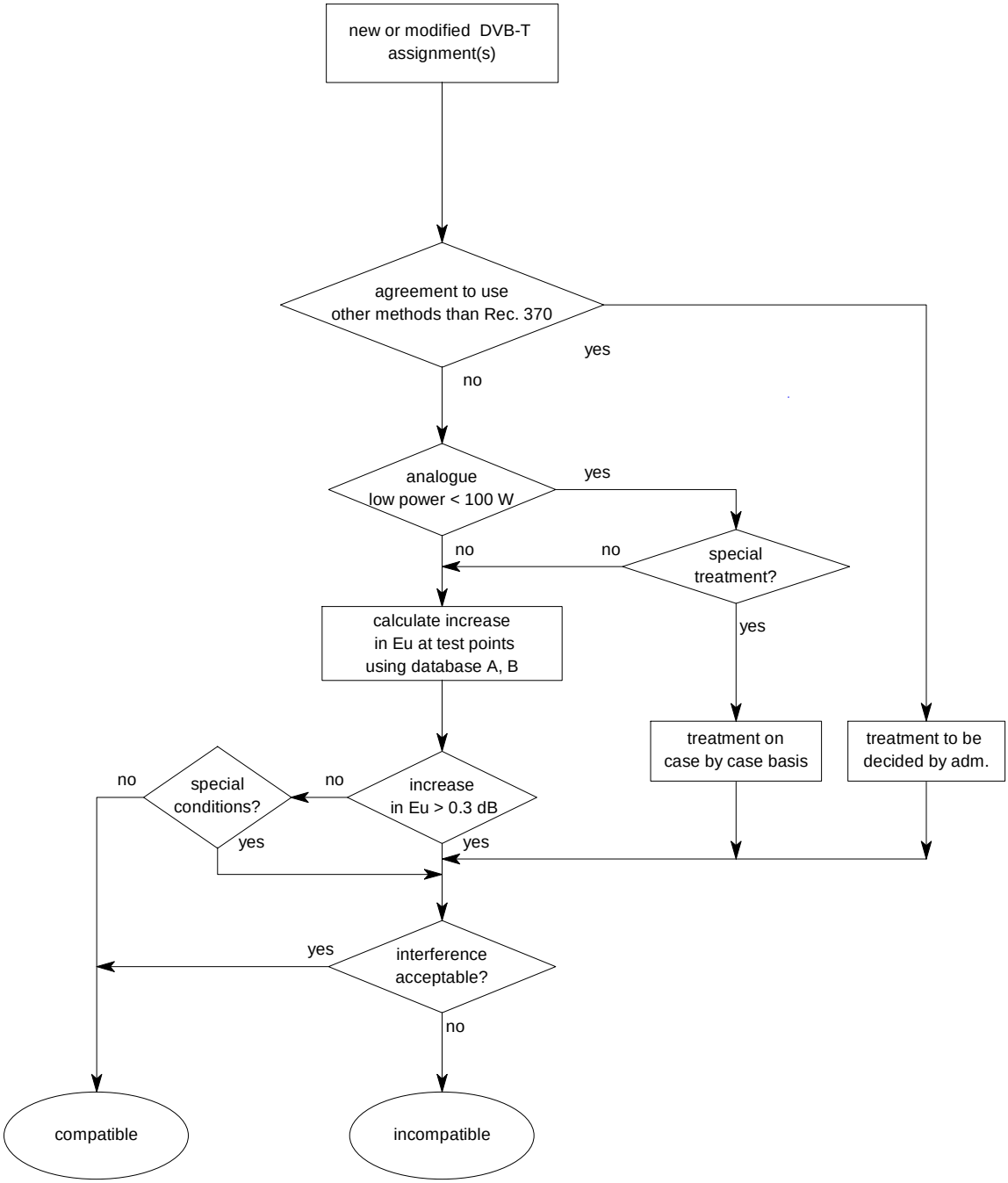
The flow charts are for information purposes only and do not form part of the Agreement

6. Compatibility analysis A/C: DVB-T interfered with by analogue television and DVB-T interfered with by DVB-T (Annex 4 Section A and C)



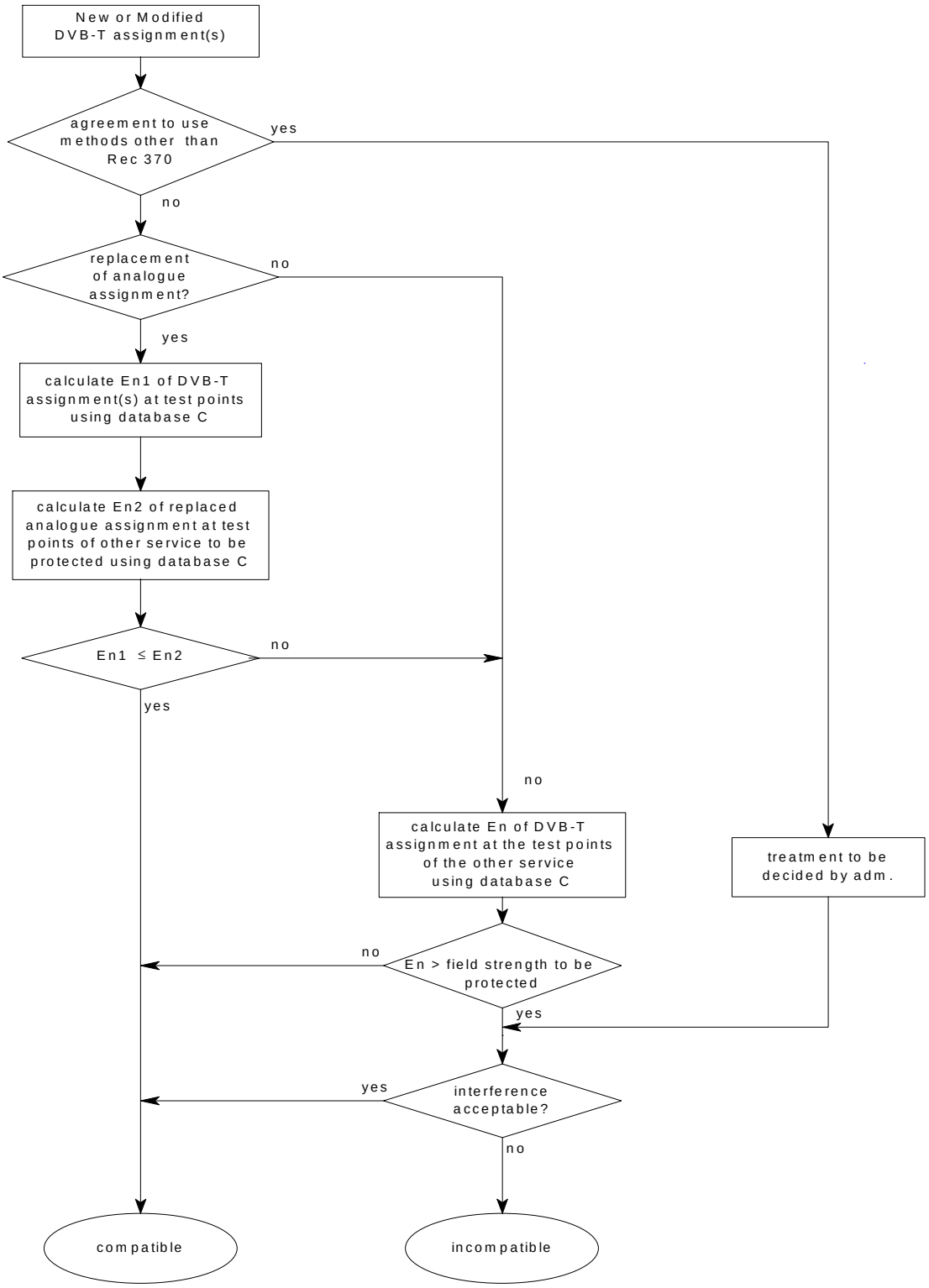
The flow charts are for information purposes only and do not form part of the Agreement

7. Compatibility analysis B: Analogue TV interfered with by DVB-T (Annex 4 Section B)



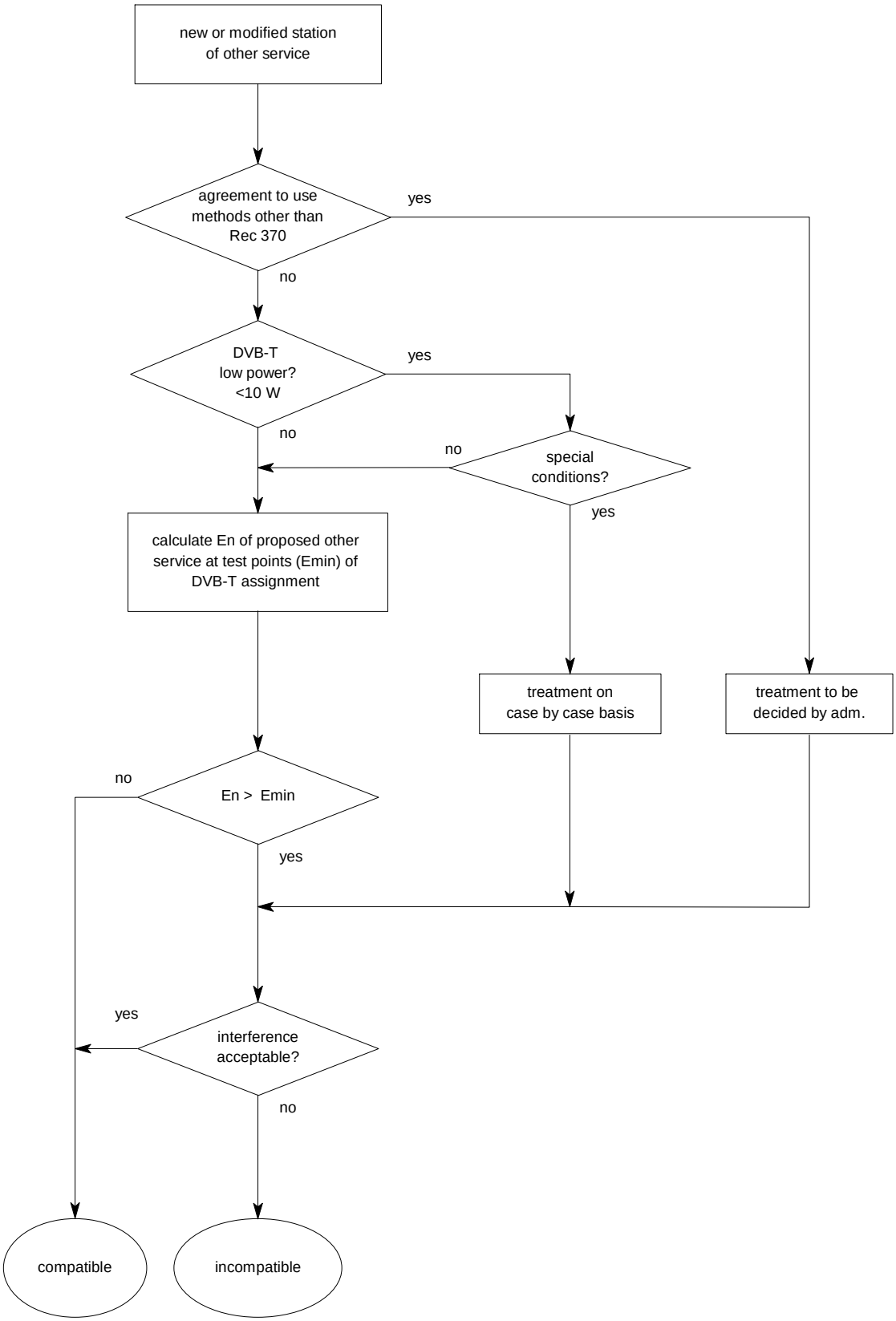
The flow charts are for information purposes only and do not form part of the Agreement

8. Compatibility analysis D: Services other than broadcasting having primary status interfered with by DVB-T (Annex 4 Section D)



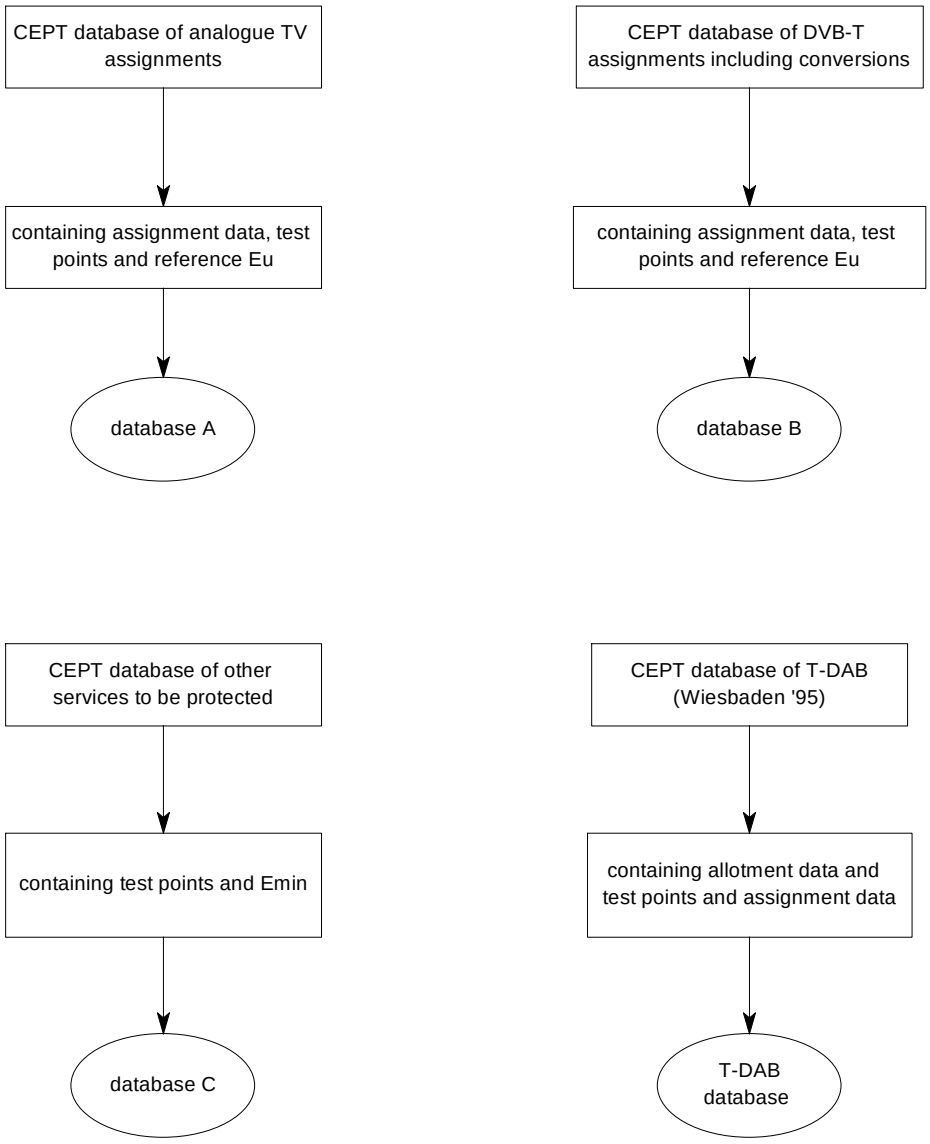
The flow charts are for information purposes only and do not form part of the Agreement

9. Compatibility analysis E: DVB-T interfered with by services other than broadcasting having primary status (Annex 4 Section E)



The flow charts are for information purposes only and do not form part of the Agreement

10. CEPT databases to be used in compatibility analysis



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