



**Homeland  
Security**

Science and Technology

Office for Interoperability and Compatibility

Technology Center

## **Project 25 Compliance Assessment Bulletin**

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Project 25 Compliance Assessment Program

Baseline Inter-RF Sub-System Interface and Console  
Sub-System Interface Interoperability Testing  
Requirements

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**P25-CAB-ISSI-CSSI\_INTEROPERABILITY\_TEST\_REQ**

October 2019

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## Notice of Disclaimer and Limitation of Liability

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

## Revision History

Version	Date	Description
Draft	6/20/2014	Revised dates and made minor editorial changes. Changed Responders Knowledgebase links to First Responder Group links.
Draft (For PC)	3/03/2015	Final release version for public comment (PC) approved on March 3, 2015. Posted for PC on March 19, 2015.
Draft 2 (For PC)	6/30/2015	Incorporates public comment-resolution candidates. Posted again for PC the week of June 30, 2015.
2016 Release	8/17/2016	Addresses March and July 2015 public comments. Posted for general use on August 17, 2016.
2019 draft (For PC)		Document only addresses Interoperability testing; TDMA testing and Console testing added to FDMA testing; testing broken into three testing scenarios: ISSI-RFSS, CSSI-RFSS, CSSI-Console. Role Combinations added to testing. Posted for public comment.
Version 1	10/01/2019	Updated based on public comments.

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## 1 Introduction

The Department of Homeland Security (DHS) Science and Technology Directorate's (S&T) Office for Interoperability and Compatibility Technology Center (OIC-TC) 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.

### 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 documents posted to the [Project 25 Compliance Assessment Program \(P25 CAP\)](#) DHS website provides that evidence. This CAB lists interoperability test cases for the P25 Console Sub-System Interface (CSSI) and the P25 Inter Sub-System Interface (ISSI).

### Effective Date

This Compliance Assessment Bulletin becomes effective on October 1, 2019.

### Acronyms

- CSS** Console Sub System
- cSU** Console Subscriber Unit
- CSSI** Console Sub System Interface

<b>CST</b>	Console Supporting the Testing
<b>CUT</b>	Console under Test
<b>ISSI</b>	Inter Sub System Interface
<b>mSU</b>	mobile Subscriber Unit
<b>SU</b>	Subscriber Unit
<b>RFSS</b>	Radio Frequency Sub System
<b>RST</b>	RFSS Supporting the Testing
<b>RUT</b>	RFSS under Test
<b>WACN</b>	Wide Area Communications Network

## Definitions

**Console based on CSS equipment:** A console that is based on console sub system equipment and does not have any connection to RF sites

**Console integrated with RFSS equipment:** A console that exists within an RFSS with RF sites; a.k.a. native console

**CST:** The Console equipment used in the testing of the RFSS-under-test and is connected to the RFSS-under-test via a CSSI.

**Console Subscriber Unit (cSU):** A fixed subscriber unit that is located within the console.

**Mobile Subscriber Unit (mSU):** A mobile subscriber unit is a Project 25 mobile/vehicular radio unit or P25 portable/handheld radio unit.

**RFSS ID:** A P25 Radio Frequency Sub System identifier typically utilizing an 8-bit RFSS ID

**RST:** The RFSS equipment used in the testing of the RFSS-under-test and is connected to the RFSS-under-test via the ISSI; or, the RFSS equipment used in the testing of the Console-under-test and is connected to the Console-under-test via the CSSI.

**System ID:** A P25 System Identifier utilizing a 12-bit System ID

**WACN ID:** A P25 Wide area Communications Network Identifier utilizing a 20-bit WACN ID

## Normative References

- [CACD-D] TIA-102.CACD-D, *Project 25 Inter-RF Subsystem Interface (ISSI) Interoperability Test Procedures for Trunked Voice Operation Involving the ISSI.*
- [CABC-C] TIA-102.CABC-C, *Interoperability Testing for Voice Operation in Trunked Systems*
- [BACA-B] TIA-102.BACA-B, *Inter-RF Subsystem Interface Messages and Procedures for Voice Services, Mobility Management, and RFSS Capability Polling Services*
- [CABCAI] P25-CAB-CAI\_TEST\_REQ, *Common Air Interface Baseline Testing Requirements.* Current version.

## Informative References

[CBBK-B] TSB-102.CBBK-B, *Project 25 Recommended Compliance Assessment Tests - Trunking ISSI Interoperability*

## 2 Testing of Equipment

Testing is defined for three different types of ISSI/CSSI equipment. The manufacturer shall decide which types of equipment will be tested and test case results submitted to P25 CAP.

### ISSI-RFSS Equipment Testing

This type of testing involves two RFSS that are connected by an ISSI. Mobile subscriber units are used to initiate the test cases and to indicate the pass criterion of the test cases.

The ISSI capability of RFSS-under-test (ISSI-RFSS) shall be tested by connecting the RFSS-under-test to at least one RFSS from a different manufacturer.

RFSS equipment tested for ISSI capability with RFSS equipment from the same manufacturer is acceptable and can be submitted as long as the RFSS manufacturer has previously submitted ISSI test case results with another RFSS manufacturer.

### CSSI-RFSS Equipment Testing

This type of testing involves a RFSS that is connected to a Console by a CSSI. The Console may be either a Console based on CSS equipment or Console integrated with RFSS equipment. Mobile subscriber units and console subscriber units are used to initiate the test cases and to indicate the pass criterion of the test cases.

The CSSI capability of RFSS-under-test (CSSI-RFSS) shall be tested by connecting the RFSS-under-test to at least one Console from a different manufacturer. The Console may be a Console based on CSS equipment or a Console integrated with RFSS equipment.

RFSS equipment tested for CSSI capability with console equipment from the same manufacturer is acceptable and can be submitted as long as the RFSS manufacturer has previously submitted CSSI test case results with another console manufacturer.

### CSSI-Console Equipment Testing

This type of testing involves a Console that is connected to a RFSS by a CSSI. The Console may be either a Console based on CSS equipment or Console integrated with RFSS equipment. Mobile subscriber units and console subscriber units are used to initiate the test cases and to indicate the pass criterion of the test cases.

The CSSI capability of Console-under-test (CSSI-RFSS) shall be tested by connecting the Console-under-test to at least one RFSS from a different manufacturer. The Console may be a Console based on CSS equipment or a Console integrated with RFSS equipment.

A Console based on CSS equipment, or a Console integrated with RFSS equipment, tested for CSSI capability with RFSS equipment from the same manufacturer is acceptable and can be submitted as long

as the console manufacturer has previously submitted CSSI test case results with another RFSS manufacturer.

### Subscribers Involved with ISSI and CSSI Testing

Subscribers are used for ISSI and CSSI testing. The subscribers are being used to initiate the ISSI and CSSI test cases and may provide the PASS CRITERION called out in the test case procedures of [CACD-D].

Subscriber units that are used in ISSI and CSSI interoperability testing shall be able to pass the following test cases defined in [CABC-C] for FDMA and TDMA operation.

**Table 1. FDMA Test Cases for Subscribers**

Test Case Number	Test Case Title
2.2.1.4.1	Valid Registration
2.2.1.4.2	Denied or Refused Registration
2.2.2.4.1	Group Call Granted
2.2.2.4.2	Group call Denied
2.2.3.4.1	Unit-to-Unit Call with Target Availability Check
2.2.3.4.5	Unit-to-Unit Call without Target Availability Check
2.2.3.4.7	Unit-to-Unit Call Denied
2.2.4.4.1	Broadcast Call
2.2.5.4.1	Radio Permitted to Affiliate with New Group
2.2.5.4.2	Radio Denied Affiliation to New Group
2.2.6.4.1	Announcement Group Call
2.2.8.4.1	Emergency Call
2.2.8.4.5	Emergency Call Request Queued
2.2.8.4.6	Emergency Call Request Ruthless Preemption
2.2.10.4.1	Call Privacy for Encrypted Call

**Table 2. TDMA Test Cases for Subscribers**

Test Case Number	Test Case Title
2.2.1.4.1	Valid Registration
2.2.2.4.1	Group Call Granted
2.2.3.4.1	Unit-to-Unit Call with Target Availability Check
2.2.3.4.5	Unit-to-Unit Call without Target Availability Check
2.2.4.4.1	Broadcast Call
2.2.5.4.1	Radio Permitted to Affiliate with New Group



Test Case Number	Test Case Title
2.2.5.4.2	Radio Denied Affiliation to New Group
2.2.6.4.1	Announcement Group Call
2.2.8.4.1	Emergency Call
2.2.8.4.5	Emergency Call Request Queued
2.2.8.4.6	Emergency Call Request Ruthless Preemption
2.2.10.4.1	Call Privacy for Encrypted Call

## Role Combinations

Each test case has multiple role combinations for the RFSS-under-test and the console-under-test. The role combinations are defined in [CACD-D] and detailed in this section. Please have a copy of [CACD-D] available when reviewing this section. Group voice testing will only cover the ‘non-roaming’ role combinations.

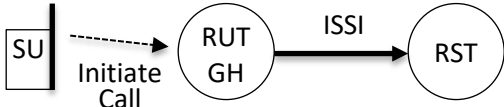

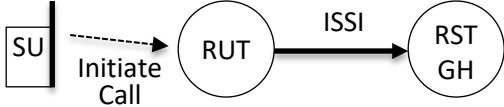

Role combinations are detailed in Table 3 through Table 12. A simple diagram for the role combination is shown below the text description.

For ISSI-RFSS testing, the RFSS-under-Test (RUT) includes test cases for unit registration, unit to unit calls, group registration and numerous types of group calls. The RUT is referred to as the RFSS A-1 in [CACD-D]. The ISSI-RFSS tests are performed with another RFSS connected via the ISSI. This ‘another RFSS connected via the ISSI’ is referred to as the ‘RFSS supporting the testing’ (RST) in this document. The RST is referred to as the RFSS B-1 in [CACD-D].

For CSSI-RFSS testing, the RFSS-under-test (RUT) includes test cases for unit to unit calls, group registration and numerous types of group calls. The RUT is referred to as the RFSS A-1 in [CACD-D]. These tests are performed with a Console connected via the CSSI. This ‘Console connected via the CSSI’ is also known as the ‘Console supporting the testing’ (CST). The CST is referred to as the RFSS B-1 in [CACD-D].

For CSSI-CSS testing, the Console-under-test (CUT) includes test cases for unit to unit calls, group registration and numerous types of group calls. The CUT is referred to as the RFSS A-1 in [CACD-D]. These tests are performed with another RFSS connected via the CSSI. This ‘RFSS connected via the CSSI’ is also known as the ‘RFSS supporting the testing’ (RST). The RST is referred to as the RFSS B-1 in [CACD-D].

**Table 3. Role Combination Descriptions for ISSI-RFSS Talkgroup Call Testing**

Role Combination	Descriptions for ISSI-RFSS Group Call (GC) Combinations	Group Home	Call Initiation
GC5	<p>A subscriber unit (SU) initiates a talkgroup call in the RFSS-under-test (RUT). The RUT is the group home (GH) system for the talkgroup that is used for testing. The RFSS supporting the testing (RST) receives the call from the RUT.</p>  <pre> graph LR     SU[SU] -.-&gt; Initiate Call  RUT_GH((RUT GH))     RUT_GH -- ISSI --&gt; RST((RST))             </pre>	RUT	SU in RUT
GC6	<p>A subscriber unit (SU) initiates a talkgroup call in the RFSS supporting the test (RST). The RST is the group home (GH) system for the talkgroup that is used for testing. The RFSS-under-test (RUT) receives the call from the RST.</p>  <pre> graph LR     SU[SU] -.-&gt; Initiate Call  RST_GH((RST GH))     RST_GH -- ISSI --&gt; RUT((RUT))             </pre>	RST	SU in RST
GC7	<p>A subscriber unit (SU) initiates a talkgroup call in the RFSS-under-test (RUT). The RFSS supporting the testing (RST) is the group home (GH) system for the talkgroup that is used for testing. The RST receives the call from the RUT.</p>  <pre> graph LR     SU[SU] -.-&gt; Initiate Call  RUT((RUT))     RUT -- ISSI --&gt; RST_GH((RST GH))             </pre>	RST	SU in RUT
GC8	<p>A subscriber unit (SU) initiates a talkgroup call in the RFSS supporting the test (RST). The RFSS-under-test (RUT) is the group home (GH) system for the talkgroup that is used for testing. The RUT receives the call from the RST.</p>  <pre> graph LR     SU[SU] -.-&gt; Initiate Call  RST((RST))     RST -- ISSI --&gt; RUT_GH((RUT GH))             </pre>	RUT	SU in RST

**Table 4. Role Combination Descriptions for ISSI-RFSS Talkgroup Registration Testing**

Role Combination	Descriptions for ISSI-RFSS Group Registration (GR) Combinations	Group Home	Registration Initiation
GR1	A subscriber unit (SU) initiates talkgroup registration in the RFSS-under-test (RUT). The RFSS supporting the testing (RST) is the group home (GH) system for the talkgroup that is used for testing. The RST receives the registration from the RUT.	RST	SU in RUT
	<pre> graph LR     SU[SU] -.-&gt; Initiate Registration  RUT((RUT))     RUT -- ISSI --&gt; RSTGH((RST GH))             </pre>		
GR2	A subscriber unit (SU) initiates talkgroup registration in the RFSS supporting the test (RST). The RFSS-under-test (RUT) is the group home (GH) system for the talkgroup used for testing. The RUT receives the registration from the RST.	RUT	SU in RST
	<pre> graph LR     SU[SU] -.-&gt; Initiate Registration  RST((RST))     RST -- ISSI --&gt; RUTGH((RUT GH))             </pre>		

**Table 5. Role Combination Descriptions for ISSI-RFSS Unit Call Testing**

Role Combination	Descriptions for ISSI-RFSS Unit to Unit (U2U) Call Combination	Calling SU Location	Called SU Location
U2U13	Subscriber unit (SU-A, unit home to the RST) roamed to the RFSS-under-test (RUT) and then unit-to-unit calls subscriber unit (SU-B, unit home to the RUT) that previously roamed to the RFSS supporting the testing (RST).	SU in RUT	SU in RST
	<pre> graph LR     SU_A[SU-A] -.-&gt; Initiate Call  RUT((RUT))     RUT -- ISSI --&gt; RST((RST))     SU_B[SU-B] -.-&gt; Receive Call  RST             </pre>		
U2U14	A subscriber unit (SU-B) that has roamed to the RFSS supporting the testing (RST) unit-to-unit calls another subscriber unit (SU-A) that has roamed to the RFSS-under-test (RUT).	SU in RST	SU in RUT
	<pre> graph LR     SU_B[SU-B] -.-&gt; Initiate Call  RST((RST))     RST -- ISSI --&gt; RUT((RUT))     SU_A[SU-A] -.-&gt; Receive Call  RUT             </pre>		

**Table 6. Role Combination Descriptions for ISSI-RFSS Unit Registration Testing**

Role Combination	Descriptions for ISSI-RFSS Unit Registration (UR) Combinations	SU Location	SU Home Location
UR1	A subscriber unit (SU) that is home (Unit Home - UH) to the RFSS supporting the testing (RST) requests unit registration when the subscriber unit (SU) is located in the RFSS-under-test (RUT).	RUT	RST
	<pre> graph LR     SU[SU] -.-&gt; Initiate Registration  RUT((RUT))     RUT -- ISSI --&gt; RST_UH((RST UH))             </pre>		
UR2	A subscriber unit (SU) that is home to the RFSS-under-test (RUT) requests unit registration when the subscriber unit (SU) is located in the RFSS supporting the testing (RST).	RST	RUT
	<pre> graph LR     SU[SU] -.-&gt; Initiate Registration  RST((RST))     RST -- ISSI --&gt; RUT_UH((RUT UH))             </pre>		

**Table 7. Role Combination Descriptions for CSSI-RFSS Talkgroup Call testing**

Role Combination	Descriptions for CSSI-RFSS Group Call (GC) Combinations	Group Home	Call Initiation
GC5	A subscriber unit (SU) initiates a talkgroup call in the RFSS-under-test (RUT). The RUT is the group home (GH) system for the talkgroup used for testing. The Console supporting the testing (CST) receives the call from the RUT.	RUT	SU in RUT
	<pre> graph LR     SU[SU] -.-&gt; Initiate Call  RUT_GH((RUT GH))     RUT_GH -- CSSI --&gt; CST((CST))             </pre>		
GC8	A console subscriber unit (cSU) initiates a talkgroup call in the Console supporting the test (CST). The RFSS-under-test (RUT) is the group home (GH) system for the talkgroup used for testing. The RUT receives the call from the CST.	RUT	cSU in CST
	<pre> graph LR     cSU[cSU] -.-&gt; Initiate Call  CST((CST))     CST -- CSSI --&gt; RUT_GH((RUT GH))             </pre>		

**Table 8. Role Combination Descriptions for CSSI-RFSS Talkgroup Registration Testing**

Role Combination	Descriptions for CSSI-RFSS Group Registration (GR) Combinations	Group Home	Registration Initiation
GR2	A console subscriber unit (cSU) initiates talkgroup registration in the console supporting the test (CST). The RFSS-under-test (RUT) is the group home (GH) system for the talkgroup used for testing. The RUT receives the registration request from the CST.	RUT	cSU in CST
	<pre> graph LR     cSU[cSU] -.-&gt; Initiate Registration  CST((CST))     CST -- CSSI --&gt; RUT_GH((RUT GH))             </pre>		

**Table 9. Role Combination Descriptions for CSSI-RFSS Unit Call Testing**

Role Combination	Descriptions for CSSI-RFSS Unit to Unit (U2U) Call Combinations	Calling SU Location	Called SU Location
U2U3	A subscriber unit (SU) that is home to the RFSS-under-test (RUT) unit-to-unit calls a console subscriber unit (cSU) that is home to the Console supporting the testing (CST).	SU in RUT	cSU in CST
	<pre> graph LR     SU[SU] -.-&gt; Initiate Call  RUT((RUT))     RUT -- CSSI --&gt; CST((CST))     CST -.-&gt; Receive Call  cSU[cSU]             </pre>		
U2U4	A console subscriber unit (cSU) that is home to the Console supporting the testing (CST) unit-to-unit calls a subscriber unit (SU) that is home to the RFSS-under-test (RUT).	cSU in CST	SU in RUT
	<pre> graph LR     cSU[cSU] -.-&gt; Initiate Call  CST((CST))     CST -- CSSI --&gt; RUT((RUT))     RUT -.-&gt; Receive Call  SU[SU]             </pre>		

**Table 10. Role Combination Descriptions for CSSI-Console Talkgroup Call Testing**

Role Combination	Descriptions for CSSI-Console Group Call (GC) Combinations	Group Home	Call Initiation
GC6	A subscriber unit (SU) initiates a talkgroup call in the RFSS supporting the test (RST). The RST is the group home (GH) system for the talkgroup used for testing. The Console under test (CUT) receives the call from the RST.	RST	SU in RST
	<pre> graph LR     SU[SU] -.-&gt; Initiate Call  RST((RST GH))     RST -- CSSI --&gt; CUT((CUT))             </pre>		
GC7	A console subscriber unit (cSU) initiates a talkgroup call in the Console-under-test (CUT). The RFSS supporting the testing (RST) is the group home (GH) system for the talkgroup used for testing. The RST receives the call from the CUT.	RST	cSU in CUT
	<pre> graph LR     cSU[cSU] -.-&gt; Initiate Call  CUT((CUT))     CUT -- CSSI --&gt; RST((RST GH))             </pre>		

**Table 11. Role Combination Descriptions for CSSI-Console Talkgroup Registration Testing**

Role Combination	Descriptions for CSSI-Console Group Registration (GR) Combinations	Group Home	Registration Initiation
GR1	A console subscriber unit (cSU) in the Console-under-test (CUT) requests talkgroup registration in the RFSS supporting the testing (RST). The RST is the group home system for group registration testing. The RST receives the registration request from the CUT.	RST	cSU in CUT
	<pre> graph LR     cSU[cSU] -.-&gt; Initiate Registration  CUT((CUT))     CUT -- CSSI --&gt; RST((RST GH))             </pre>		

**Table 12. Role Combination Descriptions for CSSI-Console Unit Call Testing**

Role Combination	Descriptions for CSSI-Console Unit to Unit (U2U) Call Combinations	Calling SU Location	Called SU Location
U2U3	<p>A subscriber unit (cSU) that is home to the Console-under-test (CUT) unit-to-unit calls a subscriber unit (SU) that is home to the RFSS supporting the testing (RST).</p> <pre> graph LR     cSU[cSU] -.-&gt; Initiate Call  CUT((CUT))     CUT -- CSSI --&gt; RST((RST))     RST -.-&gt; Receive Call  SU[SU]                     </pre>	cSU in CUT	SU in RST
U2U4	<p>A subscriber unit (SU) that is home to the RFSS supporting the testing (RST) unit-to-unit calls a console subscriber unit (cSU) that is home to the Console-under-test (CUT).</p> <pre> graph LR     SU[SU] -.-&gt; Initiate Call  RST((RST))     RST -- CSSI --&gt; CUT((CUT))     CUT -.-&gt; Receive Call  cSU[cSU]                     </pre>	SU in RST	cSU in CUT

### Testing Details by Test Suite and Test Case

This section defines the role combinations that apply per test case, where RFSS and subscriber test configurations are found in [CACD-D] and the PASS CRITERION for each test case. Most test cases have multiple PASS CRITERIONS that need to be met in order to successfully pass the test case.

Some of the test cases described in the following section have clarifications added by P25 CAP as the test procedures in [CACD-D] are incorrect and are awaiting correction by TIA-TR8.

#### 2.1.1 Test Suite: Unit Registration Using an ISSI

##### 2.1.1.1 Test Case: 2.3.1.5.1 Valid Registration

Role Combinations for ISSI-RFSS test: RFSS tested in the UR1 and UR2 roles.

Test Case Details: The RFSS and SU Configurations for testing Valid Registration in the UR1 and UR2 roles are defined in [CACD-D]; see Figure 27, Table 38, Table 39 and Table 40.

The PASS CRITERION for test step b) of test case 2.3.1.5.1 shall be recorded on the DTR. The STR test case result for test case 2.3.1.5.1 shall be considered a ‘pass’ when the PASS CRITERION is positively verified.

##### 2.1.1.2 Test Case: 2.3.1.5.2 Denied or Refused Registration

Role Combinations for ISSI-RFSS test: RFSS tested in the UR1 and UR2 roles.

Test Case Details: The RFSS and SU Configurations for testing Denied or Refused Registration in the UR1 and UR2 roles are defined in [CACD-D]; see Figure 27, Table 38, Table 39 and Table 40.

The PASS CRITERION for test step c) of test case 2.3.1.5.2 shall be recorded in the DTR. The STR test case result for test case 2.3.1.5.2 shall be considered a 'pass' when the PASS CRITERION is positively verified.

### **2.1.1.3 Test Case: 2.3.1.5.6 SU Roamed Procedure**

Role Combinations for ISSI-RFSS test: RFSS tested in the UR1 and UR2 roles.

Test Case Details: The RFSS and SU Configurations for testing SU Roamed Procedure in the UR1 and UR2 roles are defined in [CACD-D]; see Figure 27, Table 38, Table 39 and Table 40.

To simulate the physical movement called out in Test Step c) "Physically move, or otherwise simulate the physical movement of SU1 from the coverage area of the Serving RFSS to the coverage area of the SU Home RFSS", the following test case steps are recommended for this test case.

- (1) Have two radios identically configured as SU 1, with one located in the RFSS under test and the other in the RFSS supporting the test.
- (2) Start with SU 1 turned on in the RFSS supporting the test and the other SU 1 remains turned off in the RFSS under test.
- (3) [PASS CRITERION] Verifying SU1 has registered in the RFSS supporting the test,
- (4) Turn on SU 1 in the RFSS under test.
- (5) [PASS CRITERION] Verifying SU1 in the RFSS under test has been registered
- (6) [PASS CRITERION] Verify that SU1 in the RFSS supporting the test has been deregistered.
- (7) Turn off SU 1 in the RFSS supporting the test.
- (8) Turn off SU 1 in the RFSS under test.

The PASS CRITERION for test step b) (or step 3 from above) and test step d) (or step 5 and 6 from above) of test case 2.3.1.5.6 shall be recorded on the DTR. The STR test case result for test case 2.3.1.5.6 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

## **2.1.2 Test Suite: Group Voice Using an ISSI**

### **2.1.2.1 Test Case: 2.3.2.5.2 Group Call Granted - Unconfirmed - No Units Roaming**

Role Combinations for ISSI-RFSS test: RFSS tested in the GC5, GC6, GC7 and GC8 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GC5 and GC8 roles.

Role Combinations for CSSI-Console test: Console tested in the GC6 and GC7 roles.

Test Case Details: The RFSS and SU Configurations for testing Group Call Granted - Unconfirmed in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 30, Figure 31, Table 120 and Table 122.

The PASS CRITERION for test step b) of test case 2.3.2.5.2 shall be recorded in the DTR. For test step c), the test lab shall coordinate with the manufacturer(s) of 'SU2, 6 and 7' to obtain the 'manufacturer-specific indication' of SU1's 'Talking Party Identification' that is displayed by those three subscriber units. SU1's assigned home unit ID and the exact Talking Party Identification shown on the display of SU2, 6 and 7 (decimal ID, HEX ID or Unit Alias are acceptable) shall be recorded in the DTR.



The PASS CRITERION for test step e) of test case 2.3.2.5.2 shall be recorded in the DTR. For test step f), the test lab shall coordinate with the manufacturer(s) of 'SU1, 6 and 7' to obtain the 'manufacturer-specific indication' of SU2's 'Talking Party Identification' that is displayed by those three subscriber units. SU2's assigned home unit ID and the exact Talking Party Identification shown on the display of SU1, 6 and 7 (decimal ID, HEX ID or Unit Alias are acceptable) shall be recorded in the DTR. The STR test case result for test case 2.3.2.5.2 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

**2.1.2.2 Test Case: 2.3.2.5.6 Confirmed Group Voice Call Granted After RF Resources Become Available – No Units Roaming**

Role Combinations for ISSI-RFSS test: RFSS tested in the GC5, GC6, GC7 and GC8 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GC5 and GC8 roles.

Role Combinations for CSSI-Console test: Console tested in the GC6 and GC7 roles.

Test Case Details: The RFSS and SU Configurations for testing Confirmed Group Voice Call Granted After RF Resources Become Available in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 30, Figure 31, Table 120 and Table 122.

The PASS CRITERION for test step e) and test step i) of test case 2.3.2.5.6 shall be recorded on the DTR. The STR test case result for test case 2.3.2.5.6 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

**2.1.2.3 Test Case: 2.3.2.5.7 Group Call denied – All Units Roaming and No Units Roaming**

Note: Testing will only include 'No Units Roaming'

Role Combinations for ISSI-RFSS test: RFSS tested in the GC5, GC6, GC7 and GC8 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GC8 role.

Role Combinations for CSSI-Console test: Console tested in the GC7 role.

Test Case Details: The RFSS and SU Configurations for testing Group Call Denied in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 30, Figure 31, Table 120 and Table 122.

Due to issues with test case 2.3.2.5.7 (Test Case 7), please make the following changes to the test steps of 2.3.2.5.7 (Test Case 7):

- Test step a) Configure SG Home RFSS so it does not permit a Group Call using Talk Group Alpha instead of Talk Group Charlie.
- Test step b) Asset PTT on SU1 instead of SU4
- Test step c) Verify that attempted Group call has been denied and SUs 2, 3, 4, 5, 6, 7 cannot hear SU1's message
- Test step d) Release PTT on SU1 instead of SU4
- Test step e) Configure SG Home RFSS to allow Talk Group Alpha calls

The PASS CRITERION for test step c) of test case 2.3.2.5.7 shall be recorded on the DTR. The STR test case result for test case 2.3.2.5.7 shall be considered a 'pass' when the PASS CRITERION is positively verified.

#### ***2.1.2.4 Test Case: 2.3.2.5.12 Group Call Interrupt (Dispatcher Audio Takeover) – No Units Roaming***

Role Combinations for CSSI-RFSS test: RFSS tested in the GC5 and GC8 roles.

Role Combinations for CSSI-Console test: Console tested in the GC6 and GC7 roles.

Test Case Details: The RFSS and SU Configurations for testing Group Call Interrupt in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 30, Figure 31, Table 120 and Table 122.

The PASS CRITERION for test step b) and test step d) of test case 2.3.2.5.12 shall be recorded on the DTR. The STR test case result for test case 2.3.2.5.12 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

### **2.1.3 Test Suite: Unit to Unit Voice Call**

#### ***2.1.3.1 Test case: 2.3.3.5.1 Unit to Unit Call with Target Availability Check***

Role Combinations for ISSI-RFSS test: RFSS tested in the U2U13 and U2U14 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the U2U3 and U2U4 roles.

Role Combinations for CSSI-Console test: Console tested in the U2U3 and U2U4 roles.

Test Case Details: The RFSS and SU Configurations for testing Unit to Unit Call with Target Availability Check in the U2U13 and U2U14 roles are defined in [CACD-D]; see Figure 38 and Table 126. The RFSS and SU Configurations for testing Unit to Unit Call with Target Availability Check in the U2U3 and U2U4 roles are defined in [CACD-D]; see Figure 33 and Table 126.

The PASS CRITERION for test step b), test step d), test step f) and test step h) of test case 2.3.3.5.1 shall be recorded in the DTR. The STR test case result for test case 2.3.3.5.1 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

#### ***2.1.3.2 Test case: 2.3.3.5.5 Unit to Unit Call without Target Availability Check***

Role Combinations for ISSI-RFSS test: RFSS tested in the U2U13 and U2U14 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the U2U3 and U2U4 roles.

Role Combinations for CSSI-Console test: Console tested in the U2U3 and U2U4 roles.

Test Case Details: The RFSS and SU Configurations for testing Unit to Unit Call without Target Availability Check in the U2U13 and U2U14 roles are defined in [CACD-D]; see Figure 38 and Table 126. The RFSS and SU Configurations for testing Unit to Unit Call without Target Availability Check in the U2U3 and U2U4 roles are defined in [CACD-D]; see Figure 33 and Table 126.

The PASS CRITERION for test step b), test step d) and test step f) of test case 2.3.3.5.5 shall be recorded in the DTR. The STR test case result for test case 2.3.3.5.5 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

### **2.1.3.3 Test Case: 2.3.3.5.7 Unit to Unit Call Denied**

Role Combinations for ISSI-RFSS test: RFSS tested in the U2U13 and U2U14 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the U2U3 and U2U4 roles.

Role Combinations for CSSI-Console test: Console tested in the U2U3 and U2U4 roles.

Test Case Details: The RFSS and SU Configurations for testing Unit to Unit Call Denied in the U2U13 and U2U14 roles are defined in [CACD-D]; see Figure 38 and Table 126. The RFSS and SU Configurations for testing Unit to Unit Call Denied in the U2U3 and U2U4 roles are defined in [CACD-D]; see Figure 33 and Table 126.

The PASS CRITERION for test step b) of test case 2.3.3.5.7 shall be recorded in the DTR. The STR test case result for test case 2.3.3.5.7 shall be considered a 'pass' when the PASS CRITERION is positively verified.

## **2.1.4 Test Suite: Broadcast Voice Call Using an ISSI**

### **2.1.4.1 Test case: 2.3.4.5.2 Broadcast Call Granted – No Units Roaming**

Role Combinations for ISSI-RFSS test: RFSS tested in the GC5, GC6, GC7 and GC8 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GC5 and GC8 roles.

Role Combinations for CSSI-Console test: Console tested in the GC6 and GC7 roles.

Test Case Details: The RFSS and SU Configurations for testing Broadcast Voice Call in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 42, Table 120 and Table 122.

The PASS CRITERION for test step b) and test step d) of test case 2.3.4.5.2 shall be recorded in the DTR. The STR test case result for test case 2.3.4.5.2 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

## **2.1.5 Test Suite: Talk Group Registration Using an ISSI**

### **2.1.5.1 Test Case: 2.3.5.5.2 Subscriber Unit Permitted to Affiliate with New Talk Group - No Units Roaming**

Role Combinations for ISSI-RFSS test: RFSS tested in the GR1 and GR2 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GR2 role.

Role Combinations for CSSI-Console test: Console tested in the GR1 role.

Test Case Details: The RFSS and SU Configurations for testing Subscriber Unit Permitted to Affiliate with New Talk Group in the GR1 and GR2 roles are defined in [CACD-D]; see Figure 43, Table 128 and Table 129.

The PASS CRITERION for test step b), test step d), test step f) of test case 2.3.5.5.2 and test step i) shall be recorded in the DTR. The STR test case result for test case 2.3.5.5.2 shall be considered a 'pass' when the PASS CRITERION is positively verified.

### **2.1.5.2 Test Case: 2.3.5.5.4 Subscriber Unit Denied Affiliation with New Talk Group - No Units Roaming**

Role Combinations for ISSI-RFSS test: RFSS tested in the GR1 and GR2 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GR2 role.

Role Combinations for CSSI-Console test: Console tested in the GR1 role.

Test Case Details: The RFSS and SU Configurations for testing Subscriber Unit Denied Affiliation with New Talk Group in the GR1 and GR2 roles are defined in [CACD-D]; see Figure 43, Table 128 and Table 129.

The PASS CRITERION for test step b) of test case 2.3.5.5.4 shall be recorded in the DTR. The STR test case result for test case 2.3.5.5.4 shall be considered a 'pass' when the PASS CRITERION is positively verified.

### **2.1.6 Test Suite: Announcement Group Call**

#### **2.1.6.1 Test Case: 2.3.6.5.2 Announcement Group Call Granted - No Units Roaming**

Role Combinations for ISSI-RFSS test: RFSS tested in the GC5, GC6, GC7 and GC8 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GC5 and GC8 roles.

Role Combinations for CSSI-Console test: Console tested in the GC6 and GC7 roles.

Test Case Details: The RFSS and SU Configurations for testing Announcement Group Call in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 46, Figure 47, Table 120 and Table 122.

The PASS CRITERION for test step b), test step d) and test step f) of test case 2.3.6.5.2 shall be recorded in the DTR. The STR test case result for test case 2.3.6.5.2 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

### **2.1.7 Test Suite: Emergency group Call Using an ISSI**

#### **2.1.7.1 Test Case: 2.3.8.5.2 Emergency Group Call - No Units Roaming**

Role Combinations for ISSI-RFSS test: RFSS tested in the GC5, GC6, GC7 and GC8 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GC5 and GC8 roles.

Role Combinations for CSSI-Console test: Console tested in the GC6 and GC7 roles.

Test Case Details: The RFSS and SU Configurations for testing Emergency Group Call in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 50, Figure 51, Table 120 and Table 122.

The PASS CRITERION for test step b), test step d) and test step e) of test case 2.3.8.5.2 shall be recorded in the DTR. In addition, the pass criteria in test step e), the test lab shall coordinate with the manufacturer(s) of the SU1, SU6 and SU7 and the two RFSS manufacturers involved with testing to obtain and record in the DTR the 'manufacturer-specific indication/method' of the Emergency Status for SU6's transmission. The DTR shall record whether RFSS maintains or does not maintain the Emergency Status of the call. The DTR shall record whether RFSS B-1 maintains or does not maintain the Emergency Status of the call and whether emergency status based on SU6's transmission is displayed by SU1 and

SU7. The STR test case result for test case 2.3.8.5.2 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

#### ***2.1.7.2 Test Case: 2.3.8.5.6 Emergency Group Call Request Queued - No Units roaming***

Role Combinations for ISSI-RFSS test: RFSS tested in the GC5, GC6, GC7 and GC8 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GC5 and GC8 roles.

Role Combinations for CSSI-Console test: Console tested in the GC6 and GC7 roles.

Test Case Details: The RFSS and SU Configurations for testing Emergency Group Call Request Queued in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 50, Figure 51, Table 120 and Table 122.

The PASS CRITERION for test step f), test step j), test step n), test step p) and test step s) of test case 2.3.8.5.6 shall be recorded in the DTR. The STR test case result for test case 2.3.8.5.6 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

#### ***2.1.7.3 Test Case: 2.3.8.5.8 Emergency Group Call Ruthless Preemption - No units roaming***

Role Combinations for ISSI-RFSS test: RFSS tested in the GC5, GC6, GC7 and GC8 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GC5 and GC8 roles.

Role Combinations for CSSI-Console test: Console tested in the GC6 and GC7 roles.

Test Case Details: The RFSS and SU Configurations for testing Emergency Group Call Ruthless Preemption in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 50, Figure 51, Table 120 and Table 122.

The PASS CRITERION for test step f), test step k), test step l), and test step p) of test case 2.3.8.5.8 shall be recorded in the DTR. The STR test case result for test case 2.3.8.5.8 shall be considered a 'pass' when all PASS CRITERIONS are positively verified.

Test step j) 'Release PTT on SU1 to relinquish the talk group ALPHA traffic channel assignment' should be moved after test step n).

### **2.1.8 Test Suite: Encryption**

#### ***2.1.8.1 Test Case: 2.3.10.5.1 Call Privacy for Encrypted Call***

Role Combinations for ISSI-RFSS test: RFSS tested in the GC5, GC6, GC7 and GC8 roles.

Role Combinations for CSSI-RFSS test: RFSS tested in the GC5 and GC8 roles.

Role Combinations for CSSI-Console test: Console tested in the GC6 and GC7 roles.

Test Case Details: The RFSS and SU Configurations for testing Call Privacy for Encrypted Call in the GC5, GC6, GC7 and GC8 roles are defined in [CACD-D]; see Figure 30, Figure 31, Table 120 and Table 122.

The PASS CRITERION for test step b) of test case 2.3.10.5.1 shall be recorded in the DTR. The STR test case result for test case 2.3.10.5.1 shall be considered a 'pass' when the PASS CRITERION is positively verified.

### 3 ISSI Testing Requirements for Radio Frequency Sub-System (RFSS)

#### Test Scope

[BACA-B] defines the G reference point as the interface between RFSSs. The G reference point is also referred to as the ISSI. This section requires testing over a single ISSI segment between 2 RFSSs.

The table below identifies the possible ISSI connection types when connecting 2 RFSSs over a single segment. Either ISSI connection type is valid for P25 CAP compliance testing and reporting test case results. While test case results shall be reported for at least one connection type, both connection types may be tested and reported.

**Table 13 Connection Types and Identifiers - ISSI**

ISSI Connection Type	WACN IDs	SYSTEM IDs
Inter-WACN	Different	Does not Matter
Inter-System	Same	Different

#### RFSS Test Requirements for FDMA Voice Services over ISSI

The RFSS-under-test shall be tested for interoperability in accordance with [CACD-D] and with additional test details found in Section 2 of this document.

Mobile subscriber units used for testing shall comply with Section 2.4 of this document. Subscriber units used for testing shall be capable of displaying the Talking Party Identification. These test cases have test steps with a PASS CRITERION asking that the Talking Party Identification of the transmitting subscriber unit be verified on the displays of the receiving subscriber units used during the test.

The RFSS-under-test shall be tested using the test suites / test cases shown in Table 14. If the RFSS supporting the testing was not capable of supporting a test case, and therefore the test case was not performed, the testing limitation shall be noted (Not Tested) in the STR and on the SDOC for the RFSS-under-test.

FDMA voice services testing of the ISSI shall use a full rate vocoder for the SU that initiates testing in the RFSS under test or the RFSS supporting the testing. A full rate vocoder shall be used by the ISSI. The SU that receives the call from either the RFSS under test or the RFSS that supports the test shall receive a full rate vocoder transmission.

P25 CAP has defined certain test cases as 'Required PASS' test cases. 'Required PASS' means that the test case results shall be a PASS if the equipment is to be considered P25 CAP Compliant. Only P25 CAP Compliant equipment will be posted as 'Approved (Grant Eligible) Equipment on the P25 CAP webpage. These test cases have been noted with double asterisk (\*\*) in Table 14.

There is a 'unit to unit call with availability check' test case and a 'unit to unit call without availability check' test case. One of these two test cases shall have a 'PASS' test case result. The manufacturer can choose which test case or test both. These two test cases are noted with a triple asterisk (\*\*\*) in Table 14.

The 'test suites/test cases' are found in [CACD-D].

If a manufacturer does not offer the functionality to support one or more of the ‘Required PASS’ test cases, please see Section 6 of this test requirements CAB.

**Table 14. RFSS FDMA Interoperability Test Cases over ISSI**

Test Suite Test Case	RFSS FDMA Interoperability Test Cases over ISSI
<b>2.3.1</b>	<b>Unit Registration<sup>1</sup></b>
2.3.1.5.1	** Valid Registration
2.3.1.5.2	** Denied or Refused Registration
2.3.1.5.6	** SU Roamed Procedure (from serving to home)
<b>2.3.2</b>	<b>Group Voice Call<sup>2</sup></b>
2.3.2.5.2	Group Call Granted – Unconfirmed – No Units Roaming
2.3.2.5.6	** Confirmed Group Call Granted after RF Resources Become Available – No Units Roaming
2.3.2.5.7	** Group Call Denied – All Units Roaming and No Units Roaming <sup>3</sup>
<b>2.3.3</b>	<b>Unit-to-Unit Voice Call<sup>4</sup></b>
2.3.3.5.1	*** Unit-to-Unit Call with Target Availability Check
2.3.3.5.5	*** Unit-to-Unit Call without Target Availability Check
2.3.3.5.7	** Unit-to-Unit Call Denied
<b>2.3.4</b>	<b>Broadcast Call<sup>2</sup></b>
2.3.4.5.2	** Broadcast Call Granted – No Units Roaming
<b>2.3.5</b>	<b>Talk Group Registration<sup>5</sup></b>
2.3.5.5.2	** Subscriber Unit Permitted to Affiliate with New Talk Group – No Units Roaming
2.3.5.5.4	** Subscriber Unit Denied Affiliation to New Group – No Units Roaming
<b>2.3.6</b>	<b>Announcement Group Call<sup>2</sup></b>
2.3.6.5.2	** Announcement Group Call – No Units Roaming
<b>2.3.8</b>	<b>Emergency Group Call<sup>2</sup></b>
2.3.8.5.2	** Emergency Group Call – No Units Roaming
2.3.8.5.6	** Emergency Group Call request queued – No Units Roaming
2.3.8.5.8	** Emergency call request ruthless preemption – No Units Roaming
<b>2.3.10.5</b>	<b>Encryption<sup>2</sup></b>
2.3.10.5.1	** Call Privacy for Encrypted Call

<sup>1</sup> Test cases in test suite shall be run utilizing role combinations UR1 and UR2

<sup>2</sup> Test cases in the test suite shall be run utilizing role combinations GC5, GC6, GC7 and GC8 except for test case 2.3.2.5.7; see footnote 3

<sup>3</sup> Test case shall be run utilizing role combinations GC7 and GC8

<sup>4</sup> Test cases in the test suite shall be run utilizing role combinations U2U13 and U2U14

<sup>5</sup> Test cases in the test suite shall be run utilizing role combinations GR1 and GR2

### RFSS Test requirements for TDMA Voice Services over ISSI

The RFSS-under-test shall be tested for interoperability in accordance with [CACD-D] and with additional test details found in Section 2 of this document.

Mobile subscriber units used for testing shall comply with Section 2.4 of this document. Subscriber units used for testing shall be capable of displaying the Talking Party Identification. These test cases have test steps with a PASS CRITERION asking that the Talking Party Identification of the transmitting subscriber unit be verified on the displays of the receiving subscriber units used during the test.

The RFSS-under-test shall be tested using the test suites / test cases shown in Table 15. If the RFSS supporting the testing was not capable of supporting a test case, and therefore the test case was not performed, the testing limitation shall be noted (Not Tested) in the STR and on the SDOC for RFSS-under-test.

TDMA voice services testing of the ISSI shall use a half rate vocoder for the SU that initiates testing for the RFSS under test or the RFSS supporting the testing. A half rate vocoder shall be used by the ISSI. The SU that receives the call from either the RFSS under test or the RFSS that supports the test shall receive a half rate vocoder transmission. P25 CAP has defined certain test cases as ‘Required PASS’ test cases. ‘Required PASS’ means that the test case results shall be a PASS if the equipment is to be considered P25 CAP Compliant. Only P25 CAP Compliant equipment will be posted as ‘Approved (Grant Eligible) Equipment on the P25 CAP webpage. These test cases have been noted with double asterisk (\*\*) in Table 15.

There is a ‘unit to unit call with availability check’ test case and a ‘unit to unit call without availability check’ test case. One of these two test cases shall have a ‘PASS’ test case result. The manufacturer can choose which test case or test both. These two test cases are noted with a triple asterisk (\*\*\*) in Table 15.

The ‘test suites/test cases’ are found in [CACD-D].

If a manufacturer does not offer the functionality to support one or more of the ‘Required PASS’ test cases, please see Section 6 of this test requirements CAB.

**Table 15. RFSS TDMA Interoperability Test Cases over ISSI**

Test Suite Test Case	RFSS TDMA Interoperability Test Cases over ISSI
<b>2.3.1</b>	<b>Unit Registration<sup>1</sup></b>
2.3.1.5.1	** Valid Registration
<b>2.3.2</b>	<b>Group Voice Call<sup>2</sup></b>
2.3.2.5.2	Group Call Granted – Unconfirmed – No Units Roaming
2.3.2.5.6	** Confirmed Group Call Granted after RF Resources Become Available – No Units Roaming
<b>2.3.3</b>	<b>Unit-to-Unit Voice Call<sup>4</sup></b>



Test Suite Test Case	RFSS TDMA Interoperability Test Cases over ISSI
2.3.3.5.1	*** Unit-to-Unit Call with Target Availability Check
2.3.3.5.5	*** Unit-to-Unit Call without Target Availability Check
<b>2.3.4</b>	<b>Broadcast Call<sup>2</sup></b>
2.3.4.5.2	** Broadcast Call Granted – No Units Roaming
<b>2.3.5</b>	<b>Talk Group Registration<sup>5</sup></b>
2.3.5.5.2	** Subscriber Unit Permitted to Affiliate with New Talk Group – No Units Roaming
<b>2.3.6</b>	<b>Announcement Group Call<sup>2</sup></b>
2.3.6.5.2	** Announcement Group Call – No Units Roaming
<b>2.3.8</b>	<b>Emergency Group Call<sup>2</sup></b>
2.3.8.5.2	** Emergency Group Call – No Units Roaming
2.3.8.5.6	** Emergency Group Call request queued – No Units Roaming
2.3.8.5.8	** Emergency call request ruthless preemption – No Units Roaming
<b>2.3.10.5</b>	<b>Encryption<sup>2</sup></b>
2.3.10.5.1	** Call Privacy for Encrypted Call

## 4 CSSI Testing Requirements for Radio Frequency Sub-System (RFSS)

### Test Scope

[BACA-B] defines the Ec reference point as the interface between RFSS equipment and Console equipment. ‘Console equipment’ may be either be a console based on CSS equipment or a console integrated with RFSS equipment. The term ‘Console’ will be used when referring to requirements for both types of consoles. The Ec reference point is also referred to as the CSSI.

This section requires testing over a single CSSI segment between RFSS equipment and Console equipment. The table below identifies the possible CSSI connection types when connecting RFSS equipment and Console equipment over a single segment. Any one of the three CSSI connection types is valid for P25 CAP compliance testing and reporting test case results. While test case results shall be reported for at least one connection type, all connection types may be tested and reported.

**Table 16. Connection Types and Identifiers - CSSI**

CSSI Connection Type	WACN IDs	SYSTEM IDs	RFSS IDs
Inter-WACN	Different	Does not Matter	Does not Matter
Inter-System	Same	Different	Does not Matter
Intra-System	Same	Same	Different

## RFSS Test Requirements for FDMA Voice Services over CSSI

RFSS-under-test shall be tested for interoperability in accordance with [CACD-D] and with additional test details found in Section 2 of this document.

Mobile subscriber units and console subscriber units used for testing shall comply with Section 2.4 of this document. Subscriber units used for testing shall be capable of displaying the Talking Party Identification. These test cases have test steps with a PASS CRITERION asking that the Talking Party Identification of the transmitting subscriber unit be verified on the displays of the receiving subscriber units used during the test.

The RFSS-under-test shall be tested using the test suites / test cases shown in Table 17. If the Console supporting the testing was not capable of supporting a test case, and therefore the test case was not performed, the testing limitation shall be noted (Not Tested) in the STR and on the SDOC for the RFSS-under-test.

FDMA voice services testing of the CSSI shall use a full rate vocoder for the SU that initiates testing in the RFSS under test or the CSU that initiates testing in the RFSS/Console supporting the test. A full rate vocoder shall be used by the CSSI. The SU that receives the call in the RFSS under test or the CSU that receives the call in RFSS/Console that supports the test shall receive a full rate vocoder transmission.

P25 CAP has defined certain test cases as ‘Required PASS’ test cases. ‘Required PASS’ means that the test case results shall be a PASS if the equipment is to be considered P25 CAP Compliant. Only P25 CAP Compliant equipment will be posted as ‘Approved (Grant Eligible) Equipment on the P25 CAP webpage. These test cases have been noted with double asterisk (\*\*\*) in Table 17.

There is a ‘unit to unit call with availability check’ test case and a ‘unit to unit call without availability check’ test case. One of these two test cases shall have a ‘PASS’ test case result. The manufacturer can choose which test case or test both. These two test cases are noted with a triple asterisk (\*\*\*) in Table 17.

The ‘test suites/test cases’ are found in [CACD-D].

If a manufacturer does not offer the functionality to support one or more of the ‘Required PASS’ test cases, please see Section 6 of this test requirements CAB.

**Table 17. RFSS FDMA Interoperability Test Cases over CSSI**

Test Suite Test Case	RFSS FDMA Interoperability Test Cases over CSSI
<b>2.3.2</b>	<b>Group Voice Call<sup>6</sup></b>
2.3.2.5.2	Group Call Granted – Unconfirmed – No Units Roaming
2.3.2.5.6	** Confirmed Group Voice Call Granted After RF Resources Become Available - No Units Roaming <sup>7</sup>

<sup>6</sup> Test cases in the test suite in shall be run utilizing role combinations GC5 and GC8 except for test case 2.3.2.5.7; see footnote 8

<sup>7</sup> GC5 is not applicable when the equipment supporting the test is a CSS because a CSS has no RF resources.

Test Suite Test Case	RFSS FDMA Interoperability Test Cases over CSSI
2.3.2.5.7	** Group Call Denied – <del>All Units Roaming</del> and No Units Roaming <sup>8</sup>
2.3.2.5.12	** Group call interrupt (Dispatcher Audio Takeover) – No Units Roaming
<b>2.3.3</b>	<b>Unit-to-Unit Voice Call<sup>9</sup></b>
2.3.3.5.1	*** Unit-to-Unit Call with Target Availability Check
2.3.3.5.5	*** Unit-to-Unit Call without Target Availability Check
2.3.3.5.7	** Unit-to-Unit Call Denied
<b>2.3.4</b>	<b>Broadcast Call<sup>6</sup></b>
2.3.4.5.2	** Broadcast Call Granted – No Units Roaming
<b>2.3.5</b>	<b>Talk Group Registration<sup>10</sup></b>
2.3.5.5.2	** Subscriber Unit Permitted to Affiliate with New Talk Group – No Units Roaming
2.3.5.5.4	** Subscriber Unit Denied Affiliation to New Group – No Units Roaming
<b>2.3.6</b>	<b>Announcement Group Call<sup>6</sup></b>
2.3.6.5.2	** Announcement Group Call – No Units Roaming
<b>2.3.8</b>	<b>Emergency Group Call<sup>6</sup></b>
2.3.8.5.2	** Emergency Group Call – No Units Roaming
2.3.8.5.6	** Emergency Group Call request queued – No Units Roaming <sup>7</sup>
2.3.8.5.8	** Emergency call request ruthless preemption – No Units Roaming <sup>7</sup>
<b>2.3.10</b>	<b>Encryption<sup>6</sup></b>
2.3.10.5.1	Call Privacy for Encrypted Call

### RFSS Test Requirements for TDMA Voice Services over CSSI

The RFSS-under-test shall be tested for interoperability in accordance with [CACD-D] and with additional test details found in Section 2 of this document.

Mobile subscriber units and console subscriber units used for testing shall comply with Section 2.4 of this document. Subscriber units used for testing shall be capable of displaying the Talking Party Identification. These test cases have test steps with a PASS CRITERION asking that the Talking Party Identification of the transmitting subscriber unit be verified on the displays of the receiving subscriber units used during the test.

The RFSS-under-test shall be tested using the test suites / test cases shown in Table 18. If the Console equipment supporting the testing was not capable of supporting a test case, and therefore the test case

<sup>8</sup> Test case shall be run utilizing role combination GC8

<sup>9</sup> Test cases in the test suite shall be run utilizing role combinations U2U3 and U2U4. When testing with the U2U3 role and a CSS, it is acceptable to have the RFSS under test be the group home.

<sup>10</sup> Test cases in the test suite shall be run utilizing role combination GR2

was not performed, the testing limitation shall be noted (Not Tested) in the STR and on the SDOC for the RFSS-under-test.

TDMA voice services testing of the CSSI shall use a half rate vocoder for the SU that initiates testing in the RFSS under test or the CSU that initiates testing in the RFSS/Console supporting the test. A half rate vocoder shall be used by the CSSI. The SU that receives the call in the RFSS under test or the CSU that receives the call in RFSS/Console that supports the test shall receive a half rate vocoder transmission. P25 CAP has defined certain test cases as ‘Required PASS’ test cases. ‘Required PASS’ means that the test case results shall be a PASS if the equipment is to be considered P25 CAP Compliant. Only P25 CAP Compliant equipment will be posted as ‘Approved (Grant Eligible) Equipment on the P25 CAP webpage. These test cases have been noted with double asterisk (\*\*) in Table 18.

There is a ‘unit to unit call with availability check’ test case and a ‘unit to unit call without availability check’ test case. One of these two test cases shall have a ‘PASS’ test case result. The manufacturer can choose which test case or test both. These two test cases are noted with a triple asterisk (\*\*\*) in Table 18.

The ‘test suites/test cases’ are found in [CACD-D].

If a manufacturer does not offer the functionality to support one or more of the ‘Required PASS’ test cases, please see Section 6 of this test requirements CAB.

**Table 18. RFSS TDMA Interoperability Test Cases over CSSI**

Test Suite Test Case	RFSS TDMA Interoperability Test Cases over CSSI
<b>2.3.2</b>	<b>Group Voice Call<sup>6</sup></b>
2.3.2.5.2	Group Call Granted – Unconfirmed – No Units Roaming
2.3.2.5.6	** Confirmed Group Voice Call Granted After RF Resources Become Available - No Units Roaming <sup>7</sup>
2.3.2.5.12	** Group call interrupt (Dispatcher Audio Takeover) – No Units Roaming
<b>2.3.3</b>	<b>Unit-to-Unit Voice Call<sup>9</sup></b>
2.3.3.5.1	*** Unit-to-Unit Call with Target Availability Check
2.3.3.5.5	*** Unit-to-Unit Call without Target Availability Check
<b>2.3.4</b>	<b>Broadcast Voice Call<sup>6</sup></b>
2.3.4.5.2	** Broadcast Call Granted – No Units Roaming
<b>2.3.5</b>	<b>Talk Group Registration<sup>10</sup></b>
2.3.5.5.2	** Subscriber Unit Permitted to Affiliate with New Talk Group – No Units Roaming
<b>2.3.6</b>	<b>Announcement Group Call<sup>6</sup></b>
2.3.6.5.2	** Announcement Group Call – No Units Roaming
<b>2.3.8</b>	<b>Emergency Group Call<sup>6</sup></b>
2.3.8.5.2	** Emergency Group Call – No Units Roaming
2.3.8.5.6	** Emergency Group Call request queued – No Units Roaming <sup>7</sup>

<b>Test Suite</b> Test Case	<b>RFSS TDMA Interoperability Test Cases over CSSI</b>
2.3.8.5.8	** Emergency call request ruthless preemption – No Units Roaming <sup>7</sup>
<b>2.3.10</b>	<b>Encryption<sup>6</sup></b>
2.3.10.5.1	** Call Privacy for Encrypted Call

## 5 CSSI Testing Requirements for Consoles

### Test Scope

[BACA-B] defines the Ec reference point as the interface between Console equipment and RFSS equipment. ‘Console equipment’ may be either be a console based on CSS equipment or a console integrated with RFSS equipment. The term ‘Console’ will be used when referring to requirements for both types of consoles. The Ec reference point is also referred to as the CSSI.

This section requires testing over a single CSSI segment between Console equipment and RFSS equipment. The table below identifies the possible CSSI connection types when connecting Console equipment and RFSS equipment over a single segment. Any one of the three CSSI connection types is valid for P25 CAP compliance testing and reporting test case results. While test case results shall be reported for at least one connection type, all connection types may be tested and reported.

**Table 19. Connection Types and Identifiers - CSSI**

CSSI Connection Type	WACN IDs	SYSTEM IDs	RFSS IDs
Inter-WACN	Different	Does not Matter	Does not Matter
Inter-System	Same	Different	Does not Matter
Intra-System	Same	Same	Different

### Console Test Requirements for FDMA Voice Services over CSSI

The Console-under-test shall be tested for interoperability in accordance with [CACD-D] and with additional test details found in Section 2 of this document.

Mobile subscriber units and console subscriber units used for testing shall comply with Section 2.4 of this document. Subscriber units used for testing shall be capable of displaying the Talking Party Identification. These test cases have test steps with a PASS CRITERION asking that the Talking Party Identification of the transmitting subscriber unit be verified on the displays of the receiving subscriber units used during the test.

The Console-under-test shall be tested using the test suites / test cases shown in Table 20. If the RFSS supporting the testing was not capable of supporting a test case, and therefore the test case was not

performed, the testing limitation shall be noted (Not Tested) in the STR and on the SDOC for the Console-under-test.

FDMA voice services testing of the CSSI shall use a full rate vocoder for the CSU that initiates testing in the Console under test or the SU that initiates testing in the RFSS supporting the test. A full rate vocoder shall be used by the CSSI. The CSU that receives the call in the Console under test or the SU that receives the call in RFSS that supports the test shall receive a full rate vocoder transmission. P25 CAP has defined certain test cases as ‘Required PASS’ test cases. ‘Required PASS’ means that the test case results shall be a PASS if the equipment is to be considered P25 CAP Compliant. Only P25 CAP Compliant equipment will be posted as ‘Approved (Grant Eligible) Equipment on the P25 CAP webpage. These test cases have been noted with double asterisk (\*\*) in Table 20.

There is a ‘unit to unit call with availability check’ test case and a ‘unit to unit call without availability check’ test case. One of these two test cases shall have a ‘PASS’ test case result. The manufacturer can choose which test case or test both. These two test cases are noted with a triple asterisk (\*\*\*) in Table 20.

The ‘test suites/test cases’ are found in [CACD-D].

If a manufacturer does not offer the functionality to support one or more of the ‘Required PASS’ test cases, please see Section 6 of this test requirements CAB.

**Table 20. Console FDMA Interoperability Test Cases over CSSI**

<b>Test Suite Test Case</b>	<b>Console FDMA Interoperability Test Cases over CSSI</b>
<b>2.3.2</b>	<b>Group Voice Call<sup>11</sup></b>
2.3.2.5.2	Group Call Granted – Unconfirmed – No Units Roaming
2.3.2.5.6	** Confirmed Group Voice Call Granted After RF Resources Become Available - No Units Roaming <sup>12</sup>
2.3.2.5.7	** Group Call Denied – <del>All Units Roaming</del> and No Units Roaming <sup>13</sup>
2.3.2.5.12	** Group call interrupt (Dispatcher Audio Takeover) – No Units Roaming <sup>14</sup>
<b>2.3.3</b>	<b>Unit-to-Unit Voice Call<sup>9</sup></b>
2.3.3.5.1	*** Unit-to-Unit Call with Target Availability Check
2.3.3.5.5	*** Unit-to-Unit Call without Target Availability Check
2.3.3.5.7	** Unit-to-Unit Call Denied
<b>2.3.4</b>	<b>Broadcast Call<sup>11</sup></b>
2.3.4.5.2	** Broadcast Call Granted – No Units Roaming

<sup>11</sup> Test cases in the test suite shall be run utilizing role combinations GC6 and GC7 except for test case 2.3.2.5.7; see footnote 13

<sup>12</sup> GC6 is not applicable when the equipment under test is a CSS because as CSS has no RF resources.

<sup>13</sup> Test case shall be run utilizing role combination GC7

<sup>14</sup> Use GC8 instead of GC7 for this test case.

Test Suite Test Case	Console FDMA Interoperability Test Cases over CSSI
<b>2.3.5</b>	<b>Talk Group Registration<sup>15</sup></b>
2.3.5.5.2	** Subscriber Unit Permitted to Affiliate with New Talk Group – No Units Roaming
2.3.5.5.4	** Subscriber Unit Denied Affiliation to New Group – No Units Roaming
<b>2.3.6</b>	<b>Announcement Group Call<sup>11</sup></b>
2.3.6.5.2	** Announcement Group Call – No Units Roaming
<b>2.3.8</b>	<b>Emergency Group Call<sup>11</sup></b>
2.3.8.5.2	** Emergency Group Call – No Units Roaming
2.3.8.5.6	** Emergency Group Call request queued – No Units Roaming
2.3.8.5.8	** Emergency call request ruthless preemption – No Units Roaming
<b>2.3.10</b>	<b>Encryption<sup>11</sup></b>
2.3.10.5.1	** Call Privacy for Encrypted Call

### Console Test Requirements for TDMA Voice Services over CSSI

The Console-under-test shall be tested for interoperability in accordance with [CACD-D] and with additional test details found in Section 2 of this document.

Mobile subscriber units and console subscriber units used for testing shall comply with Section 2.4 of this document. Subscriber units used for testing shall be capable of displaying the Talking Party Identification. These test cases have test steps with a PASS CRITERION asking that the Talking Party Identification of the transmitting subscriber unit be verified on the displays of the receiving subscriber units used during the test.

The Console-under-test shall be tested using the test suites / test cases shown in Table 21. If the RFSS supporting the testing was not capable of supporting a test case, and therefore the test case was not performed, the testing limitation shall be noted (Not Tested) in the STR and on the SDOC for the Console-under-test.

TDMA voice services testing of the CSSI shall use a half rate vocoder for the CSU that initiates testing in the Console under test or the SU that initiates testing in the RFSS supporting the test. A half rate vocoder shall be used by the CSSI. The CSU that receives the call in the Console under test or the SU that receives the call in RFSS that supports the test shall receive a half rate vocoder transmission. P25 CAP has defined certain test cases as 'Required PASS' test cases. 'Required PASS' means that the test case results shall be a PASS if the equipment is to be considered P25 CAP Compliant. Only P25 CAP Compliant equipment will be posted as 'Approved (Grant Eligible) Equipment on the P25 CAP webpage. These test cases have been noted with double asterisk (\*\*) in Table 21.

<sup>15</sup> Test cases in the test suite shall be run utilizing role combination GR1.

There is a ‘unit to unit call with availability check’ test case and a ‘unit to unit call without availability check’ test case. One of these two test cases shall have a ‘PASS’ test case result. The manufacturer can choose which test case or test both. These two test cases are noted with a triple asterisk (\*\*\*) in Table 21.

The ‘test suites/test cases’ are found in [CACD-D].

If a manufacturer does not offer the functionality to support one or more of the ‘Required PASS’ test cases, please see Section 6 of this test requirements CAB.

**Table 21. Console TDMA Interoperability Test Cases over CSSI**

Test Suite Test Case	Console TDMA Interoperability Test Cases over CSSI
<b>2.3.2</b>	<b>Group Voice Call<sup>11</sup></b>
2.3.2.5.2	Group Call Granted – Unconfirmed – No Units Roaming
2.3.2.5.6	** Confirmed Group Voice Call Granted After RF Resources Become Available - No Units Roaming <sup>12</sup>
2.3.2.5.12	** Group call interrupt (Dispatcher Audio Takeover) – No Units Roaming <sup>14</sup>
<b>2.3.3</b>	<b>Unit-to-Unit Voice Call<sup>9</sup></b>
2.3.3.5.1	*** Unit-to-Unit Call with Target Availability Check
2.3.3.5.5	*** Unit-to-Unit Call without Target Availability Check
<b>2.3.4</b>	<b>Broadcast Voice Call<sup>11</sup></b>
2.3.4.5.2	** Broadcast Call Granted – No Units Roaming
<b>2.3.5</b>	<b>Talk Group Registration<sup>15</sup></b>
2.3.5.5.2	** Subscriber Unit Permitted to Affiliate with New Talk Group – No Units Roaming
<b>2.3.6</b>	<b>Announcement Group Call<sup>11</sup></b>
2.3.6.5.2	** Announcement Group Call – No Units Roaming
<b>2.3.8</b>	<b>Emergency Group Call<sup>11</sup></b>
2.3.8.5.2	** Emergency Group Call – No Units Roaming
2.3.8.5.6	** Emergency Group Call request queued – No Units Roaming
2.3.8.5.8	** Emergency call request ruthless preemption – No Units Roaming
<b>2.3.10</b>	<b>Encryption<sup>11</sup></b>
2.3.10.5.1	** Call Privacy for Encrypted Call

## 6 Waivers

DHS S&T will accept requests for ‘Required PASS’ test cases waivers when the manufacturer has not developed the ISSI functionality to support the test case and the manufacturer does not offer a similar non-P25 feature in place of the P25 Standard feature.



The manufacturer is required to submit the waiver request via email to [P25CAP@hq.dhs.gov](mailto:P25CAP@hq.dhs.gov). The email shall list the requested test cases to be waived, the reason for the waiver request and manufacturer attestation the manufacturer does not offer a similar non-P25 feature in place of the P25 Standard feature.

Once the waiver has been provided, the manufacturer may submit the SDOC and STR for the equipment indicating 'Unsupported' status for the test cases that were waived. After the SDOC and STR are submitted, reviewed and accepted by DHS S&T, the SDOC will be posted on the P25 CAP website and the STR be made available to email requests.