ENGLISH TRANSLATION

DSRC APPLICATION SUB-LAYER

TEST ITEMS AND CONDITIONS FOR MOBILE STATION COMPATIBILITY CONFIRMATION

ARIB TECHNICAL REPORT

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Association of Radio Industries and Businesses (ARIB)

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Foreword

The Association of Radio Industries and Business (ARIB) has been investigating and summarizing the basic technical requirements for establishing standards and technical reports with the participation of the various radio equipment manufacturers, telecommunications companies, broadcasters, and users.

This technical report contained herein will serve as private-sector guideline for the measurement methods and testing methods, etc., in order to ensure the quality and compatibility of radio facilities and equipment for private use based on the publicly established technical standards and private-sector voluntary standards in Japan.

These technical reports are being established principally for “the test items and conditions for land mobile station compatibility confirmation for the “Dedicated Short-Range Communication System Application Sub-Layer”. In order to ensure fairness and openness among all parties involved, during drafting stages, we invite radio equipment manufacturers, operators, testing organizations and users both domestically and overseas to participate openly in the activities of the Standard Assembly so as to develop technical reports with the total agreement of all parties involved.

The scope of application of these technical reports covers the minimum requirements for the fundamental items assured compatibility for the mobile stations with the base stations based on Dedicated Short-Range Communication System Application Sub Layer. On the application of this technical report, the test organizations related to operators and radio equipment manufacturers, etc., should use them together with practical guidelines for operators in developing original specifications and systems that fall within the scope of the standards.

We hope that this technical report will aid all parties involved, including radio equipment manufacturers, operators, users, testing organizations and others.

NOTE This Technical Report is a revision of the “Mobile Station Compatibility Test” portion and related Annex portion in regard to the “DSRC Application Sub-Layer (DSRC-ASL)” stated in Chapter 1 and Chapter 3 of the “DSRC Application Sub-Layer Specification, And Test Items And Conditions For Mobile Station Compatibility Confirmation Using It Technical Report ARIB TR-T17 Ver. 1.0”, positioned as the “Test Items And Conditions For Mobile Station Compatibility Confirmation” for the land mobile station conforming to the DSRC Application Sub-Layer ARIB STD-T88.
For information, the “DSRC Application Sub-Layer (DSRC-ASL)” portion and related Annex portion stated in Chapter 2 of the Technical Report ARIB TR-T17 Ver. 1.0 are separately defined as the “DSRC Application Sub-Layer ARIB STD-T88”. So you are recommended to refer to it.

Contents

1 General terms

1.1 Overview

The testing regarding the compatibility of the land mobile stations (hereafter “On Board Equipment (OBE)”) using “DSRC Application Sub-Layer” is positioned as the suitability check for the mobile stations that are installed “DSRC Application Sub-Layer” on the protocol stack specified in the DSRC System Standard (ARIB STD-T75) and is carried out for each type within the scope of basic functions and standardized options defined in the standard “DSRC Application Sub-Layer (ARIB STD-T88)”.

It is the assumption before the testing that the conduct of equipment according to the above standards (ARIB STD-T75 and ARIB STD-T88) is fully confirmed with the responsibility of the mobile station manufacturer during the development or manufacturing process.

The testing can be performed in a general testing environment and no special burden will be placed on the testing organization or manufacturer to establish a testing environment or to add functions to the mobile stations.

1.2 Test Classification

The testing for compatibility confirmation is divided into testing based on Technical Report ARIB TR-T16 “DSRC System Test Items And Conditions For Mobile Station Compatibility Confirmation” and testing based on this technical report, and the main party that will perform the testing is the mobile station manufacturer.

The testing based on Technical Report ARIB TR-T16 is conducted based on the test items and the test conditions of it.

The testing based on this technical report conducted by connection the mobile station that has been completed the tests based on Technical Report ARIB TR-T16 to the test system, and is conducted based on the test items and the test conditions of this technical report.

2 Compatibility confirmation test

2.1 Scope

The testing based on the testing system is intended to confirm that mobile stations (OBEs) manufactured by a mobile station manufacturer meet the functional requirements for mobile stations in accordance with the standard specification for DSRC-ASL specified in this technical report.

2.2 Test configuration

The testing system is generally called a base station simulator and contains RF transmission and reception characteristic functions, basic functions for transmitting and receiving signals to and from the mobile station, etc. But in this technical report, the detailed type of this testing system is not specified and is defined as any testing system that can perform the functions.

The testing system contains a test program for conducting tests of mobile stations.
As the connection method between the testing system and device (OBE) under test, the following two methods are considered.

(1) The case where the connection is made by RF coupling or by cable in a shield room or shield box. An example of test configuration by the testing system in this case is shown in Fig. 2.2-1.
(2) The case where OBE under test and testing system are arbitrarily connected by RF coupling. In this case, both of them are the equipment in the Dedicated Short-Range Communication System specified in Article 4-3 of Radio Law and Article 6-4-7 of Radio Facility Regulation by both of them being given the Technical Standards Conformity Certification. An example of test configuration by the testing system in this case is shown in Fig. 2.2-2.

However, for the methods of installation and operation of a testing system and OBE under test, the Installation and Operation standard of “Annex Q of the ARIB STD-T75 Dedicated Short-Range Communication (DSRC) system standard” should be strictly followed and consideration shall be so given that no interference and disturbance are given to other communications.

Each of the two methods of connection mentioned above may be used properly according to the details of the test.

Hereafter in this document, a mobile station will be expressed as OBE (On Board Equipment) and a testing system as TS (Test System).

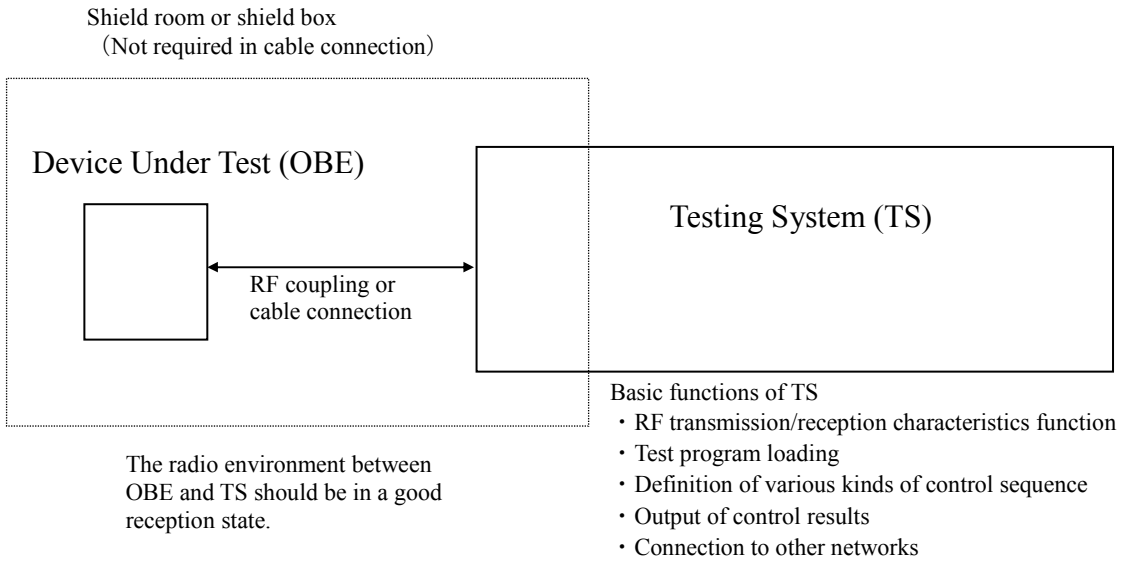

Figure 2.2-1 — Example of test configuration 1

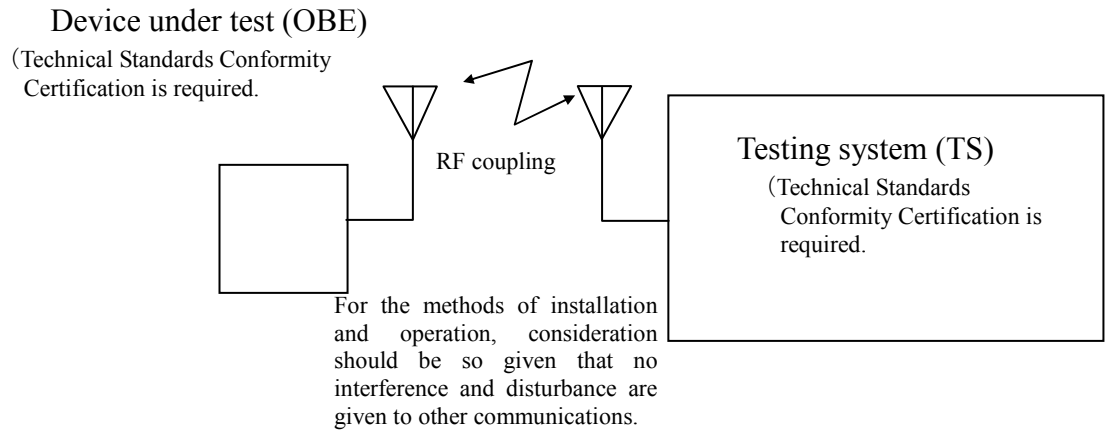

Figure 2.2-2 — Example of test configuration 2

2.3 Test Items and test conditions

2.3.1 Test items

Test items are described as to the operation test and performance test for each function.
As for the performance test, however, only a method of measurement to obtain criteria for numerical value evaluations should be described and conformance of numerical values obtained in this method of measurement is not defined.
In a case where there are separate requirements requested by the service, performance should be evaluated in accordance with this method of measurement.

2.3.1.1 Test items for extended link control protocol (ASL-ELCP)

The test items for ASL-ELCP by TS are as shown below. For information, this test is based on the existence of ASL-NCP for operation test. (Refer to 2.3.3.2)

Test number	Test item
1-1	Operation test for communication control management
1-1-1	Initial connection
1-1-2	Maintaining connection
1-1-3	Disconnection
1-1-4	Echo service
1-1-5	Event notification service
1-1-6	Access management
1-2	Extended link control operation test
1-2-1	Client / server type communication control and transmission service
1-2-2	Bulk transmission control
1-2-3	Broadcast mode control
1-3	Performance test
1-3-1	Measurement of initial connection time

2.3.1.2 Test items for network control protocol (ASL-NCP)

2.3.1.2.1 Local port control protocol (LPCP)

The test items for LPCP by TS are as shown below. For information, this test is based on the existence of test application for operation test. (Refer to 2.3.3.2)

Test number	Test item
2-1-A	LPCP operation test
2-1-1-A	Initial connection
2-1-2-A	Disconnection
2-1-3-A	Management service
2-1-4-A	Data transfer service
2-1-5-A	Data transfer service in broadcast mode

2-2-A	LPCP performance test
2-2-1-A	Measurement of initial connection time
2-2-2-A	Transmission performance

2.3.1.2.2 LAN control protocol (LANCP)

The test items for LANCP by TS are as shown below. For information, this test is based on the existence of a general network application for operation test. (Refer to 2.3.3.2)

Test number	Test item
2-1-B	LANCP operation test
2-1-1-B	Connection / disconnection
2-1-2-B	Data transmission and reception - Unicast
2-1-3-B	Data transmission and reception - Multi-cast
2-2-B	LANCP performance test
2-2-1-B	Measurement of initial connection time
2-2-2-B	Transmission performance

2.3.1.2.3 PPP control protocol (PPPCP)

The test items for PPPCP by TS are as shown below. For information, this test is based on the existence of a general network application for operation test. (Refer to 2.3.3.2)

Test number	Test item
2-1-C	PPPCP operation test
2-1-1-C	Connection / disconnection
2-1-2-C	Data transmission and reception
2-2-C	PPPCP performance test
2-2-1-C	Measurement of initial connection time
2-2-2-C	Transmission performance

2.3.2 Test parameters

The parameters that are set or registered in performing testing are as follows: These parameters are applied unless otherwise specified.

For information, the meanings of <TS>, <OBE> and <Common> shown below are as shown below.

<TS>: This is a parameter that is set or registered by TS.

<OBE>: This is a parameter that is set or registered by OBE.

<Common>: This is a parameter that is set or registered in both TS and OBE.

2.3.2.1 Layer 1 parameters

OBE notifies which is ASK or π/4 shift QPSK defined by the communication standard ARIB STD-T75 by communication profile(s).

2.3.2.2 Layer 2 parameters

- Frame class: B or C <TS>
  (NOTE: The definition of frame class is in accordance with subclause 4.2.9 of ARIB STD-T75.)
- Communication mode: Full duplex communication (Frame class B), Half duplex communication (Frame class C) <TS>
- Communication zone: Stand-alone <TS>
- Transmitter / receiver identifier TRI: No set <TS>
- Time division control: None <TS>
- Communication area: Class 1 <TS>
- LLC: Type 1 procedure only <Common>
- Link request status identifier ACPI: Authorized <TS>
- Congestion information STA: 100 to 50% <TS>
- Release timer: Fixed at 0.2 seconds, Valid identifier: Always valid <TS>
- NRQmax: 127 <OBE>
- Link request limit frequency: RT1=1, RT2, RT3=4, RT4=4 <OBE>
- Assignment with priority: Not conducted. <Common>
- Scramble: Included <Common>

2.3.2.3 Layer 7 parameters

- Concatenation: None <Common>
- Connection procedure: Standard connection <TS>
- EID: Elective number from 4 to 127 <OBE>; 3 in the broadcast mode
- FID: 1 <TS>
- PDU header's PDUnumber: Selective number from 2 to 15 <Common>
- Communication profile: A declared communication profile is selected. <Common>

2.3.2.4 DSRC application sublayer (DSRC-ASL)

- AID: 18 (Multi-purpose information system) <Common>
- ASL base station profile <TS>

Version information: 0
Connection management timer: To be set by TS.
ASL-ELCP's function identification information: [Expanded function according to the details of test]
ASL-NCP identification information: [ASL-NCP according to the details of test]

- ASL mobile station profile <OBE>
  Version information: 0
  Mobile station identification information
  ASL-ELCP's function identification information: Identifier showing a contained extended function
  ASL-NCP identification information: Identifier showing a contained ASL-NCP

2.3.2.5 Parameters to be declared at the time of testing

The parameters to be declared in advance by a manufacturer at the time of testing are as shown below:

- Radio frequency: Out of seven paired waves defined in ARIB STD-T75, one paired wave is designated. <TS>
- Frame class: B or C is designated. <TS>
- Communication profile: A communication profile to be used is designated. <Common>
- ASL mobile profile <OBE>

2.3.3 Test conditions

The conditions during testing are as shown below: These conditions are applied unless otherwise specified.
For information, the meanings of <TS>, <OBE> and <Common> shown below are as shown below:
<TS>: Condition to be given to TS
<OBE>: Condition to be given to OBE
<Common>: Condition to be given to both TS and OBE

2.3.3.1 DSRC application sublayer (DSRC-ASL)

The test number 1-1 "operation test for communication control management" and test number 1-2 "operation test for extended link control" is based on the existence of ASL-NCP for operation test. <Common>
For information, ASL-NCP for operation test is selected from among ASL-NCPs that are already contained, and it is assumed that measures making this test practicable have been taken.

2.3.3.2 Application

2.3.3.2.1 Local port control protocol (LPCP)

The test numbers 2-1-A “LPCP operation test” and 2-2-A “LPCP performance test” is based on the existence of the following applications:

- Test application <OBE>
- Echo application <OBE>

2.3.3.2.2 LAN control protocol (LANCP)

The test numbers 2-1-B “LANCP operation test” and 2-2-B “LANCP performance test” are based on the existence of the following network applications.

- DHCP: Server <TS>, client <OBE>
- Network connection test (PING: Packet Internet Groper) : <Common>
- Address Resolution Protocol (ARP: Address Resolution Protocol) : <Common>
- File transfer protocol (FTP: File Transfer Protocol): Server <TS>, client <OBE>

2.3.3.2.3 PPP control protocol (PPPCP)

The test numbers 2-1-C “PPPCP operation test” and 2-2-C “PPPCP performance test” are based on the existence of the following network applications.

- PPP:Server <TS>, client <OBE>
- PING <Common>
- FTP:Server <TS>, client <OBE>

2.3.4 Details of test

2.3.4.1 Extended link control protocol (ASL-ELCP) test

Details of the test as to ASL-ELCP are as shown below.

2.3.4.1.1 Operation test for communication control management

Test number	1-1-1	Items	Communication control management operation Initial connection
Test overview • Verify that TS and OBE get into a communication-connected state.			
Test conditions • The basic parameters are those in subclause 2.3.2. • DSRC-ASL has completed application registration in the layer 7.			
Test procedure 1. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 2. Turn TS into a transmission state from the transmission-stopped state. 3. In TS, verify the details of the ASL mobile station profile.			
Confirmation items • In TS, verify that the detail of the ASL mobile station profile received by TS is identical with the details of the ASL mobile station profile declared.			

Test number	1-1-2	Items	Communication control management operation Maintaining connection
Test overview • Verify that the communication-connected state with TS and OBE can be maintained.			
Test conditions • The basic parameters are those in subclause 2.3.2. • Verification has been done as to the operation test in the test number 1-1-1			
Test procedure 1. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 2. TS transmits the transmission inquiry primitive repeatedly at an interval of within a CTO value of T1max milli-second.			
Confirmation items • In TS, verify that OBE responds to the transmission of the transmission inquiry primitive from TS within a CTR value of T2max milli-second.			

Test number	1-1-3	Items	Communication control management operation Disconnection
Test overview • Verify that TS and OBE get into a communication-disconnected state.			
Test conditions • The basic parameters are those in subclause 2.3.2. • The release timer is set at [2] seconds. • Verification has been done as to the operation test in the test numbers 1-1-1 and 1-1-2.			
Test procedure 1. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 2. Turn TS into a transmission-stopped state from the transmission state. 3. After an elapse of a CTO value of T1max milli-second in OBE, turn TS into a transmission state from the transmission-stopped state.			
Confirmation items • In the test procedure step 2, turn TS into a transmission-stopped state. Then, verify in TS that after an elapse of a CTO value of T1max milli-second in OBE plus the value in the release timer, OBE gets into the initial connection operation starting from the ACTC transmission.			

Test number	1-1-4-1	Items	Communication control management operation Echo service 1
Test overview • Verify the operation procedure of the echo service provided by Communication control management. (TS → OBE)			
Test conditions • The basic parameters are those in subclause 2.3.2. • Initial connection processing between TS and OBE has been completed and the communication-connected state has been established. • The test data to be stored in echoParameter in the operation test are the following data. Test data 1: [0] octet data Test data 2: [32] octet arbitrary data			
Test procedure 1. TS transmits the test data 1 in the echo transmission message to OBE. 2. TS receives the echo response message from OBE. 3. After receiving the echo response message from OBE, TS transmits the test data 2 in the echo transmission message to OBE. 4. TS receives the echo response message from OBE.			
Confirmation items • Verify in TS that the data received in the test procedure step 2 is identical with the test data 1. • Verify in TS that the data received in the test procedure step 4 is identical with the test data 2.			

Test number	1-1-4-2	Items	Communication control management operation Echo service 2
Test overview • Verify the operation procedure of the echo service provided by Communication control management. (OBE→TS)			
Test conditions • The basic parameters are those in subclause 2.3.2. • Initial connection processing between TS and OBE has been completed and the communication-connected state has been established. • The test data to be stored in echoParameter in the operation test are the following data. Test data 1: [0] octet data Test data 2: [32] octet arbitrary data			
Test procedure 1. OBE transmits the test data 1 in the echo transmission message to TS. 2. OBE receives the echo response message from TS. 3. After receiving the echo response message from TS, OBE transmits the test data 2 in the echo transmission message to OBE. 4. OBE receives the echo response message from TS.			
Confirmation items • Verify in OBE that the data received in the test procedure step 2 is identical with the test data 1. • Verify in OBE that the data received in the test procedure step 4 is identical with the test data 2.			

Test number	1-1-5-1	Items	Communication control management operation Event notification service 1
Test overview • Verify the operation procedure of the event notification service provided by Communication control management. • TS give an abnormality in which the status identifier status corresponds to 1 (no access point exists) to OBE. Then, verify the occurrence of an event, and afterwards, verify that OBE does not go into an abnormality.			
Test conditions • The basic parameters are those in subclause 2.3.2. • Initial connection processing between TS and OBE has been completed and the communication-connected state has been established.			
Test procedure 1. TS produces NCP-PDU, which stores an access point identifier not installed in OBE, and transmits it to OBE. 2. TS receives the event notification message from OBE. 3. TS transmits the transmission inquiry primitive and maintain the communication-connected state.			
Confirmation items • Verify in TS that the value of the status identifier status of the event notification message received in the test procedure step 2 is 1. • Verify in TS that in response to the transmission of the transmission inquiry primitive from TS, OBC responds within a CTR value of T2max milli-second in the base station.			

Test number	1-1-5-2	Items	Communication control management operation Event notification service 2
Test overview • Verify the operation procedure of the event notification service provided by Communication control management. • TS develop an event in which the status identifier status corresponds to 1 (no access point exists). Then, verify that OBE receives the event, and afterwards, OBE does not go into an abnormality.			
Test conditions • The basic parameters are those in subclause 2.3.2. • Initial connection processing between TS and OBE has been completed and the communication-connected state has been established. • Test data to be used for the operation test does not specially specify.			
Test procedure 1. OBE transmits data to TS through an arbitrary ASL-NCP installed in OBE. 2. TS confirms the data reception. Then, TS transmits an event notification message in which the status identifier status is 1. 3. TS transmits the transmission inquiry primitive and maintain the communication-connected state.			
Confirmation items • Verify in TS that in response to the transmission of the transmission inquiry primitive from TS, OBE responds within a CTR value of T2max milli-second in the base station. • Verify in OBE that the value of the status identifier status of the event notification message received in the test procedure step 2 is 1.			

Test number	1-1-6-1	Items	Communication control management operation Access management 1
Test overview Verify the operation procedure when authentication of the access management function is successful.			
Test conditions • The basic parameters are those in subclause 2.3.2. • OBE has the access management function and it is possible to register the ID and password for testing. • As the digital signature algorithm, the default digital signature algorithm is used. • The number of authentication trials, NA, is 1. • DSRC-ASL has completed application registration in the layer 7. • The release timer is set at [2] seconds.			
Test procedure 1. OBE registers an ID designated by TS and true value password. 2. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 3. Turn TS into a transmission state from the transmission-stopped state. 4. TS receives the ASL mobile station profile. 5. TS transmits the random numbers transmission message to OBE. 6. S receives the digital signature response message from OBE. 7. In a case where TS confirms the details of the digital signature and is successful in authentication, TS transmits an event notification message in which the status identifier status is 94 (access is authorized). 8. In a case where TS confirms the details of the digital signature and is unsuccessful in authentication, TS transmits an event notification message in which the status identifier status is 95 (access is rejected).			
Confirmation items • Pick out the security profile from the ASL mobile station profile received in the test procedure step 3, and verify in TS that the equipment authentication function is valid and the ID is identical with the registered details. • In the test procedure step 6, verify in TS that the details of the digital signature agree. • In the test procedure step 7, verify in TS that the connection is maintained after the event notification message is transmitted.			

Test number	1-1-6-2	Items	Communication control management operation Access management 2
Test overview Verify the operation procedure when authentication of the access management function is unsuccessful.			
Test conditions • The basic parameters are those in subclause 2.3.2. • OBE has the access management function and it is possible to register the ID and password for testing. • As the digital signature algorithm, the default digital signature algorithm is used. • The number of authentication trials, NA, is 1. • DSRC-ASL has completed application registration in the layer 7. • The release timer is set at [2] seconds.			
Test procedure 1. OBE registers an ID designated by TS and spurious value password. 2. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 3. Turn TS into a transmission state from the transmission-stopped state. 4. TS receives the ASL mobile station profile. 5. TS transmits the random numbers transmission message to OBE. 6. TS receives the digital signature response message from OBE. 7. In a case where TS confirms the details of the digital signature and is successful in authentication, TS transmits an event notification message in which the status identifier status is 94 (access is authorized). 8. In a case where TS confirms the details of the digital signature and is unsuccessful in authentication, TS transmits an event notification message in which the status identifier status is 95 (access is rejected).			
Confirmation items • Pick out the security profile from the ASL mobile station profile received in the test procedure step 3, and verify in TS that the equipment authentication function is valid and the ID is identical with the registered details. • In the test procedure step 6, verify in TS that the details of the digital signature do not agree. • In the test procedure step 8, verify in TS that the communication is cut off after the event notification message is transmitted. For information, communication cutoff should be considered to be confirmed when OBE starts the Initial connection operation from the ACTC transmission after an elapse of the time set in the release timer from the moment TS conducts release transmission to OBE.			

2.3.4.1.2 Operation test for extended link control

Test number	1-2-1-1	Items	Extended link control operation Client / server type communication control and transmission service 1
Test overview • Verify the operation procedure for data transfer (TS→OBE) by the client / server type communication control.			
Test conditions • The basic parameters are those in subclause 2.3.2. • Initial connection processing between TS and OBE has been completed and the communication-connected state has been established. • The test data to be used as NCP-SDU in the operation test is the following data: Test data 1: [32] octet arbitrary data row			
Test procedure 1. OBE declares ASL-NCP to which TS transmits data. 2. TS transmits the transmission inquiry primitive repeatedly at an interval of within a CTO value of T1max milli-second in OBE. 3. TS transmits the test data 1 to ASL-NCP designated by OBE by using the data transmission primitive. 4. TS transmits the test data 1 to ASL-NCP designated by OBE by using the transmission inquiry primitive.			
Confirmation items • OBE verifies in ASL-NCP declared that the test data 1 transmitted by TS to the data transmission primitive is stored in NCP-SDU. • OBE verifies in ASL-NCP declared that the test data 1 transmitted by TS to the transmission inquiry primitive is stored in NCP-SDU.			

Test number	1-2-1-2	Items	Extended link control operation Client / server type communication control and transmission service 2
Test overview • Verify the operation procedure for data transfer (OBE→TS) by the client / server type communication control.			
Test conditions • The basic parameters are those in subclause 2.3.2. • Initial connection processing between TS and OBE has been completed and the communication-connected state has been established. • The test data to be used as NCP-SDU in the operation test is the following data: Test data 1: [32] octet arbitrary data row			
Test procedure 1. TS transmits the transmission inquiry primitive repeatedly at an interval of within a CTO value of T1max milli-second in OBE. 2. Transmit the test data 1 from OBE to TS through arbitrary NCP installed in OBE.			
Confirmation items • Verify in TS that the details of NCP-SDU picked out from the response primitive to the transmission inquiry from OBE are identical with the test data 1. • Verify in TS that the destination ASL-NCP exists in the ASL mobile station profile.			

Test number	1-2-2	Items	Extended link control operation Bulk transmission control

Test overview
• Verify that in response to the bulk transmission with the use of the echo service from TS, OBE normally echoes back the same data.

Test conditions
• The basic parameters are those in subclause 2.3.2.
• OBE has the bulk transmission function.
• Verification has been done as to the operation test in the test number 1-1-4-1.
• Initial connection processing between TS and OBE has been completed and the communication-connected state has been established.
• The test data to be stored in echoParameter in the operation test are the following data:
(1) Test data in the communication profile 10
Test data 1: [52] octet arbitrary data row
Test data 2: [53] octet arbitrary data row
Test data 3: [MRU of ASL-ELCP on the OBE] octet arbitrary data row
(2) Test data in the communication profile 11
Test data 1: [178] octet arbitrary data row
Test data 2: [179] octet arbitrary data row
Test data 3: [MRU of ASL-ELCP on the OBE] octet arbitrary data row

Test procedure
1. TS transmits the test data 1 in the echo transmission message to OBE.
2. TS receives the echo response message from OBE.
3. After receiving the echo response message from OBE, TS transmits the test data 2 in the echo transmission message to OBE.
4. TS receives the echo response message from OBE.
5. After receiving the echo response message from OBE, TS transmits the test data 3 in the echo transmission message to OBE.
6. TS receives the echo response message from OBE.

Confirmation items
• Verify in TS that the data received in the test procedure step 2 is identical with the test data 1.
• Verify in TS that the data received in the test procedure step 4 is identical with the test data 2.
• Verify in TS that the data received in the test procedure step 6 is identical with the test data 3.

Test number	1-2-3-1	Items	Extended link control operation Broadcast mode control 1
Test overview • Verify the operation procedure of the broadcast mode control.			
Test conditions • The basic parameters are those in subclause 2.3.2. • OBE is not connected for communication. • OBE has the bulk transmission function. • TS take steps, such as not assigning ACTS, so that OBE will not carry out initial connection operation. • TS use the bulk transmission function. • The number of consecutive transmissions, k, is [3]. • The test data to be used as NCP-SDU in the operation test are the following data: (1) Test data in the communication profile 10 Test data 1: [54] octet arbitrary data row Test data 2: [55] octet arbitrary data row Test data 3: [MRU of ASL-ELCP on the OBE side] octet arbitrary data row (2) Test data in the communication profile 11 Test data 1: [180] octet arbitrary data row Test data 2: [181] octet arbitrary data row Test data 3: [MRU of ASL-ELCP on the OBE side] octet arbitrary data row			
Test procedure 1. OBE declares ASL-NCP to which TS transmits the broadcast data. 2. TS transmits the test data 1 to ASL-NCP designated by OBE at the multicast link address by using the data transmission primitive. 3. TS transmits the test data 2 to ASL-NCP designated by OBE at the multicast link address by using the data transmission primitive. 4. TS transmits the test data 3 to ASL-NCP designated by OBE at the multicast link address by using the data transmission primitive.			
Confirmation items • Verify in OBE that it was possible to receive the test data 1. • Verify in OBE that it was possible to receive the test data 2. • Verify in OBE that it was possible to receive the test data 3.			

Test number	1-2-3-2	Items	Extended link control operation Broadcast mode control 2
Test overview • Verify the operation procedure of the broadcast mode control.			
Test conditions • The basic parameters are those in subclause 2.3.2. • OBE is not connected for communication. • TS take steps, such as not assigning ACTS, so that OBE will not carry out initial connection operation. • TS do not use the bulk transmission function. • The number of consecutive transmissions, k, is [3]. • The test data to be used as NCP-SDU in the operation test are the following data: (1) Test data in the communication profile 10 Test data 1: [54] octet arbitrary data row Test data 2: [55] octet arbitrary data row Test data 3: [MRU of ASL-ELCP on the OBE side] octet arbitrary data row (2) Test data in the communication profile 11 Test data 1: [180] octet arbitrary data row Test data 2: [181] octet arbitrary data row Test data 3: [MRU of ASL-ELCP on the OBE side] octet arbitrary data row			
Test procedure 1. OBE declares ASL-NCP to which TS transmits the broadcast data. 2. TS transmits the test data 1 to ASL-NCP designated by OBE at the multicast link address by using the data transmission primitive. 3. TS transmits the test data 2 to ASL-NCP designated by OBE at the multicast link address by using the data transmission primitive. 4. TS transmits the test data 3 to ASL-NCP designated by OBE at the multicast link address by using the data transmission primitive.			
Confirmation items • Verify in OBE that it was possible to receive the test data 1. • Verify in OBE that it was possible to receive the test data 2. • Verify in OBE that it was possible to receive the test data 3.			

Test number	1-2-3-3	Items	Extended link control operation Broadcast mode control 3

Test overview
• Verify the operation procedure of the broadcast mode control.

Test conditions
• The basic parameters are those in subclause 2.3.2.
• TS use the bulk transmission function.
• The number of consecutive transmissions, k, is [3].
• The test data to be used as NCP-SDU in the operation test are the following data:
  (1) Test data in the communication profile 10
    Test data 1: [54] octet arbitrary data row
    Test data 2: [55] octet arbitrary data row
    Test data 3: [MRU of ASL-ELCP on the OBE side] octet arbitrary data row
  (2) Test data in the communication profile 11
    Test data 1: [180] octet arbitrary data row
    Test data 2: [181] octet arbitrary data row
    Test data 3: [MRU of ASL-ELCP on the OBE side] octet arbitrary data row
• The test data to be stored in echoParameter in the operation test are the following data:
  (1) Test data in the communication profile 10
    Test data 1: [52] octet arbitrary data row
    Test data 2: [53] octet arbitrary data row
    Test data 3: [MRU of ASL-ELCP on the OBE side] octet arbitrary data row
  (2) Test data in the communication profile 11
    Test data 1: [178] octet arbitrary data row
    Test data 2: [179] octet arbitrary data row
    Test data 3: [MRU of ASL-ELCP on the OBE side] octet arbitrary data row

Test procedure
1. OBE declares ASL-NCP to which TS transmits the broadcast data.
2. Stop the transmission from TS.
3. TS transmits data in the order of the test data 1, test data 2 and test data 3 repeatedly to ASL-NCP designated by OBE by using the data transmission primitive. The link address in this case is the multicast link address.
4. Turn TS into a transmission state from the transmission-stopped state.
5. TS receives the ASL mobile station profile.
6. After receiving the ASL mobile station profile, TS transmits the test data 1 in the echo transmission message to OBE. The link address in this case is the private link address of OBE.
7. TS receives the echo response message from OBE.
8. After receiving the echo response message from OBE, TS transmits the test data 2 in the echo transmission message to OBE. The link address in this case is the private link address of OBE.
9. TS receives the echo response message from OBE.
10. After receiving the echo response message from OBE, TS transmits the test data 3 in the echo transmission message to OBE. The link address in this case is the private link address of OBE.
11. TS receives the echo response message from OBE.

Confirmation items • Verify in OBE that it was possible to receive the test data 1. • Verify in OBE that it was possible to receive the test data 2. • Verify in OBE that it was possible to receive the test data 3. • Verify in TS that the data received in the test procedure step 7 is identical with the test data 1. • Verify in TS that the data received in the test procedure step 9 is identical with the test data 2. • Verify in TS that the data received in the test procedure step 11 is identical with the test data 3.

2.3.4.1.3 Performance test

Test number	1-3-1	Items	Extended link control operation Measurement of initial connection time
Test overview • Measure the time from the moment OBE gets into the communication zone to the moment it is possible to communicate as seen from ASL-NCP.			
Test conditions • The basic parameters are those in subclause 2.3.2. • Verification has been done as to the operation test in the test number 1-1-1. • DSRC-ASL has completed application registration in the layer 7.			
Test procedure 1. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 2. Turn TS into a transmission state from the transmission-stopped state. Then, in TS, measure the time, t1, when TS is turned into the transmission state. 3. In TS, measure the time, t2, when ASL-ELCP generates the event notification primitive (communication connection notification) to ASL-NCP.			
Confirmation items • The time, ti, determined from the following equation should be considered as the initial connection time from the channel selection to ASL-NCP activation. Initial connection time ti=t2 - t1 • The number of samples should be [10] and based on the average value obtained from them, evaluations should be performed.			

2.3.4.2 Network control protocol (ASL-NCP) test

Test method and procedures for the ASL-NCP are described below.
The tests described here are specified on condition that confirmation has been completed for the operation tests required on the corresponding OBE in the test items shown 2.3.1.1.

2.3.4.2.1 Local port control protocol (LPCP)

2.3.4.2.1.1 LPCP Operation Test

Test number	2-1-1-A	Items	LPCP operation Initial connection
Test overview • Verify that initial set up process between the TS (test system) and the OBE is completed.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • For the operation test, local port number [0x0FF0] is stored in the acceptable local port list (common).			
Test procedure 1. Connect the DSRC. 2. The “test application <OBE>” receives an event notification message from the LPCP in the OBE via the eventReport.indication. 3. The TS receives the event notification message from the OBE.			
Confirmation items • Verify that the event type received by the “test application <OBE>” in test procedure step 2 was “connection notice”. • Verify that the event code received by the TS in test procedure step 3 was the “accept port list”, and that the received additional event information is the same as the accept port list in the OBE.			

Test number	2-1-2-A	Items	LPCP operation Disconnection
Test overview Verify that the communication between the TS and the OBE changes to disconnected status.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • The communication between the TS and the OBE is in connected status. • For the operation test, local port number [0x0FF0] is stored in the acceptable local port list in the OBE.			
Test procedure 1. Disconnect the DSRC. 2. The “test application <OBE>” receives an event notification message from the LPCP in the OBE via the EventReport.indication.			
Confirmation items • Verify that the event type received by the “test application <OBE>” in test procedure step 2 is “disconnection notice”.			

Test number	2-1-3-A	Items	LPCP operation Management service
Test overview • Verify the operation procedure of the management service provided by the LPCP. • Verify the local port open operation.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • For the operation test, local port number [0x0FF0] is stored in the acceptable local port list in the OBE, and local port number [0x0FF1] is not stored. The test data stored as the send data in the OpenPort.request primitive are as follows: Test data 1: The “openPort” number [0x0FF1] not registered in the acceptable local port list. Test data 2: The “openPort” number [0x0FF0] registered in the acceptable local port list. Test data 3: “openPort” is omitted.			
Test procedure 1. Send the test data 1 from the “test application <OBE>” to the LPCP in the OBE via the OpenPort.request primitive. 2. The “test application <OBE>” receives the OpenPort.confirm primitive from the LPCP in the OBE. 3. Set the test data 2 as the message in test procedure step 1, and repeat steps 1 and 2. 4. Set the test data 3 as the message in test procedure step 1, and repeat steps 1 and 2.			
Confirmation items • Verify that the OpenPort.confirm primitive in which the specified local port number is stored in the “openPort” parameter is received by the “test application <OBE>” in test procedure step 2. • Verify that the OpenPort.confirm primitive in whom the “openPort” parameter is omitted is received by the “test application <OBE>” in test procedure step 3. • Verify that the OpenPort.confirm primitive in which the local port number opened by the LPCP is stored in the “openPort” parameter is received by the “test application <OBE>” in test procedure step 4.			

Test number	2-1-4-A-1	Items	LPCP operation Data transfer service 1
Test overview • Verify the operation procedure of the data transfer service provided by the LPCP. • Send a data transfer message including a valid link address from the OBE to the TS via the TransferData.request primitive, and verify that the TS receives the data transfer message. (OBE → TS)			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data stored in the NCP-SDU is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send a data transfer message from the “test application <OBE>” to the TS via the TransferData.request primitive, including a valid link address to achieve communication connection, a valid destination local port number [0x0FF0] registered in the accept local port list in the TS, and test data 1. 2. The TS receives the data transfer message from the OBE.			
Confirmation items • Verify that the data received by the TS in test procedure step 2 matches test data 1.			

Test number	2-1-4-A-2	Items	LPCP operation Data transfer service 2
Test overview • Verify the operation procedure of the data transfer service provided by the LPCP. • Send a data transfer message from the TS to a valid link address in the OBE via the TransferData.request primitive, and then verify that the “test application <OBE>” receives the data transfer message. (TS → OBE)			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data stored in the NCP-SDU is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send a data transfer message from the TS to the OBE via the TransferData.request primitive, with a valid link address, a valid destination local port number [0x0FF0] registered in the accept local port list in the OBE, and test data 1. 2. The “test application <OBE>” receives the data transfer message.			
Confirmation items • Verify that the data received by the “test application <OBE>” in test procedure step 2 matches test data 1.			

Test number	2-1-4-A-3	Items	LPCP operation Data transfer service 3
Test overview • Verify the operation procedure of the data transfer service provided by the LPCP. • Send a data transfer message from the OBE to an unconnected link address in the TS via the TransferData.request primitive, and then verify that the “test application <OBE>” receives the notice “DSRC is not connected.” via the EventReport.indication.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data stored in the NCP-SDU is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send a data transfer message from the “test application <OBE>” to the TS via the TransferData.request primitive, including an unconnected link address and test data 1. 2. The “test application <OBE>” receives an EventReport.indication primitive from the LPCP in the OBE.			
Confirmation items • Verify that the event type received by the “test application <OBE>” in test procedure step 2 is “DSRC is not connected.”			

Test number	2-1-4-A-4	Items	LPCP operation Data transfer service 4
Test overview • Verify the operation procedure of the data transfer service provided by the LPCP. • Send a data transfer message from the TS to an unregistered local port number in the OBE via the TransferData.request primitive. The OBE sends an event notification message “Sending destination local port number is invalid.” to the TS. Verify that the TS receives this message.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • The port number [0x0FF2] is not registered in the accept port list in the OBE. • In the operation test, the test data stored in the NCP-SDU is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send a data transfer message from the TS to the OBE via the TransferData.request primitive, with a valid link address, a sending destination local port number [0x0FF2] not registered in the accept local port list in the OBE, and test data 1. 2. The TS receives an event notification message from the OBE.			

Confirmation items • Verify that the event code in the event notification message received by the TS in test procedure step 2 is “Destination local port number is invalid.”

Test number	2-1-5-A	Items	LPCP operation Data transfer service in broadcast mode
Test overview • Verify the operation procedure of the data transfer service provided by the LPCP. • Send a data transfer message whose link address is a group broadcast address from the TS to the OBE via the TransferData.request primitive, and then verify that the “test application <OBE>” receives the data transfer message. (TS → OBE)			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data stored in the NCP-SDU is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send a data transfer message from the TS to the OBE via the TransferData.request primitive, with a group broadcast address specified as the link address, a valid destination local port number [0x0FF0] registered in the accept local port list in the OBE, and test data 1. 2. The “test application <OBE>” receives the data transfer message from the TS.			
Confirmation items • Verify that the data received by the “test application <OBE>” in test procedure step 2 is the same as test data 1.			

2.3.4.2.1.2 LPCP performance test

Test number	2-2-1-A	Items	LPCP operation Measurement of initial connection time
Test overview • Measure the time between connection of the DSRC and receipt of an event notification message via the EventReport.indication primitive.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • For the operation test, the test data stored in the accept local port list are as follows: Test data 1: Port number: [0x0FF0], “primitiveType”: Omitted, “recvEventCode”: Omitted			
Test procedure 1. On the condition that test data 1 stored in the acceptable local port list, connect the DSRC. 2. The TS receives an event notification message via the EventReport.indication. 3. Record the time between the point at which the DSRC achieves connected status and the point at which the TS receives the event notification message.			
Confirmation items • Repeat test procedure steps 1 to 3 eleven times, and measure the time. • Exclude only the longest time among the 11 results, determine the average of the remaining 10 results, and use this time as the connection time. • Verify the connection time is reasonable NOTE The longest time is excluded so that the time required starting up the program in the test system server, etc. is excluded.			

Test number	2-2-2-A	Items	LPCP operation Transmission performance
Test overview • Transfer data from the TS using the echo service, and then calculate the data transfer speed from the time required for data transfer.			
Test conditions • The basic parameters are set as shown in .2.3.2. • The ASL-ELCP operates normally. • For the operation test, the test data to be transferred is as follows: Test data 1: [500] bytes			
Test procedure 1. Send a data transfer message from the TS to the OBE via the TransferData.request primitive, with test data 1. 2. The OBE sends back the data from the TS to the TS using the echo service. 3. The TS receives the data transfer message from the OBE.			
Confirmation items • Repeat test procedure steps 1 to 3 ten times. • In the TS, measure the time required for the test procedure steps 1 to 3. The time measurement method is not specified because it depends on the equipment specifications. Moreover, the unit of measured values may be “seconds”, and visual measurement is allowed. • Obtain the transfer speed from the measured time and the transferred data size.			

2.3.4.2.2 LAN control protocol (LANCP)

2.3.4.2.2.1 LANCP Operation Test

Test number	2-1-1-B-1	Items	LANCP operation Connection/disconnection1
Test overview • Verify the initial connection operation			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, LANCP is installed as ASL-NCP. • In a case OBE needs a network configuration setting; OBE is able to request the network configuration setting. • TS is able to perform the network configuration setting.			
Test procedure 1. OBE declares MAC address to which transmits the initial setting message. 2. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 3. Turn TS into a transmission state from the transmission-stopped state. 4. TS LANCP transmits the base initial setting message when event notification primitive is received from ASL-ELCP. 5. TS LANCE receives the initial setting message from OBE. 6. After receiving the initial setting message from OBE, communication-connected state is maintained.			
Confirmation items • Pick out the MAC address from the OBE initial setting message, and verify in TS that the MAC address declared. • In a case OBE requests network configuration setting, verify in OBE setting data from TS.			

Test number	2-1-1-B-2	Items	LANCP operation Connection/disconnection 2
Test overview • Verify the disconnection operation			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, LANCP is installed as ASL-NCP. • Verification has been done as to the operation test numbers 2-1-1-A-1. • The release timer is set at [2] seconds.			
Test procedure 1. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 2. Turn TS into a transmission-stopped state from the transmission state. 3. After an elapse of a CTO value of T1max milli-second in OBE, turn TS into a transmission state from the transmission-stopped state.			
Confirmation items • Verify in TS LANCP that TS receives the event notification primitive (the notification of connection) from ASL-ELCP, after the elapse of time, which value is CTO of OBE, (T1max milli-second) plus the value of the release timer, from the time when TS turns into a transmission-stopped state in the test procedure step2.			

Test number	2-1-2-B-1	Items	LANCP operation Data transmission and reception – Unicast1
Test overview • Verify the Data transmission and reception - Unicast using the PING application. (TS → OBE)			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, LANCP is installed as ASL-NCP. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data are as follows: Test data 1: [1000] octet arbitrary data row Test data 2: [1500] octet arbitrary data row Test data 3: [3000] octet arbitrary data row			
Test procedure 1. Verify the OBE Internet Protocol IP address. 2. TS transmits the test data 1 using PING application to OBE. 3. TS receives the response from OBE. 4. After receiving the response from OBE, TS transmits the test data2 using PING application to OBE. 5. TS receives the response from OBE. 6. After receiving the response from OBE, TS transmits the test data3 using PING application to OBE. 7. TS receives the response from OBE.			
Confirmation items • Verify in TS the response from OBE in the test procedure step3. • Verify in TS the response from OBE in the test procedure step5. • Verify in TS the response from OBE in the test procedure step7.			

Test number	2-1-2-B-2	Items	LANCP operation Data transmission and reception – Unicast2
Test overview • Verify the Data transmission and reception - Unicast using the PING application. (OBE → TS)			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, LANCP is installed as ASL-NCP. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data are as follows: Test data 1: [1000] octet arbitrary data row Test data 2: [1500] octet arbitrary data row Test data 3: [3000] octet arbitrary data row			
Test procedure 1. Verify the TS Internet Protocol IP address. 2. OBE transmits the test data 1 using PING application to TS. 3. OBE receives the response from TS. 4. After receiving the response from TS, OBE transmits the test data2 using PING application to TS. 5. OBE receives the response from TS. 6. After receiving the response from TS, OBE transmits the test data3 using PING application to TS. 7. OBE receives the response from TS.			
Confirmation items • Verify in OBE the response from TS in the test procedure step3. • Verify in OBE the response from TS in the test procedure step5. • Verify in OBE the response from TS in the test procedure step7.			

Test number	2-1-3-B-1	Items	LANCP operation Data transmission and reception – Multi-cast1
Test overview • Verify the data transmission/reception in broadcast mode multi-cast. (TS → OBE)			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, LANCP is installed as ASL-NCP. • TS is Multi-cast distributed by group broadcast address. • The transmission repetition times k is [3] • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data is as follows: Test data 1: default value of PING application.			
Test procedure 1. Verify the IP address and MAC address of OBE. 2. Cancel the ARP entry table of TS using ARP application. 3. TS transmits the test data1 using PING application to OBE. 4. TS receives the response from OBE. 5. Display the contents of ARP entry table of TS using ARP application.			
Confirmation items • Verify that the IP address and the MAC address of OBE are registered in the ARP entry table of TS.			

Test number	2-1-3-B-2	Items	LANCP operation Data transmission and reception – Multi-cast2
Test overview • Verify the data transmission/reception in individual transmission mode multi-cast. (TS → OBE)			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, LANCP is installed as ASL-NCP. • TS is in the Multi-cast mode, in which the transmission data are distributed to all the link address registered in the administration table. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data is as follows: Test data 1: default value of PING application.			
Test procedure 1. Verify the IP address and the MAC address of OBE. 2. Cancel the ARP entry table of TS using ARP application. 3. TS transmits the test data1 using PING application to OBE. 4. TS receives the response from OBE. 5. Display the ARP entry table of TS using ARP application.			
Confirmation items • Verify that the IP address and the MAC address of OBE are registered in the ARP entry table of TS.			

Test number	2-1-3-B-3	Items	LANCP operation Data transmission and reception – Multi-cast3
Test overview • Verify the data transmission/reception in broadcast mode. (OBE → TS)			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, LANCP is installed as ASL-NCP. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data is follows: Test data 1: default value of PING application.			
Test procedure 1. Verify the IP address and MAC address of TS. 2. Cancel the ARP entry table of OBE using ARP application. 3. OBE transmits the test data 1 using PING application to TS. 4. OBE receives the response from TS. 5. Display the ARP entry table of TS using ARP application.			
Confirmation items • Verify that the IP address and the MAC address of TS are registered in the ARP entry table of OBE.			

2.3.4.2.2.2 LANCP performance test

Test number	2-2-1-B	Items	LANCP operation Measurement of initial connection time
Test overview • Measure the required time of the initial connection process.			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, LANCP is installed as ASL-NCP. • In a case OBE needs a network configuration setting; OBE is in the state in which it can request the network configuration setting.			
Test procedure 1. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 2. Turn TS into a transmission state from the transmission-stopped state. Then, in TS, measure the time, t1, when TS is turned into the transmission state. 3. TS LANCP transmits the base initial setting message when event notification primitive is received from ASL-ELCP. 4. In TS LANCP, measure the time t2, when receives the initial setting message from OBE. 5. After receiving the initial setting message from OBE, communication-connected state is maintained.			
Confirmation items • The time, tlani, determined from the following equation should be considered as the initial connection time from the channel selection to LANCP initial setting. Initial connection time tlani=t2 - t1 • In a case OBE needs the network configuration setting, measure the time required by the network configuration setting process using a TCP/IP network monitor, then the measured time should be added to the initial connection time tlani. • The number of samples should be [10], and the evaluations should be performed based on the average value obtained from them.			

Test number	2-2-2-B	Items	LANCP operation Transmission performance
Test overview • Calculate data transfer speed of the communication frame passed through LANCP.			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, LANCP is installed as ASL-NCP. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data are as follows. Test data is selected according to the transmission capability of OBE. Test data1: [10M] byte data file. Test data2: [1M] byte data file.			
Test procedure 1. OBE connects to TS FTP server by the FTP client. 2. OBE FTP client downloads the test data file from TS.			
Confirmation items • In a case FTP client displays the transfer speed, it should be considered as a result. • In a case FTP client does not display the transfer speed Rlan, it should be determined from the following equation. transfer speed: Rlan=test data file size / download time • The number of samples should be [10] and the evaluations should be performed based on the average value obtained from them.			

2.3.4.2.3 PPP control protocol (PPPCP)

2.3.4.2.3.1 PPPCP Operation Test

Test number	2-1-1-C	Items	PPPCP operation test Connection /disconnection
Test overview • Verify the connection / disconnection operation.			
Test conditions • The basic parameters are those in subclause 2.3.2. • The ASL-ELCP operates normally. • In OBE, PPPCP is installed as ASL-NCP. • PPP link timer is adjusted so that four states: TS states (PPPconnection or disconnection) x OBE states (PPPconnection or disconnection) have been generated.			
Test procedure 1. OBE performs the DSRC connection and the PPP connection process, starting at the states that the TS and OBE states are both PPPdisconnection. 2. OBE performs the DSRC connection and the PPP re-connection process, starting at the states that the TS state is PPPconnection and the OBE state is PPPdisconnection. 3. OBE performs the DSRC re-connection and the PPP re-connection process, starting at the states that the TS state is PPPdisconnection and the OBE state is PPPconnection. 4. OBE performs the DSRC re-connection and the PPP re-connection process, starting at the states that the TS and OBE states are both PPPconnection.			
Confirmation items • Verify in TS and OBE that the connection sequence is operate normally in all cases of four states. • Verify in TS and OBE that the both of TS and OBE states are in agreement. • Verify in TS and OBE the link timer starting, and performing the PPP disconnection process after the link timer expired.			

Test number	2-1-2-C	Items	PPPCP operation Data transmission and reception
Test overview • Verify the data transmission and reception operation using the PING application. (TS → OBE)			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, PPPCP is installed as ASL-NCP. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, the test data are as follows: Test data1: [1000] octet arbitrary data row Test data2: [1500] octet arbitrary data row Test data3: [3000] octet arbitrary data row			
Test procedure 1. Verify the OBE IP address as the destination. 2. TS transmits the test data1 using PING application to OBE. 3. TS receives the response from OBE. 4. After receiving the response from OBE, TS transmits the test data2 using PING application to OBE. 5. TS receives the response from OBE. 6. After receiving the response from OBE, TS transmits the test data3 using PING application to OBE. 7. TS receives the response from OBE.			
Confirmation items • Verify in OBE that the response from TS in the test procedure step3. • Verify in OBE that the response from TS in the test procedure step5. • Verify in OBE that the response from TS in the test procedure step7.			

2.3.4.2.3.2 PPPCP performance test

Test number	2-2-1-C	Items	PPPCP operation Measurement of initial connection time
Test overview • Measure the time of the initial connection process.			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, PPPCP is installed as ASL-NCP. • Both TS and OBE are in the state PPPdisconnection.			
Test procedure 1. TS verifies the functions supported by ASL-ELCP and the type of ASL-NCP based on the details of the ASL mobile station profile declared, and registers them in the TS's ASL base station profile. 2. Turn TS into a transmission state from the transmission-stopped state. Then, in TS, measure the time t1, when TS is turned into the transmission state. 3. After performing the DSRC connection process, TS PPPCP transmits the PppCommand (connectPPP) when PppStatus (newLink) is received from OBE. 4. In TS PPPCP, measure the time t2, when TS PPPCP transmits the PppCommand. 5. After transmission of PppCommand, communication-connected state is maintained.			
Confirmation items • The time determined from the following equation should be considered as the initial connection time from the channel selection to PPPCP initial connection. Initial connection time=t2 - t1 • The number of samples should be [10] and evaluations should be performed based on the average value obtained from them.			

Test number	2-2-2-C	Items	PPPCP operation Transmission performance
Test overview • Download files at OBE, and calculate the data transfer speed from the time required for data transmission.			
Test conditions • The basic parameters are those in subclause 2.3.2. • In OBE, PPPCP is installed as ASL-NCP. • Connection processing between the TS and the OBE has been completed, and they are in the connected status. • For the operation test, test data are as follows, which is selected according to the capability of OBE (such as the transmission speed). Test data 1: [10M] byte data file. Test data 2: [1M] byte data file.			
Test procedure 1. OBE connects to TS FTP server by the FTP client. 2. OBE FTP client downloads from TS the test data file specified by TS.			
Confirmation items • In a case FTP client displays the transfer speed, it should be considered as a result. • In a case FTP client doesn't display the transfer speed, the speed should be determined from the following equation. transfer speed = test data file size / download time. • The number of samples should be [10] and evaluations should be performed based on the average value obtained from them.			

Annex A
List of confirmation test items

As for the confirmation test items that, out of the test items shown in 2.3.1, which shall be confirmed by an OBE under test is stated. These test items should be selected based on the installed functions of a mobile station (OBE). For the installed functions, refer to Annex B.

A1 Test items concerning the extended link control protocol (ASL-ELCP)

The test items for ASL-ELCP are shown in Table A1-1.
As for the basic functions of ASL-ELCP, tests are mandatory (M). In the case of the extended functions of ASL-ELCP, tests are conditionally mandatory (C), and the extended functions installed in the applicable OBE should be confirmed.

Table A1-1 — Confirmation items for OBE - ASL-ELCP

Test number	Test item	OBE test category
1-1-1	Operation test for communication control management - Initial connection	M
1-1-2	Operation test for communication control management - Maintaining connection	C
1-1-3	Operation test for communication control management - Disconnection	C
1-1-4-	Operation test for communication control management - Echo service	C (NOTE)
1-1-5	Operation test for communication control management - Event notification service	C
1-1-6	Operation test for communication control management - Access management	C
1-2-1	Extended link control operation test - Client / server type communication control and transmission service	C
1-2-2	Extended link control operation test - Bulk transmission control	C
1-2-3	Extended link control operation test - Broadcast mode control	C
1-3-1	Performance test - Measurement of initial connection time	O

Meaning of symbols
M: Mandatory test item
O: Optional test item
C: Mandatory test item in the case where installation is selected

NOTE The test number 1-1-4-2 in the echo service confirmation test is optional.

A2 Test items concerning the network control protocol（ASL-NCP）

The test items for ASL-NCP are shown in Table A2-1, Table A2-2 and Table A2-3. As for the test items for ASL-NCP, the functions of ASL-NCP installed in the applicable OBE is confirmed and test is conducted in accordance with the details of the applicable tables shown below.

Table A2-1 — Test items for OBE – LANCP

Test number	Test item	OBE test category
2-1-1-B	LANCP operation test – Connection / Disconnection	M
2-1-2-B	LANCP operation test – Data transmission and reception – Unicast	M
2-1-3-B	LANCP operation test – Data transmission and reception – Multicast	M
2-2-1-B	LANCP performance test – Measurement of initial connection time	O
2-2-2-B	LANCP performance test – Transmission performance	O

Meaning of symbols

M: Mandatory test item

O: Optional test item

Table A2-2 — Test items for OBE - PPPCP

Test number	Test item	OBE test category
2-1-1-C	PPPCP operation test – Connection / disconnection	M
2-1-2-C	PPPCP operation test – Data transmission and reception	M
2-2-1-C	PPPCP performance test – Measurement of initial connection time	O
2-2-2-C	PPPCP performance test – Transmission performance	O

Meaning of symbols

M: Mandatory test item

O: Optional test item

Table A2-3 — Test items for OBE - LPCP

Test number	Test item	OBE test category
2-1-1-A	LPCP operation test – Initial connection	M
2-1-2-A	LPCP operation test – Disconnection	M
2-1-3-A	LPCP operation test – Management service	M
2-1-4-A-1	LPCP operation test – Data transfer service	M
2-1-4-A-2	LPCP operation test – Data transfer service 2	M
2-1-4-A-3	LPCP operation test – Data transfer service 3	M
2-1-4-A-4	LPCP operation test – Data transfer service 4	M
2-1-5-A	LPCP operation test – Data transfer service in broadcast mode	C
2-2-1-A	LPCP performance test – Measurement of initial connection time	O
2-2-2-A	LPCP performance test – Transmission performance	O

Meaning of symbols

M: Mandatory test item

O: Optional test item

C: Mandatory test item in the case where installation is selected

Annex B
Classification of OBE functions and relationship with test items by TS

As for the test items by TS, those in which classified OBE (refer to the Annex D attached to ARIB STD-T88) verifies the function which needs to be installed are classified as mandatory ones, while items in which functions installed selectively are verified are defined as options. Table B1-1 shows the classification of OBE functions and relationship with test items by TS.

Table B1-1 — the classification of OBE functions and relationship with test items

Test item			Tag type OBE	Non-network type OBE	Network type OBE		Enhanced function type OBE
					IEEE802.3 connection	PPP connection	
ASL-NCP	Communication control management		(NOTE1)	(NOTE1)	(NOTE1)	(NOTE1)	(NOTE1)
	LPCP		-	2-1-1-A 2-1-2-A 2-1-3-A 2-1-4-A 2-1-5-A (2-2-1-A) (2-2-2-A)	-	-	2-1-1-A 2-1-2-A 2-1-3-A 2-1-4-A 2-1-5-A (2-2-1-A) (2-2-2-A)
	LANCP		-	-	2-1-1-B 2-1-2-B 2-1-3-B (2-2-1-B) (2-2-2-B)	-	2-1-1-B 2-1-2-B 2-1-3-B (2-2-1-B) (2-2-1-B) (NOTE2)
	PPPCP		-	-	-	2-1-1-C 2-1-2-C (2-2-1-C) (2-2-2-C)	2-1-1-C 2-1-2-C (2-2-1-C) (2-2-2-C) (NOTE2)
ASL-ELCP	Client / server type link control		-	1-2-1	1-2-1	1-2-1	1-2-1
	Bulk transmission control		-	1-2-2	1-2-2	1-2-2	1-2-2
	Broadcast mode control		-	1-2-3	1-2-3	—	1-2-3
	Communication control management	Connection management	1-1-1	1-1-1 1-1-2 1-1-3 (1-3-1)	1-1-1 1-1-2 1-1-3 (1-3-1)	1-1-1 1-1-2 1-1-3 (1-3-1)	1-1-1 1-1-2 1-1-3 (1-3-1)
		Management service	-	1-1-4 1-1-5	1-1-4 1-1-5	1-1-4 1-1-5	1-1-4 1-1-5
		Access management	-	1-1-6	1-1-6	1-1-6	1-1-6

NOTE1 To be carried out in the test number 1-1 “Operation test for communication control management”.

NOTE2 Selecting a test item corresponding to ASL-NCP installed carry out.

Table B1-2 shows the LPCP's installed functions and relationship with test items by TS.

Table B1-2 — LPCP's functions and relationship with test items by TS

		Broadcast type service	Bi-directional type service
LPCP function	TransferData	2-1-5-A	2-1-4-A
	EventReport (Connection, disconnection and reception-possible port list)	-	2-1-1-A 2-1-2-A
	EventReport (Other than the above)	2-1-4-A	2-1-4-A
	OpenPort	2-1-3-A	2-1-3-A
	ClosePort	2-1-4-A	2-1-4-A

NOTE For the implementation scope of each service; refer to Annex H attached to ARIB STD-T88.

Annex C
Test items based on the technical report ARIB TR-T16

The compatibility confirmation test based on this technical report is carried out on condition that OBE which has completed the test in accordance with the technical report ARIB TR-T16 “Test Items And Conditions For Compatibility Confirmation For Mobile Station in the Dedicated Short-Range Communication (DSRC) System” is connected to TS.
Therefore, implementation of the compatibility confirmation test in accordance with this technical report is based on the premise that the operation test items shown below, out of the tests defined in the technical report ARIB TR-T16, has been completed.

C1 Test items concerning the technical requirements for radio facilities

C1.1 Test items for the amplitude shift keying (ASK)

The test items for OBE’s, which have the communication profile 10 or 11, are shown in Table C1-1 and Table C1-2.

Table C1-1 — Test items concerning the technical requirements for radio facilities of ASK – Transmission device

Test number	Test item	TR-T16 Test category	OBE Test category
1-1-1-A	Frequency stability	M	M
1-1-2-A	Occupied frequency bandwidth	M	M
1-1-3-A	Transmission spurious	M	M
1-1-4-A	Transmission power accuracy	M	M
1-1-5-A	Adjacent channel leakage power	M	M
1-1-6-A	Leakage power during carrier of period	M	M
1-1-7-A	Transmission symbol rate accuracy	M	M
1-1-8-A	Allowable deviation of absolute signal transmission time and burst transmission transient response time	M	M

M: Mandatory test item

Table C1-2 — Test items concerning the technical requirements for radio facilities of ASK – Receiving device

Test number	Test item	TR-T16 Test category	OBE test category
1-2-1-A	Reception sensitivity	M	M
1-2-2-A	Strength of secondary radio emissions	M	M

M: Mandatory test item

C1.2 Test items concerning the π/4 shift Quadrature Phase Shift Keying (QPSK)

The test items for OBE's, which have the communication profile 11 or 12, are shown in Table C1-3 and Table C1-4.

Table C1-3 — Test concerning the technical requirements for radio facilities of π/4 shift QPSK – Transmission device

Test number	Test item	TR-T16 Test category	OBE test category
1-1-1-Q	Frequency stability	M	M
1-1-2-Q	Occupied frequency bandwidth	M	M
1-1-3-Q	Transmission spurious	M	M
1-1-4-Q	Transmission power accuracy	M	M
1-1-5-Q	Adjacent channel leakage power	M	M
1-1-6-Q	Leakage power during carrier of period	M	M
1-1-7-Q	Transmission symbol rate accuracy	M	M
1-1-8-Q	Allowable deviation of absolute signal transmission time and burst transmission transient response time	M	M

M: Mandatory test item

Table C1-4 — Test concerning the technical requirements for radio facilities of π/4 shift QPSK – Receiving device

Test number	Test item	TR-T16 Test category	OBE test category
1-2-1-Q	Reception sensitivity	M	M
1-2-2-Q	Strength of secondary radio emissions	M	M

M: Mandatory test item

C2 Test items concerning the link control method

Table C2-1 shows the test concerning the link control method for OBE on which the compatibility confirmation test is carried out in accordance with this technical report - basic operation test confirmation items. For information, the dynamic operation test confirmation items shown in Table C2-2 are be separately selected and specified.

NOTE For information, the test items for the tag type OBE's are shown. The dynamic test at this type OBE's needs to be carried out by omitting the steps [4] and [5] from the test sequence shown in ARIB TR-T16 2.3.2.6.

Table C2-1 — Test concerning the link control method – Basic operation test

Test number	Test item	TR-T16Test category	Applicable OBE Test category	
			OBE	Tag type
2-1-1	ACTC transmissions in normal condition	M	M	M
2-1-2	ACTC transmission constraints - in case of reaching maximum transmission retry number	M	M	M
2-1-3	ACTC transmission constraints - in case of unable indication in an ACPI	M	M	M
2-1-4	ACTC transmission constraints - in case of reception of an FCMC registered corresponding LID	M	M	M
2-1-5	ACTC transmissions - in case of reception of an FCMC registered AIDs	M	M	M
2-1-6	BST reception	M	M	M
2-1-7	VST reception	M	M	M
2-1-8	Initialization using communication profile(s)	O	M	M
2-1-9	Termination procedures 1	M	M	M
2-1-10	Termination procedures 2	M	M	M
2-1-11	Transaction test using one PDU	M	M	—
2-1-12	Transaction test using plural PDUs	M	M	—
2-1-13	Transaction test - duplication check of PDU	M	M	—
2-1-14	Transaction test - OBE retransmission	M	M	—
2-1-15	Transaction test - OBE retransmission request	M	M	—
2-1-16	WCNC transmission	M	M	M
2-1-17	ACTC transmission control by STA in FCMC	O	M	M
2-1-18-1	Transaction test - fragmentation and de-fragmentation of PDU (ASK)	O	C	-
2-1-18-2	Transaction test - fragmentation and de-fragmentation of PDU (QPSK)	O	C	-
2-1-19	Termination procedure 3	O	M	M
2-1-20	Re-initialization in case of reception of release	O	M	M
2-1-21	Reception of PDU addressed multicast (group) address	O	C	-
2-1-22	Reception of PDU addressed broadcast address	O	-	-

M: Mandatory test item.
C: Test item that needs to be confirmed in case of the certain implementation condition.
O: Test item that is selected depending on the installed functions of the application
–: Test item that does not need to be confirmed

Table C2-2 — Test concerning the link control method – Dynamic operation test

Test number	Test item	TR-T16 Test category	Applicable OBE test category	
			OBE (Except tag type)	Tag type OBE
2-2-1	Normal speed propagation simulation field operation test	M	(M)	C
2-2-1-1	ideal profile - maximum input power at an OBE	M	(M)	C
2-2-1-2	Ideal profile - minimum input power at an OBE	M	(M)	C
2-2-1-3	Practical profile A	M	(M)	C
2-2-1-4	Practical profile B	M	(M)	C
2-2-1-5	Adjacent lane passing profile	M	(M)	C
2-2-1-6	Shadowing profile	M	(M)	C
2-2-2	Low speed propagation simulation field operation test	M	(M)	C
2-2-2-1	Ideal profile - maximum input power at an OBE	M	(M)	C
2-2-2-2	Ideal profile - minimum input power at an OBE	M	(M)	C
2-2-2-3	Practical profile A	M	(M)	C
2-2-2-4	Practical profile B	M	(M)	C
2-2-2-5	Adjacent lane passing profile	M	(M)	C
2-2-2-6	Shadowing profile	M	(M)	C
2-2-3	High speed propagation simulation field operation test	M	(M)	C
2-2-3-1	Ideal profile - maximum input power at an OBE	M	(M)	C
2-2-3-2	Ideal profile - minimum input power at an OBE	M	(M)	C
2-2-3-3	Practical profile A	M	(M)	C
2-2-3-4	Practical profile B	M	(M)	C
2-2-3-5	Adjacent lane passing profile	M	(M)	C
2-2-3-6	Shadowing profile	M	(M)	C

M: Mandatory test item
(M): Test item that is separately selected and specified, not mandatory necessarily.
C: Test item which needs to be confirmed in case of the certain implementation condition, and which is separately selected and specified. It is not mandatory necessarily.

Annex D
Local port protocol (LPP) test

D1 Outline

This Annex specifies test items and conditions for compatibility mobile stations compatibility confirmation using LPP that is implemented as the upper protocol of the LPCP. This is optimal conformance test with corresponding to the LPP that is described in the Annex I of the ARIB STD-T88. The tests related to confirmation of the connectivity are performed by connection to a test system, based on the test items and test conditions. The testing using the TS (test system) is that the mobile stations manufacture confirms that the manufactured mobile stations (OBE) satisfy the functional specification of land mobile station for the LPP specifications by using TS.

D2 Test system configuration

The TS is generally called a base station simulator and contains RF transmission and reception characteristics functions and basic functions for transmitting and receiving to and from the mobile stations. For its configuration and connection form, refer to 2.2.

D3 Test items and test conditions

D3.1 Test items

The test items stated herein are operation tests for each function and performance tests.
With regard to the performance test, however, only the reference measurement method for numerical evaluation is described, and the evaluation of the numeric values acquired by this measurement method is not specified.
If there are separate requirements from the service side, the performance can be evaluated in conformance with this measurement method.
Test items using the TS are as follows for the case in which the LPP is implemented as non-network type upper protocol. It is assumed that for these tests, the test application for confirming the operations (see D3.3) is installed.

Test number	Test item
3-1	LPP operation test
3-1-1	Initial set up operation
3-1-2	Disconnection operation
3-1-3	Unilateral data-send transaction service
3-1-4	Unilateral data-send transaction service in broadcast mode
3-1-5	Request-response type transaction service
3-1-6	Data retransmission operation
3-1-7	Segmentation/assembly operation
3-1-8	Transaction abortion operation

3-1-9 Connection management service
3-2 LPP performance test
3-2-1 Initial set up time
3-2-2 Data transfer performance

D3.2 Test parameters

The parameters described in 2.3.2 are applied unless otherwise specified.

D3.3 Test conditions

The test conditions are as follows. These conditions are applied unless otherwise specified.
The terms <TS>, <OBE> and <Common> indicate the following meanings:
<TS>: Condition given to the TS
<OBE>: Condition given to the OBE (on board equipment = mobile station)
<Common>: Condition given to both the TS and the OBE
The tests “3-1 LPP operation test” and “3-2 LPP performance test” are performed on condition that the following applications are installed:

• Test application <OBE>
• Echo application <OBE>

D3.4 Test method and procedures

Test method and procedures for the LPP are as follows.
The tests described here are described on condition that confirmation has been completed for the operation tests required for the corresponding mobile station regarding the test items shown in 2.3.1.

D3.4.1 LPP operation test

Test number	3-1-1	Items	LPP operation Connection operation test
Test overview • Verify that Initial set up process between the TS and the OBE is completed.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • In the operation test, a local port number [0x0FF3] is stored in the accept local port list (common).			
Test procedure 1. Send the Connect.req from the “test application <OBE>” to the LPP in the OBE, with the “QueryLid” omitted and “QueryPort” set to [0x0FF3]. 2. Connect the DSRC. 3. The “test application <OBE>” receives the Connect.cnf primitive from the LPP in the OBE.			
Confirmation items • Verify that the link address and port number corresponding to the acceptable local port list registered in the TS are received by the “test application <OBE>”.			

Test number	3-1-2	Items	LPCP operation Disconnection operation
Test overview • Verify that disconnection operation between the TS and the OBE is completed.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • For the operation test, “openPort” [0x0FF3] is stored and “primitiveType” and “recvEventCode” are omitted in the connection management table in the OBE.			
Test procedure 1. Disconnect the DSRC. 2. The “test application <OBE>” receives the Disconnect.ind primitive from the LPP in the OBE.			
Confirmation items • Verify that the Disconnect.ind primitive is received by the “test application <OBE>” in test procedure step 2.			

Test number	3-1-3	Items	LPP operation Unilateral data-send transaction service
Test overview • Verify the operation procedure of the unilateral data-send transaction service provided by the LPP. • Send the Invoke.req primitive from the OBE in the unilateral data-send transaction service, and then verify that the TS receives the Invoke.ind primitive.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • For the operation test, the test data in the Invoke.req primitive is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send the Invoke.req primitive from the “test application <OBE>” to the TS, with a valid port number [0x0FF3], a link address, “Transaction Type = 0” and test data 1. 2. The TS receives the Invoke.ind with the data from the OBE.			
Confirmation items • Verify that the data received by the TS in test procedure step 2 is the same as test data 1.			

Test number	3-1-4	Items	LPP operation Unilateral transaction service in broadcast mode
Test overview • Verify the operation procedure of the unilateral data-send transaction service provided by the LPP. • Send the Invoke.req primitive from the TS in the unilateral data-send transaction service in broadcast mode, and then verify that the OBE receives the Invoke.ind primitive.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • For the operation test, the test data the Invoke.req primitive is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send the Invoke.req primitive from the TS to the OBE, with a port number [0x0FF3], a group broadcast address specified as the link address, “Transaction Type = 0” and test data 1. 2. The “test application <OBE>” receives the Invole.ind with the data from the TS.			
Confirmation items • Verify that the data received by the “test application <OBE>” in test procedure step 2 is the same as test data 1.			

Test number	3-1-5	Items	LPP operation Request-response type transaction service
Test overview • Verify the operation procedure of the request-response type transaction service provided by the LPP. • Verify the operation of the request-response type transaction service.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • For the operation test, the test data in the Invoke.req primitive is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send the Invoke.req primitive from the “test application <OBE>” to the TS, with a valid port number [0x0FF3], a link address, “Transaction Type = 1” and test data 1. 2. The TS receives the Invoke.ind primitive with the data from the OBE. 3. The TS sends the Invoke.res primitive whose send data is test data 1 to the OBE. 4. The “test application <OBE>” receives the Invoke.cnf primitive with the data from the TS.			
Confirmation items • Verify that the data received by the TS in test procedure step 2 is the same as test data 1. • Verify that the data received by the “test application <OBE>” in test procedure step 4 is the same as test data 1.			

Test number	3-1-6-1	Items	LPP operation Data retransmission operation 1
Test overview • Verify the operation procedure of the data retransmission operation provided by the LPP. • Send the transaction Invoke.req primitive from the OBE, with “Require Ack = 1” in the unilateral data-send transaction service, and then verify that the TS receives the Invoke.ind primitive.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • For the operation test, the test data in the Invoke.req primitive is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send the Invoke.req primitive from the “test application <OBE>” to the TS, with a valid port number [0x0FF3], a link address, “Transaction Type = 0”, “Require Ack = 1” and test data 1. 2. The TS receives the Invoke.ind primitive from the OBE. 3. The TS sends the “Acknowledgement PDU” to the OBE via the TransferData.req primitive.			
Confirmation items • Verify that the data received by the TS in test procedure step 2 is the same as test data 1.			

Test number	3-1-6-2	Items	LPP operation Data retransmission operation 2
Test overview • Verify the operation procedure of the data retransmission operation provided by the LPP. • Send the Invoke.req primitive from the OBE, with “Require Ack = 1” in the unilateral data-send transaction service. The TS aborts receiving of the Invoke PDU once (that is, the TS does not send the “Acknowledgement PDU” to the OBE), and the OBE sends the Invoke PDU again. Verify that the TS receives the Invoke.ind.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • For the operation test, the test data in the Invoke.req primitive is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send the Invoke.req primitive from the “test application <OBE>” to the TS, with a valid port number [0x0FF4], a link address, “Transaction Type = 0”, “Require Ack = 1” and the test data 1. 2. The TS receives the Invoke PDU from the OBE. 3. The TS does not send the “Acknowledgement PDU” to the OBE. 4. The TS receives the Invoke PDU resent from the OBE. 5. The TS sends the “Acknowledgement PDU” to the OBE.			
Confirmation item • Verify that the data received by the TS in test procedure step 4 is the same as test data 1.			

Test number	3-1-7-1	Items	LPP operation Segmentation/assembly operation 1
Test overview • Verify the operation procedure of the segmentation/assembly operation provided by the LPP. • Send the Invoke.req primitive from the OBE, with send data that exceeds the maximum transmission unit (MTU) in the unilateral data-send transaction service, and then verify that the TS receives the Invoke.ind.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • For the operation test, the test data in the Invoke.req primitive is as follows: Test data 1: Arbitrary data whose size exceeds the MTU			
Test procedure 1. Send the Invoke.req primitive from the “test application <OBE>” to the TS, with a valid port number [0x0FF3], a link address, “Transaction Type = 0” and test data 1. 2. The TS receives the Invoke.ind with the data sending from the OBE. 3. The TS sends the “Acknowledgement PDU” to the OBE.			
Confirmation item • Verify that the data received by the TS in test procedure step 2 is the same as test data 1.			

Test number	3-1-7-2	Items	LPP operation Segmentation/assembly operation 2
Test overview • Verify the operation procedure of the segmentation/assembly operation provided by the LPP. • Send the Invoke.req primitive from the OBE, with send data that exceeds the MTU in the unilateral data-send transaction service. The TS aborts once receiving of the InvokeSegment PDUs for all segments except the final segment, the TS sends the "Nack PDU" for the aborted segments and the OBE sends again InvokeSegment PDUs. Verify that the TS receive the Invoke.ind primitive.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • For the operation test, the test data in the Invoke.req primitive is as follows: Test data 1: Arbitrary data which size exceeds the MTU			
Test procedure 1. Send the Invoke.req primitive from the "test application <OBE>" to the TS, with a valid port number [0x0FF5], a link address, "Transaction Type = 0" and test data 1. 2. The TS aborts receiving of InvokeSegment PDUs for all segments except the final segment from the OBE. 3. The TS sends the "Nack PDU" to the OBE for aborted segments. 4. The TS receives resent InvokeSegment PDUs and the Invoke.ind primitive with the data from the OBE 5. The TS sends the "Acknowledgement PDU" to the OBE.			
Confirmation item • Verify that the data received by the TS in test procedure step 4 is the same as test data 1.			

Test number	3-1-7-3	Items	LPP operation Segmentation/assembly operation 3
Test overview • Verify the operation procedure of the segmentation/assembly operation provided by the LPP. • Send the Invoke.req primitive from the OBE, with send data which size exceeds the MTU in the unilateral data-send transaction service. The TS aborts once receiving of an InvokeSegment PDU for the final segment, and the TS retransmits the final segment. Verify that the TS receives the Invoke.ind.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • For the operation test, the test data in the Invoke.req primitive is as follows: Test data 1: Arbitrary data which size exceeds the MTU			
Test procedure 1. Send the Invoke.req primitive from the “test application <OBE>” to the TS, with a valid port number [0x0FF6], a link address, “Transaction Type = 0” and test data 1. 2. The TS aborts receiving of an InvokeSegment PDU for the final segment from the OBE. 3. The TS receives the resent final segment and Invoke.ind primitive with the data sending from the OBE. 4. The TS sends the “Acknowledgement PDU” to the OBE.			
Confirmation item • Verify that the data received by the TS in test procedure step 3 is the same as test data 1.			

Test number	3-1-8	Items	LPP operation Transaction abort operation
Test overview • Verify the operation procedure of the transaction abort operation provided by the LPP. • Send the Abort.req primitive from the OBE to the TS, and then verify the transaction abort operation in both the OBE and the TS.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • Confirmation has been completed for operation test number 3-1-5. • For the operation test, the test data in the Invoke.req primitive is as follows: Test data 1: Arbitrary [500] octets data			
Test procedure 1. Send the Invoke.req primitive from the “test application <OBE>” to the TS, with a valid port number [0x0FF7], a link address, “Transaction Type = 1” and test data 1. 2. The TS receives the Invoke.ind with the data sending from the OBE. 3. The “test application <OBE>” sends the Abort.req primitive to the TS. 4. The TS receives the Abort PDU from the OBE. 5. The “test application <OBE>” receives the Abort.ind primitive from the LPP in the OBE.			
Confirmation items • Verify that the Abort.ind primitive is received by the TS in test procedure step 4. • Verify that the Abort.ind primitive is received by the “test application <OBE>”in test procedure step 5.			

Test number	3-1-9-1	Items	LPP operation Connection management service 1
Test overview • Verify the operation procedure of the connection management service provided by the LPP. • Verify the operation of the transaction start possibility query service (query the counterpart port number).			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • Confirmation has been completed for operation test number 3-1-1. • The number [0x0FF3] is stored, and [0x0FF8] is not stored in the acceptable local port list of the TS. • For the operation test, the test data in the Connect.req primitive are as follows: Test data 1: “QueryLid” is specified, and a number [0x0FF3] registered in the TS is specified for “QueryPort”. Test data 2: “QueryLid” is specified, and a number [0x0FF8] not registered in the TS is specified for “QueryPort”. Test data 3: “QueryLid” is specified, and “QueryPort” is not specified.			
Test procedure 1. Send the Connect.req primitive from the “test application <OBE>” to the LPP in the OBE, with test data 1. 2. The “test application <OBE>” receives the Connect.cnf primitive from the LPP in the OBE. 3. Set test data 2 as the send data for test procedure step 1, and repeat test procedure steps 1 and 2. 4. Set test data 3 as the send data for test procedure step 1, and repeat test procedure steps 1 and 2.			
Confirmation item • Verify that the link address and port number corresponding to the acceptable local port list registered in the TS is received by the “test application <OBE>” in test procedure steps 2, 3 and 4.			

Test number	3-1-9-2	Items	LPP operation Connection management service 2
Test overview • Verify the operation procedure of the receiving port registration and receiving port deregistration provided by the LPP. • Register and deregister receiving ports in the OBE, and verify receiving by the TS.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The LPCP operates normally. • Connection processing between the TS and the OBE has been completed, and they are in connected status. • The port number [0x0FF8] is not stored in the acceptable local port list in the TS.			
Test procedure 1. Register an accept port number [0x0FF8] to the LPP in the OBE via the RegisterPort.req primitive from the “test application <OBE>”. 2. The TS receives the accept port list from the OBE. 3. Deregister the accept port number registered to the LPP in the OBE in test procedure step 1 via the DeregisterPort.req primitive from the “test application <OBE>”. 4. The TS receives the reject port notification from the OBE.			
Confirmation items • Verify that the accept port list received by the TS in test procedure step 2 is the same as the port number registered in test procedure step 1. • Verify that the reject port received by the TS in test procedure step 4 is the same as the port number deregistered in test procedure step 3.			

D3.4.2 LPP performance test

Test number	3-2-1	Items	LPP operation Initial set up time
Test overview • Measure the time from connection of the DSRC to the time when the Connect.cnf is sent.			
Test conditions • The basic parameters are set as shown in 2.3.2. • The ASL-ELCP operates normally. • For the operation test, a local port number [0x0FF3] is stored in the acceptable local port list (common). The test data in the Connect.req primitive is as follows: Test data 1: “QueryLid” is not specified, and “QueryPort” is not specified.			
Test procedure 1. Send the Connect.req primitive from the “test application <OBE>” to the LPP in the OBE, with test data 1. 2. Connect the DSRC. 3. The TS receives the Connect.cnf primitive from the OBE. 4. Record the time from the point the DSRC achieves connected status to the point when the TS receive the Connect.cnf primitive.			
Confirmation items • Repeat test procedure steps 1 to 3 ten times, and measure the time. • Obtain the average of the 10 results, and use it as the connection time. • Verify the connection time is reasonable.			

Test number	3-2-2	Items	LPP operation Data transfer performance
Test overview • Transfer data from the TS using the echo service, and then calculate the data transfer speed from the time required for data transfer.			
Test conditions • The basic parameters are as shown in 2.3.2. • The ASL-ELCP operates normally. • For the operation test, the test data to be transferred is as follows: Test data 1: [500] bytes			
Test procedure 1. Send a data transfer message from the TS to the OBE via the Invoke.req primitive, with test data 1. 2. The OBE sends back the data from the TS to the TS using the echo service. 3. The TS receives the data transfer message from the OBE.			
Confirmation items • Repeat test procedure steps 1 to 3 ten times. • In the TS, measure the time required for test procedure steps 1 to 3. The time measurement method is not specified because it depends on the equipment specifications. Moreover, the unit of measured values may be “seconds”, and visual measurement is allowed. • Obtain the transfer speed from the measured time and the transferred data size.			

D4 Confirmation test item list

Table D4-1 shows the confirmation test items for the LPP.

Table D4-1 — Confirmation items for LPP for mobile stations

Test number	Test Items	Category
3-1-1	LPP operation: Connection operation test	C
3-1-2	LPP operation: Disconnection operation	C
3-1-3	LPP operation: Unilateral data-send transaction service	C
3-1-4	LPP operation: Unilateral data-send transaction service in broadcast mode	C
3-1-5	LPP operation: Request-response type transaction service	C
3-1-6-1	LPP operation: Data resend operation 1	C
3-1-6-2	LPP operation: Data resend operation 2	C
3-1-7-1	LPP operation: Segmentation/assembly operation 1	C
3-1-7-2	LPP operation: Segmentation/assembly operation 2	C
3-1-7-3	LPP operation: Segmentation/assembly operation 3	C
3-1-8	LPP operation: Transaction abort operation	C
3-1-9-1	LPP operation: Connection management service 1	C
3-1-9-2	LPP operation: Connection management service 2	C
3-2-1	LPP operation: Initial set up time	O
3-2-2	LPP operation: Transfer ability	O

SymbolsM: Mandatory O: Option
C: Mandatory test item if OBU has an applicable function

D5 Relationship between functions classification of OBEs and test items by the test system

Table D5-1 shows the relationship between the functions of the LPP and the test items by the TS.

Table D5-1 — Relationship between examples of functions of LPP and test items

		Broadcast type service		Bidirectional type service		
		Road traffic information *2	Large-capacity traffic / area guidance / sightseeing information	Uplink information acquisition	Selective information provide	Charge / reservation
Functions of LPP	Unilateral data-send transaction	3-1-4	3-1-4	3-1-3	3-1-3	3-1-3
	Request-response type transaction	-	-	3-1-5	3-1-5	3-1-5
	Resend function	-	-	-	-	3-1-6
	Segmentation/assembly	-	3-1-7	3-1-7	3-1-7	-
	Transaction abort	-	-	-	3-1-8	3-1-8
	Communication connection notice/destination port number query	-	-	3-1-1 3-1-9	3-1-1 3-1-9	3-1-1 3-1-9
	Communication disconnection notice	-	-	3-1-2	3-1-2	3-1-2
	Receiving port registration	3-1-9	3-1-9	3-1-9	3-1-9	3-1-9
	Receiving port deregistration	3-1-9	3-1-9	3-1-9	3-1-9	3-1-9

NOTE1 For implementation scope for each service; refer to ARIB STD-T88 Annex I.
NOTE2 The size of send data is less than MTU size.

D6 LPP test application specification for OBE

D6.1 Configuration test application for OBE

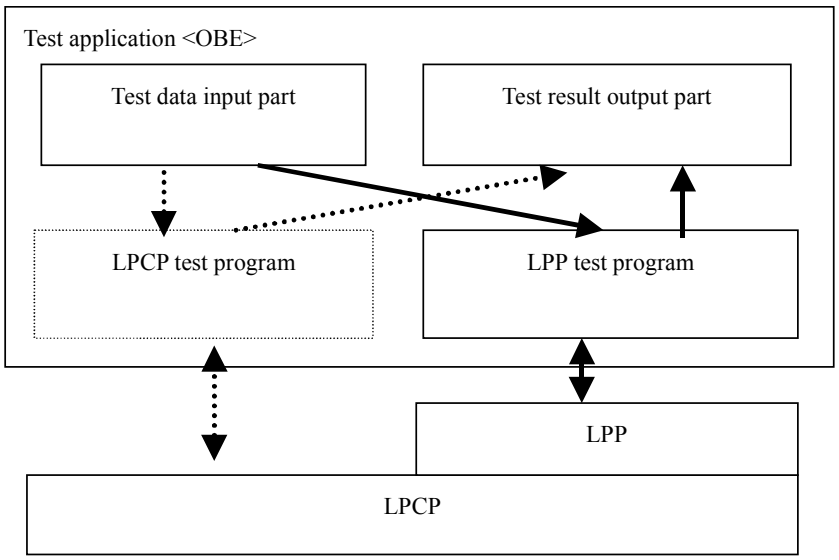

Figure D6-1 — Structure of test application (for mobile stations)

Configuration of the test application for OBE (hereafter referred to as “test application”) is shown in Figure D6-1. In the compatibility confirmation test, a test application is a simple application that accepts and sends the test data, and outputs the data and events received from the TS according to the test procedures.

D6.1.1 LPP test program

The LPP test program analyzes the LPP interfaces/primitives, sends and receives the test data related to the LPP operation tests, and outputs the test result.

D6.1.2 Test data input part and test result output part

These parts input the test data to and output the test results from the test program.
The configuration of the test data input part and the test result output part, and the interface with the test program are not specified.

[Informative] As the means of input and output, external units connected with cables, read and write memory in OBE, etc. is supposed.

D6.2 Functions of LPP test program

(1) Start the test
Start the test after inputting the test number and test data via the test data input part based on test procedure.

(2) Output the test result

The test program outputs the test results to the test data output part based on test procedure.

(3) Register and deregister accept ports
The test program requests the LPP to register accept ports (RegisterPort.req) and the test program requests the LPP to deregister accept ports (DeregisterPort.req).

(4) Query the transaction possibility
The test program queries the LPP via “Connect.req” whether or not a transaction can be started. The test program receives “Connect.cnf” from the LPP, and outputs it to the test result output part.

(5) Receive the communication disconnection notice
The test program receives the Disconnect.ind primitive from the LPP, and outputs it to the test result output part.

(6) Request to send a transaction
The test program requests the LPP to send the test data via Invoke.req.

(7) Receive a transaction
The test program receives the test data from the TS via Invoke.ind, and outputs the received data to the test result output part.

(8) Abort a transaction
The test program requests the LPP to abort a transaction via Abort.req.

(9) Receive the transaction abort notification
The test program receives the Abort.ind primitive from the LPP, and outputs it to the test result output part.

D6.3 LPP application interfaces

The application interfaces provided by the LPP are shown below. Parameters inside [ ] can be omitted. Parameters for which “Omitted” is described in the comment are not used in the test application.

(1) Register and deregister local ports

```
RegisterPort.Request (
                PortNo,
                [BulkArea],
                [BulkAreaSize]
)

DeregisterPort.Request (
                PortNo
)
```

(2) Start and end communication

```
Connect.Request (
        Querist Port,
        [Query LID],
        [Query Port],
        [TimeOut]
)

Connect.Confirm (
        Connected LID,
        Accept Port
)

Disconnect.Indication (
        Link Address
)
```

(3) Transaction

```
Invoke.Request (
        LinkAdress,             //  Link address generated by L7 in OBE
        Source Port,            //  Accept port number in sending source application
        Destination Port,       //  Destination port number specified by test contents
        UserDataSize,
        [UserData],
        Transaction Type,
        [Require Ack],
        [Result Timeout],
        Handle
)
```

NOTE A source port is registered in advance as a port to receive the confirmation response, etc.

```
Invoke.Indication (
        LinkAdress,
        Source Port,
        Destination Port,
        UserDataSize,
        UserData,
        Transaction Type,
        Handle
)

Invoke.Confirm (
        UserDataSize,
        [UserData],
        Handle
```

)

(4) Abort a transaction

Abort.Request (
[Abort Type], // 1 (request from the user)
[Abort Code],
Handle
)

Abort.Indication (
[Abort Type],
[Abort Code],
Handle
)

D6.4 Example of transactions in LPP test

Figure D6-2 to D6-5 show examples of transactions in the LPP test using the LPP test program.

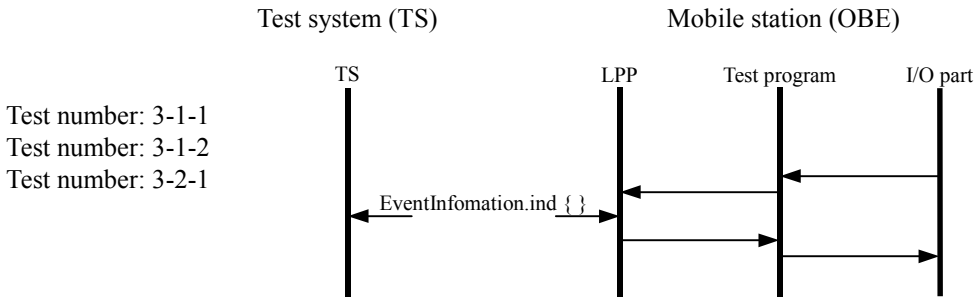

Figure D6-2 — Example of transaction in LPP test (when test is started by connection/disconnection of DSRC, and results are confirmed in OBE)

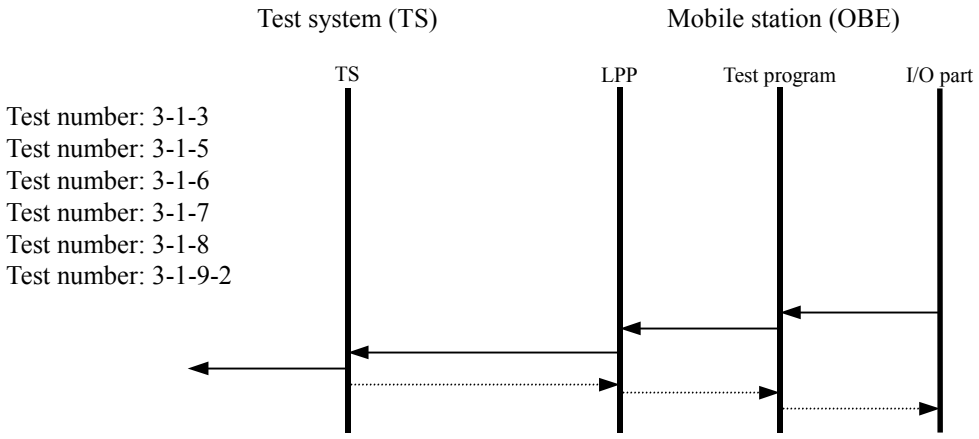

Figure D6-3 — Example of transaction in LPP test (when test is started by OBE, and results are confirmed in TS/OBE)

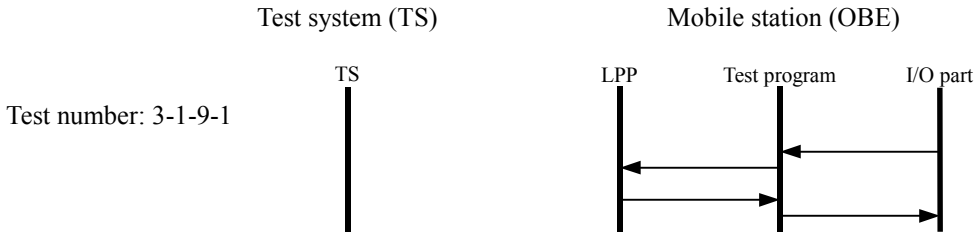

Figure D6-4 — Example of transaction in LPP test (when test is started by OBE, and results are confirmed in OBE)

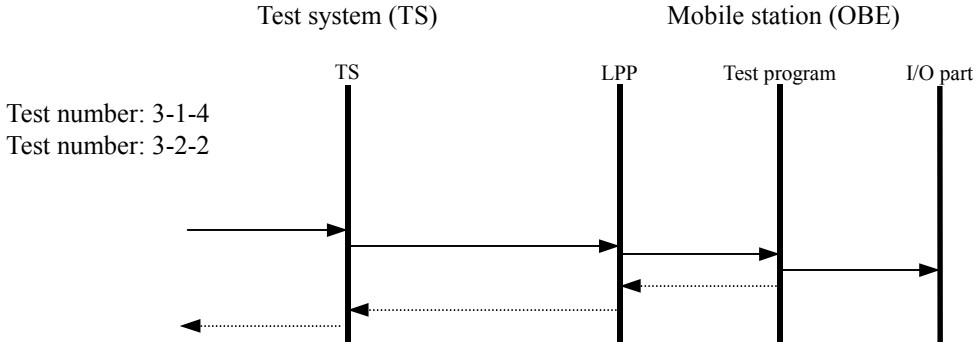

Figure D6-5 — Example of transaction in LPP test (when test is started by TS, and results are confirmed in OBE/TS)

D7 LPP echo application

D7.1 Outline

The echo application for the LPP wrap test installed in a mobile station in the compatibility confirmation test is a server application that receives echo requests and sends back echo responses.

D7.2 Local port number

In the LPP wrap test echo application (server side); [0x0FEF] is used as the receiving port. On the client side giving an echo request, an arbitrary port that does not overlap in the local station is used as the sending source port.

NOTE A source port on the client side is registered (RegisterPort) in advance to receive echo responses.

D7.3 Echo processing

D7.3.1 Server side

When receiving an echo request from the client via the Invoke.ind primitive, the echo application in the server generates an echo response message using the same user data, and sends it as a response to the sending source port in the client via the Invoke.req (TransactionType = 0, RequireAck = 0) primitive.

D7.3.2 Client side

The echo application in the client sends an echo-sending message to the echo application in the remote station (server) via the Invoke.req (TransactionType=0, RequireAck=0) primitive, and receives an echo response from the server via the Invoke.ind primitive.

Annex E
Specification of application for test of local port control protocol (LPCP) in mobile station

This Annex describes the specifications of the test application and the echo application used in LPCP test.

E1 Test application

E1.1 Configuration of test application for OBE

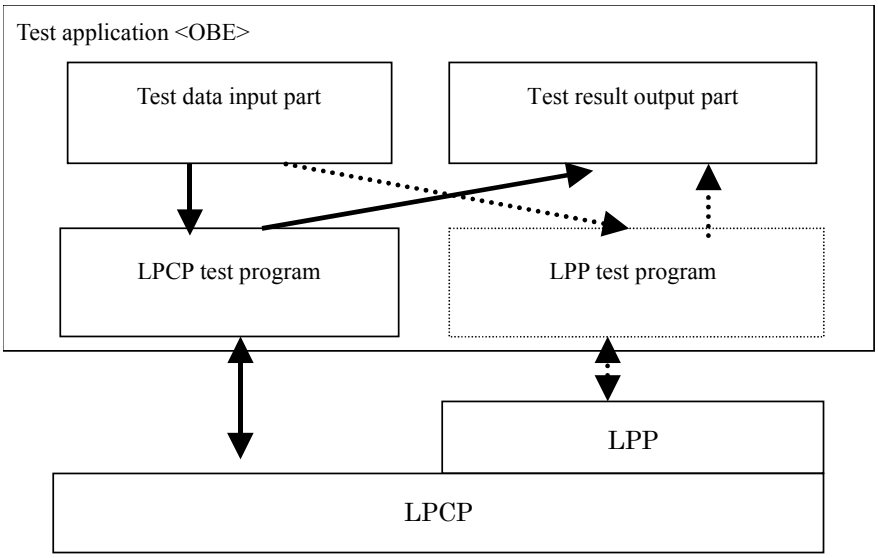

Figure E1-1 — Structure of test application (mobile stations)

The test application for mobile stations (OBE) (hereafter referred to as “test application”) is shown in Figure E1-1. In the compatibility confirmation test, a test application is a simple application that accepts and sends the test data, and outputs the data and events received from the TS according to the test procedures. Each component of the test application is defined below.

E1.1.1 LPCP test program

The LPCP test program analyzes the LPCP interfaces/primitives, sends and receives the test data related to the LPCP operation tests, and outputs the test results.

E1.1.2 Test data input part and test result output part

These parts input the test data to and output the test results from the test program.
The configuration of the test data input part and the test result output part, and the interface

with the test program are not specified.

[Informative] As the means of input and output, external units connected with cables, read and write memory in OBE, etc. are supposed.

E1.2 Implementation method (method for switching to the test mode)

Either of the following means can be used:
(1) Manual switch to test mode (in which only the test application is registered)
(2) Automatic startup (in which the test application is registered at the same time as other applications)

E1.3 Test application identification information

E1.3.1 Combination of test applications

Combinations of test application functions vary depending on the selected and implemented optional functions. A mobile station should be equipped with the test application functions required to perform tests corresponding to the mounted functions.

E1.3.2 Local port number

The local port numbers identifies the test application. For the port numbers used in the test application, refer to the each test procedure.

E1.3.3 Identification of mobile station in TS

With the condition that the target test numbers for OBE and the test data sent from OBE are declared in advance, it is supposed that the TS sets the test data according to the specified test number and identifies OBE using the accept port number of OBE at the time of Initial set up.

E1.4 Functions of test application

E1.4.1 LPCP test program

(1) Start the test
Start the test after inputting the test number and test data via the test data input part based on test procedure.

(2) Output the test results
The test program outputs the test results to the test data output part based on test procedure.

(3) Request to send the test data
The test program requests the LPCP to send the test data via TransferData.request.

(4) Receive the test data
The test program receives the test data via TransferData.indication from the TS, and outputs the received data to the test result output part.

(5) Receive an event notification
The test program receives “EventReport.indication” from the LPCP, and outputs the received data to the test result output part.

(6) Open a receiving port
The test program requests the LPCP to open a local port (OpenPort.request), the test program receives an open notification (OpenPort.confirm), and outputs the received data to the test result output part.

(7) Close a local port
The test program requests the LPCP to close a local port (ClosePort.request).

E1.4.2 LPCP application interfaces

The application interfaces provided by the LPCP are shown below. Parameters inside [ ] can be omitted. Parameters for which “Omitted” is described in the comment are not used in the test application.

(1) Opening and closing local ports

```
OpenPort.request (
        [openPort],
        [primitiveType],        //  Omitted
        [recvEventCode]         //  Omitted
)

OpenPort.confirm (
        [openPort]
)

ClosePort.request (
        closePort
)
```

(2) Notification of an event

```
EventReport.indication (
        linkAddress
        destinationPort,
        eventCode,
```

```
                [extensionParameter]
)
```

(3) Transferring data

```
TransferData.request (
                linkAddress             //  Link address generated by L7 in OBE
                sourcePort,             //  Accept port number in the sending source application
                destinationPort,        //  Destination port number specified by the test procedure
                userData                        //  Test data
)

TransferData.indication (
                linkAddress
                sourcePort,             //  Accept port in the TS
                destinationPort,        //  Accept port in the sending destination application
                userData                //  Test data
)
```

E1.5 Example of transactions in connection test

Figure E1-1 to E1-5 show examples of transactions in the LPCP test using the LPCP test program.

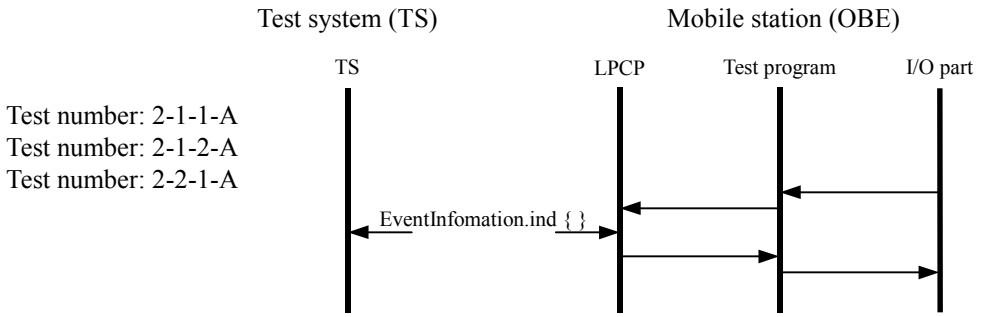

Figure E1-2 — Example of transaction in connection test (when test is started by connection/disconnection of DSRC, and results are confirmed in OBE)

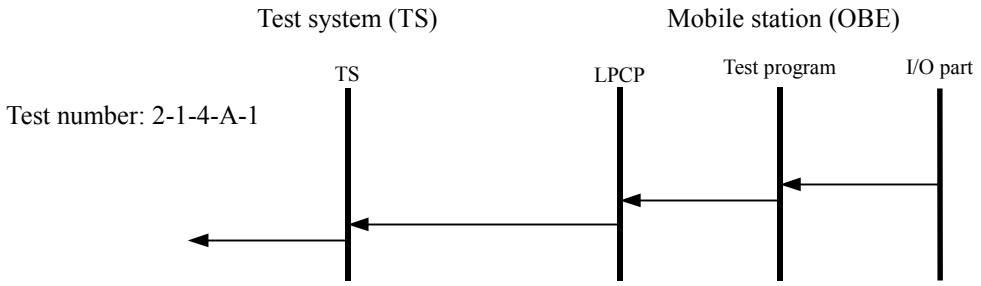

Figure E1-3 — Example of transaction in connection test (when test is started by OBE, and results are confirmed in TS)

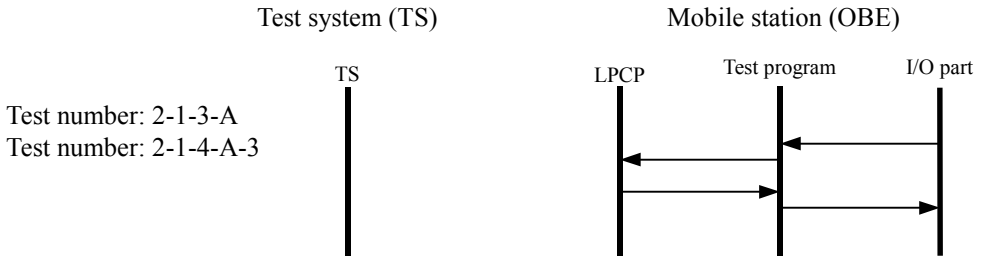

Figure E1-4 — Example of transaction in connection test (when test is started by OBE, and results are confirmed in OBE)

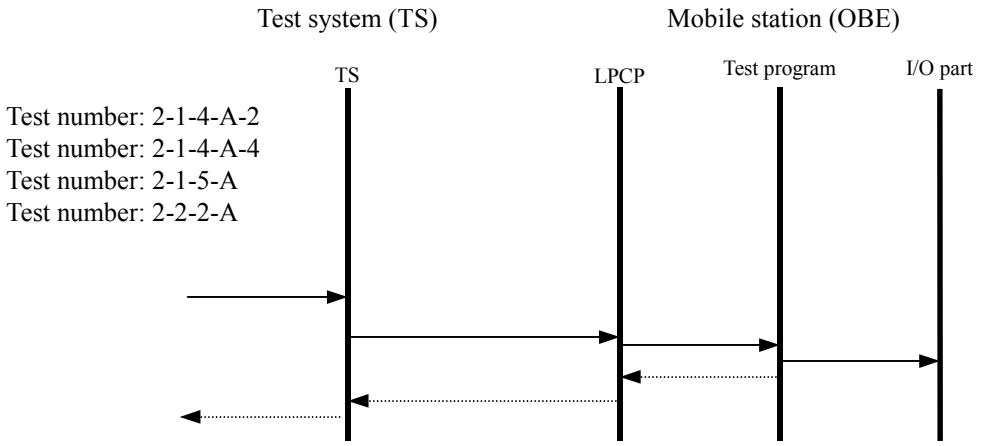

Figure E1-5 — Example of transaction in connection test (when test is started by TS, and results are confirmed in OBE/TS)

E2 Echo application

E2.1 Outline

The echo application for the LPCP wrap test installed in a mobile station in the compatibility confirmation test is a server application that receives echo requests and sends back echo responses.

E2.2 Local port number

In the LPCP wrap test echo application (server side), [0x0802] is used as the receiving port. On the client side giving an echo request, an arbitrary port which does not overlap in the local station is used as the sending source port.

NOTE A source port on the client side is opened (OpenPort) in advance to receive echo responses.

E2.3 Echo processing

E2.3.1 Server side

When receiving an echo request from the client via the TransferData.indication primitive, the echo application in the server generates an echo response message using the same user data, and sends it as a response to the sending source port in the client via the TransferData.request primitive.

E2.3.2 Client side

The echo application in the client sends an echo-sending message to the echo application in the remote station (server) via the TransferData.request primitive, and receives an echo response from the server via the TransferData.indication primitive.

DSRC APPLICATION SUB-LAYER

TEST ITEMS AND CONDITIONS FOR MOBILE STATION COMPATIBILITY CONFIRMATION

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