

WRC-12 Agenda Item 1.19:

Shaping the International Regulatory Framework for Software Defined and Cognitive Radio Systems

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ABSTRACT

World Radiocommunication Conferences, held roughly every four years, convene to consider amendments to international regulations and spectrum allocations necessary to accommodate new technologies and applications. The agenda for the next WRC, scheduled for January 23-February 17, 2012, in Geneva, invites delegates “to 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” Some of the issues being considered in these studies are discussed.

KEY WORDS: software defined radio, cognitive radio, regulation

The International Telecommunication Union convenes periodic World Radiocommunication Conferences (WRCs), each roughly four years apart. The next conference (WRC-12) is scheduled from January 23-February 17, 2012, in Geneva. In addition to changes to the international table of allocations (such as the assignment of the 30, 17, and 12-meter bands to the amateur service in 1979 and the reallocation of 7100-7200 kHz to the amateur service on a nearly worldwide basis in 2003), these conferences consider changes to other aspects of the ITU Radio Regulations, which are often incorporated within individual administrations’ more detailed national regulations.

The agenda for each WRC is set by the preceding conference. Among the items on the agenda for WRC-12 is consideration of whether new regulatory measures are necessary or desirable for software defined or cognitive radio systems. Among other items, WRC-12 is charged:

to 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 (WRC 07);*

* FINAL ACTS, 2007 WORLD RADIOCOMMUNICATION CONFERENCE, Resolution 805, Agenda Item 1.19.

Resolution 956 is printed at the end of this paper for reference.

The studies on this agenda item are being conducted within ITU-R Working Party 1B, with input from other Working Parties describing software defined and cognitive radio applications in their areas of competence. The amateur radio service has opportunity to contribute through Working Party 5A, along with the fixed and land mobile services above 30 MHz.

The studies are broadly focused, with ITU-R merely invited “to study whether there is a need for regulatory measures related to the application of” cognitive technologies or software defined radio. With a focus this broad, the results can be wide-ranging, and provide as much opportunity for mischief as for a helpful outcome.

Much of the work so far has been focused on potential definitions for software defined and cognitive radio systems. The concept and definition of software defined radio is proving much less controversial than those of cognitive radio systems, largely because cognitive systems don’t easily fit into the existing paradigm of spectrum management via allocations to services. Although revolutionary in many ways, software defined radio functions in the same practical way that a conventional radio does when transmitting and receiving. They are easily used within the existing regulatory framework, and no change is likely to the Radio Regulations beyond a definition.

The numerous issues related to cognitive radio systems are specified in Resolution 956. Some administrations have suggested that these issues require spectrum to be allocated solely for use by cognitive radio systems, a move which many administrations, including our own, are resisting.

ARRL is represented in the WRC-12 preparation process by the staff of the ARRL Technical Relations Office in Fairfax, Virginia. We welcome input from our membership and from experimenters on this issue and others before WRC-12. By the time the DCC convenes, Working Party 1B will have concluded its September meetings in Geneva, and I intend to discuss the latest developments in my presentation at Elk Grove.

RESOLUTION 956 (WRC-07)

Regulatory measures and their relevance to enable the introduction of software-defined radio and cognitive radio systems

The World Radiocommunication Conference (Geneva, 2007),

considering

- a) that cognitive radio and self-configuring networks are expected to provide additional flexibility and improved efficiency to the overall spectrum use;
- b) that ITU-R is already studying such advanced radio technologies, their functionalities, the key technical characteristics, requirements, performance and benefits (Question ITU-R 241/8);
- c) that studies have shown that software defined radio using cognitive control mechanisms is an approach for achieving better spectrum utilization, dynamic spectrum management, and flexible spectrum use (Report ITU-R M.2064)*;
- d) that considerable research and development is being carried out on cognitive radio systems and related network configurations such as self-configuring networks;
- e) that cognitive radio systems may cover a number of radio access techniques (RATs);
- f) that cognitive radio systems include self-configuring networks of different network topologies that will be able to set their spectrum usage based on the locally available spectrum;
- g) that without any information about the location and characteristics of other RATs within the covered frequency range reachable from the mobile terminal, it will be necessary to scan the whole tuning range in order to discover the local spectrum usage, which will result in a huge power and time consumption;
- h) that without additional means, it may not be possible to discover receive-only usage;
- i) that some studies indicate usefulness to have means to assist in the determination of the local spectrum usage, such as wireless or wired access to a database or to other networks;
- j) that some studies indicate a possible need for a worldwide harmonized cognitive supporting pilot channel with a bandwidth less than 50 kHz, whilst other studies indicate that the availability of a database could support access and connectivity, and therefore support the use of these systems,

* *Note by the Secretariat:* This Report was suppressed in June 2007. The subject matter is now covered by Report ITU-R M.2117.

resolves to invite ITU-R

1 to study whether there is a need for regulatory measures related to the application of cognitive radio system technologies;

2 to study whether there is a need for regulatory measures related to the application of software-defined radio,

resolves further

that WRC-11[†] consider the results of these studies and take the appropriate actions.

[†] BTP Note—WRC-12 was originally scheduled for Fall 2011 and styled WRC-11. The 2012 date were ratified by ITU member states by a consultation concluded in August 2009.