

# Relevant ITU Regional Agreements and Radio Regulations that govern the introduction of terrestrial digital broadcasting

**ITU-D Regional Development Forum for the Arab Region: "Access to spectrum, including broadcasting services – trends and technologies"**

**(Tunis, 1-3 June 2009)**



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BR/TSD/BCD



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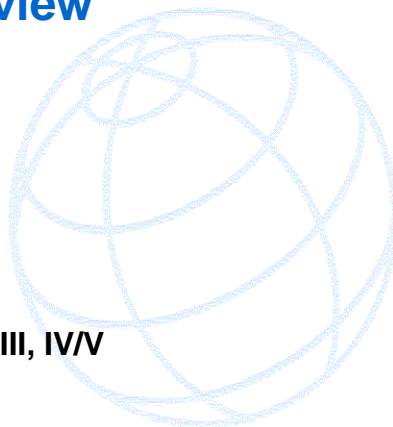


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## RR and Agreements that govern digital BS

### Overview

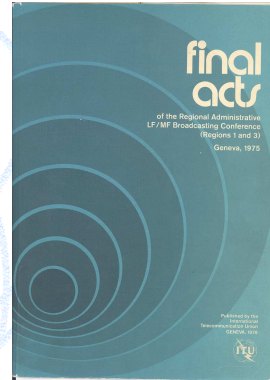
- LF/MF
- HFBC
- Band II
- Bands III, IV/V





## RR and Agreements that govern digital BS

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## RR and Agreements that govern digital BS

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### GE75 Plan



Regions 1 and 3



## Frequency bands – GE75

- LF: 148.5-283.5 kHz in Region 1
  - 15 channels , 9kHz spacing
- MF: 526.5-1606.5 kHz Region 1&3
  - 120 channels, 9kHz spacing
  - 3 low power channels (< 1kW)
    - 1485, 1584 and 1602 kHz



## LF and MF bands

Bands (kHz)	R1	R3
148.5-283.5		
526.5-1605		
1605-1606.5		



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### Protection criteria – GE75

- Co-channel
  - 30 dB - stable
  - 27 dB - fluctuating
  - 8 dB – synchronized
- Adjacent channel
  - 0, 5, 7 and 9 dB – depending on degree of compression and bandwidth



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### Affected assignments – GE75

- Usable (Eu) FS increased by 0.5 dB or more above Eu-ref
- Eu-ref: Eu when assignment entered the Plan.
- Calculation points: on the boundary of the service area.



## LPC Procedure – GE75

- Notify ADM identifies potential affected – distance to the nearest border
- Notify ADM seeks agreements
- Notify ADM submits notice to BR
- BR publishes in Part B => Plan



## Introduction of Digital transmission

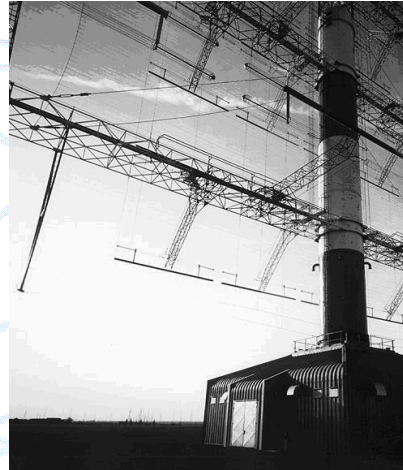
- Rule of Procedure (RRB)
  - Transmission systems DRM A2 and B2
  - Radiation reduced by at least 7 dB in all directions w.r.t analogue assignment
  - Temporary measure until the decision from a competent conference



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### HFBC (Art. 12)



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### Planning Procedure for HFBC Art 12 of RR

- Introduction
  - Adopted by the World Radiocommunication Conference 1997 (WRC-97).
  - In force since 1999.



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## RR and Agreements that govern digital BS

### Main Principles

- Equal access to the HF bands
- Equitable treatment of national and international requirements
- Efficient use of the spectrum
- Minimise incompatibilities



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### Frequency bands

- Current block allocation situation - bands between **5 900 kHz and 26 100 kHz**
- New band as of 30 March 2009:
  - 7 350 kHz – 7 450 kHz.
  - Circular letter CR/282.



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### Current frequency ranges:

- Band 6: 5900-6200
- Band 7: 7100-7300\*
- Band 7: 7300-7350\*\*
- Band 9: 9400-9900
- Band 11: 11600-12100
- Band 13: 13570-13870
- Band 15: 15100-15800
- Band 17: 17480-17900
- Band 18: 18900-19020
- Band 21: 21450-21850
- Band 25: 25670-26100

\* Regions 1 and 3 only

\*\* Band 7 extended to 7 450 kHz (30 Mar 2009 – CR/282)



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### Main features

- Coordination between administrations:
  - Bilateral and multilateral
  - Regional Coordination Groups
- Coordination on a common technical base
- Administrations may authorise broadcasters or other organisations to coordinate on their behalf





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### Introduction of digital HFBC

- **12.7** § 6 ..Other modulation techniques recommended by ITU-R shall be permitted in place of double-sideband or single-sideband emissions, provided that the level of interference caused to existing emissions is not increased.



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### Management

- Two seasonal periods:
  - "Summer" – Season A
  - "Winter" – Season B
- Two seasonal schedules: A and B

**Season A:**

From the last Sunday of March to the last Sunday of October

**Season B:**

From the last Sunday of October to the last Sunday of March

Implementation: 0100 UTC



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### Who can notify?



- Administrations
- Authorised organisations:
  - Broadcasters.
  - Frequency managers.
- Administrations must advise the BR (in writing):
  - Name of the authorised organisation.
  - Scope of the authorisation.



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### How to notify?

- The common electronic format of the requirement file must be used.
- Submissions:
  -  Email: [brmail@itu.int](mailto:brmail@itu.int).
  -  Floppy 3.5-inch.

*ITU -Radiocommunication Bureau  
Place des Nations  
CH-1211 Genève 20, Switzerland*



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### What to notify?

- Complete schedule for season
- When no amendments – inform BR without submitting schedule
- Common ASCII text format
- Annex 1 and Annex 2 – CR/285



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### When to notify?

- Circular letter to administrations:
  - November – for Season A
  - May – for Season B
- 4 months before the Start Date:
  - End of December – for Season A
  - End of July – for Season B
- Any time during the season – at least 2 weeks before final date



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### Season A09

Month	Schedule	End date for submission
January	A09T1	18/01/09
February	A09T2	15/02/09
March	A09S1	15/03/09
May	A09S2	17/05/09
July	A09S3	19/07/09
November	A09F	15/11/09



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### No schedule is submitted?

- The BR uses the requirements from the previous corresponding season
- **Once only!** Then requirements are suppressed from the schedule



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### How is the data published?

- On a CD-ROM (11 per year):
  - 2 Tentative Schedules (T1, T2)
  - 2 or 3 Schedules (S1, S2, S3)
  - Final Schedule (F)
- To subscribers only
- Contact ITU Sales and Marketing Service:
  - [sales@itu.int](mailto:sales@itu.int)
  - Sales and Marketing Service  
Places des Nations  
CH-1211 Genève 20,  
Switzerland



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### What does the CD-ROM contain?

- Updated seasonal schedule
- Propagation and compatibility analysis
- Latest versions of ITU HFBC software



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## Regional Coordination Groups



- **ABU-HFC** - Asia Pacific Broadcasting Union - High Frequency Conference



- **ASBU** - Arab States Broadcasting Union



- **HFCC** - High Frequency Coordination Conference



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## Assistance to administrations


- Application of the procedure
- HFBC software training
- Selection of suitable frequencies

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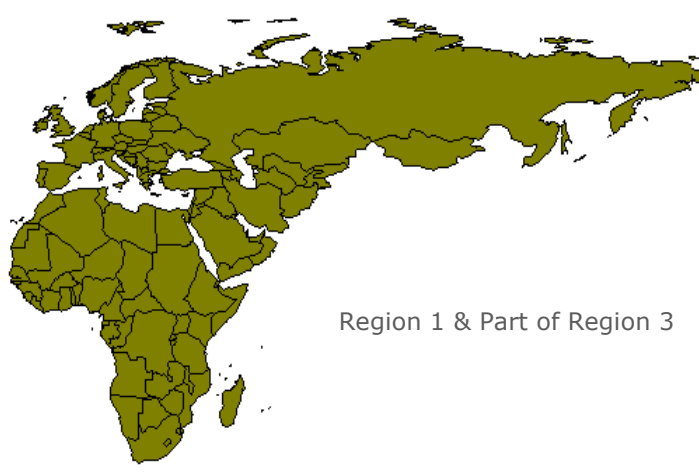


**Band II**

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### GE84 Planning Area



Region 1 & Part of Region 3



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### GE84 in summary

- In force 1 July 1987
- 51 168 frequency assignments
- 1 329 assignments in Appendix
  
- Frequency band: 87.5 – 108 MHz
  - 204 channels, 100 kHz spacing



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### Introduction of digital transmission

- Chapter 3 to Annex 2:  
Section 3.1:
  - Use of systems with different characteristics (e.g. digital modulation)
    - Does not cause greater interference
    - Nor require higher protection
  - than reference system in the Plan





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### Coordination requirements

- Other VHF-FM sound broadcasting service
- ST61 television assignments in band 87.5 – 100 MHz
- Fixed and mobile services
- Aeronautical radionavigation service above 108 MHz



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### Coordination with other sound broadcasting services

- Distance to nearest border < required coordination distances
  - ERP
  - Propagation Path (land, warm and cold seas and areas of super refractivity)
  - Tables 4.1- 4.4 of Chapter 1 of Annex 4 of the Agreement



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### Coordination with other television services

- Required coordination distances
  - Corrected ERP (Different PR depending on frequency separation between FM and television frequency carriers)
  - Propagation path
  - Tables 4.5 - 4.8 of Chapter 2 of Annex 4 of the Agreement



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### Coordination with aeronautical radionavigation services

- Distance to the nearest point on the boundary < 500 km



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### Coordination with land mobile and fixed services

- Field strength calculated at the nearest point on the boundary
- Limits of field strengths depend on
  - polarisation of the FM service



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### FM station – Agreement

- FM station should accept a modification if
  - Resulting  $E_u \leq 54 \text{ dB}\mu\text{V/m}$
  - Increased  $\leq 0.5 \text{ dB}$  relative to the reference  $E_u$  ( $E_u\text{-ref}$ )



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## Mobile station – Agreement

- 87.5-100 MHz in Region 3
- 104-108 MHz, in Region 1
- Except aeronautical mobile (OR)
- Interfering field strength
  - 18 dB $\mu$ V/m if FM polarisation H
  - 0 dB $\mu$ V/m if FM polarisation V or M



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## Fixed station – Agreement

- Interfering FS  $\leq$  0 dB $\mu$ V/m.



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## Land mobile – Agreement

- 87.5-88 MHz, in Region 1
- FM horizontal
  - 14 dB $\mu$ V/m for AM land mobile
  - 24 dB $\mu$ V/m for FM land mobile
- FM vertical
  - 6 dB $\mu$ V/m for AM land mobile
  - 16 dB $\mu$ V/m for FM land mobile



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## Assistance from BR

- Administration may request assistance in
  - Seeking agreement from another ADM
  - Applying any stage of the Article 4 procedure
  - Carrying out technical studies in relation to this procedure



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**Bands III, IV/V**



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### General aspects of GE06 Agreement

- Planning area: *Region 1 (parts of Region 1 situated to the west of meridian 170° E and to the north of parallel 40° S, except the territory of Mongolia) and in the Islamic Republic of Iran*
- Frequency Bands: 174-230 MHz and 470-862 MHz
- Plans: Digital BS GE06D, Analogue TV GE06A and OPS List GE06L



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### Modification of the broadcasting Plans

- Definition (§ 4.1 of Article 4):
  - Change characteristics of an allotment or assignment already in the Plans
  - Add an allotment or assignment to the Plans
  - Add an assignment stemming from an allotment to the digital Plan
  - Cancel (suppress) from the Plans an allotment or an assignment



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### Digital broadcasting Plan entries

PE Code	Description
1	One assignment only
2	Single Frequency Network (SFN)
3	One allotment only
4	Allotment with linked assignments and SFN_ids
5	Allotment with single linked assignment and no SFN identifier



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# Digital broadcasting Plan entries

Assignment code	Description
S	Single assignment
L	Linked assignment
C	Converted assignment



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## Technical criteria

### Television broadcasting

- Analogue television systems inherited from GE89 and ST61
- Digital television DVB-T standard
- System variants (assignments only)

		System variant designator														
Mod	QPSK					16-QAM					64-QAM					
8 MHz	A					B					C					
7 MHz	D					E					F					
FEC	1/2	2/3	3/4	5/6	7/8	1/2	2/3	3/4	5/6	7/8	1/2	2/3	3/4	5/6	7/8	
8 MHz	A1	A2	A3	A5	A7	B1	B2	B3	B5	B7	C1	C2	C3	C5	C7	
7 MHz	D1	D2	D3	D5	D7	E1	E2	E3	E5	E7	F1	F2	F3	F5	F7	





### Technical criteria

#### Television broadcasting

- Allotments using Reference Planning Configurations;
  - RPC1 – Fixed reception;
  - RPC2 – Portable outdoor and mobile reception;
  - RPC3 – Portable indoor reception;

•RPC - System variants relation (recommended only, source PXT):

	Modulation	Code rate	Reception mode
RPC1	64-QAM	2/3; 3/4; 5/6	Fixed
	QPSK	2/3	Fixed
RPC2	64-QAM	2/3	PO or MO (PI)
	16-QAM	2/3; 3/4	PO or MO
	QPSK	2/3	PO or MO
RPC3	16-QAM	2/3; 3/4	PI



### Technical criteria

#### Sound Broadcasting

- T-DAB system only
- Reference Planning Configuration as system variants
- Assignments and allotments
- RPC 4 – Mobile Reception
- RPC 5 – Portable Indoor Reception



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## RR and Agreements that govern digital BS

### Notification procedure

- Definition (§ 5.1 of Art. 5)
- Procedure in Section 2 of Annex 4 to GE06 Agreement
- Notification of one or more assignments for recording in MIFR (Art. 5)
- *Treatment of analogue television assignments (RoP)*



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## RR and Agreements that govern digital BS

### Provision 5.1.3

Use of a digital Plan entry:

- With technical characteristics different from in the Plan
- Conformity with the RR
- Peak power density in any 4 kHz not to exceed that of the Plan entry
- RoP Application of conformity examination procedure



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**Thank you**

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