Training course outline

[ITU and African Advanced Level Telecommunications Institute]

Title	**SMTP EM1.1 Spectrum Monitoring**
Modality	Online Instructor Led
Dates	4-29 July 2022
Duration	4 weeks
Registration deadline	3 July 2022
Training fees	**USD 200**
Description	The course covers the role, functions and basic techniques of spectrum monitoring, and purpose and capabilities of different types of spectrum monitoring equipment.
Course code	**22OI500013MUL-E**

1. LEARNING OBJECTIVES

After completion of this course, the participant should be capable of clearly describing the role, functions and basic techniques of spectrum monitoring, and have an understanding of the purpose and capabilities of different types of spectrum monitoring equipment. Furthermore, the participant should be able to demonstrate his/her ability to define monitoring tasks (check lists) and analyze their results (results list), as well as individually planning essential spectrum monitoring operations and measurements.

2. LEARNING OUTCOMES

- Participants will acquire skills to utilize automated spectrum skills for management of radio frequency spectrum.
- Participants will learn how to post radio frequencies in NTFAs and MIFR,
- They will learn how to conduct Authorization and licensing using automated SMS4DC tools.
- Participants will acquire knowledge on use of relational database management system and GIS for Spectrum management.
- They will acquire understanding of key elements and functional blocks of an automated spectrum management and monitoring system.

- They will acquire skills and abilities to compare and select a suitable spectrum management and monitoring system based on the needs of administrations.
- They will acquire skills to implement spectrum management systems in their respective administrations.

3. TARGET POPULATION

This course is targeted at engineers and officers tasked with planning, engineering, monitoring and operation of radio systems in developing and leased developed countries. Participants will be drawn from national regulatory authorities, fixed and mobile operators, broadcasters, service providers, government, military, security agencies, Aeronautical, maritime, meteorological, PMR Radio operators, Science and academia.

4. ENTRY REQUIREMENTS

No prior knowledge or qualification in Spectrum Monitoring is required, however it is important for participants to be working for a regulator, or in the ICT/Telecoms sector as a provider or consultant. Students in the Engineering or ICT related courses could also be considered.

5. TUTORS/INSTRUCTORS

NAME OF TUTOR(S)/INSTRUCTOR(S)	CONTACT DETAILS
Eng. Martin Mwaura	martinmwaura@live.com Tel: +254715721798
Mr. Jonathan Mwakijele	Jmwakijele@afralti.org Tel: +254718860897

6. TRAINING COURSE CONTENTS

The topics covered in this module are:

1. Purpose and Role of monitoring in the spectrum management process
2. ITU's role and structure, with focus on ITU-R, Study Group SG1 and its Working Party 1C in particular
3. Radio Regulations, with focus on various articles related to monitoring
4. Typical measurements conducted by monitoring, such as:
   - Occupancy measurements
   - Bandwidth measurements
   - Field strength measurements
   - Modulation measurements
   - Frequency measurements
5. ITU-R Recommendations and Reports related to monitoring
6. Principles of various types of monitoring equipment (manuals):
   - Antennas
   - Receivers
   - Direction finders
   - Spectrum analysers

7. TRAINING COURSE SCHEDULE

Week / Session	Topic	Exercises and Interactions
Week 1 Purpose and role of Spectrum Monitoring in the Spectrum Management process and the role of ITU.	• Purpose and Role of monitoring in the spectrum management process. • ITU's role and structure, with focus on ITU-R, Study Group SG1 and its Working Party 1C in particular. • Radio Regulations, with focus on various articles related to monitoring. • ITU-R Recommendations and Reports related to monitoring	**Forum 1:** Why is Spectrum Monitoring important in your country and what roles does it play in overall frequency usage by operators and service providers? Why are Radio Regulations important and how are they used by your monitoring team to ensure compliance with all the clauses of the Regulations by Operators in your country? **Exercise** on the Monitoring Software **Live Lecture and discussion**: Monday and Wednesday, 1500 Hours-1700 Hours EAT **Attempt Quiz 1**
Week 2 Typical measurements conducted by monitoring	• Occupancy measurements • Bandwidth measurements • Field strength measurements • Modulation measurements • Frequency measurements	**Forum 2**: Which measurements are carried out by your Spectrum Monitoring team and why are they important in terms of QoS and Spectrum efficiency? **Exercise** on the Spectrum Monitoring Software **Live lecture and discussion**: Monday and Wednesday, 1500 Hours-1700 Hours EAT **Attempt Quiz 2**
Week 3 Principles of various types of monitoring equipment (manuals)	• Antennas • Receivers	**Forum 3**: How are Radio Regulations used in monitoring in your country? **Exercise** on the spectrum monitoring software **Live lecture and discussions**: Monday and Wednesday, 1500 Hours to 1700 Hours EAT **Attempt Quiz 3**
Week 4 Principles of various types of monitoring equipment (manuals) (Cont.)	• Direction finders • Spectrum analysers	**Forum 4**: How are Radio Regulations used to reduce cases of harmful interference? **Exercise** on the Spectrum Monitoring Software **Live Lecture and discussion**: Monday and Wednesday, 1500 Hours-1700 Hours EAT **Attempt Quiz 4** **End of course assignment:** You have been nominated by your company to come up with a design and RFP for a new automated spectrum monitoring system. The system shall be integrated into the Spectrum management database and NTFA. Take into consideration ITU-T and ITU-R Regulations. Mention the important functions the system shall perform and the expected reports and output data.

8. METHODOLOGY (Didactic approach)

This course will be delivered using instructor-led online learning. The course is delivered using power-point slides posted on the course page and selected reference materials that the participants have to study each week, participate in scheduled activities and undertake self-assessments. Students will reinforce their understanding of the topics studied by drawing on their specific environments and are encouraged to consult with experienced colleagues who are working on a relevant topic. The following methods will be used for this course

- Self-study of PPTs and reference materials
- Instructor led presentations and discussions through ZOOM on Monday and Wednesday from 1500 Hours to 1700 Hours EAT
- Forum discussions through the ITU Academy portal

9. EVALUATION AND GRADING

The evaluation is based on:

- Participation in all the four Forums (10%)
- Quiz week 1 (10%)
- Quiz week 2 (10%)
- Quiz week 3 (10%)
- Quiz week 4 (10%)
- End of course assignment (50%)

Participants should score an overall mark of at least 60% to get ITU Certificate.

10. TRAINING COURSE COORDINATION

AFRALTI Coordinator:	**ITU Coordinator:**
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