

# Welcome to Wireless Innovation Forum Webinar Series

## Webinar #15: SDR 4.1 Draft Specification Release

# Administrivia

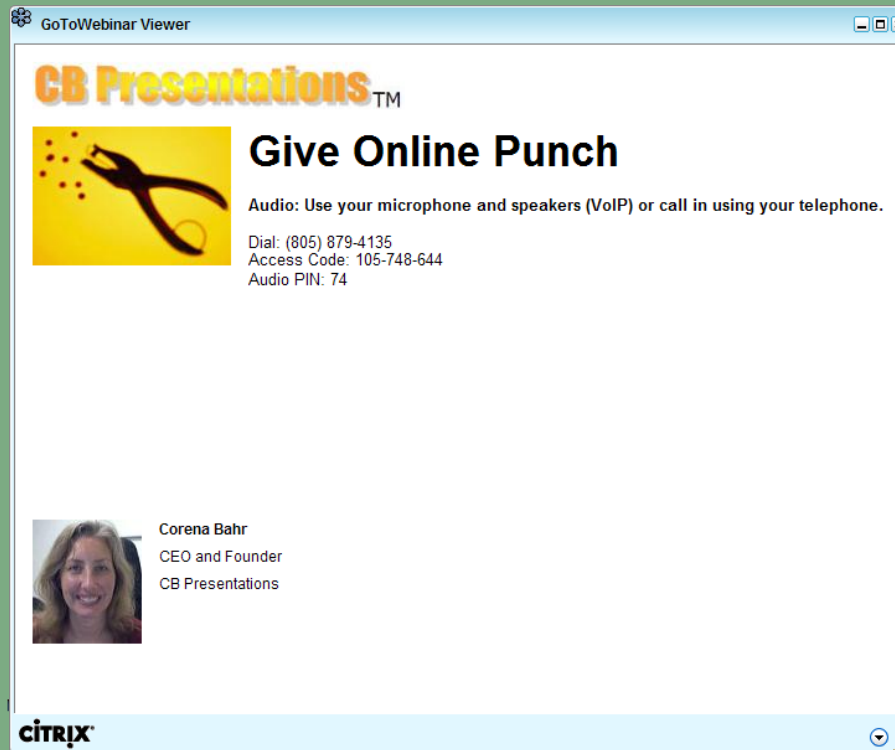
**Slides presented during this webinar will be posted here:**

**<http://www.wirelessinnovation.org/webinars>**

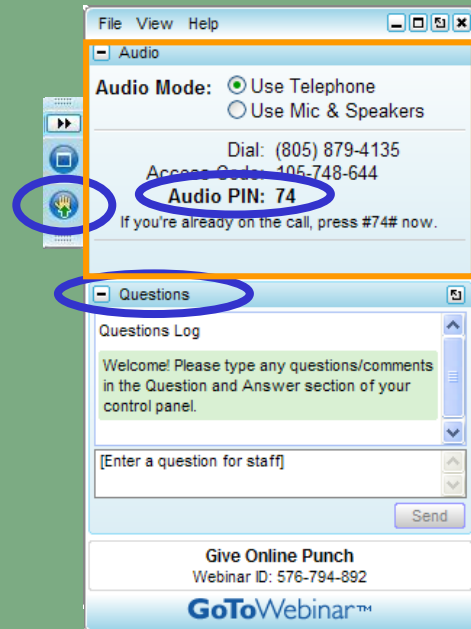
**Email [Lee.Pucker@wirelessinnovation.org](mailto:Lee.Pucker@wirelessinnovation.org) if you need more information**

# GoToWebinar Attendee Interface

## 1. Viewer Window



## 2. Control Panel



# Today's Agenda

## SCA 4.1 Value Proposition

- Presented by Eric Nicollet, Thales

## Overview of the SCA 4.1

- Presented by Kevin Richardson, MITRE, JTNC SCA 4.1 Project Lead

## How to Submit a Comment/Issues

- Presented by Ken Dingman, Harris

# SCA 4.1 OVERVIEW HIGHER BENEFITS FOR SDR STAKEHOLDERS

**SCA 4.1 Draft Release  
Webinar 18<sup>th</sup> February 2015**



Slide 5

# SCA – Global Adoption, Proven Performance

# Global Adoption, Proven Performance

## Drivers of SDR Adoption

- Enhanced communications interoperability
  - Common waveform application base across multinational coalitions
- Simplified insertion of new communications capabilities in deployed radios
  - E.g. next generation MANET, dynamic spectrum allocation...

## Benefits of SCA Adoption

- Proven cost and delivery time advantages
  - Reuse of waveform application software
  - Within a radio family and across radio vendors
- Reduced development risk and time-to-market
  - Established ecosystem of SCA vendors

**SCA standard evolutions for benefits for the Value Chain**

# Proven Performance in Deployed Systems

## Status of deliveries for US Market

- First Generation: NB capabilities: 350,000+
  - Mainly AN/PRC-152 and AN/PRC148 product familie
- Second Generation: WB capabilities: 80 000+
  - AN/ PRC-154 and AN/PRC-155: Near 25000
  - AN/PRC-117G and AN/PRC-152A product families : Near 55000



## Status of SDR Platforms and SDR Waveforms

- Near 40 Waveforms developed and ported in US and International Markets
  - More than 50% are actively developed or deployed into forces
- More than 40 Platforms identified in US and International markets
  - 15 international vendors proposing , developping and deploying SDR paltforms inc. SCA capabilities to support Multi-Waveforms



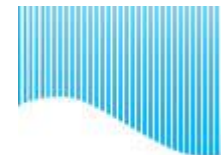
Slide 8



# A Rich and Evolving Ecosystem



Empowered by Innovation



Slide 9

Driving the future of radio communications and systems worldwide

Copyright © 2015 Software Defined Radio Forum, Inc. All Rights Reserved



# SCA 4.1 Overview & Benefits

# SCA 4.1 Introduction

**SCA 4.1 leverages the success of SCA 2.2.2, largely deployed and used in US and International markets**

**SCA 4.1 incorporates new technology advances to enhance**

- Waveform Interoperability
- Waveform Portability
- Information Assurance
- Affordability



**While preserving investments in SCA 2.2.2 Waveform Applications, SCA 4.1 introduces key benefits for all SCA Value chain stakeholders**

# SCA 4.1 Highlights

- 1 **Support Wide variety of SDR Platforms type**
  - Better Applicability for dismounted & lower cost platforms ; Longer Battery Life
  - Improve architectural scalability to address the size, weight, power and cost requirements
    - Profiling and architecture improvements
  - Improved support for devices such as DSPs and FPGAs
- 2 **Enhance Information Assurance**
- 3 **Performance improvements**
  - Start Up time Enhancements : Boot & WF deployment
  - Improved realtime performance
- 4 **Reduce Development Lifecycle costs**
  - Testing cost Enhancements
  - Requirements cleanup
- 5 **WF Portability Enhancements**
- 6 **Easy Introduction with Backwards Compatibility features**
  - SCA 4.1 protects SCA 2.2.2 Waveform Application Investment



**SCA 4.1 provides real benefits to warfighter, radio vendors and the complete SDR ecosystem**

# SCA Benefits for SDR Value Chain

End Users

Procurement

SDR  
Vendors

Eco  
System

- Interoperability
- Support Wide variety of SDR Platforms type
- Information Assurance
- Performances
- WF Portability
- Diversity & Flexibility in procurement options
- SDR Market Place
- Development Lifecycle
- WF Portability
- TTM
- Larger application for standard

# SCA 4.1 Preview Event – Testimonials



**Aeroflex:** "SCA 4.1 – it's not just for tactical radio..."



**DGA:** "DGA is investigating the potential for SCA4.1 for its French SDR roadmap"



**ESSOR PD:** "ESSOR Community congratulates the joint multinational efforts performed in the framework of the WINNF SCA 4.1 WGs, integrating positively significant contributions provided by ESSOR."



**Fraunhofer FKIE:** "The new SCA 4.1 provides a crucial edge over SCA 2.2.2"



**Harris:** "SCA 4.1 will be a useable specification"; "SCA 4.1 is essential for a broad commercial adoption"



**NordiaSoft:** "NordiaSoft has implemented many features that are now present in SCA 4.1"



**PrismTech:** "PrismTech anticipates that SCA 4.1 enhancements will help to accelerate the adoption of SCA going forward"



**Raytheon:** "The SCA 4.1 specifies a scalable technology neutral architecture"; "Raytheon utilizes the SCA in our Communications and Electronic Warfare (EW) business areas."



**Reservoir Labs:** "Reservoir Labs anticipates continuing to support the evolution of the SCA with an upgrade of R-Check SCA for SCA 4.1 in 2015"



**Selex:** "SCA 4.1 includes essential features which maximize investments and ease maintenance, allowing for a smooth transition toward the next SCA implementations and for a wider spread of this technology on commercial products."



**Thales:** "Thales is highly interested by SCA 4.1, and has actively contributed to its development ; Thales is positive regarding adoption of SCA 4.1 Core Spec"

# SCA 4.1 Overview & Benefits



# Reduce Radio Size and Cost

## Different Platforms, Different Profiles: Decreasing SWAP, Cost & Complexity



### Introducing Profiles

- **SCA Lightweight Profile:** for radio platforms where the hardware modules have a static configuration.
  - Provides a minimum set of functionality which is applicable for resource (e.g. SWAP) constrained platforms.
- **SCA Medium Profile:** for radio platforms with plug-and-play but not removable hardware modules.
  - Still rather lightweight but it introduces a configurable, dynamic aspect.
  - The most flexible platform in that it provides the lightest weight implementation that supports the legacy SCA deployment model.
- **SCA Full Profile:** for radio platforms with removable, plug-and-play hardware modules.
  - Provides the full breadth of SCA deployment and management capabilities
  - Aligned to support prime power, multi-channel sets

**SCA 4.1 allows vendors to select which features are supported to meet their program's mission without impacting portability or interoperability**



# Reduce Radio Size and Cost

## Component scalability

- Allow component developers to choose whether or not to implement some of the standard sub-component interface. The scalability will also be used to support the different profiles of the specification.

## Scalability of the manager components

- Allow developers to choose whether or not to implement all of the manager interfaces. The manager scalability will also be used to support the different profiles of the specification

## Minimal ultra-Lightweight AEP definition

- Provides minimal uLw specification with optional grouping to extend capability

## Remove requirement for CORBA middleware

- SCA 4.1 permits other middleware, including simply using C++ pointers where distributed processing is not required.

*SCA 4.1 allows vendors to 'right size' the radio to the mission*

# Resource Constrained Processors

## Component Scalability

- SCAv4.0 introduced component scalability
  - Supports components of smaller sizes but uses "conditional inheritance" which is not UML compliant
- SCAv4.1 revisited component scalability
  - Replaced conditional inheritance with "optional composition" which is UML compliant
  - Allows a mixture of components with different levels of scalability in a same radio.

## Specification of Lw and ULw AEPs

## Better enforcement of POSIX conformance

## Support of, typically, DSP Operating Environments

## International convergence is at hand

# Enhanced Information Assurance

**Design patterns and strategies  
incorporate security awareness**

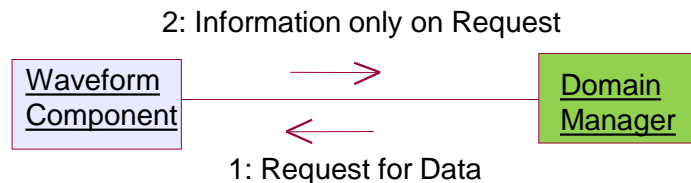
**Remove ability for a component to  
query information that could be  
inappropriately used**

**Possibility of clients requesting  
information they should not  
have removed by utilizing a  
'push' model**

**Harder to get an object reference  
to the DomainManager and learn  
about the system**

**Naming Service deleted**

SCA 2.2.2



SCA 4.1

1: Always Sends Information



# Improved Performance

## Faster Boot Times

- Port Connection improvements
- Allows faster connections, reducing waveform startup boot time
- Permits connections to be defined at build time

## Improved real-time performance

- Independence from middleware / connectivity (PIM/PSM approach)
- CORBA is not mandatory any more
  - Can be chosen or not depending on platform design choices
- This considerably broadens potential adoption
  - Possibility to use any connectivity standard
  - Solutions with proprietary middleware / connectivity (e.g. very small / emerging processors)

# Reduced Development Costs

## Static analysis tools will have more prominence

- Test all paths in the code
- Find errors much earlier in the development process.
- Provide immediate assistance by linking errors directly to the specification - this is a good way to “teach” the spec as code is being written.

## Requirements cleanup

- Introduce common requirements tags (form: “SCAXXXX”)
  - Can be used for both US Govt and commercial/international markets
- Reduced number of requirements
- Removal of some redundant requirements

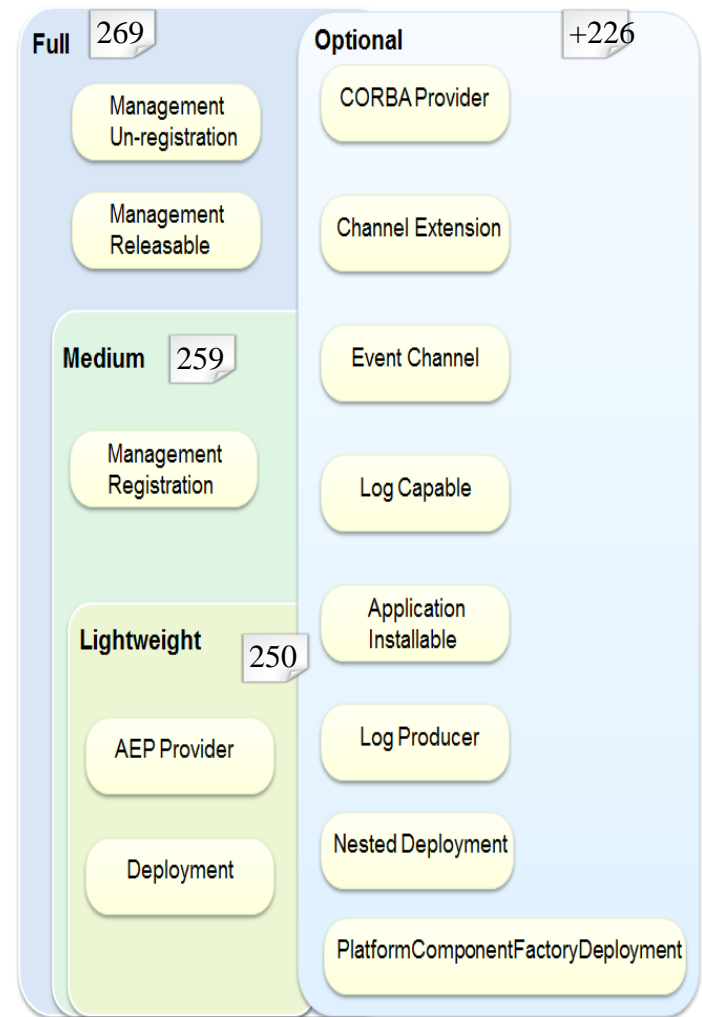
# Testability Improvements

## Total test time reduced based on profile implemented

- Cost of increase test coverage complexity

## Units of functionality and multiple base AEP profiles with optional function groups allow crisper test definitions

## The backwards compatibility UOF added to 4.1 done in a test-friendly way



## Specification of PIM (Platform Independent Modelling) IDL Profiles

- Full Profile: corresponding to existing SCA
- ULw Profile: targetted for most embedded processing needs and environments (e.g. Physical Layers, DSP / FPGA)

## Rationalization of PSM IDL Profiles

- CORBA PSM
- Extensible approach for other PSMs

## Definition of Full and ULw POSIX AEPs

- Expands applicablility towards DSP/Constained processors

## International convergence

- Same content as WInnF Full & ULw PIM IDL Profiles
- Similar content to WInnF Lw & Ulw POSIX AEPs

# Investment Protection

## **SCA 4.1 ensures investment in SCA 2.2.2 applications can be reused in SCA 4.1 environment**

- Re-introduce the DomainManager to obtain the proper allocation properties that are associated to a Device
  - Allows the ApplicationFactory to use a Device for deployment

## **Support for applications composed of a mixture of SCA 4.1 and SCA 2.2.2 components.**

- Allow developers to perform a more incremental transition from SCA 2.2.2 to SCA 4.1

## **Enhance the ability to migrate legacy waveforms to an SCA model**

- Naming convention changes



# SCA 4.1 OVERVIEW

Slide 25

# SCA 4.1 Draft Comment Handling

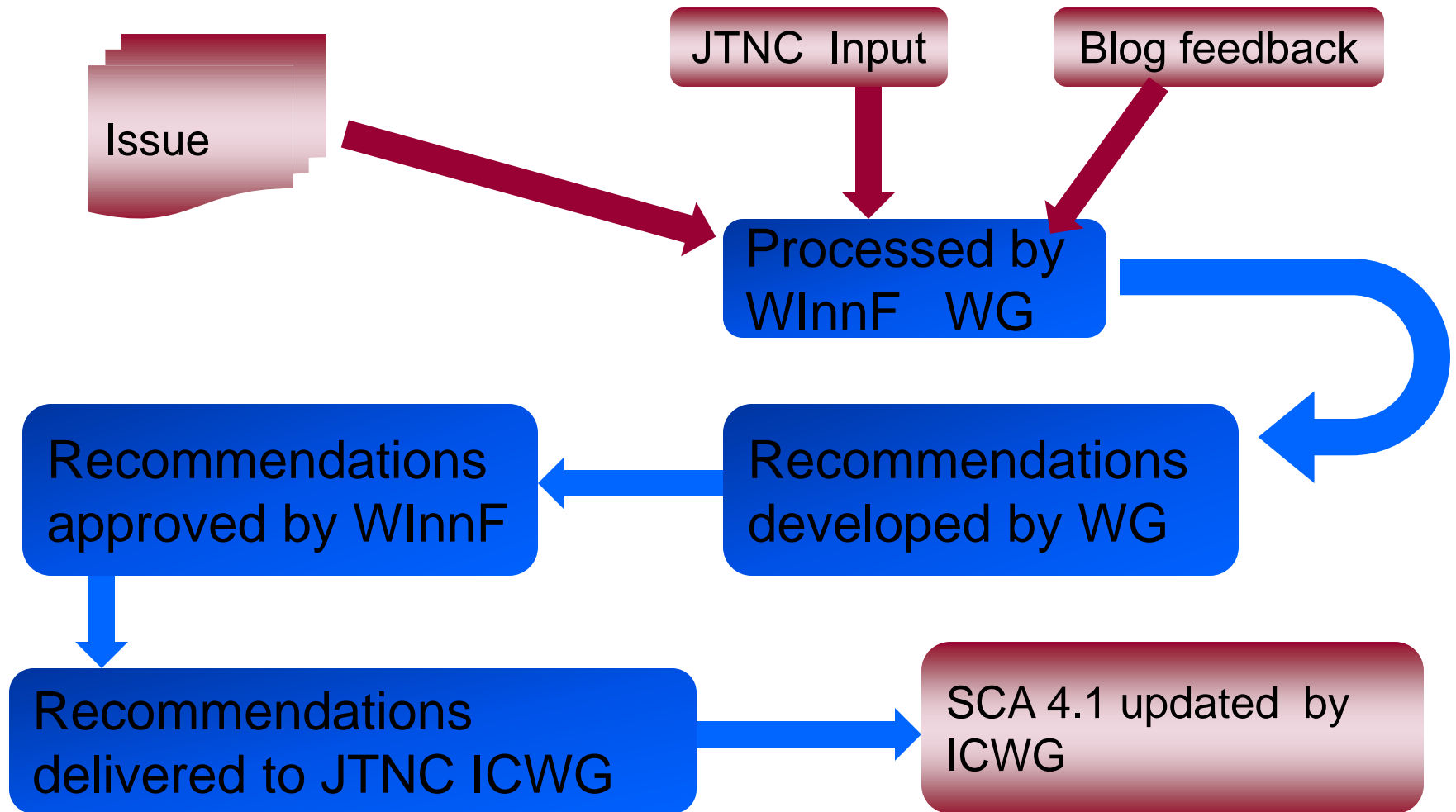
**SCA 4.1 Webinar**

**18 February 2015**

# Comment Submission

- **Submit comments using the WInnF Specification Issue Reporting Form**
  - [https://winnf.memberclicks.net/index.php?option=com\\_mc&view=mc&mcid=form\\_176912](https://winnf.memberclicks.net/index.php?option=com_mc&view=mc&mcid=form_176912)
- **Comment adjudication will be performed by a WInnF Work Group**
- **JTNC will participate in the comment adjudication as SME's**
- **Comment period will close March 20, 2015**

# Adjudication Workflow



# SCA 4.1 Comment Adjudication Process

- 1 –Collect issues submitted via the WInnF Specification Issue Reporting Form**
- 2 – Each submitted issue adjudicated by the WInnF**
  - Submitted comments will either be accepted or rejected.**
  - Accepted comments will result in a detailed analysis of the comment and its impact to the specification culminating with a proposed resolution to the comment.**
    - Accepted comments are posted to a blog hosted on the WInnF website.
      - <http://groups.winnforum.org/p/bl/et/blogid=43>
    - Public able to supply comments to the issue on the blog
    - The proposed resolution to each issue will be posted on the associated blog article for public discussion
  - Rejected comments are those that are not deemed as relevant to the draft specification.**
  - Comments received as well as working and recommended adjudications will be available on the blog**

# SCA 4.1 Comment Adjudication Process

- 3 – Resolution of all comments, whether rejected or resulting in a recommended resolution will be included in the project output work product(s).**
- 4 – All SCA 4.1 issue recommendations will be included in a WInnF work product that will go through the WInnF approval process.**
- 5 –Final project work products (including all comments and recommended adjudications) will be made available publicly on the WInnF site and submitted to JTNC for consideration and final adjudication.**

# Comment Submission

Software Defined Radio (SDR), Cognitive Radio (CR) and Dynamic Spectrum Access (DSA) Technology - Windows Internet Explorer

https://winnf.memberclicks.net/index.php?option=com\_mc&view=mc&mcid=form\_176912

Search our site... Member Login

## Coordinating Committee on International SCA Standards Specification Issue Reporting Form

This form enables submission of issues identified in Specifications developed under policy WINNF Policy 001 ([http://www.wirelessinnovation.org/policies\\_and\\_procedures](http://www.wirelessinnovation.org/policies_and_procedures)). It supports the Forums members in providing continuous improvement in the Specifications issued.

**Please feel free to consolidate issues if appropriate, but do not combine issues that are unrelated. Instead, please submit a separate form for each.**

**Upon completing this form, you will be issued a unique Issue Number. Please reference that number in all future correspondence.**

**Submitted issues may be made public, however contact information on the submitted issue will not be disclosed.**

The WinnF is currently collecting comments against the following specifications:

- JTNC SCA 4.1 Draft
- WINNF-14-S-0016-V1.0.0 IDL Profiles for Platform Independent Modeling of SDR Applications
- WINNF-14-S-0009-V1.0.0 Lw & ULw AEPs for Resource Constrained Processors
- WINNF-09-S-0011-V2.0.0 International Radio Security Services API
- SDRF-08-S-0008-V1.0.0 Transceiver Facility Specification

**Contact Information**

Contact Name  Organization Name

Email

**Issue/Suggestion Details**

Select JTNC SCA 4.1 Draft

Internet | Protected Mode: Off 95%

Contact Information  
Required

Slide 31

# Comment Submission

Software Defined Radio (SDR), Cognitive Radio (CR) and Dynamic Spectrum Access (DSA) Technology - Windows Internet Explorer

https://winnf.memberclicks.net/index.php?option=com\_mc&view=mc&mcid=form\_176912

Software Defined Radio (SDR), Cognitive Radio (C...

### Issue/Suggestion Details

Select Document: **ITNC SCA 4.1 Draft**

Page:  Section and Paragraph:

Issue One Line Description:

Issue Full Description (1000 Chars Max):

Issue Severity: ☐ Critical ☐ Major ☐ Minor

Proposed Resolution (Optional, 1000 Chars Max):

If you need more space or wish to provide an attachment, please send to SCA-Standards@wirelessinnovation.org. Only attachments in PDF format will be accepted.

Select SCA 4.1 Draft as the Document

Enter Page, Section and Paragraph for Issue

Enter short description/title for the Issue

Enter full description for the Issue

Enter Severity

Optionally, enter a proposed solution for the Issue

Slide 32



# Comment Submission

Software Defined Radio (SDR), Cognitive Radio (CR) and Dynamic Spectrum Access (DSA) Technology - Windows Internet Explorer

https://winnf.memberclicks.net/index.php?option=com\_mc&view=mc&mcid=form\_176912

Favorites | Web Slice Gallery | Dingman Org | F3 Management | FBI Projects | PAL | Kroon | FBI Training | View | Lous MUOS site | EBS | WINNF | Development\_Discovery

Software Defined Radio (SDR), Cognitive Radio (C...

Issue Severity

- ☐ Critical
- ☐ Major
- ☐ Minor

Proposed Resolution  
(Optional, 1000 Chars Max)

if you need more space or wish to provide an attachment, please send to SCA-Standards@wirelessinnovation.org.  
Only attachments in PDF format will be accepted.

**Intellectual Property Rights Disclosure (Forum Policy 007)**

Are you personally aware of any claims under any patent applications or issued patents that are likely to be infringed by an implementation the proposed solution

☐ No  
☐ Yes

**Controlled Information Disclosure (Forum Policy 009)**

☐ I confirm that I have not disclosed export restricted or controlled information in completing this form

Submit

Acknowledge no IP is disclosed

Acknowledge no controlled information is disclosed

Copyright © 2014 The Wireless Innovation Forum. All Rights Reserved  
All material, files, logos and trademarks within this site are properties of their respective organizations.

powered by memberclicks

Internet | Protected Mode: Off | 95%

Slide 33