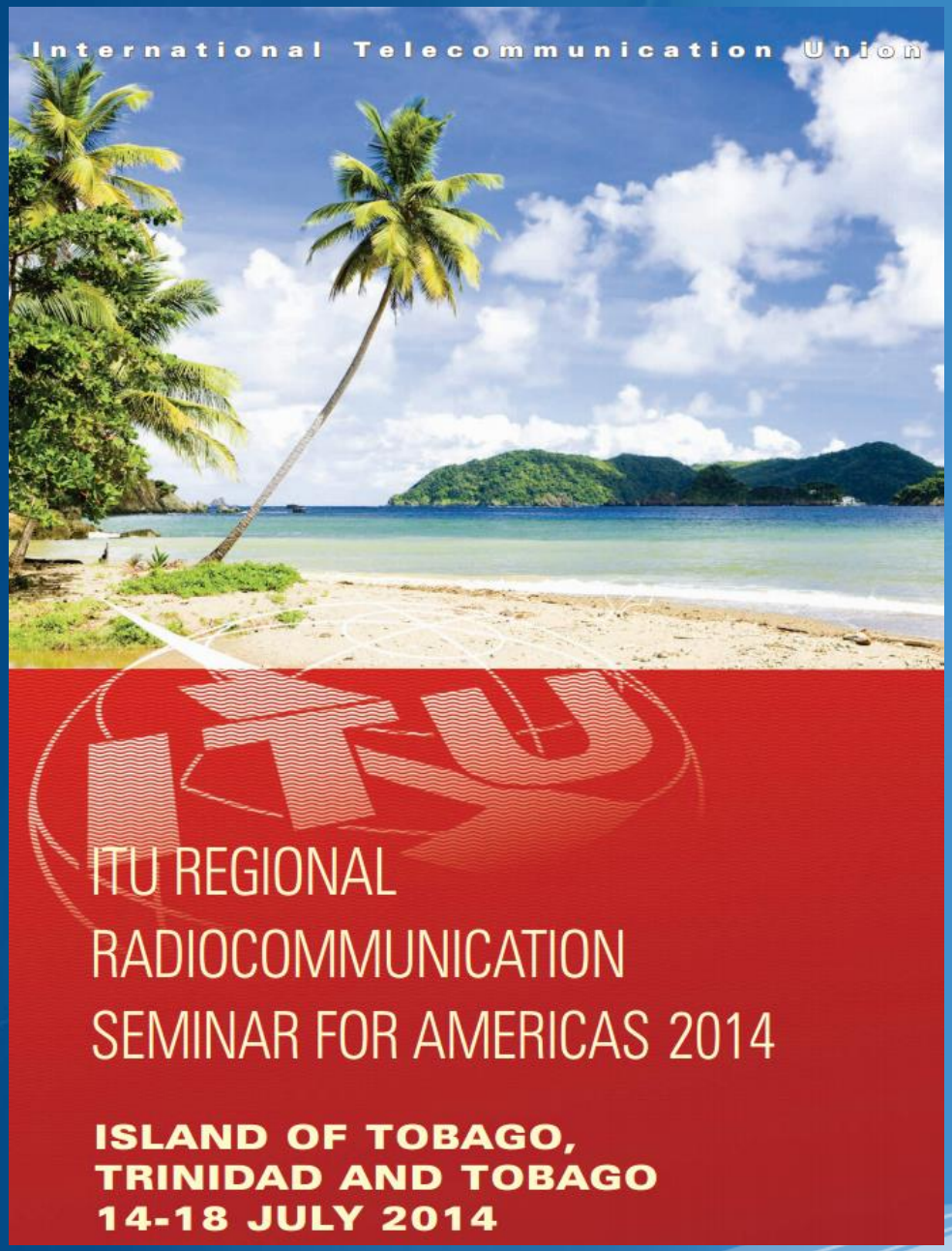

RJ81 and RJ88 Terrestrial Broadcasting Plans

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Outline

- Overview of bands allocated to terrestrial broadcasting in the MF bands in Region 2
- RJ81 Broadcasting Agreement and Plan
- RJ88 Broadcasting Agreement and Plan
- Open issues and future developments

MF Bands Allocated to Broadcasting

Table of Frequency Allocations (RR 5)

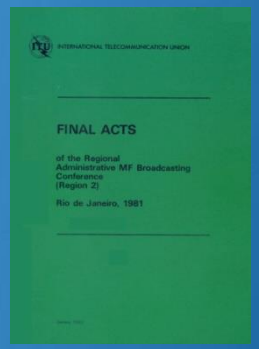
Allocation to services
Region 2
525-535 BROADCASTING 5.86 AERONAUTICAL RADIONAVIGATION
535-1 605 BROADCASTING
1 605-1 625 BROADCASTING 5.89 5.90
1 625-1 705 FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90

Broadcasting limited to low power stations:
- max. 1 kW daytime
- max. 250 W nighttime (RR 5.86)

MF Bands Allocated to Broadcasting (cont'd)

Table of Frequency Allocations (RR 5)

Allocation to services
Region 2
525-535 BROADCASTING 5.86 AERONAUTICAL RADIONAVIGATION
535-1 605 BROADCASTING
1 605-1 625 BROADCASTING 5.89 5.90
1 625-1 705 FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90



Band governed by the RJ81 Agreement

MF Bands Allocated to Broadcasting (cont'd)

Table of Frequency Allocations (RR 5)

Allocation to services
Region 2
525-535 BROADCASTING 5.86 AERONAUTICAL RADIONAVIGATION
535-1 605 BROADCASTING
1 605-1 625 BROADCASTING 5.89 5.90
1 625-1 705 FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90

FINAL ACTS

of the Regional Administrative Radio Conference to Establish a Plan for the Broadcasting Service in the Band 1 605 - 1 705 kHz in Region 2 Rio de Janeiro, 1988

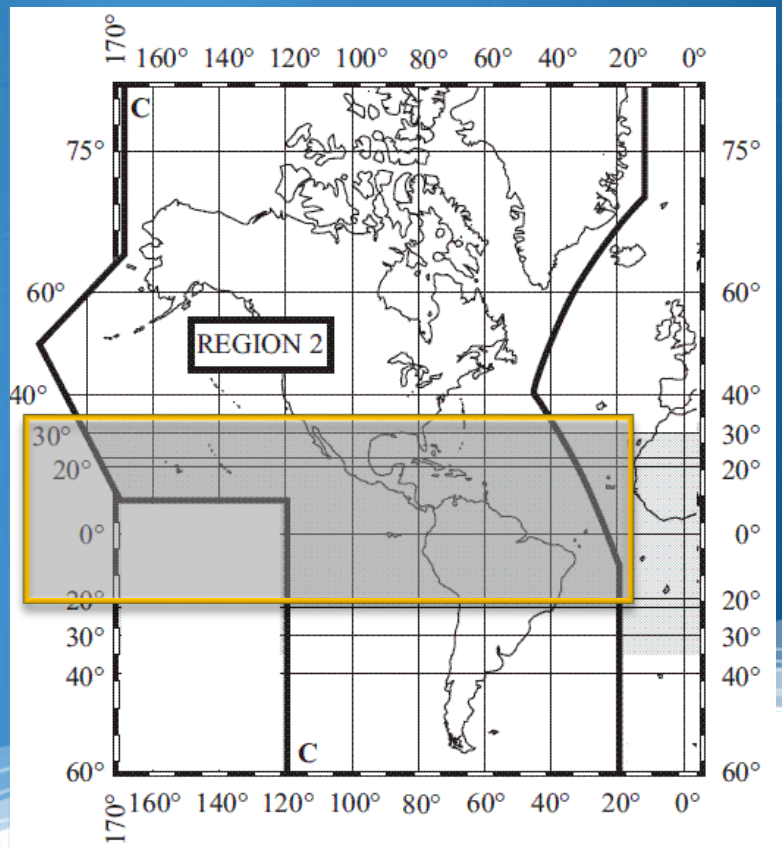
Bands governed by the RJ88 Agreement (RR 5.89)

MF Bands Allocated to Broadcasting (cont'd)

Allocation to services
Region 2
2 300-2 495
FIXED
MOBILE
BROADCASTING 5.113

Broadcasting in this band is restricted to the Tropical Zone, and station power is limited to max. 50 kW (RR 5.113, RR 23.5 – RR 23.10)

Table of Frequency Allocations (RR 5)



RJ81 Agreement and Plan

- RJ81 is an **assignment** Plan (frequency channel is assigned to a station in given location)
- Plan characteristics:

Band limits	535 – 1605 kHz	
Carrier frequencies	540, 550 … 1600 kHz 10 kHz channel spacing (up to 20 kHz is possible) 107 channels	
Class of emission	A3E: double-sideband Amplitude Modulation with full carrier	
Protection ratio	co-channel 1st adjacent channel 2nd adjacent channel	26 dB 0 dB -29.5 dB

- Three classes of stations:

Class	Coverage	Power limit
A	Extensive primary (ground-wave) and secondary (sky-wave) service area	100 kW (Day) 50 kW (Night)
B	Covers rural areas in its primary service area	50 kW (Day/Night)
C	Covers a city or town and contiguous suburban areas in its primary service area	1 kW (Day in Noise Zone 1) 5 kW (Day in Noise Zone 2) 1 kW (Night)

RJ81 Agreement and Plan (cont'd)

- References for planning and technical examination:

Eu (Nominal usable field strength)	Value of the minimum field strength to provide satisfactory reception
Protected contour	Set of points around a station where the ground- or sky-wave field strength = Eu
Protected value	Field strength value at a given point on the protected contour not to be exceeded by the interference (otherwise, objectionable interference occurs and protected assignment is considered to be affected)

- Statistics of Special Sections and the RJ81 Plan:

Special Section Number	BR IFIC	Date of Publication	Number of Notices in Part A	Number of Notices in Part B
RJ81/91	2768	29.04.2014	1	-
RJ81/90	2765	18.03.2014	-	1
RJ81/89	2759	10.12.2013	1	-
RJ81/88	2721	12.06.2012	-	504
RJ81/87	2698	12.07.2011	508	20
RJ81/86	2697	28.06.2011	-	158

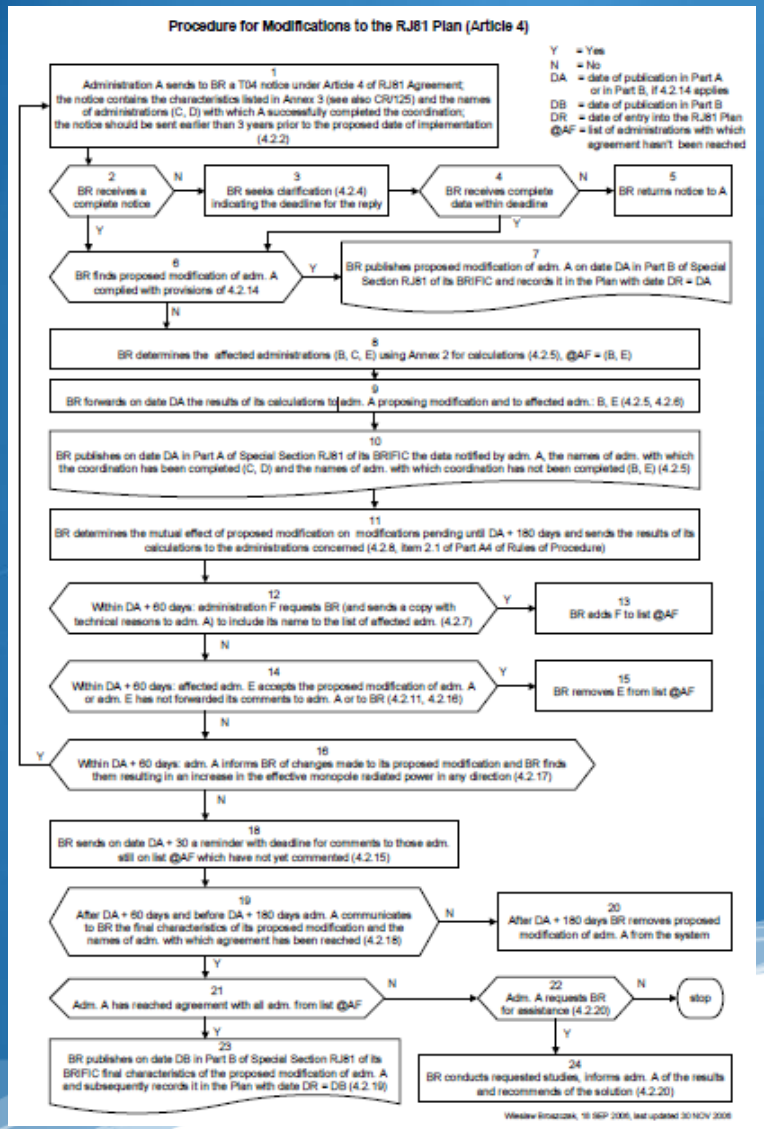
	Original Plan	Current Status
Daytime Operations	11347	12264
Nighttime Operations	8875	9905
Total	**20222**	**22169**

RJ81 Agreement and Plan (cont'd)

- Modification to the RJ81 Plan (regular procedure):
  1. Publication in Part A of Special Section RJ81:
     - Complete notified data and list of coordinated administrations
     - List of administrations considered to be affected
     - Deadline date for comments (no comment → agreement)
  2. If there are assignments already published in Part A and pending for less than 180 days, their mutual effect with respect to new proposed modifications is examined and the results communicated (i.e. the effect of a modification pending for more than 180 days is not considered)
  3. After the date for comments has passed, and if there are no objections, the administration may request publication of the notice in Part B of Special Section RJ81 (equivalent to entry into the Plan)
  4. If Plan assignments are not brought into service within five years of their entry into the Plan
     → cancellation (4.6 + RoP)

RJ81 Agreement and Plan (cont'd)

http://www.itu.int/ITU-R/terrestrial/broadcast/plans/rj81/flowchartsrj81/RJ81_Art4.pdf



RJ81 Agreement and Plan (cont'd)

- Modification to the RJ81 Plan (short procedure):
  - No agreement is required (4.2.14) for the modification of an existing Plan entry:
    - No change in frequency
    - No increase in radiation in any direction
    - Site change < 3 km or < 5% of the distance to nearest border (max. 10 km)
    - No ground-wave contour overlap

RJ81 Agreement and Plan (cont'd)

- Notification of an assignment to the MIFR:

1. BR publishes notified assignment in Part I of the BR IFIC

2. BR examines the assignment for conformity to the corresponding entry in the RJ81 Plan

3. If assignment is in CONFORMITY with the RJ81 Plan, the BR:
   - Publishes the notice in Part II of the BRIFIC
   - Records it in the MIFR with date of recognition equal to the date of receipt of complete notification

Otherwise, the BR:

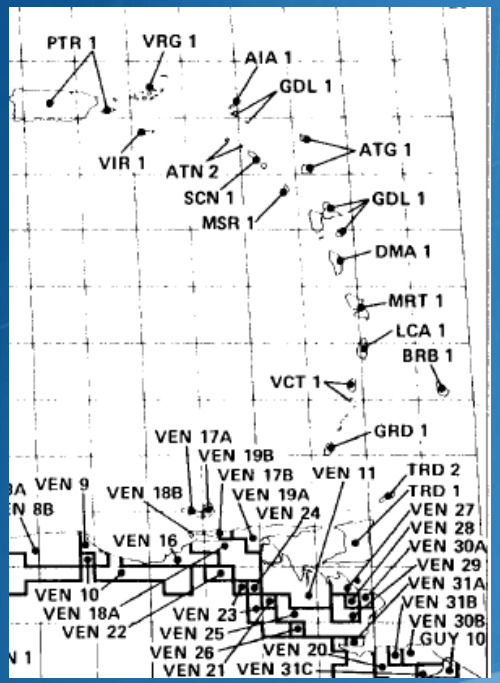
- Publishes the notice in Part III of the BR IFIC
- Returns the notice to the administration

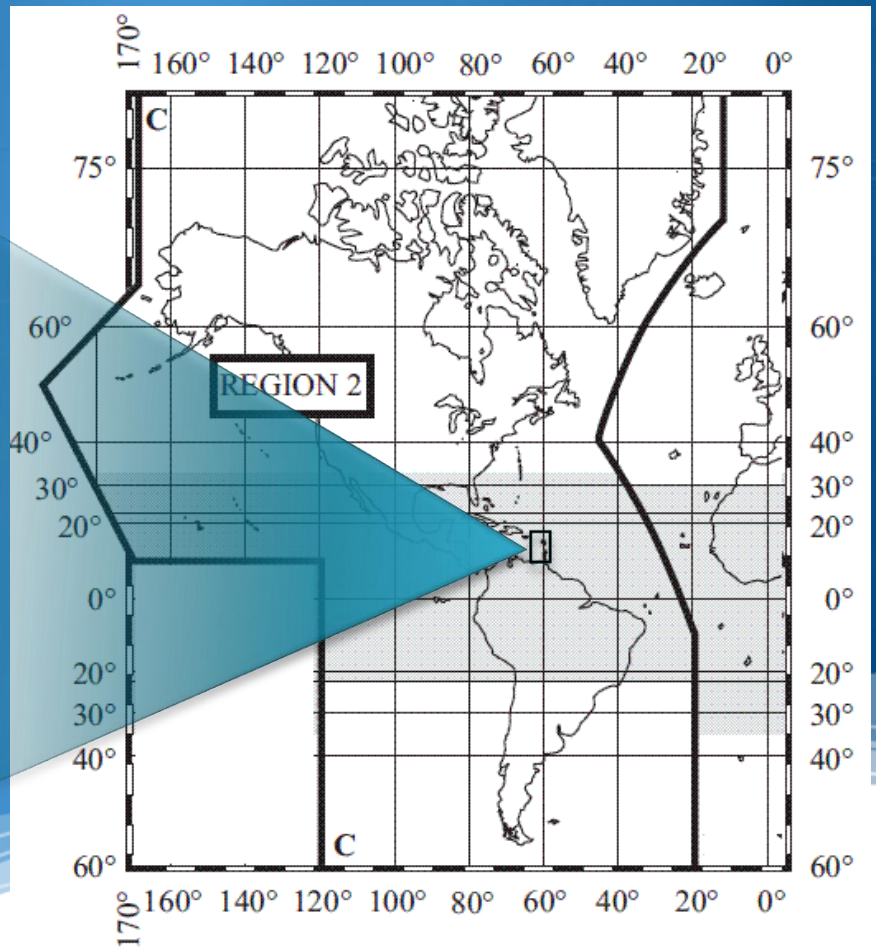
RJ88 Agreement and Plan

FINAL ACTS

of the Regional Administrative Radio Conference to Establish a Plan for the Broadcasting Service in the Band 1 605 - 1 705 kHz in Region 2 Rio de Janeiro, 1988

INTERNATIONAL TELECOMMUNICATION UNION





RJ88 Agreement and Plan (cont'd)

- RJ88 is an **allotment** Plan (frequency channels are allotted to a given allotment area)
- Plan characteristics:

Band limits	1605 - 1705 kHz	
Carrier frequencies	1610, 1620,... 1700 kHz 10 kHz channel spacing (up to 20 kHz is possible) 10 channels	
Class of emission	A3E: double-sideband Amplitude Modulation with full carrier (Other classes are allowed conditionally)	
Protection ratio	co-channel 1st adjacent channel 2nd adjacent channel	26 dB 0 dB -29.5 dB

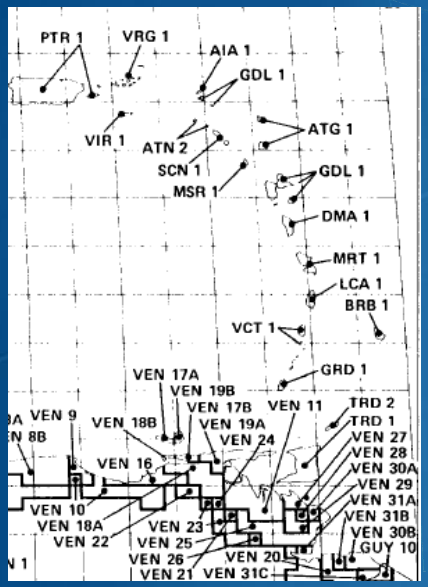
- Normalized station characteristics:

Eu (Nominal usable field strength)	310 mV/m at 1 km
Antenna height	Lambda/4 = 90 deg.
Power	1 kW

- Max. possible power: 10 kW

There has never been a request to modify the Plan under Article 4

The Plan is still as contained in Annex 4 of the Final Acts of the RJ88 Agreement



RJ88 Agreement and Plan (cont'd)

Col. No. 1:	*Allotment Area* : This column contains the symbol designating the country or the geographical area using symbols indicated in Table B1 of the Preface to the International Frequency List followed by the symbol number designating the allotment area given in Part B.
Col. No. 2:	*Allotment(s)* : This column contains the channel number(s) (see Table 1 showing channel number and corresponding frequencies to be assigned), which may be used for one or more assignments in the allotment area.
Col. No. 3:	*Remarks*.

(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
TRD 1	8		USA 6	10		VEN 7	1	
TRD 2	8		VCT 1	1	1/ BRB GRD LCA VEN	VEN 7	2	
URG 1	7		VCT 1	2		VEN 7	3	
URG 1	9		VEN 1	1		VEN 7	4	

1/: The use of this allotment is subject to the agreement of the administrations listed in this remark. However, such agreement is not required when the allotment is used with lower radiated power in the direction of the allotment area concerned, in such a way that the limits specified in Section 3 of Annex 2 are met.

2/: The use of this allotment beyond 17.5 km from the border concerned with the administration listed in the Remarks column does not require the agreement of the listed administration.

3/: The use of this allotment is not subject to first adjacent channel coordination with the administration listed in the Remarks column.

RJ88 Agreement and Plan (cont'd)

- Notification of an assignment to the MIFR:

1. BR publishes notified assignment in Part I of the BR IFIC

2. BR examines the assignment for conformity to the corresponding allotment in the RJ88 Plan

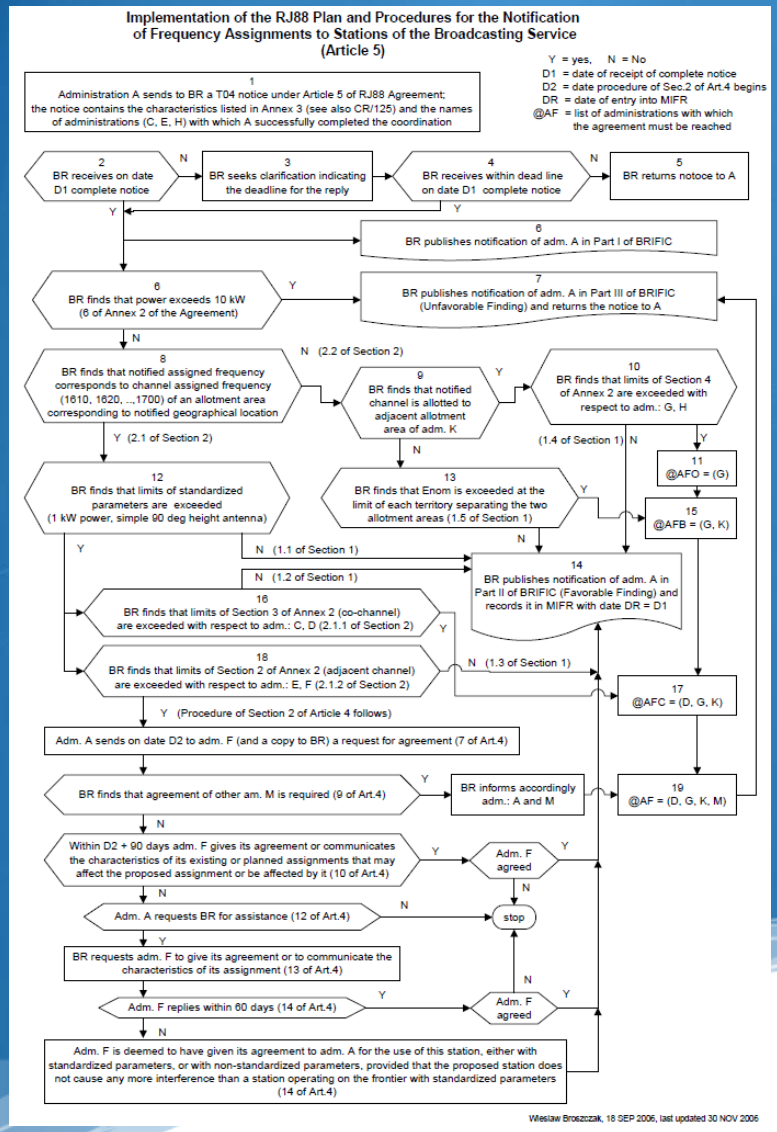
3. If assignment is in CONFORMITY with the RJ88 Plan, the BR:
   - Publishes the notice in Part II of the BRIFIC
   - Records it in the MIFR with date of recognition equal to the date of receipt of complete notification

Otherwise, the BR:

- Publishes the notice in Part III of the BR IFIC
- Returns the notice to the administration

RJ88 Agreement and Plan (cont'd)

http://www.itu.int/ITU-R/terrestrial/broadcast/plans/rj88/flowchartsrj88/RJ88_Art5.pdf



RJ88 Agreement and Plan (cont'd)

- In Region 2, frequency band 1625 – 1705 kHz is also allocated on a primary basis to FIXED and MOBILE services
- Notification and use of fixed and mobile services in this shared band must take into account allotments and assignments to the broadcasting service
- Applicable regulations:
  - Article 7 and Resolution 1 of RJ88 Agreement
  - Part A7 of Rules of Procedure

RJ88 Agreement and Plan (cont'd)

- Since the entry into force of the RJ88 Agreement, two administrations (Paraguay and USA) have notified a total of 84 broadcasting assignments for recording in the Master International Frequency Register under Art. 5

Open Issues and Future Developments

- RJ81 List B
- Introduction of digital modulation
- Update and review of RJ81 and RJ88

RJ81 List B

- The RJ81 Plan consists of two separate lists (see Resolution 2 of the Agreement):
  - List A: includes assignments whose caused and received interference are both accepted
  - List B: includes all the assignments which are not included in List A
- Resolution 2 “strongly urges administrations whose stations appear in List B to make every effort to resolve the incompatibilities relating to their stations as quickly as possible”

RJ81 List B (cont'd)

- At the end of the conference there were a total of 1203 entries in List B (day-time + night-time)
- As of July 2014, there are still 912 entries (177 daytime and 735 night-time) in List B
- Assignments can be moved from List B to List A following the procedure in Annex 2 to Res. 2 (see also RoP Part A4)

Introduction of Digital Modulation

- ITU-R Question 60/6 (1995-1999):
  Digital broadcasting at frequencies < 30 MHz
- ITU-R Recommendation BS.1514-2 (2001-2011)
  - Digital Radio Mondiale (DRM) (see also ITU-R Rec. BS.1661)
  - In-band on-channel (IBOC) DSB
- Other relevant recommendations:
  - ITU-R P.1321 (1997-2009) – Propagation factors affecting systems using digital modulation at LF and MF
  - ITU-R BS.1615 (2003-2011) – Planning parameters for DSB < 30 MHz

Introduction of Digital Modulation (cont'd)

- BR Circular Letter CCRR/20 (2002):
  - Analyzing whether RJ81 and RJ88 allow for digital modulation:
  - RJ81:
    - RoP not possible → new conference is needed
  - RJ88:
    - DRM: Mode A3 or B3 may be implemented if conditions of Annex 2 are satisfied
    - IBOC DSB (hybrid or full digital): RoP may be possible after completion of studies on protection ratios

Introduction of Digital Modulation (cont'd)

- ITU-R Question 120/6 (2006):
  "What are the necessary technical conditions which would allow the introduction of digitally modulated emissions in the RJ81 Agreement?"
- ITU-R Report BS.2144 (2009):
  Planning parameters and coverage for Digital Radio Mondiale (DRM) broadcasting at frequencies below 30 MHz
  - Reconfirming the conclusions of CCRR/20

Introduction of Digital Modulation (cont'd)

- ITU-R Report BT.2295 (12/2013): Digital terrestrial broadcasting systems
  - Covers also DRM and IBOC
- ITU-R Report BT.2140 (2008-04/2014): Transition from analogue to digital terrestrial broadcasting
  - Covers also DRM and IBOC

Introduction of Digital Modulation (cont'd)

- Study Group 6: Broadscating service
  - Working Party 6A: Terrestrial broadcasting delivery
- Output from Apr 2014 meeting:
  - Working document towards a preliminary draft mew report ITU-R BS.[DSB-TRANSITION]: Implementation considerations for the transition to digital terrestrial sound and multimedia broadcasting
- WP6A next meeting: 10-20 Nov 2014

Update and Review of RJ81 and RJ88

- CITEL Permanent Consultative Committee II: Radiocommunications including Broadcasting
  - Working Group on Broadcasting is tasked, i.a., with discussing the update and review of the RJ81 and RJ88 agreements

Update and Review of RJ81 and RJ88 (cont'd)

- August 2012 meeting: PCC.II adopted RES. 83 (XIX-12):
  - Establish rapporteurship on updating and revision of RJ81 and RJ88, to allow for gradual transition from analogue to digital
  - Send questionnaire to administrations: calculation criteria, updated maps of ground conductivity, software, proposals
  - Request technical assistance from Terrestrial Services Department of the BR

Update and Review of RJ81 and RJ88 (cont'd)

- April 2013 meeting: PCC.II decided to:
  - Ask administrations to complete the questionnaire from RES. 83 (XIX-12) by end of August 2013
  - Include additional questions:
    - Practical problems with enforcing RJ81 and RJ88 agreements
    - Priorities for the update and review from each administration's point of view
- As of March 2014, replies received from: ARG, B, CAN, CHL, CLM, DOM, EQA, GTM, MEX and PRG

Update and Review of RJ81 and RJ88 (cont'd)

- March 2014 meeting of PCC.II:
  - A special session was organized on the RJ81 and RJ88 Plans, with remote participation and presentations by BR from Geneva
  - Demonstration of BR software tools and web application specially developed to assist administrations in the technical studies concerning the eventual revision of the RJ81 and RJ88 Plans
- Next meeting: 29 Sept - 3 Oct in México, D.F.

Final Remarks

- MF broadcasting in Region 2 is mostly governed by two regional agreements and plans: RJ81 and RJ88
- In the case of RJ81 (10 times as many channels and 10 times greater max. transmitter powers than RJ88) it is not possible to implement digital broadcasting without revising the agreement
- Activities are on-going:
  - ITU-R Study Group 6 Working Party 6A: Introducing digital modulation for broadcasting in the MF bands
  - CITEL PCC.II Working Group on Broadcasting: Updating and revising the two Agreements and Plans, to enable a gradual transition to digital broadcasting
- Administrations are strongly encouraged to participate actively in these groups
- The BR is offering assistance in this process, including developing software tools

Thank you for your attention!

ITU – Radiocommunication Bureau
Questions to brmail@itu.int