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Reconfigurable Radio Systems (RRS); Feasibility Study on Control Channels for Cognitive Radio Systems

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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Reconfigurable Radio Systems (RRS).

Introduction

For the efficient operation of Cognitive Radio Systems, mechanisms with that will allow for the exchange and distribution of information as well the coordination between various management entities are essential. In this respect, Control Channels have been identified as a key feature required for Cognitive Radio Systems, as means for transmitting elements of information necessary to manage and realize various operations within a Cognitive Radio Systems. In this scope, the present document aims to identify and study communication mechanisms:

1) for the coexistence and coordination of different cognitive radio networks and nodes, operating in unlicensed bands like the ISM band or as secondary users in TV White Spaces;

2) for the management of Operator-governed Opportunistic Networks, operating in the same bands as mentioned above. In particular, it is expected that these networks will include mechanisms for operator-governed ad-hoc coverage extensions or capacity extensions of infrastructure networks. The communication is expected to include procedures from terminal to terminal as well as between a terminal and infrastructure networks.

These mechanisms could be radio access technology (RAT) specific or/and be RAT-independent.

Further on, the present document presents and analyses implementation options for Control Channels for Cognitive Radio Systems, taking into account previous work on in-band-Cognitive Pilot Channel (CPC) and Cognitive Control Channel (CCC). The investigation of implementation options is a crucial step towards the realisation of the Control Channels and the deployment of Cognitive Radio Systems.

1 Scope

The present document aims to identify and study potential communication mechanisms on Control Channels for Cognitive Radio Systems:

1) for the coexistence and coordination among different cognitive radio networks and nodes, operating in unlicensed bands like the ISM band or as secondary users in TV White Spaces;

2) for the management of operator-governed Opportunistic Networks, operating in the same bands as mentioned above.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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2.1 Normative references

The following referenced documents are necessary for the application of the present document.

Not applicable.

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ITU-R Report M.225: "Introduction to cognitive radio systems in the land mobile service", 2011.

[i.2] ITU-R Report SM.2152: "Definitions of Software Defined Radio (SDR) and Cognitive Radio System (CRS)", September, 2009.

[i.3] ETSI TR 102 683: "Reconfigurable Radio Systems (RRS); Cognitive Pilot Channel (CPC)".

[i.4] ETSI TS 122 234 (V7.5.0): "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Requirements on 3GPP system to Wireless Local Area Network (WLAN) interworking (3GPP TS 22.234 version 7.5.0 Release 7)".

[i.5] ETSI TS 136 300: "LTE; Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 (3GPP TS 36.300)".

[i.6] ETSI TS 124 302: "Universal Mobile Telecommunications System (UMTS); LTE; Access to the 3GPP Evolved Packet Core (EPC) via non-3GPP access networks; Stage 3 (3GPP TS 24.302)".

[i.7] ETSI TR 102 907: "Reconfigurable Radio Systems (RRS); Use Cases for Operation in White Space Frequency Bands".

[i.8] IETF Working Group on Protocol to Access WS database (paws).

NOTE: Available at http://datatracker.ietf.org/wg/paws/charter/.