Spectrum Sharing Committee Scope and Operations

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1 Governance

1.1 Wireless Innovation Forum

The Spectrum Sharing Committee is a committee of The Wireless Innovation Forum and will serve as a common industry and government standards body to support the development and advancement of spectrum sharing technologies based on the three-tier architecture proposed for the 3.55 GHz rulemaking activities. While the 3.55 GHz band is the main focus on the initial activities, the Wireless Innovation Forum 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.

The main activities that will be 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

The approach to work activities by this committee will emphasize system interoperability as the main focus and on achieving simplicity in interfaces and requirements. This is done to advance competitive and innovative approaches and to increase deployment speed of these systems.

The Committee will not be used as a policy-making, government certification, or liability management body. It is ultimately a standards and technical implementation forum for industry and government users and developers of the technology and spectrum. The committee may, from time to time, make

formal technical recommendations to the FCC or other regulatory bodies, following the Forum's standard policies and procedures.

The participants of this Committee should include, but not be limited to, the following:

- Developers and operators of SAS, wireless equipment and devices, and sensor systems
- Operators and service providers interested in deploying the spectrum
- Suppliers of systems and components operating on this spectrum
- Representatives of incumbent users including DoD/DISA, satellite operators, and utilities
- General users of spectrum outside of main providers
- Policy makers, academics, and researchers
- Representatives from other standards groups where interfaces or joint work is desired or necessary

1.2   Hierarchy

The latest version of several documents takes precedence over the policies and procedures defined in this charter in the following order:

Document Name	Policy Number	Date Adopted
Bylaws and **Amendments**		29 October 2008
Document Approval Process	001	`27 January 2009
Project Approval Committee Procedures	002	1 February 2008
Partner Organization Document Sharing Policy	003	22 February 2008
Member Rights, Privileges and Preferences Policy	004	23 March 2008
Member Admission Policy	005	6 August 2008
Intellectual Property Rights Policy	007	26 September 2008
Policy on Restricted or Controlled Information	009	25 November 2008
Participation by Non-Members Policy	014	10 March 2009
Regional Committees	019	6 February 2014
2013 to 2017 Strategic Plan		9 January 2013

1.3   Steering Group

1.3.1   Overview

The steering group is responsible for managing the overall activity flow and ensuring consensus and agreement with results from the discussions, such that progress can be made properly and timely to serve the interest of all the stakeholders. The main activities that the steering group is engaged in should 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

1.3.2   Membership and Rights

Membership of the Steering Group is comprised of the following:

- 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 and wireless equipment suppliers (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)

Membership in the steering group is by organization, and all Steering Group members have voting rights at the committee level (1 vote per organization). Members of the Steering Group must be full Forum members or Trial members and must supply a letter of commitment prior to joining the group. Continued membership requires that an organization be represented at 3 of 5 Steering Group meetings on a rolling window basis.

1.3.3   Observers

The Steering Group will also elect to include observers necessary for the full operations and support of the system. They include, but are not limited to, the following:

- 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

Observers have no voting rights and will be invited and approved by the Steering Group members.

1.3.4   Officers

The Steering Group will elect, on an annual basis, a chair and vice chair, or alternatively 2 co-chairs, with duties and responsibilities as follows:

a. The Chair(s) report to the Chair of the Forum for day-to-day operations.

b. The Chair(s) manage the balloting process at the Committee Level.

c. The Chair(s) oversee the meetings to ensure collaboration and manage contention.

d. The Chair(s) typically don't vote on Committee matters unless there is a tie vote.

e. The Chair(s) ensure compliance with Forum directives and follow-up on action items.

Election of chairs will be managed by Forum Staff following the Forum's standard policies and procedures. As per Forum policy, at least one chair will be invited to represent the committee as a member of the Wireless Innovation Forum Board of Directors.

The Chair may appoint from time to time, as required, other committee officers to include secretary or treasurer.

1.4   US Government Participation

DoD will participate as an observer. Their role is primarily to advise the committee on incumbent system protection and security matters, effectiveness of spectrum sharing techniques, and certification/testing of SAS and sensor systems. DoD will also provide regular participation to maintain awareness of industry plans, architecture and standards for SAS, devices, and sensor systems.

1.5   Subcommittee/Working Group Operations and Procedures

1.5.1   Charter

Subcommittees/working groups will be formed at the direction of the Steering Group. In doing so, the Steering Group will provide a charter defining the high-level mission and directives for each group. Initial working groups are defined in sections 2 and 3 of this charter. Additional subcommittees/work groups may be proposed to the steering group by members of the committee.

1.5.2   Membership

Membership in each working group shall be open to all Forum members, as per Policy 004 (http://www.wirelessinnovation.org/assets/documents/poli-Member_Benefits_Policy.pdf). Participation in a working group does not require membership in the Committee Steering Group. Membership in the group shall be maintained by an organization attending at least 3 of 5 meetings.

From time to time, the members of the working group may request participation by a non-member subject matter expert who is considered critical to the success of their project. Such requests will be reviewed and approved by the Steering group following Policy 014 (http://www.wirelessinnovation.org/assets/documents/pol%20-
%20sdrf%20policy%20on%20policy%20-%20policy%20-%20participation%20by%20non-members%20-
%20revision%202%201.pdf)

1.5.3   Projects

Each project performed within a subcommittee/work group will be initiated through the creation of a detailed project proposal defining the project's objectives, scope, deliverables and schedule, and these project proposals will be approved by the steering group following Forum Policy 002

(http://www.wirelessinnovation.org/Project_Approval_Process). Proposals must support the Work Group's charter and the annual operations objectives established by the Steering Group.

1.5.4   Subcommittee Operating Procedures

Each subcommittee shall elect a chair from among its membership, and said chair will work to facilitate discussions and manage meetings. Appointment of the Chair will be ratified by the Steering Group, and the Steering Group may call for a new election should the sitting work group chair fail to advance the project.

Development of work products shall be contribution based, with the Chair soliciting contributions to be discussed at least one week in advance of each meeting. Meetings will be held by teleconference or face-to-face as required, although the Chair may designate that certain discussions be held via email using the subcommittee's list server.

Adoption of a contribution, in whole or in part, shall be by consensus. Once all contributions have been considered and the final work product complete, the work product shall be finalized by Forum staff and submitted to the Steering Group for ratification.

1.5.5   Document Approval

Approval of documents shall follow Forum Policy 001 (http://www.wirelessinnovation.org/page/Document_Approval_Process). Once work is completed, a document will be sent to the Steering Group for ratification. Once ratified by the Steering Group, the document will be submitted to the Chair of the Forum for formal adoption.

1.5.6   Partner Organizations

The Committee anticipates establishing partnerships with other organizations to advance their objectives. Partnerships initially envisioned include 3GPP and the IEEE 802 Committee. Establishment of these partnerships will be upon the direction of the Steering Group and will follow Forum Policy 003 (http://www.wirelessinnovation.org/assets/documents/poli-Document_Sharing_Policy.pdf).

2   Working Group Charters and Deliverables

2.1   W1 – Operational and Functional Requirements (Interoperability Focus)

Description: The objective of this working group is to work on further defining shared spectrum management systems (SAS) functional requirements are they relate to creating an interoperable system across the various providers of systems and equipment across the industry. There is no intent in this working group to define a common architecture and design for SAS systems. This working group will further track and articulate common functional questions that require industry consensus for further clarification and definition.

Standards Deliverables:

- W1D1 – Spectrum Sharing System Functionality – Common functional requirements for systems interoperability that are needed for the SAS systems to interface properly and function in a similar fashion where coordination is required on functionality. Examples include the information required to be exchanged between systems, to include data input by external systems (e.g. sensor systems). Behavior when interference occurs due to incumbent activity, and freedom in assignment of spectrum channels.
- W1D2 – SAS Privacy Policies and Considerations – Common practices and rules to be observed by developers and users of the system to protect the privacy of the users of the system. Examples include practices for data retention and backup and how to mask data before sharing across subsystem operators.

2.2   W2 – Security Requirements

Description: The Security Requirements working group is responsible for defining the cybersecurity and operational security (OPSEC) requirements for the SAS ecosystem. Cybersecurity requirements focus on ensuring that SAS transactions are trusted and principally on the cryptographic protocol and key management requirements to secure the overall system. OPSEC requirements will focus on protection of sensitive incumbent information from edge-network probing and ensuring that the system has features which enable appropriate auditing and governance of commercial activities in federal bands.

Standards Deliverables:

- W2D1 – Cybersecurity Requirements Guidelines– This document will define system cybersecurity requirements guidelines to include security properties of each of the components, security properties of the interfaces, and requirements on authentication and encryption. Additionally this document will define security controls that are necessary to reduce the risk of cyber-attack against the components and the system overall.
- W2D2 – Operational Security Requirements Guidelines – This document will define the overall system operational security requirements to include handling of incumbent data, obfuscation of spectrum data, and processes associated with auditing and governance of the SAS infrastructure.

2.3   W3 – Protocol Specifications

Description: The goal of this working group is to define the detailed protocols for data and communications across the various open interfaces within the system. The interfaces are limited to what is the minimum needed for implementation of an open and interoperable system. Other interfaces may be included later. The objective is to use as many common interfaces and as light of a protocol as possible to allow for innovation and development of the subsystems in a healthy competitive environment while preserving the openness of 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 and may be the same as the above protocol

Informational Deliverables:

- W3D1 – Inventory of Existing Standards – Documentation of relevant existing protocols to minimize new inventions
- W3D4 – 3GPP/WiFi Considerations and Best Practices – Development of the minimum interface standards needed to connect existing standards and network elements to the new SAS systems.

2.4   W4 – Testing and Certification

Description: The goal of this working group is to define the test and certification standards for the SAS and across the various interfaces within the system. The certification should be limited to what is the minimum needed for the creation of a simple and standard certification process for an open and interoperable system. The objective is to maximize the use of common industry testing processes as possible to allow for innovation and development of the subsystems in a healthy competitive environment while preserving the openness of the system.

Standards Deliverables:

- W4D2 – Testing and Certification Requirements – Requirements and framework for testing and certification of SAS systems and interfaces

Informational Deliverables:

- W4D1 – Testing and Certification Objectives – Definition of common framework for testing and certification.

3 Working Group and Schedule Summary

The following proposed schedule can serve as guide to the teams for developing deliverables in the four recommended working groups. Validation and approval of this working schedule will be required from the Steering Group and the working group leadership.

Working Group	Q1 Deliverables	Q2 Deliverables	Q3 Deliverables	Q4 Deliverables
W1 – Operational and Functional Requirements (Interoperability Focus)	• W1D1 – Spectrum Sharing System Interoperability Functionality [Draft]	• W1D1 – Spectrum Sharing System Interoperability Functionality [Final]		
	• W1D2 SAS Privacy policies and considerations			
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]