NXDN®

NXDN Technical Specifications

Part 2:
Conformance Test

Sub-part D:
Trunking Operation Test (Type-C)

NXDN TS 2-D Version 1.1

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NXDN Forum

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1. Introduction

This document provides the procedures and determination criteria of interoperability testing in Type-C trunked system for the trunking operation of the radio equipment which is designed in conformity with the NXDN Air Interface specifications.

This interoperability testing enables verification of interoperability among radio equipments manufactured by different manufacturers, or among different radio equipments manufactured by the same manufacturer, or of radio equipment of which the firmware is updated.

Defining test items for all of functions and conditions defined in the Air Interface specifications results in an enormous amount of documents and is unrealistic. Additionally defining the test procedures and related determination criteria for the system dependent functions is difficult. Hence, test items presented in this document do not contain all of functions and conditions and are limited to the scope that enables guarantee of a minimum interoperability. As well as conducting test items described in this document, it is recommended that every radio manufacturer verifies that radio equipments including items undefined by this document are in conformity with the NXDN specifications by conducting more detailed testing by referring to the Air Interface specifications.

The Common Air Interface Test as presented in REF [3] shall take place prior to this testing.

2. References

Reference documents are listed below.

REF [1]	Part 1-A Common Air Interface	Version 1.3
REF [2]	Part 1-C Trunking Procedures	Version 1.3
REF [3]	Part 2-B Common Air Interface Test	Version 1.1
REF [4]	Part 2-C Basic Operation Test	Version 1.2

3. Abbreviations

To help understand this document, abbreviations are listed below.

CAC	Common Access Channel
CAI	Common Air Interface
EFR	Enhanced Full Rate
EHR	Enhanced Half Rate
FACCH1	Fast Associated Control Channel 1
FACCH2	Fast Associated Control Channel 2
FSW	Frame Sync Word
LICH	Link Information Channel
Long CAC	Long Common Access Channel
RU	Repeater Unit
SACCH	Slow Associated Control Channel
Short CAC	Short Common Access Channel
SU	Subscriber Unit
TC	Trunking Controller
TR	Trunking Repeater
TRS	Trunking Repeater Site
VCH	Voice Channel

4. Outline

There are two types of test methods available for interoperability testing of trunking operation as below:

Method 1: A method where an SU (or a TR) to be tested is tested by an interoperability tester

Method 2: A method where a testing takes place between an SU and TR

Method 1 is a test method using an interoperability tester. By verifying that the unit under test conforms to the specifications specified in Common Air Interface of the REF [1] and in Trunking Procedures of the REF [2], method 1 indirectly verifies that the unit under test has interoperability with other radio equipment which also conforms to the specifications.

Method 2 is a test method under the actual operation condition. This method allows testing without using an interoperability tester required by Method 1. If neither SU nor TR that has been verified in accordance with this document is available, both SU and TR shall be treated as units under test. Therefore, in the event that any test item fails, it is essential to specify which has nonconformity, either SU or TR. Also, even if a test item passes, it is necessary to fully verify that both SU and TR are in conformity with the specifications specified in REF [1] and REF [2].

A configuration diagram for testing is described in the configuration for Method 1; however, unless otherwise specified, either of two test methods can be employed. Configuration of an interoperability tester is not specified in this document; hence, the configuration shall be prepared using an appropriate method by the respective manufacturer that performs the test.

5. Test Procedures

In this section, test methods and judging criterions are presented.

Test methods for all functions are not described in this document. Functions not specified in this document shall be tested by the respective manufacturer using an appropriate test method.

Each test method shall verify that the contents of messages exchanged between an SU and TR are correct and the SU and TR behave according to proper procedure upon transmit or receipt of these messages. Furthermore, testing for random access behavior is done in accordance with Section 5.1.26 and Section 5.2.19 to verify that the contents of the collision control field are correct and an SU behaves correctly in accordance with the contents.

A way of checking the data string of the layer 3 message and of the collision control field is not specified in this document. For example, it can be verified by outputting the received log data from a unit under test or interoperability tester, or by preparing a monitoring receiver which can receive both inbound signals from the unit under test and outbound signals from the interoperability tester.

Unless otherwise specified, the receive signal input level of the unit under test shall be -47 dBm or shall be equal to a significantly high level.

In the case of voice call, the unit under test shall be tested at 4800 bps/EHR, 9600 bps/EHR and/or 9600 bps/EFR in accordance with the mode implemented in it.

In other cases, the unit under test shall be tested at 4800 bps and/or 9600 bps in accordance with the modes implemented in it.
The data string is, in principle, described in the hexadecimal format; however, the letter “b” shall be suffixed in the case that the data string is described in the binary format.
In the transmit sequence of a data string, transmission begins with the leftmost value, and the rightmost value is sent at the end.
The setting values of Source ID and Destination ID used by tests are not defined in particular, so they can be selected in the range specified in REF [1].
A Tone Test Pattern or actual audio signals can be applied to the voice signals to be used for voice call testing. Contents of User Data to be used for data call testing are arbitrary.
An interoperability tester shall send a broadcast message such as SITE_INFO message, etc. to put an SU in the idle state. Unless otherwise specified, a Location ID to be used in a SITE_INFO message, etc. shall be configured as below:

Category = 01b (Local)
System Code = 1
Site Code = 1

Frame Structure of RCCH is arbitrary.

5.1. SU Testing

5.1.1. Group Voice Call Test

This test shall verify that contents of messages used for Group Voice Call are correct, that the unit under test correctly responds to these messages, and that a receiving unit outputs normal received audio signal.

This test includes the test methods for the following two modes:

(1) Conference Group Call

(2) Broadcast Group Call

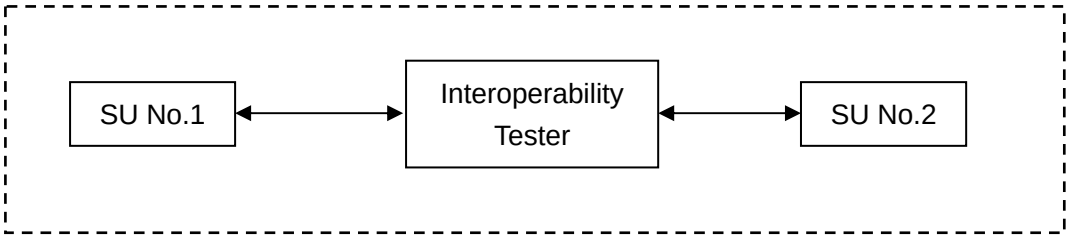

Figure 5.1-1 Configuration for Group Voice Call Test

Figure 5.1-1 shows the configuration diagram for testing. SU No. 1 and SU No. 2 shall be tested as the calling unit and the called unit respectively. The following 7 types of messages shall be applied.

Table 5.1-1: VCALL_REQ message for SU

Table 5.1-2: VCALL_RESP message for Interoperability Tester

Table 5.1-3: VCALL_ASSGN message for Interoperability Tester

Table 5.1-4: VCALL message for SU

Table 5.1-5: DISC_REQ message for SU

Table 5.1-6: DISC message for Interoperability Tester

Table 5.1-26: REG_REQ message for SU

5.1.1.1. Conference Group Call Test

In this test, parameters for messages to be used shall apply the values for Conference Group Call.

To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.1.1.1.1 and Section 5.1.1.1.2.

5.1.1.1.1. Testing the Calling SU

5.1.1.1.1.1. Case 1 - Group Call Permission

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a VCALL_REQ message as described in Table 5.1-1 is sent by switching on the PTT control of SU No. 1.

(3) Verify that SU No. 1 migrates to the specified RTCH, starts to transmit and sends a VCALL message as described in Table 5.1-4 when an interoperability tester sends a VCALL_ASSGN message as described in Table 5.1-3.
(4) Verify that SU No. 1 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH.

5.1.1.1.1.2. Case 2 – Unregistered SU

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a VCALL_REQ message as described in Table 5.1-1 is sent by switching on the PTT control of SU No. 1.
(3) Verify that SU No. 1 sends a REG_REQ message as described in Table 5.1-26 when an interoperability tester sends a VCALL_RESP message representing unregistered SU as described in Table 5.1-2.

5.1.1.1.1.3. Case 3 – Rejection by TC

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a VCALL_REQ message as described in Table 5.1-1 is sent by switching on the PTT control of SU No. 1.
(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a VCALL_RESP message as described in Table 5.1-2, which represents the calling SU is not permitted for the service.

5.1.1.1.1.4. Case 4 – Queue State

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a VCALL_REQ message as described in Table 5.1-1 is sent by switching on the PTT control of SU No. 1.
(3) Verify that SU No. 1 goes into the queue state when an interoperability tester sends a VCALL_RESP message as described in Table 5.1-2, which represents the queue when all channel resources are in use.
(4) Verify that SU No. 1 migrates to the specified RTCH, starts to transmit and sends a VCALL message as described in Table 5.1-4 when an interoperability tester sends a VCALL_ASSGN message as described in Table 5.1-3 during the queue state.

5.1.1.1.1.5. Case 5 – Interruption of Queue State

(1) Keep the SU No. 1 in the state specified in step (3) of Section 5.1.1.1.1.4.
(2) Verify that SU No. 1 sends out a DISC_REQ message as described in Table 5.1-5 is sent out upon expiration of its Ts_busy timer.
(3) Subsequently, verify that SU No. 1 goes into the idle state.

5.1.1.1.2. Testing the Called SU

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 migrates to the specified RTCH and goes into the receiving state when an interoperability tester sends a VCALL_ASSGN message as described in Table 5.1-3.

(3) Verify that SU No. 2 outputs normal received audio signal when an interoperability tester makes a voice call transmission.

(4) Verify that SU No. 2 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00 (Individual Call, Group Call, All Call) 80 (Emergency Call)		
Call Type	100b (Individual Call) 001b (Conference Group Call, All Call) 000b (Broadcast Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 1		
Destination Group/Unit ID	Valid Group ID (Group Call) FFFF as All Group (All Call) Unit ID of SU No. 2 (Individual Call)		

Table 5.1-1 VCALL_REQ Message for SU

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00 (Individual Call, Group Call, All Call) 80 (Emergency Call)		
Call Type	100b (Individual Call) 001b (Conference Group Call, All Call) 000b (Broadcast Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 2 (Individual Call) FFF0 as TC ID (Group Call/ All Call)		
Destination Unit ID	Unit ID of SU No. 1		
Cause (VD)	1C (Unregistered SU) 12 (Calling SU is not permitted for the service) 15 (No response from Called SU) 30 (Queue when all channel resources are in use) 32 (Queue when Called SU is being alerted)		

Table 5.1-2 VCALL_RESP Message for Interoperability Tester

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00 (Individual Call, Group Call, All Call) 80 (Emergency Call)		
Call Type	100b (Individual Call) 001b (Conference Group Call, All Call) 000b (Broadcast Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 1		
Destination Group/Unit ID	Valid Group ID (Group Call) FFFF as All Group (All Call) Unit ID of SU No. 2 (Individual Call)		
Call Timer	Any		
Channel	Depending on the test configuration		

Table 5.1-3 VCALL_ASSGN Message for Interoperability Tester

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00 (Individual Call, Group Call, All Call) 80 (Emergency Call)		
Call Type	100b (Individual Call) 001b (Conference Group Call, All Call) 000b (Broadcast Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 1		
Destination Group/Unit ID	Valid Group ID (Group Call) FFFF as All Group (All Call) Unit ID of SU No. 2 (Individual Call)		
Cipher Type	00b		
Key ID	000000b		

Table 5.1-4 VCALL Message for SU

CC Option	00 (Individual Call, Group Call, All Call) 80 (Emergency Call)
Call Type	100b (Individual Call) 001b (Conference Group Call, All Call) 000b (Broadcast Group Call)
Source Unit ID	Unit ID of SU No. 1
Destination Group/Unit ID	Valid Group ID (Group Call) FFFF as All Group (All Call) Unit ID of SU No. 2 (Individual Call)
Cause (DREQ)	14 (by a timer)

Table 5.1-5 DISC_REQ Message for SU

CC Option	00 (Individual Call, Group Call, All Call) 80 (Emergency Call)
Call Type	100b (Individual Call) 001b (Conference Group Call) 000b (Broadcast Group Call)
Source Unit ID	Unit ID of SU No. 1
Destination Group/Unit ID	Valid Group ID (Group Call) FFFF as All Group (All Call) Unit ID of SU No. 2 (Individual Call)
Cause (DISC)	14 (by a timer)

Table 5.1-6 DISC Message for Interoperability Tester

5.1.1.2. Broadcast Group Call Test

In this test, parameters for messages to be used shall apply the values for Broadcast Group Call.

Tests for the calling SU shall be identical to those specified in Section 5.1.1.1.1 and tests for the called SU shall be identical to those specified in Section 5.1.1.1.2.

To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.1.1.1.1 and Section 5.1.1.1.2.

5.1.2. Individual Voice Call Test

This test shall verify that contents of messages used for Individual Voice Call are correct that the unit under test correctly responds to these messages, and that a receiving unit outputs normal received audio signal.

This test includes the test methods for the following three modes. To verify the interoperability, a unit under test shall pass the test item for at least one of procedure (1) to procedure (3).

(1) In the case that the availability of the called SU is not verified and a voice call transmission on an RTCH is started from the calling SU

(2) In the case that the availability of the called SU is verified and a voice call transmission on an RTCH is started from the calling SU

(3) In the case that the availability of the called SU is verified and a voice call transmission on an RTCH is started from the called SU

Figure 5.1-1 shows the configuration diagram for testing. SU No. 1 and SU No. 2 shall be tested as the calling unit and the called unit respectively. The following 11 types of messages shall be applied.

Table 5.1-1: VCALL_REQ message for SU

Table 5.1-2: VCALL_RESP message for Interoperability Tester

Table 5.1-3: VCALL_ASSGN message for Interoperability Tester

Table 5.1-4: VCALL message for SU

Table 5.1-5: DISC_REQ message for SU

Table 5.1-6: DISC message for Interoperability Tester

Table 5.1-7: VCALL_REC_REQ message for Interoperability Tester
Table 5.1-8: VCALL_REC_RESP message for SU No. 2
Table 5.1-9: VCALL_CONN_REQ message for SU No. 2
Table 5.1-10: VCALL message for SU No. 2
Table 5.1-26: REG_REQ message for SU

Values for Individual Call shall be applied to parameters for each Table.

5.1.2.1. Individual Call Test 1

To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.2.1.1.1 and Section 5.1.2.1.2.

5.1.2.1.1. Testing the Calling SU

5.1.2.1.1.1. Case 1 – Individual Call Permission
5.1.2.1.1.2. Case 2 – Unregistered SU
5.1.2.1.1.3. Case 3 – Rejection by TC
5.1.2.1.1.4. Case 4 – Queue State
5.1.2.1.1.5. Case 5 – Interruption of Queue State

Testing Procedures for these five cases shall be identical to those tests for Conference Group Call as described in Section 5.1.1.1.1.

5.1.2.1.2. Testing the Called SU

Testing Procedures shall be identical to those tests for Conference Group Call as described in Section 5.1.1.1.2.

5.1.2.2. Individual Call Test 2

To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.2.2.1.1 and Section 5.1.2.2.2.1.

5.1.2.2.1. Testing the Calling SU

5.1.2.2.1.1. Case 1 – Individual Call Permission
5.1.2.2.1.2. Case 2 – Unregistered SU
5.1.2.2.1.3. Case 3 – Rejection by TC
5.1.2.2.1.4. Case 4 – Queue State
5.1.2.2.1.5. Case 5 – Interruption of Queue State

Testing Procedures for these five cases shall be identical to those tests for Conference Group Call as described in Section 5.1.1.1.1.

5.1.2.2.1.6. Case 6 – No Response from Called SU

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a VCALL_REQ message as described in Table 5.1-1 is sent by switching on the PTT control of SU No. 1.
(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a VCALL_RESP message as described in Table 5.1-2, which represents no response from the called SU.

5.1.2.2.2. Testing the Called SU

5.1.2.2.2.1. Case 1 – Incoming Call Permission

(1) Turn the SU No. 2 ON and keep it in the idle state.
(2) Verify that SU No. 2 sends a VCALL_REC_RESP message representing normal acceptance as described in Table 5.1-8 when an interoperability tester sends a VCALL_REC_REQ message as described in Table 5.1-7.
(3) Verify that SU No. 2 migrates to the specified RTCH, and goes into the receiving state when an interoperability tester sends a VCALL_ASSGN message as described in Table 5.1-3.
(4) Verify that SU No. 2 outputs normal received audio signal when an interoperability tester makes a voice call transmission.
(5) Verify that SU No. 2 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH.

5.1.2.3. Individual Call Test 3

To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.2.3.1.1 and Section 5.1.2.3.2.1.

5.1.2.3.1. Testing the Calling SU

5.1.2.3.1.1. Case 1 – Individual Call Permission

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a VCALL_REQ message as described in Table 5.1-1 is sent by switching on the PTT control of SU No. 1.
(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a VCALL_RESP message as described in Table 5.1-2, which represents the queue when a called unit is being alerted.
(4) Verify that SU No. 1 migrates to the specified RTCH and goes into the receiving state when an interoperability tester sends a VCALL_ASSGN message as described in Table 5.1-3.
(5) Verify that SU No. 1 outputs normal received audio signal when an interoperability tester makes a voice call transmission.
(6) Verify that SU No. 1 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH.

5.1.2.3.1.2. Case 2 – Unregistered SU

5.1.2.3.1.3. Case 3 – Rejection by TC

5.1.2.3.1.4. Case 4 – Queue State

5.1.2.3.1.5. Case 5 – Interruption of Queue State

5.1.2.3.1.6. Case 6 – No Response from Called SU

Testing Procedures for these five cases shall be identical to those tests for Individual Call Test 2 as described in Section 5.1.2.2.1.

5.1.2.3.2. Testing the Called SU

5.1.2.3.2.1. Case 1 – Incoming Call Permission

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 sends a VCALL_REC_RESP message representing normal acceptance as described in Table 5.1-8 when an interoperability tester sends a VCALL_REC_REQ message as described in Table 5.1-7.

(3) Verify that a VCALL_CONN_REQ message as described in Table 5.1-9 is sent by switching on the PTT control of SU No. 2.

(4) Verify that SU No. 2 migrates to the specified RTCH, starts to transmit and sends a VCALL message as described in Table 5.1-10 when an interoperability tester sends a VCALL_ASSGN message as described in Table 5.1-3.

(5) Verify that SU No. 2 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00 (Individual Call) 80 (Emergency Call)		
Call Type	100b		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 1		
Destination Unit ID	Unit ID of SU No. 2		

Table 5.1-7 VCALL_REC_REQ Message for Interoperability Tester

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00 (Individual Call) 80 (Emergency Call)		
Call Type	100b		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 2		
Destination Unit ID	Unit ID of SU No. 1		
Cause (VD)	10 (Normal Acceptance)		

Table 5.1-8 VCALL_REC_RESP Message for SU No. 2

Element \ Mode	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00 (Individual Call) 80 (Emergency Call)		
Call Type	100b		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 2		
Destination Unit ID	Unit ID of SU No. 1		

Table 5.1-9 VCALL_CONN_REQ Message for SU No. 2

Element \ Mode	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00 (Individual Call) 80 (Emergency Call)		
Call Type	100b		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 2		
Destination Unit ID	Unit ID of SU No. 1		
Cipher Type	00b		
Key ID	000000b		

Table 5.1-10 VCALL Message for SU No. 2

5.1.3. All Call Test

This test shall verify that contents of messages used for All Call are correct, that the unit under test correctly responds to these messages, and that receiving unit outputs normal received audio signal.

Figure 5.1-1 shows the configuration diagram for testing. SU No. 1 and SU No. 2 shall be tested as the calling unit and the called unit respectively. The following 7 types of messages shall be applied.

Table 5.1-1: VCALL_REQ message for SU

Table 5.1-2: VCALL_RESP message for Interoperability Tester

Table 5.1-3: VCALL_ASSGN message for Interoperability Tester

Table 5.1-4: VCALL message for SU

Table 5.1-5: DISC_REQ message for SU

Table 5.1-6: DISC message for Interoperability Tester

Table 5.1-26: REG_REQ message for SU

Values for All Call shall be applied to parameters for each Table.

To verify the interoperability, a unit under test shall pass the test items specified in Section5.1.3.1.1 and Section 5.1.3.2.

5.1.3.1. Testing the Calling SU

5.1.3.1.1. Case 1 – All Call Permission

5.1.3.1.2. Case 2 – Unregistered SU

5.1.3.1.3. Case 3 – Rejection by TC

5.1.3.1.4. Case 4 – Queue State

5.1.3.1.5. Case 5 – Interruption of Queue State

Testing Procedures for these five cases shall be identical to those tests for Conference Group Call as described in Section 5.1.1.1.1.

5.1.3.2. Testing the Called SU

Testing Procedures shall be identical to those tests for Conference Group Call as described in Section 5.1.1.1.2.

5.1.4. Short Data Call Test

This test shall verify that contents of messages used for Short Data Call are correct, that the unit under test correctly responds to these messages, and that the called unit outputs normal received data.

This test includes the test methods for the following two modes. To verify the interoperability, a unit under test shall pass the test item for at least either of mode (1) or mode (2).

(1) Broadcast Short Data Call

(2) Unit to Unit Short Data Call

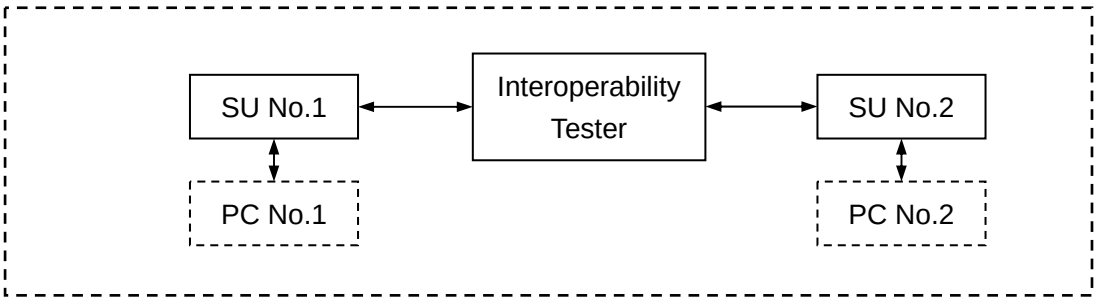

Figure 5.1-2 Configuration for Short Data Call Test

Figure 5.1-2 shows the configuration diagram for testing. In the event that an SU by itself cannot realize the Short Data Call functions, testing can be done by connecting peripheral equipment such as a PC to the SU.

The following 3 types of messages shall be applied.

Table 5.1-11: SDCALL_REQ (Header) message for SU No. 1

Table 5.1-12: SDCALL_RESP message for SU No. 2

Table 5.1-26: REG_REQ message for SU

SDCALL_REQ (User Data) messages are recommended to be constructed with User Data not exceeding 100 bytes. No contents of User Data are specified in this document.

5.1.4.1. Broadcast Short Data Call Test

In this test, parameters for messages to be used shall apply the values for Group Call.

To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.4.1.1.1 and Section 5.1.4.1.2.

5.1.4.1.1. Testing the Calling SU

5.1.4.1.1.1. Case 1 – Short Data Send Success

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message are sent when SU No. 1 initiates a Short Data Call.

(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a SDCALL_RESP message representing the Send Success as described in Table 5.1-12.

5.1.4.1.1.2. Case 2 – Unregistered SU

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message are sent when SU No. 1 initiates a Short Data Call.

(3) Verify that SU No. 1 sends a REG_REQ message as described in Table 5.1-26 when an interoperability tester sends a SDCALL_RESP message representing unregistered SU as described in Table 5.1-12.

5.1.4.1.1.3. Case 3 – Rejection by TC

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message are sent when SU No. 1 initiates a Short Data Call.

(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a SDCALL_RESP message as described in Table 5.1-12 which represents the calling SU is not permitted for the service.

5.1.4.1.1.4. Case 4 – Full Retry

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message are sent when SU No. 1 initiates a Short Data Call.

(3) Verify that SU No. 1 sends a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message, when an interoperability tester sends a SDCALL_RESP message representing the Full Retry as described in Table 5.1-12.

5.1.4.1.2. Testing the Called SU

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 correctly receives User Data when an interoperability tester sends a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message.

5.1.4.2. Unit to Unit Short Data Call Test

In this test, parameters for messages to be used shall apply the values for Individual Call.

The procedure for Unit to Unit Short Data Call is different between Confirmed format and Unconfirmed format.

To verify the interoperability, a unit under test shall pass the test item for at least either of the Confirmed format or the Unconfirmed format.

In the case of the Confirmed format, a unit under test shall pass the test items specified in Section 5.1.4.2.1.1 and Section 5.1.4.2.2.1.

In the case of the Unconfirmed format, a unit under test shall pass the test items specified in Section 5.1.4.2.1.2 and Section 5.1.4.2.2.2.

5.1.4.2.1. Testing the Calling SU

5.1.4.2.1.1. Case 1 (Confirmed) – Short Data Send Success

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message are sent when SU No. 1 initiates a Short Data Call.

(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a SDCALL_RESP message representing the Send Success as described in Table 5.1-12.

(4) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a SDCALL_RESP message representing the Receive Success as described in Table 5.1-12.

5.1.4.2.1.2. Case 1 (Unconfirmed) – Short Data Send Success

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message are sent when SU No. 1 initiates a Short Data Call.

(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a SDCALL_RESP message representing the Send Success as described in Table 5.1-12.

5.1.4.2.1.3. Case 2 – Unregistered SU

5.1.4.2.1.4. Case 3 – Rejection by TC

5.1.4.2.1.5. Case 4 – Full Retry

Testing procedures for these three cases shall be common to the Confirmed format and Unconfirmed format, and identical to those tests for Broadcast Short Data Call as described in Section 5.1.4.1.1.

In the Confirmed format, the following test shall furthermore be done.

5.1.4.2.1.6. Case 5 (Confirmed) – No Response from Called SU

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message are sent when SU No. 1 initiates a Short Data Call.

(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a SDCALL_RESP message representing the Send Success as described in Table 5.1-12.

(4) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a SDCALL_RESP message as described in Table 5.1-12 which represents no response from the called SU.

5.1.4.2.2. Testing the Called SU

5.1.4.2.2.1. Case 1 (Confirmed) – Receive Success

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 correctly receives User Data and sends a SDCALL_RESP message, representing the Receive Success as described in Table 5.1-12, when an interoperability tester sends a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message.

5.1.4.2.2.2. Case 1 (Unconfirmed) – Receive Success

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 correctly receives User Data when an interoperability tester sends a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message.

5.1.4.2.2.3. Case 6 (Confirmed) – Full Retry

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 sends a SDCALL_RESP message representing the Full Retry as described in Table 5.1-12, when an interoperability tester sends a SDCALL_REQ (Header) message as described in Table 5.1-11 and SDCALL_REQ (User Data) message containing incorrect Message CRC.

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of SU No. 1	
Destination Group/Unit ID	Unit ID of SU No. 2 (Individual Call) Valid Group ID (Group Call)	
Cipher Type	00b	
Key ID	000000b	
Packet Information	Except for the following, depends on the format to be used for testing. Delivery Flag = 0 (Group Call, Individual Call) Delivery Flag = 1 (Individual Call)	

Table 5.1-11 SDCALL_REQ (Header) Message for SU No. 1 and Interoperability Tester

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of SU No. 2 (Individual Call) FFF0 as TC ID (Group Call)	
Destination Unit ID	Unit ID of SU No. 1	
Cause (SS)	02 (Send Success) 1C (Unregistered SU) 08 (Full Retry) 12 (Calling SU is not permitted for the service) 01 (Receive Success) 15 (No Response from Called SU)	
Error Block Flag	Depends on the format to be used for testing.	

Table 5.1-12 SDCALL_RESP Message for SU No. 2 and Interoperability Tester

5.1.5. Data Call Test

This test shall verify that contents of messages used for Data Call are correct, that the unit under test correctly responds to these messages, and that the called unit outputs normal received data.

This test includes the test methods for the following two modes. To verify the interoperability, a unit under test shall pass the test item for at least either of mode (1) or mode (2).

(1) Broadcast Data Call

(2) Unit to Unit Data Call

Figure 5.1-2 shows the configuration diagram for testing. In the event that an SU by itself cannot realize the Data Call functions, testing can be done by connecting peripheral equipment such as a PC to the SU.

The following 9 types of messages shall be applied.
Table 5.1-5: DISC_REQ message for SU
Table 5.1-6: DISC message for Interoperability Tester
Table 5.1-13: DCALL_REQ message and DCALL_REC_REQ message
Table 5.1-14: DCALL_RESP message for Interoperability Tester
Table 5.1-15: DCALL_REC_RESP message for SU No. 2
Table 5.1-16: DCALL_ASSGN message for Interoperability Tester
Table 5.1-17: DCALL (Header) message for SU No. 1 and Interoperability Tester
Table 5.1-18: DCALL_ACK message for SU No. 2 and Interoperability Tester
Table 5.1-26: REG_REQ message for SU

It is recommended that DCALL (User Data) messages are constructed using User Data having a data length that is divided into multiple packets. No contents of User Data are specified in this document.

5.1.5.1. Broadcast Data Call Test

In this test, parameters for messages to be used shall apply the values for Group Call.
To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.5.1.1.1 and Section 5.1.5.1.2.

5.1.5.1.1. Testing the Calling SU

5.1.5.1.1.1. Case 1 - Group Call Permission

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a DCALL_REQ message as described in Table 5.1-13 is sent when SU No. 1 initiates a Data Call.
(3) Verify that SU No. 1 migrates to the specified RTCH, starts to transmit and sends a DCALL (Header) message as described in Table 5.1-17 and DCALL (User Data) message, when an interoperability tester sends a DCALL_ASSGN message as described in Table 5.1-16.
(4) Verify that SU No. 1 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH.

5.1.5.1.1.2. Case 2 – Unregistered SU

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a DCALL_REQ message as described in Table 5.1-13 is sent when SU No. 1 initiates a Data Call.
(3) Verify that SU No. 1 sends a REG_REQ message as described in Table 5.1-26 when an interoperability tester sends a DCALL_RESP message representing unregistered SU as described in Table 5.1-14.

5.1.5.1.1.3. Case 3 – Rejection by TC

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a DCALL_REQ message as described in Table 5.1-13 is sent when SU No. 1 initiates a Data Call.
(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a DCALL_RESP message as described in Table 5.1-14, which represents the calling SU is not permitted for the service.

5.1.5.1.1.4. Case 4 – Queue State

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a DCALL_REQ message as described in Table 5.1-13 is sent when SU No. 1 initiates a Data Call.
(3) Verify that SU No. 1 goes into the queue state when an interoperability tester sends a DCALL_RESP message as described in Table 5.1-14, which represents the queue when all channel resource are in use.
(4) Verify that SU No. 1 migrates to the specified RTCH, starts to transmit and sends a DCALL (Header) message as described in Table 5.1-17 and DCALL (User Data) message, when an interoperability tester sends a DCALL_ASSGN message as described in Table 5.1-16 during the queue state.

5.1.5.1.1.5. Case 5 – Interruption of Queue State

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that SU No. 1 sends out a DISC_REQ message as described in Table 5.1-5 upon expiration of its Ts_busy timer.
(3) Subsequently, verify that SU No. 1 goes into the idle state.

5.1.5.1.2. Testing the Called SU

(1) Turn the SU No. 2 ON and keep it in the idle state.
(2) Verify that SU No. 2 migrates to the specified RTCH and goes into the receiving state when an interoperability tester sends a DCALL_ASSGN message as described in Table 5.1-16.
(3) Verify that SU No. 2 correctly receives User Data when an interoperability tester sends a DCALL (Header) message as described in Table 5.1-17 and DCALL (User Data) message.
(4) Verify that SU No. 2 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH.

5.1.5.2. Unit to Unit Data Call Test

In this test, parameters for messages to be used shall apply the values for Individual Call.

The procedure for a Unit to Unit Data Call is different between Confirmed format and Unconfirmed format.

To verify the interoperability, a unit under test shall pass the test item for at least either of the Confirmed format or the Unconfirmed format.

In the case of the Confirmed format, a unit under test shall pass the test items specified in Section 5.1.5.2.1.1 and Section 5.1.5.2.2.1.

In the case of the Unconfirmed format, a unit under test shall pass the test items specified in Section 5.1.5.2.1.2 and Section 5.1.5.2.2.2.

5.1.5.2.1. Testing the Calling SU

5.1.5.2.1.1. Case 1 (Confirmed) – Individual Call Permission

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a DCALL_REQ message as described in Table 5.1-13 is sent when SU No. 1 initiates a Data Call.

(3) Verify that SU No. 1 migrates to the specified RTCH, starts to transmit and sends a DCALL (Header) message as described in Table 5.1-17 and DCALL (User Data) message, when an interoperability tester sends a DCALL_ASSGN message as described in Table 5.1-16.

(4) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a DCALL_ACK message on an RTCH representing the Receive Success as described in Table 5.1-18.

(5) Verify that SU No. 1 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH.

5.1.5.2.1.2. Case 1 (Unconfirmed) – Individual Call Permission

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a DCALL_REQ message as described in Table 5.1-13 is sent when SU No. 1 initiates a Data Call.

(3) Verify that SU No. 1 migrates to the specified RTCH, starts to transmit and sends a DCALL (Header) message as described in Table 5.1-17 and DCALL (User Data) message, when an interoperability tester sends a DCALL_ASSGN message as described in Table 5.1-16.

(4) Verify that SU No. 1 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH.

5.1.5.2.1.3. Case 2 – Unregistered SU

5.1.5.2.1.4. Case 3 – Rejection by TC

5.1.5.2.1.5. Case 4 – Queue State

5.1.5.2.1.6. Case 5 – Interruption of Queue State

Testing procedures for these four cases shall be common to the Confirmed format and Unconfirmed format, and identical to those tests for Broadcast Data Call as described in Section 5.1.5.1.1.

5.1.5.2.1.7. Case 6 – No Response from Called SU

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a DCALL_REQ message as described in Table 5.1-13 is sent when SU No. 1 initiates a Data Call.

(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a DCALL_RESP message as described in Table 5.1-14, which represents no response from the called SU.

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5.1.5.2.1.8. Case 7 (Confirmed) – Full Retry

(1) Perform step (1) to step (3) in Section 5.1.5.2.1.1.

(2) Verify that SU No. 1 sends a DCALL (Header) message as described in Table 5.1-17 and DCALL (User Data) message, when an interoperability tester sends a DCALL_ACK message representing the Full Retry as described in Table 5.1-18.

5.1.5.2.2. Testing the Called SU

5.1.5.2.2.1. Case 1 (Confirmed) – Incoming Call Permission

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 sends a DCALL_REC_RESP message representing normal acceptance as described in Table 5.1-15, when an interoperability tester sends a DCALL_REC_REQ message as described in Table 5.1-13.

(3) Verify that SU No. 2 migrates to the specified RTCH and goes into the receiving state when an interoperability tester sends a DCALL_ASSGN message as described in Table 5.1-16.

(4) Verify that SU No. 2 correctly receives User Data and sends a DCALL_ACK message representing the Receive Success as described in Table 5.1-18, when an interoperability tester sends a DCALL (Header) message as described in Table 5.1-17 and DCALL (User Data) message.

(5) Verify that SU No. 2 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH,.

5.1.5.2.2.2. Case 1 (Unconfirmed) – Incoming Call Permission

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 sends a DCALL_REC_RESP message representing normal acceptance as described in Table 5.1-15, when an interoperability tester sends a DCALL_REC_REQ message as described in Table 5.1-13.

(3) Verify that SU No. 2 migrates to the specified RTCH and goes into the receiving state when an interoperability tester sends a DCALL_ASSGN message as described in Table 5.1-16.

(4) Verify that SU No. 2 correctly receives User Data when an interoperability tester sends a DCALL (Header) message as described in Table 5.1-17 and DCALL (User Data) message.

(5) Verify that SU No. 2 reverts to an RCCH when an interoperability tester sends a DISC message representing the disconnection by a timer as described in Table 5.1-6 on an RTCH,

5.1.5.2.2.3. Case 7 (Confirmed) – Full Retry

(1) Perform step (1) to step (3) in Section 5.1.5.2.2.1.

(2) Verify that SU No. 2 sends a DCALL_ACK message representing the Full Retry as described in Table 5.1-18, when an interoperability tester sends a DCALL (Header) message as described in Table 5.1-17 and DCALL (User Data) message containing incorrect Message CRC.

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of SU No. 1	
Destination Group/Unit ID	Unit ID of SU No. 2 (Individual Call) Valid Group ID (Group Call)	

Table 5.1-13 DCALL_REQ/DCALL_REC_REQ Messages

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of SU No. 2 (Individual Call) FFF0 as TC ID (Group Call)	
Destination Unit ID	Unit ID of SU No. 1	
Cause (VD)	1C (Unregistered SU) 12 (Calling SU is not permitted for the service) 30 (Queue when all channel resources are in use) 15 (No response from Called SU)	

Table 5.1-14 DCALL_RESP Message for Interoperability Tester

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of SU No. 2	
Destination Unit ID	Unit ID of SU No. 1	
Cause (VD)	10 (Normal Acceptance)	

Table 5.1-15 DCALL_REC_RESP Message for SU No. 2

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	000010b
Source Unit ID	Unit ID of SU No. 1	
Destination Group/Unit ID	Unit ID of SU No. 2 (Individual Call) Valid Group ID (Group Call)	
Call Timer	Any	
Channel	Depending on the test configuration	

Table 5.1-16 DCALL_ASSGN Message for Interoperability Tester

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	000010b
Source Unit ID	Unit ID of SU No. 1	
Destination Group/Unit ID	Unit ID of SU No. 2 (Individual Call) Valid Group ID (Group Call)	
Cipher Type	00b	
Key ID	000000b	
Packet Information	Except for the following, depends on the format to be used for testing. Delivery Flag = 0 (Group Call, Individual Call) Delivery Flag = 1 (Individual Call)	

Table 5.1-17 DCALL (Header) Message for SU No. 1 and Interoperability Tester

Element \ Mode	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call)	
Data Call Option	00000b	000010b
Source Unit ID	Unit ID of SU No. 2	
Destination Unit ID	Unit ID of SU No. 1	
Response Information	0200 (Receive Success) 3200 (Full Retry)	
Error Block Flag	Depends on the format to be used for testing.	

Table 5.1-18 DCALL_ACK Message for SU No. 2 and Interoperability Tester

5.1.6. Status Notice Tests

This test shall verify that contents of messages used for a Status Call are correct, and that the unit under test correctly responds to these messages.

This test includes the test methods for the following two modes. To verify the interoperability, a unit under test shall pass the test item for at least either of mode (1) or mode (2).

(1) Broadcast Status Call

(2) Status Call

Figure 5.1-2 shows the configuration diagram for testing. In the event that an SU by itself cannot realize the Status Call functions, testing can be done by connecting peripheral equipment such as a PC to the SU.

The following 3 types of messages shall be applied.

Table 5.1-19: STAT_REQ message for SU No. 1 and Interoperability Tester

Table 5.1-20: STAT_RESP message for SU No. 2 and Interoperability Tester

Table 5.1-26: REG_REQ message for SU

5.1.6.1. Broadcast Status Call Test

In this test, parameters for messages to be used shall apply the values for Group Call.

To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.6.1.1.1 and Section 5.1.6.1.2.

5.1.6.1.1. Testing the Calling SU

5.1.6.1.1.1. Case 1 – Status Call Success

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a STAT_REQ message as described in Table 5.1-19 is sent when SU No. 1 initiates a Status Call.

(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a STAT_RESP message representing the Send Success as described in Table 5.1-20.

5.1.6.1.1.2. Case 2 – Unregistered SU

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a STAT_REQ message as described in Table 5.1-19 is sent when SU No. 1 initiates a Status Call.
(3) Verify that SU No. 1 sends a REG_REQ message as described in Table 5.1-26 when an interoperability tester sends a STAT_RESP message representing unregistered SU as described in Table 5.1-20.

5.1.6.1.1.3. Case 3 – Rejection by TC

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a STAT_REQ message as described in Table 5.1-19 is sent when SU No. 1 initiates a Status Call.
(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a STAT_RESP message as described in Table 5.1-20 which represents the calling SU is not permitted for the service.

5.1.6.1.2. Testing the Called SU

(1) Turn the SU No. 2 ON and keep it in the idle state.
(2) Verify that SU No. 2 correctly receives a Status when an interoperability tester sends a STAT_REQ message as described in Table 5.1-19.

5.1.6.2. Status Call Test

In this test, parameters for messages to be used shall apply the values for Individual Call.
The procedure for Status Call is different between Confirmed format and Unconfirmed format.
To verify the interoperability, a unit under test shall pass the test item for at least either of the Confirmed format or the Unconfirmed format.

In the case of the Confirmed format, a unit under test shall pass the test items specified in Section 5.1.6.2.1.1 and Section 5.1.6.2.2.1.
In the case of the Unconfirmed format, a unit under test shall pass the test items specified in Section 5.1.6.2.1.2 and Section 5.1.6.2.2.2.

5.1.6.2.1. Testing the Calling SU

5.1.6.2.1.1. Case 1 (Confirmed) – Status Call Success

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a STAT_REQ message as described in Table 5.1-19 is sent when SU No. 1 initiates a Status Call.
(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a STAT_RESP message representing the Send Success as described in Table 5.1-20.

(4) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a STAT_RESP message representing the Receive Success as described in Table 5.1-20.

5.1.6.2.1.2. Case 1 (Unconfirmed) – Status Call Success

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that a STAT_REQ message as described in Table 5.1-19 is sent when SU No. 1 initiates a Status Call.

(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a STAT_RESP message representing the Send Success as described in Table 5.1-20.

5.1.6.2.1.3. Case 2 – Unregistered SU

5.1.6.2.1.4. Case 3 – Rejection by TC

Testing procedures for these two cases shall be common to the Confirmed format and Unconfirmed format, and identical to those testing for Broadcast Status Call as described in Section 5.1.6.1.1.

In the Confirmed format, the following test shall furthermore be done.

5.1.6.2.1.5. Case 4 (Confirmed) – No Response from Called SU

(1) Turn the SU No. 1 ON and keep it in the idle state.

(2) Verify that SU No.1 sends a STAT_REQ message as described in Table 5.1-19 when SU No. 1 initiates a Status Call.

(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a STAT_RESP message representing the Send Success as described in Table 5.1-20.

(4) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a STAT_RESP message as described in Table 5.1-20 which represents no response from the called SU.

5.1.6.2.2. Testing the Called SU

5.1.6.2.2.1. Case 1 (Confirmed) – Receive Success

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 correctly receives a Status and sends a STAT_RESP message representing the Receive Success as described in Table 5.1-20, when an interoperability tester sends a STAT_REQ as described in Table 5.1-19.

5.1.6.2.2.2. Case 1 (Unconfirmed) – Receive Success

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 correctly receives a Status when an interoperability tester sends a STAT_REQ message as described in Table 5.1-19.

CC Option	00 (Individual Call, Group Call) 80 (Emergency Call)
Call Type	100b (Individual Call) 001b (Group Call)
Status Call Option	00000b (Unconfirmed format) 01000b (Confirmed format)
Source Unit ID	Unit ID of SU No. 1
Destination Group/Unit ID	Unit ID of SU No. 2 (Individual Call) Valid Group ID (Group Call)
Status	01 to CF (User definable) D0 (Paging) E0 (Emergency)

Table 5.1-19 STAT_REQ Message for SU No. 1 and Interoperability Tester

CC Option	00
Call Type	100b (Individual Call) 001b (Group Call)
Source Unit ID	Unit ID of SU No. 2 (Individual Call) FFF0 as TC ID (Group Call)
Destination Unit ID	Unit ID of SU No. 1
Cause (SS)	02 (Send Success) 01 (Receive Success) 1C (Unregistered SU) 12 (Calling SU is not permitted for the service) 15 (No Response from Called SU)

Table 5.1-20 STAT_RESP Message for SU No. 2 and Interoperability Tester

5.1.7. Status Inquiry Test

This test shall verify that contents of messages used for Status Inquiry processing are correct, and that the unit under test correctly responds to these messages.

Figure 5.1-2 shows the configuration diagram for testing. In the event that an SU by itself cannot realize the Status Inquiry functions, testing can be done by connecting peripheral equipment such as a PC to the SU.

The following 3 types of messages shall be applied.

Table 5.1-21: STAT_INQ_REQ message for SU No. 1 and Interoperability Tester

Table 5.1-22: STAT_INQ_RESP message for SU No. 2 and Interoperability Tester

Table 5.1-26: REG_REQ message for SU

To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.7.1.1 and Section 5.1.7.2.1.

5.1.7.1. Testing the Calling SU

5.1.7.1.1. Case 1 – Status Inquiry Success

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a STAT_INQ_REQ message as described in Table 5.1-21 is sent when SU No. 1 initiates a Status Inquiry.
(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a STAT_INQ_RESP message representing the Send Success as described in Table 5.1-22.
(4) Verify that SU No. 1 correctly receives a Status when an interoperability tester sends a STAT_INQ_RESP message representing the Receive Success as described in Table 5.1-22.

5.1.7.1.2. Case 2 – Unregistered SU

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a STAT_INQ_REQ message as described in Table 5.1-21 is sent when SU No. 1 initiates a Status Inquiry.
(3) Verify that SU No. 1 sends a REG_REQ message as described in Table 5.1-26 when an interoperability tester sends a STAT_INQ_RESP message representing the unregistered SU as described in Table 5.1-22.

5.1.7.1.3. Case 3 – Rejection by TC

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a STAT_INQ_REQ message as described in Table 5.1-21 is sent when SU No. 1 initiates a Status Inquiry.
(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a STAT_INQ_RESP message as described in Table 5.1-22 which represents the calling SU is not permitted for the service.

5.1.7.1.4. Case 4 – No Response from Called SU

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a STAT_INQ_REQ message as described in Table 5.1-21 is sent when SU No. 1 initiates a Status Inquiry.
(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a STAT_INQ_RESP message representing the Send Success as described in Table 5.1-22.
(4) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a STAT_INQ_RESP message as described in Table 5.1-22 which represents no response from the called SU.

5.1.7.2. Testing the Called SU

5.1.7.2.1. Case 1 – Receive Success

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 sends a STAT_INQ_REQ message representing the Receive Success as described in Table 5.1-22, when an interoperability tester sends a STAT_INQ_REQ message as described in Table 5.1-21.

CC Option	00
Call Type	100b
Status Call Option	01000b
Source Unit ID	Unit ID of SU No. 1
Destination Unit ID	Unit ID of SU No. 2

Table 5.1-21 STAT_INQ_REQ Message for SU No. 1 and Interoperability Tester

CC Option	00
Call Type	100b
Source Unit ID	Unit ID of SU No. 2
Destination Unit ID	Unit ID of SU No. 1
Cause (SS)	02 (Send Success) 01 (Receive Success) 1C (Unregistered SU) 12 (Calling SU is not permitted for the service) 15 (No Response from Called SU)
Status	01 to CF (User definable)

Table 5.1-22 STAT_INQ_RESP Message for SU No. 2 and Interoperability Tester

5.1.8. Remote Control Test

This test shall verify that contents of messages used for the Remote Control functions are correct, and that the unit under test correctly responds to these messages.

Figure 5.1-2 shows the configuration diagram for testing. In the event that an SU by itself cannot realize the Remote Control functions, testing can be done by connecting peripheral equipment such as a PC to the SU.

The following 3 types of messages shall be applied.

Table 5.1-23: REM_CON_REQ message for SU No. 1 and Interoperability Tester

Table 5.1-24: REM_CON_RESP message for SU No. 2 and Interoperability Tester

Table 5.1-26: REG_REQ message for SU

To verify the interoperability, a unit under test shall pass the test items specified in Section 5.1.8.1.1 and Section 5.1.8.2.1.

5.1.8.1. Testing the Calling SU

5.1.8.1.1. Case 1 – Remote Control Success

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a REM_CON_REQ message as described in Table 5.1-23 is sent when SU No. 1 activates Remote Control.
(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a REM_CON_RESP message representing the Send Success as described in Table 5.1-24.
(4) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a REM_CON_RESP message representing the Receive Success as described in Table 5.1-24.

5.1.8.1.2. Case 2 – Unregistered SU

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a REM_CON_REQ message as described in Table 5.1-23 is sent when SU No. 1 activates Remote Control.
(3) Verify that SU No. 1 sends a REG_REQ message as described in Table 5.1-26 when an interoperability tester sends a REM_CON_RESP message representing the unregistered SU as described in Table 5.1-24.

5.1.8.1.3. Case 3 – Rejection by TC

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a REM_CON_REQ message as described in Table 5.1-23 is sent when SU No. 1 activates Remote Control.
(3) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a REM_COM_RESP message as described in Table 5.1-24 which represents the calling SU is not permitted for the service.

5.1.8.1.4. Case 4 – No Response from Called SU

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Verify that a REM_CON_REQ message as described in Table 5.1-23 is sent when SU No. 1 activates Remote Control.
(3) Verify that SU No. 1 goes into the waiting state for subsequent messages when an interoperability tester sends a REM_CON_RESP message representing the Send Success as described in Table 5.1-24.
(4) Verify that SU No. 1 goes into the idle state when an interoperability tester sends a REM_CON_RESP message as described in Table 5.1-24 which represents no response from the called SU.

5.1.8.2. Testing the Called SU

5.1.8.2.1. Case 1 – Receive Success

(1) Turn the SU No. 2 ON and keep it in the idle state.

(2) Verify that SU No. 2 sends a REM_CON_RESP message representing the Receive Success as described in Table 5.1-24, when an interoperability tester sends a REM_CON_REQ message as described in Table 5.1-23.

(3) Verify that SU No. 2 behaves in accordance with the contents of the Control Command information elements and Control Parameter information elements.

CC Option	00
G/U	1b (Unit ID)
Delivery	1b (Confirmed format)
Control Command	Depending on the test configuration
Source Unit ID	Unit ID of SU No. 1
Destination Unit ID	Unit ID of SU No. 2
Control Parameter	Depending on the test configuration

Table 5.1-23 REM_CON_REQ Message for SU No. 1 and Interoperability Tester

CC Option	00
G/U	1b (Unit ID)
Control Command	Depending on the test configuration
Source Unit ID	Unit ID of SU No. 2
Destination Unit ID	Unit ID of SU No. 1
Cause (SS)	02 (Send Success) 01 (Receive Success) 1C (Unregistered SU) 12 (Calling SU is not permitted for the service) 15 (No Response from Called SU)

Table 5.1-24 REM_CON_RESP Message for SU No. 2 and Interoperability Tester

5.1.9. Paging Test

This test shall verify that contents of messages used for the Paging behaviors are correct, and that the unit under test correctly responds to these messages.

Figure 5.1-1 shows the configuration diagram for testing.

5.1.9.1. Testing the Calling SU

5.1.9.1.1. Case 1 – Status Call Success

Testing Procedures shall be identical to those tests for Status Call as described in Section 5.1.6.2.1.1. The value representing Paging in the Status element is used for testing.

5.1.9.2. Testing the Called SU

5.1.9.2.1. Case 1 – Receive Success

Testing Procedures shall be identical to those tests for Status Call as described in Section 5.1.6.2.2.1. Verify that an SU performs the behavior specified by the respective manufacturer, such as an alert tone or an indicator, upon receipt of a status value representing "Paging".

5.1.10. Emergency Test

This test shall verify that contents of messages used during the Emergency state are correct, that the unit under test correctly responds to these messages.

This test includes the test methods for the following two Emergency states. To verify the interoperability, a unit under test shall pass the test item for at least either of mode (1) or mode (2).

(1) Emergency Call

(2) Emergency Alert

Figure 5.1-1 show the configuration diagram for testing.

5.1.10.1. Emergency Call

This test shall verify that contents of messages used for an Emergency Voice Call are correct, and that the unit under test correctly responds to these messages.

This test is includes the test methods for the following two modes. To verify the interoperability, a unit under test shall pass the test item for at least either of mode (1) or mode (2).

(1) Group Voice Call

(2) Individual Voice Call

Testing procedure for mode (1) shall be identical to those specified in Section 5.1.1 and testing procedure for mode (2) shall be identical to those specified in Section 5.1.2. However, the value for CC Option in the message to be used shall be substituted with a value of 80.

Verify that a called SU performs the emergency behavior specified by the respective manufacturer upon receipt of an emergency voice call.

5.1.10.2. Emergency Alert

This test shall verify that contents of messages used for broadcasting the Emergency status are correct, and that the unit under test correctly responds to these messages.

This test includes the test methods for the following two modes. To verify the interoperability, a unit under test shall pass the test item for at least either of mode (1) or mode (2).

(1) Broadcast Status Call

(2) Status Call

Testing procedure for mode (1) shall be identical to those specified in Section 5.1.6.1 and testing procedure for mode (2) shall be identical to those specified in Section 5.1.6.2.

A status value representing Emergency is used for testing.

Verify that a called SU performs the behavior specified by the respective manufacturer, such as an alert tone or an indicator, upon receipt of a status value representing "Emergency".

5.1.11. Late Entry Test

This test shall verify that SU normally receives a call even if the SU participates in a voice call midway through the call.

Figure 5.1-1 shows the configuration diagram for testing.

This test shall be done with the following mode.

(1) Conference Group Call

This testing shall be done only with the called SU. Testing shall be done using the called SU as the SU No. 2.

5.1.11.1. Conference Group Call

In this test, parameters for messages to be used shall apply the values for Conference Group Call.

5.1.11.1.1. Testing the Called SU

(1) Turn the SU No. 2 ON.

(2) Verify that SU No. 2 migrates to the specified RTCH and goes into the receiving state when an interoperability tester sends a VCALL_ASSGN_DUP message as described in Table 5.1-25.

(3) Verify that SU No. 2 outputs normal received audio signal when an interoperability tester makes a voice call transmission.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	001b (Conference Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 1		
Destination Group ID	Valid Group ID		
Call Timer	Any		
Channel	Depending on the test configuration		

Table 5.1-25 VCALL_ASSGN_DUP Message for Interoperability Tester

5.1.12. Registration Test

This test shall verify that contents of messages used for the Registration process are correct, and that the unit under test correctly responds to these messages.

To verify the interoperability, a unit under test shall pass the test item specified in Section 5.1.12.1.

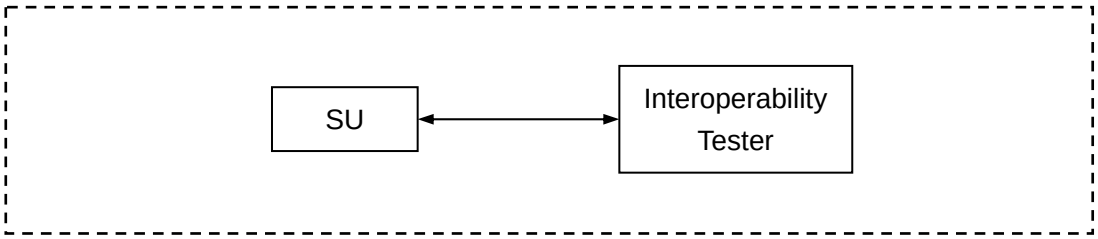


Figure 5.1-3 Configuration for SU Test

Figure 5.1-3 shows the configuration diagram for testing. The following 2 types of messages shall be applied.

Table 5.1-26: REG_REQ message for SU

Table 5.1-27: REG_RESP message for Interoperability Tester

5.1.12.1. Case 1 - Registration Accept

(1) Turn an SU ON.

(2) Verify that the SU sends a REG_REQ message as described in Table 5.1-26.

(3) Verify that the SU goes into the idle state when an interoperability tester sends a REG_RESP message representing the Accept as described in Table 5.1-27.

5.1.12.2. Case 2 - Registration Fail

(1) Turn an SU ON.

(2) Verify that the SU sends a REG_REQ message as described in Table 5.1-26.

(3) Verify that the SU goes into the idle state or starts a control channel hunting when an interoperability tester sends a REG_RESP message representing the Fail as described in Table 5.1-27.

5.1.12.3. Case 3 - Registration Refuse

(1) Turn an SU ON.

(2) Verify that the SU sends a REG_REQ message as described in Table 5.1-26.

(3) Verify that the SU updates a record concerning the site which has rejected the SU and starts a control channel hunting when an interoperability tester sends a REG_RESP message representing the Refuse as described in Table 5.1-27.

Element \ Mode	4800 bps	9600 bps
Registration Option	00000b	
Location ID	0100000000000000001b (Local, sys = 1)	
Source Unit ID	Unit ID of the SU	
Group ID	Selected Group ID of the SU	
Subscriber Type	0028	0048 (EHR) 0058 (EHR & EFR)
Version Number	Any	

Table 5.1-26 REG_REQ Message for SU

Registration Option	00000b
Location ID	0100000000000000001b (Local, sys = 1)
Destination Unit ID	Unit ID of the SU
Group ID	Selected Group ID of the SU
Cause (MM)	01 (Accept) 06 (Fail) 08 (Refuse)

Table 5.1-27 REG_RESP Message for Interoperability Tester

5.1.13. Registration Clear Test

This test shall verify that contents of messages used for clearing the Registration information are correct, and that the unit under test correctly responds to these messages.
This test shall be done when the SU is turned OFF.

Figure 5.1-3 shows the configuration diagram for testing. The following 2 types of messages shall be applied.
Table 5.1-28: REG_C_REQ message for SU
Table 5.1-29: REG_C_RESP message for Interoperability Tester

(1) Keep an SU in the idle state after the Registration process.
(2) Verify that the SU sends a REG_C_REQ message as described in Table 5.1-28 when the SU is turned OFF.
(3) Verify that the SU turns OFF itself when an interoperability tester sends a REG_C_RESP message representing the Accept as described in Table 5.1-29.

Registration Option	00000b
Location ID	0100000000000000001b (Local, sys = 1)
Source Unit ID	Unit ID of the SU

Table 5.1-28 REG_C_REQ Message for SU

Registration Option	00000b
Location ID	0100000000000000001b (Local, sys = 1)
Destination Unit ID	Unit ID of the SU
Cause (MM)	01 (Accept)

Table 5.1-29 REG_C_RESP Message for Interoperability Tester

5.1.14. Registration Command Test

This test shall verify that contents of messages used for processing the Registration command for an SU are correct, and that the unit under test correctly responds to these messages. Figure 5.1-3 shows the configuration diagram for testing.

(1) Turn an SU ON and keep it in the idle state.
(2) Verify that the SU sends a REG_REQ message as described in Table 5.1-26 when an interoperability tester sends a REG_COMM message as described in Table 5.1-30.
(3) Verify that the SU goes into the idle state when an interoperability tester sends a REG_RESP message representing the Accept as described in Table 5.1-27.

Registration Option	00000b
Location ID	0100000000000000001b (Local, sys = 1)
Destination Unit ID	Unit ID of the SU

Table 5.1-30 REG_COMM Message for Interoperability Tester

5.1.15. Group Registration Test

This test shall verify that contents of messages used for the Group Registration are correct, and that the unit under test correctly responds to these messages. The Group Registration process is initiated when a user selects another Group ID or attempts to transmit using a non-registered Group ID. This test shall be done in a case when a user selects another Group ID.
Figure 5.1-3 shows the configuration diagram for testing. The following 2 types of messages shall be applied.
Table 5.1-31: GRP_REG_REQ message for SU
Table 5.1-32: GRP_REG_RESP message for Interoperability Tester

To verify the interoperability, a unit under test shall pass the test item specified in Section 5.1.15.1.

5.1.15.1. Case 1 - Group Registration Accept

(1) Keep an SU in the idle state after the Registration process.
(2) Verify that the SU sends a GRP_REG_REQ message as described in Table 5.1-31 when another Group ID is selected.
(3) Verify that the SU goes into the idle state when an interoperability tester sends a GRP_REG_RESP message representing the Accept as described in Table 5.1-32.

5.1.15.2. Case 2 - Group Registration Fail

(1) Keep an SU in the idle state after the Registration process.

(2) Verify that the SU sends a GRP_REG_REQ message as described in Table 5.1-31 when another Group ID is selected.

(3) Verify that the SU goes into the idle state or hunts for a control channel when an interoperability tester sends a GRP_REG_RESP message representing the Fail as described in Table 5.1-32.

5.1.15.3. Case 3 - Group Registration Refuse

(1) Keep an SU in the idle state after the Registration process.

(2) Verify that the SU sends a GRP_REG_REQ message as described in Table 5.1-31 when another Group ID is selected.

(3) Verify that the SU updates a record concerning the site which has rejected the SU and starts a control channel hunting when an interoperability tester sends a GRP_REG_RESP message representing the Refuse as described in Table 5.1-32.

Group Registration Option	00
Source Unit ID	Unit ID of the SU
Group ID	Selected Group ID

Table 5.1-31 GRP_REG_REQ Message for SU

Group Registration Option	00
Destination Unit ID	Unit ID of the SU
Group ID	Selected Group ID
Cause (MM)	01 (Accept) 06 (Fail) 08 (Refuse)

Table 5.1-32 GRP_REG_RESP Message for Interoperability Tester

5.1.16. Authentication Tests

This test shall verify that contents of messages used for the Authentication process are correct, and that the unit under test correctly responds to these messages.

This test includes the test methods for the following two Authentication processes:

(1) Authentication during Registration process

(2) Authentication in normal process

Procedure (1) represents a case that a TR sends a request for Authentication while an SU is doing the Registration process, and Procedure (2) represents a case that a TR sends a request for Authentication to an SU which has completed the Registration process.

To verify the interoperability, a unit under test shall pass the test item for at least either of case (1) or case (2).

Figure 5.1-3 shows the configuration diagram for testing. The following 4 types of messages shall be applied.

Table 5.1-26: REG_REQ message for SU

Table 5.1-27: REG_RESP message for Interoperability Tester

Table 5.1-33: AUTH_INQ_REQ message for Interoperability Tester

Table 5.1-34: AUTH_INQ_RESP message for SU

5.1.16.1. Authentication Test during Registration Process

(1) Turn an SU ON.

(2) Verify that the SU sends a REG_REQ message as described in Table 5.1-26.

(3) Verify that the SU sends an AUTH_INQ_RESP message as described in Table 5.1-34 when an interoperability tester sends an AUTH_INQ_REQ message as described in Table 5.1-33.

(4) Verify that the SU goes into the idle state when an interoperability tester sends a REG_RESP message representing the Accept as described in Table 5.1-27.

5.1.16.2. Authentication Test in Normal Process

(1) Keep an SU in the idle state after the Registration process.

(2) Verify that the SU sends an AUTH_INQ_RESP message as described in Table 5.1-34 when an interoperability tester sends an AUTH_INQ_REQ message as described in Table 5.1-33.

Authentication Option	00
Source Unit ID	FFF0 as TC ID
Destination Unit ID	Unit ID of the SU
Authentication Parameter	Any

Table 5.1-33 AUTH_INQ_REQ Message for Interoperability Tester

Authentication Option	00
Source Unit ID	Unit ID of the SU
Destination Unit ID	FFF0 as TC ID
Authentication Value	Depends on ESN and Authentication Parameter of the SU

Table 5.1-34 AUTH_INQ_RESP Message for SU

5.1.17. Site Roaming Test

This test shall verify that an SU initiates a control channel hunting and performs Registration on an acquired RCCH of another site, when the SU becomes unable to receive an RCCH signal of the site where the SU completed its Registration.

Figure 5.1-4 shows the configuration diagram for testing. Interoperability tester No.1 is treated as site 1, and interoperability tester No.2 is treated as site 2. Each control channel is treated as RCCH-1 or RCCH-2.

Prior to testing, two control channels, RCCH-1 and RCCH-2 shall be configured for an SU.

Following are conditions of Location ID for site 1 and site 2:

Site 1: Category = 01b (Local)
System Code = 1
Site Code = 1
Site 2: Category = 01b (Local)
System Code = 1
Site Code = 2

(1) Set the attenuation level of attenuator 1 so that the receiver input level is a sufficient level in which SU No. 1 can acquire an RCCH-1, and set the attenuation level of attenuator 2 so that the receiver input level is an insufficient level in which SU No. 1 can not acquire an RCCH-2.
(2) Keep SU No. 1 in the idle state on an RCCH-1 after completion of registration with interoperability tester No. 1.
(3) Increase the attenuation level of attenuator 1 until SU No. 1 cannot receive outbound signals on an RCCH-1, and decrease the attenuation level of attenuator 2 until SU No. 1 can receive inbound signals on an RCCH-2.
(4) Verify that SU No. 1 migrates to the RCCH-2 and sends a REG_REQ message as described in Table 5.1-35. Verify that SU No. 1 goes into the idle state on an RCCH-2 when Interoperability tester No. 2 sends a REG_RESP message representing the Accept as described in Table 5.1-36.

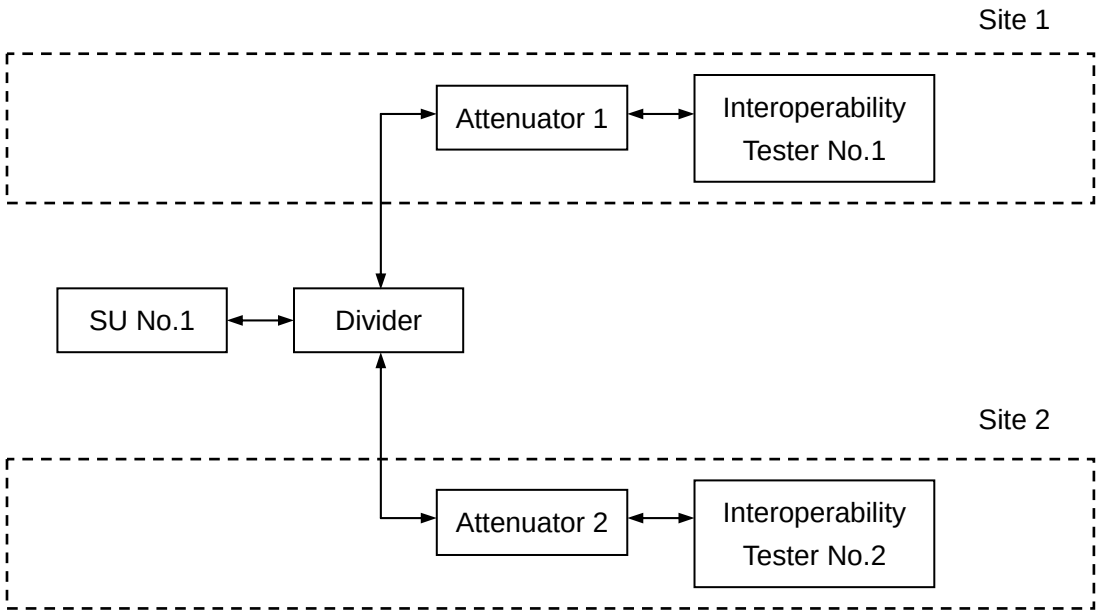


Figure 5.1-4 Configuration for Site Roaming Test

Mode / Element	4800 bps	9600 bps
RAN	000010b	
Registration Option	00	
Location ID	01000000000000000001b (Local, sys = 1)	
Source Unit ID	Unit ID of SU No. 1	
Group ID	Selected Group ID of SU No. 1	
Subscriber Type	0028	0048 (EHR) 0058 (EHR & EFR)
Version Number	Any	

Table 5.1-35 REG_REQ Message for SU No. 1 in the case of Registration on Site 2

RAN	000010b
Registration Option	00
Location ID	01000000000000000001b (Local, sys = 1)
Destination Unit ID	Unit ID of SU No. 1
Group ID	Selected Group ID of SU No. 1
Cause (MM)	01 (Accept)

Table 5.1-36 REG_RESP Message for Interoperability Tester No.2

5.1.18. Priority Monitor Test

This test shall verify that an SU stops receiving a normal Group Call and an SU starts to receive a Group Call with the Priority Group ID, when the Group Call with the Priority Group ID takes place on another RTCH while the SU is in a receiving state on an RTCH.

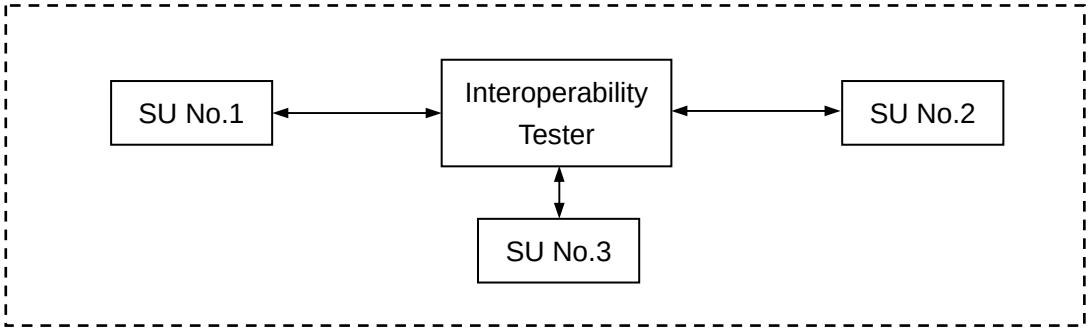


Figure 5.1-5 Configuration for Priority Monitor Test

Figure 5.1-5 shows the configuration diagram for testing.

This test represents a case that SU No. 3 initiates a Conference Group Call using a Priority Group ID while making a Conference Group Call between the calling SU No. 1 and the called SU No. 2. For explanation purposes, SU No. 1 is considered to transmit audio signals on an RTCH-1 and SU No. 3 is considered to transmit audio signals on an RTCH-2.

(1) Keep SU No. 2 in the receive state on an RTCH-1 in accordance with the Conference Group Call procedure specified in Section 5.1.1.
(2) Start a Conference Group Call by SU No. 3 using a Priority Group ID and keep SU No. 3 in the transmit state on an RTCH-2.
(3) Send, on an RTCH-1, a VCALL_ASSGN_DUP message as described in Table 5.1-37 from the interoperability tester.
  (i) Verify that SU No. 2 migrates to the specified RTCH-2 and receives a Group Voice Call using a Priority Group ID. Or,
  (ii) Verify that SU No. 2 reverts to an RCCH, receives a VCALL_ASSGN_DUP (or VCALL_ASSGN) message as described in Table 5.1-37 transmitted by the interoperability tester, migrates to the specified RTCH-2, and receives a Group Voice Call using a Priority Group ID.
(4) Verify that SU No. 2 reverts to an RCCH upon completion of Group Voice Call on an RTCH-2 using a Priority Group ID.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	001b (Conference Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU 3		
Destination ID	Priority Group ID		
Call Timer	Any		
Channel	Channel of RTCH-2		

Table 5.1-37 VCALL_ASSGN_DUP (or VCALL_ASSGN) Message for Interoperability Tester

5.1.19. Time Out Timer Test

This test shall verify that an SU stops transmitting on an RTCH in accordance with the specified time limit for transmission.
Figure 5.1-1 shows the configuration diagram for testing.
This test shall verify the transmit behavior of SU on an RTCH if the amount of time for transmission during Conference Group Call is specified by Call Timer in the VCALL_ASSGN message.

(1) Turn the SU No. 1 ON and keep it in the idle state.
(2) Initiate a Conference Group Call using SU No. 1. An interoperability tester sends a VCALL_ASSGN message as described in Table 5.1-3.
(3) Verify that SU No. 1 stops transmitting upon elapse of the time specified by Call Timer while the PTT control on SU No. 1 remains activated.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	001b		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 1		
Destination Group ID	Group ID of SU No. 1		
Call Timer	000001b to 011010b		
Channel	Depending on the test configuration		

Table 5.1-38 VCALL_ASSGN Message for Interoperability Tester

5.1.20. Transmission Trunking Test

This test shall verify the SU behaviors while in Transmission Trunking Mode.

Trunking Mode in an SU and interoperability tester shall be configured as Transmission Trunking Mode. A configuration method for Trunking Mode shall be appropriately determined by the respective manufacturer.

Figure 5.1-1 shows the configuration diagram for testing. This test is done using Conference Group Voice Call or Individual Voice Call.

The description about the procedure on an RCCH is omitted for this test.

Transmission Trunking means an RTCH assignment process takes place each time when an SU transmits.

Trunking Mode is affected by the specifications of the manufacturer which manufactures an SU; hence, it is necessary to perform at least one of the following test items.

(1) Verify that an SU begins to send a VCALL_REQ message on an RCCH when the PTT control of SU is activated again after the SU ends transmission on an RTCH, under the condition that no Hold Time is configured for an interoperability tester.
(2) Verify that an SU does not transmit on an RTCH when the PTT control of SU is activated again after the SU ends transmission on an RTCH, under the condition that Hold Time is configured for an interoperability tester and that a TX_REL_EX message representing the Transmit Inhibit is sent during the period of the Hold Time.
(3) Or, it may be verified that an SU conforms to Transmission Trunking behavior specified by the SU manufacturer.

5.1.21. Message Trunking Test

This test shall verify the SU behaviors while in Message Trunking Mode.

Trunking Mode in an SU and interoperability tester shall be configured as Message Trunking Mode. A configuration method for Trunking Mode shall be appropriately determined by the respective manufacturer.

Figure 5.1-1 shows the configuration diagram for testing. This test is done using Conference Group Voice Call or Individual Voice Call.
The description about the procedure on an RCCH is omitted for this test.

Message Trunking means a behavior that an SU can repeatedly transmit on the same RTCH during a period of Hold Time.
Trunking Mode is affected by the specifications of the manufacturer which manufactures an SU; hence, it is necessary to perform at least one of the following test items.

(1) Verify that an SU retransmits on an RTCH when the PTT control of SU is activated again after the SU ends transmission on the RTCH, under the condition that Hold Time is configured for an interoperability tester and that a TX_REL message is sent during the period of Hold Time.
(2) Verify that an SU retransmits on an RTCH when the PTT control of SU is activated again after the SU ends transmission on the RTCH, under the condition that Hold Time is configured for an interoperability tester and that a TX_REL_EX message representing the Transmit Permit is sent during the period of Hold Time.
(3) Or, it may be verified that an SU conforms to Message Trunking behavior specified by the SU manufacturer.

5.1.22. Control Channel Switchover Test

This test shall verify that an SU migrates to the switched RCCH if the RCCH switchover takes place. Figure 5.1-3 shows the configuration diagram for testing.

(1) Turn an SU ON and keep it in the idle state.
(2) Verify that the SU migrates to the specified new channel number and goes into the idle state when an interoperability tester sends a CCH_INFO message as described in Table 5.1-39.

Location ID	010000000000000000100001b (Local, Sys = 1, Site = 1)
Current	0b
New	1b
Add	0b
Delete	0b
Control Channel 1	Depending on the test configuration

Table 5.1-39 CCH_INFO Message for Interoperability Tester

5.1.23. Control Channel Add/Delete Test

This test shall verify that an SU adds to or deletes from a control channel list if addition or deletion of RCCH takes place. Figure 5.1-3 shows the configuration diagram for testing.

5.1.23.1. Control Channel Add

(1) Turn an SU ON and keep it in the idle state.
(2) Send a CCH_INFO message representing ADD as described in Table 5.1-40.from an interoperability tester.
(3) Subsequently, verify that the SU acquires the added RCCH by a control channel hunt when an interoperability tester transmits the RCCH at the frequency allocated to the added channel number.

5.1.23.2. Control Channel Delete

(1) Turn an SU ON and keep it in the idle state.
(2) Send a CCH_INFO message representing DELETE as described in Table 5.1-40 from interoperability tester.
(3) Subsequently, verify that the SU does not acquire the deleted RCCH by a control channel hunt when an interoperability tester transmits the RCCH at the frequency allocated to the deleted channel number.

Location ID	010000000000000000100001b (Local, Sys = 1, Site = 1)
Current	0b
New	0b
Add	1b (ADD), 0b (DELETE)
Delete	0b (ADD), 1b (DELETE)
Control Channel 1	Depending on the test configuration

Table 5.1-40 CCH_INFO Message for Interoperability Tester

5.1.24. 1st and 2nd Control Channel Test

This test shall verify that an SU performs Registration on either the 1st control channel or 2nd control channel in accordance with the value of Unit ID if a TRS has a multiple number of RCCH. Figure 5.1-3 shows the configuration diagram for testing.

(1) Send a SITE_INFO message as described in Table 5.1-41 on a 1st control channel and 2nd control channel from an interoperability tester.
(2) Verify that an SU sends a REG_REQ message as described in Table 5.1-26 on a 1st control channel when the SU with an odd-numbered Unit ID is turned ON.
(3) Verify that an SU sends a REG_REQ message as described in Table 5.1-26 on a 2nd control channel when the SU with an even-numbered Unit ID is turned ON.

Location ID	010000000000000000100001b (Local, Sys = 1, Site = 1)
Channel Structure Information	Depending on the test configuration
Service Information	ditto
Restriction Information	ditto
Channel Access Information	ditto
Version Number	ditto
Adjacent Site Allocation	ditto
1st Control Channel	ditto
2nd Control Channel	ditto

Table 5.1-41 SITE_INFO Message for Interoperability Tester

5.1.25. Color Code Test

Color Code is allocated to RAN on SR Information, and the lower 6 bits in Site Code is assigned to Color Code.

This test shall verify that an SU determines that received signals are sent from another site if the received RAN code differs from a RAN code for the site where Registration was done.

Figure 5.1-1 shows the configuration diagram for testing.

The called SU represented in Section 5.1.1.1.2 is tested to revert to an RCCH without outputting received audio signals if an interoperability tester sends a voice call with a different RAN code.

(1) Turn the SU No. 2 ON and keep it in the idle state.
(2) Verify that the SU migrates to the specified RTCH and goes into the receiving state when an interoperability tester sends a VCALL_ASSGN message as described in Table 5.1-3.
(3) Verify that the SU reverts to an RCCH without outputting the received audio signals when an interoperability tester sends a VCALL message using a different RAN code as described in Table 5.1-42.

Mode / Element	**4800 bps/EHR**	**9600 bps/EHR**	**9600 bps/EFR**
RAN	Incorrect RAN		
CC Option	00		
Call Type	001b		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 1		
Destination Group ID	Group ID of SU No. 1		
Cipher Type	00b		
Key ID	000000b		

Table 5.1-42 VCALL Message for Interoperability Tester

5.1.26. Random Access Test

This test shall verify that the random access of SU correctly behaves.

Figure 5.1-3 shows the configuration diagram for testing. No message to be used for testing shall be specified.

Following are two random access behaviors to be tested.

(1) Transmission of Single Frame on a Short CAC which can be used by Voice Call, etc.

(2) Transmission of Multi Frame on a Long CAC which can be used by Short Data Call.

5.1.26.1. Random Access Test for Single Frame

(1) Verify that an SU does not initiate a random access transmission if a parameter for collision control field sent from an interoperability tester is I/B = B.

(2) Verify that an SU does not initiate a random access transmission if parameters for collision control field sent from an interoperability tester are I/B = I and CK = NG.

(3) Verify that an SU fails a random access transmission if a parameter for collision control field sent from interoperability tester is I/B = B and the predetermined Random Access Timer expires while the parameter remains the same.

(4) Verify that an SU does a random access transmission if a parameter for collision control field sent from an interoperability tester is I/B = I.

(5) Verify that an SU retries a random access if parameters for collision control field sent from an interoperability tester are as follows after doing a random access transmission:
R/N = N
PE = Value for CRC in a transmitted Short CAC

(6) Verify that an SU retries a random access if parameters for collision control field sent from an interoperability tester are as follows after doing a random access transmission:
R/N = R
PE = Value except for a value for CRC in a transmitted Short CAC (three bit errors or more)

(7) Verify that an SU does not retry a random access if parameters for collision control field sent from an interoperability tester are as follows after doing a random access transmission:
R/N = R
PE = Value except for a value for CRC in a transmitted Short CAC (two bit errors or less)

5.1.26.2. Random Access Test for Multi Frame

(1) Verify that an SU sequentially sends the remaining frame from the next inbound frame if parameters for the collision field sent from an interoperability tester are as follows after the SU sends the first frame using random access.
P/D = P
CK = OK
R/N = R
PE = Value for CRC in a transmitted Long CAC

(2) Verify that an SU retries a random access if parameters for collision control field sent from an interoperability tester are as follows after the SU sends the first frame using random access:
P/D = D
CK = OK
R/N = R
PE = Value for CRC in a transmitted Long CAC

(3) Verify that an SU retries a random access if parameters for collision control field sent from an interoperability tester are as follows after the SU sends the first frame using random access:
P/D = P
CK = NG
R/N = R
PE = Value for CRC in a transmitted Long CAC

(4) Verify that an SU retries a random access if parameters for collision control field sent from an interoperability tester are as follows after the SU sends the first frame using random access:
P/D = P
CK = OK
R/N = N
PE = Value for CRC in a transmitted Long CAC

(5) Verify that an SU retries a random access if parameters for collision control field sent from an interoperability tester are as follows after the SU sends the first frame using random access:
P/D = P
CK = OK
R/N = R
PE = Value except for a value for CRC in a transmitted Long CAC (three bit errors or more)

5.1.27. Encryption Test

This test shall verify that the calling SU performs the correct encryption processing and the called SU performs the correct decryption processing.

This test, except for Section 5.1.27.2, shall be done after completion of channel assignment on an RCCH, and the testing procedure on an RCCH is omitted in this document.

No mode to be used for testing shall be specified.

5.1.27.1. Encrypted Voice Call Test

Figure 5.1-1 shows the configuration diagram for testing. Following is the message to be applied.

Table 5.1-43: VCALL message

Table 5.1-44: VCALL_IV message (DES/AES Encryption)

5.1.27.1.1. Encrypted Voice Call Test for Receiver

This test shall verify that when an interoperability tester sends an encrypted voice call, a unit under test correctly outputs the received audio signal.

Configuring conditions for Cipher Type and Key ID on the transmission side (interoperability tester) and the reception side (unit under test) as well as the received voice output conditions for respective configuring conditions are presented in Table 5.1-45.

In the event that a Key ID for an interoperability tester is identical to that for a unit under test, the encryption key shall also be identical.

5.1.27.1.1.1. Scramble Encrypted Voice Call Test

In this test, parameters for messages to be used shall apply the values for Scramble Encryption. The test procedures are presented below.

(1) Verify when an interoperability tester sends an encrypted voice call using a VCALL message as described in Table 5.1-43, SU No. 2 correctly outputs the received audio signal.
(2) Verify that SU No. 2 behaves in accordance with the received audio signal output conditions as described in Table 5.1-45.

5.1.27.1.1.2. DES Encrypted Voice Call Test

In this test, parameters for messages to be used shall apply the values for DES Encryption. The test procedures are presented below.

(1) Verify when an interoperability tester sends an encrypted voice call using a VCALL message as described in Table 5.1-43 and a VCALL_IV message as described in Table 5.1-44, SU No. 2 correctly outputs the received audio signal.
(2) Verify that SU No. 2 behaves in accordance with the received audio signal output conditions as described in Table 5.1-45.

5.1.27.1.1.3. AES Encrypted Voice Call Test

In this test, parameters for messages to be used shall apply the values for AES Encryption. Testing Procedures shall be identical to those tests for DES Encrypted Voice Call as described in Section 5.1.27.1.1.2.

5.1.27.1.2. Encrypted Voice Call Test for Transmitter

This test shall verify that a unit under test correctly performs the encryption processing by verifying the received audio signals outputted from an interoperability tester when a unit under test sends an encrypted voice call.

5.1.27.1.2.1. Scramble Encrypted Voice Call Test

In this test, parameters for messages to be used shall apply the values for Scramble Encryption. The test procedures are presented below.

(1) Send an encrypted voice call using a VCALL message as described in Table 5.1-43 from SU No. 1.
(2) Compare the contents of the VCALL message received by an interoperability tester with those of the VCALL message as presented in Table 5.1-43.
(3) Also, verify that an interoperability tester outputs the normal received audio signal.

5.1.27.1.2.2. DES Encrypted Voice Call Test

In this test, parameters for messages to be used shall apply the values for DES Encryption.
The test procedures are presented below.

(1) Send an encrypted voice call using a VCALL message as described in Table 5.1-43 and a VCALL_IV message as described in Table 5.1-44 from SU No. 1.
(2) Compare the contents of the VCALL message and the VCALL_IV message received by an interoperability tester with those of the VCALL message as presented in Table 5.1-43 and the VCALL_IV message as presented in Table 5.1-44.
(3) Also, verify that an interoperability tester outputs the normal received audio signal.

5.1.27.1.2.3. AES Encrypted Voice Call Test

In this test, parameters for messages to be used shall apply the values for AES Encryption.
Testing Procedures shall be identical to those tests for DES Encrypted Voice Call as described in Section 5.1.27.1.2.2.

5.1.27.2. Encrypted Short Data Call Test

Figure 5.1-2 shows the configuration diagram for testing. Following is the message to be applied.
Table 5.1-46: SDCALL_REQ (Header) message
Table 5.1-47: SDCALL_IV message (DES/AES Encryption)

5.1.27.2.1. Encrypted Short Data Call Test for Receiver

This test shall verify that when an interoperability tester sends an encrypted short data call, a unit under test correctly receives the user data.
Configuring conditions for Cipher Type and Key ID on the transmission side (interoperability tester) and the reception side (unit under test) as well as the data reception conditions for respective configuring conditions are presented in Table 5.1-48.
In the event that a Key ID for an interoperability tester is identical to that for a unit under test, the encryption key shall also be identical.

5.1.27.2.1.1. Scramble Encrypted Short Data Call Test

In this test, parameters for messages to be used shall apply the values for Scramble Encryption.
The test procedures are presented below.

(1) Verify that SU No. 2 correctly receives User Data when an interoperability tester sends an encrypted short data call using a SDCALL_REQ (Header) message as described in Table 5.1-46 and a SDCALL_REQ (User Data) message.
(2) Verify that SU No. 2 behaves in accordance with the data reception conditions as described in Table 5.1-48.

5.1.27.2.1.2. DES Encrypted Short Data Call Test

In this test, parameters for messages to be used shall apply the values for DES Encryption.
The test procedures are presented below.

(1) Verify that SU No. 2 correctly receives User Data when an interoperability tester sends an encrypted short data call using a SDCALL_REQ (Header) message as described in Table 5.1-46, a SDCALL_IV message as described in Table 5.1-47 and a SDCALL_REQ (User Data) message.
(2) Verify that SU No. 2 behaves in accordance with the data reception conditions as described in Table 5.1-48.

5.1.27.2.1.3. AES Encrypted Short Data Call Test

In this test, parameters for messages to be used shall apply the values for AES Encryption.
Testing Procedures shall be identical to those tests for DES Encrypted Short Data Call as described in Section 5.1.27.2.1.2.

5.1.27.2.2. Encrypted Short Data Call Test for Transmitter

This test shall verify that the unit under test correctly performs the encryption processing by verifying the received data outputted from an interoperability tester when a unit under test sends an encrypted short data call.

5.1.27.2.2.1. Scramble Encrypted Short Data Call Test

In this test, parameters for messages to be used shall apply the values for Scramble Encryption.
The test procedures are presented below.

(1) Send an encrypted short data call using a SDCALL_REQ (Header) message as described in Table 5.1-46 and a SDCALL_REQ (User Data) message from SU No. 1.
(2) Compare the contents of the SDCALL_REQ message received by an interoperability tester with those of the SDCALL_REQ message as presented in Table 5.1-46.
(3) Also, verify that an interoperability tester outputs the normal User Data.

5.1.27.2.2.2. DES Encrypted Short Data Call Test

In this test, parameters for messages to be used shall apply the values for DES Encryption.
The test procedures are presented below.

(1) Send an encrypted short data call using a SDCALL_REQ (Header) message as described in Table 5.1-46, a SDCALL_IV message as described in Table 5.1-47 and a SDCALL_REQ (User Data) message from SU No. 1.
(2) Compare the contents of the SDCALL_REQ message and the SDCALL_IV message received by an interoperability tester with those of the SDCALL_REQ message as presented in Table 5.1-46 and the SDCALL_IV message as presented in Table 5.1-47.
(3) Also, verify that an interoperability tester outputs the normal User Data.

5.1.27.2.2.3. AES Encrypted Short Data Call Test

In this test, parameters for messages to be used shall apply the values for AES Encryption.

Testing Procedures shall be identical to those tests for DES Encrypted Short Data Call as described in Section 5.1.27.2.2.2.

5.1.27.3. Encrypted Long Data Call Test

Figure 5.1-2 shows the configuration diagram for testing. Following is the message to be applied.

Table 5.1-49: DCALL (Header) message (Scramble Encryption)

Table 5.1-50: DCALL (Header) message (DES/AES Encryption)

5.1.27.3.1. Encrypted Long Data Call Test for Receiver

This test shall verify that when an interoperability tester sends an encrypted long data call, a unit under test correctly receives the user data.

Configuring conditions for Cipher Type and Key ID on the transmission side (interoperability tester) and the reception side (unit under test) as well as the data reception conditions for respective configuring conditions are presented in Table 5.1-48.

In the event that a Key ID for an interoperability tester is identical to that for a unit under test, the encryption key shall also be identical.

5.1.27.3.1.1. Scramble Encrypted Long Data Call Test

In this test, parameters for messages to be used shall apply the values for Scramble Encryption.

The test procedures are presented below.

(1) Verify that SU No. 2 correctly receives User Data when an interoperability tester sends an encrypted long data call using a DCALL (Header) message as described in Table 5.1-49 and a DCALL (User Data) message.

(2) Verify that SU No. 2 behaves in accordance with the data reception conditions as described in Table 5.1-48.

5.1.27.3.1.2. DES Encrypted Long Data Call Test

In this test, parameters for messages to be used shall apply the values for DES Encryption.

The test procedures are presented below.

(1) Verify that SU No. 2 correctly receives User Data when an interoperability tester sends an encrypted long data call using a DCALL (Header) message as described in Table 5.1-50 and a DCALL (User Data) message.

(2) Verify that SU No. 2 behaves in accordance with the data reception conditions as described in Table 5.1-48.

5.1.27.3.1.3. AES Encrypted Long Data Call Test

In this test, parameters for messages to be used shall apply the values for AES Encryption.

Testing Procedures shall be identical to those tests for DES Encrypted Long Data Call as described in Section 5.1.27.3.1.2.

5.1.27.3.2. Encrypted Long Data Call Test for Transmitter

This test shall verify that a unit under test correctly performs the encryption processing by verifying the received data outputted from an interoperability tester when the unit under test sends an encrypted long data call.

5.1.27.3.2.1. Scramble Encrypted Long Data Call Test

In this test, parameters for messages to be used shall apply the values for Scramble Encryption.

The test procedures are presented below.

(1) Send an encrypted long data call using a DCALL (Header) message as described in Table 5.1-49 and a DCALL (User Data) from SU No. 1.
(2) Compare the contents of the DCALL message received by an interoperability tester with those of the DCALL message as described in Table 5.1-49.
(3) Also, verify that an interoperability tester outputs the normal User Data.

5.1.27.3.2.2. DES Encrypted Long Data Call Test

In this test, parameters for messages to be used shall apply the values for DES Encryption.

The test procedures are presented below.

(1) Send an encrypted long data call using a DCALL (Header) message as described in Table 5.1-50 and a DCALL (User Data) from SU No. 1.
(2) Compare the contents of the DCALL message received by an interoperability tester with those of the DCALL message as described in Table 5.1-50.
(3) Also, verify that an interoperability tester outputs the normal User Data.

5.1.27.3.2.3. AES Encrypted Long Data Call Test

In this test, parameters for messages to be used shall apply the values for AES Encryption.

Testing Procedures shall be identical to those tests for DES Encrypted Long Data Call as described in Section 5.1.27.3.2.2.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	100b (Individual Call) 001b (Conference Group Call) 000b (Broadcast Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 1		
Destination Group/Unit ID	Unit ID of SU No. 2 (Individual Call) Valid Group ID (Group Call)		
Cipher Type	01b (Scramble) 10b (DES) 11b (AES)		
Key ID	000000b to 111111b		

Table 5.1-43 VCALL Message (Encryption)

Initialization Vector	0000000000000001 to FFFFFFFFFFFFFFFF

Table 5.1-44 VCALL_IV Message (DES/AES Encryption)

Cipher Type	Key ID	Receive Audio Output
Equal	Equal	Normal Audio
Equal	Not Equal	Mute or Abnormal Audio

Table 5.1-45 Encryption Test Conditions for Voice Call

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of SU No. 1	
Destination Group/Unit ID	Unit ID of SU No. 2 (Individual Call) Valid Group ID (Group Call)	
Cipher Type	01b (Scramble) 10b (DES) 11b (AES)	
Key ID	000000b to 111111b	
Packet Information	Except for the following, depends on the format to be used for testing. Delivery Flag = 0 (Group Call) Delivery Flag = 1 (Individual Call)	

Table 5.1-46 SDCALL_REQ (Header) Message (Encryption)

Initialization Vector	0000000000000001 to FFFFFFFFFFFFFFFF

Table 5.1-47 SDCALL_IV Message (DES/AES Encryption)

Cipher Type	Key ID	Receive Conditions
Equal	Equal	Normal Data
Equal	Not Equal	Message CRC Error

Table 5.1-48 Encryption Test Conditions for Short Data Call/ Data Call

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	000010b
Source Unit ID	Unit ID of SU No. 1	
Destination Group/Unit ID	Unit ID of SU No. 2 (Individual Call) Valid Group ID (Group Call)	
Cipher Type	01b	
Key ID	000000b to 111111b	
Packet Information	Except for the following, depends on the format to be used for testing. Delivery Flag = 0 (Group Call) Delivery Flag = 1 (Individual Call)	

Table 5.1-49 DCALL (Header) Message (Scramble Encryption)

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	000010b
Source Unit ID	Unit ID of SU No. 1	
Destination Group/Unit ID	Unit ID of SU No. 2 (Individual Call) Valid Group ID (Group Call)	
Cipher Type	01b	
Key ID	000000b to 111111b	
Packet Information	Except for the following, depends on the format to be used for testing. Delivery Flag = 0 (Group Call) Delivery Flag = 1 (Individual Call)	
Initialization Vector	0000000000000001 to FFFFFFFFFFFFFFFF	

Table 5.1-50 DCALL (Header) Message (DES/AES Encryption)

5.2. TR Testing

5.2.1. Control Channel Structure Test

Outbound RCCH consists of a superframe structure, and a frame containing the function channel such as BCCH, CCCH and UPCH is transmitted. This test shall verify that the superframe is correctly structured.

A BCCH including a SITE_INFO message is allocated to the 1st frame in the superframe and Location ID and Channel Structure Information in the SITE_INFO message are specified in Table 5.2-1.

Regarding the message format to be used on an RCCH, a BCCH which is the 1st frame in the superframe as described in Table 5.2-2 shall use Single Message Format; however, a CCCH except BCCH can use either Single Message Format or Dual Message Format.

Figure 5.2-2 shows the configuration diagram for testing.

(1) Turn a TR ON and start transmitting on an RCCH.
(2) Analyze the frame structure and contents of message using an interoperability tester, and compare them with those described in Figure 5.2-1 and Table 5.2-2.

A SITE_INFO message to be used during the subsequent tests shall contain a Location ID as described in Table 5.2-1, and the superframe structure defined in Channel Structure Information shall be arbitrary. Also, either Single Message Format or Dual Message Format can be used as a message structure on an RCCH.

Location ID	01000000000000000000100001b (Local, Sys = 1, Site = 1)
Channel Structure Information	0100100100010100b (Bn = 1, Gn = 1, Pn = 2, Mn = 1, In = 4)
Service Information	Depending on the test configuration
Restriction Information	ditto
Channel Access Information	ditto
Version Number	ditto
Adjacent Site Allocation	ditto
1st Control Channel	ditto
2nd Control Channel	ditto

Table 5.2-1 SITE_INFO Message for TR

BCCH	CCCH UPCH (P)	CCCH UPCH (P)	CCCH UPCH (M)	CCCH UPCH (P)	CCCH UPCH (P)	CCCH UPCH (M)	CCCH UPCH (P)	CCCH UPCH (P)	CCCH UPCH (M)	CCCH UPCH (P)	CCCH UPCH (P)	CCCH UPCH (M)
#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13

(P) Paging Frame

(M) Multipurpose Frame

Figure 5.2-1 Superframe on an RCCH

Superframe (#1)		Superframe (#2, #3, #5, #6, #8, #9, #11, #12)		Superframe (#4, #7, #10, #13)	
SR Information	10000001b (Single)	SR Information	00000001b (Single) 01000001b (Dual)	SR Information	00000001b (Single) 01000001b (Dual)
BCCH	SITE_INFO	CCCH Or UPCH (P)	A Message that may be sent on a paging frame	CCCH Or UPCH (M)	A Message that may be sent on a multipurpose frame

Table 5.2-2 Frame on an RCCH

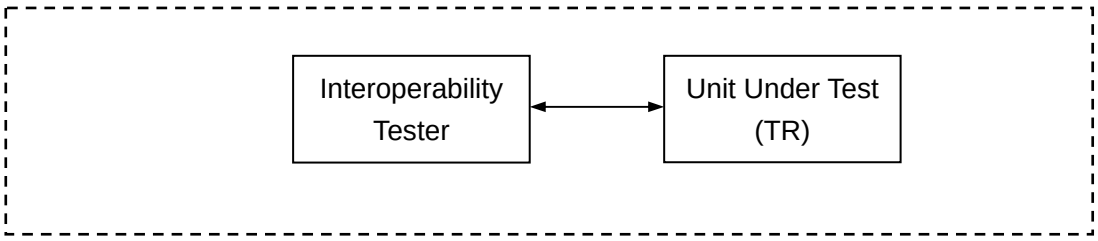


Figure 5.2-2 Configuration for Control Channel Structure Test

5.2.2. Group Voice Call Test

This test shall verify that contents of messages used for Group Voice Call are correct, and that the unit under test correctly responds to these messages.

This test is includes the test methods for the following two modes:

(1) Conference Group Call

(2) Broadcast Group Call

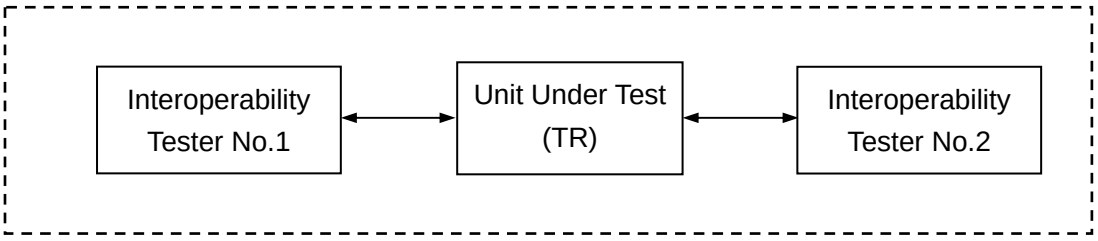


Figure 5.2-3 Configuration for Group Voice Call Test

Figure 5.2-3 shows the configuration diagram for testing. Each test shall be performed in the condition that the calling SU is Interoperability tester No. 1 and the called SU is Interoperability tester No. 2. The following 3 types of messages shall be applied.

Table 5.2-3: VCALL_REQ message for Interoperability Tester No. 1

Table 5.2-5: VCALL_ASSGN/ VCALL_ASSGN_DUP messages for TR

Table 5.2-6: DISC message for TR

5.2.2.1. Conference Group Call Test

In this test, parameters for messages to be used shall apply the values for Conference Group Call.

5.2.2.1.1. Case 1 - Group Call Permission

(1) Verify that a TR sends a VCALL_ASSGN message as described in Table 5.2-5 when Interoperability tester No. 1 sends a VCALL_REQ message as described in Table 5.2-3.

(2) Verify that the TR subsequently keeps sending a VCALL_ASSGN_DUP message or VCALL_ASSGN message as described in Table 5.2-5 while an RTCH is in use.

(3) Verify that Interoperability tester No. 2 correctly outputs received audio signal, when Interoperability tester No. 1 sends a voice call on an RTCH and the TR repeats the signal.

(4) Verify that the TR sends a DISC message as described in Table 5.2-6 on an RTCH when it completes transmission on an RTCH.

5.2.2.2. Broadcast Group Call Test

In this test, parameters for messages to be used shall apply the values for Broadcast Group Call.

Testing identical to that done for Conference Group Call as described in Section 5.2.2.1 shall be done.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	100b (Individual Call) 001b (Conference Group Call/ All Call) 000b (Broadcast Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No.1		
Destination Group/Unit ID	Valid Group ID (Group Call) FFFF as All Group (All Call) Unit ID of Interoperability Tester No. 2 (Individual Call)		

Table 5.2-3 VCALL_REQ Message for Interoperability Tester No. 1

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	100b (Individual Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No. 2		
Destination Unit ID	Unit ID of Interoperability Tester No. 1		
Cause (VD)	32 (Queue when Called SU is being alerted)		

Table 5.2-4 VCALL_RESP Message for TR

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	100b (Individual Call) 001b (Conference Group Call/ All Call) 000b (Broadcast Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No. 1		
Destination Group/Unit ID	Valid Group ID (Group Call) FFFF as All Group (All Call) Unit ID of Interoperability Tester No. 2 (Individual Call)		
Call Timer	Any		
Channel	Depending on the test configuration		

Table 5.2-5 VCALL_ASSGN/ VCALL_ASSGN_DUP Message for TR

CC Option	00
Call Type	100b (Individual Call) 001b (Conference Group Call) 000b (Broadcast Group Call)
Source Unit ID	Unit ID of Interoperability Tester No. 1
Destination Group/Unit ID	Valid Group ID (Group Call) Unit ID of Interoperability Tester No. 2 (Individual Call)
Cause (DISC)	Depending on the test configuration

Table 5.2-6 DISC Message for TR

5.2.3. Individual Voice Call Test

This test shall verify that contents of messages used for Individual Voice Call are correct, and that the unit under test correctly responds to these messages.

This test includes the test methods for the following three modes. To verify the interoperability, a unit under test shall pass the test item for at least one of procedure (1) to procedure (3).

(1) In the case that the availability of the called SU is not verified and a voice call transmission on an RTCH is started from the calling SU

(2) In the case that the availability of the called SU is verified and a voice call transmission on an RTCH is started from the calling SU

(3) In the case that the availability of the called SU is verified and a voice call transmission on an RTCH is started from the called SU

Figure 5.2-3 shows the configuration diagram for testing. Each test shall be performed in the condition that the calling SU is Interoperability tester No. 1 and the called SU is Interoperability tester No. 2. The following 7 types of messages shall be applied.

Table 5.2-3: VCALL_REQ message for Interoperability Tester

Table 5.2-4: VCALL_RESP message for TR

Table 5.2-5: VCALL_ASSGN/ VCALL_ASSGN_DUP messages for TR

Table 5.2-6: DISC message for TR

Table 5.2-7: VCALL_REC_REQ message for TR

Table 5.2-8: VCALL_REC_RESP message for Interoperability Tester No. 2

Table 5.2-9: VCALL_CONN_REQ message for Interoperability Tester No. 2

Values for Individual Call shall be applied to parameters for each table.

5.2.3.1. Individual Call Test 1

Testing identical to that done for Conference Group Call as described in Section 5.2.2.1 shall be done.

In this test, parameters for messages to be used shall apply the values for Individual Call.

5.2.3.2. Individual Call Test 2

5.2.3.2.1. Case 1 – Individual Call Permission

(1) Verify that a TR sends a VCALL_REC_REQ message as described in Table 5.2-9 when Interoperability tester No. 1 sends a VCALL_REQ message as described in Table 5.2-3.

(2) Verify that the TR sends a VCALL_ASSGN message as described in Table 5.2-5 when Interoperability tester No. 2 sends a VCALL_REC_RESP message representing normal acceptance as described in Table 5.2-8.

(3) Verify that the TR subsequently keeps sending a VCALL_ASSGN_DUP message or VCALL_ASSGN message as described in Table 5.2-5 while an RTCH is in use.

(4) Verify that Interoperability tester No. 2 correctly outputs received audio signal, when Interoperability tester No. 1 sends a voice call on an RTCH and the TR repeats the signal.

(5) Verify that the TR sends a DISC message as described in Table 5.2-6 on an RTCH when it completes transmission on an RTCH.

5.2.3.3. Individual Call Test 3

5.2.3.3.1. Case 1 – Individual Call Permission

(1) Verify that a TR sends a VCALL_REC_REQ message as described in Table 5.2-7 when Interoperability tester No. 1 sends a VCALL_REQ message as described in Table 5.2-3.

(2) Verify that the TR sends a VCALL_RESP message as described in Table 5.2-4 which represents the queue when a called unit is being alerted, when Interoperability tester No. 2 sends a VCALL_REC_RESP message representing normal acceptance as described in Table 5.2-8.

(3) Verify that the TR sends a VCALL_ASSGN message as described in Table 5.2-5 when Interoperability tester No. 2 subsequently sends a VCALL_CONN_REQ message as described in Table 5.2-9.

(4) Verify that the TR subsequently keeps sending a VCALL_ASSGN_DUP message or VCALL_ASSGN message as described in Table 5.2-5 while an RTCH is in use.

(5) Verify that Interoperability tester No. 1 correctly outputs received audio signal, when Interoperability tester No. 2 sends a voice call on an RTCH and the TR repeats the signal.

(6) Verify that the TR sends a DISC message as described in Table 5.2-6 on an RTCH when it completes transmission on an RTCH.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	100b (Individual Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No. 1		
Destination Unit ID	Unit ID of Interoperability Tester No. 2		

Table 5.2-7 VCALL_REC_REQ Message for TR

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	100b (Individual Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No. 2		
Destination Unit ID	Unit ID of Interoperability Tester No. 1		
Cause (VD)	10 (Normal Acceptance)		

Table 5.2-8 VCALL_REQ_RESP Message for Interoperability Tester No. 2

Element \ Mode	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	100b (Individual Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No. 2		
Destination Unit ID	Unit ID of Interoperability Tester No. 1		

Table 5.2-9 VCALL_CONN_REQ Message for Interoperability Tester No. 2

5.2.4. All Call Test

This test shall verify that contents of messages used for All Call are correct, and that the unit under test correctly responds to these messages.

Figure 5.2-3 shows the configuration diagram for testing.

Testing identical to that done for Conference Group Call as described in Section 5.2.2.1 shall be done.

In this test, parameters for messages to be used shall apply the values for All Call.

5.2.5. Short Data Call Test

This test shall verify that contents of messages used for the Short Data Call are correct, and that the unit under test correctly responds to these messages.

This test includes the test methods for the following two modes. To verify the interoperability, a unit under test shall pass the test item for at least either of mode (1) or mode (2).

(1) Broadcast Short Data Call

(2) Unit to Unit Short Data Call

Figure 5.2-3 shows the configuration diagram for testing.

The following 2 types of messages shall be applied.

Table 5.2-10: SDCALL_REQ (Header) message for Interoperability Tester No. 1 and TR

Table 5.2-11: SDCALL_RESP message for Interoperability Tester No. 2 and TR

SDCALL_REQ (User Data) messages are recommended to be constructed with User Data not exceeding 100 bytes. No contents of User Data are specified in this document.

5.2.5.1. Broadcast Short Data Call Test

In this test, parameters for messages to be used shall apply the values for Group Call.

5.2.5.1.1. Case 1 – Short Data Success

(1) Verify that a TR sends a SDCALL_RESP message representing the Send Success as described in Table 5.2-11, when Interoperability tester No. 1 sends a SDCALL_REQ (Header) message as described in Table 5.2-10 and SDCALL_REQ (User Data) message.

(2) Verify that the TR sends the same messages as a SDCALL_REQ (Header) message and SDCALL_REQ (User Data) message, which are sent by an interoperability tester No. 1 in step (1).

5.2.5.2. Unit to Unit Short Data Call Test

5.2.5.2.1. Case 1 – Short Data Success

(1) Verify that a TR sends a SDCALL_RESP message representing the Send Success as described in Table 5.2-11, when Interoperability tester No. 1 sends a SDCALL_REQ (Header) message as described in Table 5.2-10 and SDCALL_REQ (User Data) message.

(2) Verify that the TR sends the same messages as a SDCALL_REQ (Header) message and SDCALL_REQ (User Data) message, which are sent by an interoperability tester No. 1 in step (1).

(3) Verify that the TR sends a SDCALL_RESP message representing the Receive Success as described in Table 5.2-11, when Interoperability tester No. 2 sends a SDCALL_RESP message representing the Receive Success as described in Table 5.2-11.

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of Interoperability Tester No. 1	
Destination Group/Unit ID	Unit ID of Interoperability Tester No. 2 (Individual Call) Valid Group ID (Group Call)	
Cipher Type	00b	
Key ID	000000b	
Packet Information	Except for the following, depends on the format to be used for testing. Delivery Flag = 0 (Group Call) Delivery Flag = 1 (Individual Call)	

Table 5.2-10 SDCALL_REQ (Header) Message for Interoperability Tester No. 1 and TR

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of Interoperability Tester No. 2 (Individual Call) FFF0 as TC ID (Group Call)	
Destination Unit ID	Unit ID of Interoperability Tester No. 1	
Cause (SS)	02 (Send Success) 01 (Receive Success)	
Error Block Flag	0000	

Table 5.2-11 SDCALL_RESP Message for Interoperability Tester No. 2 and TR

5.2.6. Data Call Test

This test shall verify that contents of messages used for Data Call are correct, and that the unit under test correctly responds to these messages.

This test includes the test methods for the following two modes: To verify the interoperability, a unit under test shall pass the test item for at least either of mode (1) or mode (2).

(1) Broadcast Data Call

(2) Unit to Unit Data Call

Figure 5.2-3 shows the configuration diagram for testing.

The following 5 types of messages shall be applied.

Table 5.2-6: DISC message for TR

Table 5.2-12: DCALL_REQ message for Interoperability Tester No. 1

Table 5.2-13: DCALL_REC_REQ message for TR

Table 5.2-14: DCALL_REC_RESP message for Interoperability Tester No. 2

Table 5.2-15: DCALL_ASSGN message for TR

It is recommended that DCALL (User Data) messages are constructed using User Data having a data length that is divided into multiple packets. No contents of User Data are specified in this document.

5.2.6.1. Broadcast Data Call Test

In this test, parameters for messages to be used shall apply the values for Group Call.

5.2.6.1.1. Case 1 - Group Call Permission

(1) Verify that a TR sends a DCALL_ASSGN message as described in Table 5.2-15 when Interoperability tester No. 1 sends a DCALL_REQ message as described in Table 5.2-12.

(2) Verify that Interoperability tester No. 2 correctly outputs the received data, when Interoperability tester No. 1 sends a data call on an RTCH and the TR repeats the signal.

(3) Verify that the TR sends a DISC message as described in Table 5.2-6 on an RTCH when it completes transmission on an RTCH.

5.2.6.2. Unit to Unit Data Call Test

In this test, parameters for messages to be used shall apply the value for Individual Call.

5.2.6.2.1. Case 1 – Individual Call Permission

(1) Verify that a TR sends a DCALL_REC_REQ message as described in Table 5.2-13 when Interoperability tester No. 1 sends a DCALL_REQ message as described in Table 5.2-12.

(2) Verify that the TR sends a DCALL_ASSGN message as described in Table 5.2-15 when Interoperability tester No. 2 sends a DCALL_REC_RESP message representing normal acceptance as described in Table 5.2-14.

(3) Verify that Interoperability tester No. 2 correctly outputs the received data, when Interoperability tester No. 1 sends a data call on an RTCH and the TR repeats the signal.

(4) Verify that the TR sends a DISC message as described in Table 5.2-6 on an RTCH when it completes transmission on an RTCH.

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of Interoperability Tester No. 1	
Destination Group/Unit ID	Unit ID of Interoperability Tester No. 2 (Individual Call) Valid Group ID (Group Call)	

Table 5.2-12 DCALL_REQ Message for Interoperability Tester No. 1

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of Interoperability Tester No. 1	
Destination Unit ID	Unit ID of Interoperability Tester No. 2	

Table 5.2-13 DCALL_REC_REQ Message for TR

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call)	
Data Call Option	00000b	00010b
Source Unit ID	Unit ID of Interoperability Tester No. 2	
Destination Unit ID	Unit ID of Interoperability Tester No. 1	
Cause (VD)	10 (Normal Acceptance)	

Table 5.2-14 DCALL_REC_RESP Message for Interoperability Tester No. 2

Mode / Element	4800 bps	9600 bps
CC Option	00	
Call Type	100b (Individual Call) 001b (Group Call)	
Data Call Option	00000b	000010b
Source Unit ID	Unit ID of Interoperability Tester No. 1	
Destination Group/Unit ID	Unit ID of Interoperability Tester No. 2 (Individual Call) Valid Group ID (Group Call)	
Call Timer	Any	
Channel	Depending on the test configuration	

Table 5.2-15 DCALL_ASSGN Message for TR

5.2.7. Status Notice Test

This test shall verify that contents of messages used for Status Call are correct, and that the unit under test correctly responds to these messages.

This test includes the test methods for the following two modes. To verify the interoperability, a unit under test shall pass the test item for at least either of mode (1) or mode (2).

(1) Broadcast Status Call

(2) Status Call

Figure 5.2-3 shows the configuration diagram for testing.

The following 2 types of messages shall be applied.

Table 5.2-16: STAT_REQ message for Interoperability Tester No. 1 and TR

Table 5.2-17: STAT_RESP message for Interoperability Tester No. 2 and TR

5.2.7.1. Broadcast Status Call Test

In this test, parameters for messages to be used shall apply the values for Group Call.

5.2.7.1.1. Case 1 – Status Call Success

(1) Verify that a TR sends a STAT_RESP message representing the Send Success as described in Table 5.2-17 when Interoperability tester No. 1 sends a STAT_REQ message as described in Table 5.2-16.

(2) Verify that the TR sends the same message as a STAT_REQ message that is sent by Interoperability tester No. 1 in step (1).

5.2.7.2. Status Call Test

In this test, parameters for messages to be used shall apply the values for Individual Call.

The procedure for Status Call is different between Confirmed format and Unconfirmed format.

To verify the interoperability, a unit under test shall pass the test item for at least either of the Confirmed format or the Unconfirmed format.

5.2.7.2.1. Case 1 (Confirmed) – Status Call Success

(1) Verify that a TR sends a STAT_RESP message representing the Send Success as described in Table 5.2-17 when Interoperability tester No. 1 sends a STAT_REQ message as described in Table 5.2-16.

(2) Verify that the TR sends the same message as a STAT_REQ message that is sent by Interoperability tester No. 1 in step (1).

(3) Verify that the TR sends a STAT_RESP message as described in Table 5.2-17 when Interoperability tester No. 2 sends a STAT_RESP message representing the Receive Success as described in Table 5.2-17.

5.2.7.2.2. Case 1 (Unconfirmed) – Status Call Success

(1) Verify that a TR sends a STAT_RESP message representing the Send Success as described in Table 5.2-17 when Interoperability tester No. 1 sends a STAT_REQ message as described in Table 5.2-16.

(2) Verify that the TR sends the same message as a STAT_REQ message that is sent by Interoperability tester No. 1 in step (1).

CC Option	00
Call Type	100b (Individual Call) 001b (Group Call)
Status Call Option	00000b (Unconfirmed format) 01000b (Confirmed format)
Source Unit ID	Unit ID of Interoperability Tester No. 1
Destination Group/Unit ID	Unit ID of Interoperability Tester No. 2 (Individual Call) Valid Group ID (Group Call)
Status	01 to CF (User definable)

Table 5.2-16 STAT_REQ Message for Interoperability Tester No. 1 and TR

CC Option	00
Call Type	100b (Individual Call) 001b (Group Call)
Source Unit ID	Unit ID of Interoperability Tester No. 2 (Individual Call) FFF0 as TC ID (Group Call)
Destination Unit ID	Unit ID of Interoperability Tester No. 1
Cause (SS)	02 (Send Success) 01 (Receive Success)

Table 5.2-17 STAT_RESP Message for Interoperability Tester No. 2 and TR

5.2.8. Status Inquiry Test

This test shall verify that contents of messages used for Status Inquiry processing are correct, and that the unit under test correctly responds to these messages.

Figure 5.2-3 shows the configuration diagram for testing.

The following 2 types of messages shall be applied.

Table 5.2-18: STAT_INQ_REQ message for Interoperability Tester No. 1 and TR

Table 5.2-19: STAT_INQ_RESP message for Interoperability Tester No. 2 and TR

5.2.8.1. Case 1 – Status Inquiry Success

(1) Verify that a TR sends a STAT_INQ_RESP message representing the Send Success as described in Table 5.2-19 when Interoperability tester No. 1 sends a STAT_INQ_REQ message as described in Table 5.2-18.

(2) Verify that the TR sends the same message as a STAT_INQ_REQ message that is sent by Interoperability tester No. 1 in step (1).

(3) Verify that the TR sends a STAT_INQ_RESP message as described in Table 5.2-19 when Interoperability tester No. 2 sends a STAT_INQ_RESP message representing the Receive Success as described in Table 5.2-19.

CC Option	00
Call Type	100b (Individual Call)
Status Call Option	01000b
Source Unit ID	Unit ID of Interoperability Tester No. 1
Destination Unit ID	Unit ID of Interoperability Tester No. 2

Table 5.2-18 STAT_INQ_REQ Message for Interoperability Tester No. 1 and TR

CC Option	00
Call Type	100b (Individual Call)
Source Unit ID	Unit ID of Interoperability Tester No. 2
Destination Unit ID	Unit ID of Interoperability Tester No. 1
Cause (SS)	02 (Send Success) 01 (Receive Success)
Status	01 to CF (User definable)

Table 5.2-19 STAT_INQ_RESP Message for Interoperability Tester No. 2 and TR

5.2.9. Remote Control Test

This test shall verify that contents of messages used for Remote Control are correct, and that the unit under test correctly responds to these messages.
Figure 5.2-3 shows the configuration diagram for testing.

The following 2 types of messages shall be applied.
Table 5.2-20: REM_CON_REQ message for Interoperability Tester No. 1 and TR
Table 5.2-21: REM_CON_RESP message for Interoperability Tester No. 2 and TR

5.2.9.1. Case 1 – Remote Control Success

(1) Verify that a TR sends a REM_CON_RESP message representing the Send Success as described in Table 5.2-21 when Interoperability tester No. 1 sends a REM_CON_REQ message as described in Table 5.2-20.
(2) Verify that the TR sends the same message as a REM_CON_REQ message that is sent by Interoperability tester No. 1 in step (1).
(3) Verify that the TR sends a REM_CON_RESP message as described in Table 5.2-21 when Interoperability tester No. 2 sends a REM_CON_RESP message representing the Receive Success as described in Table 5.2-21.

CC Option	00
G/U	1b (Unit ID)
Delivery	1b (Confirmed format)
Control Command	Depending on the test configuration
Source Unit ID	Unit ID of Interoperability Tester No. 1
Destination Unit ID	Unit ID of Interoperability Tester No. 2
Control Parameter	Depending on the test configuration

Table 5.2-20 REM_CON_REQ Message for Interoperability Tester No. 1 and TR

CC Option	00
G/U	1b (Unit ID)
Control Command	Depending on the test configuration
Source Unit ID	Unit ID of Interoperability Tester No. 2
Destination Unit ID	Unit ID of Interoperability Tester No. 1
Cause (SS)	02 (Send Success) 01 (Receive Success)

Table 5.2-21 REM_CON_RESP Message for Interoperability Tester No. 2 and TR

5.2.10. Emergency Test

This test shall verify that contents of messages used during the Emergency state are correct, and that the unit under test correctly responds to these messages.

An SU can initiate an Emergency Group Voice Call or Emergency Individual Voice Call; however, this test shall verify a Group Voice Call.
Figure 5.2-3 shows the configuration diagram for testing.

5.2.10.1. Emergency Call

This test shall verify that contents of messages used for an Emergency Group Voice Call are correct, and that the unit under test correctly responds to these messages.

(1) Verify that a TR sends a VCALL_ASSGN message as described in Table 5.2-23 when Interoperability tester No. 1 sends a VCALL_REQ message as described in Table 5.2-22.
(2) Verify that the TR subsequently keeps sending a VCALL_ASSGN_DUP message or VCALL_ASSGN message as described in Table 5.2-23 while an RTCH is in use.
(3) Verify that Interoperability tester No. 2 correctly outputs received audio signal, when Interoperability tester No. 1 sends a VCALL message as described in Table 5.2-24 on an RTCH and the TR repeats the signal.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	80		
Call Type	001b (Conference Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No. 1		
Destination Group ID	Valid Group ID (Group Call)		

Table 5.2-22 VCALL_REQ Message for Interoperability Tester No. 1 (Emergency)

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	80		
Call Type	001b (Conference Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No. 1		
Destination Group/Unit ID	Valid Group ID (Group Call)		
Call Timer	Any		
Channel	Depending on the test configuration		

Table 5.2-23 VCALL_ASSGN/ VCALL_ASSGN_DUP Message for TR (Emergency)

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	80		
Call Type	001b (Conference Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No. 1		
Destination Group ID	Valid Group ID (Group Call)		
Cipher Type	00b		
Key ID	000000b		

Table 5.2-24 VCALL Message for Interoperability Tester No. 1 and TR (Emergency)

5.2.11. Registration Test

This test shall verify that contents of messages used for the Registration process are correct, and that the unit under test correctly responds to these messages.

Figure 5.2-2 shows the configuration diagram for testing. The following 2 types of messages shall be applied.

Table 5.2-25: REG_REQ message for Interoperability Tester No. 1

Table 5.2-26: REG_RESP message for TR

5.2.11.1. Case 1 - Registration Accept

(1) Verify that a TR sends a REG_RESP message representing the Accept as described in Table 5.2-26 when Interoperability tester No. 1 sends a REG_REQ message as described in Table 5.2-25.

Element \ Mode	4800 bps	9600 bps
Registration Option	00000b	
Location ID	0100000000000000001b (Local, sys = 1)	
Source Unit ID	Unit ID of Interoperability Tester No. 1	
Group ID	Selected Group ID of Interoperability Tester No. 1	
Subscriber Type	0028	0048 (EHR) 0058 (EHR & EFR)
Version Number	Any	

Table 5.2-25 REG_REQ Message for Interoperability Tester No. 1

Registration Option	00000b
Location ID	0100000000000000001b (Local, sys = 1)
Destination Unit ID	Unit ID of Interoperability Tester No. 1
Group ID	Selected Group ID of Interoperability Tester No. 1
Cause (MM)	01 (Accept)

Table 5.2-26 REG_RESP Message for TR

5.2.12. Registration Clear Test

This test shall verify that contents of messages used for clearing the Registration information are correct, and that the unit under test correctly responds to these messages.

Figure 5.2-3 shows the configuration diagram for testing. The following 2 types of messages shall be applied.

Table 5.2-27: REG_C_REQ message for Interoperability Tester No. 1

Table 5.2-28: REG_C_RESP message for TR

5.2.12.1. Case 1 - Registration Clear Accept

(1) Verify that a TR sends a REG_C_RESP message representing the Accept as described in Table 5.2-28 when Interoperability tester No. 1 sends a REG_C_REQ message as described in Table 5.2-27.

Registration Option	00000b
Location ID	0100000000000000001b (Local, sys = 1)
Source Unit ID	Unit ID of Interoperability Tester No. 1

Table 5.2-27 REG_C_REQ Message for Interoperability Tester No. 1

Registration Option	00000b
Location ID	0100000000000000001b (Local, sys = 1)
Destination Unit ID	Unit ID of Interoperability Tester No. 1
Cause (MM)	01 (Accept)

Table 5.2-28 REG_C_RESP Message for TR

5.2.13. Group Registration Test

This test shall verify that contents of messages used for Group Registration are correct, and that the unit under test correctly responds to these messages.

Figure 5.2-3 shows the configuration diagram for testing. The following 2 types of messages shall be applied.

Table 5.2-29: GRP_REG_REQ message for Interoperability Tester No. 1

Table 5.2-30: GRP_REG_RESP message for TR

5.2.13.1. Case 1 - Group Registration Accept

(1) Verify that a TR sends a GRP_REG_RESP message representing the Accept as described in Table 5.2-30 when Interoperability tester No. 1 sends a GRP_REG_REQ message as described in Table 5.2-29.

Group Registration Option	00
Source Unit ID	Unit ID of Interoperability Tester No. 1
Group ID	Selected Group ID of Interoperability Tester No. 1

Table 5.2-29 GRP_REG_REQ Message for Interoperability Tester No. 1

Group Registration Option	00
Destination Unit ID	Unit ID of Interoperability Tester No. 1
Group ID	Selected Group ID of Interoperability Tester No. 1
Cause (MM)	01 (Accept)

Table 5.2-30 GRP_REG_RESP Message for TR

5.2.14. Authentication Test

This test shall verify that contents of messages used for the Authentication process are correct, and that the unit under test correctly responds to these messages.

This test includes the test methods for the following two Authentication processes:

(1) Authentication during Registration process

(2) Authentication in normal process

Procedure (1) represents a case that a TR sends a request for Authentication while an SU is doing the Registration process, and Procedure (2) represents a case that a TR sends a request for Authentication to an SU which has completed the Registration process.

To verify the interoperability, a unit under test shall pass the test item for at least either of case (1) or case (2).

Figure 5.2-3 shows the configuration diagram for testing. The following 4 types of messages shall be applied.

Table 5.2-25: REG_REQ message for Interoperability Tester No. 1

Table 5.2-26: REG_RESP message for TR

Table 5.2-31: AUTH_INQ_REQ message for TR
Table 5.2-32: AUTH_INQ_RESP message for Interoperability Tester No. 1

5.2.14.1. Authentication Test during Registration Process

(1) Verify that a TR sends an AUTH_INQ_REQ message as described in Table 5.2-31 when Interoperability tester No. 1 sends a REG_REQ message as described in Table 5.2-25.
(2) Verify that the TR sends a REG_RESP message representing the Accept as described in Table 5.2-26 when Interoperability tester No. 1 sends an AUTH_INQ_RESP message as described in Table 5.2-32.

5.2.14.2. Authentication Test in Normal Process

(1) Verify that a TR sends an AUTH_INQ_REQ message as described in Table 5.2-31 when a TR initiates an authentication.
(2) Verify that the authentication is successful when Interoperability tester No. 1 sends an AUTH_INQ_RESP message as described in Table 5.2-32. A way to check that an authentication is successful can arbitrarily be determined.

Authentication Option	00
Source Unit ID	FFF0 as TC ID
Destination Unit ID	Unit ID of Interoperability Tester No. 1
Authentication Parameter	Any

Table 5.2-31 AUTH_INQ_REQ Message for TR

Authentication Option	00
Source Unit ID	Unit ID of Interoperability Tester No. 1
Destination Unit ID	FFF0 as TC ID
Authentication Value	Depends on ESN and Authentication Parameter of Interoperability Tester No. 1

Table 5.2-32 AUTH_INQ_RESP Message for Interoperability Tester No. 1

5.2.15. Site Roaming Test

This test shall verify that a TR recognizes a roaming SU when the SU roams between sites and that a TR in the site to which the SU migrates sends a message correctly. Figure 5.2-4 shows the configuration diagram for testing.
TR No. 1 is treated as site 1, and TR No. 2 is treated as site 2. Each control channel is treated as RCCH-1 or RCCH-2.
The connection structure between site 1 and site 2 shall be determined by the respective manufacturer.
Amount of attenuation for attenuator 1 to attenuator 4 can be adjusted so that RF interference by transmitting signals does not occur and the receiver input level is sufficient for TR No. 1 and TR No. 2 to acquire inbound signals.

Following are conditions of Location ID for site 1 and site 2:

Site 1: Category = 01b (Local)
System Code = 1
Site Code = 1
Site 2: Category = 01b (Local)
System Code = 1
Site Code = 2

(1) Complete the registration of Interoperability tester No. 1 and Interoperability tester No. 2 to TR No. 1.
(2) Verify that Interoperability tester No. 1 outputs received audio signal when Interoperability tester No. 2 makes an Individual Voice Call to Interoperability tester No. 1.
(3) Complete the registration of Interoperability tester No. 1 to TR No. 2 on an RCCH-2.
(4) Verify that TR No. 2 sends a VCALL_REC_REQ message as described in Table 5.2-33 when Interoperability tester No. 2 makes an Individual Voice Call to Interoperability tester No. 1.

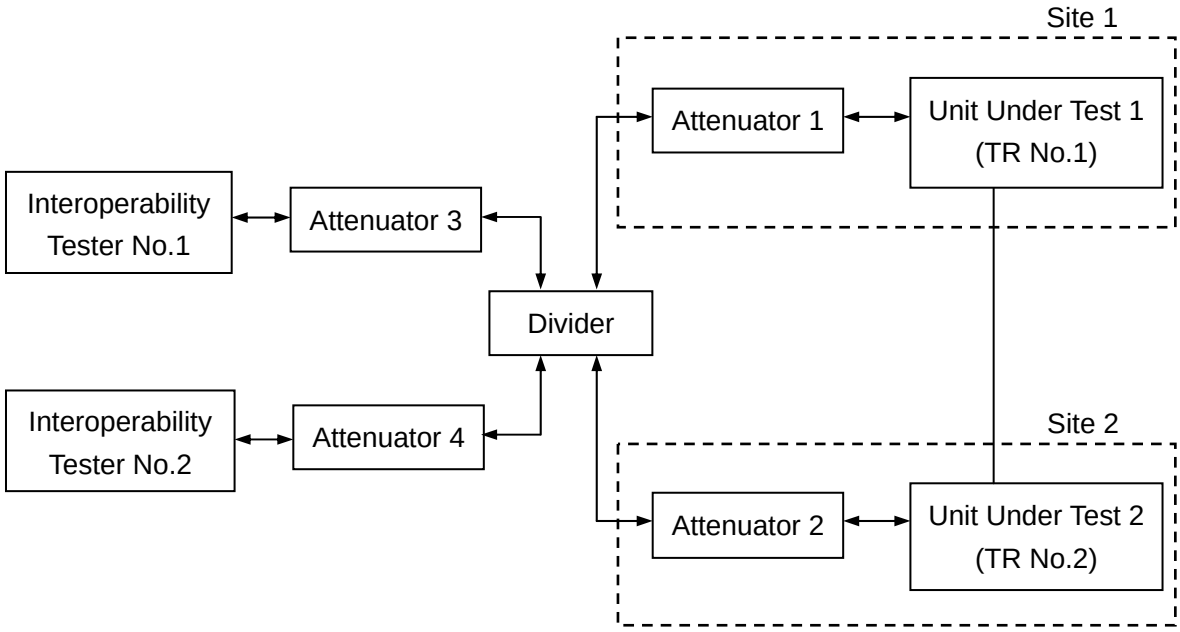


Figure 5.2-4 Configuration for Site Roaming Test

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	100b		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of SU No. 2		
Destination Unit ID	Unit ID of SU No. 1		

Table 5.2-33 VCALL_REC_REQ Message for TR No. 2

5.2.16. Transmission Trunking Test

This test shall verify the TR behaviors while in Transmission Trunking Mode.

Trunking Mode of a TR and interoperability tester shall be configured as Transmission Trunking Mode. A configuration method for Trunking Mode shall be appropriately determined by the respective manufacturer.

Figure 5.2-3 shows the configuration diagram for testing. This test is done using Conference Group Voice Call or Individual Voice Call.

The description about the procedure on an RCCH is omitted for this test.

Transmission Trunking means an RTCH assignment process takes place each time when an SU transmits.

Trunking Mode is affected by the specifications of the manufacturer which manufactures a TR; hence, it is necessary to perform at least one of the following test items.

(1) Verify that a TR immediately sends a DISC message on an RTCH upon receipt of a TX_REL message from an interoperability tester.
(2) Verify that a TR sends a TX_REL_EX message representing the Transmit Inhibit upon receipt of a TX_REL message from an interoperability tester.
(3) Or, it may be verified that a TR conforms to Transmission Trunking behavior specified by the TR manufacturer.

5.2.17. Message Trunking Test

This test shall verify the TR behaviors while in Message Trunking Mode.

Trunking Mode of a TR and interoperability tester shall be configured as Message Trunking Mode. A configuration method for Trunking Mode shall be appropriately determined by the respective manufacturer.

Figure 5.2-3 shows the configuration diagram for testing. This test is done using Conference Group Voice Call or Individual Voice Call.

The description about the procedure on an RCCH is omitted for this test.

Message Trunking means a behavior that an SU can repeatedly transmit on the same RTCH during a period of Hold Time.

Trunking Mode is affected by the specifications of the manufacturer which manufactures a TR; hence, it is necessary to perform at least one of the following test items.

(1) Verify that a TR continues to transmit on an RTCH until a Hold Time elapses and sends a TX_REL message, after receiving of a TX_REL message from an interoperability tester.
(2) Verify that a TR continues to transmit on an RTCH until a Hold Time elapses and sends a TX_REL_EX message representing the Transmit Permit, after receiving of a TX_REL message from an interoperability tester.

(3) Or, it may be verified that a TR conforms to Message Trunking behavior specified by the TR manufacturer.

5.2.18. Color Code Test

This test shall verify that the lower six bits of Site Code is allocated to a RAN on an SR Information.

Figure 5.2-3 shows the configuration diagram for testing.

(1) Verify that a value for Site Code mod 64 is configured for a RAN code to be sent on the outbound RCCH. The message to be used for testing shall be arbitrary.

5.2.19. Random Access Test

This test shall verify that a TR correctly processes a random access and correctly sends a value for collision control field.

Figure 5.2-3 shows the configuration diagram for testing. No message to be used for testing shall be specified.

Following are two random access behaviors to be tested.

(1) Transmission of Single Frame on a Short CAC which can be used by Voice Call, etc.

(2) Transmission of Multi Frame on a Long CAC which can be used by Short Data Call.

5.2.19.1. Random Access Test for Single Frame

(1) Verify that a TR sends the following parameters for collision control field at the timing of the next outbound frame if the TR succeeds in receiving a Short CAC sent from Interoperability tester No. 1.

R/N = R

PE = Value for CRC in a received Short CAC

5.2.19.2. Random Access Test for Multi Frame

(1) Verify that a TR sends the following parameters for collision control field at a timing of the next outbound frame if the TR succeeds in receiving a Long CAC sent from Interoperability tester No. 1.

P/D = P

I/B = B

CK = 1

R/N = R

PE = Value for CRC in a received Long CAC

(2) Verify that in the outbound frame subsequent to the frame described in step (1), a TR sends the following parameters for collision control field in frames depending on the number of continuous frames specified in the message sent from Interoperability tester No. 1.

P/D = D

I/B = B

5.2.20. Encryption Test

This test shall verify that a TR correctly receives and repeats an encrypted voice call.
Figure 5.2-3 shows the configuration diagram for testing.

This test shall verify under the following conditions that Interoperability tester No. 1 sends an encrypted voice call, a TR repeats the signal, and then Interoperability tester No. 2 correctly outputs the received audio signal.
This test shall be done after completion of channel assignment on an RCCH, and the testing procedure on an RCCH is omitted in this document.
No mode to be used for testing shall be specified.
To verify the interoperability, a unit under test shall pass the test using at least one of Cipher Type for a VCALL message as described in Table 5.2-34.

(1) In the test for Scramble Encryption, verify that when Interoperability tester No. 1 sends an encrypted voice call using a VCALL message as described in Table 5.2-34, Interoperability tester No. 2 correctly outputs the received audio signal.
In the test for DES and AES Encryption, verify that when Interoperability tester No. 1 sends an encrypted voice call using a VCALL message as described in Table 5.2-34 and a VCALL_IV message as described in Table 5.2-35. Interoperability tester No. 2 correctly outputs the received audio signal.

Mode / Element	4800 bps/EHR	9600 bps/EHR	9600 bps/EFR
CC Option	00		
Call Type	100b (Individual Call) 001b (Conference Group Call) 000b (Broadcast Group Call)		
Voice Call Option	00000b	00010b	00011b
Source Unit ID	Unit ID of Interoperability Tester No. 1		
Destination Group/Unit ID	Unit ID of Interoperability Tester No. 2 (Individual Call) Valid Group ID (Group Call)		
Cipher Type	01b (Scramble) 10b (DES) 11b (AES)		
Key ID	000000b to 111111b		

Table 5.2-34 VCALL Message (Encryption)

Initialization Vector	0000000000000001 to FFFFFFFFFFFFFFFF

Table 5.2-35 VCALL_IV Message (DES/AES Encryption)

6. Appendix

6.1. Samples of Test Frame

This section presents samples of frame data to be used for the Short Data Call testing.
Samples of frame data shall be used for Unit to Unit Short Data Call in the confirmed format.
Refer to REF [4] for the frame data to be used for a Voice Call test and for a Data Call test.

RAN and ID to be used for testing are arbitrary; however, the frame data is presented in this section using a RAN and ID as described in Table 6.1-1. Also, configuration as described in Table 6.1-2 is used for the encrypted frame data.

RAN	Source Unit ID	Destination Unit ID
000001b	0001	0002

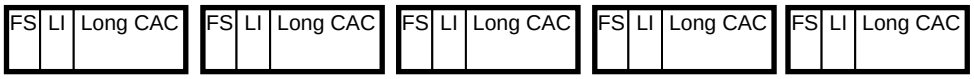
Table 6.1-1 RAN and ID for Sample Frame Data

	Scramble Mode	DES Mode	AES Mode
Cipher Type	01b	10b	11b
Key ID	00 0001b		
Encryption Key	000 0000 0000 0001b	ABCD EF01 2345 6789	ABCD EF01 2345 6789 CDEF 0123 4567 89AB EF01 2345 6789 ABCD 0123 4567 89AB CDEF
Initialization Vector	N/A	ABCD EF12 3456 7890	

Table 6.1-2 Encryption for Sample Frame Data

6.1.1. Samples of Short Data Call on Inbound

This is an inbound frame for a short data call.
Figure 6.1-1 shows the frame structure.



(1) (2) (3) (4) (5)

FS: FSW

LI: LICH

Figure 6.1-1 Data Frame Structure for Short Data Call (Inbound)

In the case of 4800 bps
Frame (1)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (Header)
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	08A0AB0AAA0420A20 56264A1A002A22D2202 62E4A1C048880601E4 102127628

Frame (2)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (User Data), Data = 303132333435363738393A3B3C3D
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2ECB3AD3CFC1694626 2BC5880D80EC95C979 A114DEDBEB21851BA8 0B5D5900A

Frame (3)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (User Data), Data = 3E3F40414243444546474849 4A4B
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2723C2A05400565E09 B31584799C094D3A87 A248E6EB35617B1C67 C7BF2E197

Frame (4)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (User Data), Data = 4C4D4E4F50515253545556575859
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2E5B8A5FA140D55617 CD979F068AEC956A88 430D0DE4C590A4E4EE AA8F658F1

Frame (5)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (User Data), Data = 5A5B5C5D5E5F60616263
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2CFDF21B3E02250E2A 5697C0211414258246 C2A94CCBDAE89C8CA0 15EB10E21

In the case of 9600 bps
Frame (1)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (Header)
Frame Data:

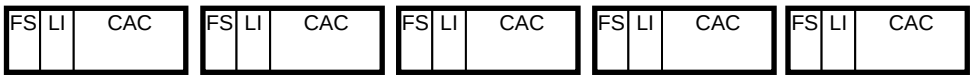
	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	00A0B30AAAC420AC15 620421A282A22D0202 83E4A7C04890060124 10292762E

Frame data for Frame (2) to Frame (5) are identical to those for 4800 bps.

6.1.2. Samples of Short Data Call on Outbound

This is an outbound frame for a short data call.

Figure 6.1-2 shows the frame structure. The collision control field is always allocated to each frame; however, this frame structure omits the field. The test shall be done by configuring the collision control field as appropriate.



FS: FSW

LI: LICH

Figure 6.1-2 Data Frame Structure for Short Data Call (Outbound)

In the case of 4800 bps
Frame (1)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_REQ (Header)
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4088A0AE8A8868EE20 462E8894182A38A282 35EB008E88B280D030 A3893603DC0EAAC254 283

Frame (2)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_REQ (User Data), Data = 303132333435363738393A3B3C3D
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	5DCA61232930269D90 06BF42B7CD1D28731D 3511E408AE11E6F134 4101A1FB9A2406A1E2 364

Frame (3)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 3E3F4041424344454647484 94A4B
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	55A7112EDA6821011C 2750E4975722281E60 A942A744A39466E148 321851439D597E46B9 3E7

Frame (4)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 4C4D4E4F50515253545556575859
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4BF011A54D50644BD4 060AD6F67C5C0061AF BD45DC00ED4F84CBB3 5381C81BDC1E7EE7A6 420

Frame (5)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 5A5B5C5D5E5F60616263
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4C85312A152822A578 C6B9C88640590823C2 A9280BCCF46185D43D A09ABFD21E6ADAA276 A84

In the case of 9600 bps
Frame (1)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (Header)
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4088A0AE8A8828EE20 272E8884982A30A282 29CB008288B281D830 A08D36031E0EAA0354 281

Frame data for Frame (2) to Frame (5) are identical to those for 4800 bps.

6.1.3. Samples of Scramble Encrypted Short Data Call on Inbound

This is an inbound frame for a scramble encrypted short data call. Figure 6.1-1 shows the frame structure.

In the case of 4800 bps
Frame (1)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (Header)
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	0880A309AA4430A805 E204A1A00282312302 C2E4A3C008900200A4 002D26E28

Frame (2)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (User Data), Data = 303132333435363738393A3B3C3D
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2E9E3AD9650529160C 8B658C1F0AC4EDCD7A 239C35DEEC892FDC6C 1E1D594B0

Frame (3)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (User Data), Data = 3E3F404142434445464748494A4B
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2F5EEAEBBE8236A206 46F4A26A1225257E04 A09512FCB03110D3A1 71050B3F0

Frame (4)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (User Data), Data = 4C4D4E4F50515253545556575859
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	26003235A782951A15 C7C75E500844F90ECB 210F65E893284EA4AB EF337779D

Frame (5)
  LICH: RCCH, Long CAC
  Long CAC: SDCALL_REQ (User Data), Data = 5A5B5C5D5E5F60616263
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	29DB9A4266C2456431 1DF6E17D1FED5DF425 A3BE38C186309684A2 D9850B6CA

In the case of 9600 bps
Frame (1)
  LICH: RCCH, Long CAC
  Long CAC: SDCALL_REQ (Header)
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	0080BB09AA8430A615 E26421A28282310302 23E4A5C00888020064 002526E2E

Frame data for Frame (2) to Frame (5) are identical to those for 4800 bps.

6.1.4. Samples of Scramble Encrypted Short Data Call on Outbound

This is an outbound frame for a scramble encrypted short data call. Figure 6.1-2 shows the Frame structure.

In the case of 4800 bps
Frame (1)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (Header)
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4088A12E8A8868E620 E62688B41E2A10A282 21EA808E88F287D070 A1090602DC1EAA825C 285

Frame (2)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 303132333435363738393A3B3C3D
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	5768D0A77D68E615B0 E6AB46F7C53728F21D 21514C84A4AE24E469 A301286A1E303E8160 A63

Frame (3)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 3E3F4041424344454647484 94A4B
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	571191280CA022DD68 4666E8874B49385DE0 21430A86990B87F400 D2118F2BD96F22047F C07

Frame (4)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 4C4D4E4F50515253545556575859
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4570C1A15D60A5C170 87CBC69656D41004EE A147FC8EFFA042CECE 130F458A1A5FBEE78E 3E2

Frame (5)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 5A5B5C5D5E5F60616263
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	484420282D6062FFC4 A61A70D6AA84387EA1 A50F7A42DA2664C904 F3926FB2DD887E431A 125

In the case of 9600 bps
Frame (1)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (Header)
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4088A12E8A8828E620 872688A49E2A18A282 3DCA808288F286D870 A20D06021E1EAA435C 287

Frame data for Frame (2) to Frame (5) are identical to those for 4800 bps.

6.1.5. Samples of DES Encrypted Short Data Call on Inbound

This is an inbound frame for a DES encrypted short data call.

Figure 6.1-3 shows the frame structure.

FS: FSW

LI: LICH

Figure 6.1-3 Data Frame Structure for DES Encrypted Short Data Call (Inbound)

In the case of 4800 bps

Frame (1)

LICH: RCCH, Long CAC

Long CAC: SDCALL_REQ (Header)

Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	08C0B30BAAC430A605 6244A1A20282352302 22F4A4C088A00600E4 002F26E29

Frame (2)

LICH: RCCH, Long CAC

Long CAC: SDCALL_IV

Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	0E48AA0D2A8AA0A274 226488A3107A3DAF02 E1BEA3E228994E817A 7021B3028

Frame (3)

LICH: RCCH, Long CAC

Long CAC: SDCALL_REQ (User Data), Data = 303132333435363738393A3B3C3D

Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	25F83AA956459A4013 AE45213F0D9F0D924A A1E369D2E819F9E568 4C0D5EE8A

Frame (4)
  LICH: RCCH, Long CAC
  Long CAC: SDCALL_REQ (User Data), Data = 3E3F4041424344454647484 94A4B
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	20E2729CCFC6BB7E3B DA65FD0C94ACED6359 E2C048E7B1115F8C24 BEFD05150

Frame (5)
  LICH: RCCH, Long CAC
  Long CAC: SDCALL_REQ (User Data), Data = 4C4D4E4F50515253545556575859
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	221A320DEF0206401C 675767860E83154A0C 429329E3D810A6462C 59F54BDF8

Frame (6)
  LICH: RCCH, Long CAC
  Long CAC: SDCALL_REQ (User Data), Data = 5A5B5C5D5E5F60616263
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2EA6E210EF438A042C C9C6EB80197B59F5AC C2DF43CC11A0DF0AA2 25911E574

In the case of 9600 bps
Frame (1)
  LICH: RCCH, Long CAC
  Long CAC: SDCALL_REQ (Header)
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	00C0AB0BAA0430A815 622421A08282350302 C3F4A2C088B8060024 002726E2F

Frame data for Frame (2) to Frame (6) are identical to those for 4800 bps.

6.1.6. Samples of DES Encrypted Short Data Call on Outbound

This is an outbound frame for a DES encrypted short data call.

Figure 6.1-4 shows the frame structure. The collision control field is always allocated to each frame; however, this frame structure omits the field. The test shall be done by configuring the collision control field as appropriate.

FS: FSW

LI: LICH

Figure 6.1-4 Data Frame Structure for DES Encrypted Short Data Call (Outbound)

In the case of 4800 bps

Frame (1)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_REQ (Header)
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4088A02E8A8828F620 C62E88941E2A08A282 29EA808A887285D030 A18906039C0EAAC254 283

Frame (2)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_IV
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	7148A1B1028869BC20 82AA88D463AA312482 3923208C990281FEE0 A2992202986AAAE74A 282

Frame (3)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_REQ (User Data), Data = 303132333435363738393A3B3C3D
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	588BE0A3C0682727D0 E7A5A887D5F3089F09 3D5EEC00A86880EA7F 908CDE1BDB90BAE153 702

Frame (4)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 3E3F4041424344454647484 94A4B
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	52AED02C9F20E38F88 A71DCEB7373A00A07D B52D6882B40164FACC 731290529C155A4625 5C5

Frame (5)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 4C4D4E4F50515253545556575859
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	49B0C1A54830A61650 673CA2E60CFB0036CB BD675A46F1FA86C8E0 D3876B1ADE2D52C61F 4C5

Frame (6)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (User Data), Data = 5A5B5C5D5E5F60616263
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4E5891A9E630A3DAB8 E6AA32A6F6F918306A B9368F40D6B125C679 729373421DF566A26D C62

In the case of 9600 bps
Frame (1)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (Header)
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4088A02E8A8868F620 A72E88849E2A00A282 35CA8086887284D830 A28D06035E0EAA0354 281

Frame data for Frame (2) to Frame (6) are identical to those for 4800 bps.

6.1.7. Samples of AES Encrypted Short Data Call on Inbound

This is an inbound frame for an AES encrypted short data call. Figure 6.1-3 shows the frame structure.

In the case of 4800 bps
Frame (1)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (Header)
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	08C0BB09AA8420A005 E274A1A10282212302 62F4A1C08888020064 002927E2A

Frame (2)
LICH: RCCH, Long CAC
Long CAC: SDCALL_IV
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	0E48AA0D2A8AA0A274 226488A3107A3DAF02 E1BEA3E228994E817A 7021B3028

Frame (3)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (User Data), Data = 303132333435363738393A3B3C3D
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2DC1129000C0FF3C22 21E5A41D06DFEDB41B 62005BD6ECC95D14EC F9A55AB18

Frame (4)
LICH: RCCH, Long CAC
Long CAC: SDCALL_REQ (User Data), Data = 3E3F404142434445464748494A4B
Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	280B0ACB13476B1838 FC950E0A92CB796049 81C3B2FB5E394939A1 BE1F0803F

Frame (5)
  LICH: RCCH, Long CAC
  Long CAC: SDCALL_REQ (User Data), Data = 4C4D4E4F50515253545556575859
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2A02BA2C00420A6601 B706624E0156A118EE 0232D0E92308470BA8 643F7CA8B

Frame (6)
  LICH: RCCH, Long CAC
  Long CAC: SDCALL_REQ (User Data), Data = 5A5B5C5D5E5F60616263
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	2E489A25C9047B9411 73A63E4312F741DA68 2323F0D0CE80338FA0 B0CD1276A

In the case of 9600 bps
Frame (1)
  LICH: RCCH, Long CAC
  Long CAC: SDCALL_REQ (Header)
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5F7D
LCAC	00C0A309AA4420AE15 E21421A38282210302 83F4A7C088900200A4 002127E2C

Frame data for Frame (2) to Frame (6) are identical to those for 4800 bps.

6.1.8. Samples of AES Encrypted Short Data Call on Outbound

This is an outbound frame for an AES encrypted short data call. Figure 6.1-4 shows the Frame structure.

In the case of 4800 bps
Frame (1)
  LICH: RCCH, CAC, Normal Data
  CAC: SDCALL_REQ (Header)
    Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4088A12E8A8828F620 C62688841A2A00A282 25EB808E887284D070 A18926035C1EAA025C 285

Frame (2)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_IV
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	7148A1B1028869BC20 82AA88D463AA312482 3923208C990281FEE0 A2992202986AAAE74A 282

Frame (3)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_REQ (User Data), Data = 303132333435363738393A3B3C3D
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	526240273158E78524 A68CB4D74105303D1D 312A7DCEAE5565F771 A008873BDD23FAC0DB 383

Frame (4)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_REQ (User Data), Data = 3E3F40414243444546474849 4A4B
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	54FF40A8AB40E385F4 C655BEC720FD28F148 BD1C44CEB19666FD2F D11420E318322EC52D 261

Frame (5)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_REQ (User Data), Data = 4C4D4E4F50515253545556575859
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	45DEA1A2605025F140 86BD00F63FBF38142D 3140B7CAD9D1A6D4DC 018E66EA5FD22226F9 7C0

Frame (6)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_REQ (User Data), Data = 5A5B5C5D5E5F60616263
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	41FEA1AA5188226D34 668526E64CE818800A 31423544CB2425D9E0 E39406EA9F05D221EF 402

In the case of 9600 bps
Frame (1)
LICH: RCCH, CAC, Normal Data
CAC: SDCALL_REQ (Header)
Frame Data:

	Individual Call
FSW	CDF59
LICH	5D77
CAC	4088A12E8A8868F620 A72688949A2A08A282 39CB8082887285D870 A28D26039E1EAAC35C 287

Frame data for Frame (2) to Frame (6) are identical to those for 4800 bps.

7. Revision History

Version	Date	Revised Contents
1.0	Mar 19 2009	Version 1.0 release
1.1	Nov 11 2011	Section 1: Add the description of Type-C. Section 5 - Encryption Test: Add DES and AES Encryption Tests. Section 5 - TR Testing: Modify the test methods of Encryption Tests. Section 6: Add frame data for DES and AES Encryption Tests.