Online Training Course Outline

ITU and African Advanced Level Telecommunications Institute

Title	SMTP EM2.1 - Advanced Spectrum Authorization Regimes
Modality	Online Instructor-led
Dates	31 October – 25 November 2022
Duration	4 weeks
Registration deadline	30 October 2022
Training fees	USD 200
Description	The scope of this course will cover an overview of the current traditional approaches to spectrum management and their limitations; new approaches to spectrum management focusing on spectrum authorisation regime to improve efficient and optimum use of the spectrum resources through adoption of advanced spectrum allocation, assignment and management techniques, and modern spectrum licensing management processes based on operational requirements and technical and economic viability. The scope will include mechanisms to promote flexile spectrum use, based on new approaches to managing spectrum commons such as dynamic spectrum access, whitespaces access; licensing structures, the light licensing, authorisations processes, etc.
Code	22OI500016MUL-E-D

1.LEARNING OBJECTIVES

This teaching module will enable students to learn new approaches to spectrum management that are currently being implemented or studied in some countries around the world but are not yet in common practice. The course will enable students to understand what might happen in the future and to engage in debate on novel forms of spectrum management.

2. LEARNING OUTCOMES

It is expected that upon completion of the training sessions, participants will achieve learning outcomes:

- **Knowledge of:**
  - Alternative approaches to spectrum management;
  - Current state of implementation and discussion around the work;

- **Understanding of:**
  - Current utilization of spectrum;
  - Methods of sharing spectrum and shortcomings of these;
  - Approaches to managing spectrum commons including proposals for future frameworks;
  - Approaches to using opportunistic spectrum access including white spaces and LSA/ASA;
  - Ideas for future sharing and use of Governmental/Federal spectrum;
  - Regulatory approaches in the US and UK to whitespace usage;
  - Database structures and business cases.

- **Special skills for:**
  - Critical analysis of existing spectrum management paradigms;
  - Spectrum management innovation skills;
  - Database regulation skills.

- **Assessment Criteria in:**
  - Understanding and use of knowledge communicated during the course;
  - Ability to critique and contribute to the debate on future spectrum management;
  - Quality of individual works.

3.TARGET POPULATION

The is training is targeted at ICT regulators, telecommunications/ICT and broadcasting companies, government ministries in charge of ICT, Internet service providers, and academia, who are aiming at improving their knowledge and skills in the aspects of advanced spectrum management, focusing on future spectrum uses for emerging technologies. The training participants may include professionals working in the telecommunications/ICT industry,

engineers, economists, lawyers, and regulatory staff across all departments. Besides that, other institutions and individuals dedicated to advancing their capacity in relation to advanced radio spectrum management approaches enabling wireless innovation using new technologies are welcome to participate.

4.ENTRY REQUIREMENTS

The participants in this course are expected to have successfully completed ITU Spectrum management course SMTP OM5, and other relevant Operation Modules. The training participants may be experienced professionals working in the telecommunications industry, including engineers, economics, lawyers, finance and regulatory staff across all departments. Besides that, other institution, academia and individuals that have experience related to spectrum management are welcome.

5.TUTORS/INSTRUCTORS

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
Vitalis Olunga	Email: volunga@gmail.com Tel: +254 722 510 077
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6.TRAINING COURSE CONTENTS

List of topics to be covered in the training and brief description of what each topic covers:

Topic 1: How spectrum is currently managed – overview of the traditional spectrum management frameworks and, liberalised legislations and regulations approaches and their limitations.

Topic 2: Spectrum commons – The uses of commons, the tragedy of commons, the various existing approaches and the proposed future approaches to overcome the issues.

Topic 3: Light Licensing – The light licensing approach as a middle ground between the licensed and unlicensed spectrum, the wide range approaches and the overlap into other techniques. Policy and regulatory guidelines for general and local authorisations to enable the operations of local operators and community networks.

Topic 4: Licensing structures – The need for licenses, license rights versus obligations, the Block Edge Musk (BEM), technology neutrality and its implications for licensing including initiatives as Wireless Access Policy for Electronics Communications Services (WAPECS), and creation of Spectrum Usage Rights (SUR;

Topic 5: Approaches to dynamic access – Spectrum management principles for different spectrum sharing systems including cognitive radios for sensing, radio beacons, and geolocation data bases.

Topic 6: Licensed shared access / Authorised shared access (LSA/ASA) and private commons: – studies of possible solutions or applications licensed and unlicensed dynamic access to spectrum approaches and private commons.

Topic 7: Whitespace access- overview use of Cognitive Radio System (CRS) that provide flexibility, improved efficiency for spectrum use. How white space access is used, regulations devices in various countries and the future direction.

Topic 8: Applications that work well with DSA – Characteristics applications that work well with DSA, including rural broadband, mobile broadband, military usage, machine to machine and applications by region.

Topic 9: Sharing with broadcasting – DSA deployments in TV White Space without causing interference, Digital Dividend Spectrum.

Topic 10: Receiver standards – TV receiver standards and their implementations.

Topic 11: Databases – complexities behind the deployment and running of the database; the role of the regulator; database management guidelines best practices;

Topic 12: Where next? Small cell sharing, Government sharing, research direction? – Advance spectrum authorisation approaches for small cell sharing, government sharing (emergency and security services); Staircase access concept. Research direction focus on opportunistic secondary access, heterogeneous network topologies, and spectrum commons. This covers Infrastructure as a service (IaaS), Platform as service (PaaS), and Software as a Service (SaaS) and Cloud computing, Software Radios and flexible front-end technologies. Network virtualisation and New commercial models for small cells.

7.TRAINING COURSE SCHEDULE

Week / Topic	Activity	Exercises and interactions
Week 1 How spectrum is currently managed; Spectrum commons – existing approach, issues and proposals;	Read Topic 1, 2 & 3 Materials and references. Attend live presentations for sessions 1, 2 & 3 before attempting Quiz 1. Participate in week 1 forum	**Forum 1: Discuss the traditional spectrum management practices; spectrum commons and light licensing.** **Live Lecture and Discussion through ZOOM** **Monday and Wednesday, 15:00 Hours to 17:00 Hours EAT**

Light licensing – existing approach, issues and proposals;		Attempt **Quiz 1** covering week 1 course contents.
Week 2 Licensing structures; Approaches to dynamic access; Licensed shared access (LSA/ASA) and private commons;	Read Topic 4, 5 & 6 Materials and references. Attend live presentations for sessions 4, 5 & 6 before attempting Quiz 2. Participate in week 2 forum. Start on self-study component	**Forum 2: Discuss licensing structures; licensed shared access and private commons.** **Live Lecture and Discussion through ZOOM** **Monday and Wednesday, 15:00 Hours to 17:00 Hours EAT.** Attempt **Quiz 2** covering week 2 course contents.
Week 3 White space access; Sharing with broadcasting; Receiver standards;	Read Topic 7, 8 & 9 Materials and references. Attend live presentations for sessions 7, 8 & 9 before attempting Quiz 3. Participate in week 3 forum. Continue self-study exercise	**Forum 3: Discuss licensing structures & technology neutrality.** **Live Lecture and Discussion through ZOOM.** **Monday and Wednesday, 15:00 Hours to 17:00 Hours EAT.** Self-study exercise Attempt **Quiz 3** covering week 3 course contents.
Week 4 Applications that work well with DSA; Databases Where next? Small cell sharing, Government sharing, research directions	Read Topic 10, 11 & 12 Materials and references. Attend presentations for sessions 10, 11 & 12 before attempting Quiz 4. Participate in week 4 forum. Complete Self-study Exercise	**Forum 4: Discuss applications and systems that work well with DSA.** **Live Lecture and Discussion through ZOOM** **Monday and Wednesday, 15:00 Hours to 17:00 Hours EAT.** Attempt **Quiz 4** covering week 4 course contents. Submit end of course **Assignment**

8.METHODOLOGY (Didactic approach)

The course will be instructor-led, with learning pace controlled and knowledge re-enforced by series of consultations with the tutor. There will online lecturing every Wednesday of the weeks. There is a self-study component to look at the methods of spectrum management used in their own country, identify where there are problems, detail which new approaches are currently being used, if any, and recommend which new approaches should be adopted in the light of this insight.

9.EVALUATION AND GRADING

Participants should score an overall mark of 60%. The evaluation is based on:

- Participation in all the four weekly Forums (10%)
- Quizzes in week 1 (10%);
- Quizzes in week 2 (10%);
- Quizzes in week 3 (10%)
- Quizzes in week 4 (10%)
- Assignment (50%)

10.TRAINING COURSE COORDINATION

AFRALTI coordinator:	**ITU coordinator:**
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