Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Fostering Innovation and Investment in the	)	GN Docket No. 09-157
Wireless Communications Market	)	
	)	
A National Broadband Plan for the Commission's	)	GN Docket No. 09-51
Future	)	

COMMENTS OF THE SDR FORUM™

I.   INTRODUCTION

The SDR Forum™ (the "Forum") respectfully submits these comments in response to the Commission's *Notice of Inquiry* [1]in which the Commission seeks comment on a wide range of important spectrum policy and other issues to gain a better understanding of the factors that encourage innovation and investment in wireless so that it may take concrete steps to support and encourage further innovation and investment. The Forum welcomes this opportunity and supports the Commission's efforts to promote innovation, especially in connection with new and innovative software defined radio (SDR) and cognitive radio (CR) technologies that are on the verge of potentially improving spectrum access and efficiency more than any past advances in technology.

A.   Summary

These comments re-introduce the Commission to the Forum and identify our recent and ongoing projects. Those projects focus on facilitating innovations in SDR and CR technologies to enable a range of new capabilities, including dynamic spectrum access (DSA), increased efficiency and improved interference mitigation in wireless systems and networks. The work of the Forum's members also addresses SDR and CR technology innovations that will improve interoperability, efficiency and performance for Public Safety and Homeland Security wireless communications. The Forum invites the

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[1] *Fostering Innovation and Investment in the Wireless Communications Market*, GN Docket No. 09-157, Notice of Inquiry, FCC 09-66 (Aug. 27, 2009) ("*Innovation NOI*").

Commission and its staff to review, monitor and participate in these projects and we generally encourage the Commission to collaborate with the broader wireless research and development (R&D) community across other federal government agencies, academia and industry to facilitate wireless innovation and experimentation.

B.   About the Forum

Established in 1996, the Forum is an international non-profit "mutual benefit corporation" whose 100-plus strong membership comprises world class technical, business and government leaders dedicated to driving technology innovation in commercial, civil, and defense communications worldwide. Forum members include organizations at all levels of the wireless value chain[2] who are passionate about creating a revolution in wireless communications based on reconfigurable radio. These members work through the Forum to address emerging wireless communications requirements through enhanced value, reduced total life cost of ownership and the responsive and rapid deployment of standardized families of products, technologies, and services.[3] The Forum provides to these members a venue within which to interact with customers, partners, colleagues, and regulators to educate decision makers, to develop and expand markets and to advance relevant technologies.[4]

The Forum has a long history of working with the regulatory community in addressing important wireless and spectrum policy issues like those raised in the *Innovation NOI* and providing reliable information. Guided by the Forum's Regulatory Committee and through the Board of Directors,[5] the

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[2] SDR Forum, *Software Defined Radio - Value Chain*, available online at http://www.sdrforum.org/pages/aboutSdrTech/valueChain.asp.

[3] *See* SDR Forum, *2008 to 2011 Strategic Plan* (Jan. 2008), available online at http://www.sdrforum.org/pages/aboutTheForum/SDR_Forum_2008to2011_Strat_Plan.pdf.

[4] *See* SDR Forum, *2009-2010 Operations Plan* (Jan. 2009), available online at http://www.sdrforum.org/pages/aboutTheForum/SDRForum_2009_Operations_Plan-Public.pdf.

[5] In addition, an international Regulatory Advisory Committee has been established by the Forum to provide advice and guidance to the Forum in support of the work of the Regulatory Committee. *See* SDR Forum, *Regulatory*
(continued….)

Forum has made a number of contributions to important Commission wireless proceedings and study

groups of the International Radio Union's Radiocommunication Sector (ITU-R), including the following:[6]

- Comments and Reply Comments, *Inquiry Regarding Software Defined Radios*, ET Docket No. 00-47 (2000)

- Comments and Reply Comments, *Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets*, WT Docket No. 00-230 (2001)

- Comments, *Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems*, ET Docket No. 00-258 (2001)

- Comments and Reply Comments, *Authorization and Use of Software Defined Radios*, ET Docket No. 00-47 (2001)

- Comments, *Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band*, ET Docket No. 02-380 (2003)

- Comments, *Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies*, ET Docket No. 03-108 (2004)

- Comments, *Creation of a Spectrum Sharing Innovation Test-Bed*, ET Docket No. 06-89 (2006)

- Comments, *Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band*, PS Docket No. 06-229 (2007 and 2008)

- Comments, *Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval*, ET Docket No. 03-201 (October 12, 2007)

- Contribution to ITU-R Working Party 5A, *Working Document Towards a Preliminary Draft New Report on Cognitive Radio in Land Mobile Service* (2008)

(Continued from previous page) ⎯⎯⎯⎯⎯⎯⎯⎯⎯

Advisory Committee Charter (April 2009), available online at
http://www.sdrforum.org/pages/aboutTheForum/Regultory_Advisory_Committee_Charter.pdf.   In light of the fact that many, if not all, of the Advisory Committee members are government officials and subject to certain ethical obligations and restrictions, the Forum, the Regulatory Committee and Advisory Committee members are at all times aware of, sensitive to and in compliance with such obligations and restrictions. Accordingly, no Advisory Committee member has participated in the development of these comments.

[6]A list of the Forum's regulatory inputs and other publications is contained in Appendix A and available at http://www.sdrforum.org/pages/documentLibrary/documentLibrary_approved.asp.

- Contributions to ITU-R Working Party 8F:
    o *Working Document Towards Preliminary Draft New [Report/Recommendation]: Software Defined Radio* (2004)
    o *Working Document Towards Preliminary Draft New Recommendation: Software Defined Radio and Related Technologies* (2002)
    o *Information on Download and Regulatory Issues for Software Defined Radio, (2002)*

The Forum welcomes the opportunity to continue this long, productive relationship through support of the Commission's efforts in developing the National Broadband Plan and its spectrum policy agenda.

II. THE FORUM IS A KEY AND RELIABLE SOURCE FOR UNDERSTANDING WIRELESS INNOVATION

The *Innovation NOI* seeks comment on a number of questions intended to help the Commission understand "the state of both innovation and investment in wireless communications and the Commission's role in promoting them more generally."[7] In response to the Commission's questions about data sources, publications, conferences and industry meetings,[8] we recommend that that the Commission staff consult certain Forum publications and market studies and participate in the Forum's projects, conferences, meetings and workshops. In doing so, a wealth of information may be obtained on the wide range of questions raised by *Innovation NOI* in connection with facilitating access to spectrum for new wireless uses and users, protecting against "harmful interference" and promoting band sharing and efficient use.

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[7] *Innovation NOI* at ¶ 10.

[8] *Id*.

A.   Forum Publications

Over the past several years, the Forum has developed a number of reports, recommendations and specifications which will assist and inform the Commission along with other wireless stakeholders.[9] Those relevant to the *Innovation NOI* include the following:

- *Cognitive Radio Definitions* (2007): Provides a common set of definitions in the area of software defined radio and cognitive radio in support of the IEEE P1900.1 effort.[10]

- *Cognitive Radio Definitions and Nomenclature* (2008): Expands on the definitions developed in 2007 to explore the different architectural aspects of cognitive radio and place them in a coherent framework.

- *Use Cases for Modeling Language for Mobility (MLM) in Modern Wireless Networks* (2009): Defines the uses cases for a machine interpretable language providing the ability to negotiate and control reconfigurable radio systems.

- *High Level SDR Security Requirements* (2006): Identifies the requirements for addressing potential security issues inherent in deploying SDR and CR technologies.

- *Utilization of SDR Technology for the 700 MHz Public/Private Partnership* (2008): Describes how SDR, CR and DSA technologies can help achieve the public/private partnership goals of the national broadband network planned for the 700 MHz frequency band.

- *Use Cases for Cognitive Applications in Public Safety Communications Systems - Volume 1: Review of the 7 July Bombing of the London Underground* (2007): First in a series of reports to develop concepts for the application of cognitive radio technology to enhance the communications capabilities of public safety first responders.

- *Software Defined Radio Technology for Public Safety* (2006): Assess the potential of and issues associated with SDR technology for the public safety/public protection and disaster response applications.

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[9] A complete list of Forum publications is contained in Appendix A and available at http://www.sdrforum.org/pages/documentLibrary/documentLibrary_approved.asp.

[10] These definitions were adopted in their entirety in IEEE 1900.1-2008, *Standard Definitions and Concepts for Dynamic Spectrum Access: Terminology Relating to Emerging Wireless Networks, System Functionality, and Spectrum Management*.

B. Market Studies.

In addition, the Forum has commissioned a number of market studies exploring the adoption of advanced wireless technologies in domains such as commercial cellular infrastructure, vehicle telematics, and the U.S. public safety market.[11] While these studies are typically available only to members, the Forum would be happy to share the results of these reports with the Commission staff upon request.

C. Ongoing Projects

In addition to these completed works, the members of the Forum also have a number of work products that are under development that may assist the Commission and wireless stakeholders' understanding of related innovations.[12] These current projects include the following:

- Use Cases for Cognitive Radio Technology in Public Safety Systems Part 2 – Chemical Plant Scenario

- Study of C-Band Spectrum Sharing Techniques Between SATCOM and Terrestrial Users Based on Software Defined Radio and Cognitive Radio Technology

- Quantifying the Benefits of Cognitive Radio

- Cognitive Radio Database – a Radio Environment Map Anticipating Future Cognitive Radio Needs

- Programmable Baseband Processing Technologies

- Modeling Languages for Mobility Specification

- Security Profiles for Public Safety Radios

- Securing Software Reconfigurable Communications Devices

- Test and Measurement of Unique Features for Software Defined and Cognitive Radios

- Transceiver Facility Specification

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[11]A complete list of these market studies is located in Appendix B and available at http://www.sdrforum.org/pages/documentLibrary/documentLibrary_studies.asp.

[12] A complete list and summaries of these current projects are contained in Appendix C and available at http://www.sdrforum.org/pages/aboutTheForum/currentProjects.asp.

As relevant reports, specifications and recommendations are published, the Forum will submit them to the Commission for inclusion in the record of this and other appropriate Commission proceedings.

D. Key Affiliations

In developing work products, the Forum and its members rely upon strong relationships with partner organizations, including standards bodies and other industry consortia.[13] A key element of the Forum's strategic plan is to collaborate with and compliment organizations having common or overlapping interests, establishing the Forum as a single location where members and other stakeholders can come to understand and influence a wide range of third-party projects. Relevant Forum affiliations include the following:

- International Telecommunications Union, Radiocommunication Sector (ITU-R, Associate Member)

- IEEE Standards Association (Corporate Member)

- European Telecommunications Standards Institute (ETSI) Technical Committee on Reconfigurable Radio Systems (TC RRS)

- End-to-End Efficiency (E3) Program

- Wireless World Research Forum (WWRF)

- Institute of Electronics Engineers of Korea

- Institute of Electronics, Information and Communications Engineers (IEICE) Technical Committee on Software Radio in Japan

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[13] A complete list of the Forum's partnerships is available at
http://www.sdrforum.org/pages/aboutTheForum/forumPartnerships.asp.

E. Conferences and Meetings

The Forum believes that Commission staff will gain a greater understanding of emerging wireless innovations through participation in the growing number of conferences and workshops on advanced wireless developments, including those held or sponsored by the Forum. Of particular interest is the Forum's annual Technical Conference and Product Exhibition. Attracting more than 400 attendees representing all levels of the wireless value chain, this conference is the ideal place to learn about the latest in advanced wireless technologies. This is the only conference of its kind centered on advanced reconfigurable radio technologies. The Forum makes the proceedings from each conference available online to the public.[14] This year's conference is being held in December in Arlington, Virginia and will feature 14 tutorials, several workshops, advanced technology demonstrations and more than 100 papers in 20 technical sessions.[15] Many Commission staff members have been invited to participate.

In addition, throughout the year, the Forum holds General Meetings of its members and other interested stakeholders. These meetings comprise working sessions of the Forum's work groups, task groups, and special interest groups and are used to advance the Forum's annual operations plan in support of the commercial, public safety, satellite communications, and international tactical radio communities. The Forum generally holds one or more workshops in conjunction with each General Meeting to explore in detail a topic that is relevant to a large base of the Forum's members. Recent workshops addressed the following topics:

- *Rapid FPGA Development for Wireless Applications – IP Cores, Tools, and Standards* (Sept. 2009) – This workshop armed communications systems engineers with the knowledge they need to implement SDR and CR systems that utilize FPGA based processing.

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[14] *See* http://www.sdrforum.org/pages/conferenceProceedings/conferenceProceedings.asp.

[15] For more information, *see* http://www.sdrforum.org/sdr09/index.html.

- *Spectrum Sharing of TV Band Devices* (June 2009) – This workshop explored the common standards and/or practices for spectrum sharing needed across otherwise incompatible TV band devices and networks.

- *Smart Communications in Transportation Systems* (June 2009) – This workshop allowed vehicle manufacturers and government officials world-wide to come together with leading experts in reconfigurable radio technologies to discuss the technical and business advantages offered by SDR and CR technologies in modern transportation systems.

- *European Reconfigurable Radio Technologies Workshop and Product Exposition* (April 2009, Madrid, Spain) – This inaugural event brought together wireless telecommunications equipment manufacturers with their customers and suppliers to explore the evolution of reconfigurable radio over the next several years.[16]

- *Government and Industry R&D Agendas for Next Generation Radio Technologies* (Sept. 2008) – This workshop explored key issues in radio communications in which both government and commercial organizations will be looking to address over the next 3 to 5 years through R&D activities and provided attendees insight into the future communications needs to help identify areas for collaborative R&D investment.

- *Frequency Agile RF Technologies for Commercial and Defense Applications - A Contrast in Requirements?* (Jan. 2008) – This workshop explored the requirements for radio systems supporting operation over a wide range of spectrum bands in both the commercial and defense markets and presented the state of the art in wireless technologies that address those requirements.

- *Rapid Prototyping and Development* (Sept. 2007) – Key players in the SDR market addressed how their products can be used by the wireless community to accelerate the development cycle for new wireless technologies and speed time to market/deployment for advanced wireless systems and networks for commercial, public safety, and defense users.

The minutes from the General Meetings along with the proceedings from these and other workshops are available online at the Forum's web site.[17] The Forum also co-sponsors a number of other conferences and events worldwide, such as IEEE's International Symposium on Dynamic Spectrum Access Networks (DySpAN).[18]

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[16] The 2nd Annual European Reconfigurable Radio Technologies Workshop will be held in June 2010 in Mainz, Germany.

[17] See http://www.sdrforum.org/pages/forumMeetingArchive/forumMeetingArchive.asp.

[18] *See* http://www.ieee-dyspan.org. Information on these events can be found on the Forum's Event Calendar at http://www.sdrforum.org/pages/upComingEvents/show_calendar.asp.

III. CONCLUSION

This proceeding, along with the Commission's related inquiries into wireless competition and the National Broadband Plan,[19] seek comment on a wide range of important spectrum and wireless policy issues. Many of the Forum's members have participated in the Commission's Broadband Workshops and have filed, or are filing, comments in each of these proceedings and the Forum hopes that the Commission takes their inputs into account, along with the many resources referenced herein, as it develops the National Broadband Plan and its overall innovation-driven agenda.

The Forum is pleased that the Commission continues to recognize that technologies such as software defined and cognitive radios enable more dynamic and robust use of limited spectrum resources.[20] Accordingly, the Forum urges the Commission to continue to promote the development of these innovative technologies by removing unnecessary regulatory barriers and constraints, while, at the same time, ensuring that its technical rules, equipment authorization processes and enforcement mechanisms fairly and properly safeguard against harmful interference and unauthorized spectrum usage.

Respectfully submitted,

/S/ Peter A. Tenhula
Peter A. Tenhula
Chair, Regulatory Committee
SDR FORUM

DATED: 30 September 2009

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[19] *See A National Broadband Plan for Our Future*, GN Docket No. 09-51, Notice of Inquiry, FCC 09-31 (Apr. 8, 2009) (*Broadband Plan NOI*); *Annual Report on Competition in the Mobile Wireless Markets*, WT Docket No. 09-66, Notice of Inquiry, FCC 09-67 (Aug. 27, 2009); *Comment Sought on Spectrum for Broadband*, NBP Public Notice # 6, DA 09-2100 (Sept. 23, 2009).

[20] *Innovation NOI* at ¶ 44; *see also Broadband Plan NOI* at 43-45, *Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies,* ET Docket No. 03-108, Report and Order, 20 FCC Rcd 5486 (2005).

Appendix A: Forum Work Products

The following documents have been balloted by the SDR Forum following the Forum's document approval process and have been approved for public release.[21]

Document Name (and Link)	Type	Year Approved
Use Cases for MLM Language in Modern Wireless Networks	Report	2009
Public Safety SDR Lifecycle Cost Estimation Workbook	Report	2009
Public Safety Radio System Cost Model	Report	2009
Test and Certification Guide for SDRs based on SCA - Part 1: SCA	Report	2009
PIM and PSM for Smart Antenna Specification	Specification	2009
Transceiver Facility Specification	Specification	2009
Cognitive Radio Definitions and Nomenclature	Report	2008
Working Document Towards a Preliminary Draft New Report on Cognitive Radio in Land Mobile Service	Recommendation	2008
Comments of the SDR Forum on the 2nd Notice of Proposed Rulemaking in the Matter of Implementing a Nationwide, Broadband, Interoperable Public Safety Network in the 700 MHz Band	Recommendation	2008
Endorsement of JTRS SCA 2.2.2	Recommendation	2008
Utilization of Software Defined Radio Technology for the 700 MHz Public/Private Partnership	Report	2008
SDRF Cognitive Radio Definitions	Recommendation	2007
Comments on Software Communications Architecture Specification Version 2.2.2	Recommendation	2007
Suggested Tasking on the OMG PIM and PSM for Smart Antenna Request for Proposal	Recommendation	2007
SDR Forum Response to FCC MOO	Recommendation	2007
Comments on NASA Space Telecommunications Radio System	Recommendation	2007

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[21] The documents are of 3 types:

- Specifications - documents designed to provide an SDRF-supported definition of a specific architectural element or interface within a software defined radio system

- Reports - used by the Forum to formally present the current state of some relevant topic with the Software Defined Radio community (regulations, markets, business, etc.)

- Recommendations - documents provided by the Forum to other organizations, such as the ITU, FCC or the JTRS JPEO, to provide guidelines or opinions

(STRS)		
SDR Forum Comments on The FCC Memorandum Opinion and Order and Further Notice of Proposed Rulemaking (NPRM) Adopted June 19, 2007	Recommendation	2007
Considerations and Recommendations for Software Defined Radio Technologies for the 700 MHz Public/Private Partnership	Recommendation	2007
Use Cases for Cognitive Applications in Public Safety Communications Systems - Volume 1: Review of the 7 July Bombing of the London Underground	Report	2007
High-Level SDR Security Requirements	Specification	2006
Software Defined Radio Technology for Public Safety	Report	2006
SDR Forum Design Process and Tools Working Group RFI Final Report	Report	2006
SDRF Change Proposals and Comments on JTRS SCA 3.0 Specialized Hardware Supplement	Recommendation	2005
Input to ITU WP8F Report/Recommendation on Advanced Technology	Recommendation	2004
Submission to JTRS JPO from SDR Forum regarding DSP and FPGA portability standardization effort	Recommendation	2004
SDR Forum Comments to FCC in the Matter of Facilitating Opportunities for Flexible, Efficient, and Reliable Spectrum Use Employing Cognitive Radio Technologies and Authorization and Use of Software Defined Radios	Recommendation	2004
Comments Relating to Development of a Preliminary Draft New Report on SDR	Recommendation	2004
Software Defined Radio Commercial Handset Guidelines	Specification	2004
Hardware Abstraction Layer Working Group Report on Results of Request For Information	Report	2004
Security Considerations for Operational Software for Software Defined Radio Devices in a Commercial Wireless Domain	Report	2004
Information and Proposed Actions Relative to ITU-R Document on SDR	Recommendation	2003
API Position Paper	Recommendation	2003
Business Model for Wireless PCS	Report	2003
Research and Development Working Group 2002 Summary Report	Report	2003
Report on Issues and Activity in the Area of Security for Software Defined Radio	Recommendation	2002

Information from SDR Forum on Download and Regulatory Issues for Software Defined Radio	Recommendation	2002
Requirements for Radio Software Download for RF Reconfiguration	Specification	2002
Working Document Towards Preliminary Draft New Recommendation Software Defined Radio and Related Technologies	Recommendation	2002
SDR Forum contributions to the ITU-R Working Party 8F	Recommendation	2002
Base Station System Structure	Report	2002
Overview and Definition of Software Download for RF Reconfiguration	Report	2002
SDR System Security	Report	2002

Appendix B: Market Studies

Market studies are commissioned by the commissioned by the Forum on behalf of its members and made available to representatives of member organizations.

The Telematics Market (June 2007)
This report provides a comprehensive look at initiatives by the automotive industry and government transportation organizations to utilize computer and communications technology to enhance the public's automobile travel experiences.

The Cognitive Radio Market (June 2007)
This report provides a comprehensive look at the technology that many industry stakeholders identify as an essential enabling technology to achieve future goals in key wireless industry market segments, including the commercial, public safety and military sectors.

The U.S. Public Safety Market (May 2007)
The report summarizes the results of interviews with public safety communication officials from around the country, and provides a comprehensive look at a very fragmented market consisting of a multitude of federal, state and local agencies; city, county and regional jurisdictions; and police, fire and emergency medical functions.

Wi-Fi, WiMAX, and Beyond 3G/4G (May 2007)
This report provides a comprehensive look at the broadband wireless access market opportunities for the SDR community and the challenges it faces.

The Cellular Industry- Terminals and Infrastructure (September 2005)
This report provides a comprehensive look at the largest potential market segment for SDR technologies.

Market Segmentation and Sizing (March 2005)
This report is the first of a series of SDR market studies commissioned by the SDR Forum. The work to create these SDR market study reports is divided into two phases and multiple reports. This first report provides an overview of the "segment and size" of the most promising market segments with rough order of magnitude estimates and general segment discussions. Follow-on reports provide more detailed segmentation and sizing for each segment and more detailed analysis of requirements, drivers, issues, and business models.

SDR: Altering the Wireless Value Chain (Pioneer Consulting - February 2005)
This report describes the evolution of SDR and the technological advances that have caused SDR to become a viable technology, and provides forecasts of market opportunities for SDR base stations and handsets (units and revenue) until 2014, using Pioneer's proprietary methodology

SDR Operator Market Requirements (October 2003)
This study summarizes the requirements identified by operators participating in the SDR Forum for future technology evolutions. Requirements were gather from responses to a questionnaire distributed in 2003.

Wireless Infrastructure Technology and Markets: the Challenge of 3G (Forward Concepts – Nov. 2002)
The focus of this report is on technology and markets for cellular infrastructure, with emphasis on emerging third-generation (3G) implementation on a world wide basis.

Software Defined Radio: The Opportunity and Challenges of the Next Generation Platform for Mobile Communications (Pioneer Consulting - April 2002)
This report examines the future opportunities for SDR technology on a world wide basis, forecasting market opportunity for both base stations and handsets in each region through the year 2008

SDR Market Survey (January 2002)
This survey compiled the thoughts of industry leaders from wireless operators, civil, military and vendor groups to help define the different requirements

Appendix C: Current Forum Projects

"*Use Cases for Cognitive Radio Technology in Public Safety Systems Part 2 – Chemical Plant Scenario*" – This report is being developed by the Forum Public Safety Special Interest Group and lays the groundwork for regulatory changes, policy and procedure changes, and technology research, development, test & evaluation to evolve and exploit CR technology. The document is being produced for Public safety community leadership, researchers, and product developers who need to understand how cognitive radio technologies can be effectively used by public safety users.

"*Study of C-Band Spectrum Sharing Techniques Between SATCOM and Terrestrial Users Based on SDR and CR Technology*" – This project is being considered by the SATCOM Special Interest Group and will be produced for Terrestrial WiMAX Service Providers and Spectrum Regulators to evaluates the use of SDR and CR technology in WiMax and SATCOM terminals, allowing them to sense and avoid spectral interference with SATCOM and WiMax terminals and base station, facilitating shared use of C-Band spectrum in a non-interference basis.

"*Quantifying the Benefits of Cognitive Radio*" – This report is being developed by the Cognitive Radio Work Group for participants in the worldwide telecommunications and spectrum community who need to understand the benefits of using cognitive radio technologies in next generation wireless systems. The report will act as a contribution to the ITU-R and lays the groundwork for regulatory organizations to understand the benefits and system design choices associated with cognitive radio technologies.

"*Cognitive Radio Database (CRDB) – a Radio Environment Map (REM) anticipating future CR needs*" – This specification is being developed by the Cognitive Radio Work Group for third party database providers and TV Band Device manufacturers to provide database structures and standardized formats and functionalities that supports the flexibility necessary to accommodate current and future cognitive radio spectrum applications, such as mobility, spectrum economic transactions, dropouts, handovers, available networks, and services. This project will also develop guidance for enabling enhanced future cognitive radio databases that can support near-real time updates of location, id, and operating conditions (e.g., interference levels, waveform, associated network) by capturing and synthesizing measurements from many CR devices to allow for more dynamic protection of incumbents, more advanced spectrum allocation mechanisms such as real time spectrum auctions, real-time coexistence, and spectrum brokering between secondary systems.

"*Report on Programmable Baseband Processing Technologies*" - This report is being developed by the Commercial Baseband Processing Technologies Work Group to provide an overview of technologies and tools available for programmable and reconfigurable baseband solutions, educating the advanced wireless community on what is possible, and facilitating the incorporation of SDR technologies in commercial products. This report is being developed for Handset Manufacturers, Infrastructure Manufacturers and Operators needing a clear understanding of available programmable baseband processing technologies in order to define their own roadmaps and adoption of SDR technologies.

"*Modeling Languages for Mobility*" – This specification is being developed by the MLM Work Group for developers of next generation communication systems who want to develop flexible and efficient communication protocols between advanced radio systems to support next generation features of vertical and horizontal mobility, spectrum awareness and dynamic spectrum adaption, waveform optimization, capabilities, feature exchanges, and advanced applications. The final report will include use cases, an ontology for mobility, corresponding signaling plan, requirements and technical analysis of the information exchanges that enable these next generation features and is intended to lead to specifications/standards for languages and data exchange structures to support these capabilities.

"Security Profiles for Public Safety Radios" – This new project will provide a security concept of operations (CONOPS) for public safety SDR and produce a security profile for public safety SDR based on the specification "**Securing Software Reconfigurable Communications Devices**" which is also being finalized by the Security Work Group. The specification is being created for designers, developers and manufacturers of Public Safety SDR Devices who need guidance on the process that should be followed to determine which of the security services would be appropriate and give range of sample analyses. The Security Work Group will invite participation in pre-formation meeting in San Diego for a new sub-group focused on creating a standardized security services API, providing a common software interface for accessing authentication services, cryptographic devices, etc.

"Test and Measurement of Unique Features for Software-Defined/Cognitive Radios" – This document is being developed by the test and measurement work group and identifies the unique test challenges created by systems with SDR/CR features and proposes solutions for a manageable subset of the challenges identified and is being developed for equipment manufacturers, test & measurement vendors, test & evaluation departments, certification authorities and end-users dealing with radio systems supporting SDR/CR features who have to deal with SDR/CR technology-driven features such as dynamic waveform activation, opportunistic scheduling, and policy based operation; features that are not seen in traditional dedicated functionality radio systems.

"Transceiver Facility Specification" – This specification is being developed by the Transceiver Systems Interface Task Group to captures the information needed for interoperability between waveform applications and transceiver subsystems in a radio device**,** expressed as generic and abstract requirements for properties and programming interfaces, including the associated real-time issues. This specification is being prepared for radio system integrators, waveform providers, SDR platform providers and radio head manufacturers, who seek increased efficiency when integrating waveform applications with target platforms (incl. radio heads), and who seek increased portability for their waveform applications. The TSI-TG will also work with the SCA Work Group to create an SCA specific version of the transceiver specification.

Federal Communications Commission

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