INTERNATIONAL TELECOMMUNICATION UNION

Radiocommunication Bureau
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Revision 1 to
Circular Letter
CCRR/43

30 June 2011

To Administrations of Member States of ITU

Subject: Draft Rules of Procedure

To the Director-General

Dear Sir/Madam,

Please find enclosed proposals for the addition and modification of some Rules of Procedure (Edition of 2009) related to the Regional Agreement concerning the use by the broadcasting service of frequencies in the medium frequency bands in Regions 1 and 3 and in the low frequency bands in Region 1 (Geneva 1975). The Board discussed the draft Rules of Procedure circulated with Circular Letter CCRR/43 and the comments received from administrations at its 57th meeting and decided to circulate the revised version (in Annex) for further comment.

In accordance with No. **13.17** of the Radio Regulations, these proposals are made available to administrations for comment before being submitted to the RRB pursuant to No. **13.14**. As indicated in No. **13.12A** *d)* of the Radio Regulations, any comments that you may wish to submit should reach the Bureau not later than **3 October 2011**, in order to be considered at the 58th meeting of the RRB, scheduled from 31 October to 4 November 2011. All e-mail comments should be sent to: brmail@itu.int.

Yours faithfully,

François Rancy
Director, Radiocommunication Bureau

Annex: 1

Distribution:

– Administrations of Member States of ITU
– Members of the Radio Regulations Board
– Director and Heads of Department of the Radiocommunication Bureau

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Annex 1

PART A3

Rules concerning the Regional Agreement concerning the use by the broadcasting service of frequencies in the medium frequency bands in Regions 1 and 3 and in the low frequency bands in Region 1 (Geneva, 1975) (GE75)

Art. 4

Procedure for modification to the Plan

An. 2

Technical data used in the preparation of the Plan and to be used in the application of the Agreement

CHAPTER 1

Definitions

Low-power channel (LPC)

Channel used by medium frequency broadcasting stations employing a maximum e.m.r.p. of 1 kW (c.m.f. of 300 V) for analogue modulation or 0.22 kW (c.m.f. of 140 V) for digital modulation.

Reasons: to take into account the maximum allowed e.m.r.p. for frequency assignments using digital modulation that would result in the same coordination distance as frequency assignments using analogue modulation. The maximum e.m.r.p. and c.m.f. values for digital assignments are 6.6 dB below those of analogue assignments because the co-channel protection ratio for analogue interfered with by digital is 6.6 dB greater than that for analogue interfered with by another analogue assignment.

4.1

4.1   NOC

4.2   NOC

4.3   NOC

MOD

4.4   *Protection ratios:* In applying the Agreement, the values of the co-channel and adjacent channel protection ratios given below should be used unless otherwise agreed between the administrations concerned. In the case of fluctuating wanted or unwanted signals, the values of the protection ratio apply for at least 50% of the nights of the year at midnight.

However, Resolution 8 of the Regional Administrative Conference (Regions 1 and 3) for drawing up frequency assignment plans for LF and MF broadcasting (Geneva, 1975) states:

"1.   that broadcasting stations may provisionally use bandwidth saving modulation methods on condition that interference in the same or adjacent channels concerned does not exceed the interference resulting from the application of double sideband modulation with full carrier (A3E);

2.   that any administration which envisages using these methods of emission shall seek the agreement of all affected administrations by following the procedure specified in Article 4 of the Agreement.".

After consideration of the relevant ITU-R studies, the Board decided that an analogue modulated frequency assignment ~~for AM broadcasting~~ in the Plan may ~~provisionally~~ be ~~used~~ notified to be recorded in the Master International Frequency Register (MIFR) with digital modulation (transmission ~~types DRM[1] A2 or B2~~system Digital Radio Mondiale[2], robust mode A and B and spectrum occupancy type 2), provided the radiation is reduced by at least 6.6 dB in all directions, compared to the radiation of the ~~AM~~ analogue ~~modulated~~ frequency assignment in the Plan.

The power of the transmitter to be notified in case of digital modulation shall be the total power within the necessary bandwidth.

The Board further decided that in the application of Article 4 of the Agreement the protection ratios between analogue and digital assignments (transmission system Digital Radio Mondiale, robust mode A and B and spectrum occupancy type 2) and digital and digital assignments in Part B Section B7 shall be used.

~~In the examination of the probability of interference from notices related to assignments using digital modulation, the Bureau shall use a co-channel protection ratio increased by 7 dB, and an adjacent channel protection ratio increased by 1 dB compared to the one applicable to the interfered transmitter.~~

~~When the proposed assignment using digital modulation is recorded into the Plan following the application of Article 4, it shall bear a symbol indicating that the recording is provisional. The reference situation shall be determined as if it were an AM transmission using an audio-frequency modulating signal of 4.5 kHz and a high degree of compression.~~

> *Reasons:* It is proposed that the provisional nature of the implementation of a frequency assignment using analogue modulation in the Plan by a frequency assignment using digital modulation in the Master International Frequency Register be reconsidered and submitted for approval by a next competent conference.
>
> The modification concerning the protection ratios takes into account the specific protection criteria for the relevant cases as provided in ITU-R Recommendation BS.1615, which have been modified to provide this information subsequent to the approval of this Rule of Procedure.
>
> The suppression of the provisional status in the Plan of frequency assignments using digital modulation would ensure that the modification of frequency assignments using analogue modulation to digital modulation would retain the same status and rights as the original assignment recorded in the Plan.

4.5

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[2]   The Digital Radio Mondiale system is described in Recommendation ITU-R BS.1514

MOD

4.5 *Minimum Value of Field Strength*

4.5.1 The following minimum values of field strength necessary to overcome natural noise (at 1 MHz) for frequency assignments using analogue modulation in the three zones A, B and C have been adopted:

Zone A: + 60 dB/1µVm

Zone B: + 70 dB/1µVm

Zone C: + 63 dB/1µVm

For frequency assignments using digital modulation the minimum field-strength values in Part B Section B7 shall be used.

> *Reasons:*. to take into account the minimum field-strength values -to be protected for assignments using digital modulation. The title of the Section 4.5 and the following texts applicable to analogue frequency assignments are kept as adopted by the Regional Radiocommunication Conference 1975.

> **4.8.3**

MOD

4.8.3 In the application of Article 4 (paragraph 3.3.1) of the Agreement, the table reproduced below will be used:

c.m.f. (V)		e.m.r.p. (kW)		Limiting distance (km)
Analogue modulation	**Digital modulation**	**Analogue modulation**	**Digital modulation**	
300	140	1.0	0.22	600
260	122	0.75	0.16	500
212	99	0.5	0.11	400
150	70	0.25	0.055	200, 300*
95	44	0.1	0.022	70, 250*
67	31	0.05	0.011	50, 200*

* Values for a propagation path over sea.

NOTE – The corresponding coordination distances for frequency assignments using digital modulation were obtained by reducing the e.m.r.p. by 6.6 dB, which represents the worst-case increase in protection ratios for the case of assignments using digital modulation interfering with assignments using analogue modulation compared with the cases of assignments using analogue modulation interfering mutually.

> *Reasons:* to take into account the equivalent maximum e.m.r.p. values for assignments using digital modulation that would result in the same coordination distances of assignments using analogue modulation.

PART B

SECTION B7

Rules concerning the protection ratio values and minimum field strength values to be used in the case of digital modulation transmission systems when applying the provisions of Article 4 of the GE75 Regional Agreement

1.   Introduction

This attachment provides the protection ratios and the minimum field strength values in the presence of intrinsic receiver noise alone for the various interference cases where digital modulation transmission systems are used. The values of the protection ratios are given in Recommendation ITU-R BS.1615. Only the cases involving the DRM transmission system and robustness modes A and B and spectrum occupancy type 2 are considered.

2.   RF protection ratios

Protection ratios are provided only for the cases of co-channel and the first adjacent channel interference that are considered by the Agreement .

Table 2.1 provides the relative protection ratios for the case of analogue transmission systems interfered with by systems using digital transmission systems. It should be noted that these values are for analogue systems using a high degree of modulation compression and audio bandwidth of 4.5 kHz (Case D in Section 4.4.2.1 of the Agreement). These values should be adjusted to provide protection ratio values for the cases in 4.4.1 and 4.4.2.1 the Agreement for the co-channel and adjacent channel cases according to the different degrees of modulation compression and audio bandwidth (Cases A to D in Section 4.4.2.1 of the Agreement).

Table 2.1

Relative RF protection ratios (dB) for analogue modulation system interfered with by digital modulation system

Wanted signal	Unwanted signal	Frequency separation, $f_{unwanted} - f_{wanted}$ (kHz)			Parameters	
					B_{DRM} (kHz)	A_{AF} [1],[2] (dB)
		−9	0	9		
AM	DRM_A2	−29.8	6.6	−29.8	9	−
AM	DRM_B2	−29.7	6.5	−29.7	9	−

[1] The RF protection ratio for analogue interfered with by digital can be calculated by adding a suitable value for the AF protection ratio according to a given case to the values in Table 2.1.
[2] The values presented in this table refer to the specific case of high degree of modulation compression and audio bandwidth of 4.5 kHz (Case D). The modulation depth, associated with high degree of modulation compression, has been assumed for the analogue signal. In order to offer adequate protection to analogue

signals with normal degree -of compression, each value in Table 2.1 should be increased to accommodate the difference between normal and high degree of modulation compression.

Tables 2.2 and 2.3 provide the relative RF protection ratios for cases of digital modulation transmission systems interfered with by analogue modulation transmission systems or by digital modulation transmission systems. These tables have been prepared for the DRM transmission system using robustness modes A and B and spectrum occupancy type 2, 64-QAM and protection level number 1.

In order to obtain the applicable RF protection ratio for a specific case, the relevant S/I value from Tables 2.2 and 2.3 should be added to the relative protection ratio along with the relevant S/I correction value from Table 2.4 in order to make provision for systems using a different modulation and protection level.

Table 2.2

Relative RF protection ratios (dB) for digital modulation system (64-QAM, protection level No. 1) interfered with by analogue modulation system

Wanted signal	Unwanted signal	Frequency separation, $f_{unwanted} - f_{wanted}$ (kHz)			Parameters	
					B_{DRM} (kHz)	S/I (dB)
		−9	0	9		
DRM_A2	AM	−34	0	−34	9	6.7
DRM_B2	AM	−33.7	0	−33.7	9	7.3

Table 2.3

Relative RF protection ratios (dB) for digital modulation systems (64-QAM, protection level No. 1) interfered with by digital modulation (identical robustness modes and spectrum occupancy types)

Wanted Signal	Unwanted signal	Frequency separation, $f_{unwanted} - f_{wanted}$ (kHz)			Parameters	
					B_{DRM} (kHz)	S/I (dB)
		−9	0	9		
DRM_A2	DRM_A2	−38.3	0	−38.3	9	15.3
DRM_B2	DRM_B2	−38.1	0	−38.1	9	15.9

Table 2.4

S/I correction values to be used in Tables 2.2 and 2.3 for other combinations of modulation scheme and protection level No.

Modulation scheme	Protection level No.	Average code rate	Correction values (dB) for DRM robustness mode/spectrum occupancy type	
			A2 (9 kHz)	B2 (9 kHz)
16-QAM	0	0.5	–6.7	–6.6
	1	0.62	–4.6	–4.6
64-QAM	0	0.5	–1.2	–1.2
	1	0.6	0.0	0.0
	2	0.71	1.8	1.8
	3	0.78	3.4	3.4

2.1 Examples of calculating an RF protection ratio

In order to obtain the relevant RF protection ratio to be used in a specific case it is required to identify the system which is being interfered with. Select from Table 2.2 or 2.3 the relevant relative RF protection ratio and S/I value according to the wanted system transmission type. Adjust the S/I value to the specific wanted transmission type variant and add the relative protection value to this adjusted value.

Example 1.: A system with robustness type A2 on an upper adjacent channel interferes with a system of robustness type A2, 16-QAM and protection level 1:

RF protection ratio = relative RF protection + S/I + S/I$_{corr}$
= -38.3 + 15.3 – 4.6 = -27.6 dB

Example 2: A system of robustness type A2 on an upper adjacent channel interferes with a system of robustness type B2, 64-QAM and protection level 3:

RF protection ratio = relative RF protection + S/I + S/I$_{corr}$
= -38.1 + 15.9 + 3.4 = -18.8 dB

3. Minimum field strength values

Table 3.1 provides the minimum field strength values in the presence of intrinsic receiver noise alone to achieve a BER of 1×10^{-4} for DRM transmission modes A2 and B2 and different modulation schemes and protection levels for the cases of ground wave and ground wave in the presence of sky-wave, and for MF and LF bands.

These values take into account receiver noise and sensitivity and should normally be adjusted by taking into account man-made and natural noise, however in the absence of such values and in accordance with 4.7 of chapter 4 of Annex 2 of GE75, when such values are not readily available the minimum field strength values can be used.

Table 3.1

Minimum field strength (dB(µV/m)) to achieve a BER of 1×10^{-4} for DRM robustness modes and spectrum occupancy types A2 and B2 and different modulation schemes and protection levels for the case of ground-wave propagation and ground-wave in the presence of sky-wave propagation

Modulation scheme	Protection level No.	Average code rate	Minimum field strength (dB(µV/m))				
			Ground-wave (MF)		Ground-wave and sky-wave (MF)		Ground-wave (LF)
			A2 (9 kHz)	B2 (9 kHz)	A2 (9 kHz)	B2 (9 kHz)	A2 (9 kHz)
16-QAM	0	0.5	33.1	33.8	33.9	34.7	39.1
	1	0.62	35.2	35.8	37.0	37.6	41.2
64-QAM	0	0.5	38.6	39.2	39.4	40.1	44.6
	1	0.6	39.8	40.4	40.8	41.4	45.8
	2	0.71	41.6	42.2	43.7	44.2	47.6
	3	0.78	43.2	43.8	46.5	46.8	49.2

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