



Project 25 Compliance Assessment Program (P25CAP)

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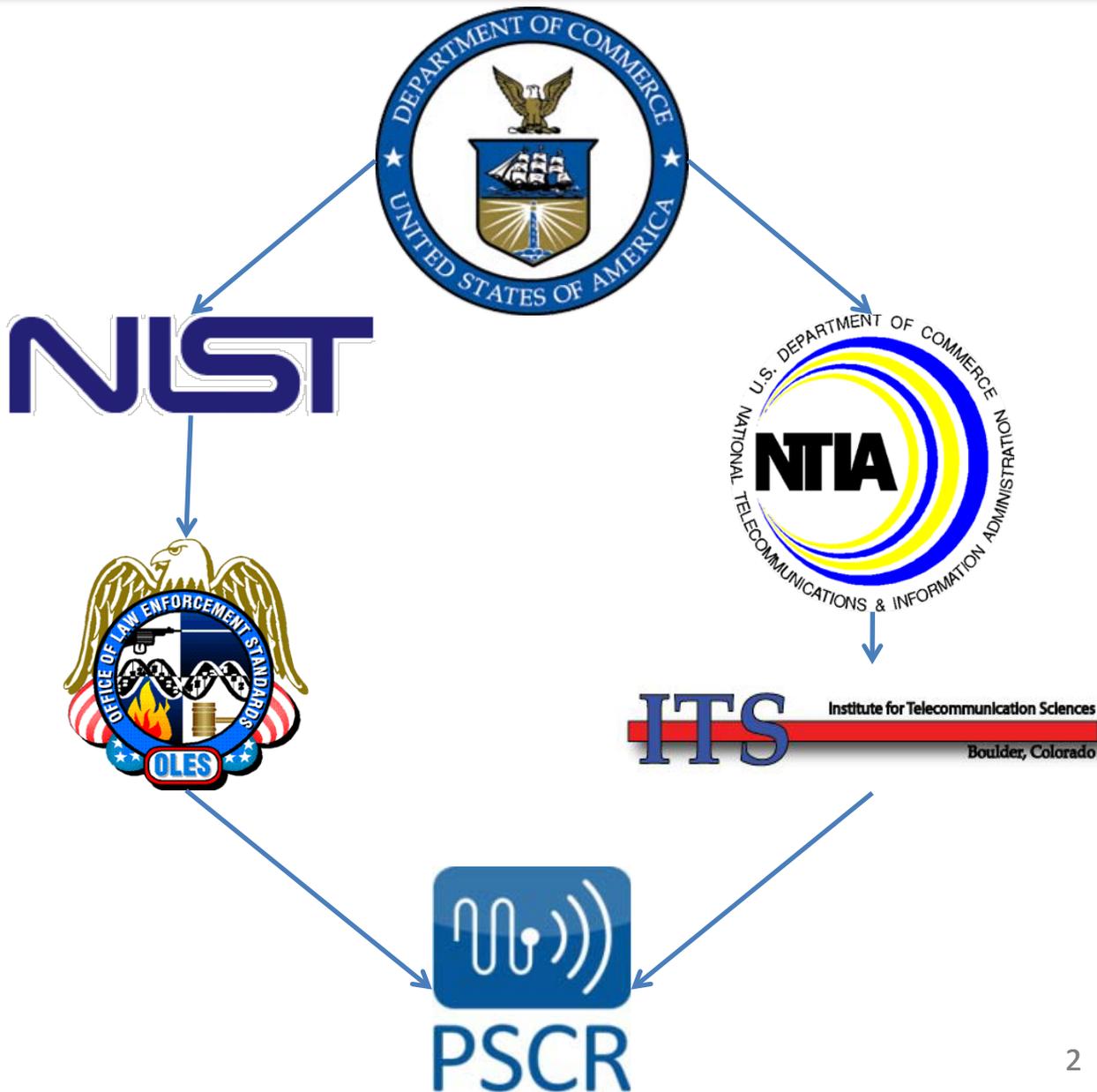


Public Safety Communications Research Program

*Located at the
Department of Commerce
Boulder Labs in Colorado*

The PSCR Program is a
joint effort between:

NIST's
Office of Law
Enforcement Standards
(OLES)
and
NTIA's
Institute for
Telecommunication
Sciences
(ITS)



PSCR Sponsors



Homeland Security

Department of Homeland Security

Office for Interoperability and Compatibility



COPS

Department of Justice

Office of Community Oriented Policing Services

R&D: Audio Quality Testing

Audio Quality Testing:

- Firefighter reports showed that some background noises created by firefighting equipment can interfere with digital narrowband communication
- Similar audio quality issues may arise as voice is introduced to the public safety broadband network
- PSCR worked with practitioners to develop and implement tests that measure the operation of digital radios, and also tested mitigation techniques for the problems.
- PSCR is initiating broadband audio quality testing with:
 - A transcoding study between the Adaptive Multi-Rate Narrow Band vocoder (the fallback vocoder for Voice over LTE) and the Project 25 vocoder
 - A subjective experiment to understand the effect of background noise on the new vocoder



Example of the Audio Issue

Analog
(no background noise)



P25
(no background noise)



Analog
(low air alarm)



P25
(low air alarm)



Changes in P25 Intelligibility Since 2008

<p>Mask 2008 (no background noise)</p> <p> 59%</p>	<p>PASS Alarm 2008</p> <p> 21%</p>
<p>Mask 2011 (updated best practices)</p> <p> 69%</p>	<p>PASS Alarm 2011 (Updated Vocoder)</p> <p> 50%</p>

P25 CAP Vision

- The P25 CAP provides the more than 60,000 emergency response agencies in the United States in addition to International interest with a:
 - Consistent and tractable perspective of P25 product compliance.
 - Means of verifying that Federal grant dollars are invested in standardized solutions and equipment that promote interoperability.

Why is the P25 CAP Important

- Provides increased confidence:
 - To purchasers that their products meet standards
 - That federal grant dollars dedicated for communications are supporting interoperability and standards
- Low cost solution to provide public safety similar services as the commercial sector

Why P25 CAP

- Past research has indicated that some radios marketed as Project 25 (P25) compliant do not meet all parts of the standard
- Public safety has no independent way to verify compliance consistently across manufacturers
- Every other major wireless standard has some form of compliance program
- P25 Compliance Assessment Program (CAP) was created to fill this gap

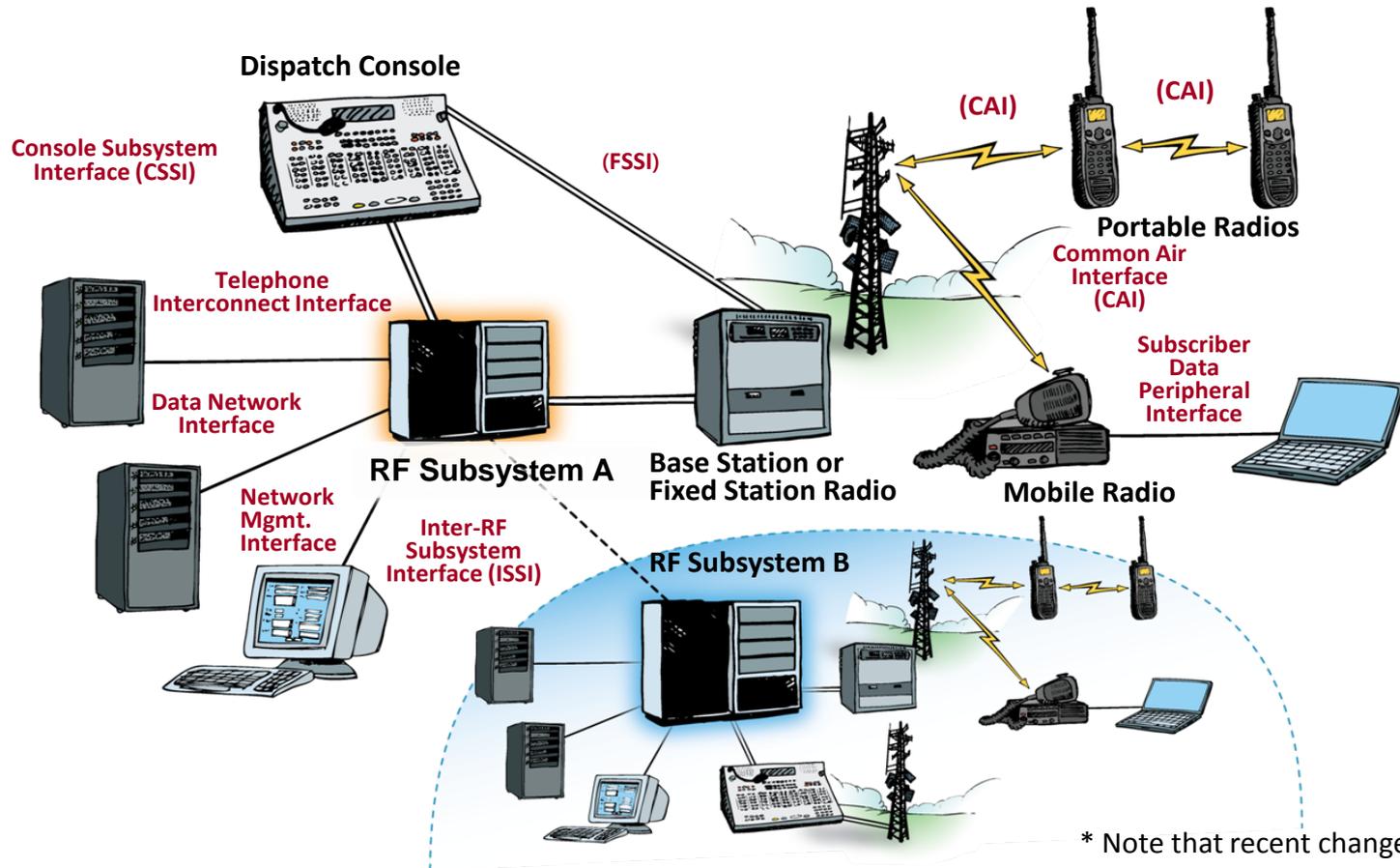
Project 25

Project 25 Standards are Focused on Achieving Goals that Benefit the Public Safety Community

<i>P25 Goals</i>	<i>Impact on Public Safety Community</i>
Graceful Migration	Allows an agency to move from a legacy system to a new system easily
Competition in System Life-Cycle Procurements	Users can select from multiple vendors that build innovative products to the same standards
Interoperability	Supports the sharing of information via voice and data signals on demand, in real time, when needed, and as authorized
Practitioner Driven Approach	Vendors develop public safety communications products that are driven by practitioner needs and requirements
User Friendly Equipment	Radio systems operate in consistent and familiar ways requiring the least mental and physical interaction by the operator
Spectrum Efficiency	Takes advantage of finite spectrum resources so more users can operate within limited bandwidths
Robust Compliance Assessment Program	A comprehensive P25 assessment program will ensure that vendor products are tested and can be trusted to be P25-compliant

Project 25

There are eight* P25 interfaces to be standardized



* Note that recent changes in P25 indicate more interfaces for items such as key management

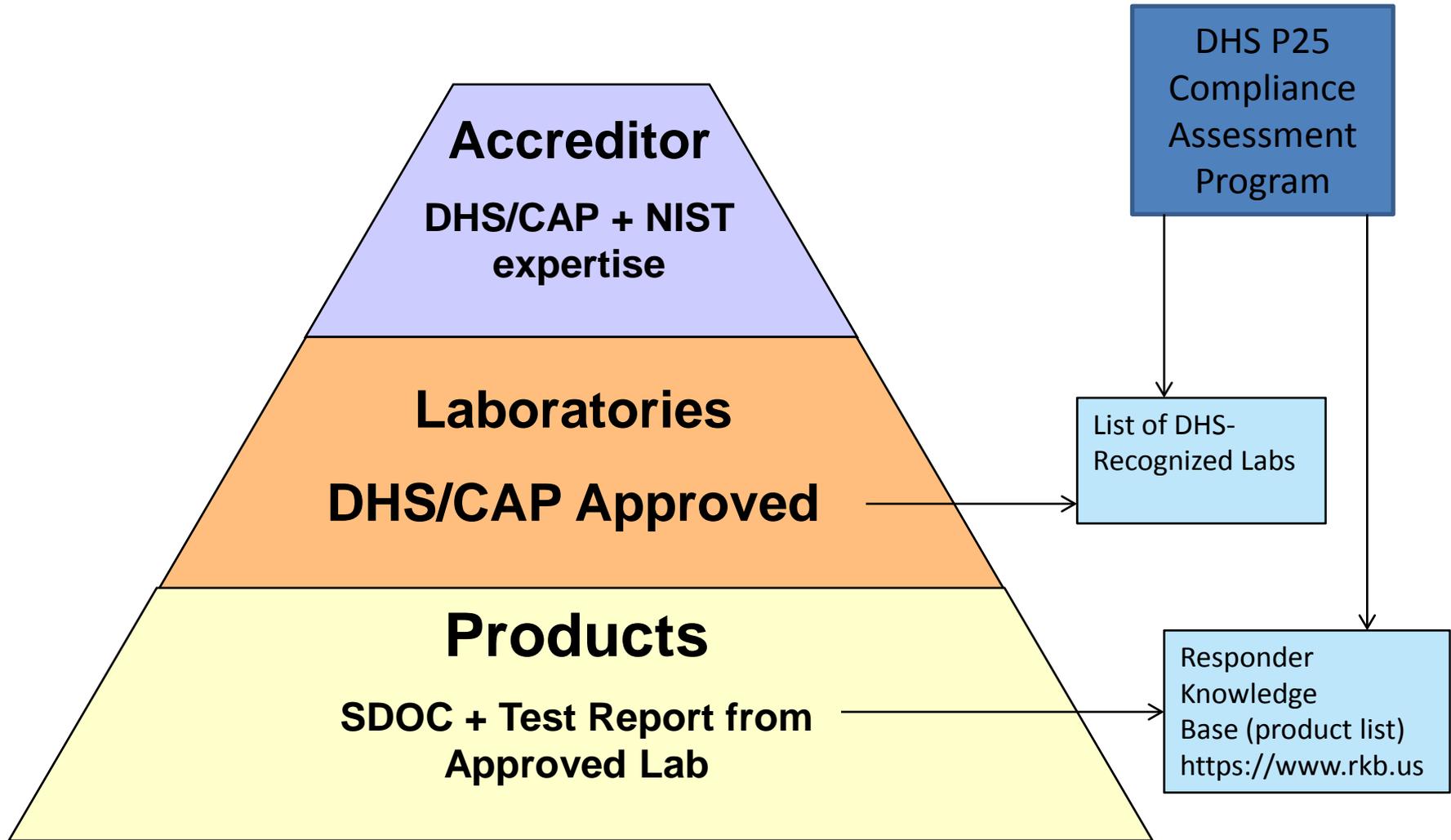
Congressional Mandate

- The P25 CAP was established on the basis of requests from the United States Congress:
 - Senate Report 109-088 – DEPARTMENTS OF COMMERCE AND JUSTICE, SCIENCE, AND RELATED AGENCIES APPROPRIATIONS BILL, 2006
 - House Report 109-241 – MAKING APPROPRIATIONS FOR THE DEPARTMENT OF HOMELAND SECURITY FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 2006, AND FOR OTHER PURPOSES.

Partnership

- The P25 CAP is a joint program between:
 - Department of Homeland Security's Office for Interoperability and Compatibility (DHS/OIC)
 - Department of Commerce's NIST Office of Law Enforcement Standards (NIST/OLES)
- The P25 CAP partners with industry and the public safety community

P25 CAP Current State



P25 CAP Goals

- P25 CAP will:
 - Operate a recognition program that fulfills, as applicable, ISO/IEC 17011;
 - Promote confidence in the technical competence of DHS/OIC recognized laboratories and the reliability of their results;
 - Communicate frequently with laboratories, public safety users, and other stakeholders to ensure the P25 CAP is meeting public safety needs and requirements; and
 - Meet the highest professional standards for integrity, impartiality, and ethical conduct.

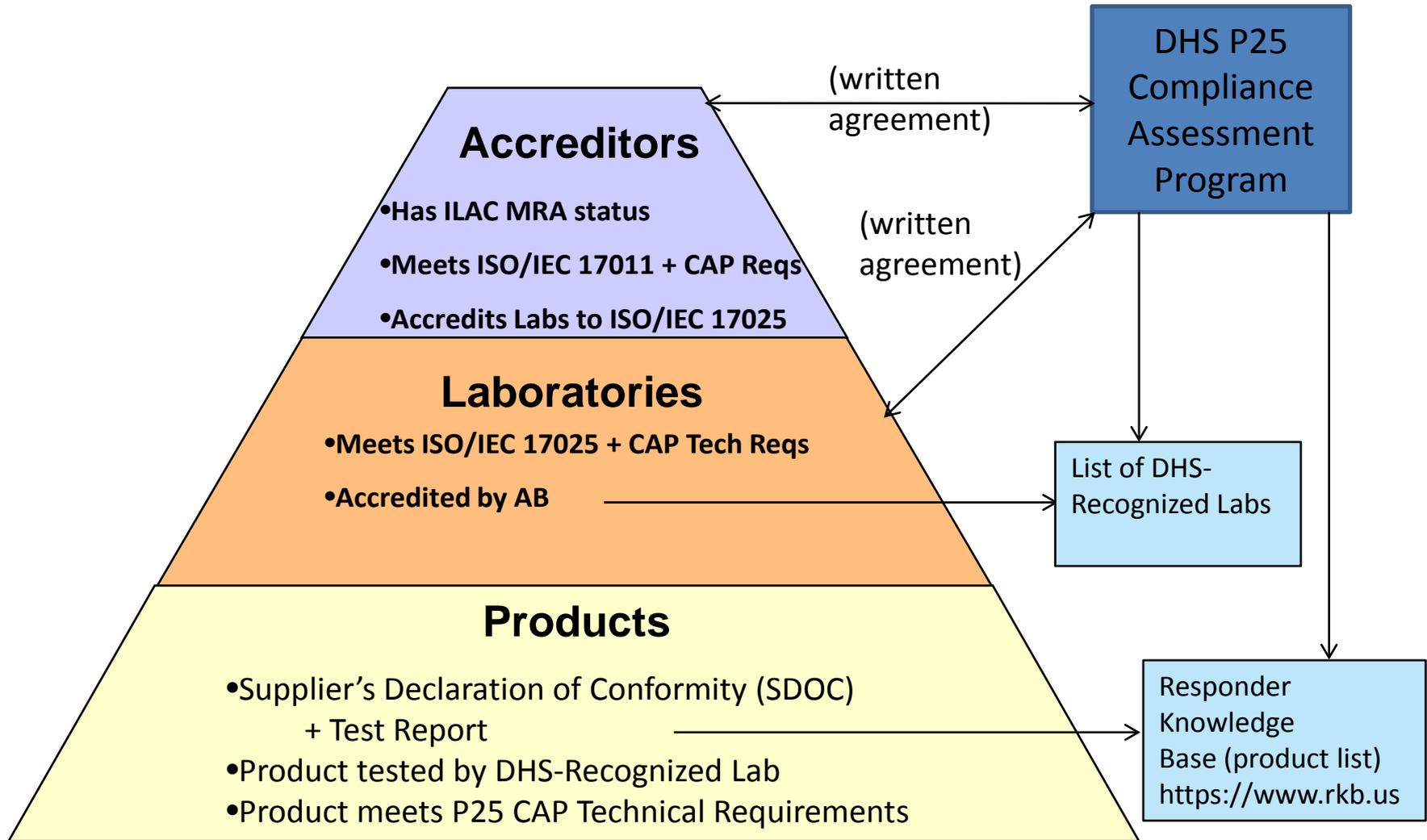
Key P25 CAP Program Features

- Program will review 1st, 2nd, or 3rd party labs who will participate in the P25 CAP program
- Manufacturers must use approved laboratory to participate in the program
- Participating manufacturers must publish a Suppliers Declaration of Compliance (SDoC) and a Summary Test Report (STR)
 - SDOCs/STRs will be housed on a common website (www.rkb.us), and DHS grantees are expected to purchase equipment with approved SDOCs/STRs
- Initial phase of the program is focused on the Common Air Interface (CAI) and the Inter-RF SubSystem Interface (ISSI)

P25 CAP Assessment Recognition Process

- Once a laboratory is recognized by DHS, manufacturers wanting to participate can submit their equipment to the laboratory for assessment.
- Equipment assessment is based on DHS Compliance Assessment Bulletins (CABs)
- Next, manufacturers publish a Supplier's Declaration of Compliance (SDoC) and a Summary Test Report (STR).

P25 CAP Future State



P25 CAP Future State Cont'd

P25 CAP Continuity

DHS P25 CAP will continue to set policies and requirements

Requirements of ISO/IEC 17025 will remain unchanged

CAP program-specific technical requirements will remain unchanged

The “bar” will not be lowered or raised for laboratories or products

P25 CAP Changes

Laboratories will be accredited by ILAC MRA signatories

CAP will set policy on AB participation requirements

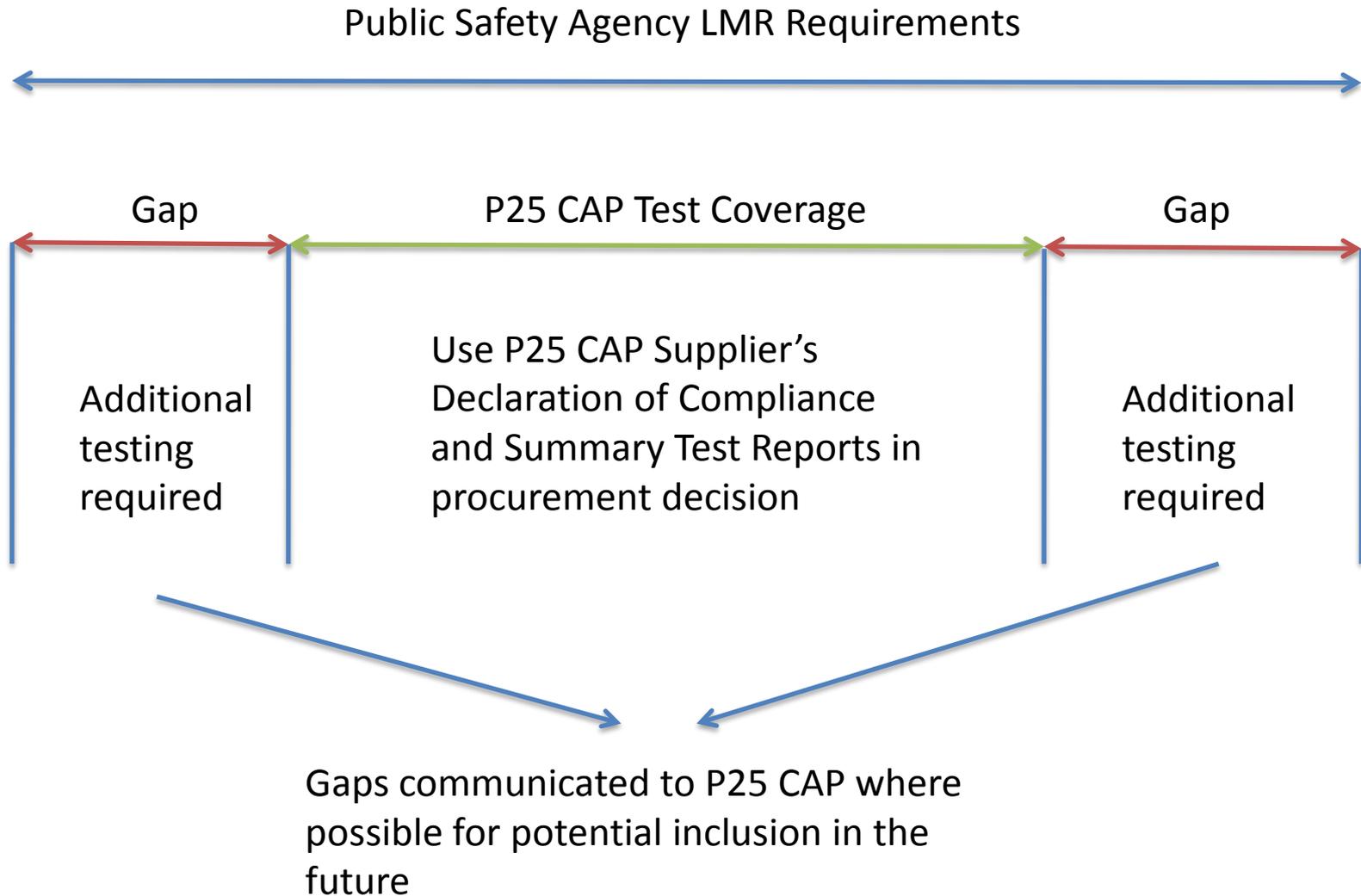
Accreditation bodies will set fees for accreditation services

Accreditation bodies will set application, renewal, and on-site schedules

CAP and ABs will work together on assessor qualifications

Proficiency testing may be included in the laboratory assessment process

What are your LMR Requirements?



Documentation

- **Supplier's Declaration of Compliance**
 - A formal declaration of compliance created in accordance for a particular set of P25 compliance tests defined by the P25 CAP.
- **Summary Test Report**
 - A predefined format for manufacturers to present results to a subset of tests.



Suppliers Declaration of Compliance



Project 25 Compliance Assessment Program

SUPPLIER'S DECLARATION OF COMPLIANCE (SDoC)

Company Name
Company Department
Street Address
City, State Zip
Name of Authorized Representative
Phone: xxx-xxx-xxxx Fax: xxx-xxx-xxxx
E-mail: authorized_rep@company.com
URL: <http://www.companyname.com>

Product Name: {Name of product}
Installed options: {List of options}

{Company Name} hereby declares that the above referenced product complies with the following Project 25 standards:

RECEIVER TESTS, TIA-102, CAAB-B:

- §3.1.4 Reference Sensitivity under the following test conditions:
- §3.1.5 Faded Reference Sensitivity under standard test conditions
- §3.1.6 Signal Delay Spread Capability under standard test conditions
- §3.1.7 Adjacent Channel Rejection under the following test conditions:
- §3.1.8 Co-Channel Rejection under the following test conditions:
- §3.1.9 Spurious Response Rejection under the following test conditions:
- §3.1.10 Intermodulation Rejection under the following test conditions:
- §3.1.11 Signal Displacement Bandwidth under the following test conditions:
- §3.1.17 Late Entry Unqualch Delay under standard test conditions
- §3.1.18 Receiver Throughput Delay under standard test conditions

TRANSMITTER TESTS, TIA-102, CAAB-A:

- §3.2.8 Unwanted Emissions: Adjacent Channel Power Ratio under standard test conditions
- §3.2.12 Transmitter Power and Encoder Attack Time under standard test conditions
- §3.2.14 Transmitter Throughput Delay under standard test conditions
- §3.2.15 Frequency Deviation for C4FM under standard test conditions
- §3.2.16 Modulation Fidelity under standard test conditions
- §3.2.18 Transient Frequency Behavior under standard test conditions

2007-09-28

Issue date

Laboratory's Authorized Representative

Summary Test Report



Project 25 Compliance Assessment

Interoperability Test Report

Common Air Interface

Trunked Mode Operation



Motorola A STRO 25		Radio #1	Radio #2	Radio #3	Radio #4	Radio #5	Radio #6	Radio #7	Radio #8	Radio #9
Test Case	Description	Verdict								
3.1	Basic Group Call Tests									
3.1.1	Basic Group Call Test – One RF Site (Test 1.1)	P	P	P	P	P	P	P	P	P
3.1.2	Talk Group Privacy Test – One RF Site (Test 1.2)	P	P	P	P	P	P	P	P	P
3.1.3	Group Call Late Entry Subscriber Test – Subscriber Initially Set for a Different Talk Group – One RF Site (Test 1.3)	P	P	P	P	P	P	P	P	P
3.1.4	Group Call Late Entry Subscriber Test – Subscriber Initially Involved in a Unit to Unit Call – One RF Site (Test 1.4)	P	P	P	P	P	P	P	P	P
3.1.8	Group Call Late Entry Subscriber Test – Subscriber Initially Involved in a Unit to Unit Call – Two RF Sites (Test 1.8)	P	P	P	P	P	P	P	P	P
3.2	Queued or Denied Group Call Tests									
3.2.1	Busy Queuing and Call Back Test for Group Call – One RF Site (Test 2.1)	P	P	P	P	P	P	P	P	P
3.2.3	Call Originator Subscriber Unit Not Valid Test – One RF Site (Test 2.3)	P	P	P	P	P	P	P	P	P
3.2.4	Target Talk Group Not Valid Test – One RF Site (Test 2.4)	P	P	N/A	P	P	P	P	P	P
3.3	Announcement Group Call Tests									
3.3.1	Basic Announcement Group Call Test – One RF Site (Test 3.1)	P	P	N/A	P	P	P	P	P	P
3.4	Protected Traffic Channel Tests									
3.4.1	Group Call Protected Traffic Channel Test – One RF Site (Test 4.1)	P	P	N/A	P	P	P	P	N/A	P

P25 CAP Status

- P25 has 8 (now potentially more) interfaces
- 4 were called out in Congressional language
 - The Common Air Interface (CAI)
 - The Inter-subsystem Interface (ISSI)
 - The Console Subsystem Interface (CSSI)
 - The Fixed Station Subsystem Interface (FSSI)
- Currently P25 CAP for:
 - CAI is operational with 92%+ of the manufacturers represented¹
 - ISSI is ready and waiting for laboratory and manufacturer participation
 - CSSI and FSSI will increase intra-system competition and will be added to the P25 CAP as appropriate test standards are completed

P25 CAP Status Cont'd

- **In May 2008, DHS OIC established the P25 CAP Governing Board**
 - This board is comprised of users and operators of P25 systems from local, state, and federal agencies.
 - The purpose of the P25 CAP Governing Board is to provide recommendations to DHS OIC on issues related to the governance of the P25 CAP
 - Types of tests (performance, conformance, and interoperability) and specific tests within these types
 - Timelines for required implementation
- **In May 2009, DHS OIC recognized 8 laboratories that can now perform compliance testing as part of the P25 CAP:**
 - Labs were recognized for Performance and Interoperability testing for products implementing the P25 CAI.
 - SDOCs/STRs are required for CAI purchases using Federal grant money as of November 6, 2009
- **In January 2010, the first Supplier's Declaration of Compliance and Summary Test Reports were posted on the DHS Responders Knowledgebase Website – www.rkb.us**
 - Thirteen manufacturers have posted their SDOCs and STRs on the publicly available website.
- **ISSI is now included in the P25 CAP**
 - Grant guidance states that March 5, 2011 is the date by which ISSI's procured with Federal grant money must have been tested in the P25 CAP

P25 CAP Status Cont'd

- **In January 2011, NIST began development of P25 CAI Conventional Conformance tests**
 - P25/TIA indicated that it did not have the ability to develop conformance tests for compliance assessment
 - NIST began the process of developing conformance tests outside of P25/TIA through the Federal Register Notice (FRN) process to ensure open environment and stakeholder participation
 - Several tests published along with test development criteria to allow stakeholders to develop and submit tests into the process
 - Final FRN to provide the final list of tests and criteria for inclusion in the P25 CAP to be released Feb/March 2012
- **In November 2011, DHS OIC began an investigation into transitioning assessment and recognition of P25 CAP laboratories to ISO/IEC 17011/17025 process**
 - ISO/IEC 17011 accreditation bodies in the United States are A2LA and NVLAP and IANZ in New Zealand
 - NIST/OLES would no longer perform assessment
 - DHS OIC would no longer recognized laboratories
 - DHS OIC would continue to develop testing policy through Compliance Assessment Bulletins

P25 CAP Status Cont'd

- **In January 2012, DHS OIC & NIST met with laboratories regarding assessment/accreditation transition**
 - Laboratories to examine their quality management systems for ISO/IEC 17025 compliance
 - DHS OIC & NIST to meet with Accreditation Bodies to determine policy and timing guidance
- **NEXT STEPS**
 - Feb/March 2012, DHS OIC & NIST develop transition plan
 - Meeting with Accreditation Bodies
 - Develop Transition Plan documentation
 - Consolidate NIST Handbook 153 technical requirements into P25 Compliance Assessment Bulletin
 - Feb/March 2012, DHS OIC & NIST to determine addition of test scope to program prior to transition
 - CAI Conventional Interoperability tests
 - Phase 2 Trunked Interoperability tests

R&D: LMR to LTE Interface

LMR to LTE Interface:

For the foreseeable future, public safety will be leveraging narrowband for voice and broadband for data communications, but there must be the capability to connect the narrowband and broadband systems together to create more dynamic communications capability amongst all existing systems.

- Through the NPSTC BBWG Broadband Voice Task Group, PSCR is looking at LMR/Broadband integration, including mission-critical voice over broadband and requirements for direct mode communication



- In developing a specification for an LMR to LTE interface, PSCR is leveraging its past work in:
 - **Radio over Wireless Broadband (ROW-B)**, which successfully integrated radios operating on an existing Land Mobile Radio (LMR) system with a 700MHz broadband network
 - **Voice over Internet Protocol (VoIP)**, in which PSCR led a coalition of public safety officials and bridging systems vendors to develop an VoIP implementation profile so one emergency response agency could seamlessly connect its radio system to another agency's system over a network—regardless of manufacturer



For Additional Information:

<http://www.pscr.gov>

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