Homeland Security

Science and Technology

Office for Interoperability and Compatibility

Project 25 Compliance Assessment Bulletin

Project 25 Compliance Assessment Program

Minimum Feature Requirements

P25-CAB-MIN-FEATURE_REQ

July 2017

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 3	9/16/2016	Original
Draft 5	9/27/2016	updates
Draft 6	10/04/2016	Add non-P25 Standard section
Draft 7	03/15/2017	Update based on comments received by the P25 CAP AP members
Draft 8	07/21/2017	Draft release for public comment

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1 Introduction

The Department of Homeland Security (DHS) Science and Technology Directorate 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.

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, for the P25 equipment the applicant intends to purchase.

The P25 CAP Advisory Panel (AP) has defined P25 features and capabilities that shall be included in the P25 equipment purchased by the applicant. These features are defined in TIA-102 standard documents that include standardized test procedures. The P25 CAP has also issued P25 CAP Compliance Assessment Bulletins (CAB) that list the test cases that will verify the P25 CAP AP minimum feature requirements. P25 Subscriber features as well as P25 Repeater features are included.

1.2 Effective Date

This Compliance Assessment Bulletin becomes effective on a date to be determined after comment period.

1.3 Normative References

[1] TIA-102.BAAD-B Project 25 Conventional Procedures (2015)

[2] TIA-102.BACA Interoperability Testing for Voice Operation in Conventional Systems (2010)

[3] TIA-102.BAAC-C Project 25 Common Air Interface Reserved Values (2011)

[4] P25-CAB-CAI_TEST_REQ Project 25 - Compliance Assessment Program – Baseline Common Air Interface Testing Requirements (August 2016)

1.4 Informative References

None

2 Subscriber P25 CAP Minimum Feature Requirements

The P25 CAP minimum feature requirements are required to be supported in all P25 subscriber transceivers. If P25 subscribers meet these minimum feature set, they can conduct the P25 CAP testing as defined with the CABs. If the SDOC and STRs are approved, they shall be considered P25 CAP approved. Subscriber transceivers that do not meet these feature requirements, shall not be considered P25 CAP approved.

2.1 Subscriber Group Call

2.1.1 Feature Overview

This features provides voice calls from one user to many users receiving the same call.

2.1.2 P25 CAP Feature Requirement Description

A subscriber unit shall be capable of initiating and receiving conventional group calls.

2.1.3 TIA Conformance

TIA 102.BAAD-B Conventional Procedures

- Section 6.1 describes the group call functionality on a conventional system.

TIA-102.CABA Interoperability Testing for Voice Operation in Conventional Systems;

- Section 2.2.2.4.1 Matching NAC Operation and SU Routine Group Voice Call Mode (Direct)
- Section 2.4.2.4.1 Matching NAC operation and SU Routine Group Call Mode (Repeated)
- Section 2.6.2.4.1 Routine Group Voice Call (Dispatch and/or Other Monitoring Console)

2.1.4 P25 CAP Test

P25 CAP tests listed in P25-CAB-CAI_TEST_REQ

- All test cases under '2.2.2 Routine Group Voice Call' (Direct)
- All test cases under '2.4.2 Routine Group Voice Call' (Repeated)
- All test cases under '2.6.2 Routine Group Voice Call' (Dispatch and/or Other Monitoring Console)

2.2 Subscriber Squelch Modes

2.2.1 Feature Overview

"Monitor Squelch" enables the receiver to unmute on any recognizable voice signal. "Normal Squelch" enables the receiver to unmute on any voice signal that has the correct network access code (NAC).

2.2.2 P25 CAP Feature Requirement Description

Subscriber units shall support monitor and normal squelch in conventional system operation.

2.2.3 TIA Conformance

TIA 102.BAAD-B Conventional Procedures

- Section 6.1.1.3 "Receiving Subscriber Unit Actions" describes the three squelch modes.

TIA-102.CABA Interoperability Testing for Voice Operation in Conventional Systems;

- Section 2.2.1.4.1 Matching NAC Operation and SU unaddressed voice call Mode (Direct – Normal Squelch)
- Section 2.2.3.4.1 Monitor Mode – SU Group Voice Call (Direct – Monitor Squelch)

- Section 2.4.1.4.1 Matching NAC operation and SU unaddressed voice call mode (Repeated – Normal squelch)
- Section 2.4.9.4.1 Monitor Mode – SU Group Voice Call (Repeated – Monitor squelch)

2.2.4 P25 CAP Test

P25 CAP tests listed in P25-CAB-CAI_TEST_REQ.

- All test cases under '2.2.1 - Normal Mode – SU Unaddressed Voice Call' (Direct)
- All test cases under '2.2.3 - Monitor Mode – SU Group Voice Call' (Direct)
- All test cases under '2.4.1 - Normal Mode – SU Unaddressed Voice Call' (Repeated)
- All test cases under '2.4.9 - Monitor Mode – SU Group Voice Call' (Repeated)

2.3 Subscriber Network Access Code (NAC)

2.3.1 Feature Overview

The NAC provides an RF channel addressing scheme to enable desired receiver traffic, block undesired receiver traffic and provide repeater addressing to control overlapping coverage.

2.3.2 P25 CAP Feature Requirement Description

A subscriber unit shall properly implement the conventional NACs $293 and $F7E.

2.3.3 TIA Conformance

TIA-102.BAAC-C Project 25 Common Air Interface Reserved Values

- Section 2.1 "Network Access Code" describes NAC functionality.

TIA-102.CABA Interoperability Testing for Voice Operation in Conventional Systems;

- Section 2.2.1.4.1 Matching NAC Operation and SU unaddressed voice call (Direct)
- Section 2.2.8.4.1 Accept Any NAC in Normal and Selective Squelch Mode – SU Group Voice Call (Direct)

2.3.4 P25 CAP Test

P25 CAP tests listed in P25-CAB-CAI_TEST_REQ.

- All test cases under '2.2.1 Matching NAC Operation and SU Unaddressed Voice Call' (Direct Mode $293)
- All test cases under '2.2.8 Routine Group Voice Call' (Conventional Receive NAC $F7E)

3 Base Station/Repeater P25 CAP Minimum Feature Requirements

The P25 CAP minimum feature requirements are required to be supported in all P25 base station/repeaters capable of transmitting and receiving. If P25 base Station/repeaters meet these minimum feature set, they can conduct the P25 CAP testing as defined with the CABs. If the SDOC and

STRs are approved, they shall be considered P25 CAP approved. Base stations/repeaters that do not meet these feature requirements, shall not be considered P25 CAP approved.

3.1 Repeater NAC

3.1.1 Feature Overview

The repeater NAC provides an RF channel addressing scheme to enable desired receiver traffic, block undesired receiver traffic and provide repeater addressing to control overlapping coverage.

3.1.2 P25 CAP Feature Requirement Description

A fixed conventional repeater shall be capable of supporting the following NAC values: $F7F and $F7E.

3.1.3 TIA Conformance

TIA 102.BAAD-B Conventional Procedures

- Section 2.5 "Network Access Code and Repeater Addressing" describes NAC functionality for $293 and $F7F codes.

TIA-102.CABA Interoperability Testing for Voice Operation in Conventional Systems.

- Section 2.4.5.4.1 Any NAC ($F7F) operation – SU unaddressed voice call
- Section 2.4.6.4.1 Any NAC ($F7F) operation – SU routine group call
- Section 2.4.7.4.1 Any NAC ($F7E) Operation with Fixed Transmit NAC – SU Group Voice Call
- Section 2.4.10.4.3 Initiate Unit-to-Unit Call from SU 1, no co-channel interference suppression
- Section 2.4.10.4.4 Initiate Unit-to-Unit Call from SU 5, no co-channel interference suppression

3.1.4 P25 CAP Test

P25 CAP tests listed in P25-CAB-CAI_TEST_REQ.

- All test cases under ‘2.4.5 Any NAC ($F7F) Operation – SU Unaddressed Voice Call’ (Conventional REPEAT)
- All test cases under ‘2.4.6 Any NAC ($F7F) Operation – SU Routine Group Call’ (Conventional REPEAT)
- All test cases under ‘2.4.7 Any NAC ($F7F) Operation with Fixed Transmit NAC – SU Group Call’ (Conventional REPEAT)
- Test cases 3 and 4 under ‘2.4.10 Unit-to-Unit Call’ (Conventional REPEAT)

3.2 Repeater NAC Operation - TX NAC = RX NAC

3.2.1 Feature Overview

This feature allows voice messages to be repeated with the same NAC as the received NAC.

3.2.2 P25 CAP Feature Requirement Description

A repeater shall be capable of transmitting the NAC that matches the NAC received from the subscriber for different call types.

3.2.3 TIA Conformance

TIA 102.BAAD-B Conventional Procedures

- Section 2.5 "Network Access Code and Repeater Addressing" describes $F7F NAC functionality.

TIA-102.CABA Interoperability Testing for Voice Operation in Conventional Systems;

- Section 2.4.1.4.1 Matching NAC operation and SU unaddressed Voice Call
- Section 2.4.2.4.1 Matching NAC – SU Routine Group Call Mode
- Section 2.4.10.4.1 Initiate Unit-to-Unit Call from SU 1
- Section 2.4.10.4.2 Initiate Unit-to-Unit Call from SU 5

3.2.4 P25 CAP Test

P25 CAP tests listed in P25-CAB-CAI_TEST_REQ.

- All test cases under '2.4.1 Matching NAC Operation and SU Unaddressed Voice Call (Conventional REPEAT)
- All test cases under '2.4.2 Matching NAC Operation – SU Routine Group Call Mode (Conventional REPEAT)
- Test cases 1 and 2 under '2.4.10 Unit-to-Unit Call' (Conventional REPEAT)

3.3 Repeater NAC Operation - RX NAC ≠ TX NAC

3.3.1 Feature Overview

Voice messages transmitted with one NAC are accepted and repeated with a different NAC, while messages without the correct NAC are rejected.

3.3.2 P25 CAP Feature Requirement Description

A fixed conventional repeater shall be capable of transmitting a NAC that is different from the NAC received from the subscriber for all call types.

3.3.3 TIA Conformance

TIA 102.BAAD-B Conventional Procedures

- Section 2.5 "Network Access Code and Repeater Addressing" describes NAC repeater functionality - RX on one NAC, TX on another NAC.

TIA-102.CABA Interoperability Testing for Voice Operation in Conventional Systems;

- Section 2.4.3.4.1 Transmit NAC independent of receive NAC – SU Unaddressed voice call
- Section 2.4.4.4.1 Transmit NAC Independent of Receive NAC – SU Routine Group Call

3.3.4 P25 CAP Test

P25 CAP tests listed in P25-CAB-CAI_TEST_REQ.

- All test cases under '2.4.3 Transmit NAC Independent of Receive NAC – SU Unaddressed Voice Call (Conventional REPEAT)
- All test cases under '2.4.4 Transmit NAC Independent of Receive NAC – SU Routine Group Call (Conventional REPEAT)

3.4 Repeater NAC Operation - Wrong RX NAC, No Repeat

3.4.1 Feature Overview

Rejecting the repeating of incorrect receive NACs provides the repeater owner control over what traffic is repeated to increase coverage and what traffic is not repeated.

3.4.2 P25 CAP Feature Requirement Description

A fixed conventional repeater shall be capable of rejecting a received transmission when the NAC of the received transmission does not match any received NAC allowed by the repeater.

3.4.3 TIA Conformance

TIA 102.BAAD-B Conventional Procedures

- Section 2.5 "Network Access Code and Repeater Addressing" describes NAC functionality where the repeater function is only enabled with the correct received NAC.

TIA-102.CABA Interoperability Testing for Voice Operation in Conventional Systems (Note: 'Rejection testing of improper receiver NACs' is tested across multiple Test Cases listed below.)

- Section 2.4.1.4.1 Matching NAC operation and SU unaddressed voice call mode
- Section 2.4.2.4.1 Matching NAC operation – SU routine group call mode
- Section 2.4.11.4.1 Initiate Unit-to-Unit call from SU1
- Section 2.4.11.4.2 Initiate Unit-to-Unit Call from SU5

3.4.4 P25 CAP Test

P25 CAP tests listed in P25-CAB-CAI_TEST_REQ.

- All test cases under '2.4.1 Matching NAC Operation and SU Unaddressed Voice Call' (Conventional REPEAT)
- All test cases under '2.4.2 Matching NAC Operation – SU Routine Group Call Model' (Conventional REPEAT)
- Test cases 1 and 2 under '2.4.11 Unit-to-Unit Voice Call Co-Channel Interference Suppression' (Conventional REPEAT)

- End -