

*Last Updated: 2008-02-05*

# **Seminar on Software Defined Radio and Cognitive Radio Systems**

(Geneva, 4 February 2008)

## **Objectives and Outline**

The purpose of the seminar is to provide a high level view of the Radiocommunication issues that might be improved through the use of Software Defined Radio (SDR) and Cognitive Radio Systems (CRS), including the motivation for WRC-11 Agenda Item 1.19 so that WP 5A / SG 5 can better contribute technical studies to assist WP 1B / SG 1 in their regulatory work. The seminar will include a summary of the work on SDR conducted in the last study period (Reference Report ITU-R M.2117) at a high level, tutorial style, as well as presentations on a number of current important topics related to SDR and CRS.

It is expected that this seminar will permit an open discussion of issues and ideas and is not intended for the presentation of proposals to Working Party 5A.

José Costa, Acting Chairman, ITU-R WP 5A

## **Reference Documents**

**Report ITU-R M.2117 (ex-Doc. 8/213) “Software defined radio in the land mobile, amateur and amateur satellite services”**

**Question ITU-R 230-2/8 “Software defined radios”**

**Question ITU-R 241-1/8 “Cognitive radio systems in the mobile service”**

**WRC-11 Agenda Item 1.19**

**Resolution 956 (WRC-07) “Regulatory measures and their relevance to enable the introduction of software-defined radio and cognitive radio systems”**

# Seminar on Software Defined Radio and Cognitive Radio Systems

(Geneva, 4 February 2008)

Note: This seminar will immediately follow the opening plenary of Working Party 5A expected to take place from 10:00 - 11:00 hours.

Note: All presentations and biographies are contained in this folder:  
<http://www.itu.int/ITU-R/study-groups/seminars/rwp5a-radio/>

## Final - Seminar Programme - Final

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11:00-11:15

### Opening Session

- Opening remarks, José M. Costa, Acting Chairman, ITU-R WP 5A
- Welcome Address by Mr. Valery Timofeev, Director, ITU Radiocommunication Bureau (BR)
- Objectives and Overview  
José M. Costa, Acting Chairman, ITU-R WP 5A  
[ Presentation ] [ Biography ]

11:15-12:30

**Session 1: Regulatory needs and Studies in ITU-R**

P1-1 Hitoshi Yoshino (NTT DoCoMo), "Summary of the work on SDR and Cognitive Radio within ITU-R"

**Abstract:** ITU-R WP8A (currently WP5A) has conducted its study on Software Defined Radio (SDR) in cooperation with WP8F (currently WP5D), in response to the Question ITU-R 230/8. As the result, ITU-R produced Report "Software Defined Radio in the land mobile, amateur and amateur satellite services" (ITU-R M.2117). WP8A also developed a new Question on Cognitive Radio (CR) systems (Question ITU-R 241/8), recognizing the potential needs to study this new technology during its work of the development of the SDR Report. This presentation first introduces the work on SDR within ITU-R, focusing on their technical aspects, from the characteristics of SDR to SDR applications to specific mobile systems, based on Report ITU-R M.2117. Then, the presentation explains the concept of cognitive radio, referring to Annex A of Report ITU-R M.2117. It finally introduces the ongoing study on CR technology within WP5A.

*[ Presentation ] [ Biography ]*

P1-2 Perspectives from the point of view WP 1B / SG 1 or some of the proponents of WRC-11 Agenda Item 1.19 to explain the issue(s) that needs to be solved and provide some views on how WP 5A / SG 5 can help WP 1B in conducting the studies

- Dr. Gabrielle Owen (The Netherlands)

**Abstract:** WRC-11 agenda item 1.19 will consider regulatory measures and their relevance, in order to enable the introduction of software-defined radio and cognitive radio systems, based on the results of ITU-R studies, in accordance with Resolution 956 [COM6/18] (WRC-07).

ITU-R WP5A has already been active for several years on aspects of software-defined radio and cognitive radio systems. The question is how ITU-R WP 5A can assist in the work on WRC-11 agenda item 1.19.

This presentation addresses the creation of WRC-11 agenda item, the content of the agenda item, the division of responsibilities, what related work has already been done, and suggests action points.

*[ Presentation ] [ Biography ]*

- Nabil Kisrawi (Syria)

Questions and Answers (15 minutes)

**12:30-14:00**  
**Lunch break**

**14:00-15:15**

**Session 2: General issues and concepts**

P2-1 Dr. Hiroshi Harada (National Institute of Information and Communications Technology - NICT), "Needs, Research and development on software defined cognitive radio technology"

**Abstract:** Currently, a number of wireless access systems have been available to users. Especially, several new systems can be used on not only 800-6000 MHz band that is suitable for cellular communications but also the lower frequency band such as VHF and UHF bands. This means that most frequency band adequate for mobile communication systems is fully occupied after around ten years and new solutions are needed. One of solutions is to use "Cognitive Radio/Dynamic Spectrum Access" technology that is a radio or system that senses, and is aware of, its operational environment and can dynamically and autonomously adjust its radio operating parameters accordingly by collaborating wireless and wired networks. This presentation summarizes the cognitive radio needs on the basis of latest Japanese frequency allocation environment. To realize the technology, National Institute of Information and Communications Technology (NICT) and a Japanese operator and some manufacturers have a project supported by Ministry of Internal Affairs and Communications (MIC) to research and develop enabling technologies on cognitive radio/dynamic spectrum access equipments. This presentation also shows the objectives, the network image, and the results of the project. Finally this presentation will address the further research and development topic in order to realize cognitive/dynamic spectrum access based communication systems.

*[ Presentation ] [ Biography ]*

P2-2 Patricia Martigne (France Telecom), "CR-related concepts, such as the Cognitive Pilot Channel"

**Abstract:** As a result of investigating opportunities to enhance the efficiency of radio resource and spectrum management in a context of end-to-end reconfigurability, the E<sup>2</sup>R European Research project has developed studies on Flexible Spectrum Management and initiated the concept of the Cognitive Pilot Channel (CPC). The latter further develops the benefits of possibilities offered by cognitive radio systems by supporting and facilitating end-to-end connectivity in a heterogeneous radio access environment where technologies are used in a flexible and dynamic manner.

*[ Presentation ] [ Biography ]*

P2-3 Mike Chartier (Intel), "Getting Smarter about Smart Radios"

**Abstract:** A flurry of industry and regulatory activity surrounded SDR and Cognitive radio at the turn of the century. Promises, predictions, and expectations were made. This presentation will look at the realities today, which may give a better indicator for the future.

*[ [Presentation](#) ] [ [Biography](#) ]*

P2-4 Patricia Martigne (Vice-chair of IEEE P1900.4, France Telecom) and Joanna Guenin (IEEE SCC41 co-chair, Motorola), "IEEE Standards Coordinating Committee 41 on Dynamic Spectrum Access Networks: Activities, Technical Issues & Results"

**Abstract:** Standards drive the interoperability of competing products and are the foundation for bringing research and technology into commercial markets. Dynamic Spectrum Access (DSA) is a key application that utilizes Cognitive Radio and Software Defined Radio to create new market opportunities. Because the technologies required to enable Dynamic Spectrum Access span a number of technical societies, the IEEE Standards Association formed Standards Coordinating Committee 41 (SCC41) so that it can sponsor standards projects that cross the boundaries of the Communications Society, the Electromagnetic Compatibility Society, the Computer Society, and others.

This presentation focuses on the standards activities that are currently in progress in SCC41, the results that have been achieved, the challenges facing SCC41, the technology/standardization space that is relevant to SCC41, and the new projects that have been proposed. SCC41 also welcomes interested entities to join by participating in on-going projects or proposed new ones that will contribute to the realization of increased efficiency in radio spectrum utilization.

*[ [Presentation](#) ] [ [Biography](#) ]*

Questions and Answers (15 min)

**15:15 - 15:45**

**Coffee break**

15:45-17:00

**Session 3: Specific research projects and opportunities**

P3-1 Reema Hafez, Gerald Chouinard and John Sydor (Industry Canada), "Cognitive Radio Research at Industry Canada's Communications Research Centre"

**Abstract:** This presentation will focus on the cognitive radio work at CRC which essentially falls into 3 categories:(1) the work on standards development, (2) the work of cognitive radio enhancements to IEEE 802.16 systems (primarily in the realm of co-channel interference control in support of MIMO and other operations), and (3) the work on cognitive radio overlays to the well established WiFi technology to develop intelligent municipal WiFi and low cost rural WiFi backhaul networks.

*[ Presentation ] [ Biographies ]*

P3-2 Didier Bourse (Motorola), "CR-related Research activities in Europe: the E<sup>2</sup>R II and E3 Projects"

**Abstract:** Presentation of the key achievements from the FP6 EC E2R Programme and highlights of the FP7 E3 Project ambitions. This presentation will cover technical, business, standardization and regulatory perspectives.

*[ Presentation ] [ Biography ]*

P3-3 Stephen Ward (MMI), Topic: "Current industry efforts in the USA"

**Abstract:** Recent success within industry areas (for example 'DFS upgrades via SDR') and Visions for future success (for example 'Exploiting Television white space').

*[ Not Presented ] [ Biography ]*

P3-4 Yvon Livran and Christophe Le Martret (Thales Communications), "Urban Planning for Radiocommunications (URC)"

**Abstract:** The purpose of the URC project is to promote cognitive radio based systems in dense urban environment and to study adapted regulation tools. These tools should be able to ensure both optimization of spectrum usage and advanced regulation for security in the usage of the spectrum.

*[ Presentation ] [ Biographies ]*

Questions and Answers (15 min)

**17:00 - 17:30**

**Closing Session**

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