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Project 25 Compliance Assessment Bulletin

Project 25 Compliance Assessment Program

Baseline Common Air Interface Testing Requirements

P25-CAB-CAI_TEST_REQ

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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 Responders 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	Incorporated public comment-resolution candidates. Posted again for PC the week of June 30, 2015.
2016 Release	8/17/2016	Addressed March and July 2015 public comments. Posted for general use on August 17, 2016.
2017 Release	7/21/2017	Incorporated TDMA test cases for performance and trunked interoperability, and added note with regard to AES 256 algorithm as the required encryption algorithm for any encryption test cases within P25 CAP. Added performance testing and interoperability testing notes for receive-only subscriber testing. Added updates to resolve public comments received.
2018 Update	10/29/2018	Eliminated some test cases for subscriber direct interoperability testing, subscriber repeat interoperability testing and base station repeat interoperability. Added note stating that testing for 700MHz Adjacent Channel Power ratio is eliminated from CAP as it is tested for FCC equipment authorization. Updated TIA document versions.

Contents

Tables

1 Introduction

The Department of Homeland Security (DHS) Science and Technology Directorate's (S&T) Project 25 Compliance Assessment Program (P25 CAP) is a voluntary program that allows P25 equipment suppliers to formally demonstrate their products' compliance with P25 standards. This program provides 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 S&T-recognized laboratories. All equipment suppliers participating in the P25 CAP must use DHS S&T-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 S&T-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 grantees using federal funds to purchase P25 equipment should obtain evidence that the equipment has been tested in a manner consistent with P25 CAP. The evidence should show the equipment has been tested based on all of the applicable, published P25 CAP Compliance Assessment Bulletins (CAB) covering performance, conformance and interoperability. The SDOC and STR documents posted to the dhs.gov/science-and-technology/p25-cap website provide that evidence. This CAB lists test cases for the P25 Common Air Interface (CAI). Applicable test cases may include tests of features and options installed in the product contemplated for purchase.[1]

1.2 Effective Date

This Compliance Assessment Bulletin becomes effective on July 21, 2017.

[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-C, *Project 25 Interoperability Testing for Voice Operation in Trunked Systems.*

[4] TIA-102.CABA-A, *Project 25 Interoperability Testing for Voice Operation in Conventional Systems.*

[5] Reserved

[6] ANSI/TIA-102.CCAA-A, *Project 25 Two-Slot Time Division Multiple Access Transceiver Measurement Methods.*

[7] ANSI/TIA-102.CCAB-A, *Project 25 Two-Slot Time Division Multiple Access Transceiver Performance Recommendations.*

1.4 Informative References

None at this time.

2 Baseline Common Air Interface Compliance Assessment Requirements

2.1 Subscriber Units

If a subscriber unit can operate in both a conventional mode of operation, as well as a trunked mode of operation, and if the 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

FDMA subscriber units (SUs) and receive-only subscriber units (also known as ‘pagers’) 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 A or Class B requirements, where applicable) as specified in ANSI/TIA-102.CAAB-D [2].

TDMA SUs and receive-only SUs (also known as ‘pagers’) shall be tested in accordance with the following sections of ANSI/TIA- TIA-102.CCAA-A [6], and shall meet or exceed all of the performance recommendations (for Class A or Class B requirements, where applicable) as specified in ANSI/A-102.CCAB-A [7].

2.1.1.1 Conventional Subscriber Unit Performance

Table 1. Conventional Subscriber Unit Receiver Tests

Conventional Subscriber Unit Receiver Tests	Method of Measurement [1]	Performance Recommendation [2]
Reference Sensitivity – C4FM & Standard Simulcast[2]	2.1.4	3.1.4
Faded Reference Sensitivity – C4FM & Standard Simulcast[2]	2.1.5	3.1.5
Signal Delay Spread Capability – C4FM & Standard Simulcast[2]	2.1.6	3.1.6
Adjacent Channel Rejection – C4FM & Standard Simulcast[2]	2.1.7.1	3.1.7.1
Offset Adjacent Channel Rejection – C4FM & Standard Simulcast[2]	2.1.7.2	3.1.7.2
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 Unsquelch Delay	2.1.17	3.1.17
Receiver Throughput Delay	2.1.18	3.1.18

Table 2. Conventional Subscriber Unit Transmitter Tests[3]

Conventional Subscriber Unit Transmitter Tests	Method of Measurement [1]	Performance Recommendation [2]
Unwanted Emissions: Adjacent Channel Power Ratio[4]	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[5]	2.2.18	3.2.18

[2] The Standard Simulcast modulation input can be either Linear Simulcast Modulation (LSM) or Wide Compatible Quadrature Phase Shift Keying modulation (WCQPSK). Both are defined in Section 1.4.3.6 of [1].
[3] Conventional Subscriber Unit Transmitter tests are not supported by receive-only devices.
[4] The 700MHz Adjacent Channel Power Ratio test results were submitted for FCC equipment authorization and there is no need to retest 700MHZ Adjacent Channel Power Ratio.
[5] Note that the Transient Frequency Behavior test requirements are unique for the VHF (136-174MHz), UHF (380-520MHz) and 700/800MHz frequency bands.

2.1.1.2 Trunked Subscriber Unit Performance - FDMA

Table 3. Trunked Subscriber Unit Receiver Tests - FDMA

Trunked Subscriber Unit Receiver Tests - FDMA	Method of Measurement [1]	Performance Recommendation [2]
Reference Sensitivity – C4FM & Standard Simulcast[2]	2.1.4	3.1.4
Faded Reference Sensitivity – C4FM & Standard Simulcast[2]	2.1.5	3.1.5
Signal Delay Spread Capability – C4FM & Standard Simulcast[2]	2.1.6	3.1.6
Adjacent Channel Rejection – C4FM & Standard Simulcast[2]	2.1.7.1	3.1.7.1
Offset Adjacent Channel Rejection – C4FM & Standard Simulcast[2]	2.1.7.2	3.1.7.2
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 Subscriber Unit Transmitter Tests - FDMA[6]

Trunking Subscriber Unit Transmitter Tests - FDMA	Method of Measurement [1]	Performance Recommendation [2]
Unwanted Emissions: Adjacent Channel Power Ratio[4]	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[6]	2.2.18	3.2.18

Table 5. Trunking Subscriber Unit Trunked Tests - FDMA[7]

Trunking Subscriber Unit Trunked Tests - FDMA	Method of Measurement [1]	Performance Recommendation [2]
Trunking Control Channel Slot Times[7]	2.3.1	3.3.1
Trunking Request Time[8]	2.3.2	3.3.2
Transmitter Time to Key on a Traffic Channel[8]	2.3.5	3.3.5

[6] Trunking Subscriber Unit Transmitter tests and Trunking Subscriber Unit Trunked Tests are not supported by receive-only devices.
[7] Measurement method necessitates both trunking infrastructure and subscriber equipment.

2.1.1.3 Trunked Subscriber Unit Performance -TDMA

Table 6. Trunked Subscriber Unit Receiver Tests - TDMA

Trunked Subscriber Unit Receiver Tests -TDMA	Method of Measurement [6]	Performance Recommendation [7]
Reference Sensitivity - HDQPSK	2.1.4	3.1.4
Faded Reference Sensitivity - HDQPSK	2.1.5	3.1.5
Signal Delay Spread Capability - HDQPSK	2.1.6	3.1.6
Adjacent Channel Rejection - HDQPSK	2.1.7.1	3.1.7.1
Offset Adjacent Channel Rejection - HDQPSK	2.1.7.2	3.1.7.2
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 7. Trunked Subscriber Unit Transmitter Tests - TDMA[8]

Trunked Subscriber Unit Transmitter Tests - TDMA	Method of Measurement [6]	Performance Recommendation [7]
Unwanted Emissions: Adjacent Channel Power Ratio[4]	2.2.8	3.2.8
Frequency Deviation for H-CPM	2.2.12	3.2.12
Modulation Fidelity	2.2.13	3.2.13
Symbol Rate Accuracy	2.2.14	3.2.14
H-CPM Transmitter Logical Channel - Peak Adjacent Channel Power Ratio	2.2.15	3.2.15
H-CPM Transmitter Logical Channel - Off Slot Power	2.2.16	3.2.16
H-CPM Transmitter Logical Channel - Power Envelope	2.2.17	3.2.17
H-CPM Transmitter Logical Channel - Time Alignment	2.2.18	3.2.18

2.1.2 Conformance

2.1.2.1 Basic Conventional Conformance

No tests are defined or required at this time.

[8] Trunking Subscriber Unit Transmitter tests (TDMA) are not supported by receive-only devices.

2.1.2.2 Advanced Conventional Conformance

No tests are defined or required at this time.

2.1.2.3 Basic Trunked Conformance

No tests are defined or required at this time.

2.1.2.4 Advanced Trunked Conformance

No tests are defined or required at this time.

2.1.3 Interoperability

2.1.3.1 Conventional Subscriber Unit Interoperability – Direct Mode

P25 SUs and receive-only SUs (also known as 'pagers') capable of conventional mode operation shall be tested for interoperability in accordance with TIA-102.CABA-A [4]. SUs must be tested against at least three[9] of the commercially available, band-compatible conventional products, where each conventional product is from a different manufacturer. SUs that are in the same model class shall count as one compatible test subject. A model class (defined by the manufacturer) is a group of products such that if each were tested for interoperability against the same P25 CAP interoperability test cases, all products in the model class would have the same test case results. Receive-only SUs will be tested in the subscriber role of 'target' in accordance with TIA-102.CABA-A [4].

Table 8. Conventional Subscriber Unit Interoperability Tests – Direct Mode[10]

Conventional Subscriber Unit Interoperability Tests – Direct Mode	Normative Test [4]
Matching NAC Operation and SU Unaddressed Voice Call	**2.2.1**
– Unaddressed Voice Call	2.2.1.4.1
Matching NAC Operation and SU Routine Group Voice Call	**2.2.2**
– Routine Group Voice Call	2.2.2.4.1
Monitor Mode – SU Group Voice Call	**2.2.3**
– Receiving Group Call	2.2.3.4.1
Emergency Call	**2.2.4**
– Emergency Call	2.2.4.4.1
Unit-to-Unit Voice Call	**2.2.5**
– Initiate Unit-to-Unit Call from SU 1	2.2.5.4.1
– 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**
– Initiate Unit-to-Unit Call from SU 1	2.2.6.4.1
– Initiate Unit-to-Unit Call from SU 5	2.2.6.4.2

[9] Known as the *rule of three.* In cases where three products cannot be found to test against, suppliers are encouraged to apply to the P25 CAP program (P25CAP@hq.dhs.gov) for an exception to the rule of three.

[10] Receive-only subscriber units will be tested in the subscriber role of 'target' in accordance with TIA-102.CABA-A [4]. Test cases that require the 'target' subscriber to transmit are not supported by the receive-only subscriber unit.

Conventional Subscriber Unit Interoperability Tests – Direct Mode	Normative Test [4]
Encryption	**2.2.7**
– Call Privacy for Encrypted Call[11]	2.2.7.4.1
Accept Any NAC in Normal and Selective Squelch Mode – SU Group Voice Call	**2.2.8**
– Receiving Group Call with Receive NAC $F7E under Normal and Selective Squelch Modes	2.2.8.4.1
Call Alert	**2.3.1**
– Call Alert (SU 1 to SU 5)	2.3.1.4.1
– Call Alert (SU 5 to SU 1)	2.3.1.4.2
Radio Check	**2.3.2**
– Radio Check (SU 1 to SU 5)	2.3.2.4.1
– Radio Check (SU 5 to SU 1)	2.3.2.4.2
Message Update	**2.3.3**
– Message Update (SU 1 to SU 5)	2.3.3.4.1
– Message Update (SU 5 to SU 1)	2.3.3.4.2
Status Update	**2.3.4**
– Status Update (SU 1 to SU 5)	2.3.4.4.1
– Status Update (SU 5 to SU 1)	2.3.4.4.2
Status Query	**2.3.5**
– Status Query (SU 1 to SU 5)	2.3.5.4.1
– Status Query (SU 5 to SU 1)	2.3.5.4.2
Radio Unit Monitor	**2.3.6**
– Radio Unit Monitor Initiated by SU 1 – Group Call	2.3.6.4.1
– Radio Unit Monitor Initiated by SU 5 – Group Call	2.3.6.4.2
– Radio Unit Monitor Initiated by SU 1 – Unit-to-Unit Call	2.3.6.4.3
– Radio Unit Monitor Initiated by SU 5 – Unit-to-Unit Call	2.3.6.4.4

2.1.3.2 Conventional Subscriber Unit Interoperability - Repeat Mode

P25 SUs and receive-only SUs (also known as 'pagers') capable of conventional mode operation shall be tested for interoperability in accordance with TIA-102.CABA-A [4]. SUs must be tested against at least three of the commercially available, band-compatible conventional-mode-capable fixed network equipment (FNE). Each FNE must be from a different manufacturer. SUs that are in the same model class shall count as one compatible test subject. A model class (defined by the manufacturer) is a group of products such that if each were tested for interoperability against the same P25 CAP interoperability test cases, all products in the model class would have the same test case results. Receive-only subscriber units will be tested in the subscriber role of 'target' in accordance with TIA-102.CABA-A [4].

[11] The 256-bit version of the Advanced Encryption Standard (AES) algorithm shall be used for the Encryption test cases.

Table 9. Conventional Subscriber Unit Interoperability Tests – Repeat Mode[12]

Conventional Subscriber Unit Interoperability Tests – Repeat Mode	Normative Test [4]
Matching NAC Operation and SU Unaddressed Voice Call	**2.4.1**
– Matching NAC operation – Unaddressed Voice Call	2.4.1.4.1
Matching NAC Operation – SU Routine Group Call Mode	**2.4.2**
– 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**
– 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**
– Independent NAC Operation – SU Routine Group Call	2.4.4.4.1
Any NAC ($F7F) Operation – SU Unaddressed Voice Call	**2.4.5**
– NAC $F7F Operation – SU Unaddressed Voice Call	2.4.5.4.1
Any NAC ($F7F) Operation – SU Routine Group Call	**2.4.6**
– NAC $F7F Operation – SU Routine Group Call	2.4.6.4.1
– NAC $F7F Operation - SU Routine Group Call on NAC 300	2.4.6.4.2
Any NAC ($F7E) Operation with Fixed Transmit NAC – SU Group Call	**2.4.7**
– NAC $F7E Operation – SU Group Call	2.4.7.4.1
– NAC $F7E Operation - Routine Group call on NAC 293	2.4.7.4.2
Emergency Call	**2.4.8**
– Emergency Call	2.4.8.4.1
Monitor Mode – SU Group Call	**2.4.9**
– Monitor Mode – Receiving Group Call	2.4.9.4.1
Unit-to-Unit Voice Call	**2.4.10**
– Initiate Unit-to-Unit Call from SU 1	2.4.10.4.1
– Initiate Unit-to-Unit Call from SU 1, No Co-Channel Interference Suppression	2.4.10.4.2
Unit-to-Unit Voice Call Co-Channel Interference Suppression by FNE	**2.4.11**
– Initiate Unit-to-Unit Call from SU 1	2.4.11.4.1
Unit-to-Unit Voice Call – Receiving Units Also in Monitor Mode	**2.4.12**
– Initiate Unit-to-Unit Call from SU 1	2.4.12.4.1
Encryption	**2.4.13**
– Call Privacy for Encrypted Call[11]	2.4.13.4.1
Accept Any NAC in Normal and Selective Squelch Mode – SU Group Call	**2.4.14**
– Receiving group Call with receive NAC $F7E under Normal and Selective Squelch Modes	2.4.14.4.1
Call Alert	**2.5.1**
– Initiate Call Alert Request from SU 1	2.5.1.4.1

[12] Receive-only subscriber units will be tested in the subscriber role of 'target' in accordance with TIA-102.CABA-A [4]. Test cases that require the 'target' subscriber to transmit are not supported by the receive-only subscriber unit.

Conventional Subscriber Unit Interoperability Tests – Repeat Mode	Normative Test [4]
Radio Check	**2.5.2**
– Initiate Radio Check from SU 1	2.5.2.4.1
Message Update	**2.5.3**
– Message Update Initiated by SU 1	2.5.3.4.1
– SU 1 to Group Message Update	2.5.3.4.2
Status Update	**2.5.4**
– Status Update Initiated by SU 1	2.5.4.4.1
– SU to Talk Group Status Update Initiated by SU 1	2.5.4.4.2
Status Query	**2.5.5**
– Status Query Initiated by SU 1	2.5.5.4.1
Radio Unit Monitor	**2.5.6**
– Radio Unit Monitor Initiated by SU 1 – Group Call	2.5.6.4.1
– Radio Unit Monitor Initiated by SU 1 – Unit-to-Unit Call	2.5.6.4.2

2.1.3.3 Conventional Subscriber Unit Interoperability – FNE Dispatch Monitoring Console - Repeat Mode

P25 SUs capable of conventional mode operation shall be tested for interoperability in accordance with TIA-102.CABA-A [4]. SUs must be tested against at least three of the commercially available, band-compatible conventional-mode-capable fixed network equipment (FNE). Each FNE must be from a different manufacturer. SUs that are in the same model class shall count as one compatible test subject. A model class (defined by the manufacturer) is a group of products such that if each were tested for interoperability against the same P25 CAP interoperability test cases, all products in the model class would have the same test case results. Receive-only subscriber units will be tested in the subscriber role of 'target' in accordance with TIA-102.CABA-A [4].

Table 10. Conventional Subscriber Unit Interoperability Tests – FNE Dispatch Monitoring Console - Repeat Mode [13]

Conventional Subscriber Unit Interoperability Tests – FNE Dispatch Monitoring Console - Repeat Mode	Normative Test [4]
Unaddressed Voice Call	**2.6.1**
– Unaddressed Voice Call	2.6.1.4.1
Routine Group Call	**2.6.2**
– Routine Group Call	2.6.2.4.1
Emergency Call	**2.6.3**
– Emergency Call from SU	2.6.3.4.1
– Emergency Call from DMC	2.6.3.4.2

[13] Receive-only subscriber units will be tested in the subscriber role of 'target' in accordance with TIA-102.CABA-A [4]. Test cases that require the 'target' subscriber to transmit are not supported by the receive-only subscriber unit.

Conventional Subscriber Unit Interoperability Tests – FNE Dispatch Monitoring Console - Repeat Mode	Normative Test [4]
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**
– Initiate Unit-to-Unit Call from DMC	2.6.5.4.1
– Initiate Unit-to-Unit Call from SU 1	2.6.5.4.2
Encryption	**2.6.6**
– Call Privacy for Encrypted Call[11]	2.6.6.4.1
Emergency Alarm to Dispatch and/or other Monitoring Console	**2.7.1**
– Emergency Alarm	2.7.1.4.1
Call Alert	**2.7.2**
– Initiate Call Alert Request from DMC	2.7.2.4.1
– Initiate Call Alert Request from SU 1	2.7.2.4.2
Radio Check	**2.7.3**
– Initiate Radio Check from DMC	2.7.3.4.1
Radio Unit Inhibit	**2.7.4**
– Radio Unit Inhibit from DMC	2.7.4.4.1
Radio Unit Uninhibit	**2.7.5**
– Radio Unit Uninhibit from DMC	2.7.5.4.1
Message Update	**2.7.6**
– Message Update from DMC	2.7.6.4.1
– SU 1 to DMC Message Update	2.7.6.4.2
– SU 1 to Group Message Update	2.7.6.4.3
Status Update	**2.7.7**
– Status Update from SU 1 to DMC	2.7.7.4.1
– Talk Group Status Update Initiated by SU 1	2.7.7.4.2
Status Query	**2.7.8**
– Status Query Initiated by DMC	2.7.8.4.1
Radio Unit Monitor	**2.7.9**
– Radio Unit Monitor Initiated by DMC – Group Call	2.7.9.4.1
– Radio Unit Monitor Initiated by DMC – Unit-to-Unit Call	2.7.9.4.2

2.1.3.4 Trunked Subscriber Unit Interoperability – FDMA (Phase 1)

P25 SUs capable of FDMA trunked mode operation shall be tested for interoperability in accordance with TIA-102.CABC-C [3]. SUs must be tested against at least three of the commercially available, band-compatible trunked systems. Each trunked system must be from a different manufacturer. SUs that are in the same model class shall count as one compatible test subject. A model class (defined by the manufacturer) is a group of products such that if each were tested for interoperability against the same P25 CAP interoperability test cases, all products in the model class would have the same test case

results. Tests are to be executed in each of the home and roaming configurations provided in TIA-102.CABC-C [3] Section 2.1.1.1, provided that the manufacturer supports the configuration. Execute tests in both FDMA and TDMA mode if both the SU and RFSS support TDMA mode.

Receive-only SUs (also known as pagers) shall be tested for interoperability in accordance with TIA-102.CABC-C [3] with the assumption that these devices can not initiate service requests that may be part of the test cases listed below. A receive-only device is tested as one of the receiving subscriber units or 'targets' in talkgroup test cases.[14]

Table 11. Trunked Subscriber Unit Interoperability Tests – FDMA (Phase 1)

Trunked Subscriber Unit Interoperability Tests – FDMA (Phase 1)	Normative Test[3]
Full Registration	**2.2.1**
– Valid Registration	2.2.1.4.1
– Denied or Refused Registration	2.2.1.4.2
– Unverified Registration	2.2.1.4.3
Group Voice Call	**2.2.2**
– Group Call Granted	2.2.2.4.1
– Group Call Denied	2.2.2.4.2
– Group Call Request Queued	2.2.2.4.3
– Group Call Interrupt	2.2.2.4.4
Unit-to-Unit Voice Call	**2.2.3**
– Unit-to-Unit Call with Target Availability Check	2.2.3.4.1
– Unit-to-Unit Call with Target Availability Check Denied by Target	2.2.3.4.2
– Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment After Target Availability Check	2.2.3.4.3
– Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment Before Target Availability Check	2.2.3.4.4
– Unit-to-Unit Call without Target Availability Check	2.2.3.4.5
– Unit-to-Unit Call Queued without Target Availability Check	2.2.3.4.6
– Unit-to-Unit Call Denied	2.2.3.4.7
Broadcast Voice Call	**2.2.4**
– Broadcast Voice Call	2.2.4.4.1
Affiliation	**2.2.5**
– Radio Permitted to Affiliate with New Group	2.2.5.4.1
– Radio Denied Affiliation to New Group	2.2.5.4.2
Announcement Group Call	**2.2.6**
– Collection of Talk Groups Receive Call	2.2.6.4.1
Emergency Alarm	**2.2.7**
– Emergency Alarm	2.2.7.4.1

[14] Receiver-only subscriber units are assumed to support the following test cases when tested as a 'target' receive-only subscriber unit: 2.2.2.4.1, 2.2.4.4.1, 2.2.6.4.1, 2.2.8.4.1, 2.2.10.4.1, 2.2.14.4.1

Trunked Subscriber Unit Interoperability Tests – FDMA (Phase 1)	Normative Test [3]
Emergency Group Call	**2.2.8**
– Emergency Call	2.2.8.4.1
Encryption	**2.2.10**
– Call Privacy for Encrypted Call[15]	2.2.10.4.1
Intra-Location Registration Area Roaming	**2.2.11**
– Idle Radio	2.2.11.4.1
Deregistration	**2.2.13**
– Deregistration	2.2.13.4.1
System Call	**2.2.14**
– System Call	2.2.14.4.1
Call Alert	**2.2.15**
– Call Alert	2.2.15.4.1
Short Message	**2.2.16**
– Short Message	2.2.16.4.1
Status Query	**2.2.17**
– Status Query	2.2.17.4.1
Status Update	**2.2.18**
– Status Update	2.2.18.4.1
Radio Unit Monitoring	**2.2.19**
– Individual Non-Silent	2.2.19.4.1
– Individual Silent	2.2.19.4.2
– Group Non-Silent	2.2.19.4.3
– Group Silent	2.2.19.4.4
Radio Unit Disable/Re-Enable	**2.2.20**
– Radio Unit Disable	2.2.20.4.1
– Radio Unit Re-Enable	2.2.20.4.2
Radio Check	**2.2.21**
– Radio Check Successful	2.2.21.4.1

2.1.3.5 Trunked Subscriber Unit Interoperability – TDMA (Phase 2)

P25 SUs capable of TDMA trunked mode operation shall be tested for interoperability in accordance with TIA-102.CABC-C [3]. SUs must be tested against at least three of the commercially available, band-compatible trunked systems. Each trunked system must be from a different manufacturer. SUs that are in the same model class shall count as one compatible test subject. A model class (defined by the manufacturer) is a group of products such that if each were tested for interoperability against the same P25 CAP interoperability test cases, all products in the model class would have the same test case

[15] The 256-bit version of the Advanced Encryption Standard (AES) algorithm shall be used for the Encryption test cases.

results. Tests are to be executed in each of the home and roaming configurations provided in TIA-102.CABC-C [3] Section 2.1.1.1, provided that the manufacturer supports the configuration.

Receive-only SUs (also known as pagers) shall be tested for interoperability in accordance with TIA-102.CABC-C [3] with the assumption that these devices can not initiate service requests that may be part of the test cases listed below. A receive-only device is tested as one of the receiving subscriber units or 'targets' in talk group test cases.[15]

Table 12. Trunked Subscriber Unit Interoperability Tests – TDMA (Phase 2)

Trunked Subscriber Unit Interoperability Tests – TDMA (Phase 2)	Normative Test [3]
Full Registration	**2.2.1**
– Valid Registration	2.2.1.4.1
Group Voice Call	**2.2.2**
– Group Call Granted	2.2.2.4.1
– Group Call Request Queued	2.2.2.4.3
– Group Call Interrupt	2.2.2.4.4
Unit-to-Unit Voice Call	**2.2.3**
– Unit-to-Unit Call with Target Availability Check	2.2.3.4.1
– Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment After Target Availability Check	2.2.3.4.3
– Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment Before Target Availability Check	2.2.3.4.4
– Unit-to-Unit Call without Target Availability Check	2.2.3.4.5
– Unit-to-Unit Call Queued without Target Availability Check	2.2.3.4.6
Broadcast Voice Call	**2.2.4**
– Broadcast Voice Call	2.2.4.4.1
Announcement Group Call	**2.2.6**
– Collection of Talk Groups Receive Call	2.2.6.4.1
Emergency Group Call	**2.2.8**
– Emergency Call	2.2.8.4.1
Encryption	**2.2.10**
– Call Privacy for Encrypted Call[16]	2.2.10.4.1
System Call	**2.2.14**
– System Call	2.2.14.4.1
Radio Unit Monitoring	**2.2.19**
– Individual Non-Silent	2.2.19.4.1
– Individual Silent	2.2.19.4.2
– Group Non-Silent	2.2.19.4.3
– Group Silent	2.2.19.4.4

[16] The 256-bit version of the Advanced Encryption Standard (AES) algorithm shall be used for the Encryption test cases.

Trunked Subscriber Unit Interoperability Tests – TDMA (Phase 2)	Normative Test [3]
Transmitting Subscriber Forced Preemption	**2.2.26**
– Transmitting Subscriber Forced Preemption	2.2.26.4.1
– TDMA Subscriber Forced Audio Preemption	2.2.26.4.2

2.2 Base Stations/Repeaters

If a base station/repeater (BS/R) 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 capable of FDMA operation shall be tested in accordance with the following sections of ANSI/TIA-102.CAAA-E [1], and shall meet or exceed all of the corresponding performance recommendations (for Class A or Class B requirements, where applicable) as specified in ANSI/TIA-102.CAAB-D [2].

Base station radios and repeater units capable of TDMA operation shall be tested in accordance with the following sections of ANSI/TIA-102.CCAA-A [6], and shall meet or exceed all of the corresponding performance recommendations (for Class A or Class B requirements, where applicable) as specified in ANSI/TIA-102.CCAB-A [7].

2.2.1.1 Conventional Base Station/Repeater Performance

Table 13. Conventional Base Station/Repeater Receiver Tests

Conventional Base Station/Repeater 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[17]	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 Unsquelch Delay[18, 19]	2.1.17	3.1.17
Receiver Throughput Delay[16]	2.1.18	3.1.18

[17] Adjacent Channel Rejection testing shall also include Offset Adjacent Channel Rejection test cases.
[18] These test cases apply to fixed stations that provide an audio (analog) output.
[19] Some of the Late Entry Unsquelch Delay test cases call for testing with encrypted transmissions. The 256-bit version of the Advanced Encryption Standard (AES) algorithm shall be used for the encrypted test transmissions.

Table 14. Conventional Base Station/Repeater Transmitter Tests

Conventional Base Station/Repeater Transmitter Tests	Method of Measurement [1]	Performance Recommendation [2]
Unwanted Emissions: Adjacent Channel Power Ratio[20]	2.2.8	3.2.8
Transmitter Throughput Delay[21]	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[22]	2.2.18	3.2.18

2.2.1.2 Trunked Base Station/Repeater Performance – FDMA (Phase 1)

Table 15. Trunked Base Station/Repeater Receiver Tests – FDMA (Phase 1)

Trunked Base Station/Repeater Receiver Tests – FDMA (Phase 1)	Method of Measurement [1]	Performance Recommendation [2]
Reference Sensitivity[14]	2.1.4	3.1.4
Faded Reference Sensitivity[14]	2.1.5	3.1.5
Adjacent Channel Rejection[14, 15]	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 16. Trunked Base Station/Repeater Transmitter Tests – FDMA (Phase 1)

Trunked Base Station/Repeater Transmitter Tests – FDMA (Phase 1)	Method of Measurement [1]	Performance Recommendation [2]
Unwanted Emissions: Adjacent Channel Power Ratio[18]	2.2.8	3.2.8
Transmitter Throughput Delay[19]	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[20]	2.2.18	3.2.18

Table 17. Trunked Base Station/Repeater Trunked Tests – FDMA (Phase 1)

Trunked Base Station/Repeater Trunked Tests – FDMA (Phase 1)	Method of Measurement [1]	Performance Recommendation [2]
Time to Grant[23]	2.3.4	3.3.4

[20] Note that Adjacent Channel Power Ratio test requirements for 700MHz equipment are different from the other frequency bands. When reporting the 700MHz test case results for test 2.2.8, use Table 19, on page 14, in [2].
[21] These test cases apply to fixed stations that provide an audio (analog) input.
[22] Note that the Transient Frequency Behavior test requirements are unique for the VHF (136-174MHz), UHF (380-520MHz) and 700/800MHz frequency bands.
[23] Measurement method necessitates both trunking infrastructure and subscriber equipment.

2.2.1.3 *Trunked Base Station/Repeater Performance – TDMA (Phase 2)*

Table 18. Trunked Base Station/Repeater Receiver Tests – TDMA (Phase 2)

Trunked Base Station/Repeater Receiver Tests – TDMA (Phase 2)	Method of Measurement [6]	Performance Recommendation [7]
Reference Sensitivity	2.1.4	3.1.4
Faded Reference Sensitivity	2.1.5	3.1.5
Adjacent Channel Rejection[15]	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 19. Trunked Base Station/Repeater Transmitter Tests – TDMA (Phase 2)

Trunked Base Station/Repeater Transmitter Tests – TDMA (Phase 2)	Method of Measurement [6]	Performance Recommendation [7]
Unwanted Emissions: Adjacent Channel Power Ratio[18]	2.2.8	3.2.8
Modulation Fidelity	2.2.13	3.2.13
Symbol Rate Accuracy	2.2.14	3.2.14

2.2.2 Conformance

2.2.2.1 *Basic Conventional Conformance*

No tests defined or required at this time.

2.2.2.2 *Advanced Conventional Conformance*

No tests defined or required at this time.

2.2.2.3 *Basic Trunked Conformance*

No tests defined or required at this time.

2.2.2.4 *Advanced Trunked Conformance*

No tests defined or required at this time.

2.2.3 Interoperability

2.2.3.1 *Conventional Base Station/Repeater Interoperability – Repeat Mode*

P25 FNE (Fixed Network Equipment), or repeaters, capable of conventional mode operation shall be tested for interoperability in accordance with TIA-102.CABA-A [4]. FNE must be tested against at least three of the commercially available, band-compatible conventional-mode-capable SUs. Each SU must be from a different manufacturer. SUs that are in the same model class shall count as one compatible test subject. A model class (defined by the manufacturer) is a group of products such that if each were tested

for interoperability against the same P25 CAP interoperability test cases, all products in the model class would have the same test case results.

Table 20. Conventional Base Station/Repeater Interoperability Tests – Repeat Mode (SU to FNE to SU)

Conventional Base Station/Repeater Interoperability Tests – Repeat Mode (SU to FNE to SU)	Normative Test [4]
Matching NAC Operation and SU Unaddressed Voice Call	**2.4.1**
– Matching NAC Operation – Unaddressed Voice Call	2.4.1.4.1
Matching NAC Operation – SU Routine Group Call Mode	**2.4.2**
– 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**
– 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**
– Independent NAC Operation – SU Routine Group Call	2.4.4.4.1
Any NAC ($F7F) Operation – SU Unaddressed Voice Call	**2.4.5**
– NAC $F7F Operation – SU Unaddressed Voice Call	2.4.5.4.1
Any NAC ($F7F) Operation – SU Routine Group Call	**2.4.6**
– NAC $F7F Operation – SU Routine Group Call	2.4.6.4.1
– NAC $F7F Operation - SU Routine Group Call on NAC 300	2.4.6.4.2
Any NAC ($F7E) Operation with Fixed Transmit NAC – SU Group Call	**2.4.7**
– NAC $F7E Operation – SU Group Call	2.4.7.4.1
– NAC $F7F Operation - SU Routine Group Call on NAC 293	2.4.7.4.2
Emergency Call	**2.4.8**
– Emergency Call	2.4.8.4.1
Monitor Mode – SU Group Call	**2.4.9**
– Monitor Mode – Receiving Group Call	2.4.9.4.1
Unit-to-Unit Voice Call	**2.4.10**
– Initiate Unit-to-Unit Call from SU 1	2.4.10.4.1
– Initiate Unit-to-Unit Call from SU 1, No Co-Channel Interference Suppression	2.4.10.4.2
Unit-to-Unit Voice Call Co-Channel Interference Suppression by FNE	**2.4.11**
– Initiate Unit-to-Unit Call from SU 1	2.4.11.4.1
Unit-to-Unit Voice Call – Receiving Units Also in Monitor Mode	**2.4.12**
– Initiate Unit-to-Unit Call from SU 1	2.4.12.4.1
Encryption	**2.4.13**
– Call Privacy for Encrypted Call[24]	2.4.13.4.1

[24] The 256-bit version of the Advanced Encryption Standard (AES) algorithm shall be used for the encrypted test transmissions.

Conventional Base Station/Repeater Interoperability Tests – Repeat Mode (SU to FNE to SU)	Normative Test [4]
Accept Any NAC in Normal and Selective Squelch Mode – SU Group Call	**2.4.14**
– Receiving group Call with receive NAC $F7E under Normal and Selective Squelch Modes	2.4.14.4.1
Call Alert	**2.5.1**
– Initiate Call Alert Request from SU 1	2.5.1.4.1
Radio Check	**2.5.2**
– Initiate Radio Check from SU 1	2.5.2.4.1
Message Update	**2.5.3**
– Message Update Initiated by SU 1	2.5.3.4.1
– SU 1 to Group Message Update	2.5.3.4.2
Status Update	**2.5.4**
– Status Update Initiated by SU 1	2.5.4.4.1
– SU to Talk Group Status Update Initiated by SU 1	2.5.4.4.2
Status Query	**2.5.5**
– Status Query Initiated by SU 1	2.5.5.4.1
Radio Unit Monitor	**2.5.6**
– Radio Unit Monitor Initiated by SU 1 – Group Call	2.5.6.4.1
– Radio Unit Monitor Initiated by SU 1 – Unit-to-Unit Call	2.5.6.4.2

2.2.3.2 Conventional Base Station/Repeater Interoperability – FNE Dispatch Monitoring Console - Repeat Mode

P25 conventional base station/repeaters with FNE Dispatch Monitoring Console shall be tested for interoperability in accordance with TIA-102.CABA-A [4]. FNE must be tested against at least three of the commercially available, band-compatible conventional-mode-capable SUs. Each SU must be from a different manufacturer. SUs that are in the same model class shall count as one compatible test subject. A model class (defined by the manufacturer) is a group of products such that if each were tested for interoperability against the same P25 CAP interoperability test cases, all products in the model class would have the same test case results.

Table 21. Conventional Base Station/Repeater Interoperability Tests – FNE Dispatch Monitoring Console - Repeat Mode

Conventional Base Station/Repeater Interoperability Tests – FNE Dispatch Monitoring Console - Repeat Mode	Normative Test [4]
Unaddressed Voice Call	**2.6.1**
– Unaddressed Voice Call	2.6.1.4.1
Routine Group Call	**2.6.2**
– Routine Group Call	2.6.2.4.1
Emergency Call	**2.6.3**
– Emergency Call from SU	2.6.3.4.1

Conventional Base Station/Repeater Interoperability Tests – FNE Dispatch Monitoring Console - Repeat Mode	**Normative Test [4]**
– 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**
– Initiate Unit-to-Unit Call from DMC	2.6.5.4.1
– Initiate Unit-to-Unit Call from SU 1	2.6.5.4.2
Encryption	**2.6.6**
– Call Privacy for Encrypted Call[24]	2.6.6.4.1
Emergency Alarm to Dispatch Monitoring Console	**2.7.1**
– Emergency Alarm	2.7.1.4.1
Call Alert	**2.7.2**
– Initiate Call Alert Request from DMC	2.7.2.4.1
– Initiate Call Alert Request from SU 1	2.7.2.4.2
Radio Check	**2.7.3**
– Initiate Radio Check from DMC	2.7.3.4.1
Radio Unit Inhibit	**2.7.4**
– Radio Unit Inhibit from DMC	2.7.4.4.1
Radio Unit Uninhibit	**2.7.5**
– Radio Unit Uninhibit from DMC	2.7.5.4.1
Message Update	**2.7.6**
– Message Update from DMC	2.7.6.4.1
– SU 1 to DMC Message Update	2.7.6.4.2
– SU 1 to Group Message Update	2.7.6.4.3
Status Update	**2.7.7**
– Status Update from SU 1 to DMC	2.7.7.4.1
– Talk Group Status Update Initiated by SU 1	2.7.7.4.2
Status Query	**2.7.8**
– Status Query Initiated by DMC	2.7.8.4.1
Radio Unit Monitor	**2.7.9**
– Radio Unit Monitor Initiated by DMC – Group Call	2.7.9.4.1
– Radio Unit Monitor Initiated by DMC – Unit-to-Unit Call	2.7.9.4.2

2.2.3.3 Trunked Base Station/Repeater Interoperability – FDMA (Phase 1)

P25 trunked base station/repeaters shall be interoperability tested in accordance with TIA-102.CABC-C [3] for FDMA and for TDMA. Trunked infrastructure must be tested against at least three of the commercially available, band-compatible SUs. Each SU must be from a different manufacturer. SUs that are in the same model class shall count as one compatible test subject. A model class (defined by the manufacturer) is a group of products such that if each were tested for interoperability against the same P25 CAP interoperability test cases, all products in the model class would have the same test case

results. Tests are to be executed in each of the home and roaming configurations provided in TIA-102.CABC-C [3] Section 2.1.1.1 unless noted that the configuration is unsupported by the manufacturer.

Table 22. Trunked Base Station/Repeater Interoperability Tests – FDMA (Phase 1)

Trunked Base Station/Repeater Interoperability Tests – FDMA (Phase 1)	Normative Test [3]
Full Registration	**2.2.1**
– Valid Registration	2.2.1.4.1
– Denied or Refused Registration	2.2.1.4.2
– Unverified Registration	2.2.1.4.3
Group Voice Call	**2.2.2**
– Group Call Granted	2.2.2.4.1
– Group Call Denied	2.2.2.4.2
– Group Call Request Queued	2.2.2.4.3
Unit-to-Unit Voice Call	**2.2.3**
– Unit-to-Unit Call with Target Availability Check	2.2.3.4.1
– Unit-to-Unit Call with Target Availability Check Denied by Target	2.2.3.4.2
– Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment After Target Availability Check	2.2.3.4.3
– Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment Before Target Availability Check	2.2.3.4.4
– Unit-to-Unit Call without Target Availability Check	2.2.3.4.5
– Unit-to-Unit Call Queued without Target Availability Check	2.2.3.4.6
– Unit-to-Unit Call Denied	2.2.3.4.7
Broadcast Voice Call	**2.2.4**
– Broadcast Voice Call	2.2.4.4.1
Affiliation	**2.2.5**
– Radio Permitted to Affiliate with New Group	2.2.5.4.1
– Radio Denied Affiliation to New Group	2.2.5.4.2
Announcement Group Call	**2.2.6**
– Collection of Talk Groups Receive Call	2.2.6.4.1
Emergency Alarm	**2.2.7**
– Emergency Alarm	2.2.7.4.1
Emergency Group Call	**2.2.8**
– Emergency Call	2.2.8.4.1
Encryption	**2.2.10**
– Call Privacy for Encrypted Call[25]	2.2.10.4.1
Intra-Location Registration Area Roaming	**2.2.11**
– Idle Radio	2.2.11.4.1

[25] The 256-bit version of the Advanced Encryption Standard (AES) algorithm shall be used for the encrypted test transmissions.

Trunked Base Station/Repeater Interoperability Tests – FDMA (Phase 1)	Normative Test [3]
Deregistration	**2.2.13**
– Deregistration	2.2.13.4.1
System Call	**2.2.14**
– System Call	2.2.14.4.1
Call Alert	**2.2.15**
– Call Alert	2.2.15.4.1
Short Message	**2.2.16**
– Short Message	2.2.16.4.1
Status Query	**2.2.17**
– Status Query	2.2.17.4.1
Status Update	**2.2.18**
– Status Update	2.2.18.4.1
Radio Unit Monitoring	**2.2.19**
– Individual Non-Silent	2.2.19.4.1
– Individual Silent	2.2.19.4.2
– Group Non-Silent	2.2.19.4.3
– Group Silent	2.2.19.4.4
Radio Unit Disable/Re-Enable	**2.2.20**
– Radio Unit Disable	2.2.20.4.1
– Radio Unit Re-Enable	2.2.20.4.2
Radio Check	**2.2.21**
– Radio Check Successful	2.2.21.4.1

2.2.3.4 Trunked Base Station/Repeater Interoperability – TDMA (Phase 2)

P25 trunked infrastructure shall be interoperability tested in accordance with TIA-102.CABC-C [3] for FDMA and for TDMA. Trunked infrastructure must be tested against at least three of the commercially available, band-compatible SUs. Each SU must be from a different manufacturer. SUs that are in the same model class shall count as one compatible test subject. A model class (defined by the manufacturer) is a group of products such that if each were tested for interoperability against the same P25 CAP interoperability test cases, all products in the model class would have the same test case results. Tests are to be executed in each of the home and roaming configurations provided in TIA-102.CABC-C [3] Section 2.1.1.1 unless noted that the configuration is unsupported by the manufacturer.

Table 23. Trunked Base Station/Repeater Interoperability Tests – TDMA (Phase2)

Trunked Base Station/Repeater Interoperability Tests – TDMA (Phase 2)	Normative Test [3]
Full Registration	**2.2.1**
– Valid Registration	2.2.1.4.1
– Denied or Refused Registration	2.2.1.4.2
– Unverified Registration	2.2.1.4.3

Trunked Base Station/Repeater Interoperability Tests – TDMA (Phase 2)	Normative Test [3]
Group Voice Call	**2.2.2**
– Group Call Granted	2.2.2.4.1
– Group Call Request Queued	2.2.2.4.3
Unit-to-Unit Voice Call	**2.2.3**
– Unit-to-Unit Call with Target Availability Check	2.2.3.4.1
– Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment After Target Availability Check	2.2.3.4.3
– Unit-to-Unit Call Queued with Target Availability Check – Traffic Channel Assignment Before Target Availability Check	2.2.3.4.4
– Unit-to-Unit Call without Target Availability Check	2.2.3.4.5
– Unit-to-Unit Call Queued without Target Availability Check	2.2.3.4.6
Broadcast Voice Call	**2.2.4**
– Broadcast Voice Call	2.2.4.4.1
Announcement Group Call	**2.2.6**
– Collection of Talk Groups Receive Call	2.2.6.4.1
Emergency Group Call	**2.2.8**
– Emergency Call	2.2.8.4.1
Encryption	**2.2.10**
– Call Privacy for Encrypted Call[25]	2.2.10.4.1
System Call	**2.2.14**
– System Call	2.2.14.4.1
Radio Unit Monitoring	**2.2.19**
– Individual Non-Silent	2.2.19.4.1
– Individual Silent	2.2.19.4.2
– Group Non-Silent	2.2.19.4.3
– Group Silent	2.2.19.4.4
Transmitting Subscriber Forced Preemption	**2.2.26**
– Transmitting Subscriber Forced Preemption	2.2.26.4.1
– TDMA Subscriber Forced Audio Preemption	2.2.26.4.2

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 24. Reference for P25 Baseline Common Air Interface Tests

Section	Reference
2.1.1.1	P25-CAB-CAI_TEST_REQ – August 2017, 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 2017, Section 2.1.1.2 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Performance – FDMA
2.1.1.3	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.1.1.3 – Project 25 TDMA Common Air Interface Trunked Subscriber Unit Performance
2.1.3.1	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.1.3.1 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Interoperability – Direct Mode
2.1.3.2	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.1.3.2 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Interoperability – Repeat Mode
2.1.3.3	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.1.3.3 – Project 25 Phase 1 Common Air Interface Conventional Subscriber Unit Interoperability – FNE Dispatch Monitoring Console - Repeat Mode
2.1.3.4	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.1.3.4 – Project 25 Phase 1 Common Air Interface Trunked Subscriber Unit Interoperability - FDMA
2.1.3.5	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.1.3.5 – Project 25 TDMA Common Air Interface Trunked Subscriber Unit Interoperability
2.2.1.1	P25-CAB-CAI_TEST_REQ – August 2017, 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 2017, Section 2.2.1.2 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Performance – FDMA
2.2.1.3	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.2.1.3 – Project 25 TDMA Common Air Interface Trunked Base Station/Repeater Performance – TDMA
2.2.3.1	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.2.3.1 – Project 25 Phase 1 Common Air Interface Conventional Base Station/Repeater Interoperability - Repeat
2.2.3.2	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.2.3.2 – Project 25 Phase 1 Common Air Interface Conventional Base Station/Repeater Interoperability – FNE with DMC
2.2.3.3	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.2.3.3 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Interoperability – FDMA
2.2.3.4	P25-CAB-CAI_TEST_REQ – August 2017, Section 2.2.3.4 – Project 25 Phase 1 Common Air Interface Trunked Base Station/Repeater Interoperability – TDMA

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 25. P25 CAP Common Air Interface Exceptions

Exception	Date	Reference
1	TBD	NONE. When necessary, this column references this CAB and the excepted section according to the convention used in the Reference column in Table 24.

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