



**Homeland
Security**

Science and Technology

Office for Interoperability and Compatibility

Project 25 Compliance Assessment Bulletin

Project 25 Compliance Assessment Program

Baseline Common Air Interface Testing
Requirements

P25-CAB-CAI_TEST_REQ

August 2016

Notice of Disclaimer and Limitation of Liability

The Project 25 Compliance Assessment Program (P25 CAP) provides equipment purchasers with 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 user’s 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. Added Conventional Interoperability Tests (TIA-102.CABA), which were last approved by the P25 CAP Governing Board.
Draft (For PC)	3/3/2015	Final release version for public comment (PC) approved on March 3, 2015. Posted for public comment 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	8/8/2016	Addresses March and July 2015 public comments. Posted for general use on August 8, 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 Common Air Interface Compliance Assessment Requirements	2
2.1 Subscriber Units (Phase 1).....	2
2.1.1 Performance	3
2.1.2 Conformance	4
2.1.3 Interoperability.....	5
2.2 Base Stations/Repeaters (Phase 1).....	11
2.2.1 Performance	11
2.2.2 Conformance	12
2.2.3 Interoperability.....	13
3 Reference of Baseline Common Air Interface Compliance Assessment Tests	17
4 Exceptions.....	18

Tables

Table 1. Conventional Mode Subscriber Unit Receiver Tests	3
Table 2. Conventional Mode Subscriber Unit Transmitter Tests.....	3
Table 3. Trunking Mode Subscriber Unit Receiver Tests	3
Table 4. Trunking Mode Subscriber Unit Transmitter Tests	4
Table 5. Trunking Mode Subscriber Unit Tests	4
Table 6. Conventional Interoperability Tests – Direct Mode.....	5
Table 7. Conventional Interoperability Tests – Repeat Mode	6
Table 8. Conventional Interoperability Tests – FNE Includes Dispatch Consoles Mode.....	8
Table 9. Trunking Interoperability Tests	9
Table 10. Conventional Mode Fixed Station Receiver Tests.....	11
Table 11. Conventional Mode Fixed Station Transmitter Tests.....	11
Table 12. Trunked Mode Fixed Station Receiver Tests.....	12
Table 13. Trunked Mode Fixed Station Transmitter Tests.....	12
Table 14. Trunked Mode Infrastructure Tests	12
Table 15. Conventional Interoperability Tests – Repeat Mode	13
Table 16. Conventional Interoperability Tests – FNE Includes Dispatch Consoles Mode.....	15
Table 17. Trunking Interoperability Tests	16
Table 18. Reference for P25 Baseline Common Air Interface Tests	17
Table 19. P25 CAP Common Air Interface Exceptions	18

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 funding 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 Common Air Interface (CAI). Applicable test procedures include tests of all mandatory features and standard options installed in the product contemplated for purchase.¹

1.2 Effective Date

This Compliance Assessment Bulletin becomes effective on August 8, 2016.

¹ Most radio technologies require climatic and power supply voltage testing for nominal as well as extreme conditions. The present P25 Compliance Assessment Program is for nominal conditions only. If testing under extreme conditions is required, then these requirements should be stipulated by the procuring agency and made mandatory in the contract for purchase of the devices or system. The measurement report and data should be reviewed by the procuring agency to determine if the extreme climatic and/or power supply voltages have been tested.

1.3 Normative References

- [1] ANSI/TIA-102.CAAA-E, *Project 25 Digital C4FM/CQPSK Transceiver Measurement Methods.*
- [2] ANSI/TIA-102.CAAB-D, *Project 25 Land Mobile Radio Transceiver Performance Recommendations, Digital Radio Technology, C4FM/CQPSK Modulation.*
- [3] TIA-102.CABC-B, *Project 25 Interoperability Testing for Voice Operation in Trunked Systems.*
- [4] TIA-102.CABA, *Project 25 Interoperability Testing for Voice Operation in Conventional Systems.*

1.4 Informative References

- TIA-102.CABC-B-1, *Note that this addendum is not yet referenced because tests in TDMA mode await P25 CAP Governing Board review.*
- [5] TIA-102.CAEA, *Project 25 Conformance Profile Level One – Basic Conventional Operation.*
- [6] TIA-102.CAEB, *Project 25 Conformance Profile Level Two – Advanced Conventional Operation.*
- [7] TIA-102.CAEC, *Project 25 Conformance Profile Basic Trunked Operation.*
- [8] TIA-102.CAED, *Project 25 Conformance for Advanced Trunked Operations.*
- [9] TSB-102.CBBJ-B, *Project 25 Recommended Compliance Assessment Tests – Trunking Interoperability.*
- [10] TSB-102.CBBH, *Project 25 Recommended Compliance Assessment Tests – Performance – Trunked Mode Fixed Station Transceiver and Related Infrastructure.*
- [11] TSB-102.CBBF, *Project 25 Recommended Compliance Assessment Tests – Transceiver Performance – Trunking Mode Subscriber.*
- [12] TSB-102.CBBE, *Project 25 Recommended Compliance Assessment Tests – Conventional Operation.*
- [13] TSB-102.CBBC, *Project 25 Recommended Compliance Assessment Tests – Transceiver Performance – Conventional Mode Fixed Station.*
- [14] TSB-102.CBBA, *Project 25 Recommended Compliance Assessment Tests – Transceiver Performance – Conventional Mode Subscriber.*

2 Baseline Common Air Interface Compliance Assessment Requirements

2.1 Subscriber Units (Phase 1)

If a subscriber unit can operate in both a conventional mode of operation as well as a trunked mode of operation, and if required tests for both are the same, the laboratory performing the tests will only be required to perform the duplicative test once.

2.1.1 Performance

Subscriber units (SUs) shall be tested in accordance with the following sections of ANSI/TIA-102.CAAA-E [1], and shall meet or exceed all of the performance recommendations (for Class B or Class A requirements, where applicable) as specified in ANSI/TIA-102.CAAB-D [2].

2.1.1.1 Conventional Mode Operation

Table 1. Conventional Mode Subscriber Unit Receiver Tests

Subscriber Unit Receiver Tests	Method of Measurement [1]	Performance Recommendation [2]
Reference Sensitivity	§2.1.4	§3.1.4
Faded Reference Sensitivity	§2.1.5	§3.1.5
Signal Delay Spread Capability	§2.1.6	§3.1.6
Adjacent Channel Rejection	§2.1.7	§3.1.7
Co-Channel Rejection	§2.1.8	§3.1.8
Spurious Response Rejection	§2.1.9	§3.1.9
Intermodulation Rejection	§2.1.10	§3.1.10
Signal Displacement Bandwidth	§2.1.11	§3.1.11
Late Entry Unsilence Delay	§2.1.17	§3.1.17
Receiver Throughput Delay	§2.1.18	§3.1.18

Table 2. Conventional Mode Subscriber Unit Transmitter Tests

Subscriber Unit Transmitter Tests	Method of Measurement [1]	Performance Recommendation [2]
Unwanted Emissions: Adjacent Channel Power Ratio	§2.2.8	§3.2.8
Transmitter Power and Encoder Attack Time	§2.2.12	§3.2.12
Transmitter Throughput Delay	§2.2.14	§3.2.14
Frequency Deviation for C4FM	§2.2.15	§3.2.15
Modulation Fidelity	§2.2.16	§3.2.16
Transient Frequency Behavior	§2.2.18	§3.2.18

2.1.1.2 Trunked Mode Operation

Table 3. Trunking Mode Subscriber Unit Receiver Tests

Subscriber Unit Receiver Tests	Method of Measurement [1]	Performance Recommendation [2]
Reference Sensitivity	§2.1.4	§3.1.4
Faded Reference Sensitivity	§2.1.5	§3.1.5
Signal Delay Spread Capability	§2.1.6	§3.1.6

Subscriber Unit Receiver Tests	Method of Measurement [1]	Performance Recommendation [2]
Adjacent Channel Rejection	§2.1.7	§3.1.7
Co-Channel Rejection	§2.1.8	§3.1.8
Spurious Response Rejection	§2.1.9	§3.1.9
Intermodulation Rejection	§2.1.10	§3.1.10
Signal Displacement Bandwidth	§2.1.11	§3.1.11

Table 4. Trunking Mode Subscriber Unit Transmitter Tests

Subscriber Unit Transmitter Tests	Method of Measurement [1]	Performance Recommendation [2]
Unwanted Emissions: Adjacent Channel Power Ratio	§2.2.8	§3.2.8
Transmitter Power and Encoder Attack Time	§2.2.12	§3.2.12
Transmitter Throughput Delay	§2.2.14	§3.2.14
Frequency Deviation for C4FM	§2.2.15	§3.2.15
Modulation Fidelity	§2.2.16	§3.2.16
Transient Frequency Behavior	§2.2.18	§3.2.18

Table 5. Trunking Mode Subscriber Unit Tests

Trunking Subscriber Unit Tests	Method of Measurement [1]	Performance Recommendation [2]
Trunking Control Channel Slot Times	§2.3.1	§3.3.1
Trunking Request Time ²	§2.3.2	§3.3.2
Transmitter Time to Key on a Traffic Channel ²	§2.3.5	§3.3.5

2.1.2 Conformance

2.1.2.1 Basic Conventional Mode Operation

No tests are defined or required at this time.

2.1.2.2 Advanced Conventional Mode Operation

No tests are defined or required at this time.

2.1.2.3 Basic Trunked Mode Operation

No tests are defined or required at this time.

²Applies to infrastructure and subscriber unit, and measurement method necessitates both trunking and infrastructure and subscriber equipment.

2.1.2.4 Advanced Trunked Mode Operation

No tests are defined or required at this time.

2.1.3 Interoperability

2.1.3.1 Conventional Direct Mode Operation

P25 SUs capable of conventional mode operation shall be tested for interoperability in accordance with TIA-102.CABA [4]. SUs must be tested against at least three³ of the commercially available, band-compatible conventional products, where each conventional product is from a different manufacturer.

Table 6. Conventional Interoperability Tests – Direct Mode

Conventional Interoperability Tests – Direct Mode	Normative Test [4]
Matching NAC Operation and SU Unaddressed Voice Call	§2.2.1
Test Case 1 – Unaddressed Voice Call	§2.2.1.4.1
Matching NAC Operation and SU Routine Group Voice Call	§2.2.2
Test Case 1 – Routine Group Voice Call	§2.2.2.4.1
Monitor Mode – SU Group Voice Call	§2.2.3
Test Case 1 – Receiving Group Call	§2.2.3.4.1
Accept Any NAC in Normal and Selective Squelch Mode – SU Group Voice Call	§2.2.8
Test Case 1 – Receiving Group Call with Receive NAC §F7E under Normal and Selective Squelch Modes	§2.2.8.4.1
Emergency Call	§2.2.4
Test Case 1 – Emergency Call	§2.2.4.4.1
Unit-to-Unit Voice Call	§2.2.5
Test Case 1 – Initiate Unit-to-Unit Call from SU 1	§2.2.5.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 5	§2.2.5.4.2
Unit-to-Unit Voice Call – Receiving Units also in Monitor Mode	§2.2.6
Test Case 1 – Initiate Unit-to-Unit Call from SU 1	§2.2.6.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 5	§2.2.6.4.2
Encryption	§2.2.7
Test Case 1 – Call Privacy for Encrypted Call	§2.2.7.4.1
Call Alert	§2.3.1
Test Case 1 – Call Alert (SU 1 to SU 5)	§2.3.1.4.1
Test Case 2 – Call Alert (SU 5 to SU 1)	§2.3.1.4.2

³ 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.

Conventional Interoperability Tests – Direct Mode	Normative Test [4]
Radio Check	§2.3.2
Test Case 1 – Radio Check (SU 1 to SU 5)	§2.3.2.4.1
Test Case 2 – Radio Check (SU 5 to SU 1)	§2.3.2.4.2
Message Update	§2.3.3
Test Case 1 – Message Update (SU 1 to SU 5)	§2.3.3.4.1
Test Case 2 – Message Update (SU 5 to SU 1)	§2.3.3.4.2
Status Update	§2.3.4
Test Case 1 – Status Update (SU 1 to SU 5)	§2.3.4.4.1
Test Case 2 – Status Update (SU 5 to SU 1)	§2.3.4.4.2
Status Query	§2.3.5
Test Case 1 – Status Query (SU 1 to SU 5)	§2.3.5.4.1
Test Case 2 – Status Query (SU 5 to SU 1)	§2.3.5.4.2
Radio Unit Monitor	§2.3.6
Test Case 1 – Radio Unit Monitor Initiated by SU 1 – Group Call	§2.3.6.4.1
Test Case 2 – Radio Unit Monitor Initiated by SU 5 – Group Call	§2.3.6.4.2
Test Case 3 – Radio Unit Monitor Initiated by SU 1 – Unit-to-Unit Call	§2.3.6.4.3
Test Case 4 – Radio Unit Monitor Initiated by SU 5 – Unit-to-Unit Call	§2.3.6.4.4

2.1.3.2 Conventional Repeat Mode Operation

P25 SUs capable of conventional mode operation shall be tested for interoperability in accordance with TIA-102.CABA [4]. SUs must be tested against at least three³ of the commercially available, band-compatible conventional-mode-capable fixed network equipment (FNE), where each FNE is from a different manufacturer.

Table 7. Conventional Interoperability Tests – Repeat Mode

Conventional Interoperability Tests – Repeat Mode (SU to FNE to SU)	Normative Test [4]
Matching NAC Operation and SU Unaddressed Voice Call	§2.4.1
Test Case 1 – Matching NAC operation – Unaddressed Voice Call	§2.4.1.4.1
Matching NAC Operation – SU Routine Group Call Mode	§2.4.2
Test Case 1 – Matching NAC – SU Routine Group Call Mode	§2.4.2.4.1
Transmit NAC Independent of Receive NAC – SU Unaddressed Voice Call	§2.4.3
Test Case 1 – Independent NAC Operation – SU Unaddressed Voice Call	§2.4.3.4.1
Transmit NAC Independent of Receive NAC – SU Routine Group Call	§2.4.4
Test Case 1 – Independent NAC Operation – SU Routine Group Call	§2.4.4.4.1
Any NAC (§F7F) Operation – SU Unaddressed Voice Call	§2.4.5

Conventional Interoperability Tests – Repeat Mode (SU to FNE to SU)	Normative Test [4]
Test Case 1 – NAC \$F7F Operation – SU Unaddressed Voice Call	§2.4.5.4.1
Any NAC (\$F7F) Operation – SU Routine Group Call	§2.4.6
Test Case 1 – NAC \$F7F Operation – SU Routine Group Call	§2.4.6.4.1
Any NAC (\$F7F) Operation with Fixed Transmit NAC – SU Group Call	§2.4.7
Test Case 1 – NAC \$F7F Operation – SU Group Call	§2.4.7.4.1
Emergency Call	§2.4.8
Test Case 1 – Emergency Call	§2.4.8.4.1
Monitor Mode – SU Group Call	§2.4.9
Test Case 1 – Monitor Mode – Receiving Group Call	§2.4.9.4.1
Unit-to-Unit Voice Call	§2.4.10
Test Case 1 – Initiate Unit-to-Unit Call from SU 1	§2.4.10.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 5	§2.4.10.4.2
Test Case 3 – Initiate Unit-to-Unit Call from SU 1, No Co-Channel Interference Suppression	§2.4.10.4.3
Test Case 4 – Initiate Unit-to-Unit Call from SU 5, No Co-Channel Interference Suppression	§2.4.10.4.4
Unit-to-Unit Voice Call Co-Channel Interference Suppression by FNE	§2.4.11
Test Case 1 – Initiate Unit-to-Unit Call from SU 1	§2.4.11.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 5	§2.4.11.4.2
Unit-to-Unit Voice Call – Receiving Units Also in Monitor Mode	§2.4.12
Test Case 1 – Initiate Unit-to-Unit Call from SU 1	§2.4.12.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 5	§2.4.12.4.2
Encryption	§2.4.13
Test Case 1 – Call Privacy for Encrypted Call	§2.4.13.4.1
Accept Any NAC in Normal and Selective Squelch Mode – SU Group Call	§2.4.14
Test Case 1 – Receiving group Call with receive NAC \$F7F under Normal and Selective Squelch Modes	§2.4.14.4.1
Call Alert	§2.5.1
Test Case 1 – Initiate Call Alert Request from SU 1	§2.5.1.4.1
Test Case 2 – Initiate Call Alert Request from SU 5	§2.5.1.4.2
Radio Check	§2.5.2
Test Case 1 – Initiate Radio Check from SU 1	§2.5.2.4.1
Test Case 2 – Initiate Radio Check from SU 5	§2.5.2.4.2
Message Update	§2.5.3
Test Case 1 – Message Update Initiated by SU 1	§2.5.3.4.1

Conventional Interoperability Tests – Repeat Mode (SU to FNE to SU)	Normative Test [4]
Test Case 2 – Message Update Initiated by SU 5	§2.5.3.4.2
Test Case 3 – SU 1 to Group Message Update	§2.5.3.4.3
Test Case 4 – SU 5 to Group Message Update	§2.5.3.4.4
Status Update	§2.5.4
Test Case 1 – Status Update Initiated by SU 1	§2.5.4.4.1
Test Case 2 – Status Update Initiated by SU 5	§2.5.4.4.2
Test Case 3 – SU to Talk Group Status Update Initiated by SU 1	§2.5.4.4.3
Test Case 4 – SU to Talk Group Status Update Initiated by SU 5	§2.5.4.4.4
Status Query	§2.5.5
Test Case 1 – Status Query Initiated by SU 1	§2.5.5.4.1
Test Case 2 – Status Query Initiated by SU 5	§2.5.5.4.2
Radio Unit Monitor	§2.5.6
Test Case 1 – Radio Unit Monitor Initiated by SU 1 – Group Call	§2.5.6.4.1
Test Case 2 – Radio Unit Monitor Initiated by SU 5 – Group Call	§2.5.6.4.2
Test Case 3 – Radio Unit Monitor Initiated by SU 1 – Unit-to-Unit Call	§2.5.6.4.3
Test Case 4 – Radio Unit Monitor Initiated by SU 5 – Unit-to-Unit Call	§2.5.6.4.4

Table 8. Conventional Interoperability Tests – FNE Includes Dispatch Consoles Mode

Conventional Interoperability Tests – FNE Includes Dispatch and other Monitoring Consoles (Repeat Mode (SU to FNE to SU) or Direct Mode)	Normative Test [4]
Unaddressed Voice Call	§2.6.1
Test Case 1 – Unaddressed Voice Call	§2.6.1.4.1
Routine Group Call	§2.6.2
Test Case 1 – Routine Group Call	§2.6.2.4.1
Emergency Call	§2.6.3
Test Case 1 – Emergency Call from SU	§2.6.3.4.1
Test Case 2 – Emergency Call from DMC	§2.6.3.4.2
All Call (System-Wide Call)	§2.6.4
Initiate System-Wide Call to Collection of Talk Groups	§2.6.4.4.1
Unit-to-Unit Voice Call	§2.6.5
Test Case 1 – Initiate Unit-to-Unit Call from DMC	§2.6.5.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 1	§2.6.5.4.2
Encryption	§2.6.6
Test Case 1 – Call Privacy for Encrypted Call	§2.6.6.4.1
Emergency Alarm to Dispatch and/or other Monitoring Console	§2.7.1

Conventional Interoperability Tests – FNE Includes Dispatch and other Monitoring Consoles (Repeat Mode (SU to FNE to SU) or Direct Mode)	Normative Test [4]
Test Case 1 – Emergency Alarm	§2.7.1.4.1
Call Alert	§2.7.2
Test Case 1 – Initiate Call Alert Request from DMC	§2.7.2.4.1
Test Case 2 – Initiate Call Alert Request from SU 1	§2.7.2.4.2
Radio Check	§2.7.3
Test Case 1 – Initiate Radio Check from DMC	§2.7.3.4.1
Radio Unit Inhibit	§2.7.4
Test Case 1 – Radio Unit Inhibit from DMC	§2.7.4.4.1
Radio Unit Uninhibit	§2.7.5
Test Case 1 – Radio Unit Uninhibit from DMC	§2.7.5.4.1
Message Update	§2.7.6
Test Case 1 – Message Update from DMC	§2.7.6.4.1
Test Case 2 – DMC to Group Message Update	§2.7.6.4.2
Test Case 3 – SU 1 to DMC Message Update	§2.7.6.4.3
Test Case 4 – SU 1 to Group Message Update	§2.7.6.4.4
Status Update	§2.7.7
Test Case 1 – Status Update from SU 1 to DMC	§2.7.7.4.1
Test Case 2 – Talk Group Status Update Initiated by SU 1	§2.7.7.4.2
Status Query	§2.7.8
Test Case 1 – Status Query Initiated by DMC	§2.7.8.4.1
Radio Unit Monitor	§2.7.9
Test Case 1 – Radio Unit Monitor Initiated by DMC – Group Call	§2.7.9.4.1
Test Case 2 – Radio Unit Monitor Initiated by DMC – Unit-to-Unit Call	§2.7.9.4.2

2.1.3.3 *Trunked Mode Operation*

P25 SUs capable of trunked mode operation shall be tested for interoperability in accordance with TIA-102.CABC-B [3]. SUs must be tested against at least three³ of the commercially available, band-compatible trunked systems, where each trunked system is from a different manufacturer. Tests are to be executed in each of the home and roaming configurations provided in TIA-102.CABC-B [3] Section 2.1.1.1, provided that the manufacturer supports the configuration.

Table 9. Trunking Interoperability Tests

Trunking Interoperability Tests	Normative Test [3]
Full Registration	§2.2.1
Test Case 1 – Valid Registration	§2.2.1.4.1

Trunking Interoperability Tests	Normative Test [3]
Test Case 2 – Denied or Refused Registration	§2.2.1.4.2
Test Case 3 – Unverified Registration	§2.2.1.4.3
Group Voice Call	§2.2.2
Test Case 1 – Group Call Granted	§2.2.2.4.1
Test Case 2 – Group Call Denied	§2.2.2.4.2
Test Case 3 – Group Call Request Queued	§2.2.2.4.3
Unit-to-Unit Voice Call	§2.2.3
Test Case 1 – Unit-to-Unit Call with Target Availability Check ⁴	§2.2.3.4.1
Test Case 2 – Unit-to-Unit Call with Target Availability Check Denied by Target ⁴	§2.2.3.4.2
Test Case 3 – Unit-to-Unit Call Queued with Target Availability Check ⁴ – Traffic Channel Assignment After Target Availability Check	§2.2.3.4.3
Test Case 4 – Unit-to-Unit Call Queued with Target Availability Check ⁴ – Traffic Channel Assignment Before Target Availability Check	§2.2.3.4.4
Test Case 5 – Unit-to-Unit Call without Target Availability Check ⁴	§2.2.3.4.5
Test Case 6 – Unit-to-Unit Call Queued without Target Availability Check ⁴	§2.2.3.4.6
Test Case 7 – Unit-to-Unit Call Denied	§2.2.3.4.7
Broadcast Voice Call	§2.2.4
Test Case 1 – Broadcast Voice Call	§2.2.4.4.1
Affiliation	§2.2.5
Test Case 1 – Radio Permitted to Affiliate with New Group	§2.2.5.4.1
Test Case 2 – Radio Denied Affiliation to New Group	§2.2.5.4.2
Announcement Group Call	§2.2.6
Test Case 1 – Collection of Talk Groups Receive Call ⁵	§2.2.6.4.1
Emergency Alarm	§2.2.7
Test Case 1 – Emergency Alarm ⁵	§2.2.7.4.1
Emergency Group Call	§2.2.8
Test Case 1 – Emergency Call ⁵	§2.2.8.4.1
Encryption	§2.2.10
Test Case 1 – Call Privacy for Encrypted Call ⁵	§2.2.10.4.1
Intra-Location Registration Area Roaming	§2.2.11
Test Case 1 – Idle Radio	§2.2.11.4.1

⁴ The fixed network equipment may support target availability check either before or after traffic channel assignment, no target availability check or both.

⁵ If provided by the manufacturer.

2.2 Base Stations/Repeaters (Phase 1)

If a base station/repeater can operate in both a conventional mode of operation as well as a trunked mode of operation, and if required tests for both are the same, the laboratory performing the tests will only be required to perform the duplicative test once.

2.2.1 Performance

Base station radios and repeater units shall be tested in accordance with the following sections of ANSI/TIA-102.CAAA-D [1], and shall meet or exceed all of the corresponding performance recommendations (for Class B or Class A requirements, where applicable) as specified in ANSI/TIA-102.CAAB-D [2].

2.2.1.1 Conventional Mode Operation

Table 10. Conventional Mode Fixed Station Receiver Tests

Conventional Station Receiver Tests	Method of Measurement [1]	Performance Recommendation [2]
Reference Sensitivity	§2.1.4	§3.1.4
Faded Reference Sensitivity	§2.1.5	§3.1.5
Adjacent Channel Rejection	§2.1.7	§3.1.7
Co-Channel Rejection	§2.1.8	§3.1.8
Spurious Response Rejection	§2.1.9	§3.1.9
Intermodulation Rejection	§2.1.10	§3.1.10
Signal Displacement Bandwidth	§2.1.11	§3.1.11
Late Entry Unsilence Delay ⁶	§2.1.17	§3.1.17
Receiver Throughput Delay ⁶	§2.1.18	§3.1.18

Table 11. Conventional Mode Fixed Station Transmitter Tests

Conventional Station Transmitter Tests	Method of Measurement [1]	Performance Recommendation [2]
Unwanted Emissions: Adjacent Channel Power Ratio	§2.2.8	§3.2.8
Transmitter Throughput Delay ⁷	§2.2.14	§3.2.14
Frequency Deviation for C4FM	§2.2.15	§3.2.15
Modulation Fidelity	§2.2.16	§3.2.16
Transient Frequency Behavior	§2.2.18	§3.2.18

⁶ These tests apply to fixed stations that provide an audio (analog) output.

⁷ These tests apply to fixed stations that provide an audio (analog) input.

2.2.1.2 Trunked Mode Operation

Table 12. Trunked Mode Fixed Station Receiver Tests

Trunking Station Receiver Tests	Method of Measurement [1]	Performance Recommendation [2]
Reference Sensitivity	§2.1.4	§3.1.4
Faded Reference Sensitivity	§2.1.5	§3.1.5
Adjacent Channel Rejection	§2.1.7	§3.1.7
Co-Channel Rejection	§2.1.8	§3.1.8
Spurious Response Rejection	§2.1.9	§3.1.9
Intermodulation Rejection	§2.1.10	§3.1.10
Signal Displacement Bandwidth	§2.1.11	§3.1.11

Table 13. Trunked Mode Fixed Station Transmitter Tests

Trunked Station Transmitter Tests	Method of Measurement [1]	Performance Recommendation [2]
Unwanted Emissions: Adjacent Channel Power Ratio	§2.2.8	§3.2.8
Transmitter Throughput Delay ⁷	§2.2.14	§3.2.14
Frequency Deviation for C4FM	§2.2.15	§3.2.15
Modulation Fidelity	§2.2.16	§3.2.16
Transient Frequency Behavior	§2.2.18	§3.2.18

Table 14. Trunked Mode Infrastructure Tests

Trunking Infrastructure Tests	Method of Measurement [1]	Performance Recommendation [2]
Time to GrantError! Bookmark not defined.	§2.3.4	§3.3.4

2.2.2 Conformance

2.2.2.1 Basic Conventional Mode Operation

No tests defined or required at this time.

2.2.2.2 Advanced Conventional Mode Operation

No tests defined or required at this time.

2.2.2.3 Basic Trunked Mode Operation

No tests defined or required at this time.

2.2.2.4 Advanced Trunked Mode Operation

No tests defined or required at this time.

2.2.3 Interoperability

2.2.3.1 Conventional Mode Operation

P25 FNE, or repeaters, capable of conventional mode operation shall be tested for interoperability in accordance with TIA-102.CABA [4]. FNE must be tested against at least three³ of the commercially available, band-compatible conventional-mode-capable SUs, where each SU is from a different manufacturer.

Table 15. Conventional Interoperability Tests – Repeat Mode

Conventional Interoperability Tests – Repeat Mode (SU to FNE to SU)	Normative Test [4]
Matching NAC Operation and SU Unaddressed Voice Call	§2.4.1
Test Case 1 – Matching NAC operation – Unaddressed Voice Call	§2.4.1.4.1
Matching NAC Operation – SU Routine Group Call Mode	§2.4.2
Test Case 1 – Matching NAC – SU Routine Group Call Mode	§2.4.2.4.1
Transmit NAC Independent of Receive NAC – SU Unaddressed Voice Call	§2.4.3
Test Case 1 – Independent NAC Operation – SU Unaddressed Voice Call	§2.4.3.4.1
Transmit NAC Independent of Receive NAC – SU Routine Group Call	§2.4.4
Test Case 1 – Independent NAC Operation – SU Routine Group Call	§2.4.4.4.1
Any NAC (\$F7F) Operation – SU Unaddressed Voice Call	§2.4.5
Test Case 1 – NAC \$F7F Operation – SU Unaddressed Voice Call	§2.4.5.4.1
Any NAC (\$F7F) Operation – SU Routine Group Call	§2.4.6
Test Case 1 – NAC \$F7F Operation – SU Routine Group Call	§2.4.6.4.1
Any NAC (\$F7F) Operation with Fixed Transmit NAC – SU Group Call	§2.4.7
Test Case 1 – NAC \$F7F Operation – SU Group Call	§2.4.7.4.1
Emergency Call	§2.4.8
Test Case 1 – Emergency Call	§2.4.8.4.1
Monitor Mode – SU Group Call	§2.4.9
Test Case 1 – Monitor Mode – Receiving Group Call	§2.4.9.4.1
Unit-to-Unit Voice Call	§2.4.10
Test Case 1 – Initiate Unit-to-Unit Call from SU 1	§2.4.10.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 5	§2.4.10.4.2
Test Case 3 – Initiate Unit-to-Unit Call from SU 1, No Co-Channel Interference Suppression	§2.4.10.4.3
Test Case 4 – Initiate Unit-to-Unit Call from SU 5, No Co-Channel Interference Suppression	§2.4.10.4.4
Unit-to-Unit Voice Call Co-Channel Interference Suppression by FNE	§2.4.11
Test Case 1 – Initiate Unit-to-Unit Call from SU 1	§2.4.11.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 5	§2.4.11.4.2

Conventional Interoperability Tests – Repeat Mode (SU to FNE to SU)	Normative Test [4]
Unit-to-Unit Voice Call – Receiving Units Also in Monitor Mode	§2.4.12
Test Case 1 – Initiate Unit-to-Unit Call from SU 1	§2.4.12.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 5	§2.4.12.4.2
Encryption	§2.4.13
Test Case 1 – Call Privacy for Encrypted Call	§2.4.13.4.1
Accept Any NAC in Normal and Selective Squelch Mode – SU Group Call	§2.4.14
Test Case 1 – Receiving group Call with receive NAC \$F7F under Normal and Selective Squelch Modes	§2.4.14.4.1
Call Alert	§2.5.1
Test Case 1 – Initiate Call Alert Request from SU 1	§2.5.1.4.1
Test Case 2 – Initiate Call Alert Request from SU 5	§2.5.1.4.2
Radio Check	§2.5.2
Test Case 1 – Initiate Radio Check from SU 1	§2.5.2.4.1
Test Case 2 – Initiate Radio Check from SU 5	§2.5.2.4.2
Message Update	§2.5.3
Test Case 1 – Message Update Initiated by SU 1	§2.5.3.4.1
Test Case 2 – Message Update Initiated by SU 5	§2.5.3.4.2
Test Case 3 – SU 1 to Group Message Update	§2.5.3.4.3
Test Case 4 – SU 5 to Group Message Update	§2.5.3.4.4
Status Update	§2.5.4
Test Case 1 – Status Update Initiated by SU 1	§2.5.4.4.1
Test Case 2 – Status Update Initiated by SU 5	§2.5.4.4.2
Test Case 3 – SU to Talk Group Status Update Initiated by SU 1	§2.5.4.4.3
Test Case 4 – SU to Talk Group Status Update Initiated by SU 5	§2.5.4.4.4
Status Query	§2.5.5
Test Case 1 – Status Query Initiated by SU 1	§2.5.5.4.1
Test Case 2 – Status Query Initiated by SU 5	§2.5.5.4.2
Radio Unit Monitor	§2.5.6
Test Case 1 – Radio Unit Monitor Initiated by SU 1 – Group Call	§2.5.6.4.1
Test Case 2 – Radio Unit Monitor Initiated by SU 5 – Group Call	§2.5.6.4.2
Test Case 3 – Radio Unit Monitor Initiated by SU 1 – Unit-to-Unit Call	§2.5.6.4.3
Test Case 4 – Radio Unit Monitor Initiated by SU 5 – Unit-to-Unit Call	§2.5.6.4.4

Table 16. Conventional Interoperability Tests – FNE Includes Dispatch Consoles Mode

Conventional Interoperability Tests – FNE Includes Dispatch and other Monitoring Consoles (Repeat Mode (SU to FNE to SU) or Direct Mode)	Normative Test [4]
Unaddressed Voice Call	§2.6.1
Test Case 1 – Unaddressed Voice Call	§2.6.1.4.1
Routine Group Call	§2.6.2
Test Case 1 – Routine Group Call	§2.6.2.4.1
Emergency Call	§2.6.3
Test Case 1 – Emergency Call from SU	§2.6.3.4.1
Test Case 2 – Emergency Call from DMC	§2.6.3.4.2
All Call (System-Wide Call)	§2.6.4
Initiate System-Wide Call to Collection of Talk Groups	§2.6.4.4.1
Unit-to-Unit Voice Call	§2.6.5
Test Case 1 – Initiate Unit-to-Unit Call from DMC	§2.6.5.4.1
Test Case 2 – Initiate Unit-to-Unit Call from SU 1	§2.6.5.4.2
Encryption	§2.6.6
Test Case 1 – Call Privacy for Encrypted Call	§2.6.6.4.1
Emergency Alarm to Dispatch and/or other Monitoring Console	§2.7.1
Test Case 1 – Emergency Alarm	§2.7.1.4.1
Call Alert	§2.7.2
Test Case 1 – Initiate Call Alert Request from DMC	§2.7.2.4.1
Test Case 2 – Initiate Call Alert Request from SU 1	§2.7.2.4.2
Radio Check	§2.7.3
Test Case 1 – Initiate Radio Check from DMC	§2.7.3.4.1
Radio Unit Inhibit	§2.7.4
Test Case 1 – Radio Unit Inhibit from DMC	§2.7.4.4.1
Radio Unit Uninhibit	§2.7.5
Test Case 1 – Radio Unit Uninhibit from DMC	§2.7.5.4.1
Message Update	§2.7.6
Test Case 1 – Message Update from DMC	§2.7.6.4.1
Test Case 2 – DMC to Group Message Update	§2.7.6.4.2
Test Case 3 – SU 1 to DMC Message Update	§2.7.6.4.3
Test Case 4 – SU 1 to Group Message Update	§2.7.6.4.4
Status Update	§2.7.7
Test Case 1 – Status Update from SU 1 to DMC	§2.7.7.4.1
Test Case 2 – Talk Group Status Update Initiated by SU 1	§2.7.7.4.2

Conventional Interoperability Tests – FNE Includes Dispatch and other Monitoring Consoles (Repeat Mode (SU to FNE to SU) or Direct Mode)	Normative Test [4]
Status Query	§2.7.8
Test Case 1 – Status Query Initiated by DMC	§2.7.8.4.1
Radio Unit Monitor	§2.7.9
Test Case 1 – Radio Unit Monitor Initiated by DMC – Group Call	§2.7.9.4.1
Test Case 2 – Radio Unit Monitor Initiated by DMC – Unit-to-Unit Call	§2.7.9.4.2

2.2.3.2 Trunked Mode Operation

P25 trunked infrastructure shall be interoperability tested in accordance with TIA-102.CABC-B [3]. Trunked infrastructure must be tested against at least three³ of the commercially available, band-compatible SUs, where each SU is from a different manufacturer. SUs 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. Tests are to be executed in each of the home and roaming configurations provided in TIA-102.CABC-B [3] Section 2.1.1.1, provided that the configuration is supported by the manufacturer.

Table 17. Trunking Interoperability Tests

Trunking Interoperability Tests	Normative Test [3]
Full Registration	§2.2.1
Test Case 1 – Valid Registration	§2.2.1.4.1
Test Case 2 – Denied or Refused Registration	§2.2.1.4.2
Test Case 3 – Unverified Registration	§2.2.1.4.3
Group Voice Call	§2.2.2
Test Case 1 – Group Call Granted	§2.2.2.4.1
Test Case 2 – Group Call Denied	§2.2.2.4.2
Test Case 3 – Group Call Request Queued	§2.2.2.4.3
Unit-to-Unit Voice Call	§2.2.3
Test Case 1 – Unit-to-Unit Call with Target Availability Check ⁸	§2.2.3.4.1
Test Case 2 – Unit-to-Unit Call with Target Availability Check ⁸ Denied by Target	§2.2.3.4.2
Test Case 3 – Unit-to-Unit Call Queued with Target Availability Check ⁸ – Traffic Channel Assignment After Target Availability Check	§2.2.3.4.3
Test Case 4 – Unit-to-Unit Call Queued with Target Availability Check ⁸ – Traffic Channel Assignment Before Target Availability Check	§2.2.3.4.4
Test Case 5 – Unit-to-Unit Call without Target Availability Check ⁸	§2.2.3.4.5

⁸ The fixed network equipment may support target availability check, no target availability check or both.

Trunking Interoperability Tests	Normative Test [3]
Test Case 6 – Unit-to-Unit Call Queued without Target Availability Check ⁸	§2.2.3.4.6
Test Case 7 – Unit-to-Unit Call Denied	§2.2.3.4.7
Broadcast Voice Call	§2.2.4
Test Case 1 – Broadcast Voice Call	§2.2.4.4.1
Affiliation	§2.2.5
Test Case 1 – Radio Permitted to Affiliate with New Group	§2.2.5.4.1
Test Case 2 – Radio Denied Affiliation to New Group	§2.2.5.4.2
Announcement Group Call	§2.2.6
Test Case 1 – Collection of Talk Groups Receive Call ⁹	§2.2.6.4.1
Emergency Alarm	§2.2.7
Test Case 1 – Emergency Alarm ⁹	§2.2.7.4.1
Emergency Group Call	§2.2.8
Test Case 1 – Emergency Call ⁹	§2.2.8.4.1
Encryption	§2.2.10
Test Case 1 – Call Privacy for Encrypted Call ⁹	§2.2.10.4.1
Intra-Location Registration Area Roaming	§2.2.11
Test Case 1 – Idle Radio	§2.2.11.4.1

3 Reference of Baseline Common Air 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 18. Reference for P25 Baseline Common Air Interface Tests

Section	Reference
2.1.1.1	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.1.1.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Performance
2.1.1.2	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance
2.1.2.1	25-CAB-CAI_TEST_REQ – August 2016, Section 2.1.2.1 – Project 25 Phase 1 Common Air Interface Basic Conventional Subscriber Unit Conformance
2.1.2.2	25-CAB-CAI_TEST_REQ – August 2016, Section 2.1.2.2 – Project 25 Phase 1 Common Air Interface Advanced Conventional Subscriber Unit Conformance

⁹ If provided by the manufacturer.

Section	Reference
2.1.2.3	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.1.2.3 – Project 25 Phase 1 Common Air Interface Basic Trunked Subscriber Unit Conformance
2.1.2.4	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.1.2.4 – Project 25 Phase 1 Common Air Interface Advanced Trunked Subscriber Unit Conformance
2.1.3.1	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.1.3.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Interoperability
2.1.3.2	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability
2.2.1.1	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.2.1.1 – Project 25 Phase 1 Common Air Interface Conventional Base Station/Repeater Performance
2.2.1.2	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.2.1.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Performance
2.2.2.1	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.2.2.1 – Project 25 Phase 1 Common Air Interface Basic Conventional Base Station/Repeater Conformance
2.2.2.2	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.2.2.2 – Project 25 Phase 1 Common Air Interface Advanced Conventional Base Station/Repeater Conformance
2.2.2.3	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.2.2.3 – Project 25 Phase 1 Common Air Interface Basic Trunked Base Station/Repeater Conformance
2.2.2.4	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.2.2.4 – Project 25 Phase 1 Common Air Interface Advanced Trunked Base Station/Repeater Conformance
2.2.3.1	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.2.3.1 – Project 25 Phase 1 Common Air Interface Conventional Base Station/Repeater Interoperability
2.2.3.2	P25-CAB-CAI_TEST_REQ – August 2016, Section 2.2.3.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater 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 Governing Board. Exceptions will be noted by date, test and—as appropriate—duration in this section of the Compliance Assessment Bulletin.

Table 19. P25 CAP Common Air Interface Exceptions

Exception	Date	Reference
1	TBD 2016	NONE. When necessary, this column references this CAB and the excepted section according to the convention used in the Reference column in Table 18.

This page is intentionally blank.