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|  | ANNEX 3.8 Terms of Reference Spectrum Management | ORIGIN AFPE6/AFPE |
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This document sets forth the Terms of Reference for the planning, development and implementation of a Course (hereinafter referred to as "the Course") in "Spectrum Management" to the Brazilian National Telecommunications Agency (hereinafter referred to as "Anatel" or "the Agency") and other public officials, by means of this relevant service as detailed hereinafter.

1. INTRODUCTION

Anatel has the constitutional role to organize the telecommunications services in Brazil. Nowadays, Anatel is facing many challenges such as the lack of experience of the labor market in Brazil, especially in relation to telecommunications services regulation; the necessity of ready adjustment of the preexistent regulation to the technological advances; high society expectations; as well as shortage of information on the regulated market behavior and other actions supported fundamentally by technology and industrial development. Therefore, such scenery enforces public officials to continuously update knowledge and innovation in order to promote regulatory process improvement in accordance to Federal Government policies.

It is of utmost importance for Anatel to provide adequate training to its employees. The Agency's capacity building programme aims at improving Brazilian regulator's response to society's yearnings for better services, enabling their follow up on technology evolution of the sector, as well as to allow continuous improvement of work processes in order to ensure the desired results

Thence, Anatel is constantly concerned about investing in training programs that will comply not only with the demands of technical needs, but also with those that can, in any way, broaden the horizon and the capacity of the Agency's employees, technicians and managers, to find innovative and creative solutions, promote interpersonal relationship, improve latent or potential skills that will enable them to develop durable core competences applied to each different role within the organization, especially in times of change. Furthermore, it will provide technical, managerial and operational conditions so that tasks' development is consistent with the Agency's regulatory role.

2. OBJECTIVE

The main objective is to hire specialized service to deliver a Course on Spectrum Management for up to 40 (forty) participants that shall be indicated by Anatel to participate in the Course.

The Course proposal shall consider a 2 (two)-week period for delivery.

The planning, development and implementation of the Course shall focus on the following 19 (nineteen) main topics:

- 1) Legal Basis and Regulatory Framework of Spectrum Management
- 2) Spectrum Engineering Fundamentals

- 3) Wireless Telecommunications Technologies
- 4) Economic and Market Tools of Spectrum Management
- 5) Efficient spectrum usage and demand (including technical, functional, economic, and social spectrum efficiency)
- 6) Strategic Planning and Policies for Wireless Innovation
- 7) Spectrum Monitoring
- 8) Enforcement and Type Approval of Equipment
- 9) Electromagnetic Compatibility and Human Exposure to EMF
- 10) SM for Satellite Systems
- 11) SM for HF Systems, Science, Maritime and Amateur Services
- 12) SM for Aeronautical and Radio Determination Services and Military Systems
- 13) Computer-aided Spectrum Management
- 14) Spectrum engineering practices (coordination, notification, technical analysis, interference mitigation, etc.)
- 15) Advanced Spectrum Authorization Regimes
- 16) Socio-Economic Impact of Spectrum Regulation; Competition and Consumer Protection
- 17) Terrestrial TV Broadcasting Planning and Digital Transition
- 18) Opportunistic Spectrum Access and Cognitive Radio
- 19) Spectrum Management Trends, Issues, Concerns

3. PRODUCTS

PHASE I

3.1. Planning and Development

The planning and development of this Course shall consider a two-week Course, with a duration of 80 (eighty) hours and 40 (forty) participants.

3.1.1 Planning:

The Product shall present at least:

- a) A general description of the Course and its subject;
- b) The detailed methodology that will be used for the implementation of the Course;
- c) Proposed schedule of Course implementation;
- d) Detailed qualification of professionals involved;
- e) Proposed methodology for assessing knowledge transmission (submit model of a questionnaire or any other evaluation instrument proposed);
- f) Detailing of the necessary infrastructure for the implementation of the Course, considering that it shall be delivered in Brasilia.

3.1.2 Development:

The Product shall present:

- a) A brief description of all instructional material for Course delivery;
- b) Copy of all materials to be used in classroom by participants;
- c) Bibliography quoted and / or used for the development of all instructional material.

The development of the programmatic content shall consider the minimum content established below:

| Subject | Duration (hours) |
|---|-------------------------------|
| Legal Basis and Regulatory Framework of Spectrum Management | To be defined in the proposal |
| Spectrum Engineering Fundamentals | To be defined in the proposal |
| Wireless Telecommunications Technologies | To be defined in the proposal |
| Economic and Market Tools of Spectrum Management | To be defined in the proposal |
| Efficient spectrum usage and demand (including technical, functional, economic, and social spectrum efficiency) | To be defined in the proposal |
| Strategic Planning and Policies for Wireless Innovation | To be defined in the proposal |
| Spectrum Monitoring | To be defined in the proposal |
| Enforcement and Type Approval of Equipment | To be defined in the proposal |
| Electromagnetic Compatibility and Human Exposure to EMF | To be defined in the proposal |
| SM for Satellite Systems | To be defined in the proposal |
| SM for HF Systems, Science, Maritime and Amateur Services | To be defined in the proposal |
| SM for Aeronautical and Radio Determination Services and Military Systems | To be defined in the proposal |
| Computer-aided Spectrum Management | To be defined in the proposal |
| Spectrum engineering practices (coordination, notification, technical analysis, interference mitigation, etc.) | To be defined in the proposal |
| Advanced Spectrum Authorization Regimes | To be defined in the proposal |
| Socio-Economic Impact of Spectrum Regulation; Competition and Consumer Protection | To be defined in the proposal |
| Terrestrial TV Broadcasting Planning and Digital Transition | To be defined in the proposal |
| Opportunistic Spectrum Access and Cognitive Radio | To be defined in the proposal |
| Spectrum Management Trends, Issues, Concerns | To be defined in the proposal |
| Total | 80 |

PHASE II

3.2. Course Delivery

The Course on “Spectrum Management” aims at providing advanced knowledge on the core activities involving spectrum regulation and monitoring, including the most recent techniques and technologies for performing such tasks in a wireless era.

After the delivery of the Course, participants are expected to have advanced knowledge on the main topics described in Session 2 - OBJECTIVE.

Anatel expects that the instrument proposed to assess knowledge transmission and instructors’ performance is applied at the end of the Course.

PHASE III

3.3. Reporting and Evaluation

3.3.1. The corresponding certificates (considering compliance with minimum attendance required) shall be delivered to Anatel and not to participants (Anatel may decide to organize a specific ceremony for this purpose).

3.3.2. A Course Completion Report shall be delivered indicating (i) problems faced and solutions adopted; (ii) compilation of results related to the knowledge transmission assessment.

4. STAGES OF IMPLEMENTATION AND DEADLINES

| PHASE | PRODUCT | DELIVERY | DEADLINE |
|-------|-------------|---|---------------|
| I | Product 3.1 | Planning of the Course* | To be defined |
| | | Course Content* | To be defined |
| II | Product 3.2 | Course delivery | To be defined |
| | | Knowledge transmission assessment | To be defined |
| III | Product 3.3 | Issuance and delivery of Certificates to Anatel | To be defined |
| | | Delivery of Course Completion Report | To be defined |

* For Anatel’ and ITU’s Approval

5. METHODOLOGY

The Course is to be delivered in Brasilia for up to 40 (forty) participants. The Contractor shall consider the following methodological aspects:

- All instructional material shall be of high quality, in Portuguese, with no grammar or vocabulary errors (one extra copy shall be in English, if that is the original language);
- The language used for the planning, development and delivery shall be the English or the Portuguese languages and Course content shall be developed in electronic media and printed, and supported by specific instructional resources, such as multimedia presentations, and others;
- Discussions shall be conducted to ensure the level of knowledge to be achieved for each topic;

- The practice of discussing case studies and critical thinking motivating tasks with indicative of solutions or improvement should be encouraged;
- During the delivery of the Course, the instructor shall avoid value judgments beyond technical connotation;
- Participants will be allowed a maximum of 25 (twenty-five percent) of absence with reasonable justification, subject to the acceptance by Anatel;
- All documents arising from this Terms of Reference shall be delivered in print, properly bound, and electronically, using Microsoft and Adobe archive's formats.

6. QUALIFICATION OF THE PROFESSIONAL WHO WILL DELIVER THE COURSE

The CV of proposed professional shall at least include the following information:

- formal education and training schools;
- Instructor's experience expressed in time (e.g. years of experience in classroom);
- length of service provided for the company;
- previous work experience; and
- areas of expertise.

7. WHAT IS EXPECTED FROM THE CONTRACTOR

The Contractor shall:

- provide human and material resources such as the Course venue, and all facilities mentioned by the Contractor in the offer presented such as multimedia equipment and other devices that may be necessary;
- develop all instructional materials and provide any other that may be necessary and indispensable for Course implementation in accordance to proposed methodology;
- provide to participants access to all supporting materials such as lecture notes, handouts or books;
- assess instructor's performance and knowledge transmission;
- issue Course completion certificate;
- perform training as contracted and specified herein;
- report to Anatel and ITU any problems occurred during Course implementation and others related to the participants;
- assume the expenses necessary to the development of the three phases of the Course, including those related to the Instructor's remuneration, accommodation, food and displacement, with the exception of those specified in Session 8 – WHAT IS EXPECTED FROM ANATEL and those related to participants' remuneration, accommodation, food and displacement.

8. WHAT IS EXPECTED FROM ANATEL

Anatel shall:

- if required, provide to participants access to specific information under the proprietorship of the Agency;
- control participants attendance based on the information provided by the Instructor and

guidelines presented in Session 5 – METHODOLOGY.