

## Energy Efficient Cognitive Radio Spectrum Sensing for 5G Networks – A Survey

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### Abstract

#### INTRODUCTION

Recently, the role of Artificial Intelligence plays a major role in the communication sector. As the revolution of spectrum and its standards is progressing towards 5G networks and beyond, there is a rapid innovation in design of 5G compatible gadgets in order to incorporate evolving wireless spectrum standards. Cognitive radio is an intelligent technology that can efficiently handle the radio spectrum usage.

#### OBJECTIVES

Researchers have been working since its inception to use this revolutionary technology in the management of the radio spectrum for both terrestrial and satellite communication. For 5G networks, research works focus on enabling efficient utilization of its features like extreme broadband, ultra-low latency communication, and ultra reliable connectivity for connected devices.

#### CONCLUSION

In this paper, energy efficient spectrum sensing schemes and challenges of 5G networks are explored and this review will assist any researcher/service provider/mobile communication sector to quickly select and apply relevant energy efficient spectrum sensing techniques using dynamic intelligent cognitive radio technology to incorporate either Co-operative, Non-Cooperative or Interference based techniques based on their application. to show how conventional energy efficient spectrum sensing techniques used in cognitive radio networks can be efficiently applied to 5G terrestrial applications.

**Keywords:** 5G radio networks, cognitive radio, energy efficient spectrum sensing

Received on 13 February 2021, accepted on 24 March 2021, published on 29 March 2021

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doi: 10.4108/\_\_\_\_\_

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### 1. Introduction

Next generation 5G networks are the mobile standards developed by ITU (International Telecommunication Union) established by a set of international bodies. Recently consumer demands are shaping the development of mobile broadband services. Innovative technologies will cause high traffic rate nearly 10-100 times during 2020-2030, with increased number of devices and along with demand for improved affordability and user

experience. It is expected that in 2025, the amount of devices to be connected over the Internet for communication is proposed to reach over 50 billion. This smart communication network can transport massive data much faster and connect an incredibly large number of devices efficiently. Once the IMT-2020 (International Mobile Telecommunication) specifications are finalized the first full-scale commercial deployments for 5G are expected to increase. Global stakeholders at the WRC-19 (World Radio Communication Conference 2019) reached

















