Wireless Innovation Forum
Spectrum Sharing Committee Overview

Presented to the FCC

25 February 2015

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Summary

Committee has formed, charter is approved

- Focus on commercializing the 3.55GHz spectrum

Broad participation from across the stakeholder community

- Operators, equipment manufacturers, SAS providers, incumbents, other stakeholders

Initial deliverables have been identified, and work is underway

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History

- July 2013: Multi-stakeholder Group originally proposed in Wireless Innovation Forum's Comments to the FCC regarding the Public Notice on the TAC White Paper and Recommendations for Improving Receiver Performance
- December 2013: Group further elaborated in the Forum Comments to the FCC regarding Licensing Models and Technical Requirements in the 3550-3650 Band
- June 2014: Formation of the group identified in the Forum's FY2015 Operations Plan
- July 2014: Additional Elaboration provided in the Forum's comments to the FCC regarding the Further Notice of Proposed Rulemaking in the Matter of Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band
- October 2014: Initial Formation Meeting held in Washington DC
- December 2014: Second formation meeting held in Washington DC
- January 2015: Final formation meeting held in McLean, VA

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Participation to Date – 35 Organizations

Members

- Alcatel-Lucent Bell Labs*
- AT&T*
- Comsearch*
- Communications Research Centre, Canada
- Federated Wireless*
- Google*
- INTELSAT
- Keybridge Global*
- Lockheed Martin
- MITRE
- Motorola Solutions*
- Nokia Networks*
- Pathfinder Wireless*
- Shared Spectrum Company
- Vistology

**** Denotes Steering Group Member***

Observers

- US NIST
- US NSWC
- US NTIA
- US DISA DSO
- US DoD/CIO
- WiMAX Forum

Guests

- ARRIS
- BAE Systems
- DMI
- Eckert Seamans Cherin & Mellott, LLC
- Ericsson
- Excelon
- iConnectiv
- PTI
- Roberson and Associates
- Satellite Industry Association
- Sprint Corporation
- T-Mobile
- Utilities Telecom Council
- Verizon

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Spectrum Sharing Committee Charter

- **Draft proposal circulated to participants on January 21, 2015**
- **Approved by prospective Committee Members at the 27 January Meeting**
- **Approved by the Wireless Innovation Forum Board of Directors on 10 February 2014**

Charter can be found at http://groups.winnforum.org/page/spectrum-sharing-committee

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Spectrum Sharing Committee: Scope

- Serve as a common industry and government standards body to support the development and advancement of spectrum sharing technologies
- Initial focus on 3.55 GHz, with aims to advance this technology for all applicable spectrum bands that can benefit from it.
- This Committee is intended to facilitate the interpretation and implementation of FCC rulemaking to a level that allows industry and government parties to collaborate on implementation of a common efficient, well functioning ecosystem around this technology.

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Spectrum Sharing Committee: Scope

The main activities that will conducted in the Committee include:

- **Detailing common industry and government functionality and architecture for Spectrum Access Systems (SAS), sensors, and devices**
- **Interoperability requirements and protocol definition to allow for open competitive and well functioning systems**
- **Common framework for testing and integration of components of spectrum sharing technologies to allow for rapid certification and deployment and predictability, thus expanding the ecosystem and increasing utility of the spectrum**
- **Details of requirements, processes, and methods for protection of incumbent users as required by the spectrum rules**
- **Operational procedures definition for the well functioning of the system as it pertains to spectrum assignment, managements and interoperability**

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Spectrum Sharing Committee: Scope

- Emphasis on system interoperability and on achieving simplicity in interfaces and requirements, to advance innovation, competition, and time to market.
- The Committee is a standards and technical implementation forum for industry and government users and developers of the technology and spectrum.
- The Committee is not a policy-making, government certification or liability management body. The committee may, from time to time, make formal technical recommendations to the FCC or other regulatory bodies, to further standards development.
- All activities, recommendations, etc. will follow the Forum's standard policies and procedures

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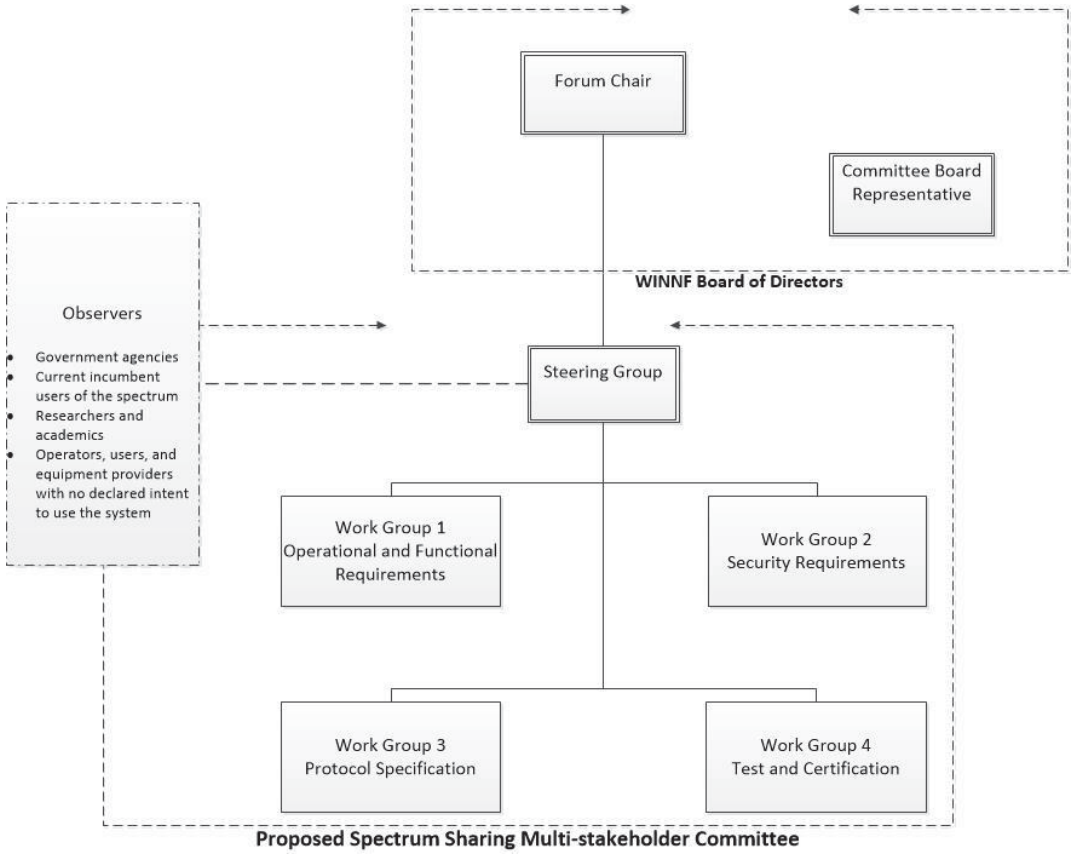
Committee Structure



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Levels of Participation

Class	Composition	Rights and responsibilities	Requirements
Steering Group Member	• Committed SAS developers and operators (engaged in the development of the system and intend on participating in this market) • Committed Sensor and/or Device developers (engaged in the development of the system and intend on participating in this market) • Committed users and service operators (engaged in the development of the system and intend on participating in this market)	Manages the committee Sets project roadmap Approves projects Manages committee budget 1 vote per company. Must attend 3 of 5 meetings to retain voting rights	Forum Membership or Trial Membership Letter of commitment
Regular member	Regular members	Proposes projects, leads projects, supports development of work products, votes at work group and committee level	Forum membership or trial membership
Observers	Individual whose participation is critical to the success of the committee, but who for whatever reason cannot join (regulatory, carrier, etc.)	Supports the steering group in setting roadmap, provides expertise to various work projects	Invitation by Steering Group
Subject Matter Expert	Individual whose participation is critical to the success of a specific project	Supports the development of a single project	Invitation by Working Group Approval by Steering Group

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Spectrum Sharing Committee: Steering Group

- **Manages the overall activity flow to ensure that consensus and agreement with results from the discussions is achieved on a timely basis.**
- **The main activities include:**
  - Defining the necessary subcommittees and adding new ones as required
  - Prioritization of work activities in the subcommittees
  - Setting objectives and desired outcome from each subcommittee
  - Approving activity scope and approach for each subcommittee
  - Approving the recommendations of each subcommittee
  - Managing the committee's annual operating budget and presenting to the Board of Directors for approval

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Spectrum Sharing Group: Observers

- **The steering group will also elect to include observers necessary for the full operations and support of the system. They include but not limited to:**
  - Government agencies that are engaged in the development of this system (i.e. FCC, NTIA, NIST)
  - Current incumbent users of the spectrum
  - Researchers and academics with special knowledge and contribution
  - Operators, users, and equipment providers with no declared intent to use the system but with interest in the topic
  - Other relevant industry associations
- **DoD will participate as an observer to advise, participate in certification activities, etc.**
- **Observers have no voting rights and will be invited and approved by the steering group members.**

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Working Groups Overview

W1 – Operational and Functional Requirements

- Lead: Andy Clegg, Google

W2 – Security Requirements

- Lead: Charles Clancy, Federated Wireless

W3 – Protocol Specifications

- Lead: Jesse Caulfield, Keybridge Global

W4 – Testing and Certification

- Lead: Kurt Schaubach, Federated Wireless

Additional subcommittees/work groups may be proposed to the steering group by members of the committee

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Working Group 1: Operational Functional Requirements

Objective: Define SAS functional requirements for interoperability across the various providers of systems and equipment across the industry.

Deliverables:

- W1D1 – Spectrum Sharing System Functionality
  - Common functional requirements for systems interoperability for the SAS systems
  - Examples includes information exchanged between systems. Behavior when interference occurs due to incumbent activity, and freedom in assignment of spectrum channels

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Working Group 2: Security Requirements

Objective: Define cybersecurity and operational security (OPSEC) requirements for the SAS ecosystem.

- Focus on requirements to secure the overall system.
- OPSEC requirements will focus on protection of sensitive incumbent information and ensure appropriate auditing and governance of commercial activities in federal bands.

Deliverables:

- W2D1 – Cybersecurity Requirements guidelines for interfaces and properties of the SAS requiring cyber protection.
- W2D2 – Operational Security Requirements guidelines – Defines operational security requirements, to include handling of incumbent data, obfuscation of spectrum data, and processes associated with auditing and governance of the SAS.

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Working Group 3: Protocol Specification

Objective: Define the detailed protocols for data and communications across the various open interfaces within the system.

Standards Deliverables

- W3D2 – SAS-SAS Protocol Specification Protocol between different SAS systems
- W3D3 – SAS-User Protocol Specification Protocol between devices and SAS system

Other Deliverables:

- W3D1 – Inventory of Existing Standards
- W3D4 – 3GPP/Wi-Fi Considerations and Best Practices

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Working Group 4: Test and Certification

Objective: Leverage common industry testing processes as to allow for innovation and development of the subsystems in a healthy competitive environment while preserving the openness of the system.

Deliverables:

- W4D1 – Testing and Certification Objectives – Definition of common framework for testing and certification.
  - Final: Q2 2015
- W4D2 – Testing and Certification Requirements – Requirements and framework for testing and certification of SAS systems and interfaces
  - Draft: Q3 2015
  - Final: Q4 2015

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Summary Schedule of Deliverables (Draft)

Working Group	Q1 Deliverables	Q2 Deliverables	Q3 Deliverables	Q4 Deliverables
W1 – Operational and Functional Requirements (Interoperability Focus)	• W1D1 – Spectrum Sharing System Interoperability Functionality [Draft] • W1D2 SAS Privacy policies and considerations	• W1D1 – Spectrum Sharing System Interoperability Functionality [Final]		
W2 – Security Requirements	• W2D1 – Cybersecurity Requirements [Draft] • W2D2 – Operational Security Requirements [Draft]	• W2D1 – Cybersecurity Requirements [Final] • W2D2 – Operational Security Requirements [Final]		
W3 – Protocol Specifications	• W3D1 – Inventory of Existing Standards [Final]	• W3D2 – SAS-SAS Protocol Specification [Draft] • W3D3 – SAS-User Protocol Specification [Draft]	• W3D2 – SAS-SAS Protocol Specification [Final] • W3D3 – SAS-User Protocol Specification [Final] • W3D4 – 3GPP/WiFi/WiMax • Considerations and Best Practices [Draft]	• W3D4 – 3GPP/WiFi /WiMax • Considerations and Best Practices [Final]
W4 – Testing and Certification		• W4D1 – Testing and Certification Objectives [Final]	• W4D2 – Testing and Certification Requirements Recommendations [Draft]	• W4D2 – Testing and Certification Requirements Recommendations [Final]

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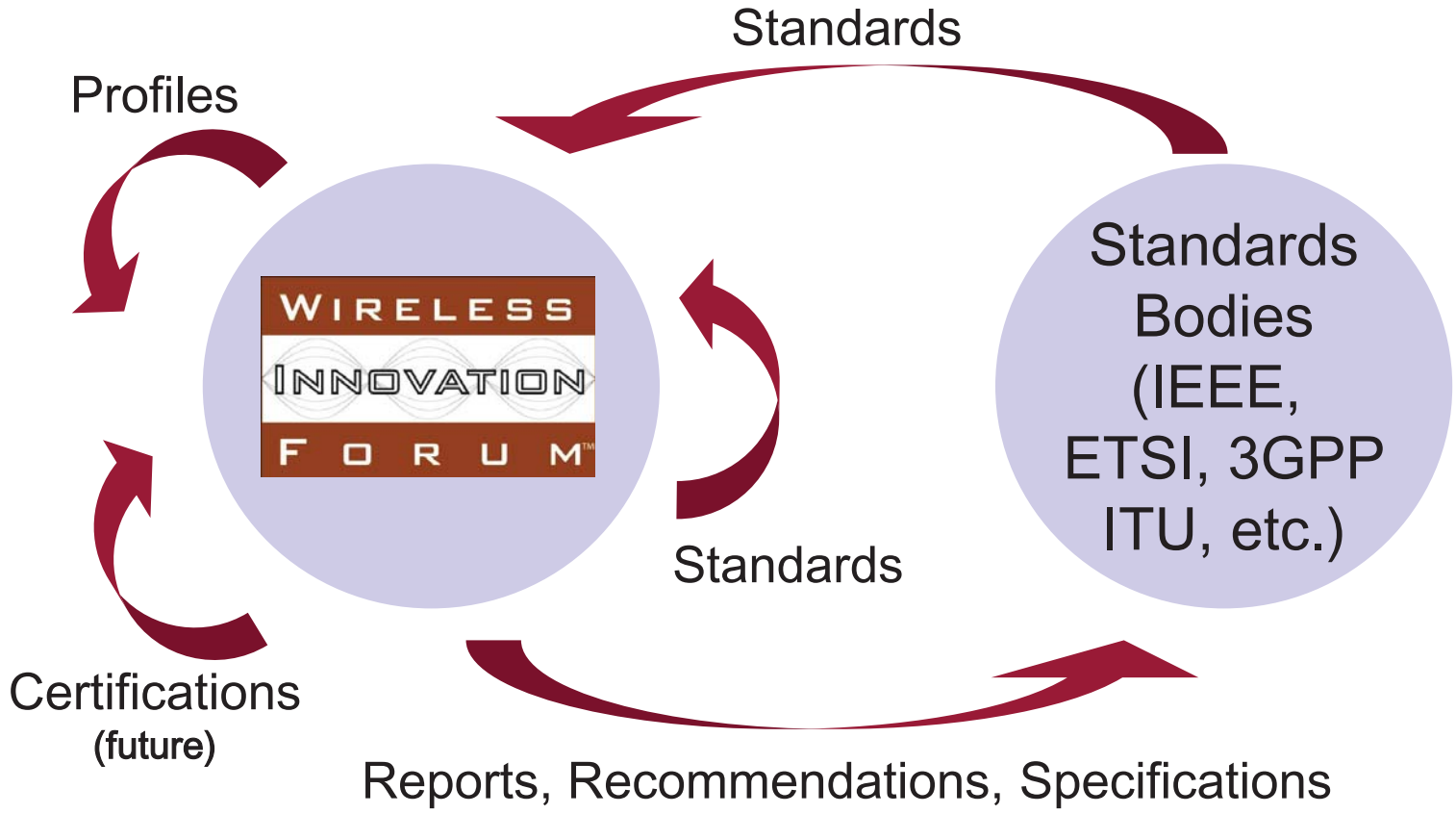
The Forum's Collaborative Model



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Conclusion

The level of engagement we have achieved at the WInnForum, and working groups is exceeding all of our expectations, reinforcing that shared spectrum will present a seismic shift for in-building enterprise networks. Shared spectrum provides the enterprise with a speedier and more cost effective alternative that is seamless and secure, at a scale that Wi-Fi and carrier networks cannot."

- Iyad Tarazi, Co-chair of the WInnForum Spectrum Sharing Committee

"The FCC is doing its part in establishing the regulatory framework, and protecting incumbent users. Now it is up to industry to develop the standards, processes, and innovative concepts to fully exploit this opportunity. With representation by carriers, innovative startups, equipment manufacturers, and database suppliers, we now have a forum to accomplish this rapidly."

- Preston Marshall, Co-chair of the WInnForum Spectrum Sharing Committee

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