WIRELESS INNOVATION FORUM UPDATE

WinnComm 2021

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Agenda

Structure of the Forum

Strategic Plan

Advocacy Agenda

Overview Of Committees

- 6 GHz Committee
- ATC: Advanced Technologies Committee
- SDS: Software Defined Systems Committee
- SSC: Spectrum Sharing Committee

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Organizational Structure of the Forum

4 Committees

- 6 GHz
- ATC: Advanced Technologies
- SDS: Software Defined Systems
- SSC: Spectrum Sharing

Steering Group Per Committee

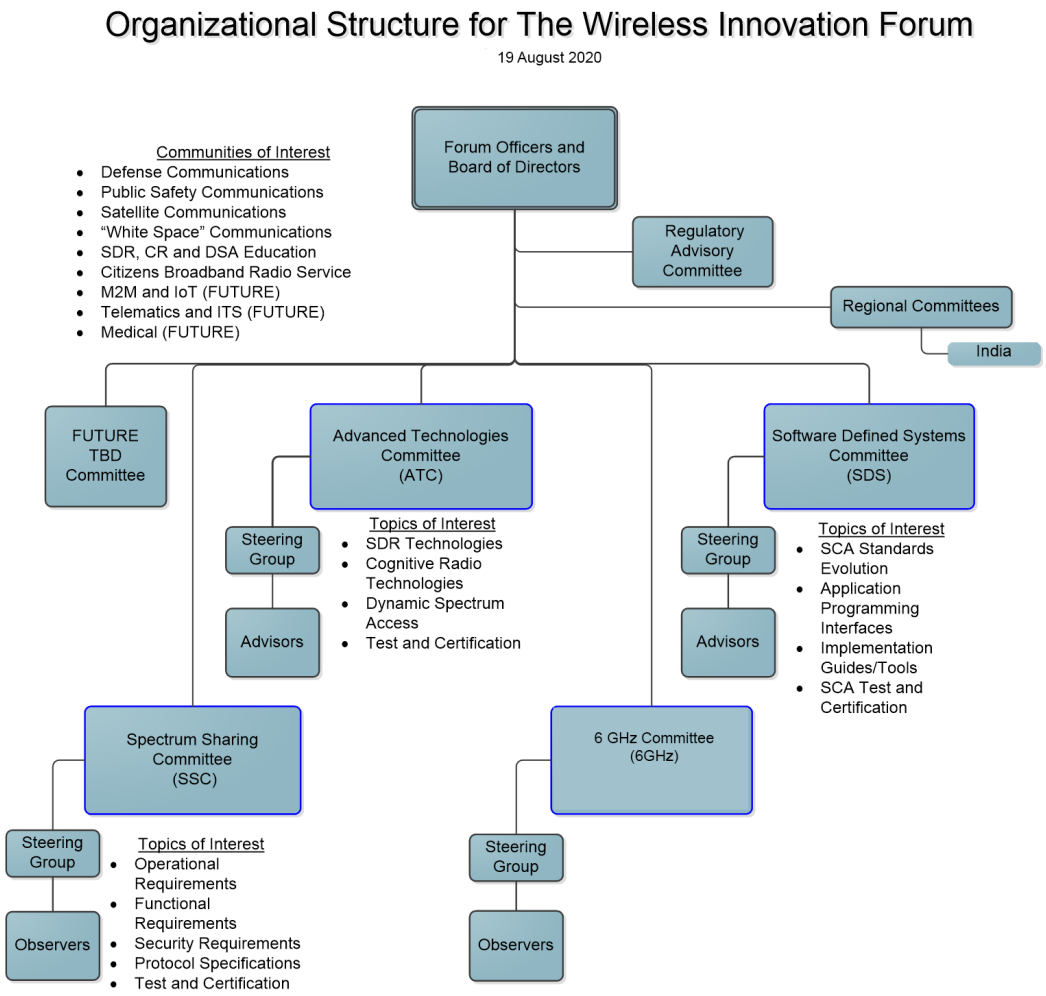
- ATC: Forum officers
- Others: By committee design

Regulatory Advisory Committee

- Special committee to the Board of Directors
- Receive input from Regulators world-wide

Regional Committees

- India



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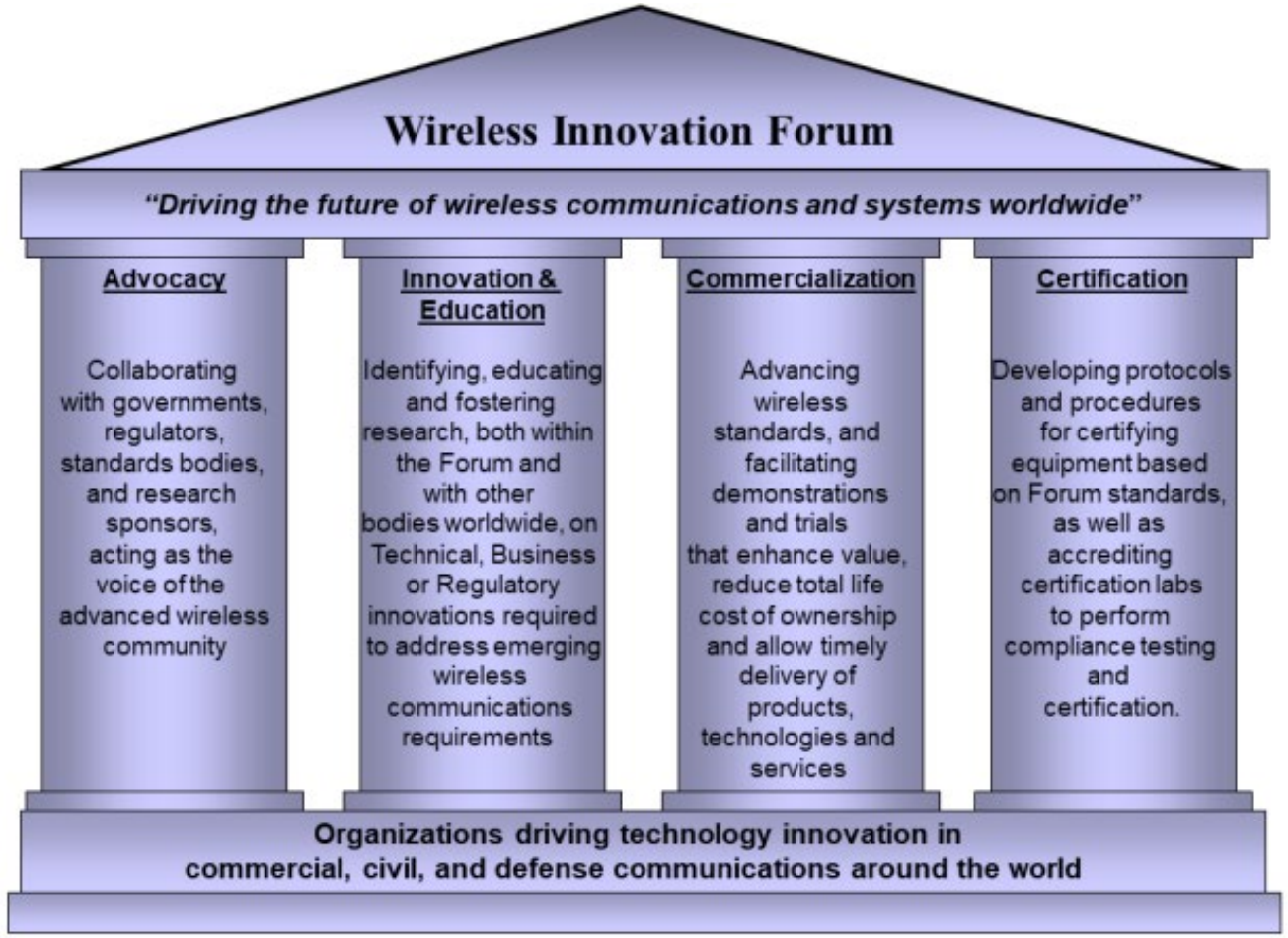
Strategic Plan

5 Year Duration

- Revision scheduled for 2022

Positioning Statement

- a member driven, wireless standards development organization
- incubating and advancing new, potentially disruptive technologies, specifications or guidelines,
- advocating for the innovative use of spectrum
- advancing radio technologies that support essential or critical communications worldwide
- Providing an international venue to rapidly advance reports, recommendations, global specifications and standards, certifications, etc.
- Without lobbying



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Forum Advocacy Agenda

Advocacy Agenda

- Initiated in 2012
- Used to collaborate with governments, regulators, standards bodies, and research sponsors
- October 2021 updated
  - 76 affirmative unanimous

Essential and Critical communications

- Fault tolerant, secure, and extensible system architectures
- Use of SDR, CR and DSA
- Dynamic, situational prioritization of network and spectrum resources
- Dynamically access additional spectrum for essential and critical communication users

Innovation and Competition

- Government strategic investment of joint research and development between industry and academia (Top-10)
- Real world Spectrum Test Beds and Test Cities
- Easy access to experimental spectrum licenses

Spectrum

- Advocates the use of spectrum sharing and small cell technologies
- Advocates the modernization of regulatory licensing database capability to fully realize the potential of spectrum sharing
- Dedicated spectrum for Essential and Critical communications
- Technology and service neutrality to enable innovative and efficient use of spectrum
- Regulatory model:
  - Combinations of licensed and unlicensed
  - Sharing and hierarchical
  - Cooperative and co-existent domains
- Networked and synchronized databases accessed with device location information
- Harmonized standards

Security

- Development and application of policies and standards that enable communication systems and platforms to protect all sensitive information and data
- Allow Over the Air software reconfiguration

Communications Interoperability

- openly developed industry requirements and architectural standards that lead to interoperable products and systems

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6 GHz Committee

Chair: Mark Gibson, WinnF Vice-Chair, Commscope

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6 GHz Committee Status

Steering Group

- Meeting Nov 18 with FCC on T&C
- Approved sending comments to WFA on AFC System Under Test doc
- Met with ISED on AFC designation process (at their request)

Functional Spec WG:

- TS-1014, r5 in comment resolution re-ballot
- Working on issues such as OOBE and definition of operating bandwidth

Interference TG

- Working on near-field antenna modeling, polarization mis-match, handling location uncertainty

Data TG

- Continuing work on RC-1010
- Working recommendations for handling missing data

Test & Cert WG

- Developing framework for AFC test and certification process
- Working on Traceability Matrix for both WInnForum and WFA requirements

Protocols WG

- Working on development of protocol extensions for AFC system to SP Access Point/Fixed Client Device interface
- Endorsement of WFA AFC System to AFC Device Interface Spec
- TS-3005 Protocol Spec out for ballot

Current documents:

- WINNF TS-1014 Functional Requirements for the U.S. 6 GHz Band under the Control of an AFC System
- WINNF RC-1010 :Recommendations for Addressing Blank, Uncollected, Erroneous, or Conflicting Database Elements for Incumbent Systems in the U.S. U-NII 5 & 7 Bands for the Purpose of Automated Frequency Coordination Systems

WInnForum Standards™

WIRELESS INNOVATION FORUM®

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Advanced Technologies Committee (ATC)

Chair: John Glossner, WinnF Chair, Optimum Semi

- Continuing WG Projects
- New WG Projects
- Top 10

Mission: To incubate new projects

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ATC Continuing Projects

Unmanned Autonomous Vehicles (Drone) Special Interest Group

- Chair: John Glossner, OST
- Sep: Provided Comments to FCC 5 GHz Spectrum Sharing specifically targeting UASs
- Nov: 2 TR's Approved by Membership
  - WINNF-TR-2009: Overview of the Use of Drones for Spectrum Monitoring Applications
  - WINNF-TR-2010: Overview of the Drone Open-Source Ecosystem
- WinnComm 2021 Dec 1st Session

3100 to 3550 MHz Work Group

- Chair: Andy Clegg, Google
- WINNF-RC-1009: WInnForum 3.45 GHz FNPRM Comments
- Met with NTIA to discuss Informing Incumbent Capability (IIC)
- Discussed FCC second order and CBRS impacts
- Sent NTIA ESC Impact TG TR

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ATC 2021 Initiated Projects

New! Joint ATC/SSC 3.45 GHz ESC Coexistence TG

- Chair: Andy Clegg, Google
- WINNF-RC-1016: Coexistence between the 3.45 GHz Service and Environmental Sensing Capability Sensors in the 3.5 GHz Citizens Broadband Radio Service

New! ATC Building Entry Loss (BEL) Ad Hoc Committee

- Chair: Chris Kurby, iPosi
- Building Entry Loss with SSC and 6GHz Use Cases
- AUG: WINNF-TR-1007 Use of GNSS for BEL Estimation

New! Joint ATC/SSC Ad Hoc Committee for CBRS TDD Synchronization

- Chair: Andy Clegg, Google

New! Passive and Active Spectrum Sharing (PASS) Working Group

- Co-Chair: Kevin Gifford, UC Boulder
- Co-Chair: Andy Clegg, Google
- Emphasis on assisting/protecting terrestrial Radio Astronomy sites
- Augment CBRS dynamic spectrum access/sharing architecture for spectrum sharing within a National Radio Dynamic Zone (NRDZ)
- Hat Creek DPA Neighborhood chosen
- Dynamic coordination zone vs static exclusion zone.

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ATC: Top 10 Most Wanted Innovations

Chair: Andy Clegg, Google

- CTO of WinnF

History

- Initiated 2010
- Identify major innovations required to create next generation of wireless devices
  - technical, business or regulatory
- Consider view of all stakeholders
  - Users
  - Radio or platform manufacturers
  - Software and hardware component providers
  - Operators and service providers
  - Spectrum regulators

2021 Update

- Restructured September 2021

2022 Revision at WinnComm

- Thursday Dec 1st

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2021 – WInnF Most Wanted Innovations

1. ***Innovation #1: Dynamic Spectrum Management***
2. ***Innovation #2: Advanced Interference Mitigation Techniques***
3. ***Innovation #3: Propagation Prediction Techniques for Dynamic Spectrum Sharing and other Applications***
4. ***Innovation #4: Artificial Intelligence/Machine Learning for Radios***
5. ***Innovation #5: Flexible, Extensible, and Secure Transportation Communication Framework***
6. ***Innovation #6: Receiver Performance Interference Thresholds***
7. ***Innovation #7: Low Cost Wide Spectral Range RF Front-End (Multi-decade; Contiguous) (Tx,Rx)***
8. ***Innovation #8: Efficient Techniques to Minimize Power Amplifier Spectral Regrowth in Non-contiguous Spectral Environment***
9. ***Innovation #9: Network Management of Mobile Ad-hoc Networks***
10. ***Innovation #10: Integrated Development and Debug Process for Software-Based Applications in Embedded Heterogeneous Platforms Innovation***

WInnForum Standards™

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Software Defined Systems (SDS) Committee

Chair: Ken Dingman, WinnF Treasurer, L3Harris

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SDS Overview

Foster usage of Software Defined Systems (SDS) Standards

- Aimed at essential and mission critical radio systems
- For communications (waveforms) but not only (e.g. sensors)
- Reconfigurable (run-time evolutions) and Evolutive (life-time evolutions) systems

Key benefits of SDS Standards

- Portability of radio applications
- Hospitality of radio platforms
- For communications: making waveform interoperability more affordable

Support international harmonization of SDS standards

- Developing SDS Standards where relevant to fill-in gaps
- Profiling SDS Standards into accepted variants
- Establishing and managing industry led certification programs where appropriate

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SDS Advisory Council

Composed of the Steering Group and SDS Advisors

Who are SDS Advisors?

- Individuals related to MoDs active in the area of International SDR Standards
- Current list of Advisors covers: JTNC, OCCAR-EA, FRA MoD, DEU MoD, ITA MoD, SWE MoD, NOR MoD, FIN MoD, European Defense Agency (EDA) and NATO HQ C3 Staff
- Appointed upon invitation issued by the Steering Group

Provide a venue for vendors and customers to interact

Advisors provide direction and feedback on committee activities

Typically meet twice a year

- Virtual meeting held Feb-2021

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SDS Standards Development

Complementing / harmonizing the SDS Standards of partner entities (e.g. JTNC, ESSOR)

WInnForum developed Standards

- International Radio Security Services (IRSS) API
- Transceiver Facility
- Time Service Facility
- (U)Lw AEPs
- PIM IDL Profiles
- Energy Management API

WInnForum support to SCA 4.1

- WINNF-16-P-0025 SCA 4.1 Requirements Allocation, Objectives, and Verification Criteria
- SCA 4.1 Application Vérification Test Procedures

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SDS Facilities 2021 Development

Quite active and productive international work group

- Active contributors from FRA, DEU, USA and CAN
- Strenghtening the WInnForum-developed suite of SDS Standards

Update to PIM and Facilities Principles Technical Report

- Architectural foundations for Transceiver and Time Facilities : MDA PIM/PSM + APIs + Attributes
- Refined PIM to PSM 'rules' mapping
  - WINNF-TR-2008 Facilities Principles

Revision to Transceiver and Time Facilities to align to latest Facilities Principles

WINNF-TS-3004 v1.0.0 Time Facility PIM

WINNF-TS-0008 v2.0.0 Transceiver Facility PIM

Completion of C++, SCA and FPGA PSMs for Transceiver and Time Facilities Specifications

- Created as separate appendices from base PIM specification

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Tactical Communications Standards

Activities in 2021

- **Project meeting with SOSA™ representatives (Dec 20)**
  - SOSA™ leadership representatives provided suggestions on collaboration opportunities
  - Identified a specific customer for the working group
- **TCS identified two candidate group contributions and sent them to SOSA™ for concurrence (Jan 21)**
- **Briefed Transceiver and Timing Facilities to SOSA™ (Aug 21)**

Ongoing Project Activities

- **Leverage SDR standards, to include SCA, concepts to address communications modality gaps**
  - Identify gaps related to the communications modality that are not adequately addressed within the SOSA™ specification

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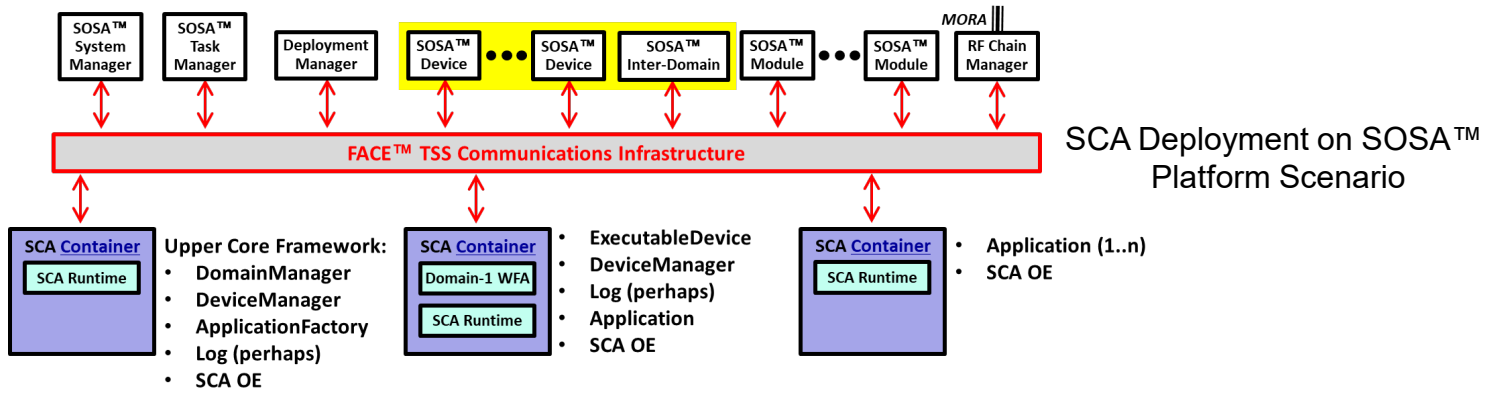
Tactical Communications Standards

Ongoing Project Activities (cont'd)

- **Demonstrate SCA/SOSA™ compatibility**
  - Show compatibility and interoperability between the two specifications.
  - Demonstrate how SCA-based communications products fit within a SOSA™ environment
  - Develop capability iteratively / to address high priority, practical scenarios



SCA Deployment on SOSA™ Platform Scenario

Goal:

- Develop model that describes approach for interoperability between SCA Applications with a SOSA™ aligned infrastructure
- Use model as supporting evidence to develop a change proposal to include a reference to the SCA within the SOSA™ specification

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Spectrum Sharing Committee (SSC)

Chair, Richard Bernhardt, WinnF Chief Marketing Officer, WISPA

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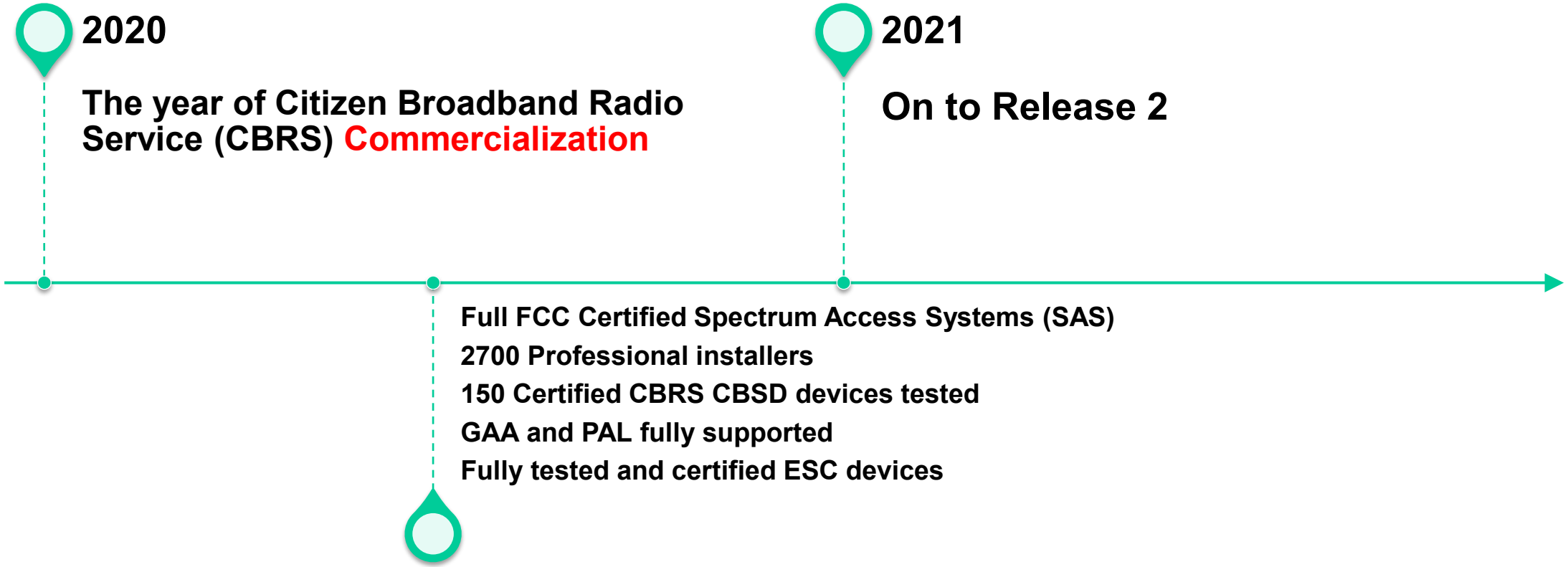
Spectrum Sharing Committee (SSC) Overview



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SSC Working Groups

Steering Group

- Co-Chair: Richard Bernhardt, WinnF Chief Marketing Officer, WISPA
- Co-Chair: Preston Marshall, Google

WG1

- Requirements and Functional needs

WG2

- Security Operations in CBRS
- Dormant having completed their work

WG3

- Protocols

WG4

- Test and Validation
- Systems / Units tests

WG5

- Methodology, approach, direction for CBRS operations

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Release 2

Requirements and Implementation Approved by Steering Group

- Non-regulatory impacting
- Regulatory impacting
  - may require baseline changes
  - In-depth work with FCC

All Release 2 Features Optional

- SAS must inform CBSD of feature support

Features

- Grouping including Single Frequency Group (SFG)
- Passive DAS use with CBRS
- Flexible Grant Alternatives
  - providing for a reduction of a current grant
  - without having to terminate a current grant
- Enhanced Antenna Configurations
  - 2D/3D, MIMO, and Beamforming
- Building Entry Loss (BEL)
- Identification of energy emitting from an indoor application of CBRS

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Other Work Items

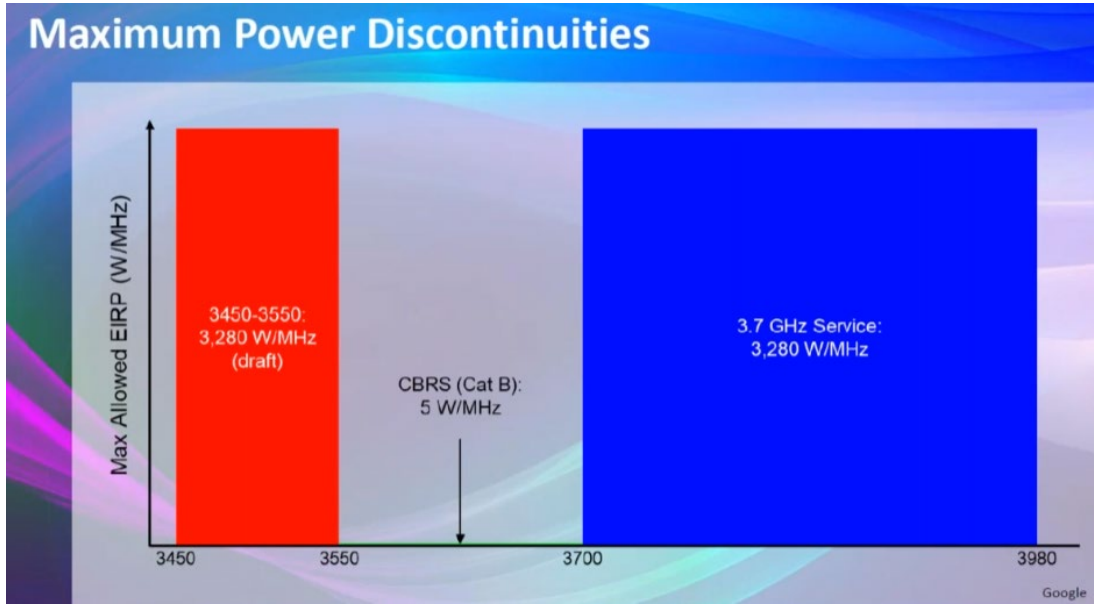
PAL Secondary Market Framework

- Leasing, sale, and disaggregation
- Considers FCC's light touch Uniform Licensing System (ULS) and Form 608

Examine Move Functions in PAL Channel Allocation

- Impacts due to DPA activations
- SAS impacts

Adjacent Band Co-Existence



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Regulatory Advisory Committee (RAC)

Chair, Prakash Moorut, WinnF Chief Regulatory Officer, Shure

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Regulatory Advisory Committee

Chair: Prakash Moorut, Shure

- Chief Regulatory Officer

Main goals are to:

- facilitate the exchange of knowledge on technical topics, not to advocate for one policy position or another.
- help Forum members better understand emerging regulatory trends across all ITU regions.
- help the advisors understand emerging technologies that may impact or be impacted by the regulatory landscape.

Topics

- 2/9: German regulator, BNetzA, Licensing framework 3.7-3.8 and 26 GHz in Germany, (Josch Luxa)
- 3/22: French regulator, ANFR, Spectrum Monitoring with drones in France, (Catherine Gabay, Frédéric Couturier)
- 6/7: Spectrum outlook in Saudi Arabia, (Noel Kirkaldy from Nokia)
- 9/27: ETSI enhanced Licensed Assisted Access (eLSA), (María Pérez from Sennheiser)
- 11/4: Canadian regulator, ISED, Update on 3.8 / 6 GHz rules, (Mark Saunders and Shalini Periyalwar)

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