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Proceedings

# Dr. Apurva N. Mody

### Brief Biography:

Dr. Apurva N. Mody (apurva.mody@ieee.org) is the Chairman of IEEE 802.22 Working Group (WG) on Wireless Regional Area Networks (WRANs) (www.ieee802.org/22). He is also the Chairman of the Whitespace Alliance

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(www.WhiteSpaceAlliance.org). The IEEE 802.22 Wi-FAR$^{TM}$/ Super Wi-Fi Standards will support Cognitive Radio (CR) based use of the TV Band WhiteSpaces to enable regional and rural broadband wireless access serving more than 3.5 Billion people. Other Machine to Machine applications will drive the volumes. Under Dr. Mody' s leadership, the IEEE 802.22 WG is the recipient of the IEEE SA Emerging Technology Award. Dr. Mody received his Ph. D. in Electrical Engineering from Georgia Institute of Technology. His research was based on Receiver Implementation for Multiple Input Multiple Output Orthogonal Frequency Division Multiplexing Systems. Dr. Mody was granted five patents through his Ph. D. research which were later sold to Intellectual Ventures. Since June 2005, he has been also performing research on Cognitive Radio systems. Dr. Mody has contributed to the field of Machine Learning based Cognitive Communications in White as well as Gray Spaces, feature based spectrum sensing, signal classification, co-existence techniques, security for CR based systems, information fusion, game theoretical decision making, policy based management etc. Dr. Mody has played a pivotal role in growing the expertise and market share for his company on CR, Dynamic Spectrum Access (DSA) related programs. Dr. Mody has been a key contributor on many programs and invited speaker at many Government and commercial events. Dr. Mody has published more than 50 conference and journal publications and is an author of more than 15 US and international patents.

Dr. Mody is the Senior Member of the IEEE, President' s Fellow while at Georgia Tech, Member of Tau Beta Pi and Eta Kappa Nu Honor Societies.

Speech Theme

From WhiteSpace Enabled Rural Broadband to Cognitive M2M

Speech Description

Regulators all over the world have realized the importance of WhiteSpaces. WhiteSpaces are the un-used or under-utilized portions of the spectrum. There is an on-going debate on licensed vs license-exempt use of this spectrum. Currently 73% of the people in the world do not have internet access. Nearly 3.5 Billion people live in rural areas with hardly any internet availability. License-exempt use of WhiteSpaces enabled through Cognitive Radio (CR) technology has the potential to change all that and benefit many emerging economies such as Brazil. Other Machine to Machine (M2M) applications will drive up the volumes. WhiteSpace spectrum can support a wide variety of applications including regional and rural area broadband access, local area networks, hot-spots, health-care applications, cellular off-load, smart utility networks, remote control and monitoring applications, home-land security, disaster-recovery etc. Skeptics exist but

recently, CR related research has seen an explosive growth all over the world, and software radio defined test-beds and prototypes are being tested and deployed in many parts of the world already. The first part of the presentation will describe ideas and results on machine learning based cognitive communications in White as well as the Gray space. The second part of the talk will focus on IEEE 802.22 Standards and WhiteSpace Alliance activities to promote this eco-system and other standards such as 3GPP / LTE, IEEE 802.19.a, IEEE P1900, IETF etc.

*Further Information on WhiteSpace Alliance:* The mission of the Whitespace Alliance (www.WhiteSpaceAlliance.org) is to promote the development, deployment and use of standards based products and services as a means of providing broadband capabilities via TV band and other emerging WhiteSpaces. By promoting the use of standards, the Alliance will enable companies to provide broadband connectivity at reasonable cost. The WSA will also act as an enabler of the emerging white spaces ecosystem through educational activities and helping to put in place interoperability, conformance, and compliance testing to make sure that our member stakeholders get the needed information & collaborations to succeed both in the market place and with regulatory requirements. WhiteSpace Alliance will promote the use of IEEE, 3GPP and IETF Standards for use in the WhiteSpaces.

*Further Information on the IEEE 802.22 Standard:* IEEE 802.22 systems will provide broadband access to wide regional areas around the world and bring reliable and secure high-speed communications to under-served and un-served rural communities, which are estimated to include nearly half of the worlds population. The IEEE 802.22-2011 is the first IEEE 802 Standard for operation in the Television (TV) Whitespaces, defined as the available or un-occupied TV channels. It is also the first IEEE Standard that focuses on broadband connectivity in rural areas where most vacant TV channels can be found, thus helping to bridge the digital divide. IEEE 802.22 Working Group is the recipient of the IEEE SA Emerging Technology Award. This new standard for Wireless Regional Area Networks (WRANs) takes advantage of the favorable transmission characteristics of the VHF and UHF TV bands to provide broadband wireless access over a large area up to 100 km from the transmitter. Each WRAN could deliver 22 Mbps to 29 Mbps, depending upon the country of deployment, without interfering with reception of existing TV broadcast stations. IEEE 802.22 incorporates advanced cognitive radio capabilities including dynamic spectrum access, incumbent database access, accurate geo-location techniques, spectrum sensing, regulatory domain dependent policies, spectrum etiquette, and self-coexistence for optimal use of the available spectrum. The new IEEE P802.22b amendment proposes to support enhanced broadband and monitoring applications.

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