

International Telecommunication Union

ITU-R
Radiocommunication Sector of ITU

Report ITU-R SM.2152
(09/2009)

**Definitions of Software Defined Radio (SDR)
and Cognitive Radio System (CRS)**

SM Series
Spectrum management



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Foreword

The role of the Radiocommunication Sector is to ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including satellite services, and carry out studies without limit of frequency range on the basis of which Recommendations are adopted.

The regulatory and policy functions of the Radiocommunication Sector are performed by World and Regional Radiocommunication Conferences and Radiocommunication Assemblies supported by Study Groups.

Policy on Intellectual Property Right (IPR)

ITU-R policy on IPR is described in the Common Patent Policy for ITU-T/ITU-R/ISO/IEC referenced in Annex 1 of Resolution ITU-R 1. Forms to be used for the submission of patent statements and licensing declarations by patent holders are available from <http://www.itu.int/ITU-R/go/patents/en> where the Guidelines for Implementation of the Common Patent Policy for ITU-T/ITU-R/ISO/IEC and the ITU-R patent information database can also be found.

Series of ITU-R Reports

(Also available online at <http://www.itu.int/publ/R-REP/en>)

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RA	Radio astronomy
RS	Remote sensing systems
SA	Space applications and meteorology
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SM	Spectrum management

Note: This ITU-R Report was approved in English by the Study Group under the procedure detailed in Resolution ITU-R 1.

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REPORT ITU-R SM.2152

Definitions of Software Defined Radio (SDR) and Cognitive Radio System (CRS)

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1 Introduction

Under the framework of World Radiocommunication Conference 2012 Agenda item 1.19, “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)”, ITU-R Working Party 1B has developed definitions of Software Defined Radio (SDR) and Cognitive Radio System (CRS) to assist in the conduct of studies and related preparations for the second session of the Conference Preparatory Meeting for WRC-12 (CPM11-2).

To this effect this Report contains two sections to make clear the distinctions between SDR and CRS technologies.

Sections One and Two of this Report establish, respectively, clear definitions of Software Defined Radio (SDR) and Cognitive Radio System (CRS) to provide common understanding and facilitate their use in an unambiguous way in ongoing work by the ITU-R.

2 Definitions**SECTION ONE****Definition of Software Defined Radio (SDR)**

“*Software-defined radio (SDR)*: A radio transmitter and/or receiver employing a technology that allows the RF operating parameters including, but not limited to, frequency range, modulation type, or output power to be set or altered by software, excluding changes to operating parameters which occur during the normal pre-installed and predetermined operation of a radio according to a system specification or standard.”

SECTION TWO**Definition of Cognitive Radio System (CRS)**

“*Cognitive radio system (CRS)*: A radio system employing technology that allows the system to obtain knowledge of its operational and geographical environment, established policies and its internal state; to dynamically and autonomously adjust its operational parameters and protocols according to its obtained knowledge in order to achieve predefined objectives; and to learn from the results obtained.”
