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# Case Studies of Spectrum Management in Developing Countries:

## Sierra Leone & Zimbabwe

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# Presentation Outline

- Introduction: why case studies?
- Spectrum Management in Sierra Leone
- Spectrum Management in Zimbabwe
- Identified common problems
- Directions for addressing those problems

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# Why Case Studies?

- Case studies provide a structured way of looking at events or systems, collecting data, analysing information, and reporting the results
- The outcome is a sharpened understanding of how a system works and why it has developed in the way it has
- Also, the study can identify what might become important to look at more extensively in future research and what might be appropriate examples to be considered for application in other situations or environments

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# Areas considered

1) Country Background
2) National telecoms market
3) Legal Framework for Spectrum Management (**SM**)
4) Institutional structure for SM in a country
5) Spectrum Allocation: current situation and future trends
6) Frequency Assignment & Apparatus Licensing processes
7) Spectrum Pricing, Financing of SM Organisation
8) Spectrum Quality Control, Interference Management & Enforcement
9) Equipment Standardization and Type Approval matters
10) International/Cross-border Spectrum Planning
11) Stakeholder Participation in the SM Process
12) Research Collaboration with Institutions of Higher Education

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# Case Study I

Sierra Leone
November 2008

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# Sierra Leone: Background

- Area 71 740 km$^2$, two neighbours: Guinea, Liberia
- Population 6.3 Million
- Legacies of civil war
- Now firmly on the road of peaceful development
- Agriculture: 42% of GDP
- GDP: ca. 700 USD p.c.


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# Telecommunications Act (2006/2009)

- The Act specifies:
  - Setting up and duties of NATCOM
  - Duties of the Ministry of Information and Communication
    - Incl. establishing Radio Spectrum Committee
  - Rights and obligations of public network operators
  - Spectrum management assigned to NATCOM
  - Inter-institutional coordination and setting of strategic SM directions through Spectrum Committee under the Ministry

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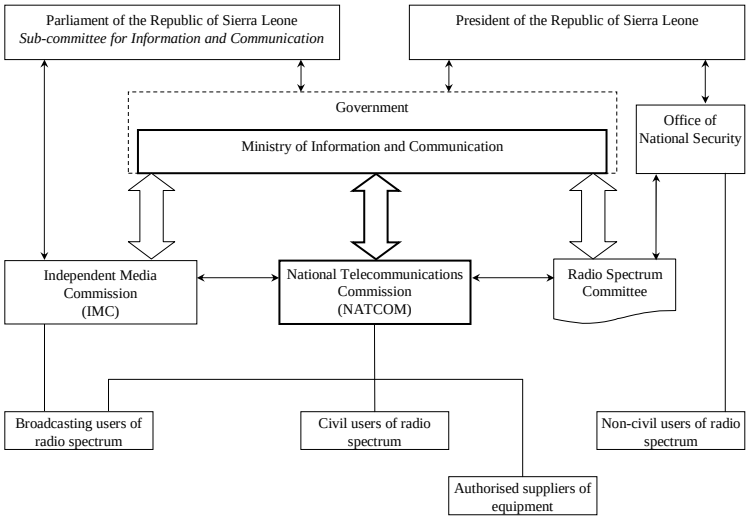
# Institutional structure for SM

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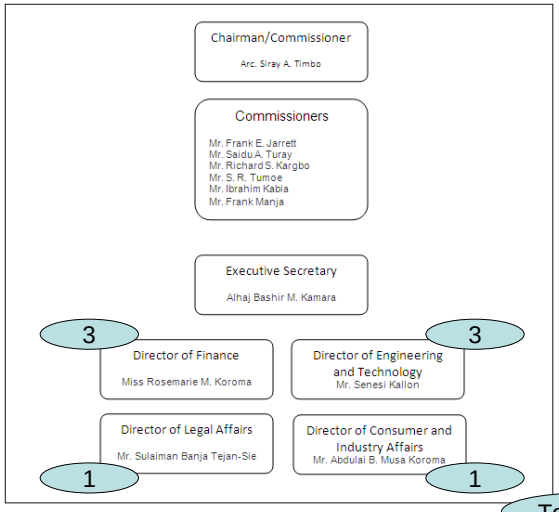
# SM Organisation: NATCOM

(Status 2008)

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# Spectrum Allocation

- National Frequency Allocation Table in draft form, not approved nor publicised
- No formal sharing/dividing spectrum between civil users and ”uniformed forces”
- Major uses:
  - Public Cellular (mixture of technologies from various regions)
  - FM radio broadcasting
  - VHF/UHF Private Mobile Radio
  - VSAT

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# Spectrum Quality Control

- No dedicated unit to deal with spectrum monitoring, hence only limited activities

- Originally very basic desktop equipment
- Monitoring van purchased recently


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# Case Study II

Zimbabwe

April 2009

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# Zimbabwe: Background

- Area 390,580 km$^2$
- Four neighbours: Botswana, Mozambique, South Africa, and Zambia
- Population near 14 Million
- Harare about 2.8 Million
- Surviving very difficult economic period


# Zimbabwe's Market

- PSTN 350,000 lines (penetration of around 3%)
- Six licensed ISPs (typically VSAT backbone): Internet penetration estimated at around 11%
- Broadcasting – only one broadcaster: state corporation ZBC (1 TV + 4 radio programmes)
- GSM penetration est. 1.7 million (ca. 12%)
- 3 active cellular networks, no plans for new operators
- BWA (WiMAX) networks expected soon

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# Postal and Telecommunications Act (2000)

- Besides the establishment of POTRAZ, the Act describes:
  - composition and functioning of the Board;
  - right of the Minister to give policy directions to the POTRAZ Board;
  - provisions for funding of POTRAZ through licensing fees;
  - sets out the types of licences and licensing procedures;
  - setting up and functioning of the Universal Service Fund;
  - other provisions related to regulation of telecommunications networks (interconnection, type approval matters and so on);
  - regulation of postal services, and
  - miscellaneous provisions (offences, etc)
  - i.e. NOT much about SM!

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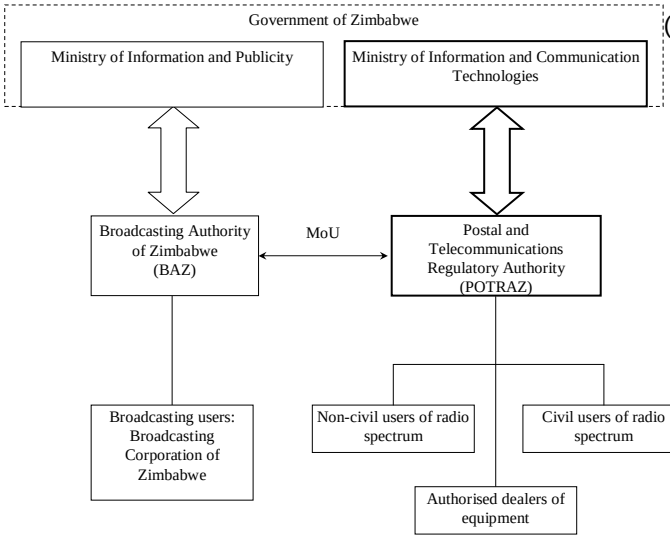
# Institutional structure for SM

(Status 2008)

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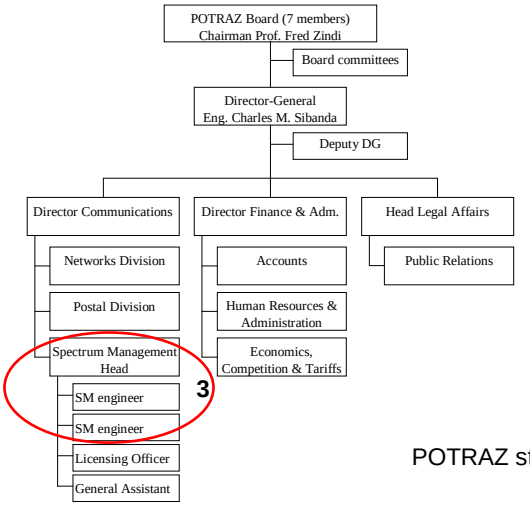
# SM Organisation: POTRAZ

(Status 2008)




POTRAZ staff total: 32

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# Spectrum Allocation

- There is no approved National Frequency Allocation Table
- Formal agreement with Broadcasting Authority on designation of broadcasting spectrum
- No formal sharing/dividing spectrum between civil users and ”uniformed forces”
- Major uses:
  - Public Cellular (GSM)
  - HF/VHF Private Mobile Radio
  - VSAT
  - Microwave links

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# Spectrum Quality Control

- Currently no dedicated staff to deal with spectrum monitoring, hence activities are random and very occasional
- Former extensive monitoring base built by monopoly PTT was abandoned for a while during liberalisation and is now not functional
- Currently only basic equipment functional, more handheld equipment purchased
- Purchase of more equipment to resuscitate activities of fixed monitoring station and at least one mobile monitoring vehicle is on the agenda of POTRAZ

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# Identified most critical problems

- inefficient or outright missing secondary legislation
- insufficient staffing of SM functions
- lack of proper enforcement
- insufficient publicity in developing major spectrum management policies
- lack of process automation

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# I. Secondary legislation

- Comprehensive set of secondary legislation is very important for smooth and transparent functioning of SM:
  - National Table of Frequency Allocations
  - Delineation of roles of involved SM parties
  - Rules for licensing and frequency assignment
  - SM strategy documents
  - Financial, enforcement regulations, etc.

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# Building legislative base

- Needs to be assigned a clear priority
- Either dedicate own staff to that task og outsource it, given its ”one-off” nature
- No need to ”re-invent the wheel”, a lot of relevant information could be found in ITU materials, regional organisations and by reviewing similar legal instruments of national regulators in other countries

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# II. Appropriate SM staffing

- The number of SM staff should be appropriate for the number of carried duties
- Even more important is that organisational units/dedicated staff exist to address specific SM functions:
  - planning, coordination
  - licensing, frequency assignment
  - radio monitoring
  - enforcement
  - type approval

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# III. Role of enforcement

- It is inconceivable that the regulator can achieve any of its objectives without proper enforcement:
  - who would follow the regulations if not faced with the prospect of prosecution for non-compliance?
- Therefore permanent and highly visible enforcement activity should be an essential element of any SM organisation

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# Building enforcement

- Start from one inspection team, give it a schedule of at least one inspection visit a day
- Based on initial experience, increase the number of teams, re-enforce them with suitable equipment
- Build regional offices, with the main tasks of radio monitoring and enforcement

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# IV. Publicity issues

- Transparency of SM operations is important prerequisite of a stable and flourishing wireless market, where players can make well-informed decisions and are confident of the future
- Publicity can be easily achieved by some organisational adjustments:
  - creating formal rules for public consultations
  - having an informative website, constantly update it
  - establishing regular venues for exchange of information with industry, such as annual seminars or consultative bodies

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# V. Automation of SM processes

- Important for increasing efficiency of SM organisation
- Enables expert spectrum management decisions by providing access to:
  - administrative tools
  - spectrum planning and engineering tools
  - related databases: licensing, frequency planning, assignment, monitoring
- Essential functionality provided by BDT's SMS4DC software tool

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# Conclusions

- The administrations in developing countries often underestimate importance and complexity of SM
- Careful design and constant improvement of SM organisations and their functioning is required if SM was to achieve its objectives
- Advices may be found in ITU Handbook on National Spectrum Management

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# Thank you!

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