



African Advanced Level Telecommunications Institute (AFRALTI)

**Online Training Course on
Spectrum Management Training Programme (SMTP)**

EM2-1 - Advanced Spectrum Authorization Regimes

18 October – 12 November 2021

TRAINING COURSE OUTLINE

COURSE DESCRIPTION

Title	EM2.1 - Advanced Spectrum Authorization Regimes
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.
Dates	18 October – 12 November 2021
Duration	4 Weeks
Registration deadline	17 October 2021
Training fees	USD 200
Course code	21OI27736MUL-E
Course Domains	Domain 1: Spectrum Authorisation Structures Domain 2: Spectrum Authorisation approaches for future use

References	<p>W. Webb, (2013) Dynamic White Space Spectrum Access www.webbsearch.co.uk</p> <p>Ofcom (2013) Spectrum Attribution Metrics - http://stakeholders.ofcom.org.uk/binaries/consultations/spectrum-management-strategy/annexes/Spectrum_attribution_metrics.pdf?utm_source=updates&utm_medium=email&utm_campaign=metrics</p> <p>ITU (2015) Handbook on National Spectrum Management - http://www.itu.int/pub/R-HDB-21</p> <p>Cave, Doyle, Webb (2010) “Essentials of Modern Spectrum Management”, CUP</p> <p>ITU (2013) Trends in Telecommunications Reform - http://www.itu.int/pub/D-REG-TTR.14-2013</p>
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DESCRIPTION OF THE TRAINING COURSE

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 flexible 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.

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.

TARGET POPULATION

The 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.

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.

TUTORS/INSTRUCTORS

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
Vitalis Olunga	Email: volunga@gmail.com Tel: +254 722 510 077
Jonathan P. Mwakijele	Email: Jmwakijele@afraiti.org Tel: +254 718 860 897

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.

TRAINING COURSE SCHEDULE

Week / Topic	Activity	Exercises and interactions
Week 1 How spectrum is currently managed; Spectrum commons – existing approach, issues and proposals; Light licensing – 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 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

FINAL ASSIGNMENT:

Identify the fundamentals and issues of the traditional spectrum management approaches and new licensing approaches currently being implemented or studied in some countries but are not yet in common practice; and discuss the licensing structures, and sharing with broadcasting, small cell sharing, government sharing focusing on automated frequency coordination and database management.

METHODOLOGY (Didactic approach)

Brief description of the methodology that will be used:

The course will be self-study, 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.

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%)

TRAINING COURSE COORDINATION

The details of course coordinators and their contacts are follows:

AFRALTI coordinator: Jonathan Mwakijele Head of Management, Policy and Regulatory Unit Nairobi, Kenya. Tel: +254 718 860 897 Email: Jmwakijele@afralti.org	ITU coordinator: Emmanuel Niyikora Programme Officer ITU Area Office for West Africa, Dakar, Senegal Tel : +250 788312939 Email: emmanuel.niyikora@itu.int
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REGISTRATION AND PAYMENT

ITU Academy portal account

Registration and payment should be made online at the ITU Academy portal.

To be able to register for the course you **MUST** first create an account in the ITU Academy portal at the following address:

<https://academy.itu.int/user/register>

Training course registration

When you have an existing account or created a new account, you can register for the course online at the following link: <https://academy.itu.int/training-courses/full-catalogue/sntp-em21-advanced-spectrum-authorization-regimes-0>

You can also register by finding your desired course in our training catalogue <https://academy.itu.int/training-courses/full-catalogue>

Payment

1. On-line payment

A training fee of USD 200 per participant is applied for this training. Payment should be made via the online system using the link mentioned above for training registration <https://academy.itu.int/training-courses/full-catalogue/sntp-em21-advanced-spectrum-authorization-regimes-0>.

2. Payment by bank transfer

Where it is not possible to make payment via the online system, select the option for offline payment to generate an invoice using the same link as above. Download the invoice to make a bank transfer to the ITU bank account shown below. Then send the proof of payment/copy of bank transfer slip and the invoice copy to Hcbmail@itu.int and copy the course coordinator. **All bank transaction fees must be borne by the payer.**

Failure to submit the above documents may result in the applicant not being registered for the training.

3. Group payment

Should you wish to pay for more than one participant using bank transfer and need one invoice for all of them, create an account as **Institutional Contact**. **Institutional Contacts** are users that represent an organization. Any student can request to be an institutional contact or to belong to any existing organization.

To do this, head to your profile page by clicking on the **“My account”** button in the user menu. At the bottom of this page you should see two buttons:

- a. If you want to **become an institutional contact**, click on the **“Apply to be an Institutional Contact”** button. This will redirect you to a small form that will ask for the organization name. After you fill the name of the organization you want to represent, click on **“continue”** and a request will be created. An ITU Academy manager will manually review this request and accept or deny it accordingly.
- b. If you want to **belong to an existing organization**, click on the **“Request to belong to an Institutional Contact”** button. This will redirect you to a small form that will ask you to select the organization you want to join from an organization list. After you select the correct organization, click on **“continue”**, a request will then be created. The Institutional Contact that represents that organization will manually accept or deny your request to join the organization.

ITU BANK ACCOUNT DETAILS:

Name and Address of Bank:	UBS Switzerland AG Case postale 2600 CH 1211 Geneva 2 Switzerland
Beneficiary:	Union Internationale des Télécommunications
Account number:	240-C8108252.2 (USD)
Swift:	UBSWCHZH80A
IBAN	CH54 0024 0240 C810 8252 2
Amount:	USD 200
Payment Reference:	21OI27736MUL-E - P.40635.1.01

4. Other method of payment

If due to national regulations, there are restrictions that do not allow for payment to be made using options 1 & 2 above, please contact the ITU coordinator for further assistance.