Before the

Federal Communications Commission

Washington, D.C. 20554

In the matter of	)	
	)	
Expanding Flexible Use of	)	
the 3.7 GHz to 4.2 GHz	)	GN Docket No. 18-122
Band	)	
	)	
	)	

REPLY COMMENTS OF THE WIRELESS INNOVATION FORUM ON THE FEDERAL COMMUNICATIONS COMMISSION PUBLIC NOTICE ON EXPANDING FLEXIBLE USE OF THE 3.7 GHZ TO 4.2 GHZ BAND

The Wireless Innovation Forum (WInnForum) is a U.S. based international non-profit organization driving technology innovation in commercial, civil, and defense communications around the world. Forum members bring a broad base of experience in Software Defined Radio (SDR), Cognitive Radio (CR) and Dynamic Spectrum Access (DSA) technologies in diverse markets and at all levels of the wireless value chain to address emerging wireless communications requirements through enhanced value, reduced total life cost of ownership, and accelerated deployment of standardized families of products, technologies, and services. In 2014, the WInnForum created a Spectrum Sharing Committee focused on implementing the U.S. Federal Communications Commission's regulations for three-tiered spectrum sharing in the 3550-3700 MHz (CBRS) band. The Committee presently has broad participation from over 60 organizational stakeholders in the new 3.5 GHz band, including wireless operators, Spectrum Access System developers, equipment manufacturers, satellite operators, Wireless Internet Service Providers (WISPs), utilities, the U.S. government, and others.

In addition, in April 2018, WInnForum announced the approval of a new project to produce a report focused on implementing spectrum sharing frameworks outside the U.S. CBRS band. The report will detail potential sharing bands, provide information on Spectrum Access Systems (SASs) and related technologies such as TV White Space, and offer recommendations. The report is expected to be released in Q3 2018.

The members of the WInnForum applaud the Commission on the release of this important Public Notice and offer the following reply comments.

WInnForum notes that some commenters have suggested that the state of spectrum sharing systems such as the Spectrum Access System (SAS) is untested and unproven.[1] While we acknowledge that SASs have yet to be certified and deployed for commercial operation, we note that SAS commercialization is expected to be achieved by Q4 this year[2] and several SASs are involved in trials.

We also take this opportunity to place on the record in this proceeding the status of CBRS per the updates presented by WInnForum to date.

In May 2018, WInnForum notified the FCC that the SAS software test harness in support of the baseline standards has been formally released as version 1.0.0 and is available on the web.[3] WInnForum also issued a press release on May 29, 2018 announcing the delivery of the test harness. The press release is provided as Attachment 1.

[1] See, for example GCI Communication Corp. comments on p. 12.
[2] See "CBRS Status Summary" at https://www.cbrs.wirelessinnovation.org/cbrs-status-summary.
[3] See WInnForum Letter Filing, 3.5 GHz SAS and ESC Applications, GN Docket No. 15-319, WInnForum *Ex Parte* filing, May 26, 2018.

In May 2018, WInnForum notified the FCC that CBSD software test harness in support of the baseline standards that were recently announced has been formally released as version 1.0.0.2 and is available on the web.[4]

On December 7, 2017, members of the WInnForum Spectrum Sharing Committee met with FCC staff to present an update on WInnForum CBRS activities, which included the Spectrum Sharing Committee Release Schedule, the latest version of which is provided as Attachment 2.[5]

WInnForum would also like to take this opportunity to reiterate the value of multi-stakeholder organizations in developing the standardization framework necessary to support the introduction of new, shared-spectrum services. WInnForum has a long history of establishing and leading successful multi-stakeholders group composed of commercial and defense equipment vendors, database providers, network operators, academia and government agencies. Accordingly, WInnForum has been able to ensure full participation among all participants and establish a broad and inclusive framework for collaboration leading to the availability of the SAS Standards listed in Attachment 2.

As indicated by the record, members of the WInnForum are working diligently to make the Spectrum Access System a reality for the CBRS band. Through several meetings and calls with the FCC, we have presented a schedule and road map that anticipate commercial launch of SASs by the end of 2018. We look forward to working with the FCC to make sharing a reality in CBRS and in other bands.

[4] See WInnForum Letter Filing, 3.5 GHz SAS and ESC Applications, GN Docket No. 15-319, WInnForum *Ex Parte* filing, May 24, 2018.
[5] See WInnForum Ex Parte Filing, 3.5 GHz SAS and ESC Applications, GN Docket No. 15-319, WInnForum *Ex Parte* filing, December 7, 2017.

Respectfully submitted,

By /s/:
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Dated: 15 June 2018

ATTACHMENT 1

Wireless Innovation Forum Test and Certification Team Completes Major Milestone Toward Commercial Rollout of CBRS Band

Team delivers code for compliance of Spectrum Access Systems (SAS) in CBRS band, brings CBRS band one step closer to operation

For Immediate Release

Washington, DC, 29 May 2018 – The Wireless Innovation Forum (WInnForum) announced today delivery of the code for Software Access System software compliance for commercial operations within the 3.5 GHz Citizens Broadband Radio Service (CBRS) band to the FCC's Institute for Telecommunication Sciences. This milestone event brings commercial rollout of CBRS networks one step closer.

"The test code release marks another important milestone for the CBRS ecosystem and is the culmination of the WINNF Spectrum Sharing Committee's Release 1 work. NTIA-ITS can now conduct its preparations for formal lab testing of Spectrum Access Systems which we expect will commence this summer," said Kurt Schaubach, of Federated Wireless and chair of the SSC.

The code has been developed and tested by the Forum's Spectrum Sharing Committee (SSC) Test and Certification Works Group. The goal of this working group has been to define the test and certification standards for the SAS and across the various interfaces within the system. Their objective was to maximize the use of common industry testing processes as much as possible to allow for innovation and development of the subsystems in a healthy competitive environment while preserving the openness of the system.

The Forum's SSC serves 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 3.5 GHz (CBRS Band) rulemaking activities.

The main activities that 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 Forum recently announced the completion of the full set of specifications required for certification of CBRS equipment. This watershed event allows the finalization of CBRS products already in various levels of testing and sets the stage for the rollout of commercial CBRS networks. Specifications in the baseline standards package can be found here: https://www.cbrs.wirelessinnovation.org/cbrs-baseline-specifications

About the Wireless Innovation Forum

Established in 1996, The Wireless Innovation Forum (SDR Forum Version 2.0) is a non-profit mutual benefit corporation dedicated to advocating for spectrum innovation, and advancing radio technologies that support essential or critical communications worldwide. Members bring a broad base of experience in Software Defined Radio (SDR), Cognitive Radio(CR) and Dynamic Spectrum Access (DSA) technologies in diverse markets and at all levels of the wireless value chain to address emerging wireless communications requirements. To learn more about The Wireless Innovation Forum, its meetings and membership benefits, visit www.WirelessInnovation.org. Forum projects are supported by platinum sponsors Motorola Solutions, Leonardo and Thales.

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Editorial Contacts

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SPECTRUM SHARING COMMITTEE RELEASE SCHEDULE

Approved by the Spectrum Sharing Committee Steering Group
28 February 2018

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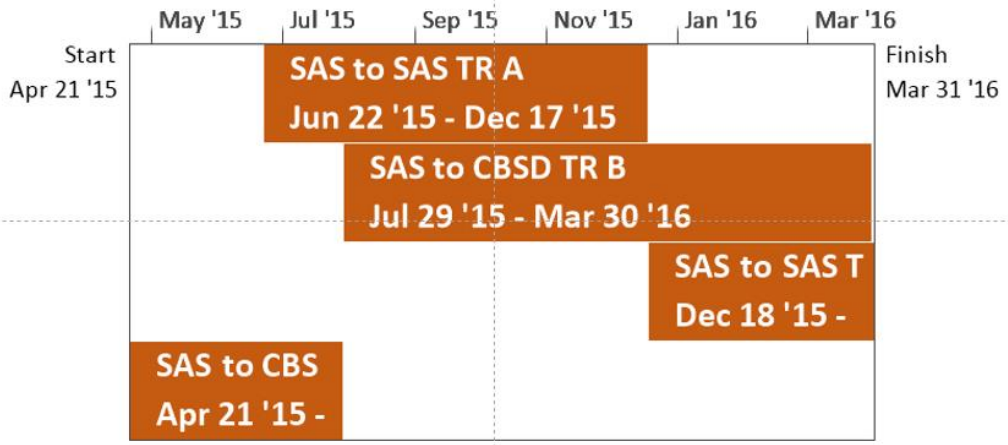
ATTACHMENT 2

Early Release (Release 0) Publication Timeline



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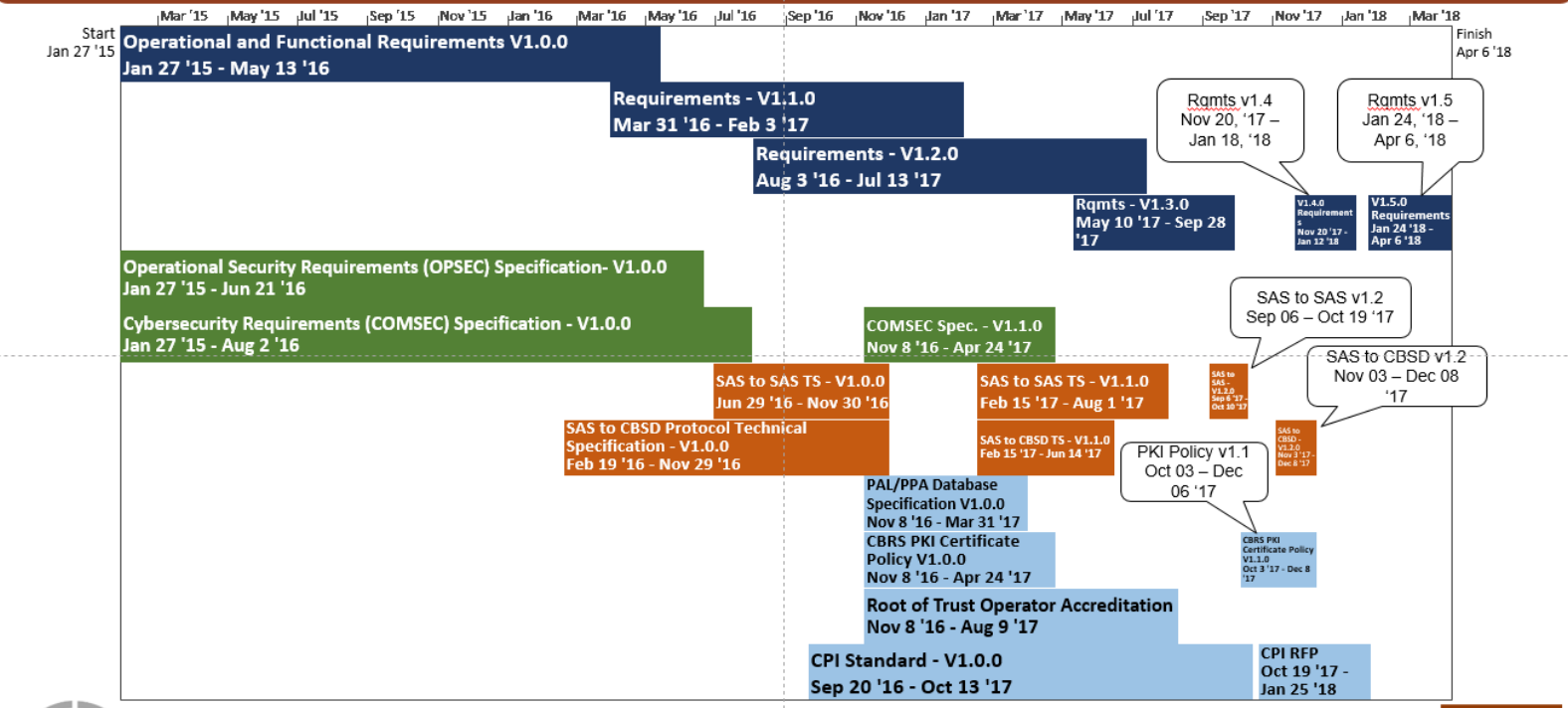
Release 1 Standards Publication Timeline



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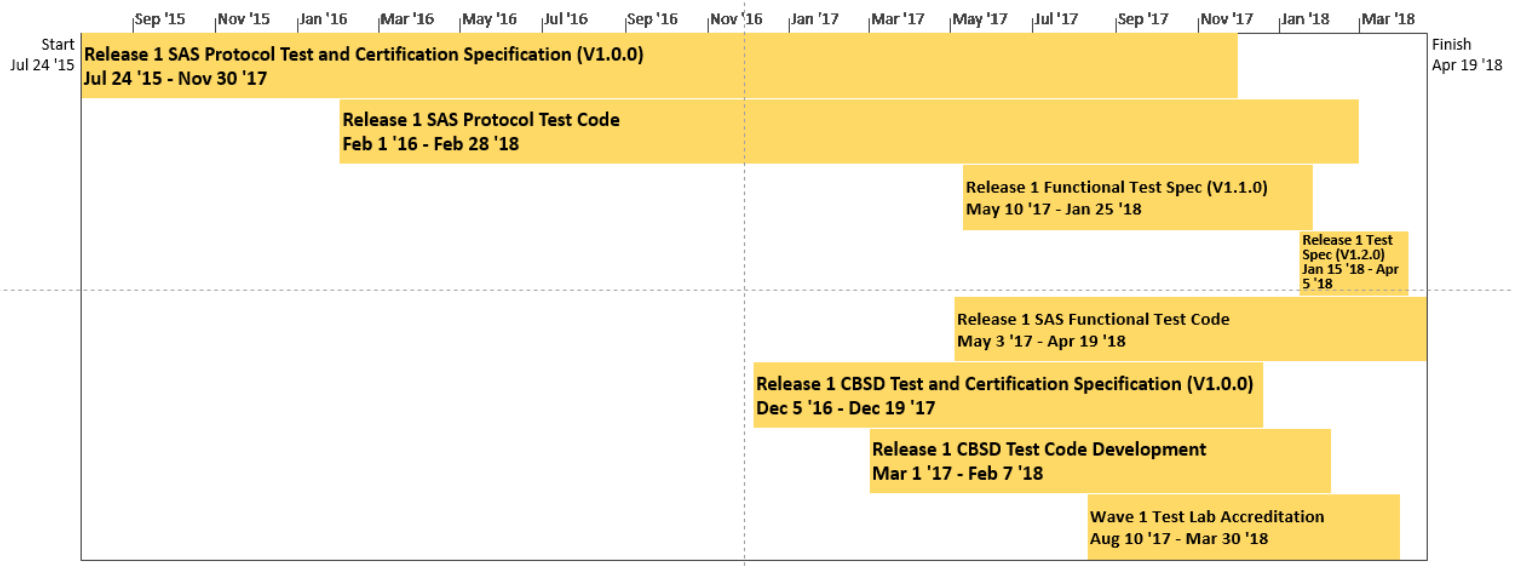
Release 1 Test and Certification Timeline



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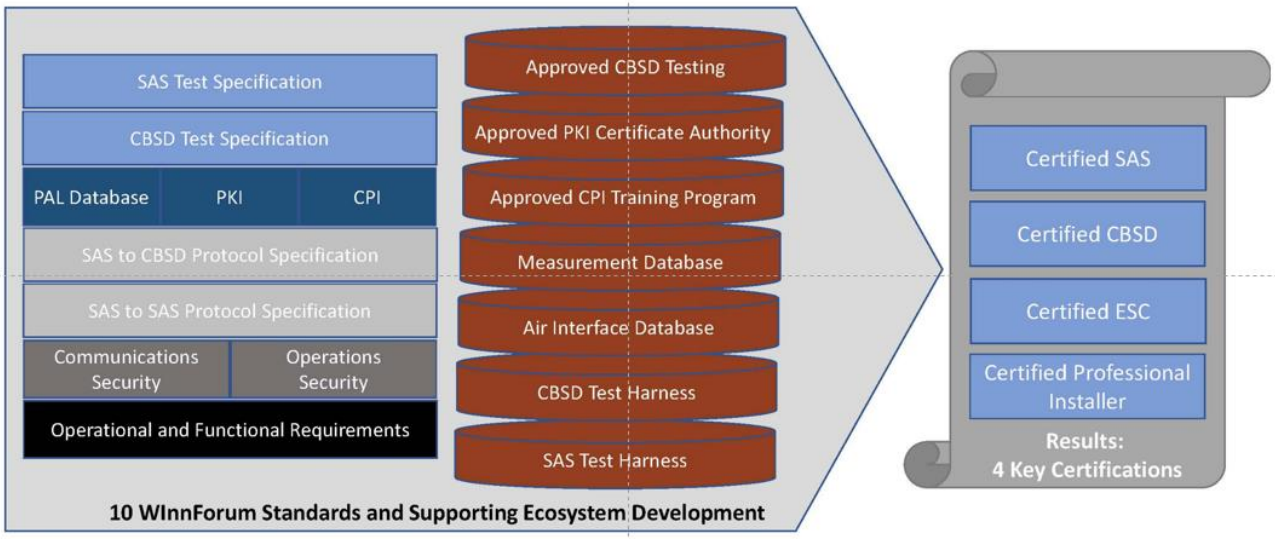
Commercializing CBRS: Standards and Ecosystem Support



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Standards That Comprise Release 1

WINNF-TS-0112-V1.5.0 Operational and Functional Requirements
WINNF-TS-0065-V1.1.0 CBRS Communications Security Technical Specification
WINNF-TS-0071-V1.0.0 CBRS Operational Security Technical Specification
WINNF-TS-0016-V1.2.1 SAS to CBSD Protocol Specification
WINNF-TS-0096-V1.2.0 SAS to SAS Protocol Specification
WINNF-TS-0061-V1.2.0 SAS Test and Certification Specification
WINNF-TS-0122-V1.0.0 CBSD Test and Certification Specification
WINNF-TS-0245-V1.0.0 PAL Database Specification
WINNF-TS-0022-V1.1.2 CBRS PKI Certificate Policy
WINNF-TS-0247-V1.0.0 CPI Training Program Accreditation Standard

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What is addressed in the Release 1 (1 of 3)

Border Area Management

- Requirements on Implementing international agreements to protect Canada and Mexico

CBSD Measurement Reporting

- Initial requirements for CBSD measurements of their local interference environment, and reporting those data back to the SAS.

CBSD Registration Processing

- The requirements for how a CBSD registers with a SAS, including owner registration, professional installer registration and CBSD registration.

Communications Security

- The communications security policies governing SAS and CBSD communications interfaces.

Certificate Authority Accreditation Standard

Certified Professional Installer Training Program Accreditation Standard

- Guidelines for adoption of uniform industry working standards and curriculum required to be consistent with the protection of spectrum, both licensed and GAA, for sharing in the 3550-3700 MHz band.

Note: Detailed feature list associated with each release is captured in the SSC CBRS Requirements Traceability Matrix (WINNF-17-SSC-0003)

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What is addressed in the Release 1 (2 of 3)

Domain Proxy

- The baseline Operational and Functional Requirements of the CBRS Domain Proxy for initial testing and trials.

Dynamic Protection Zones

Environmental Sensing Capability (ESC)

- The requirements for implementation of an Environment Sensing Capability, and protecting federal incumbents.

Exception Management

- The requirements for how trouble tickets or exceptions are managed, including from FCC input, reports from incumbents, and reports from PAL.

FSS Protection

Grandfathered Wireless Device Protection

Operations Security

- 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.

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What is addressed in the Release 1 (3 of 3)

PAL Protection Area Definition

- Requirements on how PALs reports their coverage area to the SAS for end-to-end use of the licenses. This includes how PAL licensees define PAL Protection Areas (PPAs), request to operate in a particular geographic area within their license boundary (PPA), how PPA credentials and IDs are defined, conveyed and managed, and how the SAS accomplishes such protections.

Protocol Support for Priority Access Licensing

Propagation Modeling

- Identify appropriate 3.5 GHz propagation models for Incumbent and PAL protection and PPA definition, determine relative benefits and limitations, develop agreement on baseline needs such as underlying data, and define standardized interference aggregation methodologies.

SAS to SAS Information Sharing

- Initial support for SAS-SAS Synchronization and Information exchange.

Spectrum Grant Request Processing

- The requirements for how a CBSD requests and relinquish grants, and how grants are reassigned or terminated.

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Issue Management and Change Requests

Following the release of revision 1 specifications, change requests will be collected from the Forum's public issues management portal

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Future Releases

One year cycle for future Major Releases, inclusive of both technical and test and certification specification development

- Adherence to timeline determines what's "in" or "out" of the specification
- Project approval and prioritization of new feature development will be managed by the Steering Group (see next slide)

Standards maintenance will be managed through technical updates to existing version

- E.g., 1.1, 1.2, 1.3, etc.

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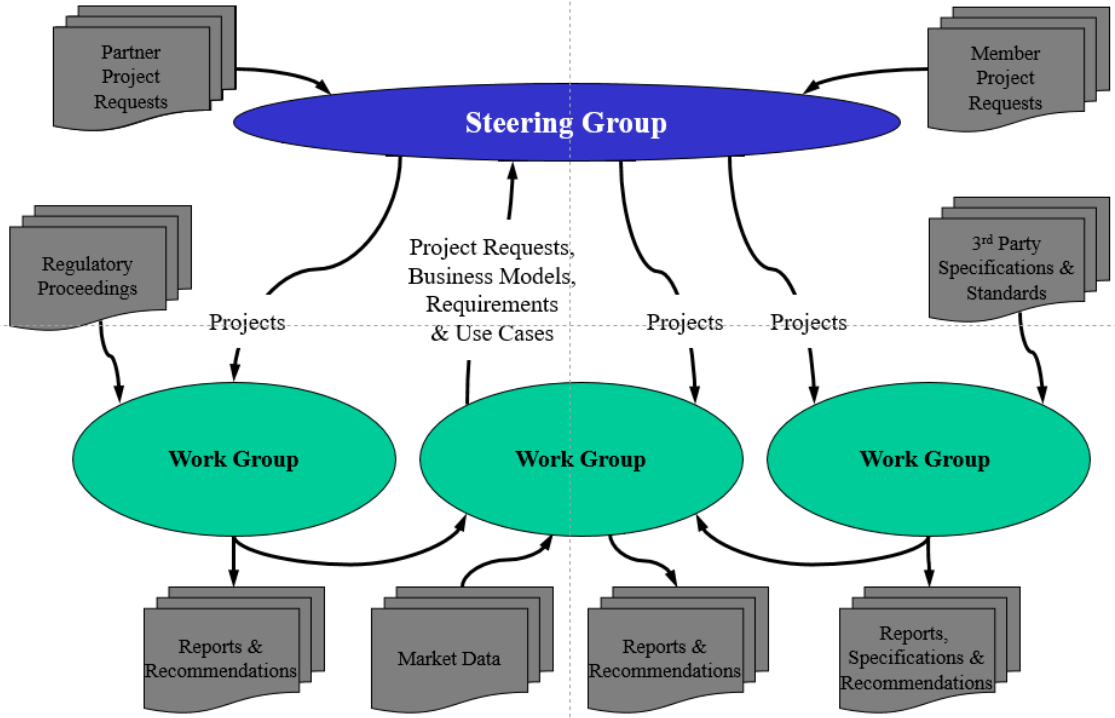
“Projects” are Initiated through the Committee Steering Group (SG)



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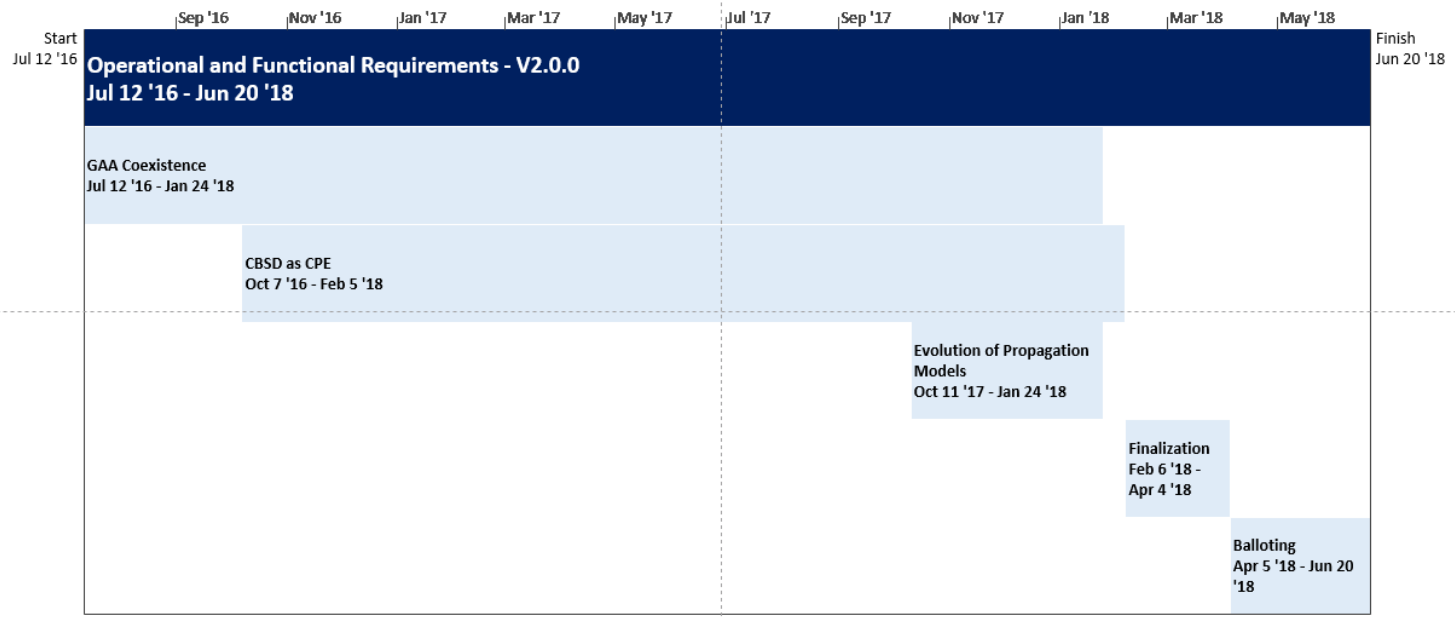
Release 2 Requirements Publication Timeline



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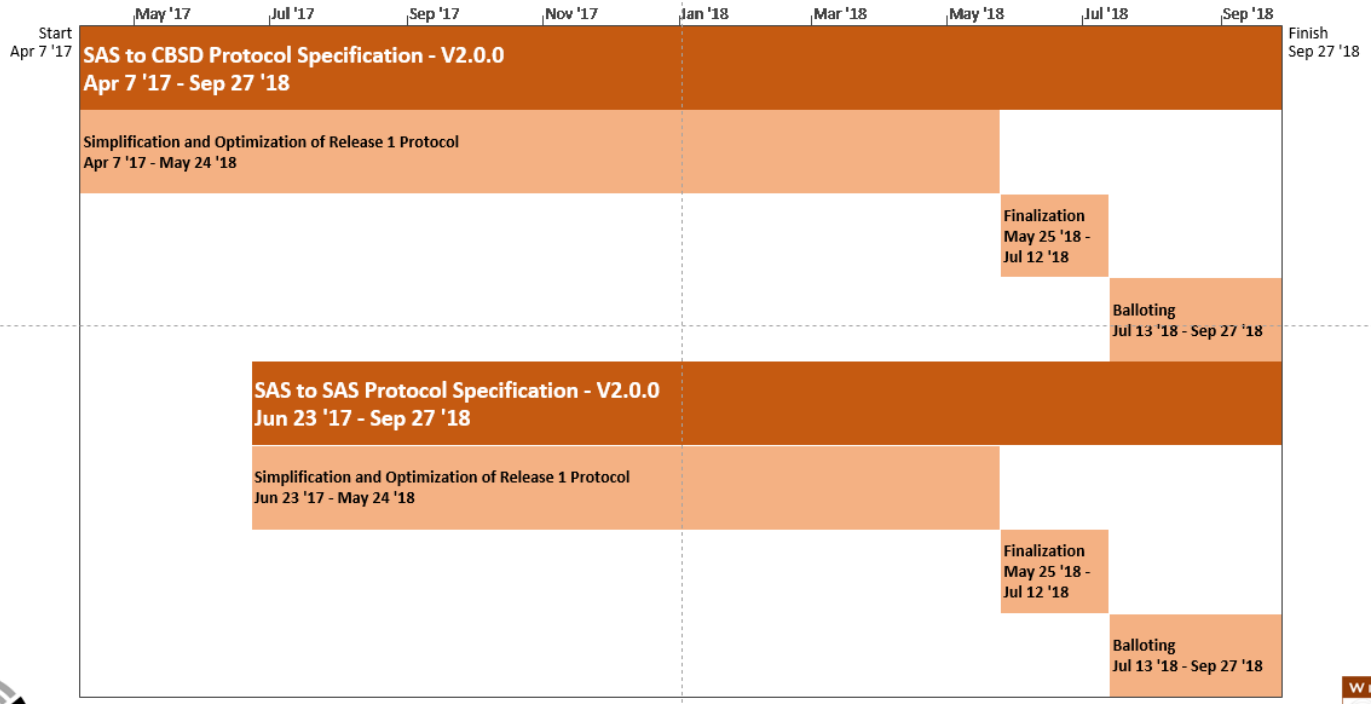
Release 2 Protocols Publication Timeline



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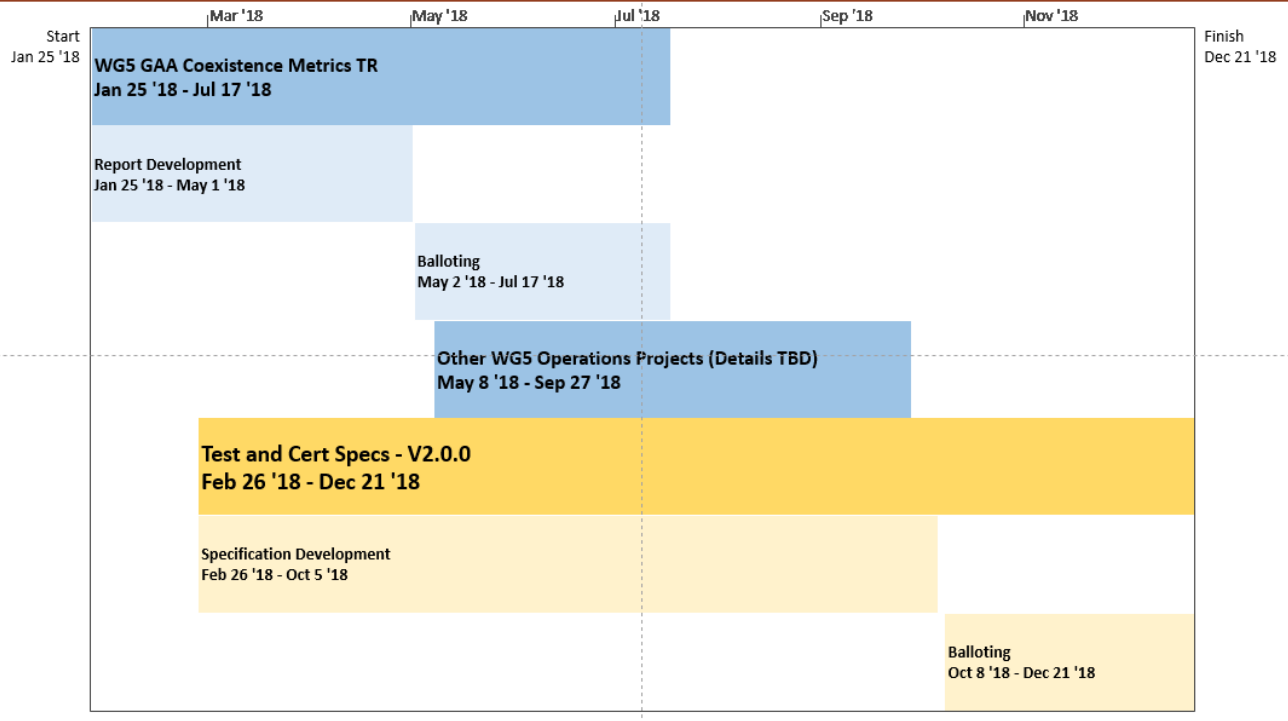
Release 2 Protocols Publication Timeline



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Backlog/Future Release Features

Backlog (Target WG)

- Leasing (WG1)
- Simplification and Optimization of Requirements from Release 1 (WG1)
- Support for Revised Rules as Required (WG1)
- Automated Exception Handling (WG1)
- Enhanced PAL Support (WG3)
- Registration Update (WG3)
- Enhanced Measurement Reporting (WG3)
- PAL Channel Assignment (WG5)
- PAL Coexistence (WG1)

In Progress

- Propagation Model for Release 1 (WG1)
- International Border Update for Release 1 (WG1)
- Test Case Updates to Release 1 (WG4)
- Simplification and Optimization of Release 1 SAS to CBSD Protocol for Release 2 (WG3)
- Simplification and Optimization of Release 1 SAS to SAS Protocol for Release 2 (WG3)
- GAA Coexistence TR (WG5)

Complete

- CBSD as CPE for Release 2 (WG1)
- GAA Coexistence for Release 2 (WG1)
- Evolution of Propagation Models for Release 2 (WG1)

CBRS WInnForum Standards

WIRELESS INNOVATION FORUM

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