



**Homeland
Security**

Science and Technology

Office for Interoperability and Compatibility

Project 25 Compliance Assessment Bulletin

Project 25 Compliance Assessment Program

Baseline Inter-RF Sub-System Interface Testing
Requirements

P25-CAB-ISSI_TEST_REQ

August 2016

Notice of Disclaimer and Limitation of Liability

The Project 25 Compliance Assessment Program (P25 CAP) provides equipment purchasers demonstrated evidence of a product’s compliance with a select group of requirements within the suite of P25 standards. The test procedures used to validate these requirements are also part of the P25 suite of standards. Although successful tests will demonstrate P25 compliance for the specific requirements tested, the conclusions drawn from these tests do not apply to every environment or individual users’ needs. P25 CAP-mandated tests only demonstrate product compliance with the test procedures listed in the Supplier’s Declaration of Compliance and, therefore, only attest to a product’s compliance with specific requirements within the P25 Standard.

Revision History

Version	Date	Description
Draft	6/20/2014	Revised dates and made minor editorial changes. Changed Responders Knowledgebase links to First Responder Group links.
Draft (For PC)	3/3/2015	Final release version for public comment (PC) approved on March 3, 2015. Posted for PC on March 19, 2015.
Draft 2 (For PC)	6/30/2015	Incorporates public comment-resolution candidates. Posted again for PC the week of June 30, 2015.
2016 Release	8/17/2016	Addresses March and July 2015 public comments. Posted for general use on August 17, 2016.

Contents

Notice of Disclaimer and Limitation of Liability	ii
Revision History	ii
1 Introduction.....	1
1.1 Scope	1
1.2 Effective Date	1
1.3 Normative References	2
1.4 Informative References	2
2 Baseline Inter-Radio Frequency Sub-System Interface Compliance Assessment Requirements.....	2
2.1 RF Sub-System	2
2.1.1 Performance.....	2
2.1.2 Conformance.....	2
2.1.3 Interoperability	4
3 Reference of Baseline Inter-RF Sub-System Interface Compliance Assessment Tests	6
4 Exceptions.....	6

Tables

Table 1. RFSS Voice Services Conformance Tests 3
Table 2. RFSS Voice Services Interoperability Tests..... 4
Table 3. Reference for P25 Baseline Inter-RF Sub-System Interface Tests 6
Table 4. P25 CAP Inter-RF Sub-System Interface Exceptions 6

1 Introduction

The Department of Homeland Security (DHS) Office for Interoperability and Compatibility (OIC) Project 25 Compliance Assessment Program (P25 CAP) is a voluntary program that allows P25 equipment suppliers to formally demonstrate their products' compliance with a select group of requirements within the suite of P25 standards. The purpose of the program is to provide emergency response agencies with evidence that the communications equipment they are purchasing meet P25 standards for performance, conformance and interoperability.

The program requires test laboratories to demonstrate their competence through a rigorous and objective assessment process. Such a process promotes the user community's confidence in, and acceptance of, test results from DHS-recognized laboratories. All equipment suppliers that participate in the P25 CAP must use DHS-recognized laboratories to conduct performance, conformance and interoperability tests on their products. P25 equipment suppliers will release Summary Test Report (STR) and Supplier's Declaration of Compliance (SDOC) documents based on the Detailed Test Report (DTR) from the DHS-recognized laboratory(s) that performed the product testing. This documentation will serve to increase the public's confidence in the performance, conformance and interoperability of P25 equipment.

Performance, conformance and interoperability issues are likely to occur in all communications technologies and especially in ones like P25 with protocols that constantly adapt to changing user requirements. Users should seek to address such problems with the supplier first, then with TIA TR8.25, and then within the P25 CAP and, notably, before product launch and deployment. Further, the declaration of compliance-related documents developed by program participants will provide useful technical information about the equipment.

1.1 Scope

Federal Grant Guidance states that grant applicants using funds to purchase P25 equipment must obtain SDOC and STR documents posted to the dhs.gov/science-and-technology/p25-cap website. The evidence should show that the equipment has been tested based on all of the applicable, published P25 CAP Compliance Assessment Bulletins covering performance, conformance and interoperability. This Compliance Assessment Bulletin (CAB) defines these procedures for the P25 Inter-RF Sub-System Interface (ISSI). Applicable test procedures include tests of all mandatory features and standard options installed in the product contemplated for purchase.

1.2 Effective Date

This Compliance Assessment Bulletin becomes effective on August 17, 2016.

1.3 Normative References

- [1] TIA-102.CACA, *Project 25 Inter-RF Subsystem Interface (ISSI) Measurement Methods for Voice Services*.
- [2] TIA-102.CACB, *Project 25 Inter-RF Subsystem Interface (ISSI) Performance Recommendations for Voice Services*.
- [3] TIA-102.CACC, *Project 25 Inter-RF Subsystem Interface (ISSI) Conformance Test Procedures for Voice Services*.
- [4] TIA-102.CACD-C, *Project 25 Inter-RF Subsystem Interface (ISSI) Interoperability Test Procedures for Trunked Voice Operation Involving the ISSI*.
- [5] P25-CAB-CAI_TEST_REQ, *Common Air Interface Baseline Testing Requirements*. Current version.¹
- [6] TIA-102.CABC-B, *Project 25 Interoperability Testing for Voice Operation in Trunked Systems TIA-102.CABC-B-1*, Note that this addendum is not yet referenced because tests in TDMA mode await P25 CAP Advisory Panel review.

1.4 Informative References

- TIA-102.CACC-1, Note that this addendum is not yet referenced because new tests await P25 CAP Advisory Panel review.
- [7] TSB-102.CBBK-A, *Project 25 Recommended Compliance Assessment Tests – Trunking ISSI Interoperability*.

2 Baseline Inter-Radio Frequency Sub-System Interface Compliance Assessment Requirements

2.1 RF Sub-System

If a Radio Frequency Sub-System (RFSS) offers multiple service types, and if required tests for different services are the same, the laboratory performing the tests will only be required to perform the duplicative test once.

2.1.1 Performance

2.1.1.1 Voice Services

No tests are defined or required at this time.

2.1.2 Conformance

2.1.2.1 Voice Services

RFSS capable of voice services shall be tested for conformance in accordance with TIA-102.CACC [3].

¹ See <https://www.dhs.gov/science-and-technology/p25-cap> for the latest document version.

Table 1. RFSS Voice Services Conformance Tests

RFSS Voice Services Conformance Tests	Normative Test [3]
PCP 6.1.1 Individual SU Registration Procedures	§4
SU Registration – Successful (SU Presence Confirmed)	§4.1
PCP 6.1.2 Group Registration Procedures	§5
SG Registration – Successful	§5.1
SG Registration – Unsuccessful (Target RFSS Not Home to the SG)	§5.2
PCP 6.1.3 Individual SU De-Registration Procedures	§6
SU De-Registration – Successful (Serving RFSS Initiated)	§6.1
PCP 6.1.4 Group De-Registration Procedures	§7
SG De-Registration – Successful (Serving RFSS Initiated)	§7.1
PCP 6.1.5 SU Individual Roamed Procedures	§8
SU Roamed Procedure – Successful (Home Initiated)	§8.1
PCP 6.2.1 Call Setup for an Unconfirmed Group Call	§9
Group Call Setup – Successful	§9.1
Group Call Setup – Successful (Protected/Unprotected Mode Requested)	§9.9
PCP 6.2.2 Call Teardown for a Group Call	§10
Group Call Teardown – Successful (Triggered by Serving RFSS)	§10.1
PCP 6.2.3 Basic Group Call Transmission Control Procedures	§11
Group Call Transmission – Successful (Serving RFSS Starts and Stops Talk Spurt)	§11.1
Group Call Mute and Unmute – Successful (Home RFSS Initiated)	§11.3
Heartbeat – Successful	§11.5
Heartbeat Query – Successful (Home RFSS Initiated)	§11.7
PCP 6.3.1 Call Setup for a Unit-to-Unit Call	§12
SU-to-SU Call Setup – Successful (Availability Check Option)	§12.1
SU-to-SU Call Setup – Successful (Direct Call Option)	§12.2
SU-to-SU Call Setup (Protected/Unprotected Audio Call Cannot be Granted)	§12.13
SU-to-SU Call Setup (Called Serving RFSS Does Not have Available RTP Resources)	§12.21
SU Roaming (Called SU)	§12.23
SU Roaming (Calling SU)	§12.24
SU Roaming (No RF Resources Available in the New Called Serving RFSS)	§12.25
SU Roaming (No RF Resources Available in the New Calling Serving RFSS)	§12.26
PCP 6.3.2 Call Teardown for a Unit-to-Unit Call	§13
SU-to-SU Call Termination (Calling Serving RFSS Initiated)	§13.1
PCP 6.3.3 Basic SU-to-SU Call Transmission Control Procedures	§14

RFSS Voice Services Conformance Tests	Normative Test [3]
SU-to-SU Voice Transmission (Serving RFSS Originated)	§14.1
PCP 6.4.2 Home Query Procedures for SUs	§16
SU Home Query – Successful (“Force” Parameter Enabled)	§16.2
SU Home Query – Successful (“Confirm” Parameter Enabled)	§16.3
PCP 6.4.3 Home Query Procedures for SGs	§17
SG Home Query – Successful (“Force” Parameter Enabled)	§17.2
SG Home Query – Successful (“Confirm” Parameter Enabled)	§17.3
PCP 6.5.1 Call Control for Confirmed Group Call	§18
Confirmed Group Call Setup – Successful (RF Resources Available)	§18.1
CP 6.5.2 Transmission Control for Confirmed Group Call	§19
Confirmed Group Call Voice Transmission – Successful (Serving RFSS Initiated)	§19.1
PCP 6.6.1 Advanced RTP Resource Management	§20
Confirmed Group Call Setup – Successful (Serving RFSS RF Resources Initially Unavailable)	§20.3

2.1.3 Interoperability

2.1.3.1 Voice Services

RFSS capable of voice services shall be tested for interoperability in accordance with TIA-102.CACD-C [4]. RFSS must be tested against at least three² commercially available RFSSs with an ISSI, where each RFSS is from a different manufacturer. RFSSs that are in the same model class shall count as one compatible test subject. A model class is defined by the manufacturer as a product having identical P25 functionality; for instance, a radio model with three keypad configurations would count as one test subject. Subscriber Units and RFSSs that are used in ISSI interoperability tests are required to have undergone all interoperability tests in the P25-CAB-CAI_TEST_REQ [5] prior to use in ISSI interoperability tests.

Table 2. RFSS Voice Services Interoperability Tests

RFSS Voice Services Interoperability Tests	Normative Test [4]
Unit Registration Using an ISSI	§2.3.1
Valid Registration ³	§2.3.1.5.1
Denied or Refused Registration ³	§2.3.1.5.2
Group Voice Call Using an ISSI	§2.3.2
Group Call Granted – Unconfirmed – All Units Roaming ³	§2.3.2.5.1
Group Call Granted – Unconfirmed – No Units Roaming ³	§2.3.2.5.2

² Known as the *rule of three*. In cases where three products cannot be found to test against, suppliers are encouraged to apply to the program for an exception to the rule of three. See also, Section 4, “Exceptions.”

³ If provided by the manufacturer.

RFSS Voice Services Interoperability Tests	Normative Test [4]
Group Call Granted – Confirmed – All Units Roaming ³	§2.3.2.5.3
Group Call Granted – Confirmed – No Units Roaming ³	§2.3.2.5.4
Confirmed Group Call Granted after RF Resources become available – All Units Roaming ³	§2.3.2.5.5
Confirmed Group Call Granted after RF Resources Become Available – No Units Roaming ³	§2.3.2.5.6
Group Call Denied – All Units Roaming and No Units Roaming ³	§2.3.2.5.7
Unit-to-Unit Voice Call	§2.3.3
Unit-to-Unit Call with Target Availability Check ^{3, 4}	§2.3.3.5.1
Unit-to-Unit Call with Target Availability Check Refused by Target ^{3, 4}	§2.3.3.5.2
Unit-to-Unit Call with Target Availability Check Queued – FNE Implementation Checks the Availability of the Traffic Channel after Availability Check ^{3, 4}	§2.3.3.5.3
Unit-to-Unit Call with Target Availability Check Queued – FNE Implementation Checks the Availability of the Traffic Channel before Availability Check ^{3, 4}	§2.3.3.5.4
Unit-to-Unit Call without Target Availability Check ^{3, 4}	§2.3.3.5.5
Unit-to-Unit Call without Target Availability Check Queued ^{3, 4}	§2.3.3.5.6
Unit-to-Unit Call Denied ^{3, 4}	§2.3.3.5.7
Broadcast Voice Call Using an ISSI	§2.3.4
Broadcast Call Granted – All Units Roaming ³	§2.3.4.5.1
Broadcast Call Granted – No Units Roaming ³	§2.3.4.5.2
Talk Group Registration Using an ISSI	§2.3.5
Subscriber Unit Permitted to Affiliate with New Talk Group – All Units Roaming ³	§2.3.5.5.1
Subscriber Unit Permitted to Affiliate with New Talk Group – No Units Roaming ³	§2.3.5.5.2
Subscriber Unit Denied Affiliation to New Talk Group – All Units Roaming ³	§2.3.5.5.3
Subscriber Unit Denied Affiliation to New Group – No Units Roaming ³	§2.3.5.5.4
Announcement Group Call	§2.3.6
Announcement Group Call – All Units Roaming	§2.3.6.5.1
Announcement Group Call – No Units Roaming ³	§2.3.6.5.2
Emergency Group Call Using an ISSI	§2.3.8
Emergency Group Call – All Units Roaming ³	§2.3.8.5.1
Emergency Group Call – No Units Roaming ³	§2.3.8.5.2
Encryption	§2.3.10
Call Privacy for Encrypted Call ³	§2.3.10.5.1

⁴ The Fixed Network Equipment may support Target Availability Check, no Target Availability Check or both.

3 Reference of Baseline Inter-RF Sub-System Interface Compliance Assessment Tests

To provide further clarity regarding the tests that will be performed based on this Compliance Assessment Bulletin, it is important that both public safety and industry reference the tests in a common fashion, especially in STR and SDOC documents. To facilitate this commonality, the following table provides a means by which to refer to a particular set of tests.

Table 3. Reference for P25 Baseline Inter-RF Sub-System Interface Tests

Section	Reference
2.1.1.1	P25-CAB-ISSI_TEST_REQ – August 2016, Section 2.1.1.1 – Project 25 Inter-RF Sub-System Interface RFSS Voice Services Performance
2.1.2.1	P25-CAB-ISSI_TEST_REQ – August 2016, Section 2.1.2.1 – Project 25 Inter-RF Sub-System Interface RFSS Voice Services Conformance
2.1.3.1	P25-CAB-ISSI_TEST_REQ – August 2016, Section 2.1.3.1 – Project 25 Inter-RF Sub-System Interface RFSS Voice Services Interoperability

4 Exceptions

The preceding sections provide the tests that are required as part of the P25 CAP. Exceptions to these test requirements are possible, on a case-by-case basis, at the discretion of the P25 CAP Advisory Panel. Exceptions will be noted by date, test and—as appropriate—duration in this section of the Compliance Assessment Bulletin.

Table 4. P25 CAP Inter-RF Sub-System Interface Exceptions

Exception	Date	Details
1	8/8/2016	It is recognized that the initial inclusion of the ISSI into the P25 CAP comes at a time when there may not be enough different manufacturer products available to satisfy the rule-of-three ² requirement in Section 2.1.3.1. Until such time as there are enough different manufacturer products to satisfy this requirement, manufacturers will be required to test their products against whatever is commercially available at the time of testing. Once the rule-of-three requirement can be met, this exception will be suspended.