Documents of the Regional Administrative Radio Conference for the Planning of VHF/UHF Television Broadcasting in the African Broadcasting Area and Neighbouring Countries (2nd Session) (RARC AFBC-2)

(Geneva, 1989)

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INTERNATIONAL TELECOMMUNICATION UNION
AFBC(2) **RARC FOR THE PLANNING OF VHF/UHF TELEVISION BROADCASTING IN THE AFRICAN BROADCASTING AREA AND NEIGHBOURING COUNTRIES**
SECOND SESSION, GENEVA November-December 1989

Document DL/1-E
13 November 1989

AGENDA

OF THE

MEETING OF HEADS OF DELEGATIONS

Monday, 13 November 1989 at 1030 hrs

(Room II)

		Document No.
1.	Opening by the Secretary-General and designation of the Chairman of the meeting	-
2.	Approval of the agenda of the meeting	DL/1
3.	Proposals for the election of the Chairman of the Conference	-
4.	Proposals for the election of the Vice-Chairmen of the Conference	-
5.	Conference structure	DT/1
6.	Proposals for the election of the Chairmen and Vice-Chairmen of the Committees	-
7.	Draft agenda of the first Plenary Meeting	DT/2
8.	Allocation of documents to Committees	DT/3
9.	Other business	-

Pekka TARJANNE
Secretary-General

INTERNATIONAL TELECOMMUNICATION UNION
AFBC(2) **RARC FOR THE PLANNING OF VHF/UHF TELEVISION BROADCASTING IN THE AFRICAN BROADCASTING AREA AND NEIGHBOURING COUNTRIES**
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Document DL/2-E
13 November 1989

STEERING COMMITTEE

DRAFT

GENERAL SCHEDULE OF THE WORK OF THE CONFERENCE

Week 1 (13 - 17 November)

Organisation and commencement of work

Friday 17 - End of work of the Technical Working Group of the PL

Week 2 (20 - 24 November)

Continuation of work in Working Groups and Committees

Week 3 (27 November - 1 December)

Tuesday 28 - End of work of Working Groups of Committee 5

Wednesday 29 - End of work of Working Groups of Committee 4

Thursday 30 - End of work of Committee 5

Friday 1 - End of work of Committee 4

Week 4 (4 - 8 December)

Wednesday 6 - Report of Committee 2
- First reading by Plenary of last texts of the Final Acts

Thursday 7 - Report of Committee 3
- Second reading by Plenary of last texts of the Final Acts

Friday 8 - Signing Ceremony and Closing

Note 1 Plenary meetings will be scheduled as necessary during each week of the Conference.

Note 2 This schedule may be changed in the course of the work of the Conference.

INTERNATIONAL TELECOMMUNICATION UNION
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SECOND SESSION, GENEVA November-December 1989

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13 November 1989
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Suggestion by the Chairman of Committee 4 for the organization of work

AFBC PLANNING GROUPS

The breakdown of the Planning Area into four planning groups will facilitate the planning and coordination work to be done during the AFBC(2) Conference. The following list gives the proposed composition of each of the groups according to responsible administration. An asterisk (*) indicates those administrations which would participate in two groups. Administrations bearing an asterisk within any given group should coordinate with other administrations bearing an asterisk, within that same group, if the asterisk is followed by an exclamation mark (*!).

1. PLANNING GROUP 1 (EASTERN)

ARS *!	KWT
BHR	OMA *!
IRN	QAT
IRQ	UAE

2. PLANNING GROUP 2 (CENTRAL)

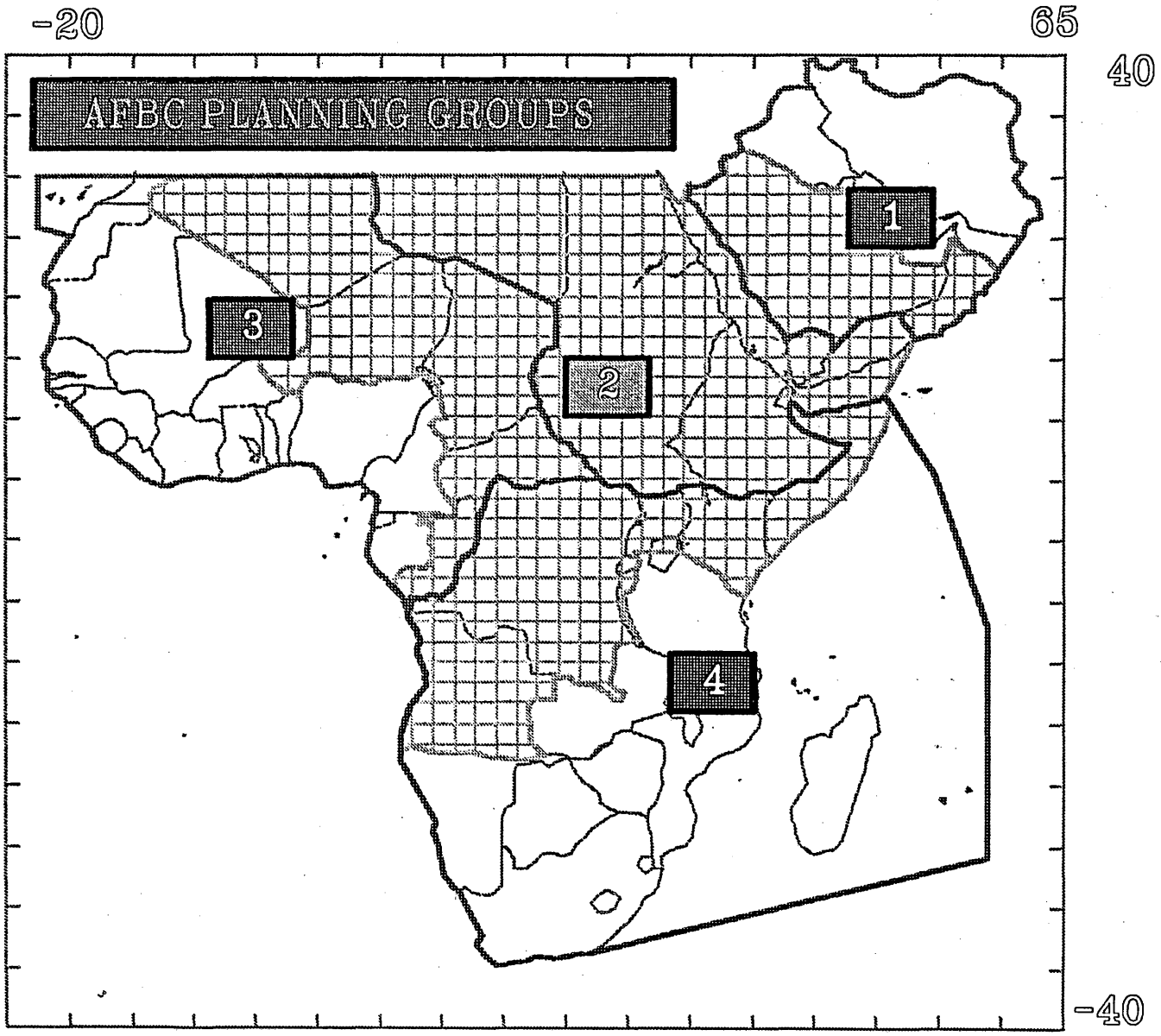
ALG *	NGR *
AGL *	OMA *
ARS *	RRW *
BDI *	SDN
CAF *	SOM *
COG *	TCD *
DJI	UGA *
EGY	YEM
ETH	YMS
KEN *	ZAI *
LBY	

3. PLANNING GROUP 3 (WESTERN)

ALG *!	GNB
BEN	GNE
BFA	GUI
CAF *!	LBR
CME	MLI
COG *!	MRC
CPV	MTN
CTI	NGR *!
E (CNR)	NIG
G (ASC , SHN , TRC) *!	SEN
GAB	SRL
GHA	TCD *!
GMB	TGO

4. PLANNING GROUP 4 (SOUTHERN)

AFS	MWI
AGL *!	NMB
BDI *!	RRW *!
BOT	SEY
COM	SOM *!
F (REU , MYT)	SWZ
G (ASC , SHN , TRC) *!	TZA
KEN *!	UGA *!
LSO	ZAI *!
MAU	ZMB
MDG	ZWE
MOZ	



E. KAMDEM KAMGA
Chairman of Committee 4

INTERNATIONAL TELECOMMUNICATION UNION
AFBC(2) **RARC FOR THE PLANNING OF VHF/UHF TELEVISION BROADCASTING IN THE AFRICAN BROADCASTING AREA AND NEIGHBOURING COUNTRIES**
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TECHNICAL WORKING
GROUP OF THE PLENARY

CHAPTER 2 - PROPAGATION IN THE VHF/UHF BANDS

2.1 Propagation data for the VHF/UHF television broadcasting service

2.1.1 General considerations

The propagation curves shown in Figures 2.1 to 2.34 are used for the planning of the television broadcasting service. They give, on the basis of statistics of measurement results and also of theoretical considerations, the field strength value exceeded for 50% of locations for time percentages of 50, [10, 5] and 1%.

The data are given for various types of areas and climates, namely, land, cold sea, warm sea and areas subject to extreme superrefractivity.

The method used to forecast field strength values in the various propagation zones of the planning area is explained below.

It was also noted that abnormal long-distance (500 - 9,000 km) propagation by ionospheric layers could severely constrain frequency reuse in Band I. However, this factor was disregarded for calculation purposes.

2.1.1 Propagation curves and their application to geographical zones

2.1.2.1 Propagation curves

The propagation curves represented in Figures 2.1 to 2.34 establish a relation between the field strength and the path length; in the case of Figures 2.1 to 2.32 the effective height of the transmitting antenna is the characteristic parameter of each curve in the same figure; the values obtained correspond to a receiving antenna height of 10 m over local ground. The values are expressed in decibels relative to 1 μV/m (dB(μV/m) for an e.r.p. of 1 kW in the direction of the receiver. The curves give the field strength exceeded at 50% of locations and each figure corresponds to time percentages of 50, [10, 5] and 1% for one of the geographical zones defined in the following section and shown on the map in Figure 2.35.

The curves for 50% of the time will be used to determine coverage areas and for calculations of continuous interference, and those for 1% of the time to calculate tropospheric interference.

2.1.2.2 Geographical division

Zone 1: Temperate and subtropical (continental) regions, exhibiting propagation conditions found over land in Europe and North America.

Zone 2: Desert regions, exhibiting propagation conditions found in regions having low humidity and small annual variations in climate.

Zone 3: Equatorial regions, exhibiting propagation conditions found in hot and humid climates.

Zone 4: Maritime regions, representing warm seas and terrestrial zones of low altitude bordering warm seas, where superrefraction conditions occasionally obtain (all the seas around the African continent are Zone 4 except Zones A and B designed below).

Zone A: Maritime zone at low latitudes, frequently displaying superrefractivity for which the propagation curves applicable to Zone 4 should be used with a correction factor of +10 dB, under the condition that the resulting field strength will not exceed the value calculated for free space propagation by more than 6 dB.

Zone B: Maritime zone at low latitudes, frequently displaying superrefractivity for which the propagation curves applicable to Zone 4 should be used with a correction factor of +5 dB, under the condition that the resulting field strength will not exceed the value calculated for free space propagation by more than 6 dB.

Zone C: Maritime zone within the area extending from the Shatt-al-Arab up to and including the Gulf of Oman, which persistently displays extreme superrefractivity.

For 50% of the time and for all frequency bands, the propagation curves applicable to Zone 4 should be used with a correction factor of 15 dB under the condition that the resulting field strength will not exceed the value calculated for free space propagation.

At VHF and for 1% of the time, the propagation curve for Zone 4 for an effective antenna height of 150 m should be used with a correction factor of 15 dB under the condition that the resulting field strength will not exceed the value calculated for free space propagation.

At UHF and for 1% of the time the following formula
$E = (106.9 - 20 \log d - 0.012d)$ should be used under the condition that the resulting field strength will not exceed the value calculated for free space propagation.

Zone C1: Coastal land area surrounding Zone C, which persistently displays extreme superrefractvity and ducting. This zone can extend up to 100 km from the coastal line [and defined in Annex ...].

For 50% of the time and for all frequency bands, the propagation curves applicable to Zone 1 and Zone 2, should be used according to the relevant path conditions.

At VHF and for 1% of the time, the field strength results from averaging the two field strengths calculated as follows:

- the curve for an effective antenna height of 150 m, both for Zone 1 and for Zone 2, should be used.

At VHF and for 1% of the time, the field strength results from averaging the following two values:

- the field strength value given for an effective antenna height of 150 m both for Zone 1 and Zone 2;

- the field strength value given for an effective antenna height of 150 m applicable to Zone 4 and corrected by a factor of 15 dB under the condition that the value thus obtained will not exceed the free space propagation value.

At UHF and for 1% of the time, the following formula should be used:
(a) $E = 106.9 - 20 \log d - 0.1d$.

[In bilateral negotiations between concerned administrations, the following formula may also be used: (b) $E = 106.9 - 20 \log d - 0.025d$.]

2.1.3 Effective transmitting antenna height

The effective transmitting antenna height, h_1, is defined as the antenna height above the average ground level between 3 km and 15 km from the transmitter in the direction of the receiver. The height of the receiving antenna, h_2, is assumed to be 10 m above the ground.

The curves in Figures 2.1 to 2.32 are given for effective transmitting antenna heights between 37.5 and 1,200 m, each value given of the effective height being twice that of the previous one. For different values of effective height, at distances where the field strength depends strongly on this height, one can interpolate; for the distance concerned, the most accurate procedure is to draw a curve giving the field strength as a function of effective height; nevertheless by referring directly to the figures which give the field strength as a function of distance, and performing a linear interpolation between the two curves corresponding to effective heights immediately above and below the true value, the corresponding error will not exceed 1.5 dB in the worst case.

For an effective transmitting antenna height, h_1, in the range 0 to 37.5 m, the field strength at a distance x from the transmitter is taken as the same as that given on the curve for 37.5 m at a distance of $(x + 25 - 4.1 \sqrt{h_1})$ km. An effective antenna height of less than 0 m is replaced by 0 m. This procedure is valid for distances beyond the radio horizon, given by $(4.1 \sqrt{h_1})$ km. Field strength values for shorter distances are obtained by:

- calculating the difference between the field strength value at the radio horizon for height h_1 (using the procedure given above) and the value on the 37.5 m curve for the same distance;

- subtracting the absolute value of the difference thus obtained from the field strength value on the 37.5 m curve for the actual distance involved.

This may be expressed as follows:

For $x \geq 4.1 \sqrt{h_1}$ $\quad F(x, h_1)^1 = F((x + 25 - 4.1 \sqrt{h_1}), 37.5)$

For $x < 4.1 \sqrt{h_1}$ $\quad F(x, h_1) = F(x, 37.5) - F(4.1 \sqrt{h_1}, 37.5) + F(25, 37.5)$

For an effective transmitting antenna height, h_1, greater than 1,200 m, the field strength at a distance x from the transmitter is taken as the same as that given on the curve for 1,200 m at a distance of $(x + 140 - 4.1 \sqrt{h_1})$ km. This

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1 Where $F(x, h_1)$ is the field strength ($dB(\mu V/m)$) for a distance x(km) and effective transmitting antenna height h_1(m).

procedure is valid for distances beyond the radio horizon, given by (4.1 $\sqrt{h_1}$) km. Field strength values for shorter distances are obtained by:

- calculating the difference between the field strength value at the radio horizon for height h_1 (using the procedure given above) and the value on the 1,200 m curve for the same distance;

- adding the absolute value of the difference thus obtained to the field strength value on the 1,200 m curve for the actual distance involved.

This may be expressed as follows:

For $x \geq 4.1 \sqrt{h_1}$ $\quad F(x, h_1) = F((x + 140 - 4.1 \sqrt{h_1}), 1{,}200)$

For $x < 4.1 \sqrt{h_1}$ $\quad F(x, h_1) = F(x, 1{,}200) - F(4.1 \sqrt{h_1}, 1{,}200) + F(140, 1{,}200)$

This procedure is subject to the limitation that the value obtained does not exceed the free-space value.

2.1.4 Correction for terrain irregularities

Data which would allow for terrain irregularities are generally not known with sufficient precision to be useful in the development of a plan.

However, for bilateral or multilaterial coordination in Zones 1, 2, 3 and C1, it is possible, when the terrain relief on the propagation paths of concern is known with sufficient precision, to take account of the information given in Annex 2.A of this Chapter. These corrections do not however have to be made in type 4 zones, which have been delineated taking account of the fact that their relief is fairly flat and that the propagation conditions observed within them are close to those found over the adjacent seas.

2.1.5 Variations as a function of the percentage of locations

The curves referred to correspond to 50% of locations, the percentage used for the purposes of planning. Corrections for other percentages of locations are given in Annex 2.B.

2.1.6 Calculations for mixed paths

When propagation paths occur over zones of different propagation characteristics, as defined in section 2.1.2 above, the following method is used which takes account of the different characteristics of the various parts of the path:

a) At UHF, for percentages of time < 10%, use the following procedure for calculating the field strength for paths crossing a land/sea or land/coastal land boundary.

$$E_{m,t} = E_{l,t} + A\,[E_{s,t} - E_{l,t}]$$

where:

$E_{l,t}$: field strength for land path equal in length to the mixed path for t% of the time;

$E_{s,t}$: field strength for sea or coastal-land path equal in length to the mixed path for t% of the time;

$E_{m,t}$: field strength for mixed path for t% of the time; and

A: interpolation factor as given in Figure 2.2 below.

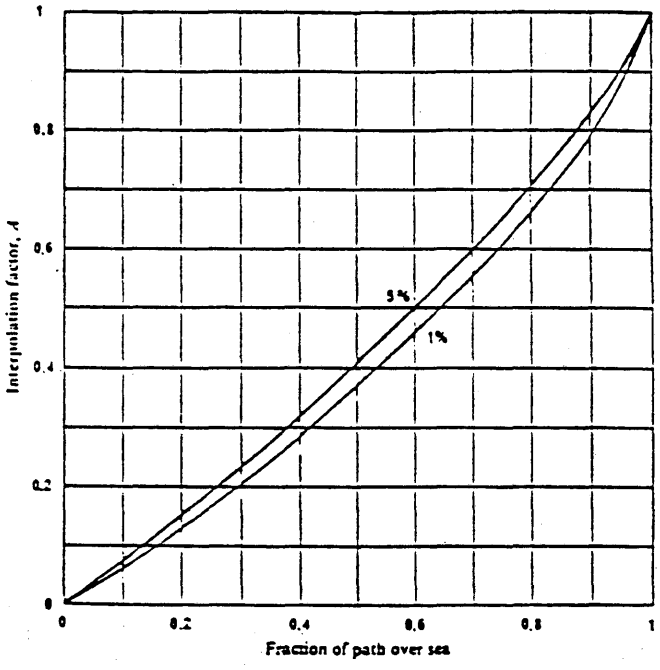

FIGURE 2.2

Interpolation for mixed land/sea paths

In cases where the path crosses more than two zones (of which at least one is sea or coastal land), the linear procedure given in b) is applied, first, to those sections of the path crossing sea zones and secondly, to those sections crossing land zones. The two resulting values of field strength are then combined using the non-linear procedure given above. It should be noted that "sea zones" include the coastal land zone C1. For all other cases, the procedure given in b) is applied.

$E_{i,t}$: field strength for path in Zone i equal in length to the mixed path for t% of time;

$E_{m,t}$: field strength for mixed path for t% of time;

d_i : length of path in Zone i;

d_T : length of total path.

To determine the field strength value for the mixed path ($E_{m,t}$), the following formula is used:

$$E_{m,t} = \sum_i \frac{d_i}{d_T} E_{i,t}$$

This method is also used for mixed paths between zones with different propagation characteristics in the VHF and the UHF bands.

[Figures 2.1 to 2.35, see report to the second session; square brackets should be placed around the following figures:

2.2, 2.3, 2.6, 2.7, 2.10, 2.11, 2.14, 2.15, 2.18, 2.19, 2.22, 2.23, 2.26, 2.27, 2.30, 2.31.]

2.2 Propagation information for shared services

This section contains information in connection with compatibility between the broadcasting, mobile and fixed services.

a) In the case of interference from the broadcasting, land mobile or fixed services:

the propagation curves described in § 2.1.2 are to be used together with the following information on transmitting and receiving antenna height gain.

Transmitter sited at base station or other fixed locations

The propagation curves described in § 2.1.2 are to be used for the effective height of the base station antenna. If the effective height of this antenna is outside the range 37.5 to 1,200 m, the procedure in § 2.1.3 is to be applied.

Transmitter of a mobile station in the land mobile service

The propagation curves described in § 2.1.2 are to be used with the procedure in § 2.1.3 applied to derive field strength values for an effective transmitting antenna height of 1.5 m; this is considered to be the appropriate value for planning purposes.

Receiving antenna height gain

Recent measurements suggest that over the range 2-40 m a.g.l. field strength increases by approximately 6 dB with each doubling of height, and is substantially independent of distance. This is an average value which shows the effect of increasing the height of the antenna in overcoming losses caused by the terrain and clutter (buildings and vegetation), within its optical horizon. There will be wide variations about the average increase at individual sites due to the unique nature of each propagation path; the transmission frequency will also influence the result. Some indication of these two factors can be obtained from Table 2.I which shows the effects of doubling the height of the antenna for various receiver environments at VHF and UHF.

TABLE 2.I

Typical height gain factors
for doubling of antenna height

Zone	VHF(dB)	UHF(dB)
Rural	4	4
Suburban	5	6
Urban	6	8

For any other value of height ratio (r), the following formula should be used:

$$\text{Height gain (dB)} = \frac{v}{6} \cdot 20 \log_{10} (r)$$

where v is the appropriate height gain factor from Table 2.I.

No distinction is made here between types of polarization, or the effect the directivity of the antenna has in determining the absolute value in a particular situation. The results correspond to 50% of the time and 50% of locations, but for planning purposes, it may be assumed that the results are independent of time percentage.

The information relates specifically to reception in the land mobile and fixed services, but is applicable, with the same reservations, to reception in the broadcasting service.

b) In the case of interference from the aeronautical mobile service: Figures 2.C.6 and 2.C.7 of Annex 2.C are to be used.

Note - Whenever use is made of the propagation curves discussed above (whether for wanted or for interfering signals), it is essential to evaluate the e.r.p. in the direction of the receiving site under consideration.

[Include Annex 2.A of the report to the second session.]

[Include Annex 2.B of the report to the second session.]

[Annex 2.C: include only Figures 2.C.6 and 2.C.7.]

INTERNATIONAL TELECOMMUNICATION UNION
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SECOND SESSION, GENEVA November-December 1989

Addendum 1 to
Document DL/5-E
16 November 1989
Original: English

COMMITTEE 5

Please add the following page to the Document DL/5.

D.F. MATAVIRE
Chairman of Committee 5

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230 - 238 and 246 - 254 MHz

Service	Band (MHz)	Area of Allocation	Category of service	Table/ Footnote No.	Remarks
Broadcasting	230 - 238 246 - 254	BOT, LSO, NMB, AFS, SWZ, ZMB, [ZWE]	Primary	635	Subject to agreement obtained under the provision of Article 14
Fixed	230 - 238 246 - 254	All planning area, except BOT, LSO, NMB, AFS, SWZ, ZMB, [ZWE]	Primary	Table + 635	
Mobile	230 - 238 246 - 254	All planning area, except BOT, LSO, NMB, AFS, SWZ, ZMB, [ZWE]	Primary	Table + 635	
Aeronautical radionavigation	230 - 235	IRN	Primary	Table	
	230 - 235	ARS, BHR, VAE, OMA, QAT	Permitted	632	
Radiolocation	230 - 235	OMA	Secondary	629	

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Document DL/5-E
15 November 1989
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COMMITTEE 5

INFORMATION DOCUMENT LISTING THE SERVICES SHARING THE FREQUENCY BANDS ALLOCATED TO THE TELEVISION BROADCASTING SERVICE IN THE PLANNING AREA

D.F. MATAVIRE
Chairman of Committee 5

47 - 68 MHz

Service	Band (MHz)	Area of Allocation	Category of service	Table/ Footnote No.	Remarks
Broadcasting	47 - 50	All planning area	Primary	TABLE	
	50 - 54	Planning area except; BOT, BDI, LSO, MWI, NMB, RRW, AFS, SWZ, ZAI, ZMB	Primary	557 559	
	54 - 68	All planning area	Primary	TABLE	
Fixed	47 - 68	IRN	Primary	TABLE + 557	
		AGL, CME, COG, MDG, MOZ, SOM, SDN, TCD, TZA	Permitted	555	
	54 - 68	BOT, BDI, LSO, MWI, MLI, NMB, RRW, AFS, SWZ, ZAI, ZMB, ZWE	Primary	561	
	47 - 48.5	KEN	Secondary	553	
	56.5 - 58	KEN	Secondary	553	
MOBILE	47 - 68	IRN	Primary	TABLE	
Mobile except Aeronautical Mobile	47 - 68	AGL, CME, COG, MDG, MOZ, SOM, SDN, TZA	Permitted	555	
	54 - 68	BOT, BDI, LSO, MWI, MLI, NMB, RRW, AFS, SWZ, ZAI, ZMB, ZWE	Primary	561	

47 - 68 MHz

Service	Band (MHz)	Area of Allocation	Category of service	Table/ Footnote No.	Remarks
LAND MOBILE	47 - 68	GAB, MLI, MRC, NIG, SEN	Permitted	554	Shall not cause harmful interference to or claim protection from existing or planned stations of countries other than those mentioned
	47 - 48.5 56.5 - 58	KEN	Secondary	553	
Amateur	50 - 54	BOT, BDI, LSO, MWI, NMB, RRW, AFS, SWZ, ZAI, ZMB, ZWE	Primary	559	

174 - 230 MHz

Service	Band (MHz)	Area of Allocation	Category of service	Table/ Footnote No.	Remarks
Broadcasting	174 - 223	All planning area	Primary	Table	
	223 - 230	Planning area except: BOT, LSO, NMB, AFS, SWZ, ZMB	Primary	Table 635	
	223 - 230	BOT, LSO, NMB, AFS, SWZ, ZMB	Primary	635	Subject to agreement obtained under procedure set forth in Article 14
Fixed	174 - 230	IRN	Primary	Table	
	174 - 223	COG, ETH, GMB, GUI, KEN, LBY, MWI, MLI, UGA, SEN, SRL, SOM, TZA, ZWE	Secondary	623	
	223 - 230	Region 1	Secondary	Table	
Mobile	174 - 230	IRN	Primary	Table	
	174 - 223	COG, ETH, GMB, GUI, KEN, LBY, MWI, MLI, UGA, SEN, SRL, SOM, TZA, ZWE	Secondary	623	
	223 - 230	Region 1	Secondary	Table	

174 - 230 MHz

Service	Band (MHz)	Area of Allocation	Category of service	Table/ Footnote No.	Remarks
Aeronautical radionavigation	216 - 225	SOM	Primary	628	Subject to not causing harmful interference to existing and planned broadcasting service in other countries
	223 - 230	IRN	Primary	Table	
	223 - 230	ARS, BHR, UAE, OMA, QAT	Permitted	632	
Radiolocation	216 - 230	OMA	Secondary	629	
	223 - 230	IRN	Secondary	Table	

470 - 862 MHz

Service	Band (MHz)	Area of Allocation	Category of service	Table/ Footnote No.	Remarks
Broadcasting	470 - 862	All planning areas	Primary	Table	
Fixed	470 - 790	IRN	Primary	Table	
	470 - 582	BDI, CME, COG, ETH, KEN, LBY, SEN, SDN	Secondary	676	
	582 - 790	LBY, SDN	Secondary	684	
	790 - 862	Planning area (except MRC and TUN) and IRN	Primary	Table 696	
Mobile	470 - 862	IRN	Primary	Table	
Mobile except Aeronautical Mobile	582 - 790	LBY, SDN	Secondary	684	
Radionavigation	582 - 606	OMA	Secondary	683	
	585 - 862	IRN	Primary	Table	
Aeronautical radionavigation	590 - 598	KWT	Primary	685	Until 1 January 1995
Broadcasting-satellite	620 - 790	All planning areas		693	Assignments may be made to television stations using frequency modulation subject to agreement between administrations concerned and those having services, operating in accordance with the Table, which may be affected.

470 - 862 MHz

Service	Band (MHz)	Area of Allocation	Category of service	Table/ Footnote No.	Remarks
Radioastronomy	606 - 614	African Broadcasting Area	Permitted	687	
	608 - 614	ARS, BHR, IRQ, KWT, OMA, QAT, UAE, IRN	Secondary	689	
Mobile-satellite except aeronautical mobile-satellite	806 - 862	IRN	Primary	701	The use of this service is limited to operation within national boundaries and is subject to agreements obtained under the procedure set forth in Article 14. This service shall not cause harmful interference to services operating in accordance with the Table.

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SECOND SESSION, GENEVA November-December 1989

Document DL/6-E
16 November 1989
Original: French

TECHNICAL WORKING GROUP
OF THE PLENARY

CHAPTER 3 - TECHNICAL STANDARDS AND TRANSMISSION CHARACTERISTICS

3.1 Channel spacing, channel distribution

3.1.1 Channel spacing

A uniform channel spacing of 7 MHz or 8 MHz shall be used for Bands I and III. The 7 MHz channel spacing shall be applicable for systems using 7 MHz bandwidth; the 8 MHz channel spacing shall be applicable for systems using 8 MHz bandwidth.

A uniform channel spacing of 8 MHz shall be used for Bands IV/V.

3.1.2 Channel distribution

In each channel the nominal vision carrier frequency is situated at 1.25 MHz above the lower limit of the channel and the associated sound carrier frequency is higher than the vision carrier frequency.

3.1.2.1 Channel numbering in Band I (47 - 68 MHz)

Channel number	Channel limits (MHz)	Nominal vision carrier frequency (MHz)
	7 MHz channel spacing	
2	47 - 54	48.25
3	54 - 61	55.25
4	61 - 68	62.25
	8 MHz channel spacing	
2	47 - 55	48.25
3	55 - 63	56.25

3.1.2.2 Channel numbering in Band III (174 - 230 MHz)

Channel number	Channel limits (MHz)	Nominal vision carrier frequency (MHz)
	7 MHz channel spacing	
5	174 - 181	175.25
6	181 - 188	182.25
7	188 - 195	189.25
8	195 - 202	196.25
9	202 - 209	203.25
10	209 - 216	210.25
11	216 - 223	217.25
12	223 - 230	224.25
	8 MHz channel spacing	
4* 5*	174 - 182	175.25
5 6	182 - 190	183.25
6 7	190 - 198	191.25
7 8	198 - 206	199.25
8 9	206 - 214	207.25
9 10	214 - 222	215.25
10 11	222 - 230	223.25

3.1.2.3 Channel numbering in Band IV (channels 21-34) and in Band V (channels 35-69)

Channel number	*Channel limits*	*Nominal vision carrier frequency*	*Channel number*	*Channel limits*	*Nominal vision carrier frequency*
21	470-478	471.25	51	710-718	711.25
22	478-486	479.25	52	718-726	719.25
23	486-494	487.25	53	726-734	727.25
24	494-502	495.25	54	734-742	735.25
25	502-510	503.25	55	742-750	743.25
26	510-518	511.25	56	750-758	751.25
27	518-526	519.25	57	758-766	759.25
28	526-534	527.25	58	766-774	767.25
29	534-542	535.25	59	774-782	775.25
30	542-550	543.25	60	782-790	783.25
31	550-558	551.25	61	790-798	791.25
32	558-566	559.25	62	798-806	799.25
33	566-574	567.25	63	806-814	807.25
34	574-582	575.25	64	814-822	815.25
			65	822-830	823.25
35	582-590	583.25	66	830-838	831.25
36	590-598	591.25	67	838-846	839.25
37	598-606	599.25	68	846-854	847.25
38	606-614	607.25	69	854-862	855.25
39	614-622	615.25			
40	622-630	623.25			
41	630-638	631.25			
42	638-646	639.25			
43	646-654	647.25			
44	654-662	655.25			
45	662-670	663.25			
46	670-678	671.25			
47	678-686	679.25			
48	686-694	687.25			
49	694-702	695.25			
50	702-710	703.25			

* Numbering applicable for countries already using it.

3.2 Modulation standards, emission bandwidth

TABLE 3.I

Characteristics of the radiated signals

Item	Characteristics		B,G	H	I	K1
1	Frequency spacing (see Figure 3.1)	Nominal radio-frequency channel bandwidth (MHz)	B:7 G:8	8	8	8
2		Sound carrier relative to vision carrier (MHz)	+5.5 ± 0.001	+5.5	+5.9996 ± 0.0005	+6.5
3		Nearest edge of channel relative to vision carrier (MHz)	-1.25	-1.25	-1.25	-1.25
4		Nominal width of main sideband (MHz)	5	5	5.5	6
5		Nominal width of vestigial sideband (MHz)	0.75	1.25	1.25	1.25
6	Minimum attenuation of vestigial sideband (dB at MHz)		20(-1.25) 20(-3.0) 30(-4.43)	20(-1.75) 20(-3.0)	20(-3.0) 30(-4.43)	0(+0.8) 20(-2.7) 30(-4.3)
7	Type and polarity of vision modulations		C3F neg.	C3F neg.	C3F neg.	C3F neg.
8	Levels in the radiated signal (% of peak carrier)	Synchronizing level	100	100	100	100
		Blanking level	75 ± 2.5	72.5 to 77.5	76 ± 2	75 ± 2.5
		Difference between black level and blanking level	0 to 2 (nominal)	0 to 7	0 (nominal)	0 to 4.5
		Peak white-level	10 to 12.5	10 to 12.5	20 ± 2	10 to 12.5
9	Type of sound modulation		F3E	F3E	F3E	F3E
10	Frequency deviation (kHz)		± 50	± 50	± 50	± 50
11	Pre-emphasis for modulation (μS)		50	50	50	50
12	Ratio of effective radiated powers of vision and sound[1]		10/1	10/1	10/1	10/1
13	Line frequency f_H and tolerance when operated non-synchronously (Hz)		15 625 (± 0.02%)* ± 0.0001%	15 625 (± 0.02%)* ± 0.0001%	15 625 ± 0.0001%	15 625 (± 0.02%)* ± 0.0001%
13a)	Maximum variation rate of line frequency valid for monochrome transmission (%/S)		0.05	0.05	0.05	0.05

[1] For existing stations which have a ratio other than 10/1, the existing ratio shall be taken into account in planning.

* The values in parentheses apply to monochrome television systems.

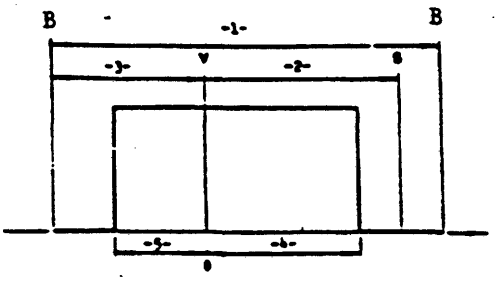

FIGURE 3.1

Significance of items 1 to 5 of Table 3.I

B: channel limit
V: vision carrier
S: sound carrier

3.3 Protection ratios

The protection ratio values corresponding to tropospheric interference and the propagation curves for 1% of the time shall be used to calculate the nuisance field strength. In exceptional cases, the protection ratio values corresponding to continuous interference and the propagation curves for 50% of the time may be used.

3.3.1 Co-channel interference

In this section the protection ratios between two television signals apply only to interference due to the modulated vision carrier of the unwanted signal. Additional protection may be necessary if the wanted sound carrier is affected, or if the unwanted sound carrier lies within the wanted vision channel, e.g. the unwanted sound carrier of system G or H lies within the vision channel of system K1.

Table 3.II shows the protection ratios for carriers separated by multiples of twelfth the line frequency up to about ± 36/12 f_{line} (about ±50 kHz). These protection ratio values do not necessarily apply for greater carrier separations.

TABLE 3.II

Protection ratio

Offset in $\frac{f_{line}}{12}$		0	1	2	3	4	5	6	7	8	9	10	11	12
Non-precision offset Transmitter stability ±500 Hz	Tropospheric interference	45	44	40	34	30	28	27	28	30	34	40	44	45
	Continuous interference	52	51	48	44	40	36	33	36	40	44	48	51	52
Precision offset Transmitter stability ±1 Hz	Tropospheric interference	32	34	30	26	22	22	24	22	22	26	30	34	38
	Continuous interference	36	38	34	30	27	27	30	27	27	30	34	38	42

(Value in the first column is only valid for the 0/12 case. All other values between 1/12 and 12/12 are the same by addition or subtraction of integer multiples of 12/12 up to ± 36/12.)

3.3.2 Adjacent-channel interference

The given protection ratios apply to tropospheric interference and they are defined in terms of wanted and unwanted vision carrier levels. For continuous interference the values should be increased by 10 dB.

Adjacent-channel protection ratios cannot be determined directly from the overlapping channel protection ratio curves shown in Figures 3.3 and 3.4, because for certain systems the values may be affected by special measures in the receiver, e.g. sound traps.

3.3.2.1 Lower adjacent-channel interference

The worst interference on the picture signal from another signal using the same standard results from the sound signal in the lower adjacent channel.

Linear correction should be made to take into account vision-to-sound power ratios different from those assumed in the following sub-sections.

VHF bands

The protection ratio below relates to the cases where the separation between the wanted vision carrier frequency and the unwanted sound carrier frequency is 1.5 MHz and the ratio between the unwanted vision and unwanted sound powers is 10 dB.

Protection ratio: all systems: -9 dB

UHF bands

For 8 MHz channels in the UHF bands, Table 3.III gives the protection required by a signal of any system against a lower adjacent-channel signal of the same or any other standards, assuming a vision-to-sound power ratio of 10 dB for unwanted signals of all standards of systems used in the planning area. A correction must be made for different vision-to-sound power ratios.

TABLE 3.III

Protection ratio from lower adjacent-channel interference (UHF bands)

Wanted signal \ Unwanted signal	Protection ratio (dB)			
	G	H	I	K1
G	-9	-9	-9	-9
H	-9	-9	-9	+13
I	-9	-9	-9	+13
K1	-9	-9	-9	-9

3.3.2.2 Upper adjacent-channel interference - VHF and UHF bands

Protection ratio: all systems: -12 dB

3.3.3 Image channel interference

TABLE 3.IV

Protection ratio for image channel interference (UHF bands)

Wanted signal (channel n) \ Unwanted signal	Protection ratio (dB)			Image channel	Remarks
	G,H	I	K1		
G	-1	-4	-11	n + 9	Interference from sound carrier
H	-1	-4	-9	n + 9	
I	-13	-10	-10	n + 9	
K1	-1	0	-2	n - 9 *	
	-1	-4	-5	n + 9	
	+7	+7	+7	n + 10	Interference from vision carrier

* Local oscillator below the vision carrier.

The image-channel protection ratios in Table 3.IV apply to tropospheric interference, and are defined in terms of wanted and unwanted vision carrier levels assuming a vision-to-sound power ratio of 10 dB for unwanted signals. A correction must be made for different vision-to-sound ratios. For continuous interference the values should be increased by 10 dB.

3.3.4 Overlapping channel interference

All the tables in this section give protection ratios to be applied when a CW signal lies within the vision channel of the wanted transmission, the wanted vision signal being negatively modulated.

Corrections to be made for other types of potentially interfering signals are as given in Table 3.V. When the interfering signal is a television signal, two calculations of protection ratio are necessary: one for the interfering vision carrier and one for the interfering TV sound carrier.

TABLE 3.V

Correction values for different wanted and unwanted signals

Unwanted signal / Wanted signal	Correction factors (dB)			
	CW	TV-negative	FM-sound	AM-sound
Vision signal negative modulated	0	-2	0	+4

Tables 3.VI and 3.VII give protection ratios applicable for tropospheric and for continuous interference. The values shown refer to the case of a wanted negatively modulated vision signal affected by an unwanted CW signal. The previously indicated corrections apply when considering other combinations of wanted and unwanted signals.

TABLE 3.VI

Tropospheric interference
(non-precision offset)

Offset (multiples of 1/12 line-frequency)	Frequency difference (MHz) (separation between wanted and unwanted carriers)											
	Luminance range								PAL***		SECAM***	
	-1.25*	-1.25**	-0.5	0.0	0.5	1.0	2.0	3.0	3.6 - 4.8	5.7 - 6.0	3.6 - 4.8	5.7 - 6.0
0	32	23	44	47	50	50	44	36	35	18	40	25
1	31	20	43	46	49	49	42	34	39	20	40	25
2	28	17	39	42	45	45	39	32	42	22	40	25
3	25	13	34	36	39	39	35	29	45	25	40	25
4	22	10	30	32	35	35	32	27	42	22	40	25
5	20	8	28	30	32	32	30	25	39	20	40	25
6	19	7	27	29	31	31	29	24	35	18	40	25
7	20	8	28	30	32	32	30	25	35	18	40	25
8	22	10	30	32	35	35	32	27	39	20	40	25
9	25	13	34	36	39	39	35	29	42	22	40	25
10	28	17	39	42	45	45	39	32	39	20	40	25
11	31	20	43	46	49	49	42	34	35	18	40	25
12	32	23	44	47	50	50	44	36	35	18	40	25
Protection ratio (dB)												

* H, I, K1 television systems
** B, G television systems
*** B, G television systems: the separation is 5.3 - 6.0 MHz

TABLE 3.VII

Continuous interference
(non-precision offset)

Offset (multiples of 1/12 line-frequency)	Frequency difference (MHZ) (separation between wanted and unwanted carriers)											
	Luminance range								PAL		SECAM***	
	-1.25*	-1.25**	-0.5	0.0	0.5	1.0	2.0	3.0	3.6 - 4.8	5.7 - 6.0	3.6 - 4.8	5.7 - 6.0
0	40	32	50	54	58	58	54	44	45	30	45	30
1	38	30	49	53	57	57	53	43	48	32	45	30
2	34	27	46	50	55	55	51	41	51	33	45	30
3	30	23	42	46	50	50	46	38	53	35	45	30
4	28	21	38	42	45	45	42	35	51	33	45	30
5	26	19	35	38	41	41	38	32	48	32	45	30
6	24	17	33	35	37	37	36	30	45	30	45	30
7	26	19	35	38	41	41	38	32	45	30	45	30
8	28	21	38	42	45	45	42	35	48	32	45	30
9	30	23	42	46	50	50	46	38	51	33	45	30
10	34	27	46	50	55	55	51	41	48	32	45	30
11	38	30	49	53	57	57	53	43	45	30	45	30
12	40	32	50	54	58	58	54	44	45	30	45	30
Protection ratio (dB)												

* H, I, K1 television systems
** B, G television systems
*** B, G television systems: the range is 5.3 - 6.0 MHz

3.3.5 Out-of-channel interference

TABLE 3.VIII

Protection ratio values for out-of-channel interference

Frequency of CW signal relative to vision carrier (MHz)	Protection ratio (dB)		TV-system
	Tropospheric inteference	Continuous interference	
-14 to -6	-15	-10	B,G,I,K1
-2.5 to -1.5	+1	+11	B,G,I,K1
[6.2] to +15	-12	-2	B,G
[7.3] to +15	-12	-2	I, K1
-1.25	+32	+40	I, K1
-1.25	+23	+32	B, G

3.3.6 Protection ratio for sound signals

Protection ratios for the wanted sound signal are given in Table 3.IX for tropospheric and continuous interference. The values quoted refer to the level of the wanted sound carrier.

TABLE 3.IX

Protection ratio for wanted sound carriers
Unwanted signal: CW or FM sound carrier

Difference between wanted sound carrier and unwanted carrier (kHz)	Wanted sound signal	
	Tropospheric interference	Continuous interference
	FM	FM
0	32	39
15	30	35
50	22	24
250	-6	-6

Note - For unwanted vision carrier subtract 2 dB.

3.3.7 Calculation of nuisance field

The nuisance field for continuous interference is given by the formula

$$E_t = P + E(50,50) + A_c$$

and the nuisance field for tropospheric interference is given by the formula

$$E_t = P + E(50,T) + A_t$$

where

P : e.r.p. (dB(1 kW)) of the interfering transmitter;
A : radio-frequency protection ratio (dB);
E(50,T) : field strength (dB(μV/m)) of the interfering transmitter, normalized to 1 kW, and exceeded during T% of the time,*

and where indices c and t indicate continuous and tropospheric interference respectively.

The protection-ratio curve for continuous interference is applicable when the resulting nuisance field is stronger than that resulting from tropospheric interference.

i.e. $E_c \geq E_t$
This means that A_c should be used in all cases when :
$E(50,50) + A_c \geq E(50,T) + A_t$.

3.3.8 Calculation of multiple interference

The simplified multiplication method shall be used to calculate the effects of multiple interference. See Annex 3.B for details of its application.

3.4 Field strength values to be used in the planning process

Reference usable field strength

The median field strength values shall be used for the purpose of planning against interference in Bands I, III, IV and V. These values are:

Band	I	III	IV	V
dB(μV/m)	+48	+55	+65	+70

The values refer to the field strength at a height of 10 m above ground level. Protection shall be sought for 99% of the time.

3.5 Maximum radiated power

The planning shall be based on the following maximum power limits (e.r.p.):

BAND	I	III	IV/V
max power (kW)	100	200	500

It should be noted that in accordance with No. 2666 of the Radio Regulations, powers in excess of those necessary to provide the required quality of national service should not be used.

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* For the calculation of tropospheric interference, 1% of the time is used.

3.6 Basic characteristics of transmitting and receiving antennas - Polarization

3.6.1 Transmitting antennas

When polarization discrimination is taken into account in the process of coordination between administrations, a value of 16 dB for orthogonal polarization discrimination shall be used.

3.6.2 Receiving antennas

Planning calculations shall be based on the use of a non-directional receiving antenna.

For special interference problems to be treated on an individual basis (i.e. bi- or multilaterally), the discrimination that can be obtained by the use of directional receiving antennas is given in Figure 3.6.

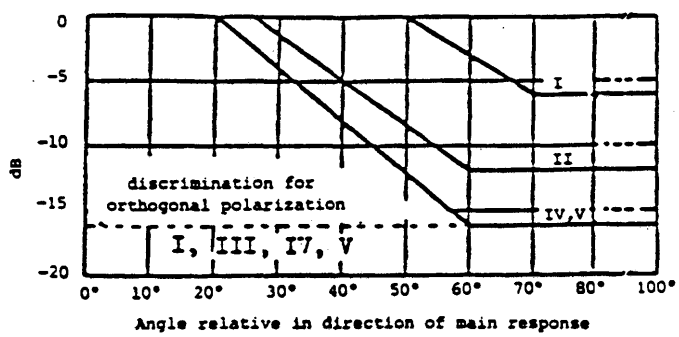

FIGURE 3.6

Discrimination obtained by the use of directional receiving antennas in broadcasting

(The number of the broadcasting band is shown on the curve)

Note 1 - It is considered that the discrimination shown will be available at the majority of antenna locations in built-up areas. At clear sites in open country, slightly higher values will be obtained.

Note 2 - The unbroken curves are valid when the wanted and the unwanted signals have the same linear polarization, whether horizontal or vertical.

[Insert Annex 3.B.]

ANNEX 3.C

Precision offset

1. Co-channel interference

In this section the protection ratios between two television signals apply only for interference due to the modulated vision carrier of the unwanted signal. For precision-offset transmitters, the values in Table 3.C.I shall be used instead of those given in Table 3.II.

TABLE 3.C.I

Protection ratio

Offset in $\frac{f_{line}}{12}$		0	1	2	3	4	5	6	7	8	9	10	11	12
Precision offset Transmitter stability ±1 Hz	Tropospheric interference	32	34	30	26	22	22	24	22	22	26	30	34	38
	Continuous interference	36	38	34	30	27	27	30	27	27	30	34	38	42

2. Overlapping channel interference

Tables 3.C.II and 3.C.III give protection ratios to be applied when a CW signal lies within the vision channel of the wanted transmission, the wanted vision signal being negatively modulated.

For precision-offset transmitters, these tables shall be used instead of Tables 3.VI and 3.VII.

TABLE 3.C.II

Tropospheric interference
(precision offset)

Offset (multiples of 1/12 line-frequency)	Frequency difference (MHz) (separation between wanted and unwanted carriers)											
	Luminance range								PAL***		SECAM***	
	-1.25*	-1.25**	-0.5	0.0	0.5	1.0	2.0	3.0	3.6-4.8	5.7-6.0	3.6-4.8	5.7-6.0
0	23	11	32	34	40	40	37	31	28	15	33	18
1	23	11	33	36	39	39	36	31	31	16	33	18
2	21	9	29	32	35	35	33	29	34	17	33	18
3	19	7	25	28	31	31	29	26	35	18	33	18
4	17	5	22	24	26	26	25	24	34	17	33	18
5	17	5	22	24	26	26	25	24	31	16	33	18
6	17	5	24	26	28	28	26	24	28	15	33	18
7	17	5	22	24	26	26	25	24	28	15	33	18
8	17	5	22	24	26	26	25	24	31	16	33	18
9	19	7	25	28	31	31	29	26	34	17	33	18
10	21	9	29	32	35	35	33	29	31	16	33	18
11	23	11	33	36	39	39	35	31	28	15	33	18
12	23	11	32	40	40	40	37	31	28	15	33	18
Protection ratio (dB)												

* H, I, K1 television systems
** B, G televisions systems
*** B, G television systems: the separation is 5.3 - 6.0 MHz

TABLE 3.C.III

Continuous interference
(precision offset)

Offset (multiples of 1/12 line-frequency)	Frequency difference (MHz) (separation between wanted and unwanted carriers)											
	Luminance range								PAL		SECAM***	
	-1.25*	-1.25**	-0.5	0.0	0.5	1.0	2.0	3.0	3.6-4.8	5.7-6.0	3.6-4.8	5.7-6.0
0	30	22	37	38	44	44	42	36	34	21	37	21
1	29	22	38	40	42	42	41	36	36	22	37	21
2	27	20	34	36	38	38	37	34	39	24	37	21
3	24	17	30	32	34	34	33	31	40	26	37	21
4	22	15	27	29	31	31	31	30	39	24	37	21
5	22	15	27	29	31	31	31	30	36	22	37	21
6	23	16	29	32	33	33	32	30	34	21	37	21
7	22	15	27	29	31	31	31	30	34	21	37	21
8	22	15	27	29	31	31	31	30	36	22	37	21
9	24	17	30	32	34	34	33	31	39	24	37	21
10	27	20	34	36	38	38	37	34	36	22	37	21
11	29	22	38	40	42	42	41	36	34	21	37	21
12	30	22	37	44	44	44	42	36	34	21	37	21
Protection ratio (dB)												

* H, I, K1 television systems
** B, G television systems
*** B, G television systems: the range is 5.3 - 6.0 MHz

3. Calculation of frequencies for precision offset

Frequencies for precision offset

Table 3.C.IV lists the possible frequencies for precision offset, in the vicinity of each twelfth of line frequency (f_{line}). For the luminance range, the frequencies shown in Table 3.C.IV end with 25 Hz up to 6/12 f_{line} and with 100 Hz beyond this frequency. Two possibilities are shown for 6/12 f_{line} (7 800 and 7 825 Hz) because at this point the spectral lines are symmetrical and thus of the sample amplitude. The offset frequencies are expressed in twelfths of line frequency.

Alternative frequencies in the vicinity of each offset position, which differ by integer multiples of 50 Hz and by integer multiples of 15 625 Hz from the values given, are possible. The term "precision offset" always refers to a difference between the carrier frequencies of the wanted and unwanted transmitters, and not to an offset of a transmitter from its nominal carrier frequency.

If the frequency difference between wanted and unwanted carrier exceeds the normalized range specified in Table 3.C.IV, one has to subtract integer multiples of 15 625 Hz. For computer calculations, formulae are given below for all precision offset frequency differences in the luminance and in the chrominance range, for 625-line systems.

TABLE 3.C.IV

Normalized precision offset between 0/12 and 12/12 of line frequency for all 625-line systems

Offset in multiples of $\frac{f_{line}}{12}$	Precision offset frequency (Hz)		
	Luminance range	Chrominance range	
		PAL	SECAM
0	25	5	0
1	1325	1305	1302
2	2625	2605	2604
3	3925	3905	3906
4	5225	5205	5208
5	6525	6505	6510
6	7800 or 7825	7810	7812
7	9100	9120	9115
8	10400	10420	10417
9	11700	11720	11719
10	13000	13020	13021
11	14300	14320	14323
12	15600	15630	15625

Luminance range: $f_p = m \times 15\,625 \pm (2n + 1) \times 25$

$m \leq 192,\ n \leq 156$

Chrominance range: PAL systems: $f_p = m \times 15\,625 \pm (2n + 1) \times 25 + k$

$m \geq 216$ and
$k = -20$ for $0 \leq n \leq 143$
$k = -15$ for $143 \leq n \leq 169$
$k = -5$ for $169 \leq n \leq 299$
$k = +5$ for $299 \leq n \leq 312$

SECAM systems: $f_p = m \times 15\,625 + 2n \times (25 + \frac{25}{624})$

with m, n, k integers

Computation of operational precision offset frequencies in a network with transmitter triplets

Precision offset techniques are usually employed to provide solutions to particular interference problems between two co-channel transmitters. In operational television networks co-channel transmitters are situated at the corner of a triangle. A typical line offset (non-precision offset) situation for such a transmitter triplet is: nominal vision carrier frequency -2/3 f_{line}, ± 0 f_{line}, $\pm 2/3$ f_{line} of the line frequency, or in twelfth: 8M, 0, 8P. A transmitter triplet A-B-C consists of three transmitter pairs A-B, A-C and B-C. Introduction of precision offset for the above-mentioned example means a possible reduction of interference for all three pairs of the transmitter triplet. In practice only 35% of all theoretical possible transmitter triplets have full improvement for all three pairs, the residual 65% triplets have one or two pairs in non-precision offset.

Table 3.C.V shows a complete and normalized list of these 35% possible cases within the range between 0 and 12P which secure improved interference situation for all three transmitter pairs within a triplet, when precision offset is used.

Precision offset frequencies for transmitter triplets can be determined using a simple rule. All transmitter triplets which cannot be translated to the normalized cases of Table 3.C.V contain one pair at least without precision offset.

TABLE 3.C.V

Possible offset combinations allowing precision offset for all transmitter pairs in transmitter triplets

CASE	OFFSET	FREQUENCY (Hz) (625-line systems)	
1	0 - 0P - 6P	0 25	7800
2	0 - 0P - 6P	0 25	7825
3	0 - 1P - 6P	0 1325	7800
4	0 - 1P - 7P	0 1325	9100
5	0 - 2P - 6P	0 2625	7800
6	0 - 2P - 7P	0 2625	9100
7	0 - 2P - 8P	0 2625	10400
8	0 - 3P - 6P	0 3925	7800
9	0 - 3P - 7P	0 3925	9100
10	0 - 3P - 8P	0 3925	10400
11	0 - 3P - 9P	0 3925	11700
12	0 - 4P - 6P	0 5225	7800
13	0 - 4P - 7P	0 5225	9100
14	0 - 4P - 8P	0 5225	10400
15	0 - 4P - 9P	0 5225	11700
16	0 - 4P - 10P	0 5225	13000
17	0 - 5P - 6P	0 6525	7800
18	0 - 5P - 7P	0 6525	9100
19	0 - 5P - 8P	0 6525	10400
20	0 - 5P - 9P	0 6525	11700
21	0 - 5P - 10P	0 6525	13000
22	0 - 5P - 11P	0 6525	14300
23	0 - 6P - 6P	0 7800	7825
24	0 - 6P - 7P	0 7825	9100
25	0 - 6P - 8P	0 7825	10400
26	0 - 6P - 9P	0 7825	11700
27	0 - 6P - 10P	0 7825	13000
28	0 - 6P - 11P	0 7825	14300
29	0 - 6P - 12P	0 7800	15600
30	0 - 6P - 12P	0 7825	15600

Example

The aim of this calculation is to transform all three offset positions into the range between 0P and 12P (see Table 3.C.V). Each single transmitter carrier frequency can be moved by multiples of line frequency, i.e. by multiples of 12/12 (see Step 2). Moving of any twelfths is allowed, provided that all transmitter carrier frequencies are moved by the same number of twelfths (see Step 1).

Given: Transmitter triplet A B C

Line offset position 18M 8P 2P

Step 1			
Set one transmitter to zero by linear translation:	+18	+18	+18
Result:	0	26P	20P
Step 2			
Translation of transmitter B and C into the range between O and 12P by subtracting or adding a multiple of the line frequency:		-24	-12
Result:	0	2P	8P
Step 3			
Selection of precision offset frequencies from Table 3.C.V:	0	2 625 Hz	10 400 Hz
Step 4			
Step 2 has to be compensated		+31 250 Hz	+15 625 Hz
Result:	0	+33 875 Hz	+26 025 Hz
Step 5			
Step 1 has to be compensated	-23 400 Hz	-23 400 Hz	-23 400 Hz
Result:	-23 400 Hz	+10 475 Hz	+2 625 Hz
equivalent to	18M	8P*	2P

* To reduce the sound interference between transmitter B and C, an offset position of 20P = 26 100 Hz (enlarged by 12P = 15 625 Hz) would be preferable. In this case picture interference is unchanged.

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AGENDA

OF THE

THIRD AND FOURTH MEETINGS OF PLANNING GROUP 4/1

Friday, 17 November 1989 at 0900 hrs and 1430 hrs

(Room XVIII)

		Documents
1.	Adoption of the agenda	-
2.	Discussion on planning procedure	11
3.	Other business	-

I.M. WAKOMBO
Chairman of Planning Group 4/1

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TECHNICAL WORKING GROUP OF THE PLENARY

CHAPTER 4 - COMPATIBILITY WITH OTHER SERVICES

4.3 Sharing criteria

4.3.1 Protection of the broadcasting service (television) from fixed and mobile services

4.3.1.1 Minimum field-strength values to be protected

The minimum values of field-strength for the broadcast service (television) which require protection from the fixed and mobile services are:

[46 dB	(μV/m)	in Band I	at 10 m a.g.l.]
[49 dB	(μV/m)	in Band III	at 10 m a.g.l.]
[53 dB	(μV/m)	in Band IV	at 10 m a.g.l.]
58 dB	(μV/m)	in Band V	at 10 m a.g.l.

4.3.1.2 Protection ratios

Ratios for the protection of AM vestigial sideband television systems against overlapping channel interference are given in [Chapter 3]. The values for a non-controlled condition should be used.

4.3.1.3 Protection margin

The protection margin (PM) is given, in dB, by:

PM = FS - combined value of (NF + AF) for all interfering sources

where: FS is the minimum field-strength value in dB (μV/m) given in Section 4.3.1.1,
NF is the nuisance field in dB (μV/m) discussed in Section 4.3.1.3.1,
AF is the adjustment factor (in dB), intended to deal with antenna discrimination and clutter loss, discussed in Section 4.3.1.3.2.

The combination of multiple interference from co-sited and non co-sited sources is discussed in Sections 4.3.1.3.3 and 4.3.1.3.4, respectively.

The calculated protection margin should be positive at all locations where the television service is required.

4.3.1.3.1 Nuisance field (NF)

The calculation of nuisance field is given in [3.3.8]. The field-strength, for 1% and 50% time, from the interfering source should be calculated using [2.2]. Information regarding fixed stations or base stations of the mobile service with effective antenna heights of less than 37.5 m is given in section [2.2].

4.3.1.3.2 Adjustment factor (AF)

Four distinct cases of interference to a station of the television service from stations of the fixed or mobile services can be identified; these are dealt with separately below.

4.3.1.3.2.1 Interference from stations of the fixed service or base stations of the mobile service which are orthogonally polarized with respect to a station of the television service.

In this case the adjustment factor is equal to the antenna discrimination of -16 dB (see 3.6.2).

4.3.1.3.2.2 Interference from stations of the fixed service or base stations of the mobile service which have the same polarization as a station of the television service.

In this case the adjustment factor is equal to the relevant receiving antenna directivity discrimination value given in section 3.6.2.

4.3.1.3.2.3 Interference from a mobile station operating at more than 150 km from a station of the television service.

No polarization discrimination will be taken into account.

Interference calculations will be carried out for the erp of the mobile station, assuming this to be situated at the site of the base station of the mobile service with an effective antenna height of 75 m. It is then appropriate to use an adjustment factor of -15 dB to allow for the effect of clutter loss and ground reflection effects near the mobile station.

In some cases it may be possible to include an additional adjustment to allow for the directivity of the television receiving antenna, as given in section 3.6.2.

4.3.1.3.2.4 Interference from a mobile station operating relatively close to a receiving site from a station of the television service.

In this case, it is necessary to carry out detailed calculations for individual, worst-case paths. No polarization discrimination is taken into account.

4.3.1.3.3 Multiple interference from co-sited sources

The interference arising from multiple co-sited sources should be combined by means of the power-sum method

$$Ec = \sqrt{\sum_{i=1}^{n} Ei^2}$$

Where Ei = The value, in μV/m, of (NF + AF) for each individual co-sited source. As indicated in section 4.3.1.3 NF is expressed in dB (μV/m) and AF in dB. The sum of these two is converted to μV/m to express Ei.

n = Number of co-sited sources,

Ec = Effective interference in μV/m.

Note: The value of Ec represents one of the terms to be included in the procedure given in Section 4.3.1.3.4, after conversion to db (μV/m).

4.3.1.3.4 Multiple interference from non co-sited sources

The interference arising from multiple non co-sited sources should be combined by using the simplified multiplication method given in Chapter [4].

4.3.1.4 Effective transmitting antenna heights

The case of low values of effective transmitting antenna height (<10 m for VHF and <37.5 m for UHF), and especially that of negative heights is dealt in [2.1.3].

4.3.2 Protection of the land mobile service from the broadcasting service (television)

4.3.2.1 Minimum field strength values to be protected

4.3.2.1.1 The minimum protected median field strength for the land mobile service, using 25 or 30 kHz channel spacings is given in Table I below:

TABLE I

Frequency Range (MHz)	Field Strength dB(uV/m) Signal Quality Grade	
	3	4
44 to 68	16	19
174 to 230	14	21
470 to 582	20	24
582 to 960	30	38
760 to 862	30	38

For 12.5 or 15 kHz channel spacing the values should be 3 dB higher. For channel spacings greater than 30 kHz (wideband equipment), appropriate values of minimum protected field strengths have still to be determined.

4.3.2.1.2 Calculations for the interfering field strength should be carried out using curves of [2.2]. Appropriate figures for 10% time and 50% of locations should be used.

4.3.2.2 Protection ratios

4.3.2.2.1 In the case of sharing between television broadcasting and the land mobile service the protection ratio should be 10 dB.

4.3.2.2.2 The curve giving the relative protection ratio values as a function of the carrier frequency separation is given in Figure 4.1. The frequency separation between the vision and sound carrier should be as detailed in section [3.1].

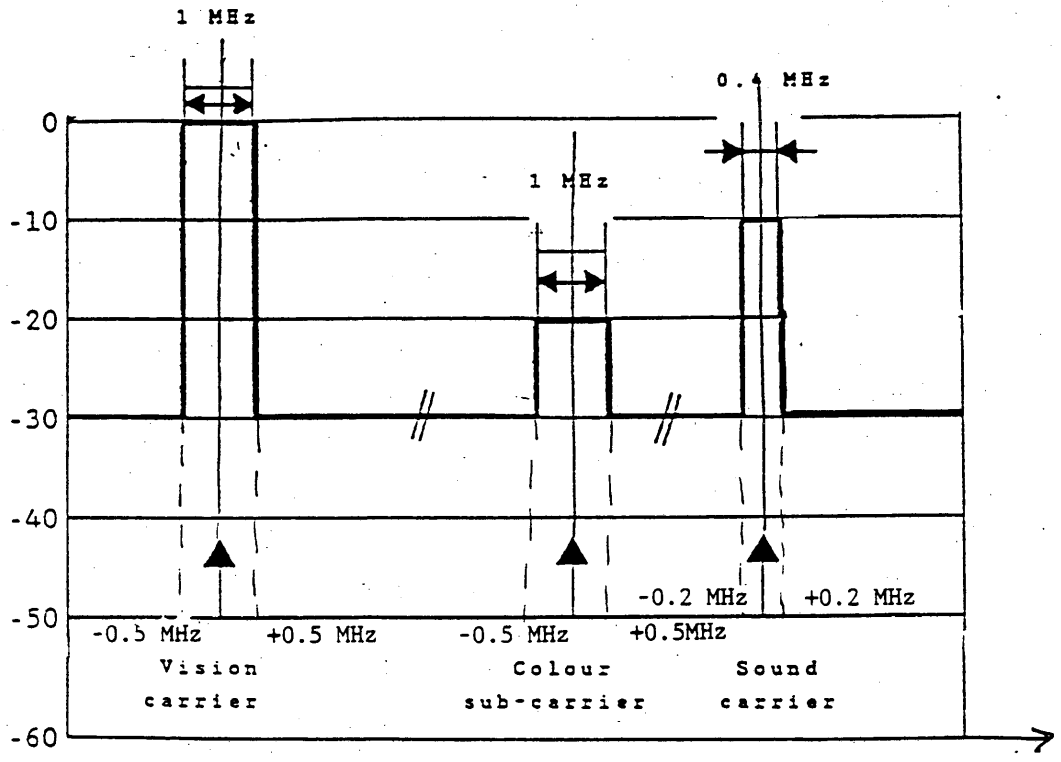

FIGURE 4.1

Relative values of the radio frequency protection ratio as a function of the carrier frequency separation

4.3.2.3 Receiving antenna discrimination

For base stations: The value of antenna polarization discrimination for horizontally polarized broadcasting transmissions is 18 dB. Where vertically or mixed polarized broadcasting emissions are used no antenna polarization discrimination should be taken into account.

For mobile stations: No polarization discrimination can be taken into account because:

- the mobile receiving system, consisting of an antenna and the body of a vehicle, cannot be assumed to have any orthogonal polarization discrimination;
- the effect of environmental clutter near the mobile station can be expected to introduce a degree of depolarization.

4.3.2.4 Propagation model

Propagation information for the land-mobile service can be found in [2.2].

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TECHNICAL WORKING
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ANNEX 2

CHAPTER 5

COMPATIBILITY OF THE BROADCASTING (TELEVISION) SERVICE AND OTHER SERVICES SHARING THE SAME BAND

5.1 Protection of the broadcasting service (television) from the fixed and mobile services

5.1.1 Minimum field-strength values to be protected

The minimum values of field-strength for the broadcast service (television) which require protection from the fixed and mobile services are:

46 dB (μV/m) in Band I at 10 m a.g.l.
49 dB (μV/m) in Band III at 10 m a.g.l.
53 dB (μV/m) in Band IV at 10 m a.g.l.
58 dB (μV/m) in Band V at 10 m a.g.l.

5.1.2 Protection ratios

Ratios for the protection of AM vestigial sideband television systems are given in Tables 3.VI and 3.VII. The values for a CW interfering source and the zero offset (non-precision) condition should be used.

5.1.3 Protection margin

The protection margin (PM) is given, in dB, by:

PM = FS - combined value of (NF + AF) for all interfering sources

where: FS is the minimum field-strength value in dB (μV/m) given in section 4.3.1.1,

NF is the nuisance field in dB (μV/m) discussed in section 5.1.3.1,

AF is the adjustment factor (in dB), intended to deal with antenna discrimination and clutter loss, discussed in section 5.1.3.2.

The combination of multiple interference from co-sited and non co-sited sources is discussed in sections 5.1.3.3 and 5.1.3.4, respectively.

The calculated protection margin should be positive at all locations where the television service is required.

5.1.3.1 Nuisance field (NF)

The calculation of nuisance field is given in [3.3.8]. The field-strength, for 1% and 50% time, from the interfering source should be calculated using [2.2]. Information regarding fixed stations or base stations of the mobile service with effective antenna heights of less than 37.5 m is given in section [2.2].

5.1.3.2 Adjustment factor (AF)

Four distinct cases of interference to a station of the television service from stations of the fixed or mobile services can be identified; these are dealt with separately below.

5.1.3.2.1 Interference from stations of the fixed service or base stations of the mobile service which are orthogonally polarized with respect to a station of the television service.

In this case the adjustment factor is equal to the antenna discrimination of -16 dB (see 3.6.2).

5.1.3.2.2 Interference from stations of the fixed service or base stations of the mobile service which have the same polarization as a station of the television service.

In this case the adjustment factor is equal to the relevant receiving antenna directivity discrimination value given in section 3.6.2.

5.1.3.2.3 Interference from a mobile station operating at more than 150 km from a station of the television service.

No polarization discrimination will be taken into account.

Interference calculations will be carried out for the erp of the mobile station, assuming this to be situated at the site of the base station of the mobile service with an effective antenna height of 75 m. It is then appropriate to use an adjustment factor of -15 dB to allow for the effect of clutter loss and ground reflection effects near the mobile station.

[With the agreement of the concerned administrations, it may be possible to include an additional adjustment to allow for the directivity of the television receiving antenna, as given in section 3.6.2.]

5.1.3.2.4 Interference from a mobile station operating relatively close to a receiving site from a station of the television service.

In this case, it is necessary to carry out detailed calculations for individual, worst-case paths. No polarization discrimination is taken into account.

5.1.3.3 Multiple interference from co-sited sources

The interference arising from multiple co-sited sources should be combined by means of the power-sum method

$$Ec = \sqrt{\sum_{i=1}^{n} Ei^2}$$

where Ei = The value, in μV/m, of (NF + AF) for each individual co-sited source. As indicated in section 5.1.3, NF is expressed in dB (μV/m) and AF in dB. The sum of these two is converted to μV/m to express Ei.

n = Number of co-sited sources.

Ec = Effective interference in (μV/m).

Note - The value of Ec represents one of the terms to be included in the procedure given in section 5.1.3.4, after conversion to dB (μV/m).

5.1.3.4 Multiple interference from non co-sited sources

The interference arising from multiple non co-sited sources should be combined by using the simplified multiplication method given in Chapter [4].

5.1.4 Effective transmitting antenna heights

The case of low values of effective transmitting antenna height (<10 m for VHF and <37.5 m for UHF), and especially that of negative heights is dealt in [2.1.3].

5.2 Protection of the broadcasting service (television) from the aeronautical radionavigation service

5.2.1 Minimum field strength values to be protected

The minimum values of field strength for the broadcasting service (television) to be protected from the aeronautical radionavigation service are given in 5.1.1.

5.2.2 Protection ratios

Ratios for the protection of AM vestigial sideband television systems are given in Tables 3.VI and 3.VII. The values for a CW interfering source and the zero offset (non-precision) condition should be used.

5.2.3 Nuisance field

The calculation of the nuisance field is given in 3.3.8. The field strength, for 1 and 50% time, from the interfering source should be calculated using 2.2.

5.3 Protection of the broadcasting service (television) from the radionavigation service

5.3.1 Minimum field strength values to be protected

The minimum values of field strength for the broadcasting service (television) to be protected from the radionavigation service are given in 5.1.1.

5.3.2 Protection ratios

The ratios for the protection of AM vestigial sideband television systems are given in Figure 5.2. The protection ratios given in this figure do not provide for protection of the sound signal associated with a television signal.

5.3.3 Nuisance field

The calculation of the nuisance field is given in 3.3.8. The field strengths, for 1 and 50% time, from the interfering source should be calculated using [2.2].

5.4 Protection of the land mobile service from the broadcasting service (television)

5.4.1 Minimum field strength values to be protected

5.4.1.1 The minimum protected median field strength for the land mobile service, using 25 or 30 kHz channel spacings is given in Table I below:

TABLE I

Frequency Range (MHz)	Field Strength dB(uV/m) Signal Quality Grade	
	3	4
44 to 68	16	19
174 to 230	14	21
470 to 582	20	24
582 to 960	30	38

For 12.5 or 15 kHz channel spacing the values should be 3 dB higher.

5.4.1.2 Calculations for the interfering field strength should be carried out [for the receiving site of the station of the land mobile service and at a height of 3 m above ground level] using curves of [2.2]. Appropriate figures for 10% time and 50% of locations should be used.

5.4.2 Protection ratios

5.4.2.1 In the case of sharing between television broadcasting and the land mobile service the protection ratio should be 10 dB.

5.4.2.2 The curve giving the relative protection ratio values as a function of the carrier frequency separation is given in Figure 5.1. The frequency separation between the vision and sound carrier should be as detailed in section [3.1].

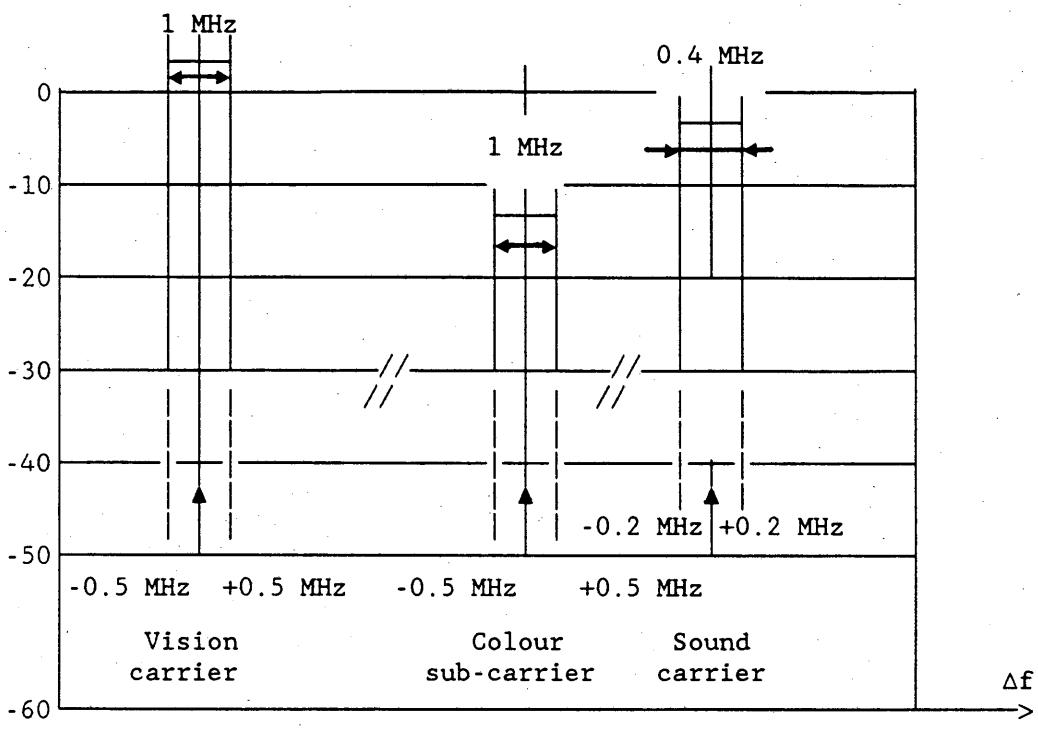

FIGURE 5.1

Relative values of the radio frequency protection ratio as a function of the carrier frequency separation

5.4.3 Receiving antenna discrimination

For base stations: The value of antenna polarization discrimination for horizontally polarized broadcasting transmissions is 18 dB. Where vertically or mixed polarized broadcasting emissions are used no antenna polarization discrimination should be taken into account.

For mobile stations: No polarization discrimination can be taken into account because:

- the mobile receiving system, consisting of an antenna and the body of a vehicle, cannot be assumed to have any orthogonal polarization discrimination;
- the effect of environmental clutter near the mobile station can be expected to introduce a degree of depolarization.

5.4.4 Propagation model

Propagation information for the land-mobile service can be found in [2.2].

5.5 Protection of the fixed service from the broadcasting service (television)

[See Recommendation XYZ.]

5.6 Protection of the aeronautical radionavigation service in the band from 223 MHz to 230 MHz from the broadcasting service (television)

5.6.1 Minimum field strength to be protected

The minimum value of field strength for the aeronautical radionavigation service to be protected against the broadcasting service (television) is 51 dB (μV/m).

5.6.2 Protection ratios

The curve giving the relative protection ratios as a function of the frequency spacing between the aeronautical radionavigation service carrier frequency and the television vision carrier is given in Figure 5.3.

5.6.3 Interfering field strength

The value of the interfering field strength should be calculated assuming free space propagation if there is an optical path between the television transmitting antenna and the location of the aeronautical radionavigation receiver. This location is taken to be at a height of 20,000 m above sea level and at a distance of 300 km from the aeronautical radionavigation transmitter site and situated above a line joining the transmitter sites. For distances beyond the optical horizon, the field strength should be calculated using the CCIR atlas of ground wave propagation curves.

Note - If the aeronautical radionavigation service being considered has a range of less than 300 km, the relevant value should be used in place of 300.

5.6.4 Low power television stations

Special considerations apply to the case of a low power television station situated close to the site of an aeronautical radionavigation transmitter.

If the carrier frequencies are coincident and the e.r.p. of the television station is less than 250 W, the required protection is achieved by the difference in e.r.p. values for the two services. If the carrier frequency spacing is greater than 1.4 MHz, the curve in Figure 4C may be used to derive the maximum permitted power for the television station; for example, if the vision carrier frequency of the television transmitter is +2.5 MHz relative to that of the aeronautical radionavigation transmitter, an e.r.p. up to 25 kW could be used.

5.7 Protection of the aeronautical radionavigation service in the band from 590 MHz to 598 MHz from the broadcasting service (television)

5.7.1 The values and procedures given in 5.6 should be used.

5.8 Protection of the radionavigation service in the band from 585 MHz to 610 MHz from the broadcasting service (television)

5.8.1 Minimum field strength to be protected

The minimum value of field strength for the radionavigation service to be protected from the broadcasting service (television) is -10 dB (μV/m).

5 8.2 Protection ratios

The curve giving the relative protection ratios as a function of the frequency spacing between the radionavigation service carrier frequency and the television vision carrier is given in Figure 4.1.

5.8.3 Interfering field strength

The interfering field strength for 1% time should be calculated at the site of the radionavigation receiver using the method given in 2.2 and Annex 2.A.

5.9 Protection of the radioastronomy service in the band from 606 MHz to 614 MHz from the broadcasting service (television)

5.9.1 Minimum field strength to be protected

The minimum field strength for the radioastronomy service to be protected from interference by the broadcasting service (television) is [-185 dB(W/m2)].

5.9.2 Protection ratios

The curve giving the relative protection ratios as a function of the frequency spacing between the television vision carrier and the frequency used by the radioastronomy service is given in Figure 4.1.

5.9.3 Interfering field strength

The interfering field strength for 1% time should be calculated at the site of the radioastronomy receiver using the method given in 2.2 and Annex 2.A.

5.10 Minimum separation distances

Using the information given in sections 5.1-5.9, the minimum separation distances required to achieve protection of the potentially affected service calculated. [Examples of the] [The] results of such calculations are given in Annex 4.A.

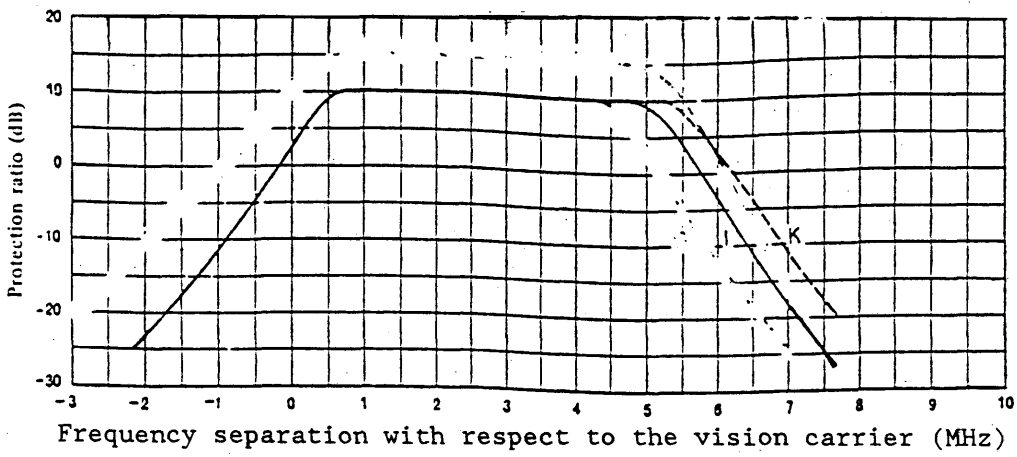

FIGURE 5.2

Protection ratio required by system I and K picture signals against a radionavigation signal in the band 582 to 606 MHz

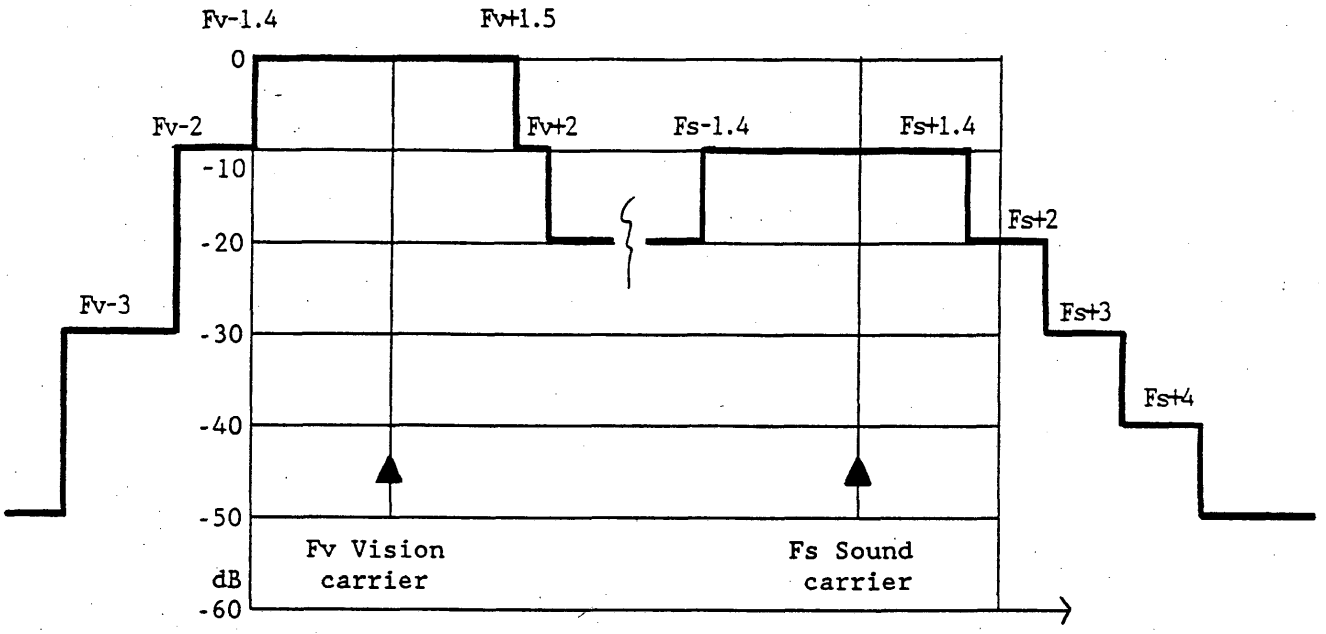

FIGURE 5.3

Relative values of the radio frequency protection ratio as a function of the carrier frequency separation

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TECHNICAL WORKING
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DRAFT NOTE FROM THE CHAIRMAN OF THE TECHNICAL WORKING GROUP OF THE PLENARY TO THE CHAIRMAN OF COMMITTEE 5

This Note has been drafted in response to Document 41 and concerns the limits beyond which coordination procedure is to be activated when a modification to the TV plan is being proposed.

R. ALVARINO
Chairman of the Technical Working
Group of the Plenary

1. Limiting criteria to determine the need for seeking agreement when the broadcasting service of other administrations is involved (for all bands that are being planned)

When applying the procedure for modifications to the Plan, the tables in this annex shall be used to determine the administrations with which agreement must be reached.

Each table refers to a particular frequency band and sets out the coordination distance limits for effective radiated powers of 1 W, 10 W, 100 W, 1 kW, 10 kW and 100 kW and effective antenna heights of 75 m, 300 m and 1,200 m in propagation zones [1, 2, 3, 4, A and B].

For intermediate effective radiated power and effective antenna height values, linear interpolation shall be used. For effective radiated power values lower than 1 W, or for effective antenna height values below 75 m, the values corresponding to 1 W and 75 m respectively shall be used. For effective radiated power values greater than 100 kW, or for effective antenna height values greater than 1,200 m, linear extrapolation shall be applied.

For mixed paths over different propagation zones the coordination distance shall be calculated by linear interpolation.

[When a whole path or part of a path covers propagation zones C and C1, the provisions in section 2 of the procedure shall be applied.]

Similarly, when no distance is shown in the tables (*) a specific procedure shall be applied [to be developed by Committee 5].

TABLE I

Band 47-68 MHz

Coordination distance limits (km)

Z \ Hef	Effective radiated power																	
	100 kW			10 kW			1 kW			100 W			10 W			1 W		
	75	300	1200	75	300	1200	75	300	1200	75	300	1200	75	300	1200	75	300	1200
1	600	630	700	480	520	590	370	420	480	270	310	370	170	205	290	100	135	200
2	430	450	500	340	370	420	260	290	350	190	220	260	120	140	210	70	90	140
3	520	550	610	420	450	510	320	360	420	230	270	320	150	180	250	90	120	170
4	1050	*	*	830	870	950	630	670	750	450	490	560	300	330	410	170	205	290
A	*	*	*	*	*	*	900	960	1070	640	700	800	430	470	580	240	290	410
B	*	*	*	1000	1050	*	760	810	880	540	590	670	360	400	490	200	240	340

Hef: Effective antenna height (m)
Z: Propagation zone
*: The provisions of section 2 of the procedure shall be applied

TABLE II

Band 174-230 MHz

Coordination distance limits (km)

Z \ Hef	Effective radiated power																	
	100 kW			10 kW			1 kW			100 W			10 W			1 W		
	75	300	1200	75	300	1200	75	300	1200	75	300	1200	75	300	1200	75	300	1200
1	530	560	630	420	450	520	310	340	410	210	240	320	120	150	230	60	90	160
2	340	380	440	270	300	370	200	230	290	130	160	220	80	100	160	40	60	110
3	390	460	540	310	370	440	230	280	350	150	200	270	90	120	190	50	70	130
4	910	950	1030	720	750	820	520	550	630	350	390	460	220	250	330	120	150	230
A	*	*	*	*	*	*	830	900	970	560	620	730	350	400	530	190	240	370
B	*	*	*	900	940	1020	650	710	780	440	490	570	270	310	410	150	190	290

Hef: Effective antenna height (m)
Z: Propagation zone
*: The provisions of section 2 of the procedure shall be applied

TABLE III

Band 470-582 MHz

Coordination distance limits (km)

Z \ Hef	Effective radiated power																	
	100 kW			10 kW			1 kW			100 W			10 W			1 W		
	75	300	1200	75	300	1200	75	300	1200	75	300	1200	75	300	1200	75	300	1200
1	360	390	470	270	300	370	180	220	290	110	150	210	60	100	160	30	60	110
2	300	320	390	220	250	310	150	180	250	90	120	170	50	80	130	20	50	90
3	330	350	430	240	270	340	160	200	270	100	130	190	50	90	140	20	50	100
4	*	*	*	*	*	*	*	*	*	980	980	980	720	720	720	510	510	510
A	*	*	*	*	*	*	*	*	*	*	*	*	950	950	950	730	730	730
B	*	*	*	*	*	*	*	*	*	*	*	*	810	810	810	610	610	610

Hef: Effective antenna height (m)
Z: Propagation zone
*: The provisions of section 2 of the procedure shall be applied

TABLE IV

Band 582-790 MHz

Coordination distance limits (km)

	Effective radiated power																	
	100 kW			10 kW			1 kW			100 W			10 W			1 W		
Z \ Hef	75	300	1200	75	300	1200	75	300	1200	75	300	1200	75	300	1200	75	300	1200
1	310	340	420	230	260	330	150	180	250	80	120	180	40	80	130	20	50	100
2	270	300	370	200	230	290	130	160	220	70	100	160	30	70	110	20	40	80
3	290	320	400	210	240	310	140	170	240	70	110	170	30	70	120	20	40	90
4	*	*	*	*	*	*	*	*	*	850	850	850	620	620	620	410	410	410
A	*	*	*	*	*	*	*	*	*	1050	1050	1050	830	830	830	580	580	580
B	*	*	*	*	*	*	*	*	*	910	910	910	720	720	720	500	500	500

Hef: Effective antenna height (m)
Z: Propagation zone
*: The provisions of section 2 of the procedure shall be applied

2. Protection of the broadcasting service (television) from fixed and mobile services

2.1 Minimum field-strength values to be protected

The minimum values of field strength for the broadcasting service (television) to be protected from the fixed and mobile services are:

- 46 dB (μV/m) in Band I at 10 m agl;
- 49 dB (μV/m) in Band III at 10 m agl;
- 53 dB (μV/m) in Band IV at 10 m agl;
- 58 dB (μV/m) in Band V at 10 m agl.

The protection should be achieved at any point of the boundaries of the country of the broadcasting station.

3. Protection of the broadcasting service (television) from the aeronautical radionavigation service

3.1 Minimum field strength values to be protected

The minimum values of field strength for the broadcasting service (television) to be protected from the aeronautical radionavigation service are given in 2.1.

3.2 Protection ratios

Ratios for the protection of AM vestigial sideband television systems are given in Tables 3.VI and 3.VII. The values for a CW interfering source and the zero offset (non-precision) condition should be used.

3.3 Nuisance field

The calculation of the nuisance field is given in [3.3.8]. The field strength, for 1 and 50% time, from the interfering source should be calculated using [2.2].

4. Protection of the broadcasting service (television) from the radionavigation service

4.1 Minimum field strength values to be protected

The minimum values of field strength for the broadcasting service (television) to be protected from the radionavigation service are given in 2.1 above.

4.2 Protection ratios

The ratios for the protection of AM vestigial sideband television systems are given in Figure 1. The protection ratios given in this figure do not provide for protection of the sound signal associated with a television signal.

4.3 Nuisance field

The calculation of the nuisance field is given in 3.3.8. The field strengths, for 1 and 50% time, from the interfering source should be calculated using 2.2.

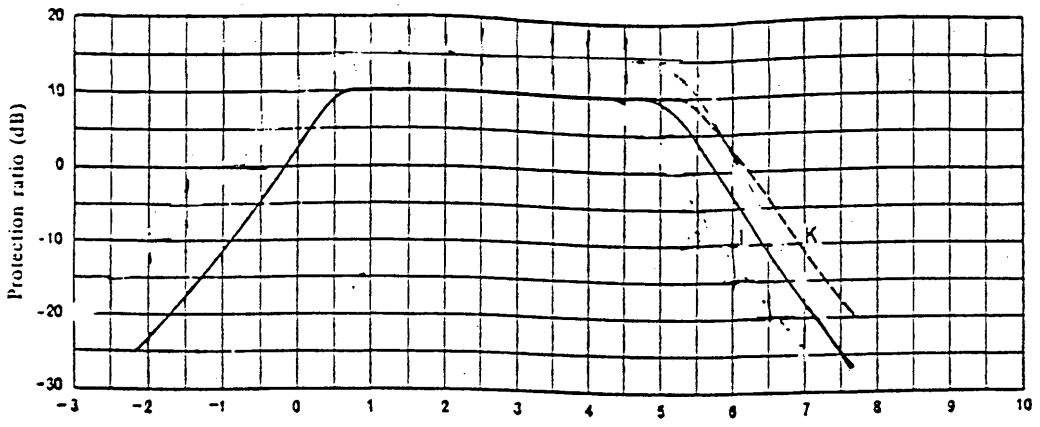


FIGURE 1

Protection ratio required by systems I and K picture signals against a radionavigation signal in the band 582 to 606 MHz

5. Limiting criteria to protect the fixed service in the bands 47 - 68, 174 - 238, 246 - 254 and 470 - 862 MHz

The ad hoc Group felt that insufficient technical input to this Conference was available to fix a minimum value of field strength to be protected from the broadcasting source.

However, the opinion of the Group was that a suitable Recommendation should be issued by the Conference to allow for coordination among the concerned administrations to be carried out according to the procedure indicated in annex.

6. Limiting criteria to protect the mobile service in the bands 47 - 68, 174 - 238, 246 - 254, and 470 - 862 MHz

Minimum field strength values to be protected at the nearest point of the boundary of another administration.

The minimum protected median field strength for the land mobile service, using 25 or 30 kHz channel spacings is given in Table I below:

TABLE I

Frequency Range (MHz)	Field Strength dB(uV/m) Signal Quality Grade	
	3	4
47 to 68	16	19
174 to 254	14	21
470 to 582	20	24
582 to 862	30	38

For 12.5 or 15 kHz channel spacing the values should be 3 dB higher.

Protection ratios

The protection ratio value for protecting the land mobile service against an AM vestigial sideband television station is 10 dB.

The curve giving the relative protection ratio values as a function of the carrier frequency separation is given in Figure 2 [also Figure 5.1 of Chapter 5, Annex 2]. The frequency separation between the vision and sound carrier should be as detailed in section [3.1, Chapter 3, Annex 2].

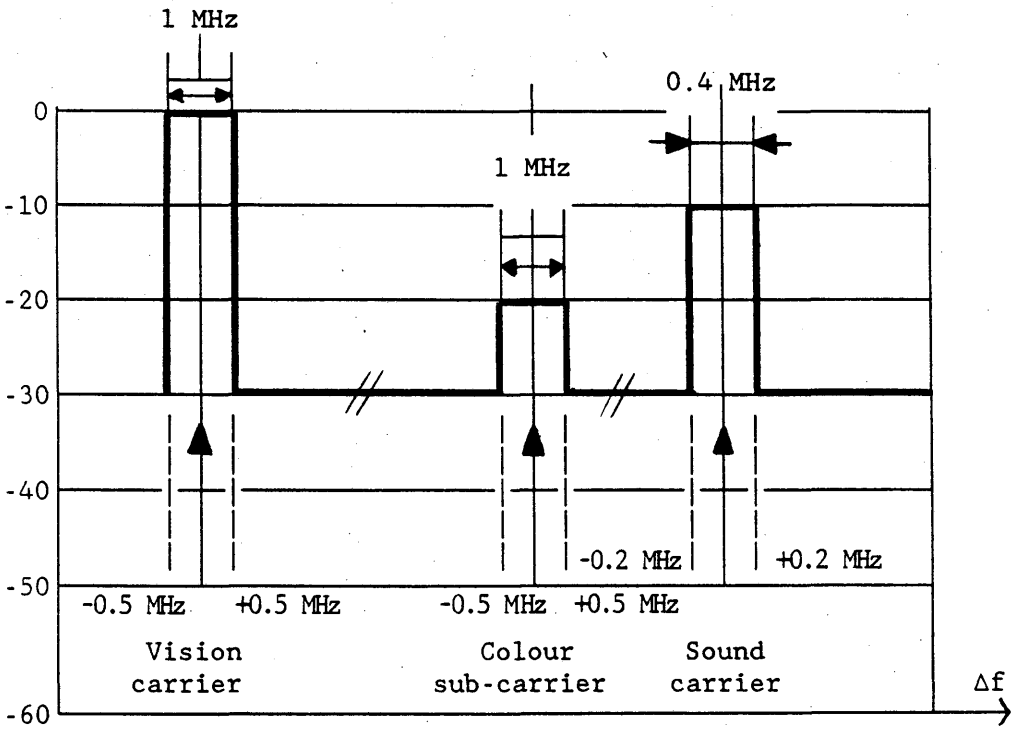


FIGURE 2

Relative values of the radio frequency protection ratio as a function of the carrier frequency separation

7. Limiting criteria to protect the amateur service in the band 50 - 54 MHz

In the 50 - 54 MHz band, any possible interference caused to the amateur service by the broadcasting service can best be resolved on a case-by-case basis through bilateral consultation between the administrations concerned.

8. Limited criteria to protect the aeronautical radionavigation service in the bands 223 - 230 and 590 - 598 MHz

8.1 Minimum field strength to be protected

The minimum value of field strength for the aeronautical radionavigation service to be protected against the broadcasting service (television) is 51 dB(μV/m).

8.2 Protection ratios

The curve giving the relative protection ratios as a function of the frequency spacing between the aeronautical radionavigation service carrier frequency and the television vision carrier is given in Figure 3.

8.3 Interfering field strength

The value of the interfering field strength should be calculated assuming free space propagation if there is an optical path between the television transmitting antenna and the location of the aeronautical radionavigation receiver. This location is taken to be at a height of 20,000 m above sea level and at a distance of 300 km from the aeronautical radionavigation transmitter site and situated above a line joining the transmitter sites. For distances beyond the optical horizon, the field strength should be calculated using the CCIR atlas of ground wave propagation curves.

Note - If the aeronautical radionavigation service being considered has a range of less than 300 km, the relevant value should be used in place of 300.

8.4 Low power television stations

Special considerations apply to the case of a low power television station situated close to the site of an aeronautical radionavigation transmitter.

If the carrier frequencies are coincident and the e.r.p. of the television station is less than 250 W, the required protection is achieved by the difference in e.r.p. values for the two services. If the carrier frequency spacing is greater than 1.4 MHz, the curve in Figure 4C may be used to derive the maximum permitted power for the television station; for example, if the vision carrier frequency of the television transmitter is +2.5 MHz relative to that of the aeronautical radionavigation transmitter, an e.r.p. up to 25 kW could be used.

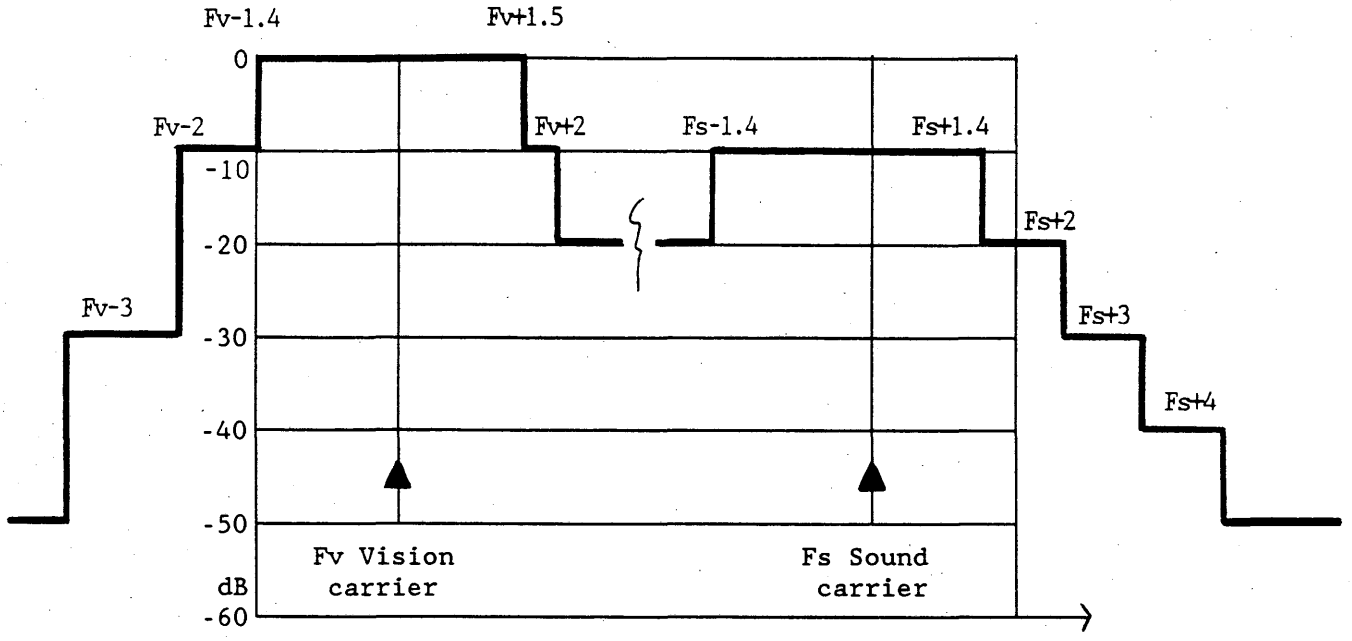


FIGURE 3

Relative values of the radio frequency protection ratio
as a function of the carrier frequency separation

9. Limiting criteria to protect the radionavigation service in the band 585 - 610 MHz

9.1 Minimum field strength to be protected

The minimum value of field strength for the radionavigation service to be protected from the broadcasting service (television) is -10 dB (μV/m).

9.2 Protection ratios

The curve giving the relative protection ratios as a function of the frequency spacing between the radionavigation service carrier frequency and the television vision carrier is given in Figure 2.

9.3 Interfering field strength

The interfering field strength for 1% time should be calculated at the site of the radionavigation receiver using the method given in 2.2 and Annex 2.A.

10. Limiting criteria to protect the radioastronomy service in the band 606 - 614 MHz

10.1 Minimum field strength to be protected

The minimum field strength for the radioastronomy service to be protected from interference by the broadcasting service (television) is [-185 dB(W/m2)].

10.2 Protection ratios

The curve giving the relative protection ratios as a function of the frequency spacing between the television vision carrier and the frequency used by the radioastronomy service is given in Figure 2.

10.3 Interfering field strength

The interfering field strength for 1% time should be calculated at the site of the radioastronomy receiver using the method given in 2.2 and Annex 2.A.

ANNEX

Protection of the fixed service from the broadcasting service (television)

1. Minimum field strength value to be protected

The minimum value of field strength for the fixed service to be protected from the broadcasting service (television) is [-2 dB(μV/m)].

2. Protection ratios

The curve giving the relative protection ratios as a function of the frequency spacing between the fixed service carrier and the television vision carrier is given in Figure 1.

3. Initial calculations for protection

Because of the nature of the fixed service (point-to-point links) and the related system parameters[1], it is not easy to make the required calculations in the general case.

Therefore, as a first approximation, the separation distances established for the case of the land mobile service [4.4.X], taken as the distance between the site of the television transmitter and the nearest point on the boundary of another administration, should be used to determine if more detailed calculations (see 5.5.4) are necessary.

4. Interfering field strength

The maximum value of the interfering field strength FS_{limit} is given by:

$$FS_{limit} = -2+RPR+TSF+RAD \text{ dB}(\mu V/m)$$

where

RPR is the relative protection ratio taken from Figure 1.

TSF is the terrain shielding factor determined for the specific propagation path and calculated using the methods given in 2.2 and Annex 2.A.

RAD is the receiving antenna discrimination factor (for the fixed service receiver) determined by the specific fixed service equipment in use and the relative angles between the direction of arrival of the wanted and interfering signals.

---

1 For example, use of a high-gain, directional receiving antenna and screening by local terrain of the receiving site.

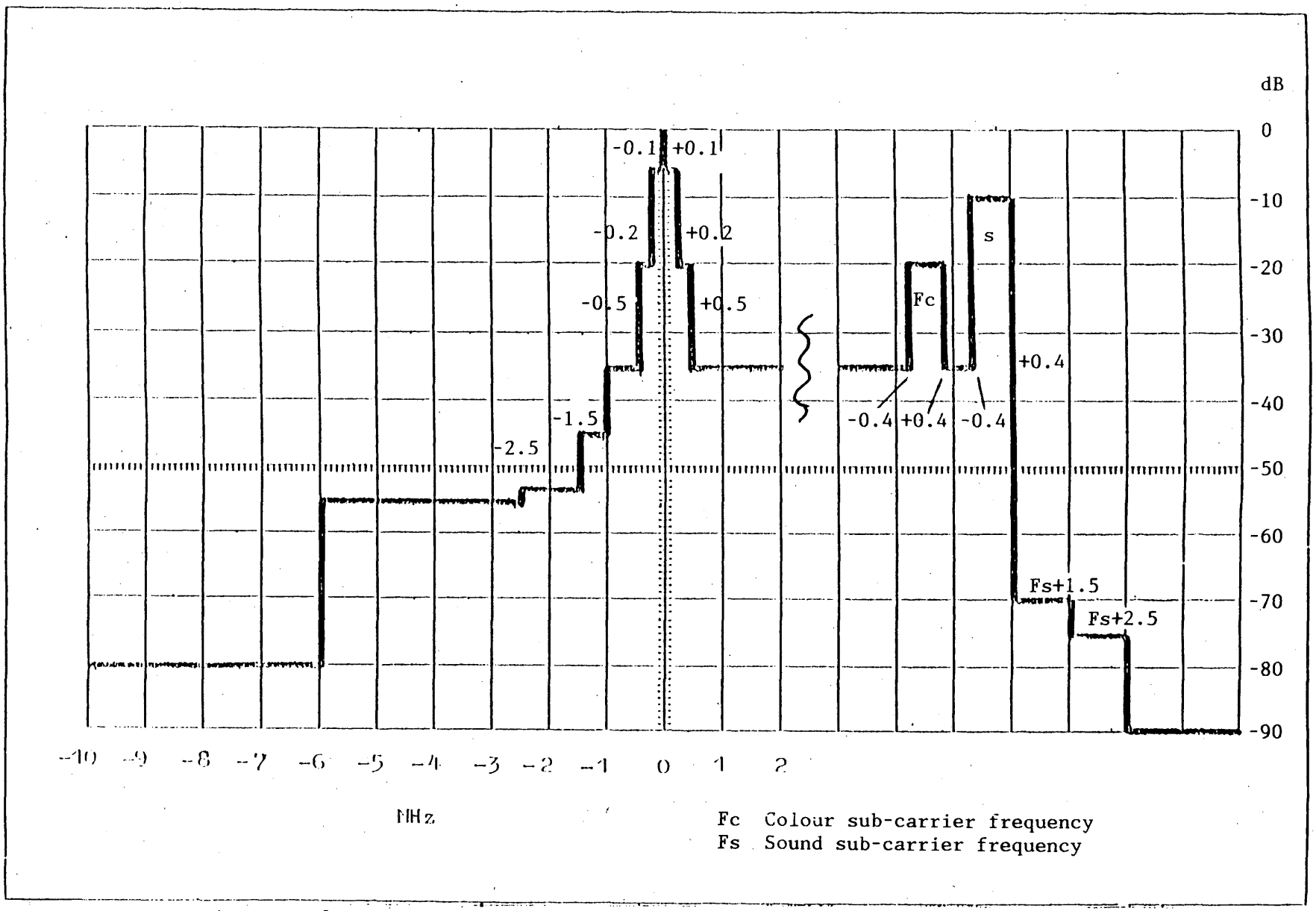


FIGURE 1

Relative protection ratio in the RF range as a function of the carrier frequency separation

INTERNATIONAL TELECOMMUNICATION UNION
AFBC(2) **RARC FOR THE PLANNING OF VHF/UHF TELEVISION BROADCASTING IN THE AFRICAN BROADCASTING AREA AND NEIGHBOURING COUNTRIES**
SECOND SESSION, GENEVA November-December 1989

Document DL/11-E
21 November 1989
Original: English

COMMITTEE 5

INFORMATION NOTE

The calculation of usable field strength, as applied during the Conference does not take into account the following aspects:

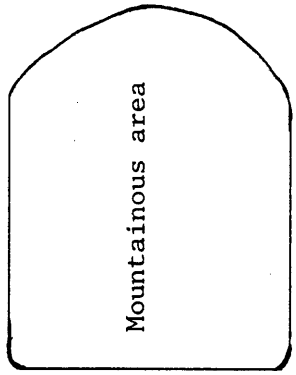
- cross polarization;
- directivity of reception antennas;
- influence of topography on propagation.

Consequently, the interfering field strength due to a proposed new assignment may be over-estimated and the calculated usable field strength of an assignment in the Plan may also be over-estimated.

In example 1, the interfering field strength due to a proposed modification is over-estimated. Consequently, although the calculated increase in usable field strength is greater than 0.5 dB, the proposed modification is acceptable.

In example 2, the usable field strength of the assignment in the Plan is over-estimated. Consequently, although the calculated increase of usable field strength is less than 0.5 dB, the proposed modification causes interference which might be unacceptable.

Example 1: The interfering field strength is over-estimated



A
x

Assignment in the Plan
Usable field strength: 70 dB(μV/m)

B
x

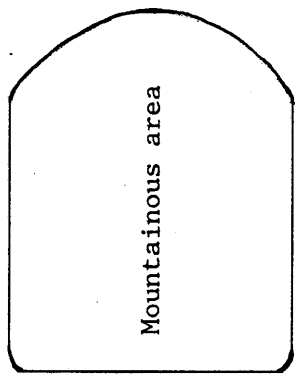
Proposed new assignment
Calculated interfering
field strength: 100 dB(μV/m)

Interfering field strength taking into account the topography: 50 dB(μV/m)

Example 2: The usable field strength is over-estimated

C
x

New assignment:
interfering field strength: 80 dB



A
x

Assignment in the Plan
Calculated Eu: 122 dB(μV/m)

B
x

First interferer
in the Plan: interfering
field strength: 122 dB

Actual Eu taking into account topography: 68 dB(μV/m)

D.F. MATAVIRE
Chairman of Committee 5

AFBC(2) INTERNATIONAL TELECOMMUNICATION UNION
RARC FOR THE PLANNING OF VHF/UHF TELEVISION BROADCASTING IN THE AFRICAN BROADCASTING AREA AND NEIGHBOURING COUNTRIES
SECOND SESSION, GENEVA November-December 1989

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21 November 1989
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COMMITTEE 5

SUGGESTED TEXT TO BE ADDED TO DOCUMENT DT/9

4.2.7 of Article 4 of the Agreement

"d) inform the administrations identified in a) above of the increase in the usable field strength to any of its assignments in the Plan which results from the proposed modification to the Plan. Such information shall only be sent when the increase exceeds the limits given in paragraph [4.3.7.1]. For those administrations identified under a) above and not having any assignments identified by these calculations, the Board shall also inform them that there are no assignments affected. A copy of these calculations shall also be sent to the administration proposing the modification to the Plan."

As an alternative to the above the following text could be considered:

"d) inform the administrations identified in a) above of its assignments in the Plan for which the interfering field strength, calculated at the site, from the proposed modification exceeds the reference usable field strength given in paragraph [3.4 of Annex 2 (Document 47)]. For those administrations identified under a) above and not having any assignments identified by these calculations, the Board shall also inform them that there are no assignments affected. A copy of these calculations shall also be sent to the administration proposing the modification to the Plan."

If the second alternative is agreed, then the following text could be considered for paragraph 4.3.7.1:

"4.3.7.1 a television broadcasting station, it should normally accept the proposed modification if the interfering field strength does not exceed the appropriate reference usable field strength given in paragraph [3.4 of Annex 2 (Document 47)]."

D.F. MATAVIRE
Chairman of Committee 5

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS
AFBC(2) **CARR CHARGÉE DE LA PLANIFICATION DE LA RADIODIFFUSION TÉLÉVISUELLE EN ONDES MÉTRIQUES ET DÉCIMÉTRIQUES DANS LA ZONE AFRICAINE DE RADIODIFFUSION ET PAYS VOISINS**
SECONDE SESSION, GENÈVE Novembre-Décembre 1989

Document DL/13-F/E/S
28 novembre 1989

COMMISSION 5
COMMITTEE 5
COMISION 5

Projet/Draft/Proyecto

TABLEAUX DES DISTANCES LIMITES DE COORDINATION (km)/ TABLES OF COORDINATION DISTANCE LIMITS (km)/ CUADROS DE DISTANCIAS LIMITE DE COORDINACIÓN (km)

Président de la Commission 5
Chairman of Committee 5
Presidente de la Comisión 5
D.F. MATAVIRE

Annexe: 1
Annex:
Anexo:

TABLEAU/TABLE/CUADRO I

Bande/Band/Banda 47 - 68 MHz

Distances limites de coordination (km)/Coordination distance limits (km)/Distancias límite de coordinación (km)

	Puissance apparente rayonnée/Effective radiated power/Potencia radiada aparente																	
	100 kW			10 kW			1 kW			100 W			10 W			1 W		
Hef / Z	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200
1	600	640	710	490	530	600	380	420	490	280	310	380	170	210	290	100	130	200
2	410	450	500	320	360	410	240	280	340	180	210	270	130	160	220	90	120	170
3	480	510	560	380	420	480	290	340	390	210	260	330	140	190	270	85	120	210
4	1 900	1 900	1 900	1 480	1 480	1 480	930	1 010	1 070	560	620	690	360	400	470	220	260	330
A	2 320	2 320	2 320	1 900	1 900	1 900	1 480	1 480	1 480	930	1 010	1 070	560	620	690	360	400	470
B	2 100	2 100	2 100	1 690	1 690	1 690	1 240	1 260	1 280	720	780	860	450	500	570	290	330	390
C/C1	3 000	3 000	3 000	2 500	2 500	2 500	1 900	1 900	1 900	1 290	1 290	1 290	750	750	750	470	470	470

Hef.: Hauteur équivalente de l'antenne (m)/Effective antenna height (m)/Altura efectiva de la antena (m)

Z: Zone de propagation/Propagation zone/Zona de propagación

TABLEAU/TABLE/CUADRO II

Bande/Band/Banda 174 - 254 MHz

Distances limites de coordination (km)/Coordination distance limits (km)/Distancias límite de coordinación (km)

	Puissance apparente rayonnée/Effective radiated power/Potencia radiada aparente																				
	200 kW			100 kW			10 kW			1 kW			100 W			10 W			1 W		
Hef / Z	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200
1	560	590	660	530	560	630	420	450	520	310	340	410	200	240	310	120	150	230	60	90	160
2	370	410	460	350	380	440	270	300	360	200	230	290	140	180	230	100	130	190	60	90	140
3	440	470	530	410	440	500	320	360	420	230	280	340	160	210	280	100	140	230	60	90	170
4	1 730	1 730	1 730	610	1 610	1 610	410	1 160	1 190	650	720	790	410	460	530	260	300	360	130	180	250
A	2 100	2 100	2 100	2 000	2 000	2 000	1 600	1 600	1 600	1 110	1 160	1 190	650	720	790	410	460	530	260	300	360
B	1 900	1 900	1 900	1 800	1 800	1 800	1 400	1 400	1 400	840	900	980	520	560	640	330	370	440	190	240	300
C/C1	2 900	2 900	2 900	2 700	2 700	2 700	2 100	2 100	2 100	1 470	1 470	1 470	780	780	780	540	540	540	360	360	360

Hef.: Hauteur équivalente de l'antenne (m)/Effective antenna height (m)/Altura efectiva de la antena (m)

Z: Zone de propagation/Propagation zone/Zona de propagación

TABLEAU/TABLE/CUADRO III

Bande/Band/Banda 470 - 582 MHz

Distances limites de coordination (km)/Coordination distance limits (km)/Distancias límite de coordinación (km)

	Puissance apparente rayonnée/Effective radiated power/Potencia radiada aparente																				
	500 kW			100 kW			10 kW			1 kW			100 W			10 W			1 W		
Hef / Z	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200
1	380	430	520	310	350	450	220	250	330	130	180	240	80	130	180	50	80	140	30	50	100
2	280	310	370	230	260	320	170	200	260	120	160	210	80	120	170	50	80	130	30	50	100
3	290	340	400	240	290	350	180	220	290	130	170	230	80	120	180	50	80	140	30	50	100
4	1 500	1 500	1 500	1 360	1 360	1 360	1 110	1 110	1 110	870	870	870	650	650	650	460	460	460	300	300	300
A	1 750	1 750	1 750	1 600	1 600	1 600	1 360	1 360	1 360	1 110	1 110	1 110	870	870	870	650	650	650	460	460	460
B	1 650	1 650	1 650	1 490	1 490	1 490	1 240	1 240	1 240	990	990	990	760	760	760	550	550	550	370	370	370
C/C1	1 900	1 900	1 900	1 740	1 740	1 740	1 490	1 490	1 490	1 230	1 230	1 230	990	990	990	760	760	760	550	550	550

Hef.: Hauteur équivalente de l'antenne (m)/Effective antenna height (m)/Altura efectiva de la antena (m)

Z: Zone de propagation/Propagation zone/Zona de propagación

TABLEAU/TABLE/CUADRO IV

Bande/Band/Banda 582 - 862 MHz

Distances limites de coordination (km)/Coordination distance limits (km)/Distancias límite de coordinación (km)

	Puissance apparente rayonnée/Effective radiated power/Potencia radiada aparente																				
	500 kW			100 kW			10 kW			1 kW			100 W			10 W			1 W		
Hef / Z	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200
1	330	370	460	260	300	380	170	210	280	100	150	210	60	100	160	40	60	120	25	50	90
2	240	280	340	200	230	290	150	180	240	100	130	190	60	100	150	40	65	120	25	50	90
3	260	300	370	210	250	320	160	190	260	110	150	210	60	100	160	35	65	120	20	20	90
4	1 400	1 400	1 400	1 200	1 200	1 200	990	990	990	760	760	760	550	550	550	370	370	370	230	230	230
A	1 650	1 650	1 650	1 480	1 480	1 480	1 240	1 240	1 240	990	990	990	760	760	760	550	550	550	370	370	370
B	1 500	1 500	1 500	1 360	1 360	1 360	1 110	1 110	1 110	870	870	870	650	650	650	460	460	460	300	300	300
C/C1	1 750	1 750	1 750	1 600	1 600	1 600	1 360	1 360	1 360	1 110	1 110	1 110	870	870	870	650	650	650	450	450	450

Hef.: Hauteur équivalente de l'antenne (m)/Effective antenna height (m)/Altura efectiva de la antena (m)

Z: Zone de propagation/Propagation zone/Zona de propagación

AFBC(2)

INTERNATIONAL TELECOMMUNICATION UNION
RARC FOR THE PLANNING OF VHF/UHF TELEVISION BROADCASTING IN THE AFRICAN BROADCASTING AREA AND NEIGHBOURING COUNTRIES
SECOND SESSION, GENEVA November-December 1989

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30 November 1989
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PLENARY MEETING

ANNEX 2

[CHAPTER 2]

Propagation in the VHF/UHF bands

The following text is to be inserted under paragraph 2.1.2.2 in Document 59, page B.3/1:

2.1.2.2 Geographical division

Zone 1: Temperate and subtropical (continental) regions, exhibiting propagation conditions found over land in Europe and North America.

Zone 2: Desert regions, exhibiting propagation conditions found in regions having low humidity and small annual variations in climate.

Zone 3: Equatorial regions, exhibiting propagation conditions found in hot and humid climates.

Zone 4: Maritime regions, representing warm seas and terrestrial zones of low altitude bordering warm seas, where superrefraction conditions occasionally obtain (all the seas around the African continent are Zone 4 except Zones A and B designed below).

Zone A: Maritime zone at low latitudes, frequently displaying superrefractivity for which the propagation curves applicable to Zone 4 should be used with a correction factor of +10 dB, under the condition that the resulting field strength will not exceed the value calculated for free space propagation by more than 6 dB.

Zone B: Maritime zone at low latitudes, frequently displaying superrefractivity for which the propagation curves applicable to Zone 4 should be used with a correction factor of +5 dB, under the condition that the resulting field strength will not exceed the value calculated for free space propagation by more than 6 dB.

Zone C: Maritime zone within the area extending from the Shatt-al-Arab up to and including the Gulf of Oman, which persistently displays extreme superrefractivity.

For 50% of the time and for all frequency bands, the propagation curves applicable to Zone 4 should be used with a correction factor of 15 dB under the condition that the resulting field strength will not exceed the value calculated for free space propagation.

At VHF and for 1% of the time, the propagation curve for Zone 4 for an effective antenna height of 150 m should be used with a correction factor of 15 dB under the condition that the resulting field strength will not exceed the value calculated for free space propagation.

At UHF and for 1% of the time the following formula
$E = (106.9 - 20 \log d - 0.012d)$ should be used under the condition that the resulting field strength will not exceed the value calculated for free space propagation.

Zone C1: Coastal land area surrounding Zone C, which persistently displays extreme superrefractvity and ducting. This zone can extend up to 100 km from the coastal line [and defined in Annex ...].

For 50% of the time and for all frequency bands, the propagation curves applicable to Zone 1 and Zone 2, should be used according to the relevant path conditions.

At VHF and for 1% of the time, the field strength results from averaging the two field strengths calculated as follows:

- the curve for an effective antenna height of 150 m, both for Zone 1 and for Zone 2, should be used.

At VHF and for 1% of the time, the field strength results from averaging the following two values:

- the field strength value given for an effective antenna height of 150 m both for Zone 1 and Zone 2;

- the field strength value given for an effective antenna height of 150 m applicable to Zone 4 and corrected by a factor of 15 dB under the condition that the value thus obtained will not exceed the free space propagation value.

At UHF and for 1% of the time, the following formula should be used:
(a) $E = 106.9 - 20 \log d - 0.1d$.

[In bilateral negotiations between concerned administrations, the following formula may also be used: (b) $E = 106.9 - 20 \log d - 0.025d$.]

Figures [2.26] and [2.27], together with their associated text as appears on the pages B.3/29 and B.3/30 in Document 59 (English version) are to be replaced with the figures and associated text as annexed herewith.

Annexes: 1/1, 1/2

ANNEX 1/1

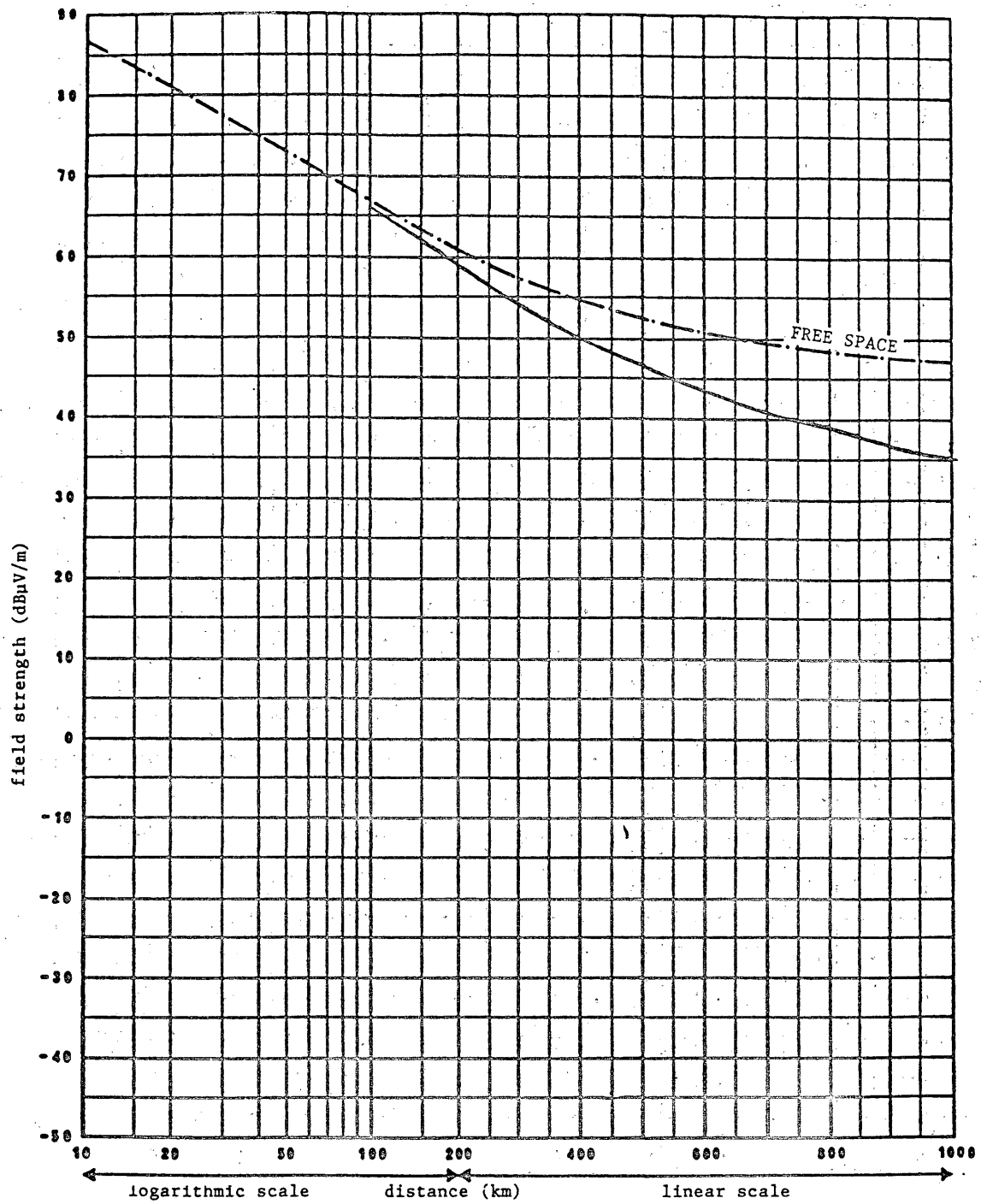

FIGURE [2.26]

(E = 106.9 - 20 log d - 0.012d)

Propagation curve for the broadcasting service for the Gulf within the area extending from the Shatt-al-Arab up to and including the Gulf of Oman (Zone: C)

Field strength (dB(μV/m)) for 1 kW e.r.p.

Frequency: 450 to 1 000 MHz;
1% of the time; 50% of the locations; h_2 = 10 m

ANNEX 1/2

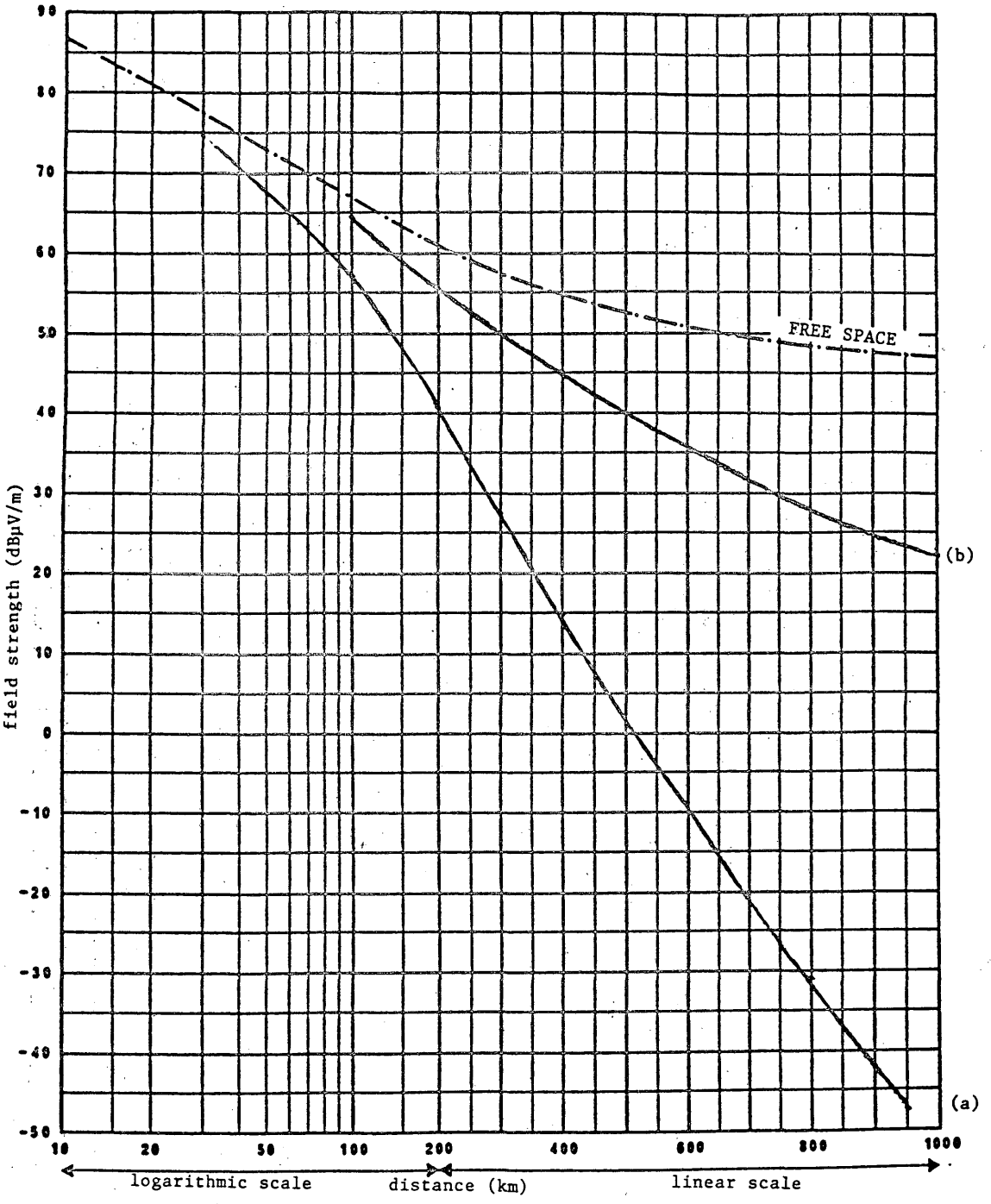

FIGURE [2.27]

(a) (E_a = 106.9 - 20 log d - 0.100d)
(b) (E_b = 106.9 - 20 log d - 0.025d)

Propagation curves for the broadcasting service for the Gulf Coastal Land Area surrounding Zone C (Zone C1)

Field strength (dB(μV/m)) for 1 kW e.r.p.

Frequency: 450 to 1 000 MHz;
1% of the time; 50% of the locations; h_2 = 10 m

INTERNATIONAL TELECOMMUNICATION UNION
AFBC(2) **RARC FOR THE PLANNING OF VHF/UHF TELEVISION BROADCASTING IN THE AFRICAN BROADCASTING AREA AND NEIGHBOURING COUNTRIES**
SECOND SESSION, GENEVA November-December 1989

Document DL/15-E
1 December 1989
Original: English

PLENARY MEETING

NOTE FROM THE CHAIRMAN OF THE CONFERENCE

The Board was asked to comment on the question as to whether this Conference can include in the Agreement provisions which would permit one administration to use in a portion of its territory different technical criteria from those contained in the Agreement.

After considering this matter, the Board is of the view that this Conference could agree to include in the Agreement such provisions provided the conditions of such use are also included in the Agreement.

A possible approach would be to include in the appropriate part of the Agreement a provision such as:

> "Stations in Iran north of [ ] may use different technical criteria from those contained in Annex 2 on the condition of providing the same protection to the Plan as provided for in the Agreement."

C.T. NDIONGUE
Chairman of the Conference

AFBC(2)

INTERNATIONAL TELECOMMUNICATION UNION
RARC FOR THE PLANNING OF VHF/UHF TELEVISION BROADCASTING IN THE AFRICAN BROADCASTING AREA AND NEIGHBOURING COUNTRIES
SECOND SESSION, GENEVA November-December 1989

Document DL/16-E
5 December 1989
Original: English

PLENARY MEETING

NOTE FROM THE CHAIRMAN OF THE CONFERENCE

After discussion in Plenary of Document DL/15, the Board was requested to prepare a document giving a specific suggestion as to how the principle contained in that document could be included in the Agreement.

The following is the proposal that I received:

- add a 1) after the text of paragraph 2.2 of the Agreement;

- add the following text at the bottom of the page:

"For the Administration of the Islamic Republic of Iran, stations located north of the line connecting the points:

(44E00,39N00), (47E00,36N00), (47E00,35N00), (53E30,29N00)
(55E00,28N00), (57E30,29N00), (59E00,27N00), (63E00,26N00)

may use different technical criteria from those contained in Annex 2 of the Agreement, on the condition that any stations using these technical criteria provide the same protection to the Plan as confirmed by the IFRB with reference to the criteria contained in Annex 2."

INTERNATIONAL TELECOMMUNICATION UNION
AFBC(2) **RARC FOR THE PLANNING OF VHF/UHF TELEVISION BROADCASTING IN THE AFRICAN BROADCASTING AREA AND NEIGHBOURING COUNTRIES**
SECOND SESSION, GENEVA November-December 1989

Document DL/17-E
6 December 1989
Original: French/Spanish

PLENARY MEETING

Note by the Chairman of the Conference

COORDINATION DISTANCE TABLES

(Annex 4, Chapter 1)

The following coordination distance tables for zones 4, A, B, C and C1 are the outcome of discussions between the Delegation of Spain, the Chairman of the Technical Working Group of the Plenary and the IFRB, pursuant to the decision taken at the seventh Plenary Meeting.

C.T. NDIONGUE
Chairman of the Conference

TABLE I

Coordination distance limits

	Effective radiated power																	
	100 kW			10 kW			1 kW			100 kW			10 W			1 W		
Hef / Z	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200
4	1 050	1 050	1 050	830	870	950	630	670	750	450	490	560	300	330	410	170	205	290
A	1 150	1 150	1 150	1 050	1 050	1 050	900	960	1 070	640	700	800	430	470	580	240	290	410
B	1 100	1 100	1 100	1 000	1 000	1 000	760	810	880	540	590	670	360	400	490	200	240	340
C	1 500	1 500	1 500	1 200	1 200	1 200	1 050	1 050	1 050	850	850	850	550	550	550	410	410	410
C1	1 000	1 000	1 000	820	820	820	650	650	650	490	490	490	360	360	360	240	240	240

TABLE II

Coordination distance limits

	Effective radiated power																				
	200 kW			100 kW			10 kW			1 kW			100 W			10 W			1 W		
Hef / Z	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200
4	1 100	1 100	1 100	910	950	1 030	720	750	820	520	550	630	350	390	460	220	250	330	120	150	230
A	1 300	1 300	1 300	1 200	1 200	1 200	1 050	1 050	1 050	830	900	970	560	620	730	350	400	530	190	240	370
B	1 200	1 200	1 200	1 150	1 150	1 150	900	940	1 020	650	710	780	440	490	570	270	310	410	150	190	290
C	1 600	1 600	1 600	1 400	1 400	1 400	1 200	1 200	1 200	950	950	950	600	600	600	450	450	450	410	410	410
C1	930	930	930	880	880	880	700	700	700	540	540	540	400	400	400	280	280	280	170	170	170

TABLE III

Coordination distance limits

Zone	Effective radiated power																				
	500 kW			100 kW			10 kW			1 kW			100 W			10 W			1 W		
Hef / Z	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200
4	1 300	1 300	1 300	1 100	1 100	1 100	900	900	900	750	750	750	650	650	650	460	460	460	300	300	300
A	1 400	1 400	1 400	1 350	1 350	1 350	1 100	1 100	1 100	900	900	900	750	750	750	650	650	650	460	460	460
B	1 350	1 350	1 350	1 200	1 200	1 200	1 000	1 000	1 000	800	800	800	700	700	700	550	550	550	370	370	370
C	1 500	1 500	1 500	1 400	1 400	1 400	1 200	1 200	1 200	1 000	1 000	1 000	800	800	800	700	700	700	400	400	400
C1	590	590	590	530	530	530	440	440	440	360	360	360	280	280	280	210	210	210	140	140	140

TABLE IV

Coordination distance limits

Z	Hef	Effective radiated power																				
		500 kW			100 kW			10 kW			1 kW			100 W			10 W			1 W		
	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200	75	300	1 200
4		1 200	1 200	1 200	1 000	1 000	1 000	800	800	800	650	650	650	550	550	550	370	370	370	230	230	230
A		1 300	1 300	1 300	1 200	1 200	1 200	1 000	1 000	1 000	800	800	800	650	650	650	550	550	550	370	370	370
B		1 250	1 250	1 250	1 100	1 100	1 100	900	900	900	700	700	700	600	600	600	460	460	460	300	300	300
C		1 400	1 400	1 400	1 250	1 250	1 250	1 100	1 100	1 100	900	900	900	700	700	700	500	500	500	270	270	270
C1		540	540	540	480	480	480	400	400	400	320	320	320	240	240	240	170	170	170	110	110	110

UNION INTERNATIONALE DES TÉLÉCOMMUNICATIONS
AFBC(2) **CARR CHARGÉE DE LA PLANIFICATION DE LA RADIODIFFUSION TÉLÉVISUELLE EN ONDES MÉTRIQUES ET DÉCIMÉTRIQUES DANS LA ZONE AFRICAINE DE RADIODIFFUSION ET PAYS VOISINS**
SECONDE SESSION, GENÈVE Novembre-Décembre 1989

Document DL/18-FES
7 décembre 1989

1. Page R.3/2, remplacer le 1er paragraphe de la "Zone C" par le paragraphe suivant :

Zone maritime qui va de la jonction de la ligne côtière de l'Iran avec sa frontière avec le Pakistan à l'ouest le long de la ligne côtière de l'Iran, l'Iraq, en passant par le point 48E 30N, le long de la ligne côtière du Koweit, de la ligne côtière orientale de l'Arabie saoudite, du Qatar, des Emirats arabes unis et d'Oman jusqu'à son intersection avec le parallèle 22N.

2. Page R.3/3, remplacer le 1er paragraphe de la "Zone C1" par le suivant :

Bande de territoire d'une largeur maximale de 100 km entourant la Zone C.

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1. Page R.3/2, replace 1st paragraph of "Zone C" by:

Maritime area from the junction of the coastline of Iran with its border to Pakistan westward along the coastline of Iran, Iraq, through point 48E 30N, along the coastline of Kuwait, eastern coastline of Saudi Arabia, Qatar, United Arab Emirates and Oman down to its intersection with parallel 22N.

2. Page R.3/3, replace 1st paragraph of "Zone C1" by:

Landstrip of maximum depth of 100 km surronding Zone C.

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1. Página R.3/2, sustitúyase el primer párrafo de "Zona C" por el siguiente:

Zona marítima que se extiende desde la intersección de la costa de Irán con su frontera hasta la parte occidental de Pakistán, siguiendo la costa de Irán, Iraq a través del punto 48E 30N, a lo largo de la costa de Kuwait, la costa oriental de Arabia Saudita, Qatar, Emiratos Arabes Unidos y Omán, hasta su intersección con el paralelo 22N.

2. Página R.3/3, sustitúyase el primer párrafo de "Zona C1" por el siguiente:

Faja de tierra de 100 km como máximo que rodea a la Zona C.
