ENGLISH TRANSLATION

DEDICATED SHORT-RANGE COMMUNICATION (DSRC) BASIC APPLICATION INTERFACE

ARIB STANDARD

ARIB STD-T110 Version 1.1

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Association of Radio Industries and Businesses

General Notes on the Translated Version of ARIB Standard in English

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Introduction

The Association of Radio Industries and Businesses (ARIB) has been investigating and summarizing the basic technical requirements for establishing standards. These will appear in the form of standards and specifications governing the use of radio transmission facilities and equipment.

The standards are being developed based on the participation of and discussions with, radio equipment manufacturers, telecommunication operators, broadcasting equipment manufacturers, broadcasting operators, and users.

The current standard is being established for a "DEDICATED SHORT-RANGE COMMUNICATION (DSRC) Basic Application Interface" that allows providing multiple applications to the non-IP type DSRC protocol stack as defined by the ARIB STD-T75 "DEDICATED SHORT-RANGE COMMUNICATION (DSRC) SYSTEM" and ARIB STD-T88 "DEDICATED SHORT-RANGE COMMUNICATION (DSRC) APPLICATION SUB-LAYER." In order to ensure fairness and openness among all parties involved, during drafting stages, we invite radio equipment manufacturers, operators and users both domestically and overseas to participate openly in the activities of the Standard Assembly so as to develop standards with the total agreement of all parties involved.

The scope of application of these standards covers the minimum requirements for communications. They are designed to serve as practical guidelines for operators configuring DSRC systems and developing original specifications and systems that fall within the scope of the standards.

We hope that the standards will aid all parties involved, including radio equipment manufacturers, operators, users, and others in the development of an excellent radio telecommunication system.

NOTE: Although this ARIB Standard contains no specific reference to any Essential Industrial Property Rights relating thereto, the holders of such Essential Industrial Property Rights state to the effect that the rights listed in the List of Essential Industrial Property Rights, which are the Industrial Property Rights relating to this ARIB STD-T110 standard, are held by the parties also listed therein, and that to the users of this standard, in the case of selection of Option 1, such holders shall not assert any

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List of Essential Industrial Property Rights (selection of Option 2)

PATENT HOLDER	NAME OF PATENT	REGISTRATION NO. /APPLICATION NO.	REMARKS
Mitsubishi Electric Corporation	Mobile communication terminal	2012-000170 /2012-110004 *1	
Mitsubishi Electric Corporation	Base station equipment and short-range communication system	2012-098836 /2012-155749 *1	

Note *1: Special provisions concerning priority claim based on patent application 2004-99862
Priority date: March 30th 2004

Note 1: Special provisions concerning

- ◆ Chapters 1 to 3 contain the actual standard and provisions.
- ◆ Chapter 4 explains essential terms and concepts that are important for understanding the content of the document.
- ◆ The Annex section provides additional information about items related to the standard and provisions given in chapters 1 to 3. The items mentioned in the Annex section have equal validity as the standard and provisions section.

[Reference]: Indicates parts that are included for informative purposes.

Contents

Chapter 1 General Descriptions

1.1 Overview

This standard specifies a basic application interface that augment the DSRC protocol functions to allow executing non-IP type multiple applications of different types and with different functionality in the communication between a Land Mobile Station and Base Station in a DSRC system as defined by the ARIB STD-T75 "DEDICATED SHORT-RANGE COMMUNICATION (DSRC) SYSTEM" and ARIB STD-T88 "DEDICATED SHORT-RANGE COMMUNICATION (DSRC) APPLICATION SUB-LAYER" standards.

1.2 Scope

1.2.1 Scope of Application

The DSRC system covered by this standard consists of a Base Station and Land Mobile Station and equipment for testing. The standard specifies the following six types of basic application interfaces for roadside-to-vehicle communication within such a DSRC system.

(1) OBE instruction response application
(2) OBE memory access application
(3) IC card access application
(4) Push-type information delivery application
(5) OBE ID communication application
(6) OBE basic indication application

1.2.2 Positioning of DSRC Basic Application Interface in Protocol Configuration

Figure 1.2-1 shows the positioning of the DSRC basic application interface in the protocol configuration.

In order to prevent security leaks when personal information or settlement information is exchanged between Land Mobile Station and Base Station, and to prevent the risk of system attacks by a malicious Base Station or Land Mobile Station, mutual authentication and equipment authentication must be implemented. To achieve this, a security platform (DSRC-SPF) is configured on top of the application sub-layer's local port protocol (LPP).

Information about the relationship between the security platform (DSRC-SPF) and the basic application interface is provided in Annex 2.

An IP type application here is a network application that is executed on the Internet Protocol specified by ARIB STD-T88 "DEDICATED SHORT-RANGE COMMUNICATION (DSRC) APPLICATION SUB-LAYER," and a non-IP type application is a non-network application that does not use the network protocol stack and runs directly on the application sub-layer.

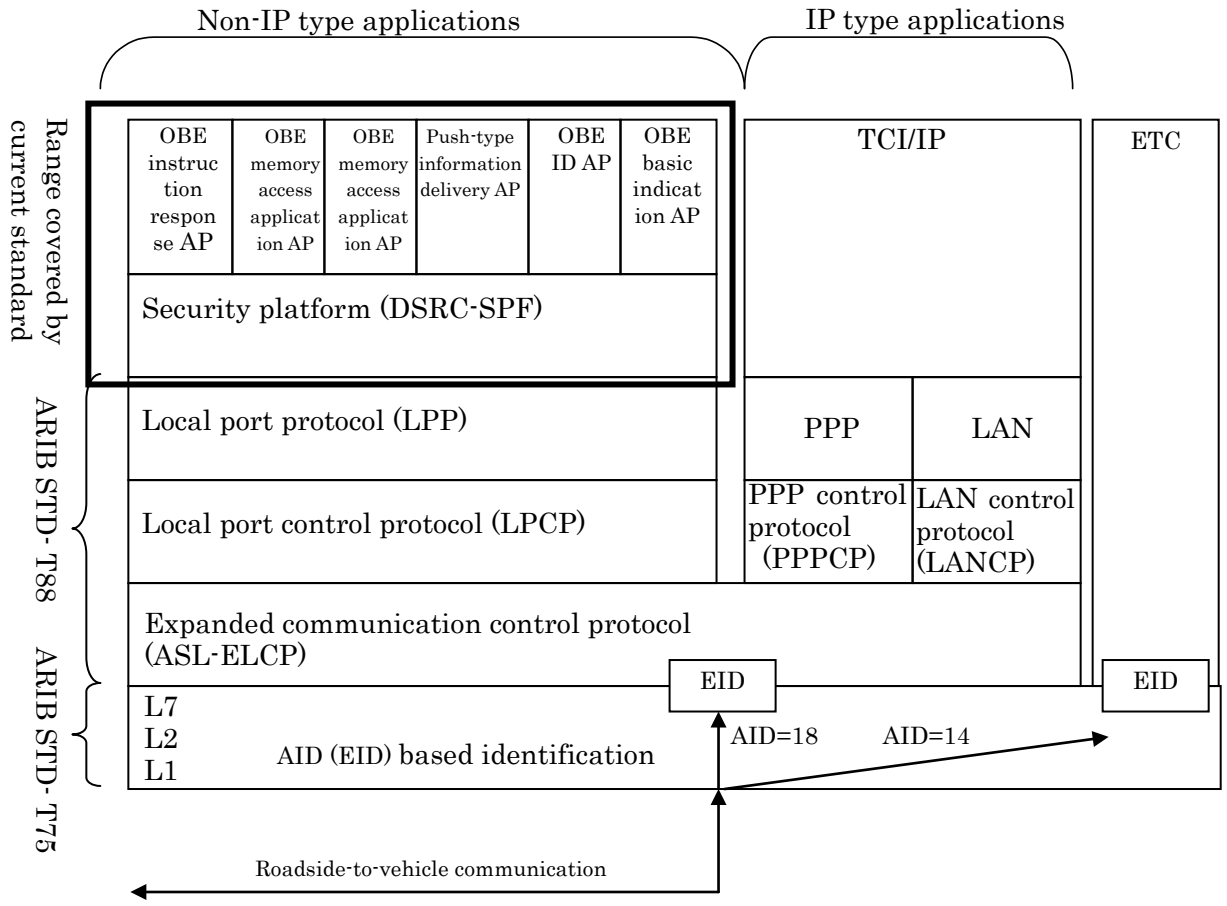

Figure 1.2-1 Basic application interface protocol configuration

1.3 Handling of Reserved Fields

Variables, information fields, etc. denoted as "Reserved" in this standard are intended for future extensions of definitions. In some instances, specific values or identifiers are given in this standard, but it must be noted that such values may be subject to change in future revisions.

1.4 Encoding Rules

Variables in this standard are described according to ASN.1 (Abstract Syntax Notation One, ISO/IEC 8824), and UNALIGNED PER (Packed Encoding Rule, ISO/IEC 8825-2) is used for packed encoding.

1.5 Normative References

Regarding items not covered by this standard, the following standards and specifications are to be applied. The version to use unless otherwise specified is the latest version.

[1]ARIB STD-T75	DEDICATED SHORT-RANGE COMMUNICATION (DSRC) SYSTEM
[2]ARIB TR-T16	DEDICATED SHORT-RANGE COMMUNICATION (DSRC) SYSTEM TEST ITEMS AND CONDITIONS FOR LAND MOBILE STATION COMPATIBILITY CONFIRMATION
[3]ARIB STD-T88	DEDICATED SHORT-RANGE COMMUNICATION (DSRC) APPLICATION SUB LAYER
[4]ARIB TR-T17	TEST ITEMS AND CONDITIONS FOR DEDICATED SHORT-RANGE COMMUNICATION (DSRC) APPLICATION SUB LAYER LAND MOBILE STATION COMPATIBILITY CONFIRMATION
[5]ISO/IEC 8824-1	Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation
[6]ISO/IEC 8825-2	Information technology - ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)
[7]JEITA TT-6001	Standard specification of ITS On-Board Unit
[8]JEITA TT-6002	Standard specification for DSRC section of ITS On-Board Unit
[9]JEITA TT-6003	Standard specification for Car Navigation System section of ITS On-Board Unit
[10]JEITA TT-6004	Speech synthesizer symbols for ITS on-Board Unit

[11]ISO15628:2007 Road transport and traffic telematics -- Dedicated short range communication (DSRC) -- DSRC application layer

[12]ISO24103:2009 Intelligent transport systems -- Communications access for land mobiles (CALM) -- Media adapted interface layer (MAIL)

[13]ISO29281:2011 Intelligent transport systems -- Communications access for land mobiles (CALM) -- Non-IP networking

Chapter 2 Basic Application Interface Overview

2.1 Assumption of Basic Application InterfaceFunctions

The DSRC application systems are required to correspond to the diversified services. However, the resources of early Land Mobile Stations were limited, which made it difficult to provide a platform that could handle the addition and deletion of functions.

This section shows the fundamentally-required functions and specifications, combining several applications to correspond to the diversfified services. Under this concept, what types ofapplication functions are defined as “basic” is important. This section specifies the structure that is required to realize the advanced service, as well as to support the minimum extent of the human machine Interfaces (HMI) and to include the DSRC-specific applications.

(1) Human Machine Interface functions of OBE

The resources of Land Mobile Stations premised on advanced HMI become burdenson, HMI for an extremely basic Land Mobile Station that does not assume excessive resources based on existing ETC Land Mobile Stations was contemplated.

Table 2.1.1 shows examples of the configuration of HMI of Land Mobile Station in view of numbers and characters, voice, sound, and input system (buttons).

Table 2.1-1 Examples of Land Mobile Station configuration

	Example 1	Example 2	Example 3	Example 4
No HMI	X			
Display		X		X
Button			X	X
Required functions	none	Instruction	Indication	Instruction and response
Remarks	Sane as existing ETC			

Example 1 is a simple Land Mobile Station without an HMI.

Example 2 uses resources identical to the resources of existing ETC Land Mobile Stations. It can provide number/character information, simple sound data, and alarm messages to users from Base Station to Land Mobile Station. The application to realize these functions is defined as “OBE basic instruction application”.

Examples 3 and 4 can transmit messages from users to the Base Staion. This allows

the users to transmit decisions such as “OK”. The application to realize this function is defined as “OBE instruction response application”.

More complicated services are realized by higher DSRC Land Mobile Station with using the road-to-vehicle communication function described in section (3) below.

(2) DSRC- specific application

This section specifies the DSRC-specific application which takes advantage of the features of DSRC.

DSRC has various services which identifies Land Mobile Station on the Base Station. By defining the OBE IDs available for many services, identification of Land Mobile Station is realized. The application to realize this function is defined as “OBE ID communication application.”

For the application of DSRC, billing and settlement are assumed to be the main application, and the IC card access is realized for the basic operation. The application to realize this operation is defined as “IC card access application.”

(3) Improving of convenience of road-to-vehicle communication function

The basic of DSRC is road-to-vehicle communication. Directly using LPCP and LPP realizes the road-to-vehicle communication. However, improving usability and convenience will make the configuring of the various services easier and more effective.

“OBE Memory Access Application” is a basic function that performs data reading and writing from a Base Station to Land Mobile Station memory and is defined as seeking to easily create flows of the information from Base Station to Land Mobile Station memory.

For the transmission of information from Base Station to Land Mobile Station, it is assumed that the type of data will be diversified (multimedia such as sound and image as well as text). The "push-type information delivery application" which packages diversified data to transmit from Base Station to Land Mobile Station is, therefore, defined.

2.2 Functional Overview of Basic Application Interface

This section describes the outline of functions of the six basic applications for the basic application interface defined in Section 2.1.

Figure 2.2-1 shows the functional configuration of the application to be realized by the local port protocol.

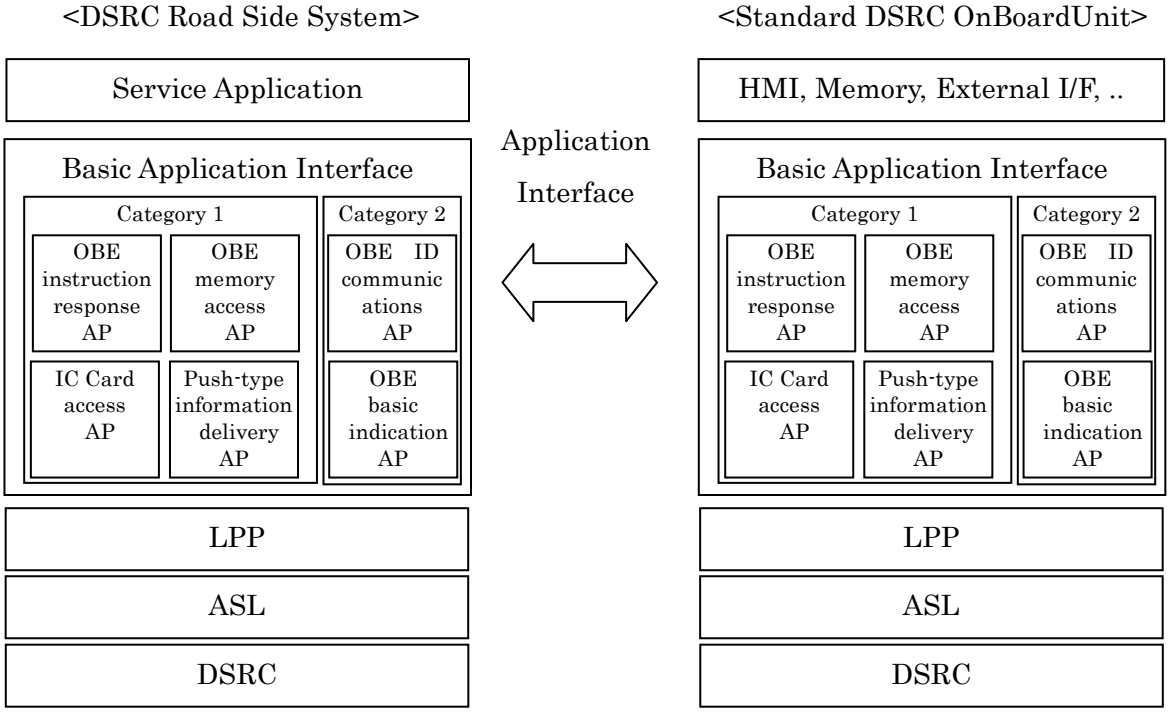

Figure 2.2-1 Functional configuration

2.2.1 OBE Instruction Response Application

OBE instruction response application notifies the Land Mobile Station of the specific instruction information from the external server connected to the Base Station and returns the response from the users by using the input mechanism (such as buttons) of Land Mobile Station.

2.2.2 OBE Memory Access Application

OBE memory access application is the application of the system on the Base Station. The memory on Land Mobile Station of the application stores variable length data in free form with search tag (8 bytes). This application also enables to write data to the mentioned memory of Land Mobile Station and read from the application of the system on the Base Station. In this case, the search tag needs to be preliminarily specified by application.

2.2.3 IC Card Access Application

IC card access application provides the function to access the IC card on request from the system on the roadside by the method prescribed by ISO/IEC7816. The function of the IC card access application is exclusively applicable to the ISO/IEC7816-compliant IC card and contactless IC smart card.

2.2.4 Push-type Information Delivery Application

Push-type information delivery application sends the contents or the position of the contents to the client on the Land Mobile Station from the external server connected to the Base Station. This application on the client side automatically executes the processing corresponding to each receive contents. The method that the contents are distributed is called "contents push," and the method that the position of contents (URL, etc.) is distributed, and the acquisition of the contents is separately executed with HTTP, etc. is called "pseudopush."

2.2.5 OBE ID Communications Application

OBE ID communications application notifies the Base Stationof the ID of the Land Mobile Station to identify the Land Mobile Station on the Base Station. To communicate the OBE ID with road-to-vehicle communication, the system on the Base Station notifies the Land Mobile Station of the acquirer ID, and the Land Mobile Station returns the OBE ID corresponding to the acquirer ID.

2.2.6 OBE Basic Indication Application

OBE basic indication application is used to provide the minimum HMI function. The specific instruction information is notified to Land Mobile Station from the external server connected to the Base Station.

2.2.7 Examples of Combinations of Basic Application Interfaces and Correspondence with DSRC Services

Table 2.2-1 shows the example of the combination of the basic application interfaces and correspondence to DSRC services.

Table 2.2-1 Functions required for the DSRC services and correspondence to basic application interfaces

			OBE instruction response AP	OBE memory access AP	IC card access AP	Push-type information delivery AP	OBE ID communication AP	OBE basic instruction AP
Fare settlement	Link settlement system	Function to give the instructions to Land Mobile Station (as well as ETC system or expanded function)	X					X
		Function to access the Land Mobile Station-specific information (ID)		X			X	
		Function to access the memory of Land Mobile Station (accumulation of information for use)		X				
	Card transaction system	Function to give the instructions to Land Mobile Station (as well as ETC system or expanded function)	X					X
		Function to confirm response of user	X					
		Function to access the IC card loaded into Land Mobile Station			X			
		Function to access the memory of Land Mobile Station (accumulation of information for use)		X				
Transmitting/receiving information	Vehicle-specific information control system	Function to give the instructions to Land Mobile Station (as well as ETC system or expanded function)	X					X
		Function to access the Land Mobile Station-specific information (ID)		X			X	
		Function to access the memory of Land Mobile Station (accumulation of information for use)		X				
	Information service system with picture	Function to access the information in server by request from Land Mobile Station on IP (Providing request/response type information)	Applications are not loaded in Land Mobile Stations, but are loaded in navigation systems and on-board PCs					
		Function to distribute the URL of the start page by the information providing service and other information from the information providing server to Land Mobile Station (providing of push-type information)				X		

Note) For the services which require some basic applications or commands to be

synchronized, such as acquisition of response from users to a specific instruction, it is assumed that synchronization is executed by the system on the Base Station. The specific method of synchronization will be indicated in the process of the operation and therefore is out of stipulated range of this standard.

2.3 Local Port Number of Basic Application Interface

For the local port number of each basic application interface, the area 0x0C00 to 0x0C1F is used. The area is classified into four types by flows of information. Table 2.3-1 lists example of local port number for basic application interfaces.

Table 2.3-1 Local port number of basic application interfaces (example)

Port number	Application	Information flow
0x0C00	OBE ID communication application	Road to vehicle
0x0C01 - 0x0C07	For future use application	
0x0C08	OBE basic instruction application	Road to vehicle
0x0C09	OBE instruction response application	
0x0C0A	Push-type information delivery application	
0x0C0B - 0x0C0F	For future use application	
0x0C10	IC card access application	Road to vehicle /Vehicle to road, Use of card
0x0C11	Contactless IC smart card access application	
0x0C12 - 0x0C17	For future use	
0x0C18	OBE memory access application	Road to vehicle /Vehicle to road, Use of memory
0x0C19 - 0x0C1F	For future use	

Note) For the local port number for use of security platform, see Annex 2. Load of applications on the remote station is judged by exchanging the local port number.

Figure 2.3-1 shows the flow of the initial connection.

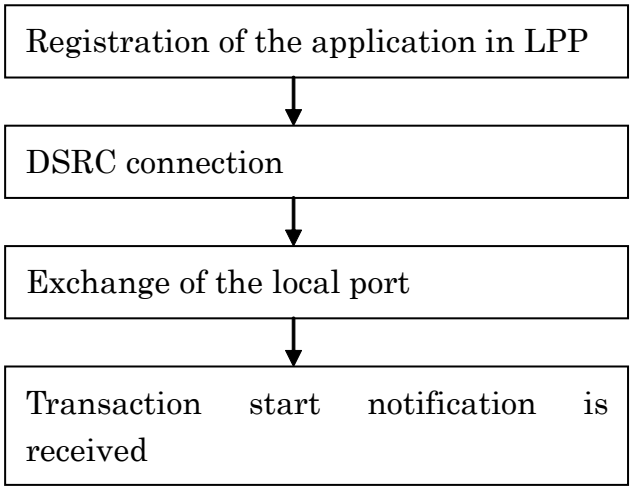

Figure 2.3-2　Figure2.3-1 Flow of initial connection

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Chapter 3 Basic Application Interfaces Specification

3.1 OBE Instruction Response Application

3.1.1 Function Overview

The OBE instruction response application notifies the Land Mobile Station of specific instruction information from the external server connected to the Base Station, and returns responses of the user to the Base Station using input functions (such as buttons) provided on the Land Mobile Station.

This application concretely provides the following two functions:

(1) OBE function to output the fee/toll information, etc. in voice from the Land Mobile Station.
(2) OBE confirmation function to perform confirmation in the Land Mobile Station through button pressing, voice output, etc.

3.1.2 Command

3.1.2.1 Command System

Commands (ObuIndicationCommand) used in the OBE instruction response application consist of normal commands and the denial response command from the Land Mobile Station.

The normal commands consist of "OBE instruction notice command and OBE confirmation request command" from the Base Station to the Land Mobile Station as well as the "OBE instruction response command and OBE confirmation response command" from the Land Mobile Station to the Base Station.

The version number is "1" for the OBE instruction response application having the specifications described in this document.

3.1.2.2 Command Format

3.1.2.2.1 Normal Command

3.1.2.2.1.1 OBE Instruction Notice Command

The OBE instruction notice command is used when the Base Station notifies the Land Mobile Station of the basic instruction information. Table 3.1-1 shows the command format.

Table 3.1-1 OBE Instruction Notice Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type indicationRequest (0)							
4	Security Profile plainText(0)							
5	The data length of Operation Command Body "opCommandBody" (10)							
6-15	The content of Operation CommandBody "opCommandBody" OBE instruction notice information "Indication" format parameter							

(1) version

This field is set to the application version.

(2) Command Type

This field is set to an identifier "operationCommand(1)" to indicate the normal command.

(3) Operation Type

This field is set to an identifier "indicationRequest(0)" to indicate the OBE instruction notice command.

(4) Security Profile

This field is set to "plainText(0)" as an attribute of the operation command body in this command.

(5) Operation Command Body

a) The data length of Operation Command Body "opCommandBody"

This field indicates the data length (10) of the succeeding operation command body. The unit is octet.

b) The content of Operation Command Body "opCommandBody"

This field is set to the OBE instruction information ("Indication" format; Refer to 3.1.3).

(i) transactionResult

This field indicates the communication result with the Base Station. Three values shown in Table 3.1-2 are defined, and other values are reserved for future use.

Table 3.1-2 Communication result format

Value	Meaning
0	The service is normally terminated without charge.
64	The service is abnormally terminated.
128	The service is normally terminated with charge.

(ii) time

This field is used to notify the time. Table 3.1-3 shows the format. "0x00 00 00 00" is given when there is no effective time information.

Table 3.1-3 Time format

stored order	item	bit size	data type
1	year	6	INTEGER(0..63)
2	month	4	INTEGER(0..12)
3	day	5	INTEGER(0..31)
4	hour	5	INTEGER(0..23)
5	minute	6	INTEGER(0..59)
6	second	6	INTEGER(0..59)

Note: The year is expressed as relative year from 2000.

(iii) amount

This field is used to notify the fee/toll. Table 3.1-4 shows the format.

Table 3.1-4 Fee Format

stored order	item	bit size	data type
1	amount	24	INTEGER(-8,388,608..8,388,607)
2	unit	16	BCD(4)

Note: "0x0392" specified in ISO4217 is stored as the unit.

3.1.2.2.1.2 OBE Instruction Response Command

The OBE instruction response command is used when the Land Mobile Station notifies the Base Station of the normal operation in response to the basic instruction notice command. Table 3.1-5 shows the command format.

Table 3.1-5 OBE Instruction Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type indicationResponse(128)							
4	Security Profile plainText(0)							
5	The data length of Operation Command Body ”opCommandBody” (0)							

(1) version

This field is set to the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “indicationResponse(128)” to indicate the OBE instruction response command.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) The data length of Operation Command Body ”opCommandBody”

This field indicates the data length (0) of the operation command body. The unit is octet.

3.1.2.2.1.3 OBE Confirmation Request Command

The OBE confirmation request command is used when the Base Station confirms whether any input such as button pressing is given to the Land Mobile Station. Table 3.1-6 shows the command format.

Table 3.1-6 OBE Confirmation Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type confirmationRequest(1)							
4	Security Profile plainText(0)							
5	The data length of Operation Command Body ”opCommandBody” (1)							
6	The content of Operation Command Body ”opCommandBody” Confirmation Second information “ConfirmationSec” format parameter							

(1) version

This field is set to the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “confirmationRequest(1)” to indicate the OBE confirmation request command.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) The data length of Operation Command Body

This field indicates the data length (1) of the succeeding operation command body. The unit is octet.

b) The content of Operation Command Body

This field is set to the second information of confirmation (“ConfirmationSec”

format; Refer to 3.1.3).

(i) sec

The Land Mobile Station confirms whether various inputs are given after receiving this command. It stores the time after this command is received until any input is confirmed. Table 3.1-7 shows the format.

Table 3.1-7 Format of sec

Unit: second (Fixed to 1 byte, the value from 0 to 255)

3.1.2.2.1.4 OBE Confirmation Response Command

The OBE confirmation response command is used when the Land Mobile Station sends a response to the Base Station so that the Base Station can confirm whether any input such as button pressing and voice input is given to the Land Mobile Station. Table 3.1-8 shows the command format.

Table 3.1-8 OBE Confirmation Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type confirmationResponse(129)							
4	Security Profile plainText(0)							
5	The data length of Operation Command Body ”opCommandBody” (1)							
6	The content of Operation Command Body ”opCommandBody” Confirmation Result information “confirmationResult” format parameter							

(1) version

This field is set to the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “confirmationResponse(129)” to indicate the OBE confirmation response command.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) The data length of Operation Command Body ”opCommandBody”

This field indicates the data length (1) of the succeeding operation command body. The unit is octet.

b) The content of Operation Command Body ”opCommandBody”

This field is set to the result information of confirmation (“ConfirmationResult” format; Refer to 3.1.3).

(i) result

It stores whether various input is given to the Land Mobile Station within the number of seconds specified in the “confirmationRequest” command. Table 3.1-9 shows the format.

Table 3.1-9 Confirmation Result

Confirmation Result (fixed to 1 byte) 0: No input, 1: Input indicating the approval (yes), 2: Input indicating the denial (no)

3.1.2.2.2 OBE Denial Response Command

The OBE denial response command is used when the Land Mobile Station notifies the Base Station of negative acknowledgement in response to the basic instruction notice command. Table 3.1-10 shows the command format.

Table 3.1-10 OBE Denial Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type “obuDenailResponse(255)”							
3	Status							
4	The length of supplement information “supplementInfo”							
5 :	The contents of supplement information “supplementInfo”							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “obuDenialResponse(255)” to indicate the denial response command.

(3) Status

This field is set to the reason of denial response. For details, refer to Table 3.1-11.

Table 3.1-11 Status Code

Status code	Description
0	Not Use
1	There are no confirmation input means
2-3	For future use
4	The version incompatible
5-15	For future use
16	Invalid command (cannot interpret)
17-254	For future use
255	Other Land Mobile Station internal error

(4) Supplement Information

a) The length of supplement information “supplementInfo”

This field is set to the length of successing supplement information. The unit is octet. When there are no supplement information (this case is default case), this filed is set to value “0”.

b) The contents of supplement information “supplementInfo”

This field is set to free information (the maximum length is 127 octets) as supplement information. When the version number is not the same, this field is set to own version (“versionIndex” parameter).

3.1.3 Definition of Data Structures

```
ObuIndicationCommand::=SEQUENCE{
    versionIndex        Version,
    accessCommand       IndicationCommand
}

Version::=SEQUENCE{
    version     INTEGER(0..15),
    fill        BIT STRING(SIZE(4))             -- value of encoding is set up 0
}

IndicationCommand::=CHOICE{
    dummy               [0]     NULL,           -- not use
    operationCommand    [1]     OperationCommand,
    dummy               [2-254] NULL,           -- for future use
    obuDenialResponse   [255]   ObuDenialResponse
}

OperationCommand::=SEQUENCE{
    opCommandType       OpCommandType,
    opSecurityProfile   OpSecurityProfile,
    opCommandBody       OCTET STRING
}

OpCommandType::=ENUMERATED{
    indicationRequest           (0),    -- OBE instruction notice command
  message
    confirmationRequest         (1),    -- OBE confirm request command message
    reservedFor future use      (2-127), -- for future use
    indicationResponse          (128),  -- OBE instruction response command
  message
    confirmationResponse        (129),  -- OBE confirm response command message
    reservedFor future use      (130-255) -- for future use
}
```

```
Indication ::=SEQUENCE{
    transactionResult    INTEGER(0...255),
    time                 OCTET STRING(SIZE(4)),
    amount               OCTET STRING(SIZE(5))
}

ConfirmationSec ::=SEQUENCE{
    sec          INTEGER(0...255)
}

ConfirmationResult ::=SEQUENCE{
    result       Result
}

Result ::=ENUMERATED{
    noInput                    (0),      -- no input
    approval                   (1),      -- input indicated the approval
    denial                     (2),      -- input indicated the denial
    reservedFor future use     (3-255)   -- for future use
}

ObuDenialResponse::=SEQUENCE{
    status               INTEGER(0...255),              -- status code
    supplementInfo       OCTET STRING(SIZE(0...255))    -- supplement information
}
```

3.1.4 Relationship with Other Standards

The relationships with other DSRC related standards used in this application are shown below.

Table 3.1-12 Relationship with other DSRC related standards

	DSRC related standard	Content used in this application
1	DSRC standard	AID=18 (DSRC Application Sub Layer)
2	NCP of ASL	LPCP (Local Port Control Protocol)
3	port number of LPCP	0x0C09
4	transaction service	Unidirectional data-sending transaction service in two transaction service provided by LPP.

3.1.5 Communication Procedures

This subsection describes the procedures for giving instructions to the Land Mobile Station and receiving confirmation result from the Land Mobile Station using the OBE instruction response application.

(1) Giving instructions to the Land Mobile Station

a) The Base Station notifies the Land Mobile Station of the OBE instruction information using the OBE instruction notice command.

b) When receiving the OBE instruction notice command, the Land Mobile Station refers to the OBE instruction information, and outputs the contents. When output is completed, the Land Mobile Station sends the OBE instruction response command to the Base Station.

c) When rejecting the OBE instruction notice command due to the contents of the OBE instruction information or the Land Mobile Station status in the step b), the Land Mobile Station sends to the Base Station the OBE denial response command instead of the OBE instruction response command.

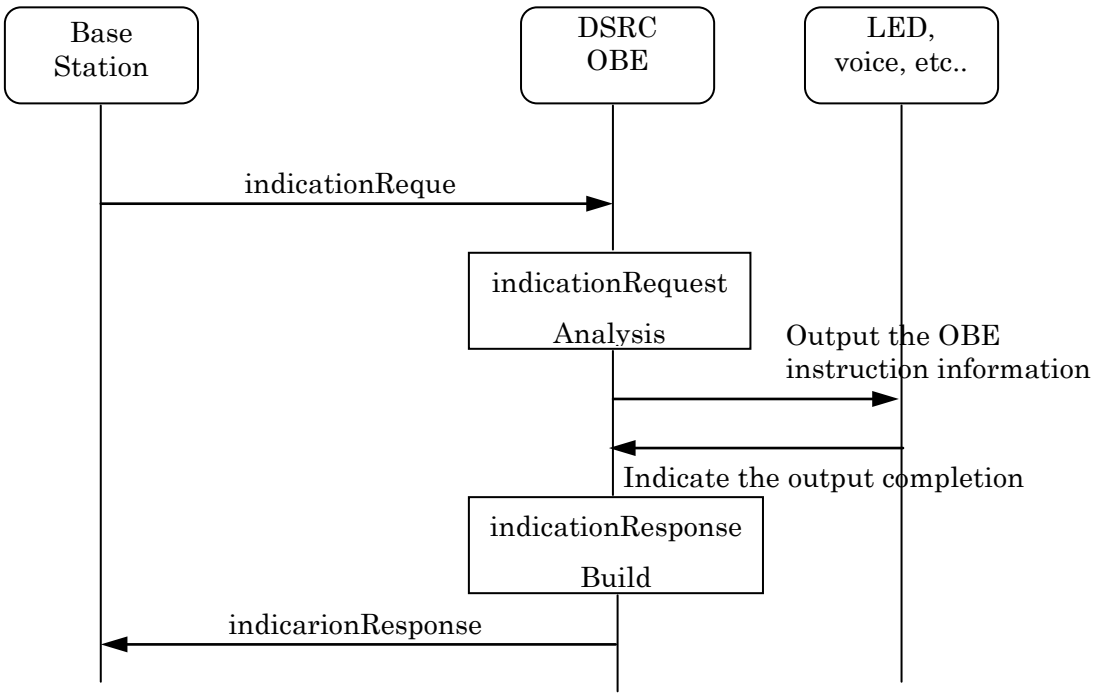


Figure 3.1-2 Sequence example of instruction information notice to Land Mobile Station

(2) Receiving confirmation result from the Land Mobile Station

a) The Base Station notifies the Land Mobile Station of the OBE confirmation information

using the OBE confirmation request command.

b) When receiving the OBE confirmation request command, the Land Mobile Station refers to the information on the number of seconds for confirmation, and waits for input of the confirmation information.

c) When the confirmation information is input or is not input to the Land Mobile Station within the number of seconds indicated in the information on the number of seconds for confirmation, the Land Mobile Station notifies the Base Station of the confirmation result using the OBE confirmation response command.

d) When the Land Mobile Station does not have the confirmation information input means in the step b), the Land Mobile Station sends to the Base Station the OBE denial response command whose “status” indicates that “the Land Mobile Station does not have confirmation input means”.

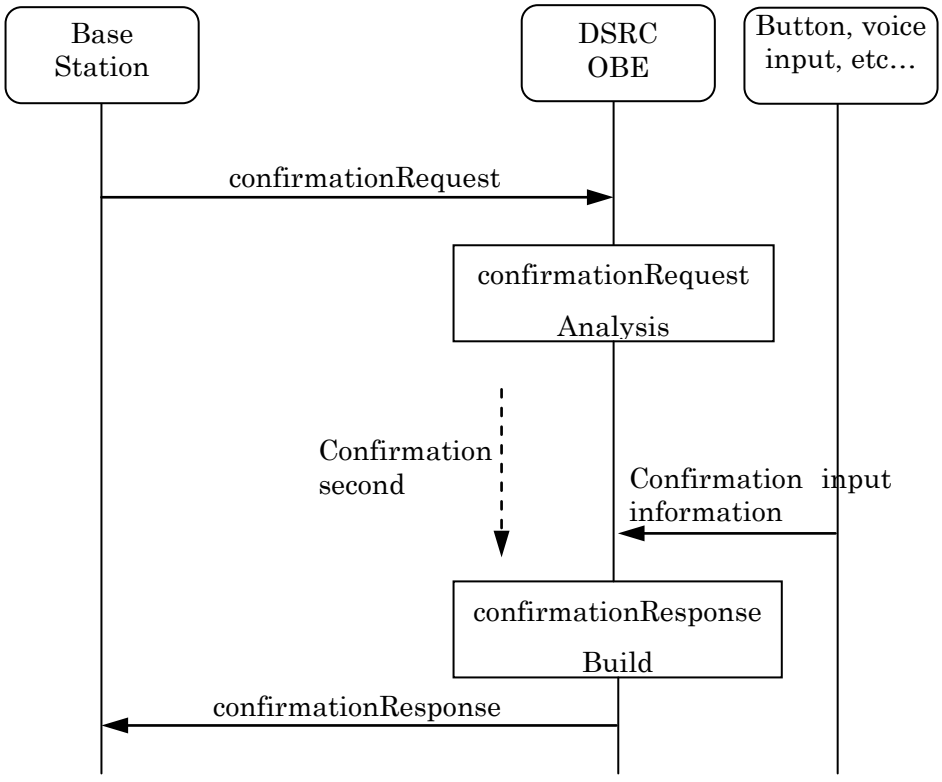


Figure 3.1-3 Sequence example of confirmation information notice to Land Mobile Station

3.2 OBE Memory Access Application

3.2.1 Function Overview

The OBE memory access application reads or writes variable-length data stored in the memory inside the Land Mobile Station in accordance with requests from the Base Station.

Data reading to and data writing from the memory inside the Land Mobile Station from the Base Station shall be executed in units of data storage area specified and allocated in the Base Station or Land Mobile Station. Each data storage memory area shall be identified by the identifier called memory tag.

The memory inside the Land Mobile Station is mainly divided into the following two areas (memory control classification) by the data storage memory allocation method. The following control classification is specified explicitly in the 1st octet of the memory tag. (Refer to Annex.4 for details.)

(1) Base Station allocatable memory: Memory whose data storage area can be allocated from the Base Station

This memory becomes usable by the data storage memory allocation request from the Base Station or by memory allocation by the Land Mobile Station.

To the allocated data storage memory area, the Base Station can write and read variable-length data, and make the memory area free. The memory tag for the data storage memory area allocated in this memory is especially called “Base Station allocatable memory tag”. This memory is provided to allocate and use the memory for specific purpose inside the Land Mobile Station after manufacturing of the Land Mobile Station.

(2) OBE controlling memory: Memory whose data storage area cannot be allocated from the Base Station

This memory becomes usable when the Land Mobile Station preliminarily allocates the data storage memory area and specifies the memory tag name corresponding to the data storage memory area. To the allocated data storage memory area, the Base Station can write and read variable-length data.

The memory tag for the data storage area allocated in this memory is especially called “OBE controlling memory tag”.

This memory area is provided to read and write the data stored during manufacturing of the Land Mobile Station (or subsequent registration work for setup, etc.), and exchange data between the Base Station and the external equipment connected to the Land Mobile Station.

In addition to the above control classification, the memory inside the Land Mobile Station is also classified into the following two areas by the record assurance method for the data storage memory. The following classification is specified explicitly in the 1st octet of the memory tag. (Refer to Annex 4 for details.)

(1) Volatile memory area: Area in which the recorded information is not assured when the vehicle engine is turned OFF or when the Land Mobile Station power is turned OFF

(2) Nonvolatile memory area: Area in which the recorded information is assured even when the vehicle engine is turned OFF or when the Land Mobile Station power is turned OFF

The memory tag identifier shall consist of 8 octets.

This standard defines each bit of the 1st octet for the memory control classification inside the Land Mobile Station, record assurance, etc.

The 7-octet space from the 2nd octet to the 8th octet indicates the memory tag address, and is provided for unique setting for each system or provider. This standard does not specify the assignment method of this 7-octet space. (Refer to Annex 4 for details.)

The following attributes are set in each data storage memory area identified by the memory tag in the Land Mobile Station. (Refer to Annex 4 for details.)

(1) Protection mode

The protection mode is set for each memory tag (corresponding to each data storage memory area) against accesses from the Base Station.

The protection mode has three attributes, read permission, write permission and SPF (security platform) essentiality.

(2) Current data size

The current data size indicates the size of variable-length data stored in the data storage area.

(3) Memory allocation size

The memory allocation size (data storage upper limit) is set in the data storage memory area.

This set value can be set when the data storage memory area is allocated, and a different value can be set for each data storage memory area (corresponding to each memory tag).

Data storage up to the data size specified by this set value shall be assured in the Land Mobile Station about writing from the Base Station.

When setting the memory allocation size in the data storage area, the communication

resource (maximum data size for reading and writing from the Base Station) of the Land Mobile Station should be considered.

(4) Password (Optional)

Access restriction is set against accesses from the Base Station by the password authentication.

The password can be set when the data storage memory area is allocated, and different password can be set for each data storage memory area (corresponding to each memory tag). The Land Mobile Station compares the registered password with the password set in various request commands from the Base Station, and then enables or disables accesses to the stored data.

When the password setting is handled as option, the Land Mobile Station does not handle commands with password.

The OBE memory access application defined in this document has the following five functions:

(1) Function to inquire the use situation of the memory inside the Land Mobile Station
(2) Function to allocate the data storage memory area in the memory inside the Land Mobile Station (Optional)
(3) Function to make free the data storage memory area allocated in the memory inside the Land Mobile Station (Optional)
(4) Function to read data from the memory inside the Land Mobile Station
(5) Function to write data to the memory inside the Land Mobile Station

Table 3.2-1 Available command types in each memory control classification

Memory Control Classification (Memory Tag)		OBE Controlling Memory (memory tag managed by OBE)			RSU Allocatable Memory (memory tag allocated by RSU)		
Protection Mode		RO	WO	R/W	RO	WO	R/W
(1)	OBE memory resource information acquisition function	X			X		
(2)	OBE memory allocation function	-			X		
(3)	OBE memory free function	-			X		
(4)	Memory Read Function	X	-	X	X	-	X
(5)	Memory Write Function	-	X	X	-	X	X

Note: RO(ReadOnly) : Read Only Memory Tag
WO(WriteOnly) : Write Only Memory Tag
R/W(Read/Write): Readable/Writable Memory Tag

3.2.1.1 OBE Memory Resource Information Acquisition Function

This function notifies the Base Station of the resource information on the Land Mobile Station in response to a request from the Base Station. The Base Station can acquire the following information from the Land Mobile Station:

(1) Maximum receivable data size : Maximum size of operation data which can be received by the Land Mobile Station*

(2) Remaining capacity of the “Base Station allocatable memory” and number of “Base Station allocatable memory tags” which can be set (in both the volatile memory and the nonvolatile memory)

(3) Maximum number of memory tags which can be read or written at a time by batch processing

*Note: Maximum size (equivalent to the buffer size specified by “RegisterPort”) of the LPP-SDU subtracted by the header size of the OBE memory access application

The Base Station can acquire the attributes of data storage memory areas corresponding to memory tags by sending in advance the list of memory tags to be accessed using this function.

The Land Mobile Station sends the attributes to the Base Station in response to an inquiry about memory tags already allocated and registered as data storage memory areas, and does not send the attributes of unregistered memory tags.

3.2.1.2 RSU Allocatable Memory Allocation Function (Optional)

This function allocates data storage memory areas inside the Land Mobile Station in response to a request from the Base Station, and registers memory tags (Base Station allocatable memory tags) specified as identifiers of data storage memory areas by the Base Station.

When the Land Mobile Station cannot allocate new memory areas or when the Base Station points out an improper memory tag (OBE controlling memory tag), the Land Mobile Station sends the OBE denial response command to the Base Station.

The OBE memory allocation function is classified into the following two types.

3.2.1.2.1 Memory Allocation (Optional)

This function allocates one data storage memory area inside the Land Mobile Station, sets the attributes, and registers a memory tag based on the memory allocation information (such as memory tag, protection mode, memory allocation size and initial set value) excluding the password attribute specified by the Base Station.

3.2.1.2.2 Memory Allocation with Password (Optional)

This function allocates one data storage memory area inside the Land Mobile Station, sets the attributes, and registers a memory tag based on the memory allocation information (such as memory tag, protection mode, memory allocation size and initial set value) including the password attribute specified by the Base Station.

The difference from the memory allocation function described above is setting of the password as the attribute.

When the Base Station accesses a memory tag set by the “memory allocation with password” function, not only the memory tag but also the password is required.

3.2.1.3 RSU Allocatable Memory Free Function (Optional)

This function makes free one data storage memory area (Base Station allocatable memory)

allocated by the memory allocation function in accordance with a request from the Base Station.

When judging the area free request as proper based on the memory tag and attributes requested by the Base Station, the Land Mobile Station deletes the registered memory tag, deletes and makes free data stored in the corresponding data storage memory area, and sends the result to the Base Station.

When judging the area free request as improper because the request specifies an OBE controlling memory tag (OBE controlling memory), etc., the Land Mobile Station sends the OBE denial response command to the Base Station.

The OBE memory free function is classified into the following two types.

3.2.1.3.1 Memory Free (Optional)

This function makes free one data storage memory area inside the Land Mobile Station based on the memory tag information specified by the Base Station.

This function is valid only to data storage memory areas (Base Station allocatable memory tags) allocated in the Base Station allocatable memory. When the Base Station specifies an OBE controlling memory tag, the Land Mobile Station sends the OBE denial response command to the Base Station.

3.2.1.3.2 Memory Free with Password (Optional)

This function makes free one data storage memory area inside the Land Mobile Station based on the password attribute and memory tag information specified by the Base Station. The difference from the memory free function described above is that the Land Mobile Station confirms agreement of the password before making the memory free. When the password disagrees, the Land Mobile Station sends the OBE denial response command to the Base Station.

3.2.1.4 Memory Read Function

This function reads data stored in data storage memory areas in response to a request from the Base Station. When judging the memory read request as proper based on the memory tags and attributes requested by the Base Station, the Land Mobile Station sends the stored data corresponding to the memory tags to the Base Station. When judging the memory read request as improper, the Land Mobile Station sends the OBE denial response command to the Base Station. The memory reading function is classified into the following four types.

3.2.1.4.1 Memory Read

This function reads data stored in one data storage memory area not having the password attribute. The data size per command is restricted by the resource of the Base Station and the Land Mobile Station. When the memory tag specified by the Base Station is not registered, the Land Mobile Station sends the OBE denial response command to the Base Station.

3.2.1.4.2 Bulk Memory Read

This function reads data stored in one or more data storage memory areas not having the password attribute. The data size per command is restricted by the resource of the Base Station and the Land Mobile Station. When an unregistered memory tag is included in memory tags specified by the Base Station, the Land Mobile Station sends only the stored data corresponding to registered memory tags to the Base Station.

3.2.1.4.3 Memory Read with Password (Optional)

This function reads data stored in one data storage memory area having the password attribute. The data size per command is restricted by the resource of the Base Station and the Land Mobile Station. When the memory tag specified by the Base Station is not registered or when the password disagrees, the Land Mobile Station sends the OBE denial response command to the Base Station.

3.2.1.4.4 Bulk Memory Read with Password (Optional)

This function reads all data stored in one or more data storage memory areas having the password attribute. The data size per command is restricted by the Base Station and the resource of the Land Mobile Station. When an unregistered memory tag or memory tag whose password disagrees is included in memory tags specified by the Base Station, the Land Mobile Station sends only the stored data corresponding to registered memory tags whose password agrees to the Base Station.

3.2.1.5 Memory Write Function

This function writes data specified by the Base Station to data storage memory areas specified by memory tags in accordance with a request from the Base Station.

When judging the memory write request as proper based on the memory tags and attributes requested by the Base Station, the Land Mobile Station writes corresponding stored data to data storage memory areas, and sends the writing result to the Base Station.

When judging the memory write request as improper, the Land Mobile Station sends the

OBE denial response command to the Base Station.

The memory writing function is classified into the following four types.

3.2.1.5.1 Memory Write

This function writes data specified by the Base Station to one data storage memory area not having the password attribute. The data size per command is not specified, but is restricted by the resource of the Base Station and the Land Mobile Station. When the memory tag specified by the Base Station is not registered, the Land Mobile Station sends the OBE denial response command to the Base Station.

3.2.1.5.2 Bulk Memory Write

This function writes data specified by the Base Station to one or more data storage memory areas not having the password attribute. The data size per command is not specified, but is restricted by the resource of the Base Station and the Land Mobile Station. When an unregistered memory tag is included in memory tags specified by the Base Station, the Land Mobile Station writes the specified data only to data storage memory areas corresponding to registered memory tags, and sends memory tags whose writing is successfully completed to the Base Station.

3.2.1.5.3 Memory Write with Password (Optional)

This function writes data specified by the Base Station to one data storage memory area having the password attribute. The data size per command is not specified, but is restricted by the resource of the Base Station and the Land Mobile Station. When the memory tag specified by the Base Station is not registered or when the password disagrees, the Land Mobile Station sends the OBE denial response command to the Base Station.

3.2.1.5.4 Bulk Memory Write with Password (Optional)

This function writes data specified by the Base Station to one or more data storage memory areas having the password attribute. The data size per command is not specified, but is restricted by the resource of the Base Station and the Land Mobile Station. When an unregistered memory tag or memory tag whose password disagrees is included in memory tags specified by the Base Station, the Land Mobile Station writes the specified data only to data storage memory areas corresponding to registered memory tags whose password agrees, and sends memory tags whose writing is successfully completed to the Base Station.

3.2.2 Command

3.2.2.1 Command System

Commands in the OBE memory access application consist of normal commands and the OBE denial response command sent from the Land Mobile Station. There are 26 normal commands as follows. The version number is "1" for the OBE memory access application having the specification described in this document.

- Memory Resource Information Acquisition Request Command
- Memory Resource Information Acquisition Response Command
- Memory Allocation Request Command (OPTIONAL)
- Memory Allocation Response Command (OPTIONAL)
- Memory Free Request Command (OPTIONAL)
- Memory Free Response Command (OPTIONAL)
- Memory Read Request Command
- Memory Read Response Command
- Memory Write Request Command
- Memory Write Response Command
- Bulk Memory Read Request Command
- Bulk Memory Read Response Command
- Bulk Memory Write Request Command
- Bulk Memory Write Response Command
- Memory Allocation with Password Request Command (OPTIONAL)
- Memory Allocation with Password Response Command (OPTIONAL)
- Memory Free with Password Request Command (OPTIONAL)
- Memory Free with Password Response Command (OPTIONAL)
- Memory Read with Password Request Command (OPTIONAL)
- Memory Read with Password Response Command (OPTIONAL)
- Memory Write with Password Request Command (OPTIONAL)
- Memory Write with Password Response Command (OPTIONAL)
- Bulk Memory Read with Password Request Command (OPTIONAL)
- Bulk Memory Read with Password Response Command (OPTIONAL)
- Bulk Memory Write with Password Request Command (OPTIONAL)
- Bulk Memory Write with Password Response Command (OPTIONAL)

3.2.2.2 Command Format

3.2.2.2.1 Normal Command

3.2.2.2.1.1 Memory Resource Information Acquisition Request Command

The memory resource information acquisition request command is used when the Base Station acquires from the Land Mobile Station the information on the resource of the Land Mobile Station and memory tags to be accessed subsequently. The Land Mobile Station gives the information on specified memory tags using the memory resource information acquisition request command (resourceInfoResponse). Table 3.2-2 shows the command format.

Table 3.2-2 Memory Resource Information Acquisition Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type resourceInfoRequest(0)							
4	Security Profile plainText(0)							
5	Length of opCommandBody							
:	Content of opCommandBody “MemTagList” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “resourceInfoRequest(0)” to indicate the request command of memory resource information acquisition function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The

unit is octet.

b) This field is set to the list of reading memory tag (“memTagList” format, Refer to Table 3.2-3). Maximum number of memory tags handled in this command is 30 or less.

Table 3.2-3 Memory Tag List (memTagList) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	The number of memory tags							
:	1st memory tag memTag							
	:							
	:							
	Nth memory tag memTag							

(1) The number of memory tags

This field is set to the number of succeeding memory tags.

(2) Memory tag

This field indicates memory tag (“memTag” format parameter)

3.2.2.2.1.2 Memory Resource Information Acquisition Response Command

The memory resource information acquisition response command is used when the Land Mobile Station notifies the Base Station of the information on resource of the Land Mobile Station and memory tags specified by the Base Station. Table 3.2-4 shows the command format.

Table 3.2-4 Memory Resource Information Acquisition Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type resourceInfoResponse(128)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “resourceInfo” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “resourceInfoResponse(128)” to indicate the response command of memory resource information acquisition function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to the resource information of memory tag (“resourceInfo” format, Refer to Table 3.2-5).

Table 3.2-5 The Resource Information of Memory Tag (resourceInfo) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1-4	Max Receivable Data Size maxCommandBodySize							
5-16	Property of Memory Area storageProperty							
	Remaining number of memory tags in the nonvolatile memory area availableNonVolatileTagNum							
	Remaining capacity of data storage areas in the nonvolatile memory area availableNonVolatileDataCapacity							
	Remaining number of memory tags in the volatile memory area availableVolatileTagNum							
	Remaining capacity of data storage areas in the volatile memory area availableVolatileDataCapacity							
17-18	Maximum number of memory tags handled in batch processing bulkTagNum							
19 :	Memory tag resource information list “tagResourceList” format parameter							

(1) Maximum Receivable Data Size

This field indicates the maximum operation data size which can be received by the Land Mobile Station.

This field is set to "4294967295” when the maximum receivable data size exceeds 4294967295 bytes.

(2) Property of Memory Area

This field indicates the following areas when the Land Mobile Station incorporates the memory allocation function (Base Station allocatable memory).

This field is set to “0” to all of the following areas for the Land Mobile Station not

incorporating the memory allocation function (Base Station allocatable memory).

a) Remaining number of memory tags in the nonvolatile memory area

This field indicates the remaining number of memory tags available in the nonvolatile memory area in the Base Station allocatable memory.

This field is set to "65535" when the number of allocatable memory tags exceeds 65535.

This field is set to "0" for the Land Mobile Station not incorporating the nonvolatile memory area.

b) Remaining capacity of data storage areas in the nonvolatile memory area

This field indicates the remaining capacity of nonvolatile memory area in the Base Station allocatable memory.

This field is set to "4294967295" when the remaining capacity exceeds 4294967295 bytes. This field is set to "0" for the Land Mobile Station not incorporating the nonvolatile memory area.

c) Remaining number of memory tags in the volatile memory area

This field indicates the remaining number of memory tags available in the volatile memory area in the Base Station allocatable memory.

This field is set to "65535" when the number of allocatable memory tags exceeds 65535.

This field is set to "0" for the Land Mobile Station not incorporating the volatile memory area.

d) Remaining capacity of data storage areas in the volatile memory area

This field indicates the remaining capacity of volatile memory area in the Base Station allocatable memory.

This field is set to "4294967295" when the remaining capacity exceeds 4294967295 bytes. This field is set to "0" for the Land Mobile Station not incorporating the volatile memory area.

(3) Maximum number of memory tags handled in batch processing

This field indicates the maximum number of memory tags in the Land Mobile Station which can be read or written in batch processing.

(4) Memory tag resource information list

Memory tags and attributes ("tagResourceList" type shown in Table 3.2-6) registered (whose memory area is allocated) in the Land Mobile Station is stored here among memory tags shown in the memory tag list ("memTagList" format parameter) contained

in “resourceInfoRequest”.

Table 3.2-6 The List of Resource Information of Memory Tag (tagResourceList) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	The number of memory tags							
:	Resource information of 1st memory tag tagResourceInfo							
	:							
	:							
	Resource information of Nth memory tag tagResourceInfo							

a) The number of resource information of memory tags

This field is set to the number of succeeding “tagResourceInfo”.

b) Resource Information of Memory Tag

This field is set to resource information of memory tag (“tagResourceInfo” format; Refer to Table 3.2-7).

Table 3.2-7 Resource Information of Memory Tag (tagResourceInfo) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1-8	Memory Tag memTag							
9	The Attribute of Memory Tag tagAttribute							
:	fill(0)					Protection Mode permission		
						spf	WritePro tect	readProt ect
	The Size of Memory Tag Data tagDataSize							
	Memory allocation size maxMemorySize							

(1) Memory Tag

This field is set to memory tag.

(2) Protection Mode

This field indicates the protection mode of the data storage memory area identified by the memory tag. The protection mode is represented by 3 bits indicating “essential/nonessential” or “enabled/disabled”.

a) spf

This field is set to "1” to make essential the use of the SPF for accessing the data storage memory area.

b) writeProtect

This field is set to “1” to disable writing to the data storage memory area.

c) readProtect

This field is set to “1” to disable reading from the data storage memory area.

(3) The Size of Memory Tag Data

This field indicates the size of data currently in the data storage memory area identified by the memory tag. The field is set to “0” to a memory tag for which reading is disabled in the protection mode.

(4) Memory allocation size

This field indicates the capacity of the data storage memory area identified by the memory tag. This field is set to "4294967295” when the allocated memory size exceeds 4294967295 bytes.

3.2.2.2.1.3 Memory Allocation Request Command

The memory allocation request command is used when the Base Station allocates the Base Station allocatable memory in the Land Mobile Station. The Land Mobile Station gives response using the memory allocation response command (memoryAllocResponse). Table 3.2-8 shows the command format.

Table 3.2-8 Memory Allocation Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type memoryAllocRequest (1)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memoryAllocInfo” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “memoryAllocRequest (1)” to indicate the request command of memory allocation function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This filed is set to the memory allocation information (“memoryAllocInfo” format, Refer to Table 3.2-9).

Table 3.2-9 Memory Allocation Information (memoryAllocInfo) Format

<table>
<tr><th></th><th>7(MSB)</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0(LSB)</th></tr>
<tr><td>1-8</td><td colspan="8">Memory Tag
memTag</td></tr>
<tr><td rowspan="3">9
:</td><td colspan="5" rowspan="2">fill(0)</td><td colspan="3">Protection Mode
permission</td></tr>
<tr><td>spf</td><td>writeProt
ect</td><td>readProt
ect</td></tr>
<tr><td colspan="8">Memory Allocation Size
maxMemorySize</td></tr>
<tr><td colspan="8">Initial Set Value
initialValue</td></tr>
</table>

(1) Memory tag

The memory tag name corresponding to the data storage memory area to be allocated is stored here.

(2) Protection mode

This field indicates the protection mode of the data storage memory area to be allocated.

The protection mode is represented by 3 bits indicating “essential/nonessential” or “enabled/disabled”.

a) spf

This field is set to "1” to make essential the use of the SPF for accessing the data storage memory area.

b) writeProtect

This field is set to “1” to disable writing to the data storage memory area.

c) readProtect

This field is set to “1” to disable reading from the data storage memory area.

(3) Memory allocation size

This field indicates the memory capacity to be allocated under consideration of the communication resource (maximum data size which can be read and written from the Base Station) of the Land Mobile Station.

(4) Initial set value

This field indicates the data initial value to be stored when the data storage memory

area is allocated.

3.2.2.2.1.4 Memory Allocation Response Command

The memory allocation response command is used when the Land Mobile Station notifies the Base Station that memory allocation requested by the memory allocation request command is normally finished. Table 3.2-10 shows the command format.

Table 3.2-10 Memory Allocation Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type memoryAllocResponse(129)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
6-13	The content of OpCommandBody “memTag” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “memoryAllocResponse (129)” to indicate the response command of memory allocation function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to memory tag (“memTag” format parameter).

3.2.2.2.1.5 Memory Free Request Command

The memory free request command is used when the Base Station makes free the Base Station allocatable memory already allocated in the Land Mobile Station.

The Land Mobile Station gives response using the memory free response command (memoryFreeResponse). Table 3.2-11 shows the command format.

Table 3.2-11 Memory Free Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type memoryFreeRequest (2)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memTag” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “memoryFreeRequest (2)” to indicate the request command of memory free function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This filed is set to memory tag (“memTag” format parameter).

3.2.2.2.1.6 Memory Free Response Command

This command is used when the Land Mobile Station notifies the Base Station that memory free requested by the memory free request command is normally finished. Table 3.2-12 shows the command format.

Table 3.2-12 Memory Free Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type memoryFreeResponse(130)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody(0)							
6-13	The content of OpCommandBody “memTag” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “memoryFreeResponse(130)” to indicate the response command of memory free function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This filed is set to memory tag (“memTag” format parameter).

3.2.2.2.1.7 Memory Read Request Command

The memory read request command is used when the Base Station reads one data storage memory area (one memory tag) in the Land Mobile Station. The Land Mobile Station gives response about the data storage memory area specified by the Base Station using the memory read response command (readResponse). Table 3.2-13 shows the command format.

Table 3.2-13 Memory Read Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type readRequest(3)							
4	Security Profile plainText(0)							
5-13	The data length of OpCommandBody							
	The content of OpCommandBody “memTag” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “readRequest(3)” to indicate the request command of memory read function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this

command.

(5) Operation Command Body

a) This field is set to the data length(8) of the succeeding operation command body. The unit is octet.

b) This filed is set to memory tag (“memTag” format parameter).

3.2.2.2.1.8 Memory Read Response Command

The memory read response command is sent from the Land Mobile Station to the Base Station as response when the Base Station reads one data storage memory area (one memory tag) in the Land Mobile Station. Table 3.2-14 shows the command format.

Table 3.2-14 Memory Read Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type readResponse(131)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memData” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “readResponse(131)” to indicate the response command of memory read function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This filed is set to memory data information (“memData” format parameter, Refer to Table 3.2-15).

Table 3.2-15 The Memory Data Information (memData) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1-8	Memory Tag memTag							
9 :	The length of Stored Data							
	The contents of Stored Data							

(1) Memory Tag

This field is set to memory tag.

(2) Stored Data

a) This field is set to the data length of succeeding stored data.

b) This field is set to the store data corresponding to memory tag.

3.2.2.2.1.9 Memory Write Request Command

The memory write request command is used when the Base Station writes specified data to one data storage memory area corresponding to one memory tag in the Land Mobile Station. The Land Mobile Station gives response using the memory write response command (writeResponse) when the write request is normally executed. Table 3.2-16 shows the command format.

Table 3.2-16 Memory Write Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type writeRequest(4)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memData” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “writeRequest (4)” to indicate the request command of memory write function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This filed is set to memory data information (“memData” format parameter, Refer to Table 3.2-17).

3.2.2.2.1.10 Memory Write Response Command

The memory write response command is sent from the Land Mobile Station to the Base Station as response when the Base Station writes specified data to one data storage area corresponding to one memory tag in the Land Mobile Station. Table 3.2-17 shows the command format.

Table 3.2-17 Memory Write Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type writeResponse(132)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
6-13	The content of OpCommandBody “memTag” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “writeResponse(132)” to indicate the response command of memory write function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This filed is set to writing memory tag (“memTag” format parameter).

3.2.2.2.1.11 Bulk Memory Read Request Command

The bulk memory read request command is used when the Base Station reads specified one or more data storage memory areas in the Land Mobile Station. The Land Mobile Station gives response about one or more data storage memory areas specified by the Base Station using the bulk memory read response command (readBulkResponse). Table 3.2-18 shows the command format.

Table 3.2-18 Bulk Memory Read Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type readBulkRequest(5)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memTagList” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “readBulkRequest (5)” to indicate the request command of bulk memory read function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This filed is set to memory tag list information (“memTagList” format parameter, Refer to

Table 3.2-19).

Table 3.2-19 Memory Tag List Information (memTagList) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	The number of Memory Tag							
:	1st Memory Tag memTag							
	:							
	:							
	Nth Memory Tag memTag							

(1) The number of Memory Tags

This field is set to the number of succeeding “memTag”.

(2) Memory Tag

This filed is set to memory tag (“memTag” format parameter).

3.2.2.2.1.12 Bulk Memory Read Response Command

The bulk memory read response command is used when the Land Mobile Station sends to the Base Station one or more data stored in one or more data storage memory areas specified by the Base Station. Table 3.2-20 shows the command format.

Table 3.2-20 Bulk Memory Read Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type readBulkResponse(133)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memDataList” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “readBulkResponse (133)” to indicate the response command of bulk memory read function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to the data list information (“memDataList” format parameter, Refer to Table 3.2-21).

Table 3.2-21 Data List Information (memDataList) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	The number of Memory Data Information							
:	1st Memory Data Information memData							
	:							
	Nth Memory Data Information memData							

(1) The number of Memory Data Information

This field is set to the number of succeeding “memData”.

(2) Memory Data Information

This field is set to the memory data information (“memData” format, Refer to Table 3.2-15).

3.2.2.2.1.13 Bulk Memory Write Request Command

The bulk memory write request command is used when the Base Station writes one or more data to one or more data storage memory areas allocated in the Land Mobile Station. The Land Mobile Station gives response about memory tags whose data writing is successfully finished among specified one or more memory tags using the bulk memory write response command (writeBulkResponse). Table 3.2-22 shows the command format.

Table 3.2-22 Bulk Memory Write Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type writeBulkRequest(6)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memDataList” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “wirteBulkRequest (6)” to indicate request command of the bulk memory write function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to the writing information list (“memDataList” format parameter, Refer to Table 3.2-21).

3.2.2.2.1.14 Bulk Memory Write Response Command

The bulk memory write response command is sent from the Land Mobile Station to the Base Station as response when the Base Station writes one or more data at one time to the Land Mobile Station. The Land Mobile Station gives response about memory tags whose data writing is

successfully finished among specified one or more memory tags. Table 3.2-23 shows the command format.

Table 3.2-23 Bulk Memory Write Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type writeBulkResponse(134)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memTagList” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “wirteBulkResponse (134)” to indicate the response command of bulk memory write function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to the memory tag information list (“memTagList” format parameter, Refer to Table 3.2-3).

3.2.2.2.1.15 Memory Allocation with Password Request Command

The memory allocation with password request command is used when the Base Station

allocates the Base Station allocatable memory in the Land Mobile Station and set password attribute. The Land Mobile Station gives response using the memory allocation with password response command (memoryAllocResponseWithCredence). Table 3.2-24 shows the command format.

Table 3.2-24 Memory Allocation with Password Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type memoryAllocRequestWithCredence (65)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memoryAllocInfoWithCredence” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “memoryAllocRequestWithCredence (65)” to indicate the request command of memory allocation with password function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to the memory allocation information with password (“memoryAllocInfoWithCredence” format parameter, Refer to Table 3.2-25).

Table 3.2-25 The Memory Allocation Information with Password (memoryAllocInfoWithCredence) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1-8	Memory Tag memTag							
9 :	fill(0)					Protection Mode permission		
						spf	writeProtect	readProtect
	Memory Allocation Size maxMemorySize							
	Password accessCredential							
	Initial Set Value initialValue							

(1) Memory tag

This field is set to the memory tag.

(2) Protection mode

This field indicates the protection mode of the memory tag. The protection mode is represented by 3 bits indicating “essential/nonessential” or “enabled/disabled”.

a) spf

This field is set to "1” to make essential the use of the SPF for accessing the data storage memory area.

b) writeProtect

This field is set to “1” to disable writing to the data storage memory area.

c) readProtect

This field is set to “1” to disable reading from the data storage memory area.

(3) Memory allocation size

This field indicates the memory capacity to be allocated under consideration of the communication resource (maximum data size which can be read and written from the Base Station) of the Land Mobile Station.

(4) Password

This field indicates password (8 octet).

(5) Initial set value

This field indicates the data initial value to be stored when the data storage memory area is allocated.

3.2.2.2.1.16 Memory Allocation with Password Response Command

The memory allocation with password response command is used when the Land Mobile Station notifies the Base Station that memory allocation requested by the memory allocation with password request command is normally finished. Table 3.2-26 shows the command format.

Table 3.2-26 Memory Allocation with Password Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type memoryAllocResponseWithCredence(193)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
6-13	The content of OpCommandBody “memTag” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “memoryAllocResponseWithCredence (193)” to indicate the response command of memory allocation with password function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The

unit is octet.

b) This field is set to memory tag information allocated successfully (“memTag” format parameter).

3.2.2.2.1.17 Memory Free with Password Request Command

The memory free with password request command is used when the Base Station makes free the data storage memory area allocatable memory already allocated in the Land Mobile Station. The Land Mobile Station gives response using the memory free with password response command (memoryFreeResponseWithCredence). Table 3.2-27 shows the command format.

Table 3.2-27 Memory Free with Password Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type memoryFreeRequestWithCredence (66)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memTagWithCredence” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “memoryFreeRequestWithCredence (66)” to indicate the request command of memory free with password function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to memory tag with password information (“memTagWithCredence” format parameter, Refer to Table 3.2-28).

Table 3.2-28 Memory Tag with Password Information (memTagWithCredence) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1-8	Memory Tag memTag							
9-16	Password accessCredential							

(1) Memory Tag

This field is set to memory tag.

(2) Password

This field is set to password (8Bytes).

3.2.2.2.1.18 Memory Free with Password Response Command

This command is used when the Land Mobile Station notifies the Base Station that memory free requested by the memory free with password request command is normally finished. Table 3.2-29 shows the command format.

Table 3.2-29 Memory Free with Password Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type memoryFreeResponseWithCredence(194)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
6-13	The content of OpCommandBody "memTag" format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier "operationCommand(1)" to indicate the normal command.

(3) Operation Type

This field is set to an identifier "memoryFreeResponseWithCredence(194)" to indicate the response command of memory free with password function.

(4) Security Profile

This field is set to "plainText(0)" as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to memory tag information processed successfully ("memTag'" format parameter).

3.2.2.2.1.19 Memory Read with Password Request Command

The memory read with password request command is used when the Base Station reads the data storage memory area with password in the Land Mobile Station. The Land Mobile Station gives response about the data storage memory area specified by the Base Station using the

memory read with response command (readResponseWithCredence). Table 3.2-30 shows the command format.

Table 3.2-30 Memory Read with Password Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type readRequestWithCredence(67)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memTagWithCredence” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “readRequestWithCredence(67)” to indicate the request command of memory read with password function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This filed is set to memory tag with password information (“memTagWithCredence” format parameter, Refer to Table 3.2-28).

3.2.2.2.1.20 Memory Read with Password Response Command

The memory read with password response command is sent from the Land Mobile Station to

the Base Station as response when the Base Station reads the data storage memory area restricted to read by password in the Land Mobile Station.

Table 3.2-31 shows the command format.

Table 3.2-31 Memory Read with Password Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type readResponseWithCredence(195)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memData” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “readResponseWithCredence(195)” to indicate the response command of memory read with password function

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to stored memory data information (“memData” format parameter, Refer to Table 3.2-15).

3.2.2.2.1.21 Memory Write with Password Request Command

The memory write with password request command is used when the Base Station writes specified data to one data storage memory area corresponding to one memory tag with password in the Land Mobile Station. The Land Mobile Station gives response using the memory write with password response command (writeResponseWithCredence) when the write request is normally executed. Table 3.2-32 shows the command format.

Table 3.2-32 Memory Write with Password Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type writeRequestWithCredence(68)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memDataWithCredence” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “writeRequestWithCredence (68)” to indicate the response command of memory write with password function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to writing memory data information with password

(“memDataWithCredence” format parameter, Refer to Table 3.2-33).

Table 3.2-33 Memory Data Information with Password (memDataWithCredence) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1 : 	Memory Tag with Password “memTagWithCredence” format parameter							
	The length of memory data							
	The contents of memory data							

(1) Memory Tag with Password

This field is set to memory tag information with password (Refer to Table 3.2-28).

(2) Memory Data

a) This field is set to the length of succeeding memory data.

b) This field is set to data corresponding to memory tag with password.

3.2.2.2.1.22 Memory Write with Password Response Command

The memory write with password response command is sent from the Land Mobile Station to the Base Station as response when the Base Station writes specified data to one data storage area corresponding to one memory tag with password in the Land Mobile Station. Table 3.2-34 shows the command format.

Table 3.2-34 Memory Write with Password Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type writeResponseWithCredence(196)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
6-13	The content of OpCommandBody “memTag” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “writeResponseWithCredence(196)” to indicate the response command of memory write with password function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to memory tag information (“memTag” format parameter).

3.2.2.2.1.23 Bulk Memory Read with Password Request Command

The bulk memory read with password request command is used when the Base Station reads specified one or more data storage memory with password in the Land Mobile Station. The Land Mobile Station gives response about one or more data storage memory areas specified by the Base Station using the bulk memory read with password response command

(readBulkResponseWithCredence). Table 3.2-35 shows the command format.

Table 3.2-35 Bulk Memory Read with Password Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type readBulkRequestWithCredence(69)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memTagListWithCredence” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “readBulkRequestWithCredence (69)” to indicate the request command of bulk memory read with password function.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to memory tags list information with password (“memTagListWithCredence” format parameter, Refer to Table 3.2-36).

Table 3.2-36 Memory tags list information with password (memTagListWithCredence) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	The number of memory tags with password							
:	1st Memory Tag with Password "memTagWithCredence"							
	:							
	Nst Memory Tag with Password "memTagWithCredence"							

(1) The Number of Memory Tags with Password

This field is set to the number of successing memory tags with password.

(2) Memory Tag with Password

This filed is set to memory tag with password ("memTagWithCredence" format parameter, Refer to Table 3.2-28).

3.2.2.2.1.24 Bulk Memory Read with Password Response Command

The bulk memory read with password response command is used when the Land Mobile Station sends to the Base Station one or more data stored in one or more data storage memory areas with password specified by the Base Station. Table 3.2-27 shows the command format.

Table 3.2-37 Bulk Memory Read with Password Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type readBulkResponseWithCredence(197)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody "memDataList"' format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier "operationCommand(1)" to indicate the normal command.

(3) Operation Type

This field is set to an identifier "readBulkResponseWithCredence (197)" to indicate the bulk memory read with password response.

(4) Security Profile

This field is set to "plainText(0)" as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to data list information ("memDataList" format parameter, Refer to Table 3.2-21).

3.2.2.2.1.25 Bulk Memory Write with Password Request Command

The bulk memory write with password request command is used when the Base Station writes one or more data to one or more data storage memory areas with password allocated in the Land Mobile Station. The Land Mobile Station gives response about memory tags whose data

writing is successfully finished among specified one or more memory tags using the bulk memory write with password response command (writeBulkResponseWithCredence). Table 3.2-38 shows the command format.

Table 3.2-38 Bulk Memory Write with Password Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type writeBulkRequestWithCredence(70)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memDataListWithCredence” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “wirteBulkRequestWithCreence (70)” to indicate the bulk memory write with password request.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to list of writing data with password (“memDataListWithCredence” format parameter, Refer to Table 3.2-39).

Table 3.2-39 List of writing Data with Password (memDataListWithCredence) Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	The number of memory data with password							
:	1st memory data with password “memDataWithCredence” format parameter							
	: :							
	Nth memory data with password “memDataWithCredence” format parameter							

(1) The number of memory data with password

This field is set to the number of successing memory data with password.

(2) Memory Data with Password

This field is set to the memory data with password (“memDataWithCredence” format parameter, Refer to Table 3.2-33).

3.2.2.2.1.26 Bulk Memory Write with Password Response Command

The bulk memory write with password response command is sent from the Land Mobile Station to the Base Station as response when the Base Station writes one or more data at one time to the Land Mobile Station. The Land Mobile Station gives response about memory tags whose data writing is successfully finished among specified one or more memory tags. Table 3.2-40 shows the command format.

Table 3.2-40 Bulk Memory Write with Password Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type writeBulkResponseWithCredence(198)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody “memTagList” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “wirteBulkResponseWithCredence (198)” to indicate the bulk memory write with password response.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) This field indicates the data length of the succeeding operation command body. The unit is octet.

b) This field is set to the list of memory tag information written successfully (“memTagList” format parameter, Refer to Table 3.2-3).

3.2.2.2.2 OBE Denial Response Command

OBE denial response command is used when the Land Mobile Station notifies the Base Station of negative acknowledgement. Table 3.2-41 shows the command format.

Table 3.2-41 OBU Denial Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type obuDenialResponse(255)							
3	status							
4	The length of supplement information							
5 :	The contents of supplement information							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to obuDenialRespnose(255) as OBE Denial Response Conmand.

(3) status

This field is set to the reason of denial response. For details, refer to Table 3.2-42.

(4) Supplement Information

a) The length of supplement information

This field is set to the length of successing supplement information. The unit is octet. When there are no supplement information (this case is default case), this filed is set to value “0”.

b) The contents of supplement information

This field is set to free information (the maximum length is 127 octets) as supplement information. When version number is not same, this field is set to own version (“versionIndex” parameter).

Table 3.2-42 Status Code

Status Code	Description
0	For future use
1	Failure to Read from OBE Memory
2	Failure to Write to OBE Memory
3	OBE memory allocation/free failed
4	Version incompatible
5	Insufficient free space in OBE
6	No corresponding memory tag
7	Maximum available number of tags over in batch processing
8	Protection mode violation
9	Access control violation
10	The password incompatible
11	SPF violation
12	No support command
13-15	For future use
16	Invalid command (cannot interpret)
17-254	For future use
255	Other Land Mobile Station internal error

3.2.3 Definition of Data Structures

```
ObuMemoryAccessCommand::=SEQUENCE{
    versionIndex        Version,
    accessCommand       AccessCommand
}

Version::=SEQUENCE{
    version             INTEGER(0...15),
    fill                BIT STRING(SIZE(4))     -- encoding value is 0
}

AccessCommand::=CHOICE{
    dummy               [0]     NULL,                   -- don't use
    operationCommand    [1]     OperationCommand,
    dummy               [2-254] NULL,                   -- For future use
    obuDenialResponse   [255]   ObuDenialResponse
}

OperationCommand::=SEQUENCE{
    opCommandType       OpCommandType,
    opSecurityProfile   OpSecurityProfile,
    opCommandBody       OCTET STRING
}

OpCommandType::=ENUMERATED{
    resourceInfoRequest     (0),
            -- Memory Resource Information Acquisition Request Command
    memoryAllocRequest      (1),    -- Memory Allocation Request Command
    memoryFreeRequest       (2),    -- Memory Free Request Command
    readRequest             (3),    -- Memory Read Request Command
    writeRequest            (4),    -- Memory Write Request Command
    readBulkRequest         (5),    -- Bulk Memory Read Request Command
    writeBulkRequest        (6),    -- Bulk Memory Write Request Command
    reservedFor future use  (7-64), -- For future use
```

memoryAllocRequestWithCredence (65),
--Memory Allocation with Password Request Command
memoryFreeRequestWithCredence (66),
-- Memory Free with Password Request Command
readRequestWithCredence (67),
-- Memory Read with Password Request Command
writeRequestWithCredence (68),
-- Memory Write with Password Request Command
readBulkRequestWithCredence (69),
-- Bulk Memory Read with Password Request Command
writeBulkRequestWithCredence (70),
-- Bulk Memory Write with Password Request Command
reservedFor future use (71-127), -- For future use
resourceInfoResponse (128),
-- Memory Resource Information Acquisition Response Command
memoryAllocResponse (129),
-- Memory Allocation Response Command
memoryFreeResponse (130),
-- Memory Free Response Command
readResponse (131),
-- Memory Read Response Command
writeResponse (132),
-- Memory Write Response Command
readBulkResponse (133),
-- Bulk Memory Read Response Command
writeBulkResponse (134),
-- Bulk Memory Write Response Command
reservedFor future use (135-192), -- For future use
memoryAllocResponseWithCredence (193),
-- Memory Allocation with Password Response Command
memoryFreeResponseWithCredence (194),
-- Memory Free with Password Response Command
readResponseWithCredence (195),
-- Memory Read with Password Response Command
writeResponseWithCredence (196),

```
            -- Memory Write with Password Response Command
        readBulkResponseWithCredence        (197),
            -- Bulk Memory Read with Password Response Command
        writeBulkResponseWithCredence       (198),
            -- Bulk Memory Write with Password Response Command
        reservedFor future use              (199-255) ,     -- For future use
    }

    OpSecurityProfile::=ENUMERATED{
        plainText                   (0),                    -- plain text
        reservedFor future use      (1-255)                 -- For future use
    }

    ObuDenialResponse::=SEQUENCE{
        status              INTEGER(0...255),               -- status code
        supplementInfo      OCTET STRING(SIZE(0..255))
                                                            -- supplement information
    }

    ResourceInfo::= SEQUENCE{
        maxCommandBodySize      INTEGER(0...4294967295),
            -- Maximum Receivable Data Size
        storageProperty         StorageProperty,
            -- Property of Memory Area
        bulkTagNum              INTEGER(0...65535),
            -- Maximum number of memory tags handled in batch processing
        tagResourceList         TagResourceList
            -- Memory tag resource information list
    }

    StorageProperty::=SEQUENCE{
        availableNonVolatileTagNum          INTEGER(0...65535),
            -- Remaining number of memory tags in the nonvolatile memory area
        availableNonVolatileDataCapacity    INTEGER(0...4294967295),
            -- Remaining capacity of data storage areas in the nonvolatile memory area
```

```
    availableVolatileTagNum          INTEGER(0...65535),
        -- Remaining number of memory tags in the volatile memory area
    availableVolatileDataCapacity    INTEGER(0...4294967295)
        -- Remaining capacity of data storage areas in the volatile memory area
}

TagResourceList::= SEQUENCE OF TagResourceInfo

TagResourceInfo::= SEQUENCE{
    tag              MemTag,              -- Memory Tag
    tagAttribute     TagAttribute         -- The Attribute of Memory Tag
}

TagAttribute::= SEQUENCE{
    fill             BITSTRING(SIZE(5)),
    permission       Permission,          -- Protection mode
    tagDataSize      INTEGER(0...4294967295),
                                          -- The Size of Memory Tag Data
    maxMemorySize    INTEGER(0...4294967295)
                                          -- Memory allocation size
}

Permission::= SEQUENCE {
    spf              BOOLEAN,     -- SPF usage case is 1
    writeProtect     BOOLEAN,     -- Write prohibit case is 1
    readProtect      BOOLEAN      -- Read prohibit case is 1
}

MemoryAllocInfo ::= SEQUENCE{
    memTag           MemTag,              -- Memory Tag ( 8 Bytes )
    fill             BITSTRING(SIZE(5)),
    permission       Permission,          -- Protection mode
    maxMemorySize    INTEGER(0...4294967295),-- Memory allocation size
    initialValue     OCTET STRING         -- Initial set value
}
```

```
MemoryAllocInfoWithCredence ::= SEQUENCE{
    memTag              MemTag,                 -- Memory Tag ( 8 Bytes )
    fill                BITSTRING(SIZE(5)),
    permission          Permission,             -- Protection mode
    maxMemorySize       INTEGER(0...4294967295), -- Memory allocation size
    accessCredential    OCTET STRING(SIZE(8)), -- Password
    initialValue        OCTET STRING            -- Initial set value
}

MemDataListWithCredence ::=SEQUENCE OF MemDataWithCredence

MemTagListWithCredence ::=SEQUENCE OF MemTagWithCredence

MemDataWithCredence ::= SEQUENCE{
    memTagWithCredence      MemTagWithCredence,
    data                    OCTET STRING
}

MemTagWithCredence::= SEQUENCE{
    memTag                  MemTag,
    accessCredential        OCTET STRING(SIZE(8))
}

MemTagList::= SEQUENCE OF MemTag

MemDataList ::= SEQUENCE OF MemData

MemData::=SEQUENCE{
    memTag              MemTag,
    data                OCTET STRING
}

MemTag::= OCTET STRING(SIZE(8))
```

3.2.4 Relationship with Other Standards

The relationships with other DSRC related standards used this application are shown below.

Table 3.2-43 Relationship with other DSRC related standards

	DSRC related standard	Content using in this application
1	DSRC standard	AID=18 (DSRC Application Sub Layer)
2	NCP of ASL	LPCP (Local Port Control Protocol)
3	port number of LPCP	0x0C18
4	transaction service	Request-response type transaction service in two transaction service provided by LPCP. When the message size is larger than MTU size of LPCP, message segmentation/re-assembly function of LPP is used.

Note: The memory data of the response command corresponding to the memory tag of the request command is identify by request-response type transaction

3.2.5 Communication procedures

This subsection describes communication procedures for accessing the memory in the Land Mobile Station using the OBE memory access application.

3.2.5.1 Acquiring memory information

(1) The Base Station sends to the Land Mobile Station the memory resource information acquisition request command (resourceInfoRequest) containing the memory tag list used later.

(2) When memory tags specified in the received memory resource information acquisition request command are already registered (that is, their data storage memory areas are already allocated) in the Land Mobile Station, the Land Mobile Station stores the attributes and sends them to the Base Station using the memory resource information acquisition response command (resourceInfoResponse).

(3) The OBE memory resource information acquisition response command sends the maximum data size receivable in the Land Mobile Station, remaining number of Base Station allocatable memory tags, remaining capacity of the Base Station allocatable memory area and upper limit number of batch memory tags. In the Land Mobile Station not incorporating the OBE memory allocation function, however, “0” is set to the remaining number of Base Station allocatable memory tags and remaining capacity of the Base Station allocatable memory area.

(4) When every memory tag specified by the memory resource information acquisition request command does not exist in the step (2), the Land Mobile Station sets “0” to the number of memory tags in the memory resource information acquisition response command sent to the Base Station.

3.2.5.2 Allocating Base Station allocatable memory

(1) The Base Station sends to the Land Mobile Station the OBE memory allocation request command (memoryAllocRequest) for allocating the Base Station allocatable memory area.

(2) The OBE allocates data storage memory areas based on memory tags specified in the received memory allocation request command, and sets the attributes. When the attributes are set normally, the Land Mobile Station sends the memory allocation response command (memoryAllocResponse) to the Base Station.

(3) When the Land Mobile Station does not incorporate the memory allocation function in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command (obuDenialResponse) notifying the status 12 “Unsupported command”.

(4) When the memory tag specified in the memory allocation request command is an OBE controlling memory tag in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(5) When the memory tag specified in the memory allocation request command is already registered (that is, its data storage memory area is already allocated) in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(6) When memory allocation is disabled due to insufficient capacity of the Base Station allocatable memory in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 5 “Insufficient free space in OBE”.

(7) When the Land Mobile Station cannot handle the memory allocation size specified by the Base Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 9 “Access control violation”.

(8) When memory allocation is not executed normally in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 3 “OBE memory allocation/free failed”.

3.2.5.3 Making free Base Station allocatable memory

(1) The Base Station sends the memory free request command (memoryFreeRequest) to the Land Mobile Station.

(2) The Land Mobile Station makes data storage memory areas free based on memory tags specified in the received memory free request command. When data storage memory areas are made free normally, the Land Mobile Station sends the memory free response command (memoryFreeResponse) command to the Base Station.

(3) When the Land Mobile Station does not incorporate the memory free function in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 12 “Unsupported command”.

(4) When a memory tag whose protection mode is “SPF essential” is specified in the received memory free request command without using the SPF in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 11 “SPF violation”.

(5) When the memory tag specified in the memory free request command is not registered (that is, its data storage memory area is not allocated) in the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(6) When the password is set in the memory tag specified in the memory free request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 10 “Password imcompatible”.

(7) When memory free is not executed normally in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 3 “OBE memory allocation/free failed”.

3.2.5.4 Reading data from the data storage memory area

(1) The Base Station sends the memory read request command (readRequest) to the Land Mobile Station.

(2) The Land Mobile Station reads the data storage memory area specified in the received memory read request command, and sends the memory read response command (readResponse) to the Base Station.

(3) When a memory tag whose protection mode is “SPF essential” is specified in the received memory read request command without using the SPF in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command (obuDenialResponse) notifying the status 11 “SPF violation”.

(4) When the memory tag specified in the memory read request command is not registered (that is, its data storage memory area is not allocated) in the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(5) When the password is set in the memory tag specified in the memory read request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 10 “Password imcompatible”.

(6) When a memory tag whose protection mode is “write only” is specified in the memory read request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 8 “Protection mode violation”.

(7) When reading from the data storage memory area in the Land Mobile Station has failed in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 1 “Read from OBE memory failed”.

(8) It is recommended in the step (1) to acquire in advance the attributes of the memory tag (data storage memory area) to be read using the memory resource information acquisition request command (resourceInfoRequest), etc., and then confirm that the size to be read is allowed in both the Base Station and the Land Mobile Station.

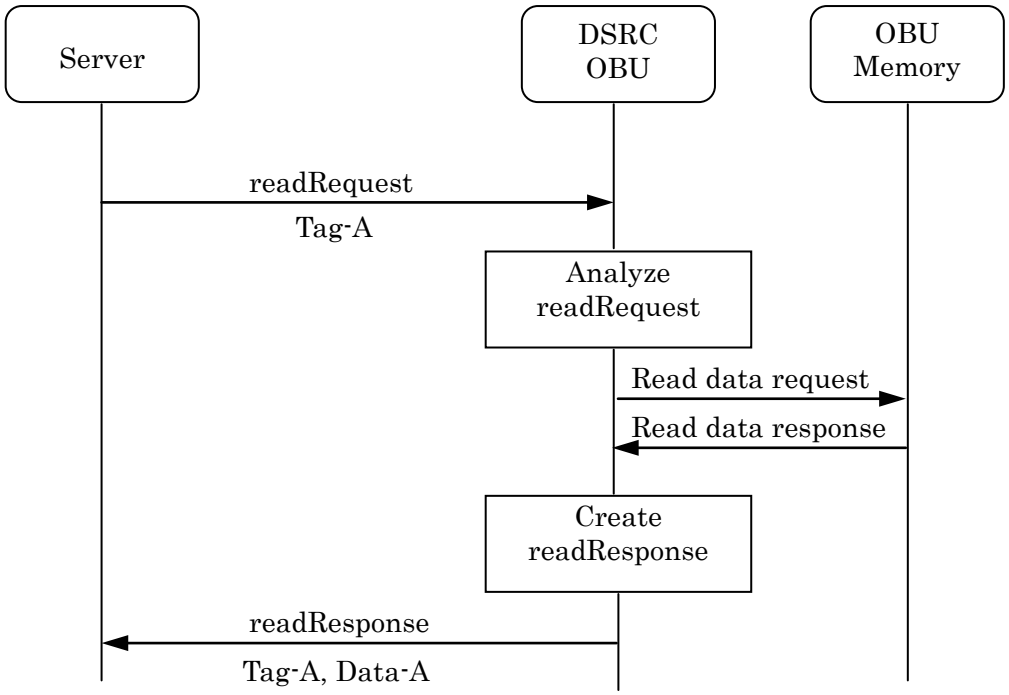


Figure 3.2-2 Example sequence of reading data from the OBE memory

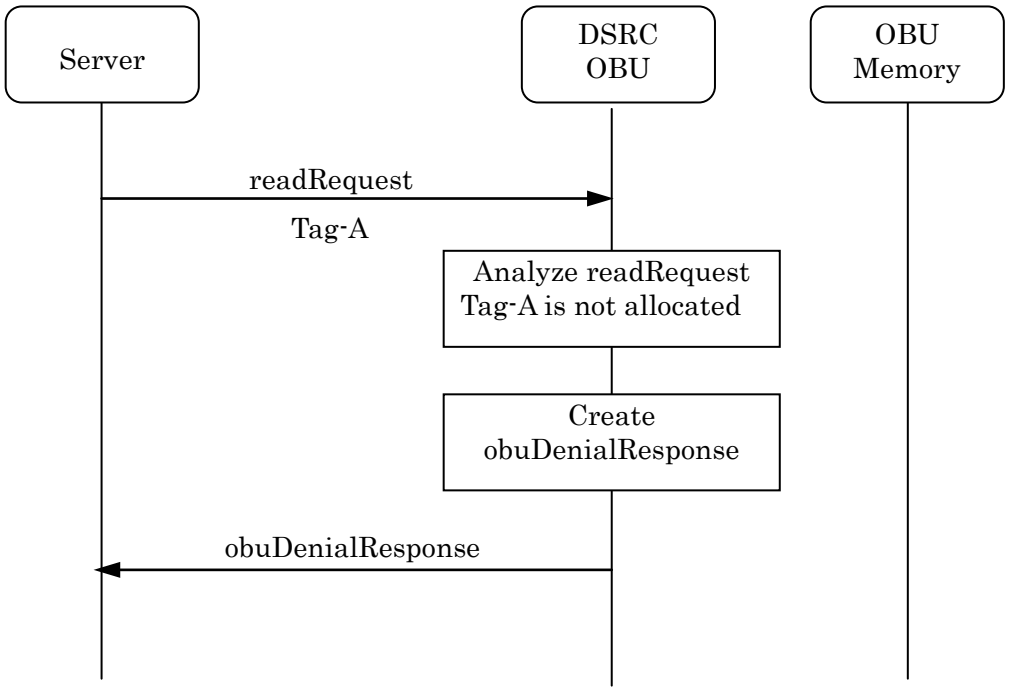


Figure 3.2-3 Example sequence of OBE denial response

3.2.5.5 Writing data to the data storage memory

(1) The Base Station sends the memory write request command (writeRequest) to the Land Mobile Station.

(2) The Land Mobile Station writes data to the data storage memory area specified in the received memory write request command, and sends the memory write response command to the Base Station. Existing data is overwritten with the received data.

(3) When a memory tag whose protection mode is “SPF essential” is specified in the received memory write request command without using the SPF in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command (obuDenialResponse) notifying the status 11 “SPF violation”.

(4) When the memory tag specified in the memory write request command is not registered (that is, its data storage memory area is not allocated) in the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(5) When the password is set in the memory tag specified in the memory write request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 10 “Password imcompatible”.

(6) When a memory tag whose protection mode is “read only” is specified in the memory write request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 8 “Protection mode violation”.

(7) When data larger than the data storage memory is specified in the memory write request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 9 “Access control violation”.

(8) When writing to the data storage memory area in the Land Mobile Station has failed in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 2 “Write to OBE memory failed”.

(9) It is recommended in the step (1) to acquire in advance the attributes of the memory tag (data storage memory area) to be written using the memory resource information acquisition request command (resourceInfoRequest), etc., and then confirm that the size to be written is allowed in both the Base Station and the Land Mobile Station.

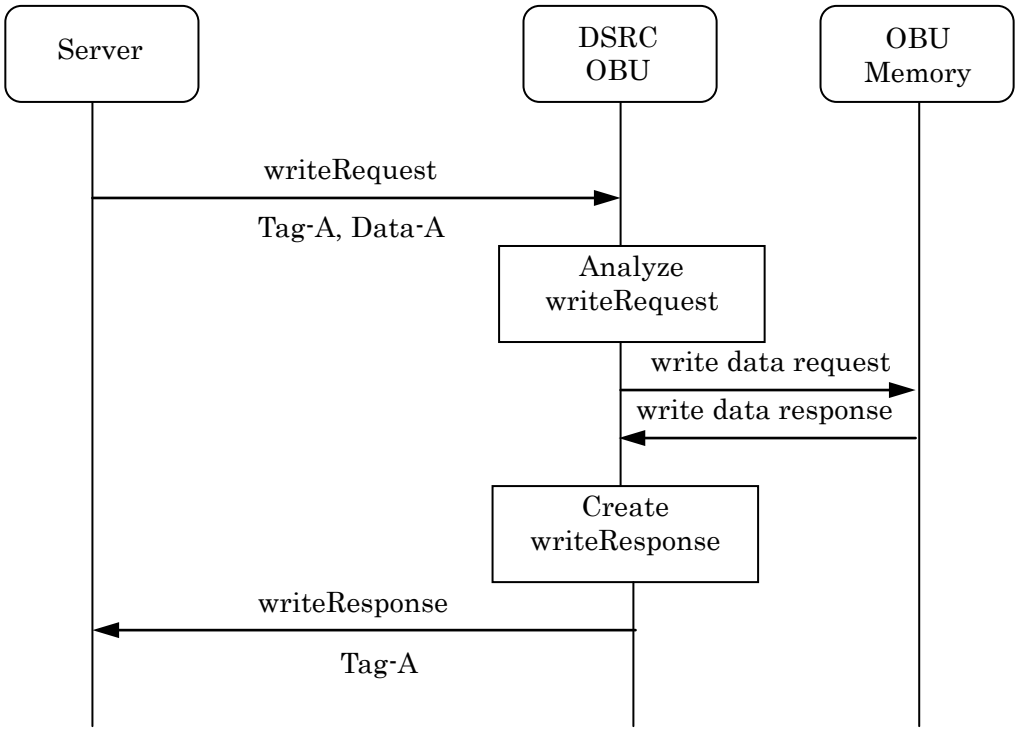


Figure 3.2-4 Example sequence of Example sequence of writing data to the OBE memory

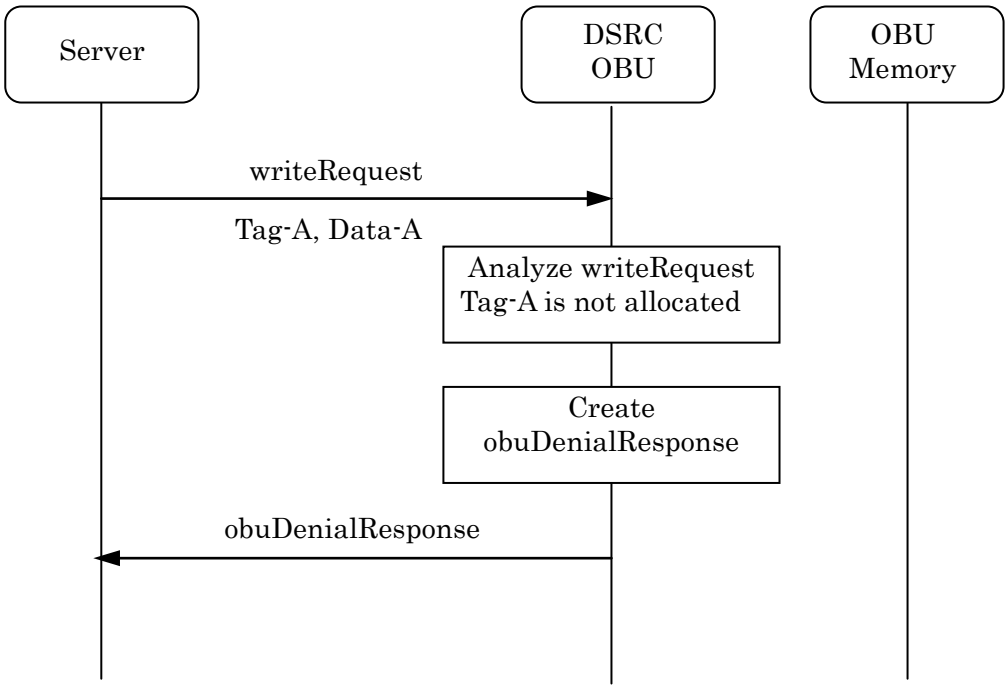


Figure 3.2-5 Example sequence of OBE denial response

3.2.5.6 Reading Bulk Data from One or More Data Storage Memory

(1) The Base Station sends the bulk memory read request command (readBulkRequest) to the Land Mobile Station.

(2) The Land Mobile Station reads data storage memory specified in the received bulk memory read request command, and sends the bulk memory read response command (readBulkResponse) to the Base Station for notifying memory tags and stored data read successfully.

(3) When data cannot be read from a memory tag due to no corresponding memory tag, protection mode violation, password imcompatible, read data size error or any another reason in the step (2), the Land Mobile Station aborts processing of the corresponding memory tag, and continues processing of the next memory tag.

(4) When the number of memory tags specified in the bulk memory read request command exceeds the maximum number of tags handled simultaneously by the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command (obuDenialResponse) notifying the status 7 “Maximum available number of tags over in batch processing”.

(5) When no requested memory tag exists in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(6) When reading from every requested memory tag has failed in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 1 “Read from OBE memory failed”.

(7) It is recommended in the step (1) to acquire in advance the attributes of the memory tags (data storage memory areas) to be read using the memory resource information acquisition request command (resourceInfoRequest), etc., and then confirm that the size to be read is allowed in both the Base Station and the Land Mobile Station.

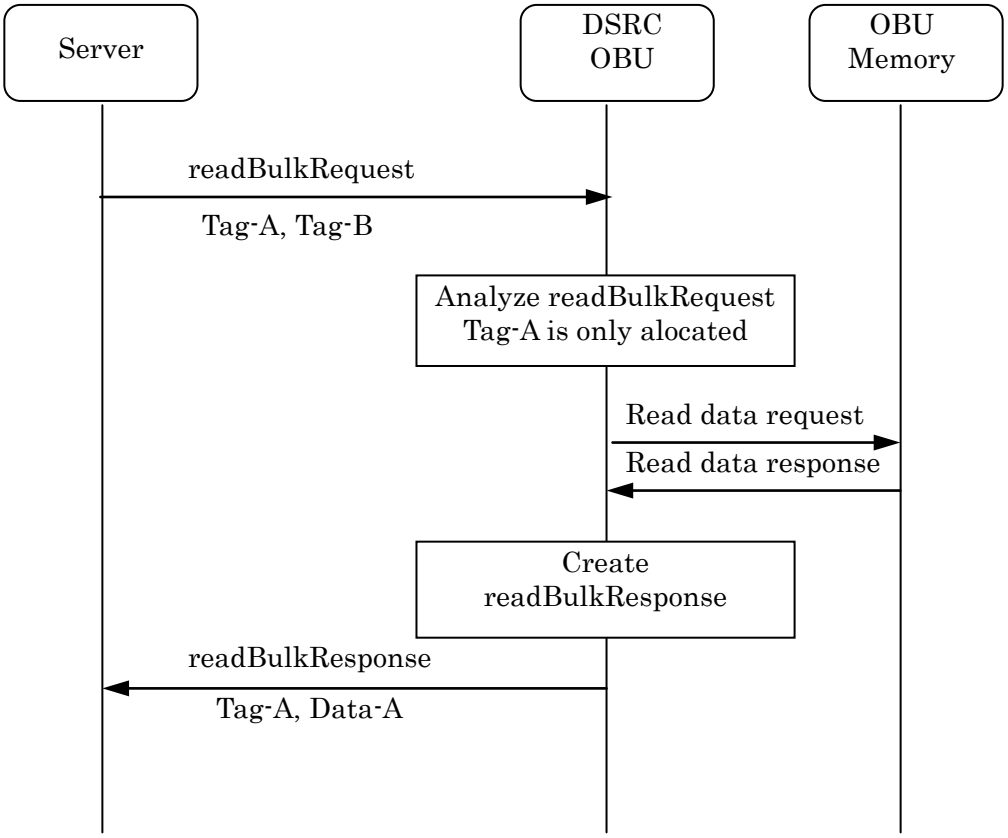


Figure 3.2-6 Example sequence of reading bulk data from the OBE memory

3.2.5.7 Writing Bulk Data to One or More Data Storage Memory

(1) The Base Station sends the bulk memory write request command (writeBulkRequest) to the Land Mobile Station.

(2) The Land Mobile Station writes data storage memory areas specified in the received bulk memory write request command, and sends the bulk memory write response command (writeBulkResponse) to the Base Station. for notifying memory tags written successfully. Existing data are overwritten with the received data.

(3) When data cannot be written to a memory area due to no corresponding memory tag, protection mode violation, password imcompatible, write data size error or any another reason in the step (2), the Land Mobile Station aborts processing of the corresponding memory tag, and continues processing of the next memory tag.

(4) When the number of memory tags specified in the bulk memory write request command exceeds the maximum number of tags handled simultaneously by the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command (obuDenialResponse) notifying the status 7 “Maximum available number of tags over in batch processing”.

(5) When no requested memory tag exists in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(6) When writing to every requested memory tag has failed in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 1 “Write to OBE memory failed”.

(7) It is recommended in the step (1) to acquire in advance the attributes of the memory tags (data storage memory areas) by using the memory resource information acquisition request command (resourceInfoRequest), and then confirm that the size to be written is allowed in both the Base Station and the Land Mobile Station.

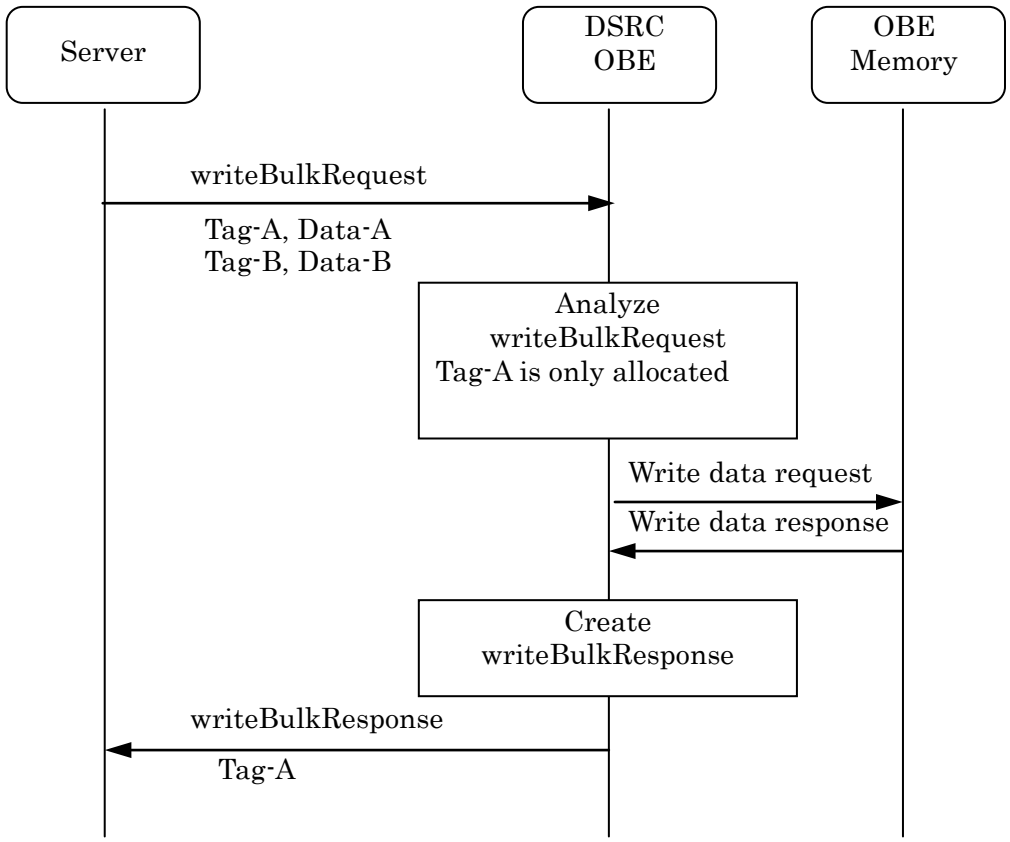


Figure 3.2-7 Example sequence of writing data simultaneously to the OBE memory

3.2.5.8 Allocating Base Station allocatable memory with password

(1) The Base Station sends to the Land Mobile Station the OBE memory allocation with password request command (memoryAllocRequestWithCredence) for allocating the Base Station allocatable memory area with password.

(2) The Land Mobile Station allocates data storage memory areas based on memory tags specified in the received memory allocation with password request command, and sets the attributes (include password). When the attributes are set normally, the Land Mobile Station sends the memory allocation with password response command (memoryAllocResponseWithCredence) to the Base Station.

(3) When the Land Mobile Station does not incorporate the memory allocation function in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command (obuDenialResponse) notifying the status 12 “Unsupported command”.

(4) When the memory tag specified in the memory allocation with password request command is an OBE controlling memory tag in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(5) When the memory tag specified in the memory allocation with password request command is already registered (that is, its data storage memory area is already allocated) in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(6) When memory allocation is disabled due to insufficient capacity of the Base Station allocatable memory in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 5 “Insufficient free space in OBE”.

(7) When the Land Mobile Station cannot handle the memory allocation size specified by the Base Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 9 “Access control violation”.

(8) When memory allocation is not executed normally in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 3 “OBE memory allocation/free failed”.

3.2.5.9 Making free Base Station allocatable memory with password

(1) The Base Station sends the memory free with password request command (memoryFreeRequestWithCredence) to the Land Mobile Station.

(2) The Land Mobile Station makes data storage memory areas free based on memory tags specified in the received memory free with password request command. When data storage memory area whose password is same to received one are made free normally, the Land Mobile Station sends the memory free with password response command (memoryFreeResponse- WithPassword) command to the Base Station.

(3) When the Land Mobile Station does not incorporate the memory free with password function in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 12 “Unsupported command”.

(4) When a memory tag whose protection mode is “SPF essential” is specified in the received memory free request command without using the SPF in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 11 “SPF violation”.

(5) When the memory tag specified in the memory free with password request command is not registered (that is, its data storage memory area is not allocated) in the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(6) When the password is not set in the memory tag specified in the memory free with password request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 10 “Password imcompatible”.

(7) When the password of the memory tag specified in the memory free with password request command is different from received one in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 10 “Password imcompatible”.

(8) When memory free is not executed normally in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 3 “OBE memory allocation/free failed”.

3.2.5.10 Reading data from the data storage memory with password

(1) The Base Station sends the memory read with password request command (readRequestWithCredence) to the Land Mobile Station.

(2) The Land Mobile Station reads the data storage memory area specified in the received request command, and when password of stored data is same to received one, the Land Mobile Station sends the memory read with password response command (readResponseWithCredence) to the Base Station.

(3) When the Land Mobile Station does not incorporate the password function in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 12 “Unsupported command”.

(4) (4) When the memory tag specified in the request command is not registered (that is, its data storage memory area is not allocated) in the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(5) When a memory tag whose protection mode is “SPF essential” is specified in the received memory read request command without using the SPF in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command (obuDenialResponse) notifying the status 11 “SPF violation”.

(6) When the password is not set in the memory tag specified in the request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 10 “Password imcompatible”.

(7) When the password in the memory tag specified in the request command is different from received one in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 10 “Password imcompatible”.

(8) When a memory tag whose protection mode is “write only” is specified in the request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 8 “Protection mode violation”.

(9) When reading from the data storage memory in the Land Mobile Station has failed in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 1 “Read from OBE memory failed”.

(10) It is recommended in the step (1) to acquire in advance the attributes of the memory tag (data storage memory area) to be read using the memory resource information acquisition request command (resourceInfoRequest), etc., and then confirm that the size to be read is allowed in both the Base Station and the Land Mobile Station.

3.2.5.11 Writing data to the data storage memory with password

(1) The Base Station sends the memory write with password request command (writeRequestWithCredence) to the Land Mobile Station.

(2) The Land Mobile Station writes data to the data storage memory specified in the received request command when the password of storage memory area is same to received one, and sends the memory write with password response command to the Base Station. Existing data is overwritten with the received data.

(3) When the Land Mobile Station does not incorporate the password function in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 12 “Unsupported command”.

(4) When the memory tag specified in the request command is not registered (that is, its data storage memory area is not allocated) in the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(5) When a memory tag whose protection mode is “SPF essential” is specified in the received request command without using the SPF in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command (obuDenialResponse) notifying the status 11 “SPF violation”.

(6) When the password is not set in the memory tag specified in the request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 10 “Password imcompatible”.

(7) When the password in the memory tag specified in the request command is different from received one in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 10 “Password imcompatible”.

(8) When a memory tag whose protection mode is “read only” is specified in the request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 8 “Protection mode violation”.

(9) When data larger than the data storage area is specified in the request command in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 9 “Access control violation”.

(10) When writing to the data storage memory in the Land Mobile Station has failed in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 2 “Write to OBE memory failed”.

(11) It is recommended in the step (1) to acquire in advance the attributes of the memory tag (data storage memory area) to be written using the memory resource information

acquisition request command (resourceInfoRequest), etc., and then confirm that the size to be written is allowed in both the Base Station and the Land Mobile Station.

3.2.5.12 Reading Bulk Data from Data Storage Memory with Password

(1) The Base Station sends the bulk memory read with password request command (readBulkRequestWithCredence) to the Land Mobile Station.

(2) The Land Mobile Station reads data storage memory areas whose password is same specified in the received bulk memory read request command, and sends the bulk memory read with password response command (readBulkResponseWithCredence) to the Base Station for notifying memory tags and stored data read successfully.

(3) When data cannot be read from a memory tag due to no corresponding memory tag, protection mode violation, password imcompatible, read data size error or any another reason in the step (2), the Land Mobile Station aborts processing of the corresponding memory tag, and continues processing of the next memory tag.

(4) When the Land Mobile Station does not incorporate the password function in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 12 “Unsupported command”.

(5) When the number of memory tags specified in the request command exceeds the maximum number of tags handled simultaneously by the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command (obuDenialResponse) notifying the status 7 “Maximum available number of tags over in batch processing”.

(6) When no requested memory tag exists in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(7) When reading from every requested memory tag has failed in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 1 “Read from OBE memory failed”.

(8) It is recommended in the step (1) to acquire in advance the attributes of the memory tags (data storage memory areas) to be read using the memory resource information acquisition request command (resourceInfoRequest), etc., and then confirm that the size to be read is allowed in both the Base Station and the Land Mobile Station.

3.2.5.13 Writing Bulk Data to the Data Storage Memory Areas with Password

(1) The Base Station sends the bulk memory write with password request command (writeBulkRequestWithCredence) to the Land Mobile Station.

(2) The Land Mobile Station writes the data to data storage memory areas specified in the received request command when the password of each storage memory area is same to received one, and sends the bulk memory write with password response command (writeBulkResponseCredence) to the Base Station for notifying memory tags written successfully. Existing data are overwritten with the received data.

(3) When data cannot be written to a memory tag due to no corresponding memory tag, protection mode violation, password imcompatible, write data size error or any another reason in the step (2), the Land Mobile Station aborts processing of the corresponding memory tag, and continues processing of the next memory tag.

(4) When the Land Mobile Station does not incorporate the password function in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 12 “Unsupported command”.

(5) When the number of memory tags specified in the request command exceeds the maximum number of tags handled simultaneously by the Land Mobile Station in the step (2), the Land Mobile Station sends to the Base Station the OBU denial response command (obuDenialResponse) notifying the status 7 “Maximum available number of tags over in batch processing”.

(6) When no requested memory tag exists in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 6 “No corresponding memory tag”.

(7) When writing to every requested memory tag has failed in the step (2), the Land Mobile Station sends to the Base Station the OBE denial response command notifying the status 1 “Write to OBE memory failed”.

(8) It is recommended in the step (1) to acquire in advance the attributes of the memory tags (data storage memory areas) by using the memory resource information acquisition request command (resourceInfoRequest), and then confirm that the size to be written is allowed in both the Base Station and the Land Mobile Station.

3.3 IC Card Access Application

3.3.1 Function Overview

The IC card access application provides functions to access the IC card using methods specified in ISO/IEC7816 in accordance with requests from the Base Station. The IC card access application handles only IC card in conformity to ISO/IEC7816.

The IC card access application concretely provides the following three functions:

(1) Application start function to perform the IC card initialization processing, etc.

The Land Mobile Station activates the IC card based on the initialization request received from the Base Station. The Land Mobile Station edits the ATR (reset response) received from the IC card into a message, and transfers it to the Base Station.

(2) IC card command send/receive function to send and receive ISO/IEC7816 commands to/from IC card.

The Land Mobile Station transfers the CommandAPDU received from the Base Station to the IC card based on the EMV level 1 specification. The Land Mobile Station edits the ResponseAPDU received from the IC card into a message, and transfers it to the Base Station.

(3) Application termination function to perform the IC card inactivation termination processing, etc.

The Land Mobile Station inactivates the IC card based on the termination request received from the Base Station.

3.3.2 Command

3.3.2.1 Command System

Commands (ICCAccessCommand) of the IC card access application consist of normal commands, OBE denial response command from the Land Mobile Station, and committed information acquisition commands. The normal commands consist of “application start request command, IC card command send command, application termination request command, application start response command, IC card response send command and application termination response command”. Committed information acquisition commands consist of the committed information acquisition request command and committed information acquisition response command. The version number is “1” for the IC card access application having the specification described in this document.

3.3.2.2 Command Format

3.3.2.2.1 Normal Command

3.3.2.2.1.1 Application Start Request Command

This command is used when the Base Station notifies the Land Mobile Station that the IC card access application processing is started. Table 3.3-1 shows the command format.

Table 3.3-1 Application Start Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type initRequest(3)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody “opCommandBody” (0)							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “initRequest(3)” to indicate the request command of application start.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

This field indicates the data length (0) of the succeeding operation command body. The unit is octet.

3.3.2.2.1.2 Application Start Response Command

This command is used when the Land Mobile Station notifies the Base Station of response to application start request and IC card initialization result. Table 3.3-2 shows the command format.

Table 3.3-2 Application Start Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type initResponse(131)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody value of ATR obtained from IC card							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “initResponse(131)” to indicate the response command of application start.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) The data length of OpCommandBody

This field indicates the data length of the succeeding operation command body. The unit is octet. In this command, this field size is extended based on ASN.1 coding rules.

b) The content of OpCommandBody

This field is set to the value of ATR (reset response) obtained from IC card.

3.3.2.2.1.3 IC Card Command Send Command

This command is used when the Base Station sends IC card data to the Land Mobile Station. Table 3.3-3 shows the command format.

Table 3.3-3 IC Card Command Send Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type iCCCommand(0)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody CommandAPDU of ISO/IEC7816-4 passed to IC card							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “iCCCommand(0)” to indicate the send command of IC card command.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) The data length of OpCommandBody

This field indicates the data length of the succeeding operation command body. The unit is octet. In this command, this field size is extended based on ASN.1 coding

rules

b) The content of OpCommandBody

This field is set to the CommandAPDU of ISO/IEC7816-4 passed to IC card.

3.3.2.2.1.4 IC Card Response Send Command

This command is used when the Land Mobile Station sends data received from the IC card to the Base Station. Table 3.3-4 shows the command format.

Table 3.3-4 IC Card Response Send Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type iCCResponse(128)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody							
:	The content of OpCommandBody ResponseAPDU of ISO/IEC7816-4 obtained from IC card							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “iCCResponse(128)” to indicate the response send command of IC card.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) The data length of OpCommandBody

This field indicates the data length of the succeeding operation command body.

The unit is octet. In this command, this size is extended based on ASN.1 coding rules.

b) The content of OpCommandBody

This field is set to the ResponseAPDU of ISO/IEC7816-4 obtained from IC card.

3.3.2.2.1.5 Application Termination Request Command

This command is used when the Base Station notifies the Land Mobile Station that the IC card access application processing is terminated. Table 3.3-5 shows the command format.

Table 3.3-5 Application Termination Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type endRequest(2)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody (0)							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “endRequest(2)” to indicate the request command of application termination.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

This field indicates the data length (0) of the succeeding operation command body. The unit is octet.

3.3.2.2.1.6 Application Termination Response Command

This command is used when the Land Mobile Station notifies the Base Station of response to application termination request. Table 3.3-6 shows the command format.

Table 3.3-6 Application Termination Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	operation Type endResponse(130)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody (0)							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “endResponse(3)” to indicate the response command of Application termination.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

This field indicates the data length (0) of the succeeding operation command body. The unit is octet.

3.3.2.2.2 OBE Denial Response Command

The OBE denial response command is used when the Land Mobile Station notifies the Base Station of its abnormal status. Table 3.3-7 shows the command format.

Table 3.3-7 OBE Denial Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type obuDenialResponse(255)							
3	Status							
4	The length of supplement information							
5 :	The contents of supplement information							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “obuDenialResponse(255)” to indicate the OBE denial response.

(3) Status

This field is set to the reason of denial response. For details, refer to Table 3.3-8.

Table 3.3-8 Status Code

Status code	Description
0-1	For future use
2	ICC insertion error (reverse side, reverse direction, etc.)
3	ICC no response (access error or retry over)
4	The version incompatible
5	ICC not inserted
6	ICC data error (wrong IC Card)
7-15	For future use
16	Illegal command
17-254	For future use
255	Other Land Mobile Station internal error

(4) Supplement Information

a) The length of supplement information

This field is set to the length of successing supplement information. The unit is octet. When there are no supplement information (this case is default case), this filed is set to value "0".

b) The contents of supplement information

This field is set to free information (the maximum length is 127 octets) as supplement information. When version number is not same, this field is set to own version ("versionIndex" parameter).

3.3.2.2.3 Committed Information Acquisition Commands

3.3.2.2.3.1 Committed Information Acquisition Request Command

The committed information acquisition request command is issued from the Base Station to the Land Mobile Station to acquire the committed information stored in the Land Mobile Station. Table 3.3-9 shows the command format.

Table 3.3-9 Committed Information Acquisition Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill			
2	Command Type accreditationInfoCommand(2)							
3	Operation Type accreditationInfoRequest(0)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody (0)							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “accreditationInfoCommand(2)” to indicate the committed information acquisition request.

(3) Operation Type

This field is set to an identifier “accreditationInforRequest(0)” to indicate the request command of committed information acquisition.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) The data length of OpCommandBody

This field indicates the data length (0) of the succeeding operation command body. The unit is octet.

3.3.2.2.3.2 Committed Information Acquisition Response Command

The committed information acquisition response command is issued from the Land Mobile Station to the Base Station as response to the committed information acquisition request command for notifying the Base Station of the committed information stored in the Land Mobile Station. Table 3.3-10 shows the command format.

Table 3.3-10 Committed Information Acquisition Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill			
2	Command Type accreditationInfoCommand(2)							
3	Operation Type accreditationInfoResponse(128)							
4	Security Profile plainText(0)							
5	The data length of OpCommandBody (1)							
6	The content of OpCommandBody OBE committed information “OBUAccreditationInfo” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “accreditationInfoCommand(2)” to indicate the committed information acquisition operation.

(3) Operation Type

This field is set to an identifier “accreditationInfoResponse(129)” to indicate the response command of the committed information acquisition.

(4) Security Profile

This field is set to “plainText(0)” as an attribute of the operation command body in this command.

(5) Operation Command Body

a) The data length of OpCommandBody

This field indicates the data length (1) of the succeeding operation command body. The unit is octet.

b) The content of OpCommandBody

This field is set to the OBE committed information (“OBUAccreditationInfo” format).

3.3.3 Definition of Data Structures

```
ICCAccessCommand::=SEQUENCE {
    versionIndex                Version,
    accessCommand               AccessCommand
}

Version::=SEQUENCE{
    version     INTEGER(0..15),         -- set up 1 initially
    fill        BIT STRING(SIZE(4))     -- value of encoding is set up 0
}

AccessCommand::=CHOICE{
    dummy                       [0]     NULL,   -- Not use
    operationCommand            [1]     OperationCommand,
    accreditationInfoCommand    [2]     AccreditationInfoCommand,
    dummy                       [3-254] NULL,   -- For future use
    obuDenialResponse           [255]   ObuDenialResponse
}

OperationCommand::=SEQUENCE{
    opCommandType               OpCommandType,
    opSecurityProfile           OpSecurityProfile,
    opCommandBody               OCTET STRING
}

OpCommandType::=ENUMERATED{
    iCCCommand                  (0),        -- IC Card Command Sent
    reservedFor future use      (1),        -- For future use
    endRequest                  (2),        -- Application End Request
    initRequest                 (3),        -- Application Start Request
    reservedFor future use      (4-127),    -- For future use
    iCCResponse                 (128),      -- IC Card Response Send
    reservedFor future use      (129),      -- For future use
    endResponse                 (130),      -- Application End Response
```

```
        initResponse                (131),          -- Application Start Response
        reservedFor future use      (132-255)       -- For future use
    }

    ObuDenialResponse::=SEQUENCE{
        status              INTEGER(0...255),       -- Status Code
        supplementInfo      OCTET STRING(SIZE(0...255))  -- supplement information
    }

    AccreditationInfoCommand::=SEQUENCE{
        acCommandType               AcCommandType,
        acSecurityProfile           OpSecurityProfile,
        acCommandBody               OCTET STRING
    }

    AcCommandType::=ENUMERATED{
        accreditationInfoRequest    (0),
                    -- Accreditation Information Acquisition Request
        reservedFor future use      (1-127),        -- For future use
        accreditationInfoResponse   (128),
                    -- Accreditation Information Acquisition Response
        reservedFor future use      (129 -255)      -- For future use
    }

    OBUAccreditationInfo::=SEQUENCE{
        emvIcc      BOOLEAN,
                    -- presence or absence of accreditation information of EMV
        fill        BIT STRING(SIZE(7))             -- For future use
    }
```

3.3.4 Relationship with Other Standard

The relationships with other DSRC related standards used this application are shown below.

Table 3.3-11 Relationship with other DSRC related standards

	DSRC related standard	Content using in this application
1	DSRC Standard	AID=18 (DSRC Application Sub Layer)
2	NCP of ASL	LPCP (Local Port Control Protocol)
3	Port number of LPCP	Contact IC; 0x0C10 Contactless IC; 0x0C11
4	Transaction Service	Use Unidirectional data transmit transaction service in two transaction service provided by LPCP

3.3.5 Communication Procedures

This subsection describes the communication procedures of the IC card access application.

Note: Annex 3-5 shows an example of settlement processing combining the basic sequences (1) to (3).

(1) IC card initialization processing

a) The Base Station sends the application start request command to the Land Mobile Station.

b) When receiving the application start request command, the Land Mobile Station executes the IC card activation processing, and notifies the Base Station using the application start response command of the ATR value acquired from the IC card.

c) When IC card activation has failed (because the IC card is not inserted, the IC card is inserted in the reverse direction, etc.) in the step b), the Land Mobile Station sends the OBE denial response command instead of the application start response command to the Base Station.

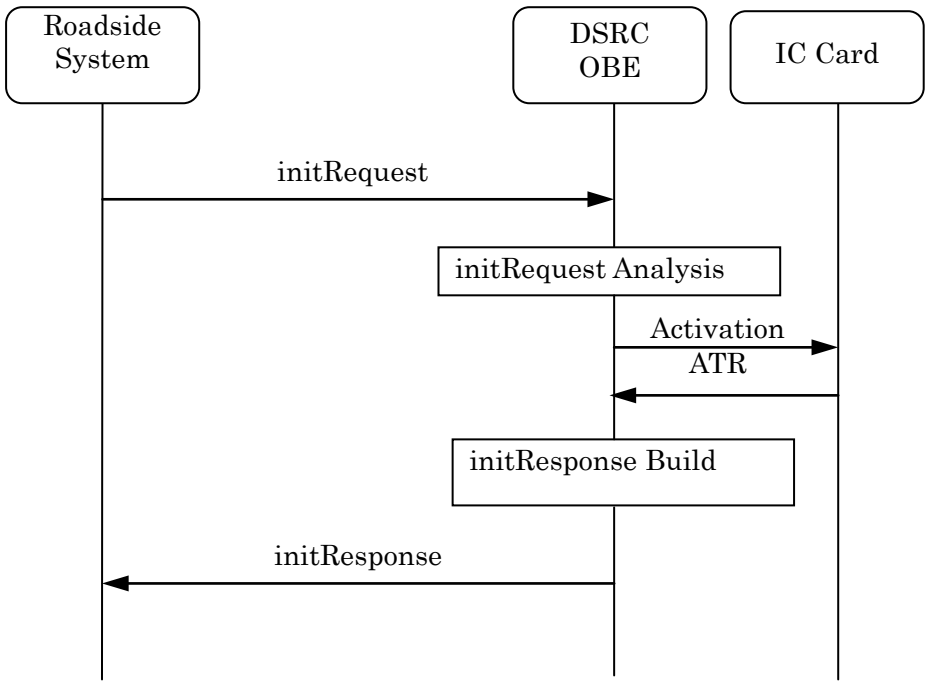


Figure 3.3-2 Sequence example of initiation process of IC Card

(2) IC card data processing (APDU command processing)

a) The Base Station notifies the Land Mobile Station of "CommandAPDU" using the IC card command send command.

b) When receiving the IC card command send command, the Land Mobile Station acquires "CommandAPDU", transfers it to the IC card based on the EMV specification, and waits for response from the IC card.

c) When receiving "ResponseAPDU" from the IC card, the Land Mobile Station stores it in the IC card response send command, and notifies the Base Station of "ResponseAPDU".

d) When command transfer with the IC card is not executed normally in the step b) or c), the Land Mobile Station notifies the OBE denial response command instead of the IC card response send command to the Base Station. After that, the Land Mobile Station inactivates the IC card, and waits for an application start request from the Base Station.

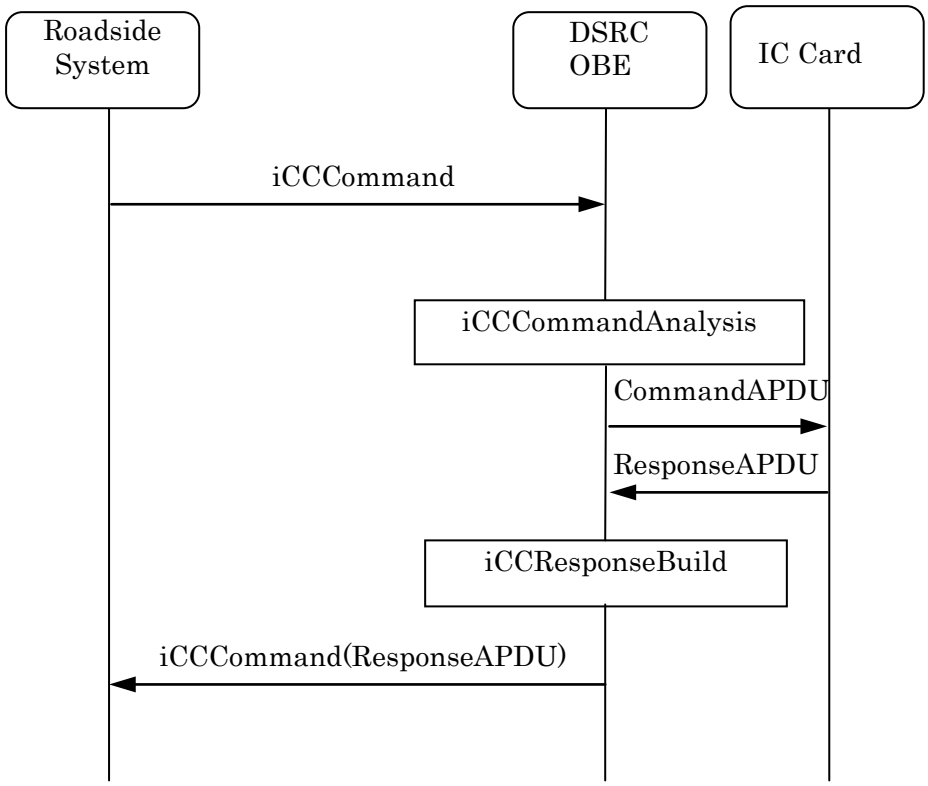


Figure 3.3-3 Sequence example of IC card data process

(3) IC card termination processing

a) The Base Station sends the application termination request command to the Land Mobile Station.

b) When receiving the application termination request command, the Land Mobile Station executes the IC card inactivation processing. When the inactivation processing is finished, the Land Mobile Station notifies the Base Station of IC card inactivation using the application termination response command.

c) When IC card inactivation has failed in the step b), the Land Mobile Station sends the OBE denial response command instead of the application termination response command to the Base Station.

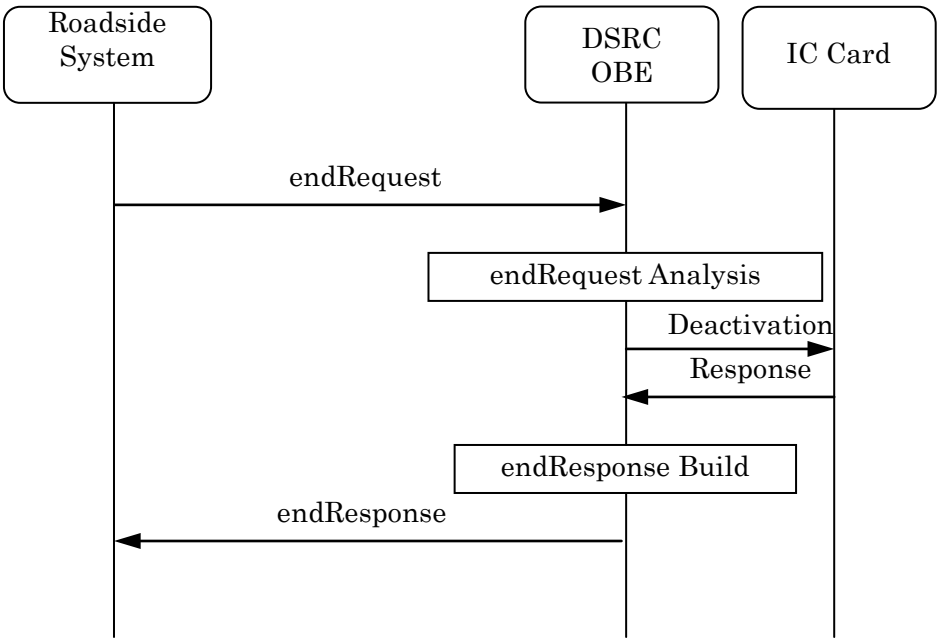


Figure 3.3-4 Sequence example of End process of IC card

(4) OBE committed information acquisition processing

a) For acquiring the committed information, the Base Station sends the committed information acquisition request command to the Land Mobile Station before the IC card initialization processing is started.

b) When receiving the committed information acquisition request command, the Land Mobile Station checks the stored committed information, and notifies the Base Station of the committed information using the committed information acquisition response command.

c) When receiving the committed information acquisition response command, the Base Station checks the stored committed information, and executes the IC card initialization processing if the Land Mobile Station holds required committed information.

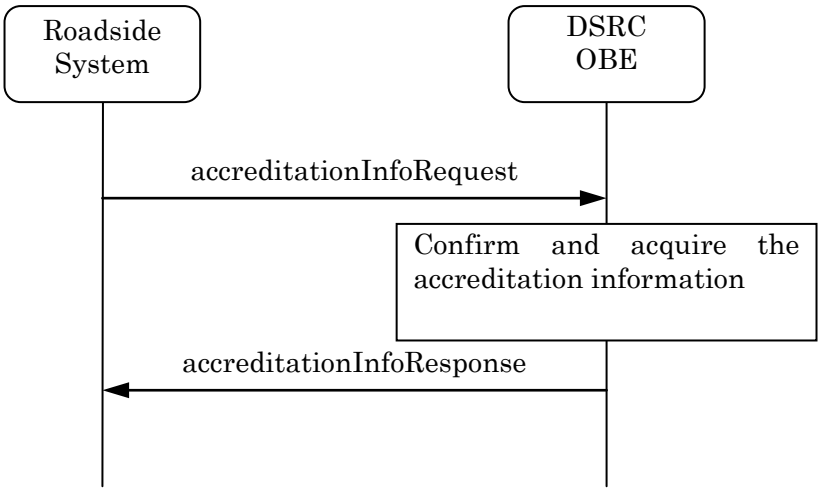


Figure 3.3-5 Sequence example of Acquisition process of accreditation information

3.4 Push-type Information Delivery Application

3.4.1 Outline of functions

The push-type information delivery application sends a content or content position from the server in the Base Station to the client in the Land Mobile Station, and automatically executes processing in accordance with the received content type in the client.

The method to distribute a content itself is called “content push”, and the method to distribute a content position (such as URL) and acquire a content separately using the HTTP, etc. is called “pseudo push”.

This subsection describes the content push and pseudo push procedures.

(1) Realization example of the content push

A realization example of the content push is as follows

a) After the DSRC (dedicated short range communication) route is established,

b) the push server transmits a content, and

c) the push client analyzes the content type and starts up the corresponding application.

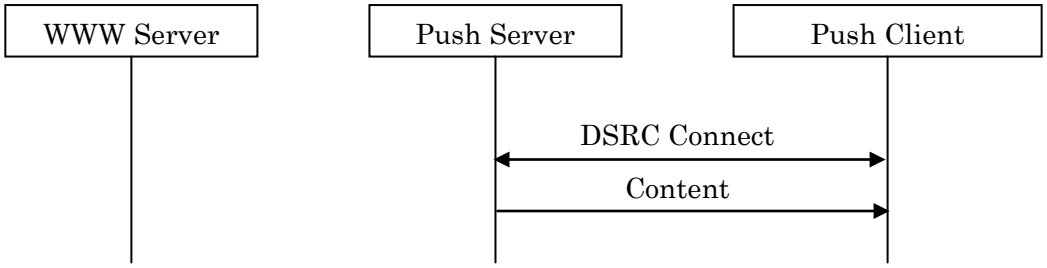


Figure 3.4-1 Example sequence of “content push”

(2) Realization example of the pseudo push

A realization example of the pseudo push is as follows:

a) After the DSRC route is established,

b) the push server transmits the URL, and

c) the push client acquires the content using the HTTP.

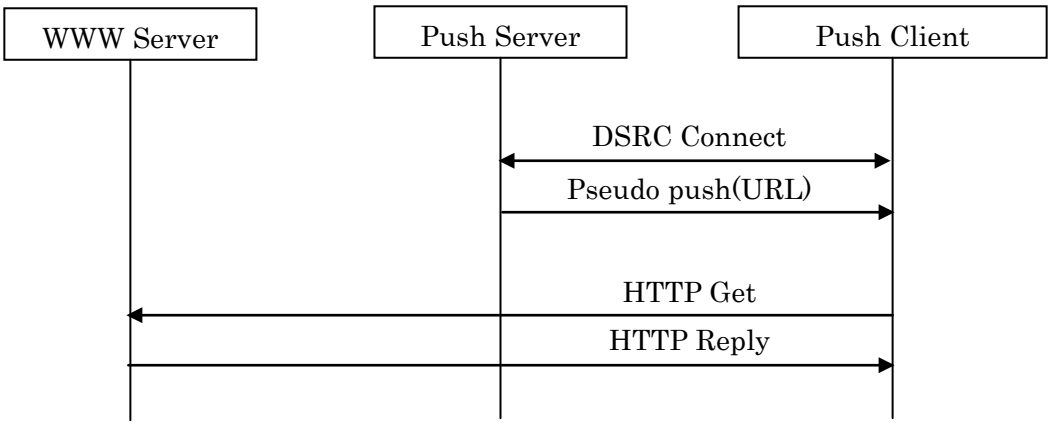


Figure 3.4-2 Example of sequence of "pseudo push"

The push-type information delivery application defined in this document has the following functions.

The content push and pseudo push are realized by these functions.

The content push uses the functions (1), (2), (3) and (4), and the pseudo push uses the functions (1), (2) and (5).

(1) DSRC client resource acquisition function (Point-to-point communication)
(2) Push-type information delivery function
    a) Push-type information delivery without confirmation response (Point-to-point communication/broadcast communication)
    b) Push-type information delivery with confirmation response (Point-to-point communication)
    c) Abort of push-type information delivery with confirmation response (Point-to-point communication)
(3) Divide and send function in accordance with the DSRC client resource (Point-to-point communication)
(4) Pushed content replay request function (Point-to-point communication)
(5) Pseudo push function (Point-to-point communication)

In this document, the push server and push client indicates the push-type information delivery application mounted in the Base Station and Land Mobile Station respectively, and the DSRC client indicates the push client, application which executes contents, and system equipped with such push client and application.

3.4.1.1 DSRC client resource acquisition function

In the push-type information delivery application interface, the push server acquires the following information as DSRC client resource information at initial connection:

(1) Maximum content size which can be received at a time by the push client (MaxPushBodySize)
(2) Maximum content size which can be handled by the DSRC client (MaxContentsSize)
(3) Content types which can be handled by the DSRC client
(4) Application types held by the DSRC client

The initial connection operation does not exist in broadcast communication. For executing services using broadcast communication, it is necessary to define in advance the minimum DSRC client resource in accordance with each content type. The minimum DSRC client resource in broadcast communication is outside the range of this document, and is not defined here.Refer to Subsection 3.4.6 for the application type and content type.

Reference: When the LPP is used, “MaxPushBodySize” is the maximum size of the LPP-SDU subtracted by the header size of the push-type information delivery application interface.

Reference: When the LPP is used, the division/assembly function of the LPP is used if the message size exceeds the MTU size in the LPCP in a service using broadcast communication.

3.4.1.2 Push-type information delivery function

In the push-type information delivery application, the push server specifies the content type and application type to be executed, and sends a content to the push client.

This protocol specifies the following two types of push operations:

(1) Push-type information delivery without confirmation response

The push server transmits a content to the push client. The push client does not return confirmation response to the push server. This operation is used in both point-to-point communication and broadcast communication.

(2) Push-type information delivery with confirmation response

The push server transmits content to the push client. When the push client receives the pushed content, the push client returns confirmation response to the push server.

The response sending timing can be selected among the following three types by the push server:

(1) When receiving of content is completed in the push client

(2) When transfer of the content to the application which will execute the content from the push client is completed

(3) When execution of the content is completed

This operation is available only in point-to-point communication because confirmation response to the push server is required.

In push-type information delivery with confirmation response, it is possible to abort the push operation from either the push client or the push server during the period from sending of the content to receiving of the response.

When the push server continuously sends contents, the receiving buffer may become insufficient in the push client, and contents may be overwritten or aborted. In such a case, the push client can notify the push server using the confirmation response at completion of transfer that it can receive the next content.

In the same push server, the 1-byte PushID is used to discriminate each push operation.

3.4.1.3 Divide and send function in accordance with DSRC client resource (OPTIONAL)

In the push-type information delivery application, the push server specifies the function to divide a send content into several segments and send segments. This function is provided to distribute content data larger than the receiving buffer size of the DSRC Land Mobile Station.

In this function, the push server compares the content size (MaxPushBodySize) which can be received at a time by the push client on the client side acquired by the client resource acquisition function with the send content size (ContentSize).

If the comparison result is “MaxPushBodySize < ContentSize”, the push server divides the send content into several segments so that the send data size does not exceed “MaxPushBodySize”, and then sends segments.

The DSRC client not supporting this function should notify “MaxPushBodySize” and “MaxContentsSize” of a same size as the DSRC client resource information at initial connection.

A procedure example in the divide and send function is as follows:

(1) When the send content size is larger than “MaxPushBodySize" of the push client, the push server divides the send content into several segments so that the send data size does not exceed “MaxPushBodySize", sends the first segment, and then waits for receiving the next segment data send request from the push client. At this time, the push server makes valid

the parameter value (isSegment) indicating that send data is a segment data. After that, the push server repeatedly sends 1-segment data every time the push client gives the next segment data send request, and waits for the next request. When the send data is the final segment, the push server makes valid the parameter (isLast) indicating the end of division and transfer, and finishes the send processing.

(2) When received data is a segment data, the push client executes the processing (such as transfer to the external equipment) in accordance with the received data, and then gives the next segment data request to the push server at the timing at which the push client becomes ready for receiving the next segment data.The processing executed by the DSRC client during the period from receiving 1-segment data to giving next segment data send request is implementation-dependent. When received data is the final segment, the push client does not give the next segment data send request, but finishes the receiving processing.

In division and transfer, it is possible to abort the push operation from either the push client or the push server during the period from start of content sending to completion of content sending.

3.4.1.4 Pushed content replay request function

In the push-type information delivery application, the pushed content replay request function is specified.

A procedure example to realize the replay request function is as follows:

(1) The push server makes valid the parameter (requireCache) indicating holding of content data in the push client, and sends content data.When the push client receives this message, the client holds received content. At this time, the push client links received content data with the PushID.

(2) The push server notifies the push client of the PushID of the content data sent in the step (1). The push client replays the content data corresponding to the notified PushID.

If the PushID overlaps between the received push operation and the cached content, the cached content is overwritten with the received content. The cached content data remains valid until it is overwritten with a received message having the same PushID or until it is aborted inside the DSRC client. The abort timing is implementation-dependent.

When same content is executed several times by the DSRC client using this function, the overall communication quantity can be reduced. Different applications can be specified in this

function under consideration of the necessity to execute same content in different applications.

This function has two types, “without confirmation response” and “with confirmation response” in the same way as the normal push-type information delivery function. This function is applicable only to point-to-point communication.

3.4.1.5 Pseudo push function

The pseudo push (smart pull) function is realized when the push server distributes the “SmartPull (SP)” type content.

As an example of the pseudo push function using the SP, the URL automatic distribution procedure at entrance into the communication area is offered as follows:

(1) After the DSRC client enters the communication area, the push server creates a command whose content type is “dsrc-smart-pull(129) and push body is SP defined separately, and transmits it to the push client with push-type information delivery without confirmation response or push-type information delivery with confirmation response.

(2) The DSRC client establishes IP communication.

(3) The push server acquires specified content using a protocol (such as HTTP) specified by the SP, and then displays it.

Reference: When DSRC-ASL/PPPCP is used for IP communication, the pseudo push distribution timing should interlock with a connection event of the PPPCP (“communication connection event” for the PPP line). The concrete realization method is implementation-dependent.

3.4.2 Definition of commands

3.4.2.1 Command system

Commands of the push-type information delivery application consist of the push operation command, confirmed push operation command, confirmed push response command, re-push operation command, re-confirmed push operation command, re-confirmed push response command, push abort operation command, next segment request command, next segment data distribution command and client information notice command.

Pseudo push services use pseudo push contents.

3.4.2.2 Command format

3.4.2.2.1 Push Operation Command

The push operation command "PushOperation" is used in push-type information delivery without confirmation response from the push server to the push client.

Table 3.4-1 shows the "PushOperation" format.

Table 3.4-1 The "PushOperation" command format.

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type push(0)				res	DC	RC	IS
2	pushID							
3	applicationType							
4	contentType							
5	contentsSize							
6								
7								
8								
9	Length of "pushBody"							
:	Contents of "pushBody"							

(1) Command Type

This field is set to an identifier "push(0)" to indicate the push operation command.

(2) res

This field indicates the reservation area.

(3) DC

DC stands for “Duplicate Check”, and gives instruction to the push client to (or not to) execute the duplicate check. This field is set to “true (1)” for requesting the duplicate check, and is set to “false (0)” for not requesting the duplicate check.

This flag is valid only in broadcast communication, and is set to “0” in point-to-point communication.

(4) RC

RC stands for “RequireCache”, and gives instruction to the push client to (or not to) hold content data. This field is set to “true (1)” for requesting holding, and is set to “false (0)” for not requesting holding. This flag is valid only in point-to-point communication, and is set to “0” in broadcast communication.

(5) IS

IS stands for “IsSegment”, and indicates that content data is divided by the push divide and send function. This field is set to “true (1)” when content data is divided, and “false (0)” when content data is not divided.

(6) pushID

This field indicates the ID to identify the push operation.

(7) ApplicationType

This field indicates the application type which executes push content. Refer to Table 3.4-14 for details.

(8) contentType

This field indicates the content type of push content. Refer to Table 3.4-15 for details.

(9) contentsSize

This field indicates the push content data size in fixed 4-byte length in units of octet. The size of entire content before division should be set to when the divide and send function is used.

(10) Length of “pushBody”

This field indicates the length of subsequent content data in units of octet. This field is set to “0” when there is no subsequent content data. This field size is extended based on ASN.1 conding rules.

(11) Contents of “pushBody”

This field indicates content data of undefined length to be sent.

3.4.2.2.2 Confirmed Push Operation Command

The confirmed push operation command “ConfirmedPushOperation” is used in push-type information delivery with confirmation response from the push server to the push client.

Table 3.4-2 shows the “ConfirmedPushOperation” format.

Table 3.4-2 “ConfirmedPushOperation” command format.

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type confirmed-push(1)				responseTiming		RC	IS
2	pushID							
3	applicationType							
4	contentType							
5	contentsSize							
6								
7								
8								
9	Length of “pushBody”							
:	Contents of “pushBody”							

(1) Command Type

This field is set to an identifier “confirmed-push(1)” to indicatre the confirmed push operation command.

(2) responseTiming

This field indicates the confirmation response return timing. Refer to Table 3.4-3 for details.

Table 3.4-3 Contents of “responseTiming”

Value	Identifier	Meaning
0	received	When receiving is completed in the Land Mobile Station
1	transfered	When transfer to the outside is completed
2	executed	When execution of content is completed

(3) RC

RC stands for “RequireCache”, and gives instruction to the push client to (or not to) hold content data. This field is set to “true (1)” for requesting holding, and is set to “false (0)” for not requesting holding.

(4) IS

IS stands for “IsSegment”, and indicates that content data is divided by the push divide and send function. This field stores “true (1)” when content data is divided, and “false (0)” when content data is not divided.

(5) pushID

This field indicates the ID to identify the push operation.

(6) applicationType

This field indicates the application type which executes push content. Refer to Table 3.4-14 for details.

(7) contentType

This field indicates the content type of push content. Refer to Table 3.4-15 for details.

(8) contentsSize

This field indicates the push content data size in fixed 4-byte length in units of octet. The size of entire content before division should be set to when the divide and send function is used.

(9) Length of “pushBody”

This field indicates the length of subsequent content data in units of octet. This field is set to “0” when there is no subsequent content data. This field size is extended based on ASN.1 conding rules.

(10) Contents of “pushBody”

This field indicates content data of undefined length to be sent.

3.4.2.2.3 Confirmed Push Response Command

The confirmed push response command “ConfirmedPushResponse” is used to return response from the push client which received the confirmed push operation command to the push server.

Table 3.4-4 shows the “ConfirmedPushResponse” format.

Table 3.4-4 “ConfirmedPushResponse” command format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type confirmed-push-res(2)				res			
2	pushID							
3	Length of “acknowledgement”							
:	Content of “acknowledgement”							

(1) Command Type

This field is set to an identifier “confirmed-push-res(2)” to indicate the confirmed push response command.

(2) res

This field indicates the reservation area.

(3) pushID

This field indicates the ID of confirmed push operation command to identify the push operation.

(4) Length of “acknowledgement”

This field indicates the length of subsequent response data in units of octet. This field is set to “0” when there is no subsequent response data (default). This field size is extended based on ASN.1 coding rules.

(5) Content of “acknowledgement”

This field indicates the contents of response data of undefined length from the application which executes content. This field is used for individual service or future expansion, and its details are outside the range of specification described in this document. Additional information is not given when there is no specification (default value).

3.4.2.2.4 Re-push Operation Command

The re-push operation command “Re-PushOperation” is used in replay without confirmation response of content data distributed by the push operation command or confirmed push operation command executed before from the push server to the push client.

Table 3.4-5 shows the “Re-PushOperation” format.

Table 3.4-5 “Re-PushOperation” command format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type re-push(3)				res			
2	pushID							
3	applicationType							

(1) Command Type

This field is set to an identifier “re-push(3)” to indicate the re-push operation command.

(2) res

This field indicates the reservation area.

(3) pushID

This field is set to ID of the push operation to replay. This ID is set to the value that can identify push operation in the push server and the push client.

(4) applicationType

This field indicates the application type which executes push content. A value may be specified that is different from the applicationType specified by earlier push distribution command or the confirmed response push distribution command. Refer to Table 3.4-14 for details.

3.4.2.2.5 Re-Confirmed Push Operation Command

The re-confirmed push operation command “Re-ConfirmedPushOperation” is used in replay with confirmation response of content data distributed by the push operation command or confirmed push operation command executed before from the push server to the push client.

Table 3.4-6 shows the “Re-ConfirmedPushOperation” format.

Table 3.4-6 “Re-ConfirmedPushOperation” command format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type re-confirmed-push(4)				responseTiming		res	
2	pushID							
3	applicationType							

(1) Command Type

This field is set to an identifier “re-confirmed-push(4)” to indicate the re-confirmed push operation command.

(2) responseTiming

This field indicates the confirmation response return timing. Refer to Table 3.4-3 for details.

(3) res

This field indicates the reservation area.

(4) pushID

This field is set to ID of the push operation to replay. This ID is set to the value that can identify push operation in the push server and the push client.

(5) applicationType

This field indicates the application type which executes push content. Refer to Table 3.4-14 for details.

3.4.2.2.6 Re-Confirmed Push Response Command

The re-confirmred push response command “Re-ConfirmedPush Response” is used when the push client which received the re-confirmed push operation command gives response to the push server.

Table 3.4-7 shows the “Re-ConfirmedPushResponse” format.

Table 3.4-7 “Re-ConfirmedPushResponse” command format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type re-confirmed-push-res(5)				res			
2	pushID							
3	Length of “acknowledgement”							
:	Contents of “acknowledgement”							

(1) Command Type

This field is set to an identifier “re-confirmed-push-res(5)” to indicate the re-confirmed push response command.

(2) res

This field indicates the reservation area.

(3) pushID

This field indicates the ID of “Re-ConfirmedPushOperation” to identify the push operation.

(4) Length of “acknowledgement”

This field indicates the length of subsequent response data in units of octet. Stores “0” when there is no subsequent response data (default). This field size is extended based on ASN.1 coding rules.

(5) Content of “acknowledgement”

This field indicates the contents of response data of undefined length from the application which executes content. This field is used for individual service or future expansion, and its details are outside the range of specification described in this document. Additional information is not given when there is no specification (default value).

3.4.2.2.7 Push Abort Operation Command

The push abort operation command “PushAbortOperation” is used to abort push delivery with confirmation response, re-push with confirmation response or push operation using the divide and send function, and used also to notify the push server of an error occurred in the push client which is executing push delivery with confirmation response, re-push with confirmation response or push operation using the divide and send function.

Table 3.4-8 shows the “PushAbortOperation” format.

Note: When aborting a push operation adopting a request/response type transaction of the LPP using the push abort operation command, issue the “Abort.req” primitive of the LPP and abort the transaction of the LPP at the same time.

Table 3.4-8 “PushAbortOperation” command format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type push-abort(6)				res			
2	pushID							
3	status							
4	Length of “supplementInfo”							
:	Contents of “supplementInfo”							

(1) Command Type

This field is set to an identifier “push-abort(6)” to indicate the push abort operation command.

(2) res

This field indicates the reservation area.

(3) pushID

This field indicates the ID to identify the push operation.

(4) Status identifier “status”

This field indicates the reason why the push operation is aborted. Refer to Table 3.4-9 for details.

(5) Length of “supplementInfo”

This field indicates the data length of subsequent additional information in units of octet. This field is set to “0” when there is no subsequent response data. This field size is extended based on ASN.1 coding rules.

(6) Contents of “supplementInfo”

This field indicates data of undefined length up to 127 octets as the contents of additional information. Refer to Table 3.4-9 for details.

Table 3.4-9 Contents of status identifier "status"

Value	meanings	contents of supplementInfo
0	Prohibited from use	Nothing
1	PDU error (PDU structure error)	Nothing
2	PDU error (Undefined PDU)	Nothing
3	Push operation abort request*	Specified by the application which executes the content
4	Specified application type not executed	Nothing
5	Specified content type not processed	Nothing
6	Content improper*	Nothing
7	Content size error (Received size incompatible)	Nothing
8	Content size error (Maximum content size over)	Nothing
9	No content to be redistributed	Nothing
10	Divide and send error (Segment number sequence error)	Nothing
11	Divide and send error (Divide and send not supported)	Nothing
12-254	For future use	
255	Other error codes	Nothing

Note: Used in the push operation abort request from the application which executes the content.

3.4.2.2.8 Next Segment Request Command

The next segment request command “NextSegmentRequest” is used when the push client notifies the push server that it is ready for receiving the next segment data after it received a segment data in delivery using the divide and send function.

Table 3.4-10 shows the “NextSegmentRequest” format.

Table 3.4-10 “NextSegmentRequest” command format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type next-seg-request(7)				res			
2	pushID							

(1) Command Type

This field is set to an identifier “next-seg-request (7)” to indicate the next segment request command.

(2) res

This field indicates the reservation area

(3) pushID

This field indicates the ID to identify the push operation.

3.4.2.2.9 Next Segment Data Delivery Command

The next segment data delivery command “NextSegment” is used when the push server distributes the next segment data to the push client in delivery using the divide and send function.

Table 3.4-11 shows the “NextSegment” format.

Table 3.4-11 “NextSegment” format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type nextSegment(8)				res			isLast
2	pushID							
3	segmentNo							
4								
5	Length of “segmentBody”							
:	Contents of “segmentBody”							

(1) Command Type

This field is set to an identifier “nextSegment (8)” to indicate the next segment data delivery command.

(2) res

This field indicates the reservation area

(3) isLast

This field indicates whether it is the final segment or not. This field is set to “true (1)” when “NextSegment” distributes the final segment. This field is set to “false (0)” for any other segment.

(4) pushID

This field indicates the ID to identify the push operation.

(5) segmentNo

This field indicates the segment sequence number. The sequence number is incremented in turn from “2.”

(6) Length of “segmentBody”

This field indicates the length of subsequent segment data in units of octet. This field size is extended based on ASN.1 coding rules.

(7) Contents of “segmentBody”

This field indicates the contents of segment data of undefined length.

3.4.2.2.10 Client Information Notice Command

The client information notice command “ClientInformation” is used when the push client notifies the push server of the functions held by the DSRC client at initial connection.

Table 3.4.12 shows the “ClientInformation” format.

Table 3.4-12 “ClientInformation” format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type clientInformation(15)				version			
2 :	applicationTypeList (Stores the list of application types. Refer to Table 3.4-14 for details.)							
:	contentTypeList (Stores the list of content types. Refer to Table 3.4-15 for details.)							
: : : :	maxPushBodySize							
: : : :	maxContentsSize							
: :	Length of “supplementInfo” Contents of “supplementInfo”							

(1) Command Type

This field is set to an identifier “clientInformation (15)” to indicate the client information notice command.

(2) version

This field indicates the application version of the push client. The current version is “0x01.”

(3) applicationTypeList

This field indicates the list of application types supported by the DSRC client.

(4) contentTypeList

This field indicates the list of content types supported by the DSRC client.

(5) maxPushBodySize

This field indicates the maximum content size that can be received at a time by the push client, in other words, the maximum size of the “pushBody” area of “PushOperation” and “ConfirmedPushOperation,” in units of octet. The area size of this identifier is fixed to 4 bytes.

(6) maxContentsSize

This field indicates the maximum content size that can be handled by the DSRC client in units of octet. The area size of this identifier is fixed to 4 bytes.

(7) Length of supplementInfo

This field indicates the data length of subsequent additional information in units of octet. This field is set to “0” when there is no subsequent additional information (default). This field size is extended based on ASN.1 coding rules.

(8) Contents of supplementInfo

This field indicates the client information other than (1) to (7) above of undefined length up to 127 octets as the contents of additional information. This area is used for individual service or future expansion, and its details are outside the range of specification described in this document. Additional information is not given when there is no specification (default value).

3.4.2.2.11 Pseudo push content

Pseudo push content is used to notify the content position (such as URL). This content is set to in "pushBody" of "PushOperation" or "ConfirmedPushOperation," and distributed from the push server to the push client.

Table 3.4-13 shows the pseudo push content format.

Table 3.4-13 Pseudo push content format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Length of "href"							
2	Contents of "href"							
:	:							
	Length of "parameter"							
	Contents of "parameter"							
	:							

(1) Length of "href"

This field indicates the data length of the information specifying the subsequent content position (URI) in units of octet. This field size is extended based on ASN.1 conding rules.

(2) Contents of "href"

This field indicates the contents of information (URI) of undefined length specifying the content position.

(3) Length of "parameter"

This field indicates the data length of subsequent parameter in units of octet. This field is set to "0" when there is no parameter. This field size is extended based on ASN.1 coding rules.

(4) Contents of "parameter"

This field indicates the contents of parameter of undefined length transferred to the URI indicated by "href."

3.4.3 The Definition of Data Structures

```
PushOperationCommand ::= CHOICE {
    push                    [0]     PushOperation,
    confirmed-push          [1]     ConfirmedPushOperation,
    confirmed-push-res      [2]     ConfirmedPushResponse,
    re-push                 [3]     Re-PushOperation,
    re-confirmed-push       [4]     Re-ConfirmedPushOperation,
    re-confirmed-push-res   [5]     Re-ConfirmedPushResponse,
    push-abort              [6]     PushAbortOperation,
    next-seg-request        [7]     NextSegRequest,
    nextSegment             [8]     NextSegment,
    dummy                   [9-14]  NULL,
    clientInformation       [15]    ClientInformation
}

PushOperation ::= SEQUENCE {
    res                 BIT STRING(SIZE(1)),    -- For future use
    duplicateCheck      BOOLEAN,
    requireCache        BOOLEAN,
        -- TRUE(1) in specifying the content retention for the retry operation request
    isSegment           BOOLEAN,        -- TRUE(1) in segmentation transmission
    pushID              INTEGER(0..255),
    applicationType     ApplicationType,
    contentType         ContentType,
    contentSize         INTEGER(0..4294967295),
    pushBody            OCTET STRING -- content data body for transmission
}

ApplicationType ::= CHOICE {
    default             [0]     NULL,
    browser             [1]     NULL,
    mailer              [2]     NULL,
    sound-player        [3]     NULL,
    video-player        [4]     NULL,
```

tts	[5]	NULL,
mobile-device-browser	[6]	NULL,
store	[7]	NULL,
vics	[8]	NULL,
text-display	[9]	NULL,
safety	[10]	NULL,
image-display	[11]	NULL,
payment	[12]	NULL,
automated-drive	[13]	NULL,
dynamic-map	[14]	NULL,
multignss-payment	[15]	NULL,
qzs	[16]	NULL,
other	[17..254]	NULL,
private	[255]	OCTET STRING

}

ContentType ::= CHOICE{

everyType	[0]	OCTET STRING,
text	[1]	OCTET STRING,
text-plain	[2]	NULL,
text-enrich	[3]	NULL,
text-html	[4]	NULL,
text-xml	[5]	NULL,
text-x-hdml	[6]	NULL,
text-x-html	[7]	NULL,
text-tts	[8]	NULL,
otherTextType	[9-15]	NULL,
image	[16]	OCTET STRING,
image-jpeg	[17]	NULL,
image-gif	[18]	NULL,
image-bmp	[19]	NULL,
image-tiff	[20]	NULL,
image-png	[21]	NULL,
otherImageType	[22-31]	NULL,
audio	[32]	OCTET STRING,

audio-wav	[33]	NULL,
audio-mp3	[34]	NULL,
audio-wma	[35]	NULL,
audio-aiff	[36]	NULL,
audio-midi	[37]	NULL,
audio-adpcm	[38]	NULL,
audio-celp	[39]	NULL,
otherAudioType	[40-46]	NULL,
audio-encoded-voice-type1	[47]	NULL,
video	[48]	OCTET STRING,
video-mpeg	[49]	NULL,
video-real	[50]	NULL,
video-qt	[51]	NULL,
video-wmv	[52]	NULL,
reservedForFutureVideoType	[53-63]	NULL,
message	[64]	OCTET STRING,
otherMessageType	[65-79]	NULL,
application	[80]	OCTET STRING,
application-java-vm	[81]	NULL,
application-postscript	[82]	NULL,
othereAppType	[83-95]	NULL,
multipart	[96]	OCTET STRING,
otherMultiPartType	[97-127]	NULL,
dsrc	[128]	OCTET STRING,
dsrc-smart-pull	[129]	NULL,
dsrc-vics	[130]	NULL,
dsrc-mime	[131]	NULL,
dsrc-safety	[132]	NULL,
dsrc-multipart	[133]	NULL,
dsrc-privateSpot_text_plain	[134]	NULL,
dsrc-privateSpot_image_jpeg	[135]	NULL,
dsrc-privateSpot_image_gif	[136]	NULL,
dsrc-privateSpot_image_bmp	[137]	NULL,
dsrc-privateSpot_image_tiff	[138]	NULL,
dsrc-privateSpot_image_png	[139]	NULL,

```
        dsrc-automatedDrive         [140]       NULL,
        dsrc-dynamicMap             [141]       NULL,
        dsrc-multignssPayment       [142]       NULL,
        dsrc-qzs                    [143]       NULL,
        otherType                   [144..239]  NULL,
        private                     [240-255]   NULL
}

ConfirmedPushOperation ::= SEQUENCE {
        responseTiming      ResponseTiming,
                                    -- specify the response timing of confirmation
        requireCache        BOOLEAN,
                                    -- TRUE(1) in requesting the data retention
        isSegment           BOOLEAN,
                                    -- TRUE(1) in segmentation transmission
        pushID              INTEGER(0..255),
        applicationType     ApplicationType,
        contentType         ContentType,
        contentSize         INTEGER(0.. 4294967295),
        pushBody            OCTET STRING
}

ResponseTiming ::= INTEGER{
        received    (0),        -- on completion of Land Mobile Station reception
        transfered  (1),        -- on completion of transfer for external
        executed    (2)         -- on completion of execute a content
}(0..3)

ConfirmedPushResponse ::= SEQUENCE {
        res                 BIT STRING(4),      -- for future use
        pushID              INTEGER(0..255),    -- corresponding PushID
        acknowledgement     OCTET STRING
}

Re-PushOperation ::= SEQUENCE {
```

```
        res                 BIT STRING(SIZE(4)),    -- for future use
        pushID              INTEGER(0..255),
                                    -- target PushID for replay operation
        applicationType     ApplicationType
    }

    Re-ConfirmedPushOperation ::= SEQUENCE {
        responseTiming      ResponseTiming,
                                    -- specify the response timing of confirmation
        res                 BIT STRING(SIZE(2)),    -- for future use
        pushID              INTEGER(0..255),
                                    -- target PushID for replay operation
        applicationType     ApplicationType
    }

    Re-ConfirmedPushResponse ::= SEQUENCE {
        res                 BIT STRING(SIZE(4)),    -- for future use
        pushID              INTEGER(0..255),        -- operated PushID again.
        acknowledgement     OCTET STRING
    }

    PushAbortOperation ::= SEQUENCE {
        res                 BIT STRING(SIZE(4)),    -- for future use
        pushID              INTEGER(0..255),        -- target PushID
        status              INTEGER(0..255),        -- status code
        supplementInfo      OCTET STRING(SIZE(0..255))
                                                    -- supplement information
    }


    NextSegRequest ::= SEQUENCE {
        res                 BIT STRING(SIZE(4)),    -- for future use
        pushID              INTEGER(0..255)
    }
```

```
NextSegment ::= SEQUENCE{
    res                 BIT STRING(SIZE(3)),    -- for future use
    isLast              BOOLEAN,                -- TRUE(1) in a last segment
    pushID              INTEGER(0..255),        -- corresponding PushID
    segmentNo           INTEGER(0..65535),      -- sequence number
    segmentBody         OCTET STRING            -- divided pushBody
}

ClientInformation ::= SEQUENCE {
    version             INTEGER(0..15),         -- value is set up to 1 at first
    applicationTypeList ApplicationTypeList,
    contentTypeList     ContentTypeList,
    maxPushBodySize     INTEGER(0..4294967295),
    maxContentsSize     INTEGER(0..4294967295),
    supplementInfo      OCTET STRING(SIZE(0..255)) -- supplement information
}

ApplicationTypeList ::= SEQUENCE OF ApplicationType

ContentTypeList ::= SEQUENCE OF ContentType

SP ::= SEQUENCE{
    href                URI,
    parameter           OCTET STRING
}

URI ::= OCTET STRING
```

3.4.4 Relationship with Other Standards

The relationships with other DSRC related standards used this application are shown below.

Table 3.4-14 Relationship with other DSRC related standards

	DSRC related standard	Content using in this application
1	DSRC Standard	AID=18 (DSRC Application Sub Layer)
2	NCP of ASL	LPCP (Local Port Control Protocol)
3	Port number of LPCP	0x0C0A
4	Types of transaction services of the local port protocol	(1) When not using the push divide and send processing a) Use a unidirectional data send transaction for push without confirmation response and replay without confirmation response. b) Use a request/response type transaction for push with confirmation response and replay with confirmation response. (2) When using the push divide and send processing a) Use a request/response type transaction for push with confirmation response and push without confirmation response for any segment other than the final segment. b) For the final segment, use a unidirectional data send transaction for push without confirmation response, and use a request/response type transaction for push with confirmation response. (3) When transferring consecutively a same content in broadcast communication, use the transaction re-execution function of the LPP. (4) When the message size exceeds the MTU size in the LPCP, use the division/assembly function of the LPP. (5) When aborting a push operation adopting a

		request/response type transaction using the push abort operation command, issue the "Abort.req" primitive of the LPP and abort the transaction of the LPP at the same time.
5	Types of primitives of the local port protocol	(1) Send each of the "PushOperation", "ConfirmedPushOperation", "Re-PushOperation", "Re-ConfiremdPushOperation", "NextSegment" and "ClientInformation" commands using the "Invoke.req" primitive. (2) Send each of the "ConfirmedPushResponse", "Re-ConfirmationPushResponse" and "NextSegmentRequest" commands using the "Invoke.res" primitive. (3) Use the "Invoke.res" primitive for sending the "PushAbortOperation" command when aborting a push operation adopting a request/response type transaction from the Land Mobile Station side, and use the "Invoke.req" primitive (TT = 0) in any other case.

3.4.5 Procedures

3.4.5.1 Procedure Using Client Resource Acquisition Function

(1) After the DSRC is connected and communication from the push client is enabled, the push client creates the client information notice command “ClientInformation,” and notifies the push server of the client information.

Figure 3.4-3 shows a sequence example of the client resource acquisition function.

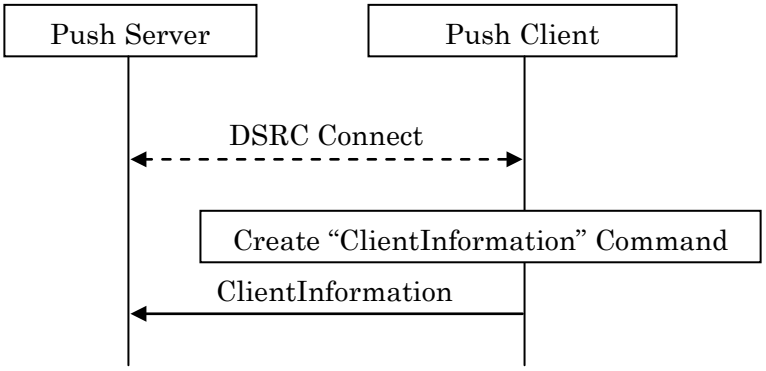


Figure 3.4-3 Example of the client resource acquisition function

3.4.5.2 Push-type Information Delivery Procedures (without division)

3.4.5.2.1 Data transfer procedure in push type information delivery without confirmation response

(1) The push server creates the push operation command “PushOperation,” and distributes content to the push client.

(2) When the push client receives “PushOperation” sent in the step (1), the push client executes the processing for the received content in accordance with the content type and application type specified by “contentType” and “applicationType”.

Figure 3.4-4 shows an example of the data transfer procedure sequence in push delivery without confirmation response (without divide and send).

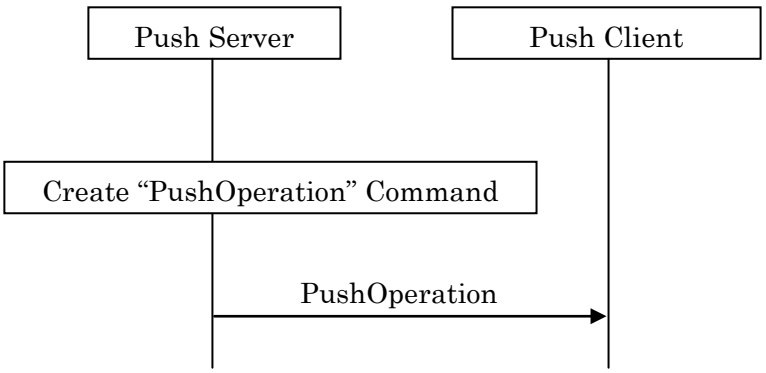


Figure 3.4-4 Example of the data transfer procedure sequence in push type information delivery without confirmation response (without divide and send)

3.4.5.2.2 Data transfer procedure in push type information delivery with confirmation response

(1) The push server creates the confirmed push operation command “ConfirmedPushOperation,” and distributes a content to the push client.

(2) When the push client receives “ConfirmedPushOperation” sent in the step (1), the push client executes the processing for the received content in accordance with the content type and application type specified by “contentType” and “applicationType”.

(3) The push client creates the confirmed push response command “ConfirmedPushResponse” at the timing specified by the “responseTiming” parameter, and sends it to the push server.

When the received “ConfirmedPushOperation” corresponds to any of the following, the push client sends the corresponding push abort operation command to the push server, and terminates the processing.

a)When the DSRC client does not support the specified content type, the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “Specified content type not precessed”, and sends it to the push server.

b)When the DSRC client does not support the processing in accordance with the specified application type, the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “Specified application type not executed,” and sends it to the push server.

c)When the content size specified in the received “ConfirmedPushOperation” disagrees with the actually received content size, the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “Content size error (Received size disagreed),” and sends it to the push server.

Figure 3.4-5 shows an example of the data transfer procedure sequence in push-type information delivery with confirmation response (without divide and send).

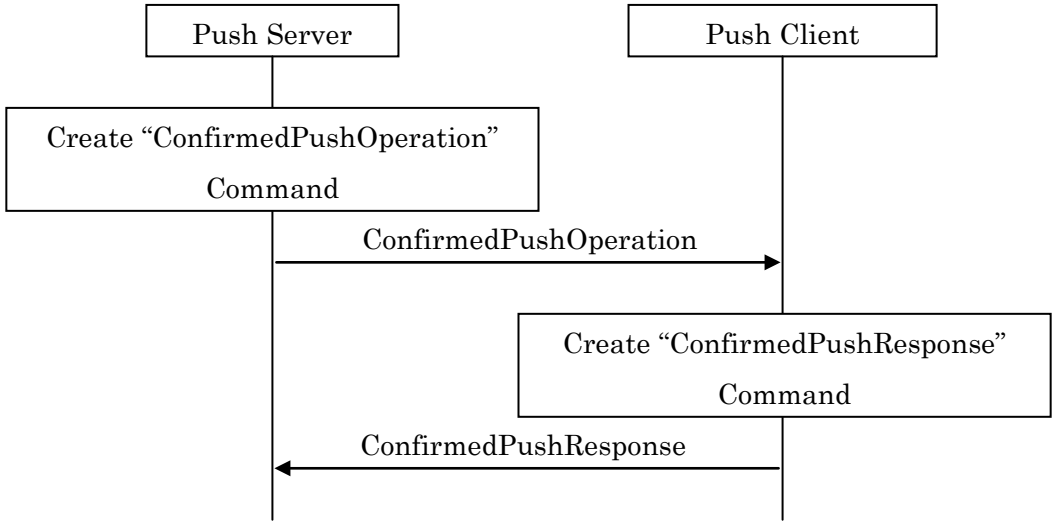


Figure 3.4-5 Example of the data transfer procedure sequence in push type information delivery with confirmation response (without divide and send)

3.4.5.2.3 Data transfer procedure in push type information delivery using broadcast communication

(1) The push server creates one or more push operation commands “PushOperation” in accordance with a request from the service application, and distributes contents. At this time, if the service application does not specify the use of repeated send function, the push server sets “0” to the DC flag, and sends the created “PushOperation”. If the service application specifies the use of repeated send function, the push server sets “1” to the DC flag, and sends the created “PushOpeartion” repeatedly. Refer to Attached data Annex 7-2.1 b) for consideration about pushID assignment in broadcast communication.

(2) When the Land Mobile Station enters the DSRC communication area, the push client receives “PushOperation” sent in the step (1). The push client holds its pushID if the DC flag value is “1”.

(3) The push client executes the processing for the received content in accordance with the content type and application type specified by “contentType” and “applicationType”.

(4) When the push client receives “PushOperation” whose DC flag value is “1” and pushID remains held in the same communication area, the client aborts the received “PushOperation”.

Note: When the LPP sends the DSRC disconnection notice to the push client, the push client shall annulled the pushID stored if the DC flag value is “1”. The push client can store up to 128 pushIDs. If the push client receives 129 or more pushIDs, it shall annul the pushID in turn from the one stored earliest.

Reference: When a same pushID is sent consecutively using the LPP in the step (1), the replay function of the transaction is used. Accordingly, the duplicate received data in the step (4) is annulled by the LPP, and is not given to the push-type information delivery application.

Figure 3.4-6(a) shows an example of the data transfer procedure sequence in push type broadcast delivery using the repeated send function, and Figure 3.4-6(b) shows an example of the data transfer procedure sequence in push type delivery using broadcast communication without using the repeated send function.

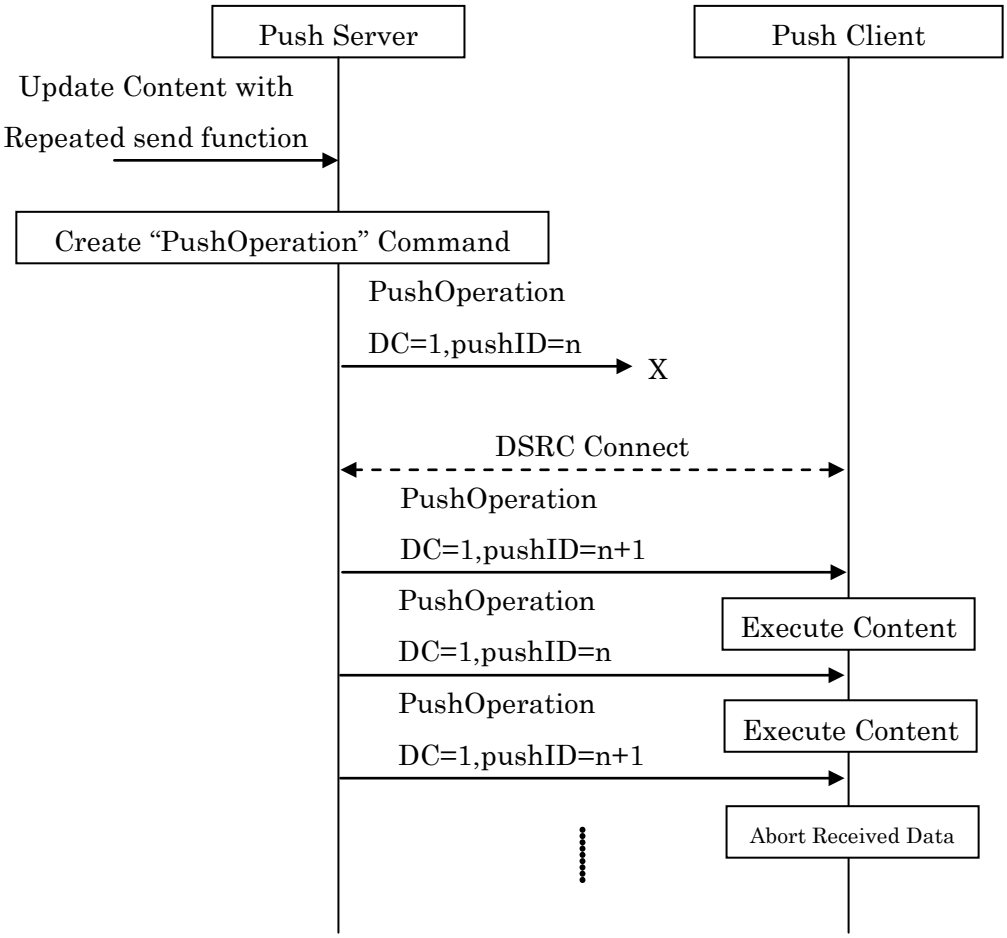


Figure 3.4-6 (a) Example of the data transfer procedure sequence in push type information delivery using broadcast communication with repeated send function (the DC flag value is "1")

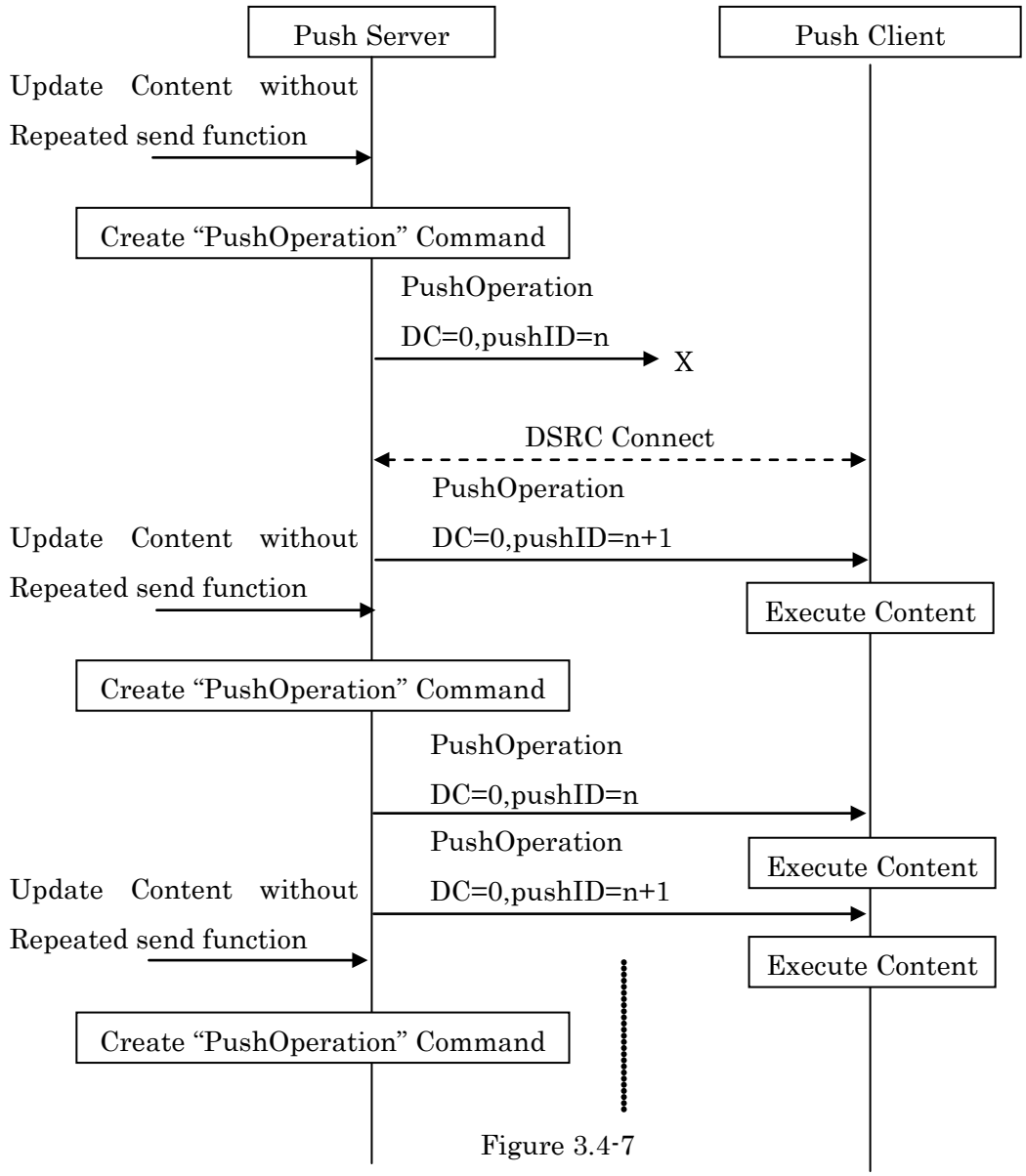


Figure 3.4-7

Figure3.4-6 (b) Example of the data transfer procedure sequence in push type information delivery using broadcast communication without the repeated send function (the DC flag value is "0")

3.4.5.3 Data transfer procedure using divide and send function

(1) This transaction is started when the push server sends content whose size exceeds “maxPushBodySize”.

(2) The push server divides the content from the head by “maxPushBodySize”, creates the push operation command “PushOperation” or confirmed push operation command “ConfirmedPushOperation” whose “pushBody” is a segment data, and sends it to the push client. At this time, the push server acquires “maxPushBodySize” in advance using the client resource acquisition function, and sets the IS flag indicating divide and send.

(3) When the push client receives “PushOperation” or “ConfirmedPushOperation” sent in the step (2), the push client transfers the received data to the external terminal in accordance with the content type and application type specified by “contentType” and “applicationType”.

(4) When the push client becomes ready for receiving the next segment, the push client creates the next segment request command “NextSegmentRequest”. And the push client sends it to the push server.

(5) When the push server receives “NextSegmentRequest” sent in the step (4) or (6), the push server divides the unsent portion of the content by “maxPushBodySize” from the head, creates the next segment data delivery command “NextSegment” whose "segmentBody” is a segment data, and then sends it to the push client. At this time, the push server assigns the segment number “2” to the first “NextSegment”, and assigns an incremented segment number to the second and later “NextSegment” in turn. The push server sets the “isLast” flag to the send data that is the final segment data.

(6) When the push client receives "NextSegment" sent in the step (5), the push client transfers the received data to the external terminal same as the step (3). If the “isLast” flag is not set in the received data, the push client creates the next segment request command “NextSegmentRequest” after completing the transfer processing, and sends it to the push server. If the “isLast” flag is set in the received data, the push client terminates the transaction after completing the transfer processing in the case of “PushOperation”. In the case of “ConfirmedPushOperation, the push client creates the confirmed push response command “ConfirmedPushResponse” at the timing specified by the “responseTiming” parameter in “ConfirmedPushOperation” received in the step (2), and sends it to the push server.

When the command received by the push client corresponds to any of the following, the push client sends the corresponding push abort operation command to the push server, and terminates the processing.

a) When the DSRC client does not support the specified content type in the step (3), the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “Specified content type not processed”, and sends it to the push server.

b) When the DSRC client does not support the processing in accordance with the specified application type in the step (3), the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “Specified application type not executed”, and sends it to the push server.

C) When the segment number specified by “NextSegment” received in the step (6) is wrong, the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “Divide and send error (Segment number sequence error)”, and sends it to the push server.

d) When the total received content size exceeds “maxContentsSize” in the step (6), the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “Content size error (Maximum content size over)”, and sends it to the push server.

e) If the content size specified in “ConfirmedPushOperation” received in the step (3) disagrees with the actually received content size when receiving “NextSegment” whose “isLast” flag is set in the step (6), the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “Content size error (Received size disagreed)”, and sends it to the push server.

Figures 3.4-7 and 3.4-8 show examples of the data transfer procedure sequence in push-type information delivery without confirmation response and push-type information delivery with confirmation response using the divide and send function.

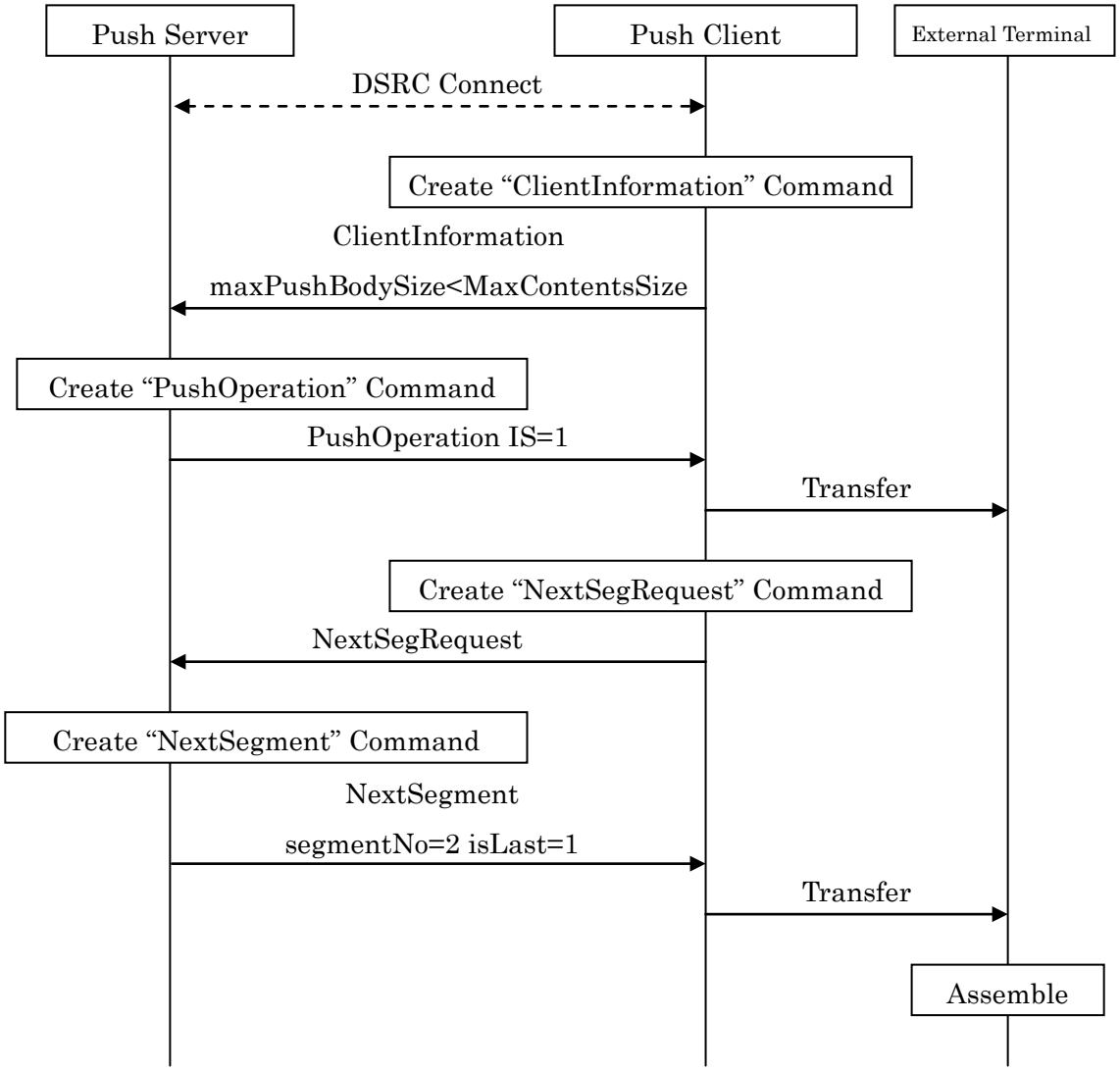


Figure3.4-7 Examples of the data transfer procedure sequence in push-type information delivery without confirmation response with the divide and send function

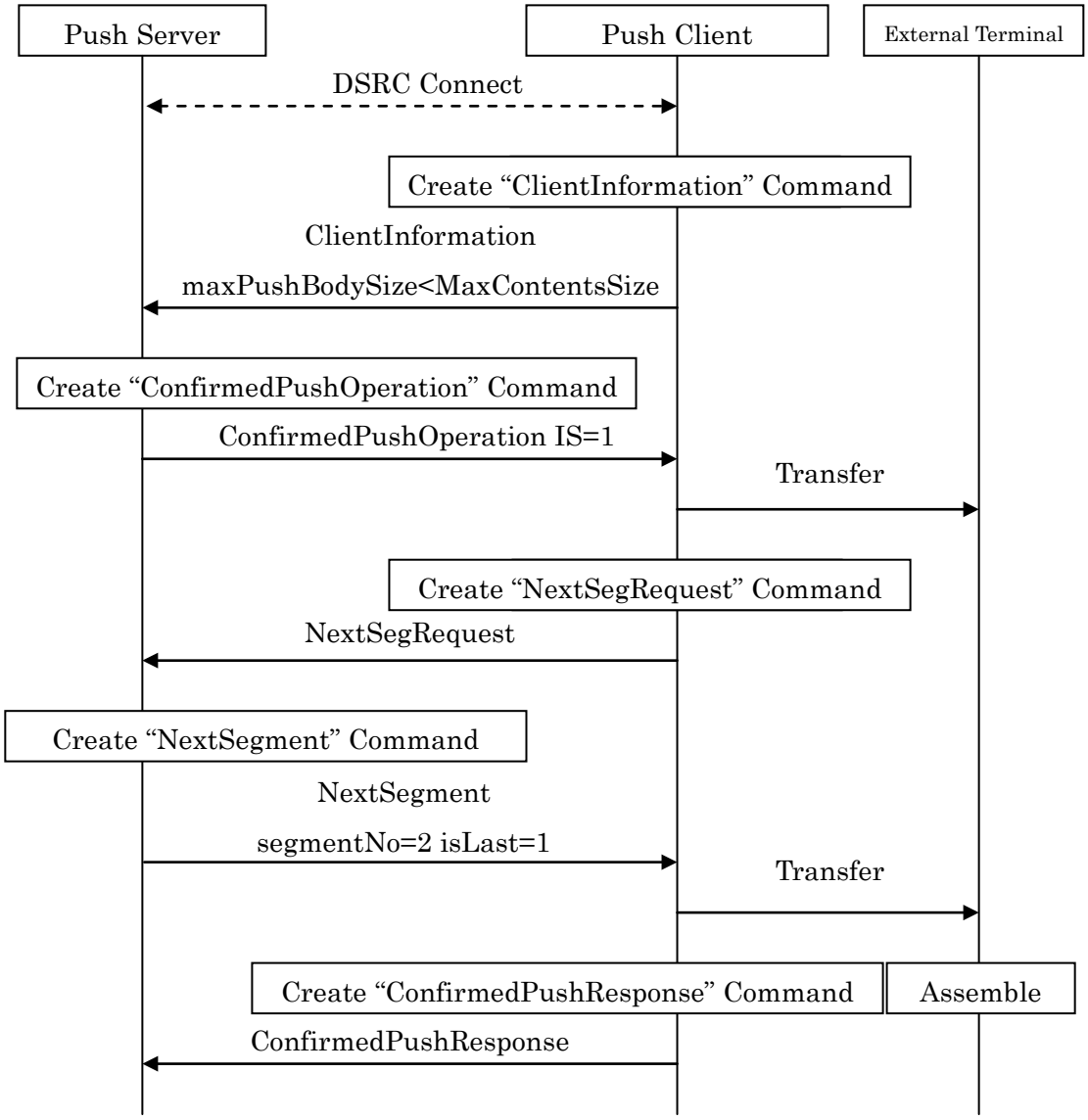


Figure 3.4-8 Examples of the data transfer procedure sequence in push-type information delivery with confirmation response with the divide and send function

3.4.5.4 Data transfer procedure using pushed content replay request function

3.4.5.4.1 Re-push function without confirmation response

(1) The push server distributes the content to the push client using the push operation command “PushOperation” or confirmed push operation command “ConfirmedPushOperation”. At this time, the push server sets the RC flag.

(2) When the push client receives “PushOperation” or “ConfirmedPushOperation” sent in the step (1), the push client executes and saves the received content. If a content cached in the past has the same ID, the push client overwrites the existing cached data.

(3) The push server creates the re-push operation command “Re-PushOperation” using the same ID as “pushID” in PushOperation” or “ConfirmedPushOperation” sent in the step (1), and sends it to the push client.

(4) When the push client receives “Re-PushOperation” sent in the step (3), the push client reads the content saved in the step (3), and executes the read content using the method specified by “applicationType”.

Figure 3.4-9 shows an example of the data transfer procedure sequence using the re-push function without confirmation response.

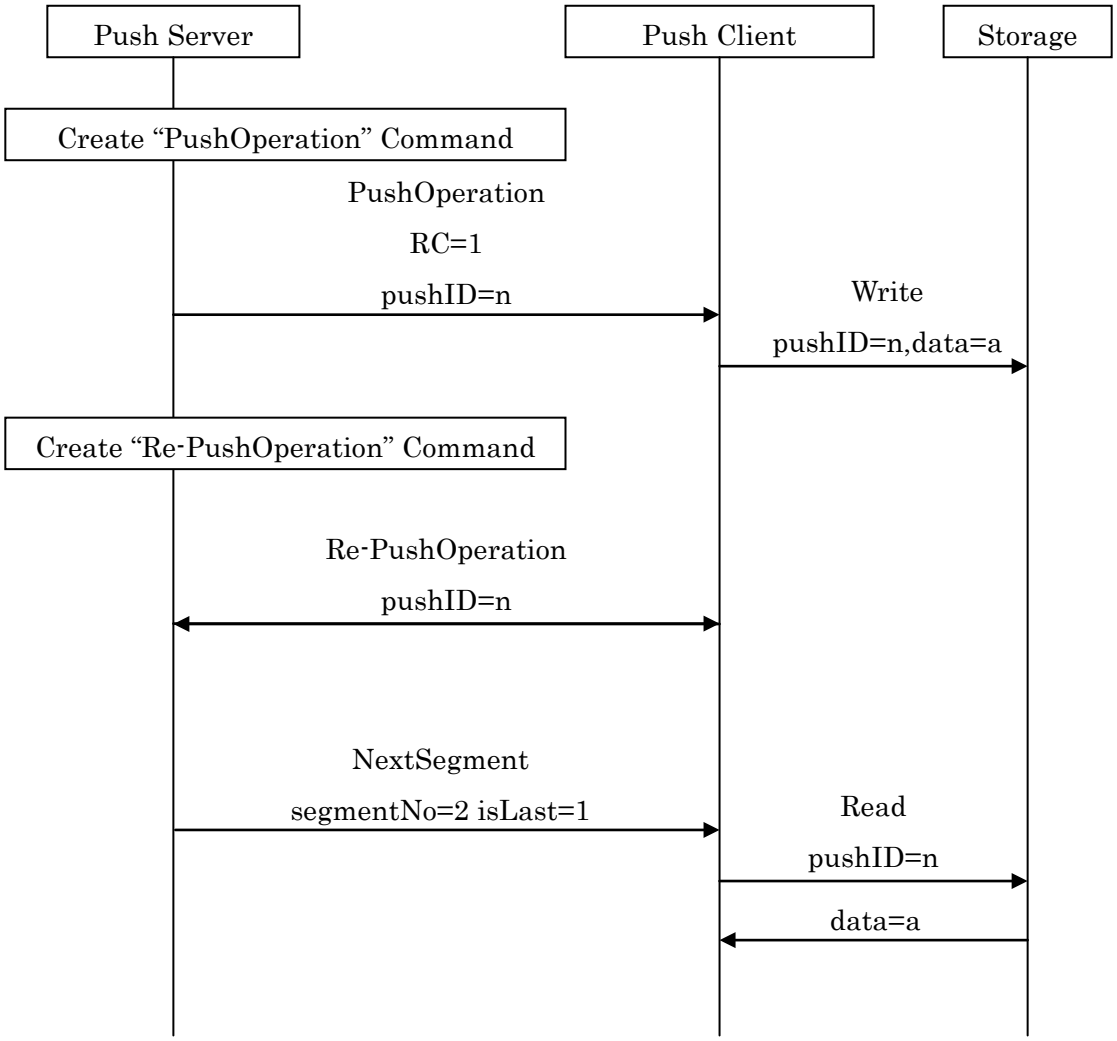


Figure 3.4-9 An example of the data transfer procedure sequence using the re-push function without confirmation response

3.4.5.4.2 Re-push function with confirmation response

(1) The push server distributes a content to the push client using the push operation command “PushOperation” or confirmed push operation command “ConfirmedPushOperation”. At this time, the push server sets the RC flag.

(2) When the push client receives “PushOperation” or “ConfirmedPushOperation” sent in the step (1), the push client executes and saves the received content. If a content cached in the past has the same ID, the push client overwrites the existing cached data.

(3) The push server creates the re-push operation command with confirmation response “Re-ConfirmedPushOperation” using the same ID as “pushID” in “PushOperation” or “ConfirmedPushOperation” sent in the step (1), and sends it to the push client.

(4) When the push client receives “Re-ConfirmedPushOperation” sent in the step (3), the push client reads the content saved in the step (3), and executes the read content using the method specified by “applicationType”.

(5) The push client creates the re-confirmed push response command “Re-ConfiremdPushResponse” at the timing specified by the “responseTiming” parameter, and sends it to the push server.

When a command received by the push client corresponds to any of the following, the push client sends the corresponding push abort operation command to the push server, and terminates the processing.

a) When the content of the specified pushID is not cached in the step (4), the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “No content to be distributed”, and sends it to the push server.

b) When the DSRC client does not support the processing in accordance with the specified application type in the step (4), the push client creates the push abort operation command “PushAbortOperation” whose status identifier indicates “Specified application type not executed”, and sends it to the push server.

Figure 3.4-10 shows an example of the data transfer procedure sequence using the re-push function with confirmation response.

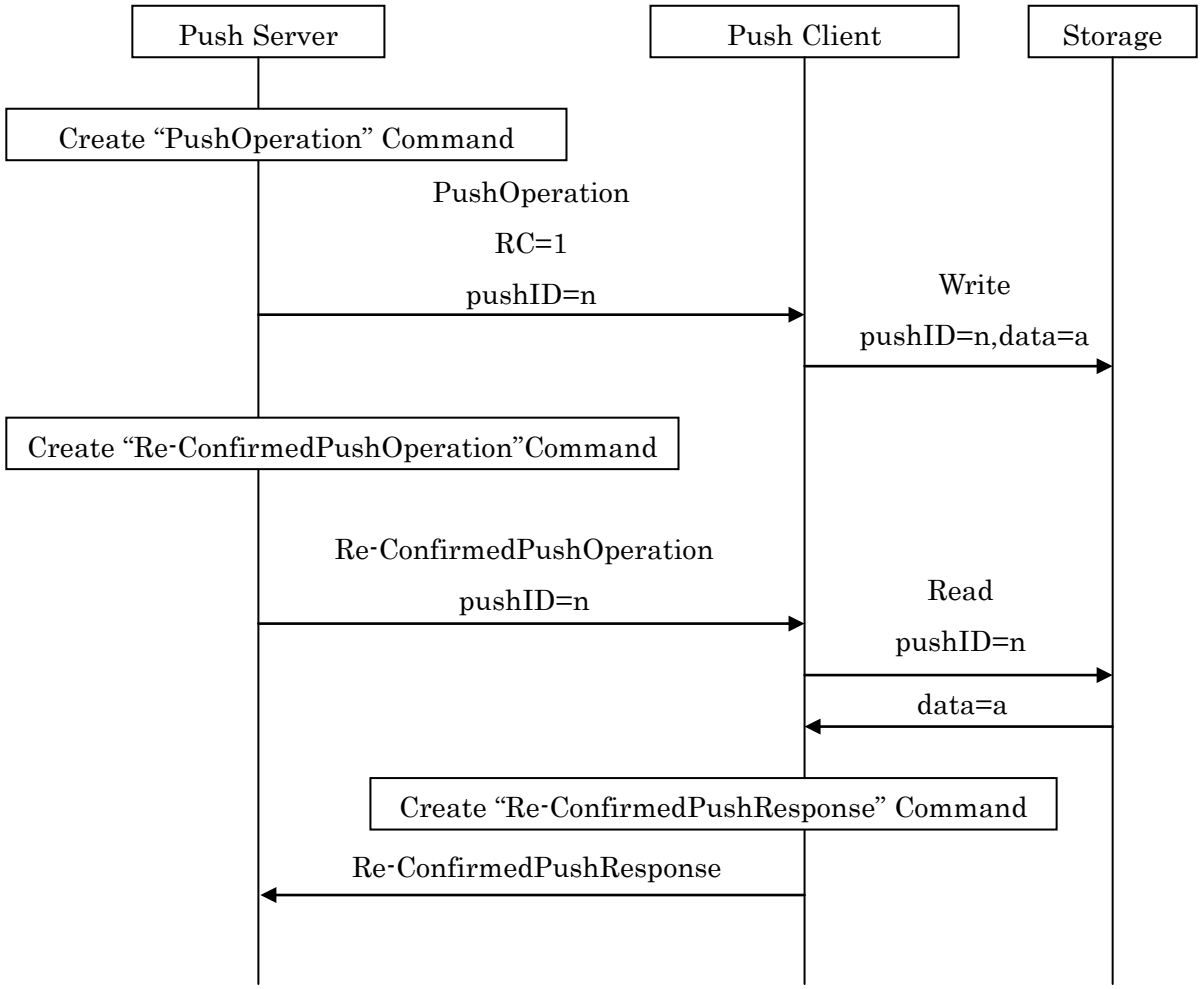


Figure 3.4-10 An example of the data transfer procedure sequence using the re-push function with confirmation response

3.4.6 Application type and content type list

Table 3.4-15 Application type list

Application	Identifier	Value	Remarks
default	default	0x00	Default application for handling content type
Web Browser	browser	0x01	Supported content types depend on implementation
Mailer	mailer	0x02	
Sound Player	sound-player	0x03	Sound content type, text/tts content type, etc.
Movie Player	video-player	0x04	video content type
TTS	tts	0x05	Generally, content type is specified as text/plain or text/tts. Other content types may be supported, depending on implementation
Mobile Browser	mobile-device-browser	0x06	Supported content types depend on implementation
Store	store	0x07	Storing of push data. Any content type can be specified.
VICS	vics	0x08	Only dsrc/vics content type is valid
Text display	text-display	0x09	Displays text data
Driving Safety Support	safety	0x0A	
Image Display	image-display	0x0B	
Payment	Payment	0x0C	For charge settlement at parking lots, etc.
Automated Drive	automated-drive	0x0D	
Dynamic Map	dynamic-map	0x0E	
Multignss Payments	multignss-payment	0x0F	
Qzs	qzs	0x10	
Others	others	0x11-0xFE	
Any	private	0xFF	Specify application type using any text string

Table 3.4-16 Content type list

Contents Type	Value	Format of pushBody	Remarks
/	0x00		(Note 1)
text/*	0x01		(Note 1)
text/plain	0x02	Shift-jis	Plain text
text/enrich	0x03	Enrich	Enrichtext
text/html	0x04	HTMLfile	HTMLtext
text/xml	0x05	XMLfile	XMLtext
text/x-hdml	0x06	X-HDMLfile	X-HDMLtext
text/x-html	0x07	X-HTMLfile	X-HTMLtext
text/tts	0x08	TTSfile	JEITA TT-6004
otherTextType	0x09-0x0F	-	(Note 2)
image/*	0x10	Image file Binary Format	(Note 1)
image/jpeg	0x11		jpeg file
image/gif	0x12		gif file
image/bmp	0x13		bmpfile
image/tiff	0x14		tifffile
image/png	0x15		pngfile
otherImageType	0x16-0x1F	-	(Note 2)
audio/*	0x20	Audio file Binary Format	(Note 1)
audio/wav	0x21		WAV file
audio/mp3	0x22		MP3file
audio/wma	0x23		WMAfile
audio/aiff	0x24		AIFFfile
audio/midi	0x25		MIDIfile
audio/adpcm	0x26		IMA-ADPCMfile
audio/celp	0x027		CELP encoded file
otherAudioType	0x28-0x2E	-	(Note 2)
audio/encoded-voice-type1	0x2F	Audio file Binary Format	(Note 2)
video/*	0x30	Movie file Binary Format	(Note 1)
video/mpeg	0x31		MPEGfile
video/real	0x32		RealPlayerfile

video/qt	0x33		QuickTimefile
video/wmv	0x34		WMVfile
otherVideoType	0x35-0x3F		(Note 2)
message/*	0x40	Mail message defined RFC822	(Note 1)
otherMessageType	0x41-0x4F	-	(Note 2)
application/*	0x50	Application data files	(Note 1)
application/java-vm	0x51		Java Virtual Machine
application/postscript	0x52		PostScript
otherApplicationType	0x53-0x5F	-	(Note 2)
multipart/*	0x60	Multi-part message	(Note 1)
otherMultipartType	0x61-0x7F	-	(Note 2)
dsrc/*	0x80	Content for DSRC applications	(Note 1)
dsrc/smart-pull	0x81	Refer to 3.4.3	Pseudo push
dsrc/vics	0x82		data format for VICS service
dsrc/mime	0x83	MIME encoded textfile	MIME encoded textfile
dsrc/safety	0x84		For safe driving support application use
dsrc/multipart	0x85	Multipart contents format	Refer to JEITA TT6003
dsrc/privateSpot_text_plain	0x86	Shift JIS line feed code CR+LF	Content that can be displayed in-vehicle during emergency stops and slow driving
dsrc/privateSpot_image_jpeg	0x87	Image File Binary Format	
dsrc/privateSpot_image_gif	0x88		
dsrc/privateSpot_image_bmp	0x89		
dsrc/privateSpot_image_tiff	0x8A		
dsrc/privateSpot_image_png	0x8B		
dsrc/automatedDrive	0x8C		Automated Drive service
dsrc/dynamicMap	0x8D		Dynamic Map service
dsrc/multignssPayment	0x8E		Multignss Payments service

dsrc/qzs	0x8F		Qzs service
otherType	0xA0-0xEF		(Note 2)
private	0xF0-FF		For private use (may be used freely)

Note 1: The content type specification method by “octet string” utilizes the “Content-Type” header field specified in RFC2045.

Note 2: Number assignment to areas not assigned in specific contents/applications is outside the range of specification described in this document.

3.5 OBE ID Communication Application

3.5.1 Outline of Functions

3.5.1.1 Functions

The OBE ID communication application notifies the Base StationBase Station of the ID held by the Land Mobile Station so that the Base StationBase Station can identify the Land Mobile Station.

The OBE ID communication application has the function to notify the OBE ID and the maintenance function to register, delete, etc. the OBE ID.

The OBE ID is registered in the nonvolatile memory, etc. of the Land Mobile Station, and the recorded information is assured even if the power is turned OFF.

Maintenance of the OBE ID is available on the assumption that proper access control is achieved in the Land Mobile Station, has arbitrary specification determined by the manufacturer (maybe including use of Vehicle navigation equipment or use of the HMI incorporated in the Land Mobile Station), and is outside the range of specification described in this document.

3.5.1.2 OBE ID registration information

The OBE ID registration information “ObuIDForRegistration” (see Subsection 3.5.3) consists of the acquirer ID, ID condition and OBE ID.

3.5.1.3 Acquirer ID

The acquirer ID (ApplicationServiceProvider) identifies the provider who registers and acquires the OBE ID for the Land Mobile Station.

In acquirer ID assignment, the representative assignment method in which upper 2 bytes indicate the representative number and lower 6 bytes indicate the sub number and the individual assignment method in which all of 8 bytes indicate a number, can be used together. The upper 2 bytes are for representative numbers from 0x0001 to 0x0FFF, and the lower 6 bytes are for individual assignment from 0x1000 to 0xFFFF. When all 8 bytes are 0, they are for shared use and are used when not limited to the business operator.

3.5.1.4 ID condition

The ID condition (IDCondition) indicating the ID condition specified by the registrant can be set for each acquirer. Table 3.5-1 shows the contents of “IDCondition”. The security executed individually inside each application is outside the range of specification described in this document.

Table 3.5-1 Contents of "IDCondition"

Field name	True (1)	False (0)	Remarks
plaintextIDRefusal	Refuses ID send in plain text.	Permits ID send in plain text.	
ciphertextIDRefusal	Refuses ID send in cipher text.	Permits ID send in cipher text.	For individual in-application security
mutualAuthentication	Requires mutual authentication.	Does not require mutual authentication.	For individual in-application security
userApproval	Requires approval by user at each send.	Does not require approval by user.	(Reserved)
idUnlock	Enables deletion of this ID.	Disables deletion of this ID.	
spf	Permits ID send in SPF cipher.	Does not permit ID send in SPF cipher.	For common SPF security
fill	-	-	Filling with "0"

Note: When not using the individual in-application security (default), set "ciphertextIDRefusal(1)" and "mutualAuthentication(0)".Refer to Attached data Annex 2 for handling using the common SPF.

3.5.1.5 OBE ID

The OBE ID uniquely identifies the Land Mobile Station when combined with the acquirer ID.

The OBE ID is assigned in units of provider (acquirer) ID. One OBE ID should be used only once in each provider.

It is possible that single Land Mobile Station has contracts with one or more service providers having different acquirer IDs. In such a case, different OBE ID is assigned to each acquirer ID in single Land Mobile Station. Accordingly, it is recommended that one or more OBE IDs can be registered for single Land Mobile Station.

Reference: The OBE ID can be assigned in the following methods:

a) Representative assignment method

Upper 2 bytes indicate the representative number ("manufacturerID (0 … 65535)" used in the VST), and lower 6 bytes indicate the sub number.

b) Individual assignment methods

All of 8 bytes indicate a number.

3.5.2 Command

3.5.2.1 Command System

Commands in the OBE ID communication application consist of normal commands, OBU denial response command from the Land Mobile Station, maintenance commands, and authentication commands.

The normal commands consist of ID 1st request command, ID 2nd request command, ID 1st response command, ID 2nd response command, end notice command, and end response command. The maintenance commands consist of ID registration request command, ID registration response command, registered ID deletion request command, registered ID deletion response command, registered ID list request command, registered ID list response command, ID condition change request command, and ID condition change response command. The version number is “1” for the OBE ID communication application described in this document.

Authentication commands are used for individual authentication inside the OBE ID communication application, and details are outside the range of specification described in this document.

For acquiring the OBE ID through communication between the Base Station and the Land Mobile Station, the Base StationBase Station notifies the Land Mobile Station of the acquirer ID, and the Land Mobile Station gives the OBE ID in accordance with the acquirer ID.

3.5.2.2 Command Format

3.5.2.2.1 Normal Commands

3.5.2.2.1.1 ID 1st Request Command

The ID 1st request command is used when the Base StationBase Station asks the Land Mobile Station at the first time to give the OBE ID. Table 3.5-2 shows the command format.

Table 3.5-2 ID 1st Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type firstIDRequest(0)							
4	Acquirer ID (“ApplicationServiceProvider” format parameter)							
5								
6								
7								
8								
9								
10								
11								

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “firstIDRequest(0)” to indicate the ID 1st request command.

(4) Acquirer ID

This field indicates the Acquirer ID as “ApplicationServiceProvider” format parameter (refer to 3.5.3).

3.5.2.2.1.2 ID 1st Response Command

The ID 1st response command is used when the Land Mobile Station notifies the Base StationBase Station of the OBE ID in response to the ID 1st request command sent from the Base Station. Table 3.5-3 shows the command format.

Table 3.5-3 ID 1st Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type firstIDResponse(1)							
4	OBE ID(“ObuID” format parameter)							
5								
6								
7								
8								
9								
10								
11								
12								

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “firstIDResponse(1)” to indicate the ID 1st response.

(4) OBE ID

This field indicates the OBE ID as “ObuId” format parameter (refer to 3.5.3) to indicate the ID 1st response.

3.5.2.2.1.3 ID 2nd Request Command

The ID 2nd request command is used when the Base Station requests the Land Mobile Station at the second time to give the OBE ID. Table 3.5-4 shows the command format.

Table 3.5-4 ID 2nd Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type secondIDRequest(2)							
4	Acquirer ID (“ApplicationServiceProvider” format parameter)							
5								
6								
7								
8								
9								
10								
11								

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “secondIDRequest(2)” to indicate the ID 2nd request.

(4) Acquirer ID

This field indicates the Acquuirer ID as “ApplicationServiceProvider” format parameter (refer to 3.5.3).

3.5.2.2.1.4 ID 2nd Response Command

The ID 2nd response command is used when the Land Mobile Station notifies the Base Station of the OBE ID in response to the ID 2nd request command sent from the Base Station. Table 3.5-5 shows the command format.

Table 3.5-5 ID 2nd Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type secondIDResponse(3)							
4 :	ID 2nd Response Information (“SecondIDResponse” format parameter)							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “operationCommand(1)” to indicate the normal command.

(3) Operation Type

This field is set to an identifier “secondIDResponse(3)” to indicate the ID 2nd response.

(4) ID 2nd Response Information

This field indicates the ID 2nd response information as “SecondIDResponse” format parameter (refer to 3.5.3).

3.5.2.2.1.5 End Notice Command

The end notice command is used when the Base Station notifies the Land Mobile Station that the ID acquisition processing is finished. Table 3.5-6 shows the command format.

Table 3.5-6 End Notice Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type endRequest(4)							

(1) version

This field stores the application version.

(2) Command Type

This field stores the “operationCommand(1)” normal command.

(3) Operation Type

This field stores the “endRequest(4)” end notice command.

3.5.2.2.1.6 End Response Command

The end response command is used when the Land Mobile Station gives response to the end notice command sent from the Base Station. Table 3.5-7 shows the command format.

Table 3.5-7 End Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type operationCommand(1)							
3	Operation Type endResponse(5)							

(1) version

This stores the application version.

(2) Command Type

This field stores the “operationCommand(1)” normal command.

(3) Operation Type

This field stores the “endResponse(5)” end response command.

3.5.2.2.2 OBU Denial Response Command

OBU denial response command is used when the Land Mobile Station notifies the Base Station of negative acknowledgement. Table 3.5-8 shows the command format.

Table 3.5-8 OBU Denial Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type OBU denial response command obuDenialResponse(255)							
3	status							
4	data size of supplement information "supplementInfo"							
5 :	contents of supplement information "supplementInfo"							

(1) version

This field stores the application version.

(2) Command Type

This field stores the "obuDenialRespnose(255)" OBU denial response command.

(3) status

This field is set to the reason of denial response. For details, refet to Table 3.5-9.

(4) The length of supplement information

a) This field stores the length of successing supplement information. The unit is octet. When there are no supplement information (this case is default case), this filed is set to value "0".

b) The contents of supplement information

This field is set to free information (the maximum length is 127 octets) as supplement information. When version number is not same, this field is set to own version ("versionIndex").

Table 3.5-9 Contents of "status" in OBU Denial Response Command in OBE ID Communication Application

No.	Meaning
0	Not used
1	Communication error
2	No OBE ID corresponding to specified acquirer ID
3	For future use (Reserved)
4	Version disagreed
5-10	For future use (Reserved)
11	Maintenance command failed
12	OBE ID not registered
13	OBE ID fully registered
14-31	For future use (Reserved)
32	Plain text send refused, authentication failed, or no authentication
33-63	For in-application security
64-127	For future use (Reserved)
128-255	For private (Can be used arbitrarily by Land Mobile Station)

3.5.2.2.3 Maintenance Commands

3.5.2.2.3.1 ID Registration Request Command

The ID registration request command is used when the Base Station asks the Land Mobile Station to register the ID. Table 3.5-10 shows the command format.

Table 3.5-10 ID Registration Request Command

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type maintenanceCommand(2)							
3	Maintenance Type iDSetupRequest(0)							
4 :	OBE ID Registration Information “ObuIDForRegistration” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “maintenanceCommand(2)” to indicate the maintenance command.

(3) Maintenance Type

This field is set to an identifier “iDSetupRequest(0)” to indicate the ID registration request.

(4) OBE ID Registration Information

This field is set to the OBE ID registration information (“ObuIDForRegistration” format; Refer to 3.5.3).

3.5.2.2.3.2 ID Registration Response Command

The ID registration response command is used when the Land Mobile Station notifies the Base Station that the ID registration request from the Base Station is completed. Table 3.5-11 shows the command format.

Table 3.5-11 ID Registration Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type maintenanceCommand(2)							
3	Maintenance Type iDSetupResponse(1)							
4 :	OBE ID Registration Information “ObuIDForRegistration” format parameter							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “maintenanceCommand(2)” to indicate the maintenance command.

(3) Maintenance Type

This field is set to an identifier “iDSetupResponse(1)” to indicate the ID registration response.

(4) OBE ID Registration Information

This field is set to the OBE ID registration information (“ObuIDForRegistration” format; Refer to 3.5.3).

3.5.2.2.3.3 Registered ID Deletion Request Command

The registered ID deletion request command is used when the Base Station asks the Land Mobile Station to delete a registered ID. Table 3.5-12 shows the command format.

Table 3.5-12 Registered ID Deletion Request Command

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type maintenanceCommand(2)							
3	Maintenance Type iDDeleteRequest(2)							
4	Acquirer ID (“ApplicationServiceProvider” format parameter)							
5								
6								
7								
8								
9								
10								
11								

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “maintenanceCommand(2)” to indicate the maintenance command.

(3) Maintenance Type

This field is set to an identifier “iDDeleteRequest(2)” to indicate the registered ID deletion request.

(4) Acquirer ID

This field is set to Acquirer ID for deleting OBE ID.

3.5.2.2.3.4 Registered ID Deletion Response Command

The registered ID deletion response command is used when the Land Mobile Station notifies the Base Station that the registered ID deletion request from the Base Station is completed. Table 3.5-13 shows the command format.

Table 3.5-13 Registered ID Deletion Response Command

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type maintenanceCommand(2)							
3	Maintenance Type iDDeleteResponse(3)							
4	Acquirer ID (“ApplicationServiceProvider” format parameter)							
5								
6								
7								
8								
9								
10								
11								

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “maintenanceCommand(2)” to indicate the maintenance command.

(3) Maintenance Type

This field is set to an identifier “iDDeleteResponse(3)” to indicate the registered ID deletion response.

(4) Acquirer ID

This field is set to Acquirer ID for deleting OBE ID.

3.5.2.2.3.5 Registered ID List Request Command

The registered ID list request command is used when the Base Station asks the Land Mobile Station to give the registered ID list. Table 3.5-14 shows the command format.

Table 3.5-14 Registered ID List Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type maintenanceCommand(2)							
3	Maintenance Type iDCheckRequest(4)							

(1) version

This stores the application version.

(2) Command Type

This field stores the “maintenanceCommand(2)” maintenance command.

(3) Maintenance Type

This field stores the “iDCheckRequest(4)” registered ID list request command.

3.5.2.2.3.6 Registered ID List Response Command

The registered ID list response command is used when the Land Mobile Station notifies the Base Station of the registered ID list in response to the registered ID list request command from the Base Station. Table 3.5-15 shows the command format.

Table 3.5-15 Registered ID List Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type maintenanceCommand(2)							
3	Maintenance Type iDCheckResponse(5)							
4	number of Acquirer ID							
5 :	Acquirer ID List							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “maintenanceCommand(2)” to indicate the maintenance command.

(3) Maintenance Type

This field is set to an identifier “iDCheckResponse(5)” to indicate the registered ID list response command.

(4) APServiceProverList

a) The number of Acquirer ID

This field is set to the number of acquirer ID in the registered acquirer ID list.

b) Acquirer ID List

This field is set to the list of registered acquirer ID (“APServiceProviderList” format parameter).

3.5.2.2.3.7 ID Condition Change Request Command

The ID condition change request command is used when the Base Station asks the Land Mobile Station to change the registered ID condition. Table 3.5-16 shows the command format.

Table 3.5-16 ID Condition Change Request Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type maintenanceCommand(2)							
3	Maintenance Type iDConditionChangeRequest(6)							
4-13	NewIDCondition							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “maintenanceCommand(2)” to indicate the maintenance command.

(3) Maintenance Type

This field is set to an identififier iDConditionChangeRequest(6)” to indicate the ID condition change request.

(4) NewIDCondition

This field is set to new condition of OBE ID (“NewIDConditon” format parameter; Refer to 3.5.3).

3.5.2.2.3.8 ID Condition Change Response Command

The ID condition change response command is used when the Land Mobile Station notifies the Base Station that change is completed in response to the ID condition change request from the Base Station. Table 3.5-17 shows the command format.

Table 3.5-17 ID Condition Change Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	version				fill(0)			
2	Command Type maintenanceCommand(2)							
3	Maintenance Type iDConditionChangeResponse(7)							
4-13	NewIDCondition							

(1) version

This field indicates the application version.

(2) Command Type

This field is set to an identifier “maintenanceCommand(2)” to indicate the maintenance response command.

(3) Maintenance Type

This field is set to an identifier “iDConditionChangeResponse(7)” to indicate the ID condition change response.

(4) NewIDCondition

This field is set to the new condition of OBE ID (“NewIDConditon” format parameter; Refer to 3.5.3).

3.5.3 Definition of Data Structures

```
ObuIDAcquisitionCommand::=SEQUENCE{
    versionIndex                Version,
    iDAcquisitionCommand        IDAcquisitionCommand
}

Version::= SEQUENCE {
    version     INTEGER(0..15),                 -- value is set up to 1 at first
    fill        BIT STRING(SIZE(4))             -- value of encoding is set up to 0
}

IDAcquisitionCommand::=CHOICE{
    authenticateCommand     [0]     AuthenticateCommand,
                                        -- for securiy in the application
    operationCommand        [1]     OperationCommand,
    maintenanceCommand      [2]     MaintenanceCommand,
    dummy                   [3-254] NULL,  -- For future use
    obuDenialResponse       [255]   ObuDenialResponse
}

AuthenticateCommand::=CHOICE{
    authPath1   [0]     OCTET STRING,       -- for securiy in the application
    authPath2   [1]     OCTET STRING,       -- for securiy in the application
    authPath3   [2]     OCTET STRING,       -- for securiy in the application
    authPath4   [3]     OCTET STRING,       -- for securiy in the application
    dummy       [4-255] NULL                -- for future use
}

OperationCommand::=CHOICE{
    firstIDRequest      [0]     ApplicationServiceProvider,
                                    -- first ID request
    firstIDResponse     [1]     ObuID,
                                    -- response for the first ID request
    secondIDRequest     [2]     ApplicationServiceProvider,
```

```
                                -- second ID request
        secondIDResponse    [3]     SecondIDResponse,
                                -- response for the second ID request
        endRequest          [4]     NULL,  -- termination notification
        endResponse         [5]     NULL,
                                -- response for the termination notification
        dummy               [6-255] NULL            -- for future use
    }

    maintenanceCommand ::=CHOICE{
        iDSetupRequest              [0]     ObuIDForRegistration,
                                -- request of ID registration
        iDSetupResponse             [1]     ObuIDForRegistration,
                                -- response for the request of ID registration
        iDDeleteRequest             [2]     ApplicationServiceProvider,
                                -- request of registered ID deletion
        iDDeleteResponse            [3]     ApplicationServiceProvider,
                                -- response for the request of registered ID deletion
        iDCheckRequest              [4]     NULL,
                                                --request of registered ID list
        iDCheckResponse             [5]     APServiceProviderList,
                                -- response for the request of registered ID list
        iDConditionChangeRequest    [6]     NewIDCondition,
                                -- request of the ID condition change
        iDConditionChangeResponse   [7]     NewIDCondition,
                                -- response for the request of the ID condition change
        dummy                       [8-255] NULL    -- for future use
    }

    ObuIDForRegistration::=SEQUENCE{
        applicationServiceProvider  ApplicationServiceProvider,
        iDCondition                 IDCondition,
        obuID                       ObuID
    }
```

```
ApplicationServiceProvider::=OCTET STRING(SIZE(8))      -- acquier ID

IDCondition::=SEQUENCE{
    plaintextIDRefusal          BOOLEAN,
    -- whether ID transmits in plain text or not
    ciphertextIDRefusal         BOOLEAN,
    -- whether ID transmits in cipher text or not (for security in the application)
    mutualAuthentication        BOOLEAN,
    -- whether mutual authentication require or not (for security in the application)
    userApproval                BOOLEAN,
    -- whether operation of transmit permission require or not
    idUnlock                    BOOLEAN,      -- whether OBE ID delete or not
    spf                         BOOLEAN,
    -- whether common SPF security transmit or not
    fill                        BIT STRING(SIZE(10))   -- for future use
}

ObuID::=SEQUENCE{
    fill                        BIT STRING(SIZE(7)),
    originalObuID               OCTET STRING(SIZE(8)), -- OBE ID
    mACForOriginalText                  MACForOriginalText      OPTIONAL
}

MACForOriginalText::=SEQUENCE{
    encryptionAlgorithmId       INTEGER(0..255),
        -- encryption algorithm for MAC (for security in the application)
    keyNumber                   INTEGER(0..255),
        -- key number for MAC (for security in the application)
    MAC                         OCTET STRING(SIZE(4))
        -- for security in the application
}

ObuDenialResponse ::=SEQUENCE{
    status              INTEGER(0..255),
    supplementInfo      OCTET STRING(SIZE(0..255)) -- supplement information
```

```
}

SecondIDResponse::=SEQUENCE{
    encryptionAlgorithmId       INTEGER(0..255),
        -- encryption algorithm for ID secret (for security in the application)
    keyNumber                   INTEGER(0..255),
        -- key number for ID secret (for security in the application)
    encryptedId                 OCTET STRING
        -- encryption ID information (for security in the application)
}

APServiceProviderList ::=SEQUENCE(0..255) OF ApplicationServiceProvider

NewIDCondition ::=SEQUENCE{
    applicationServiceProvider          ApplicationServiceProvider,
    iDCondition                         IDCondition
}
```

3.5.4 Relationship with Other Standards

The relationships with other DSRC related standards used in this application are shown below.

Table 3.5-18 Relationship with other DSRC related standards

	DSRC related standard	Content using in this application
1	DSRC Standard	AID=18 (DSRC Application Sub Layer)
2	NCP of ASL	LPCP (Local Port Control Protocol)
3	Port number of LPCP	0x0C00
4	Transaction Service	Use Unidirectional data transmit transaction service in two transaction service provided by LPCP

3.5.5 Communication Procedures

3.5.5.1 ID Acquisition Procedure

The communication procedure for acquiring the OBE ID is as follows:

(1) The Base Station sends “firstIDRequest” to the Land Mobile Station.

(2) When receiving “firstIDRequest”, the Land Mobile Station refers to the ID registration information, and sends “firstIDResponse” or “ObuDenialResponse” to the Base Station as follows:

a) When the condition of the OBE ID corresponding to the specified acquirer ID is “plaintextIDRefusal (false (0))", the Land Mobile Station sends “firstIDResponse” to the Base Station for notifying the OBE ID. When the condition is “plaintextIDRefusal (true (1))", the Land Mobile Station sends “obuDenialResponse” whose status is “32: Plain text send refused, authentication failed or no authentication” to the Base Station.

b) When the OBE ID is not registered at all in the Land Mobile Station, the Land Mobile Station sends “ObuDenialResponse” whose status is “12: OBE ID not registered at all” to the Base Station.

c) When the OBE ID corresponding to the specified acquirer is not registered, the Land Mobile Station sends “obuDenialResponse” whose status is “2: No OBE ID corresponding to specified acquirer ID” to the Base Station.

The communication procedure for terminating the OBE ID acquisition processing is as follows:

(1) The Base Station sends “endRequest” to the Land Mobile Station.

(2) When receiving “endRequest”, the Land Mobile Station finishes the OBE ID acquisition processing, and sends “endResponse” to the Base Station.

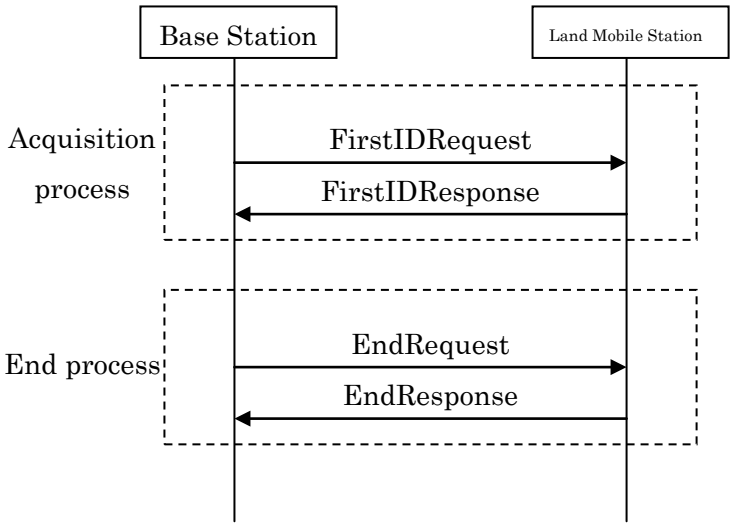


Figure 3.5-1 Example sequence of OBE ID acquisition processing

Reference: The figure below shows a sequence example when the corresponding ID condition is “plaintextIDRefusal (true (1))”, “ciphertextIDRefusal (false (0))”, and “mutualAuthentication (true (1))”, though this case is outside the range of specification described in this document.

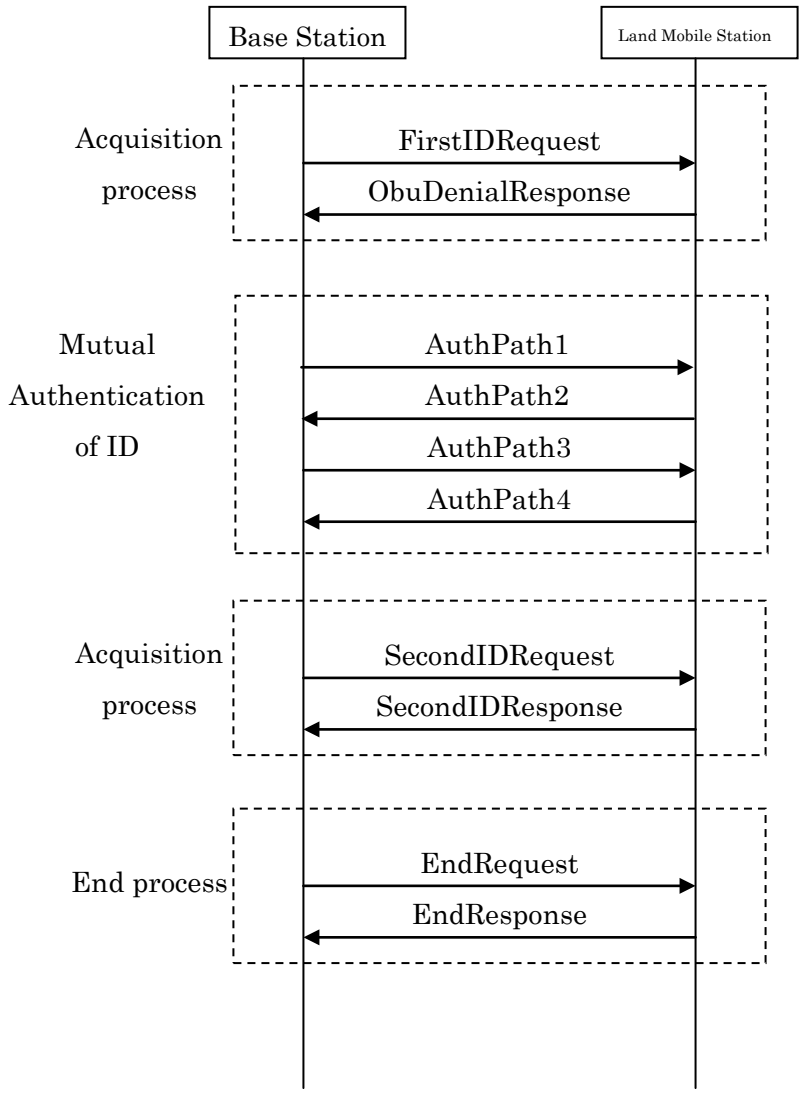


Figure 3.5-2 Example sequence of OBE ID acquisition processing with security function of OBE ID communication application

3.5.5.2 ID Maintenance Sequence

This paragraph describes communication procedures for maintenance of the OBE ID.

3.5.5.2.1 Acquisition of Registered ID List

(1) The Base Station sends “IDCheckRequest” to the Land Mobile Station.

(2) When receiving "IDCheckRequest", the Land Mobile Station sends the acquirer ID list registered in the Land Mobile Station “APServiceProviderList” as “IDCheckResponse” to the Base Station.

3.5.5.2.2 Change of ID Condition

(1) The Base Station sends “IDConditionChangeRequest” to the Land Mobile Station.

(2) When receiving "IDConditionChangeRequest", the Land Mobile Station refers to the contents of its “NewIDCondition”, and sends “IDConditionChangeResponse” or “ObuDenialResponse” to the Base Station as follows:

a) The Land Mobile Station updates the OBE ID information having the specified acquirer ID, and sends “IDConditionChangeResponse” to the Base Station for notifying that change is completed.

b) When there is no OBE ID corresponding to the specified acquirer ID, the Land Mobile Station sends “ObuDenialResponse” whose status is “2: No OBE ID corresponding to specified acquirer ID” to the Base Station.

c) When the OBE ID is not registered at all, the Land Mobile Station sends “ObuDenialResponse” whose status is “12: OBE ID not registered at all” to the Base Station.

3.5.5.2.2.1 Deletion of registered ID

(1) The Base Station sends to the Land Mobile Station “IDDeleteRequest” containing the acquirer ID corresponding to the OBE ID to be deleted.

(2) When receiving "IDDeleteRequest", the Land Mobile Station refers to the acquirer ID contained in “IDDeleteRequest”, and sends “IDDeleteResponse” or “ObuDenialResponse” to the Base Station as follows:

a) When there is OBE ID corresponding to the specified acquirer ID whose condition is “idUnlock (true (1))” enabling deletion, the Land Mobile Station deletes the OBE ID, and sends “IDDeleteResponse” to the Base Station. If the OBE ID condition is “idUnlock (false (0))” disabling deletion, the Land Mobile Station sends “ObuDenialResponse” whose status is “11: Maintenance command failed” to the Base Station.

b) When there is no OBE ID corresponding to the specified acquirer ID, the Land Mobile Station sends “ObuDenialResponse” whose status is “2: No OBE ID corresponding to specified acquirer ID” to the Base Station.

c) When the OBE ID is not registered at all, the Land Mobile Station sends “ObuDenialResponse” whose status is “12: OBE ID not registered at all” to the Base Station.

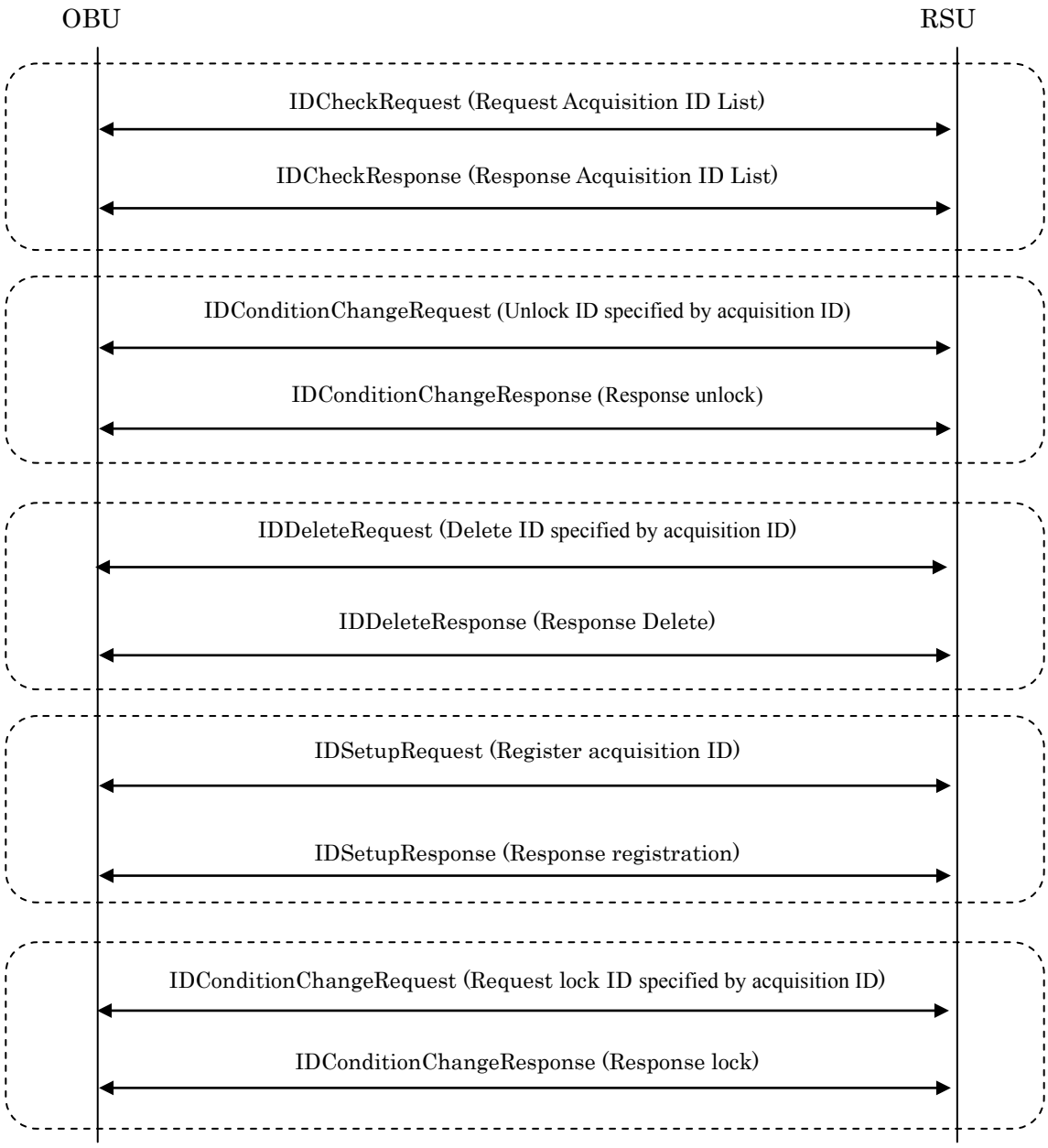
3.5.5.2.2.2 Registration of ID

(1) The Base Station sends “IDSetupRequest” to the Land Mobile Station.

(2) When receiving “IDSetupRequest”, the Land Mobile Station sends “IDSetupResponse” or “ObuDenialResponse” to the Base Station as follows:

a) When there is a registration area for new OBE ID, the Land Mobile Station registers the OBE ID in accordance with the OBE registration information specified in “IDSetupRequest”, and sends “IDSetupResponse” to the Base Station for notifying that registration is completed.

b) When the maximum allowable number of registered OBE IDs is reached and there is no registration area for new OBE ID, the Land Mobile Station sends “ObuDenialResponse” whose status is “13: OBE ID fully registered" to the Base Station.



Note: It can be executed independently in units of area surrounded by broken lines.

Figure 3.5-3 Example of maintenance sequence

3.6 OBE Basic Indication Application

3.6.1 Function Overview

The OBE basic indication application notifies the basic instruction information provided fee information from the external server connected to the Base Station.

3.6.2 Command

3.6.2.1 Command System

Commands used in the OBE basic instruction application consist of the normal command and the denial response command from the Land Mobile Station. The normal commands consist of "basic instruction notice command from the Base Station to the Land Mobile Station" and "basic instruction response command from the Base Station to the Land Mobile Station".

3.6.2.2 Command Format

3.6.2.2.1 Normal Commands

3.6.2.2.1.1 Basic Instruction Notice Command

The basic instruction notice command is used when the Base Station notifies the Land Mobile Station of the basic instruction information. Table 3.6-1 shows the command format.

Table 3.6-1 Basic Instruction Notice Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type operationCommand(1)							
2	Operation Type bOIRequest(0)							
3-36	OBE Basic Instruction Information "BasicObuIndication" format parameter							

(1) Command Type

This field is set to an identifier "operationCommand(1)" to indicate the normal command.

(2) Operation Type

This field is set to an identifier "bOIRequest(0)" to indicate the notice command of basic instruction.

(3) OBE Basic Instruction Information

This field is set to the OBE basic instruction information ("BasicObuIndication" format

parameter; Refer to 3.6.3).

a) versionIndex

This field indicates the version of OBE basic instruction application. The current value is 1.

b) transactionResult

This field indicates the communication result with the Base Station. Three values shown in Table 3.6-2 are defined, and other values are reserved for future use.

Table 3.6-2 Communication Result Format

Value	Meaning
0	The service is normally terminated without charge.
64	The service is abnormally terminated.
128	The service is normally terminated with charge.

c) supplement

This field indicates the supplement information of communication result from the Base Station. It is used 8-bit code of JIS X 0201. “0x00 00 00 00 00” is given when there is no supplement information.

d) time

It is used to notify the time. Table 3.6-3 shows the format. “0x00 00 00 00” is given when there is no effective time information.

Table 3.6-3 Time Format

Stored order	Item	Bit size	Data type
1	year	7	INTEGER(0..127)
2	month	4	INTEGER(0..12)
3	day	5	INTEGER(0..31)
4	hour	5	INTEGER(0..23)
5	minute	6	INTEGER(0..59)
6	second	5	INTEGER(0..29)

Note: The year is expressed as relative year from 1997. The second indicates in 2 seconds unit.

e) amount

It is used to notify the fee/toll. Table 3.6-4 shows the format.

Table 3.6-4 Fee format

Stored order	item	Bit size	Data type
1	fee	24	INTEGER(-8,388,608..8,388,607)
2	unit	16	BCD(4)

Note: “0x0392” specified in ISO4217 is stored as the unit.

3.6.2.2.1.2 Basic Instruction Response Command

The basic instruction response command is used when the Land Mobile Station notifies the Base Station of the normal operation in response to the basic instruction notice command. Table 3.6-5 shows the command format.

Table 3.6-5 Basic Instruction Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type operationCommand(1)							
2	Operation Type bOIResponse(1)							

(1) Command Type

This field is set to an identifier "operationCommand(1)" to indicate the normal command.

(2) Operation Type

This field is set to an identifier "bOIResponse(1)" to indicate the response command of basic instruction.

3.6.2.2.2 OBE Denial Response Command

The OBE denial response command is used when the Land Mobile Station notifies the Base Station of negative acknowledgement in response to the basic instruction notice command. Table 3.6-6 shows the command format.

Table 3.6-6 OBE Denial Response Command Format

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Command Type obuDenailResponse(255)							
2	Status							
3	The length of supplement information							
4 :	The contents of supplement information							

(1) Command Type

This field is set to an identifier "obuDenialResponse(255)" to indicate the normal command.

(2) Status

This field is set to the reason of denial response. For details, refer to Table 3.6-7.

Table 3.6-7 Status Code

Status code	Description
0	Not use
1	Communication error (instruction information and OBE inside error)
2-3	For future use
4	The version incompatible
5-127	For future use
128-255	For private (note)

Note: Land Mobile Station can use these codes arbitrarily.

(3) Supplement Information

a) The length of supplement information

This field is set to the length of successing supplement information. The unit is

octet. When there are no supplement information (this case is default case), this filed is set to value “0”.

b) The contents of supplement information

This field is set to free information (the maximum length is 127 octets) as supplement information. When version number is not same, this field is set to own version (“versionIndex” parameter).

3.6.3 Definition of Data Structures

```
BasicObuIndicationCommand ::=CHOICE{
    dummy               [0]     NULL,
    operationCommand    [1]     OperationCommand,
    dummy               [2-254] NULL,           -- for future use
    obuDenialResponse   [255]   ObuDenialResponse
}

OperationCommand::=CHOICE{
    bOIRequest          [0]     BasicObuIndication,--basic instruction notice
    bOIResponse         [1]     NULL,           --basic instruction response
    dummy               [2-255]  NULL           --for future use
}

ObuDenialResponse ::=SEQUENCE{
    status              INTEGER(0..255),
    supplementInfo      OCTET STRING(SIZE(0..255)) --supplement information
}
BasicObuIndication ::=SEQUENCE{
    versionIndex        INTEGER(0..255),
    transactionResult   INTEGER(0..255),
    supplement          OCTET STRING(SIZE(5)),
    dummy1              OCTET STRING(SIZE(12)),
    time                OCTET STRING(SIZE(4)),
    dummy2              OCTET STRING(SIZE(1)),
    amount              OCTET STRING(SIZE(5)),
    dummy3              OCTET STRING(SIZE(5))
}
```

3.6.4 Relationship of Other Standard

The relationships with other DSRC related standards used in this application are shown below.

Table 3.6-8 Relationship with other DSRC related standards

	DSRC related standard	Content using in this application
1	DSRC Standard	AID=18 (DSRC Application Sub Layer)
2	NCP of ASL	LPCP (Local Port Control Protocol)
3	Port number of LPCP	0x0C08
4	Transaction Service	Use Unidirectional data transmit transaction service in two transaction service provided by LPCP

3.6.5 Communication Procedure

This subsection describes the communication procedure of the OBE basic instruction application.

(1) The Base Station notifies the Land Mobile Station of the OBE basic instruction information using the basic instruction notice command.

(2) When the Land Mobile Station receives the basic instruction notice command, it refers to the OBE basic instruction information, and outputs the contents. When the output is completed, the Land Mobile Station sends the basic instruction response command to the Base Station.

(3) When the Land Mobile Station rejects the OBE basic instruction command due to the contents of the OBE basic instruction or the Land Mobile Station status in the step (2), the Land Mobile Station sends the OBE denial response command to the Base Station.

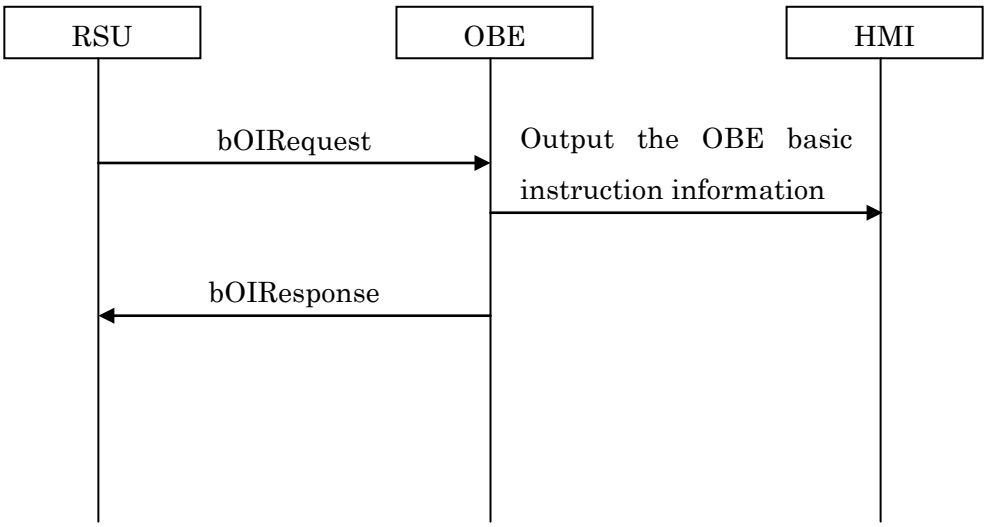


Figure 3.6-2 Sequence example of OBE basic instruction (normal operation)

Chapter 4 Definitions and Abbreviations

4.1 Glossary

Special terms used in this standard are defined below:

[A]

Application sub-layer (ASL)

Placed between the DSRC protocol stack and IP type/non-IP type applications, this layer augments DSRC communication functions and provides a platform that frees applications from having to be DSRC aware.

Land Mobile Station

Mobile onboard equipment in a vehicle that performs wireless communication with a Base Station installed at the roadside.

Octet

A data unit comprised of 8 adjacent binary bits.

[Ka]

Expanded communication control protocol (ASL-ELCP)

A protocol that augments DSRC communication functions and provides communication and management services for ASL-NCP.

Activation

The process of enabling a function.

Pseudo push (smart pull)

A method that delivers content placement information (URL, etc.) for separate content acquisition by HTTP, etc.

Base Station

Fixed roadside communication equipment capable of wireless communication with multiple Land Mobile Stations.

Basic application

A general non-IP type application used in the DSRC system. The following six types are used: OBE instruction response application, OBE memory access application, IC card access application, push-type information delivery application, OBE ID communication application, and OBE basic indication application.

Basic application interface (Basic API)

Interface for communication between basic applications

Search tag

An 8-byte tag that is predefined for each application.

Command

A data communication command.

Content push

A method for delivering the content itself.

[Sa]

OBE ID

A specific identifier that uniquely identifies a Land Mobile Station (OBE).

OBE ID communication application

An application that transmits the ID of a Land Mobile Station to the Base Station, in order to fix the Land Mobile Station at the Base Station.

OBE management memory tag

A memory tag assigned to data for which the Base Station cannot obtain a data storage area.

OBE basic indication application

This application is used when providing the minimum required HMI functions. The application lets the Base Station notify the Land Mobile Station of specific instruction information supplied by a connected external server and intended for the Land Mobile Station.

OBE instruction response application

When specific instruction information from an external server connected to the Base Station and intended for a Land Mobile Station is transmitted, this application serves for returning the user response (entered with input functions of the Land Mobile Station such as buttons, etc.) to the roadside Base Station.

OBE memory access application

This application enables Base Station applications to store free-format, variable-length data along with an 8-byte search tag in internal memory installed in the Land Mobile Station, and to read such data from the memory.

Acquirer ID

An identifier that allows identification of operators registering and acquiring OBE IDs from Land Mobile Stations.

Security profile

Indicates SPF type and data for SPF parameters, linked to the acquirer ID. SPF and SPF

parameters to use are selected according to the security profile.

[Ha]

Deactivation

The process of disabling a function.

Push

The delivery of content from the Base Station to the Land Mobile Station without a request from the Land Mobile Station.

Push-type information delivery application

This application serves for sending content or content location information from an external server connected to the Base Station to a client on the Land Mobile Station, and for automatically processing such received information on the client according to the content type.

[Ma]

Memory tag

An identifier for a data storage memory area in the internal memory where data read/write is performed.

[Ra]

Local port control protocol (LPCP)

One of the protocols forming the ASL-NCP configuration, this control protocol provides communication capability to non-IP type applications.

Local port control number

Identification information that serves to identify a non-IP type application connection.

Local port protocol (LPP)

A transaction oriented protocol placed between LPCP and non-IP type applications to enhance application configuration efficiency.

Base Station allocatable memory tag

A memory tag assigned to a data storage area for which the Base Station has obtained the capability to store data.

[D]

DSRC-SPF

Refers to the DSRC security platform for mutual authentication and for data

authentication and encryption in the OBE -- Base Station.

[I]

IC card access application

An application that provides IC card access according to the ISO/IEC7816 standard method upon request by the Base Station.

[P]

Push client

A client for receiving content or content location information from the push-type information delivery application on the Base Station.

Push server

Server used by the push-type information delivery application to send content or content location information to the Land Mobile Station.

4.2 Abbreviations

This standard uses the following abbreviations:

[A]

AID : Application Identifier

AP : Application Process

APDU : Application Protocol Data Unit

API : Application Interface

ASL : Application Sub-Layer

ASL-ELCP : DSRC-ASL Extended Link Control Protocol

ASN.1 : Abstract Syntax Notation One

ATR : Answer To Reset

[B]

BCD : Binary-coded decimal

[D]

DSRC : Dedicated Short Range Communication

DSRC-ASL : DSRC Application Sub-Layer

[E]

EID : Element Identifier

ETC : Electronic Toll Collection System

[H]

HDML : Handheld Device Markup Language

HMI : Human Machine Interface

HTTP : Hyper Text Transfer Protocol

[I]

ICC : IC Card

ID : Identifier

IP : Internet Protocol

[L]

LAN : Local Area Network

LANCP : LAN Control Protocol

LED : Light Emitting Diode

LPCP : Local Port Control Protocol

LPP : Local Port Protocol

LSB : Least Significant Bit

[M]

MIME : Multipurpose Internet Mail Extensions

MSB : Most Significant Bit

MTU : Maximum Transmission Unit

[N]

NCP : Network Control Protocol

[P]

PDU : Protocol Data Unit

PER : Packed Encoding Rule

PPP : Point-to-Point Protocol

PPPCP : PPP Control Protocol

[S]

SDU : Service Data Unit

SP : Smart Pull

SPF : Security Platform

[T]

TCP : Transmission Control Protocol

TTS : Text To Speech

[U]

URI : Uniform Resource Identifier

URL : Uniform Resource Locator

[V]

VICS : Vehicle Information and Communication System

[X]

XML : Extensible Markup Language

4.3 Variables

This standard uses the following variables:

maxCommandBodySize: Maximum size of operation data section that can be received by Land Mobile Station

maxMemorySize: Maximum size of memory area for storing data that can be identified by memory tag

MaxPushBodySize: Maximum size of content data that can be received in one operation by push client

MaxContentSize: Maximum size of content data that can be handled by DSRC client

Annex

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AnnexA Relationship between DSRC Services and Basic Application Interface

A.1 Postulated Examples of DSRC Services and Required Functions

The table below shows provision places, concrete contents, and required functions of postulated DSRC services.

Table A1-1 Functions required in DSRC services

Postulated DSRC service examples			Required function	
Provision place		Concrete contents	Charge settlement	Information exchange
(1)	Gas station	Fuelling, sales and purchasing of goods, etc.	X	
		Information distribution, sales and purchasing of maps, music, etc.	X	X
		Guidance of services (such as Vehicle washing and oil change)		X
		Services for members such as loyalty Point Card		X
(2)	Vehicle dealer	Control of customer, and control and provision of maintenance history		X
		Sales and purchasing of goods, etc.	X	
		Information distribution, sales and purchasing of maps, music, etc.	X	X
		Update, sales and purchasing of software for OBE (such as navigator)	X	X
(3)	Parking lot	Control of entrance and exit (for monthly contract)		X
		Guidance of parking position (on pay-by-the-hour basis)		X
		Charge and payment of parking fee	X	
(4)	Fast food restaurant, convenience store, etc	Information distribution, sales and purchasing of various goods, discount goods, etc.	X	X
		Reservation, sales and purchasing of various tickets	X	X
		Information distribution, sales and purchasing of maps, music, etc.	X	X

(5)	Ferry landing	Reservation and boarding procedure		X
		Charge and payment of ferry fee	X	
		Guidance of parking position		X
(6)	Store/facility notice and guidance	Various advertisements and guidance of store/facility		X
		Reservation for use of store/facility		X
(7)	Expressway service area and parking area	Provision of traffic information, restriction information, road information, etc.		X
		Provision of services, facility guidance, sightseeing information, etc.		X

A.2 Detailed Function Analysis

A.2.1 Requirements in system realizing charge settlement

For realizing the charge settlement function in the DSRC system, the following two methods are postulated:

- Settlement method in which the identification information held in the Land Mobile Station is linked with the settlement means
- Settlement method in which the IC Card mounted in the Land Mobile Station is accessed

(1) Settlement Processing Using OBE ID

The following functions are required to link the identification information held by the Land Mobile Station with the settlement means, and then settle the charge. The infrastructure should have not only the following functions but also the function to realize the settlement corresponding to the information (ID) specific to the Land Mobile Station.

a)Function to give various instructions to the Land Mobile Station (Function equivalent to or expanded from the function of the ETC system)

b)Function to access the information (ID) specific to the Land Mobile Station

c)Function to access the memory incorporated in the Land Mobile Station (for accumulating the use information, etc.)

(2) Card settlement system

The following functions are required to access the IC Card mounted in the Land Mobile Station, and then settle the charge using the IC Card. The infrastructure should have not only the following functions but also the settlement function specific to the IC

Card.

a)Function to give various instructions to the Land Mobile Station (Function equivalent to or expanded from the function of the ETC system)

b)Function to access the IC Card mounted in the Land Mobile Station

c)Function to access the memory incorporated in the Land Mobile Station (for accumulating the use information, etc.)

A.2.2 Requirements for System Realizing Information Exchange

For realizing the information exchange function in the DSRC system, the following two methods are postulated:

- Exchange method in which the counterpart is authenticated using the identification information held by the Land Mobile Station, and then information is exchanged between the counterpart and the memory incorporated in the Land Mobile Station
- Exchange method in which the Land Mobile Station is used as communication means, and then information is exchanged between the information terminal unit connected to the Land Mobile Station and the Base Station

(1) OBE Specific Information Control System

The following functions are required to authenticate the counterpart using the identification information held by the Land Mobile Station, and then exchange information between the counterpart and the memory incorporated in the Land Mobile Station.

The infrastructure should have not only the following functions but also the information processing function.

a) Function to give various instructions to the Land Mobile Station (Function equivalent to or expanded from the function of the ETC system)

b) Function to access the information (ID) specific to the Land Mobile Station

c) Function to access the memory incorporated in the Land Mobile Station (for accumulating the use information, etc.)

(2) Information Provision System Interlocking with the Image Display Unit

The following functions are required to use the Land Mobile Station as communication means, and then exchange information between the information terminal unit connected to the Land Mobile Station and the Base Station.

The infrastructure and information terminal unit connected to the Land Mobile Station should have not only the following functions but also the information processing

function.

a) Function to connect the information server through IP connection, and access information in accordance with requests from the Land Mobile Station (Request/response type information provision)

b) Function to distribute the URL of the start page for provided services and diversified information from the information server to the Land Mobile Station (Push type information provision)

A.2.3 Correspondence between Required Functions and Processing Flows

The figures shows the correspondence between the required functions extracted in the previous paragraph and the processing flow in each service scene.

A.2.3.1 Charge Settlement

(1) Linking Settlement System

System to perform settlement using the personal information linked with the specific information held by the Land Mobile Station

a) Function to give various instructions to the Land Mobile Station (Function equivalent to or expanded from the function of the ETC system)

b) Function to access the information (ID) specific to the Land Mobile Station

c) Function to access the memory incorporated in the Land Mobile Station (for accumulating the use information, etc.)

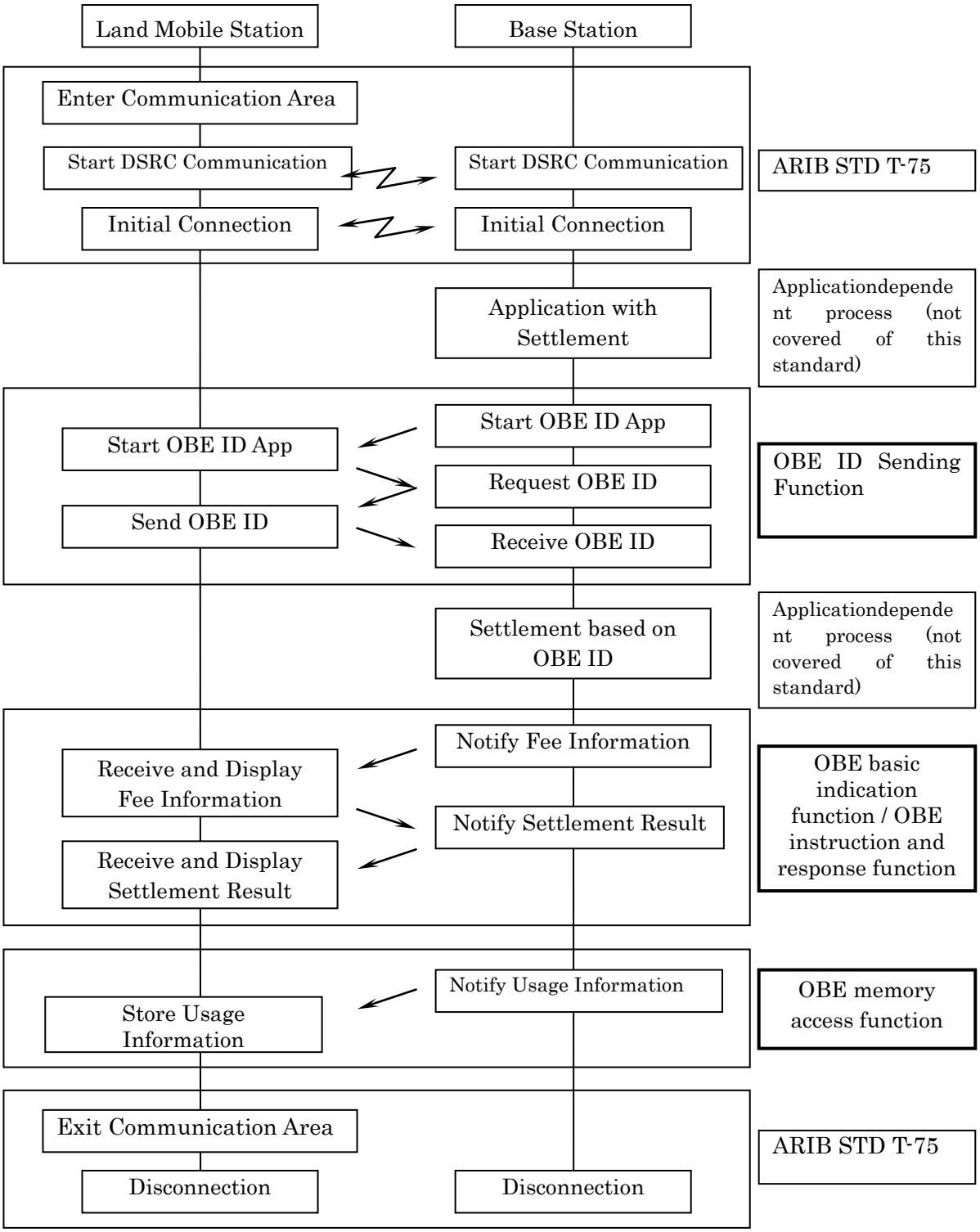

Figure A2-1 Procedure of Linking settlement system

(2) Card Settlement System

System to directly perform settlement using a contact type IC Card (such as Credit Card and Prepaid Card)

a) Function to give various instructions to the Land Mobile Station (Function equivalent to or expanded from the function of the ETC system)

b) Function to access the IC Card mounted in the Land Mobile Station

c) Function to access the memory incorporated in the Land Mobile Station (for accumulating the use information, etc.)

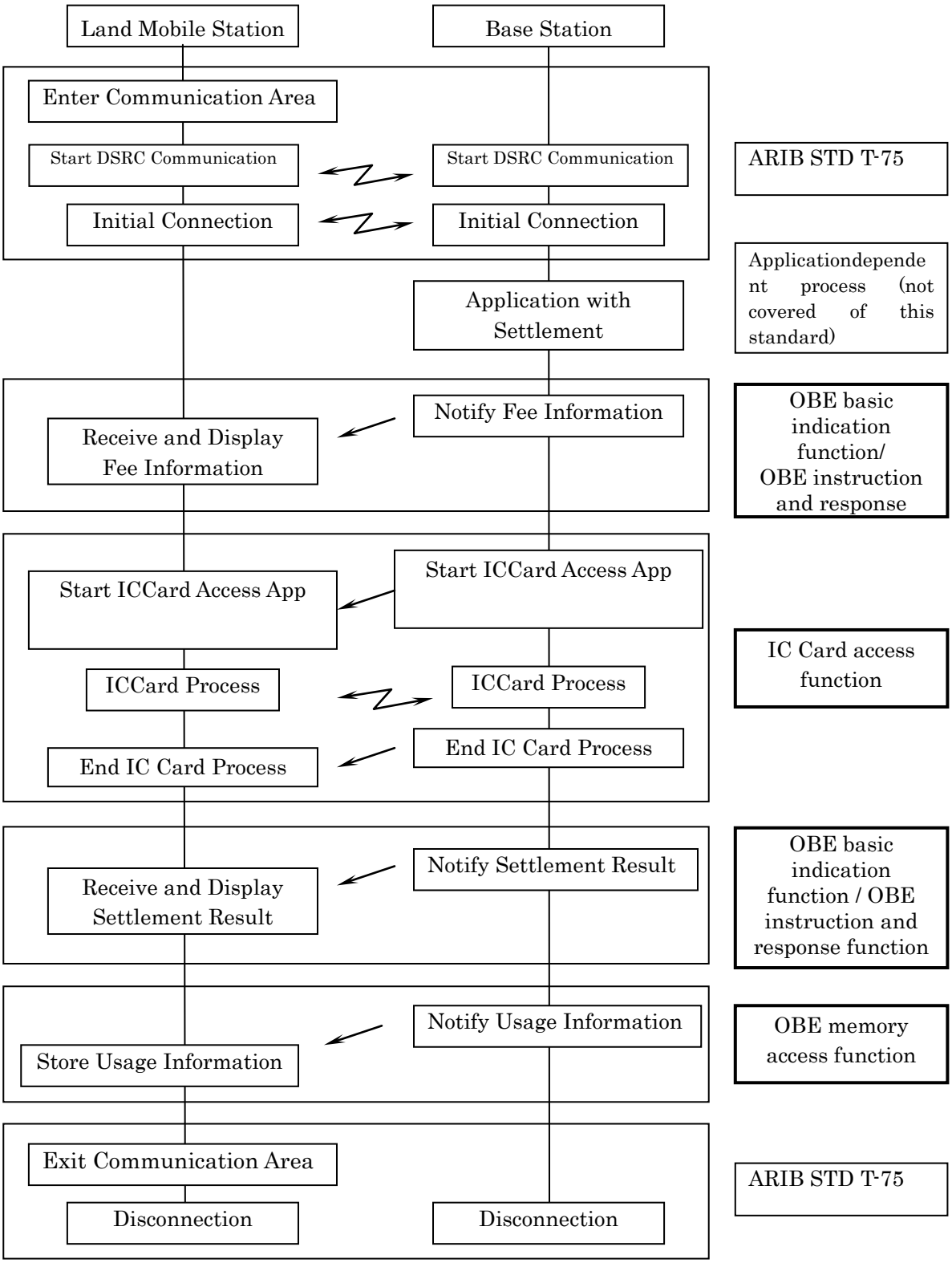

Figure A2-2 Procedure of Card settlement system

A.2.3.2 Information Exchange

(1)Vehicle specific information control system

System to control the information specific to the Vehicle for customer control by Vehicle dealers, entrance/exit control in monthly-paid parking lot, etc.

a) Function to give various instructions to the Land Mobile Station (Function equivalent to or expanded from the function of the ETC system)

b) Function to access the information (ID) specific to the Land Mobile Station

c) Function to access the memory incorporated in the Land Mobile Station (for accumulating the use information, etc.)

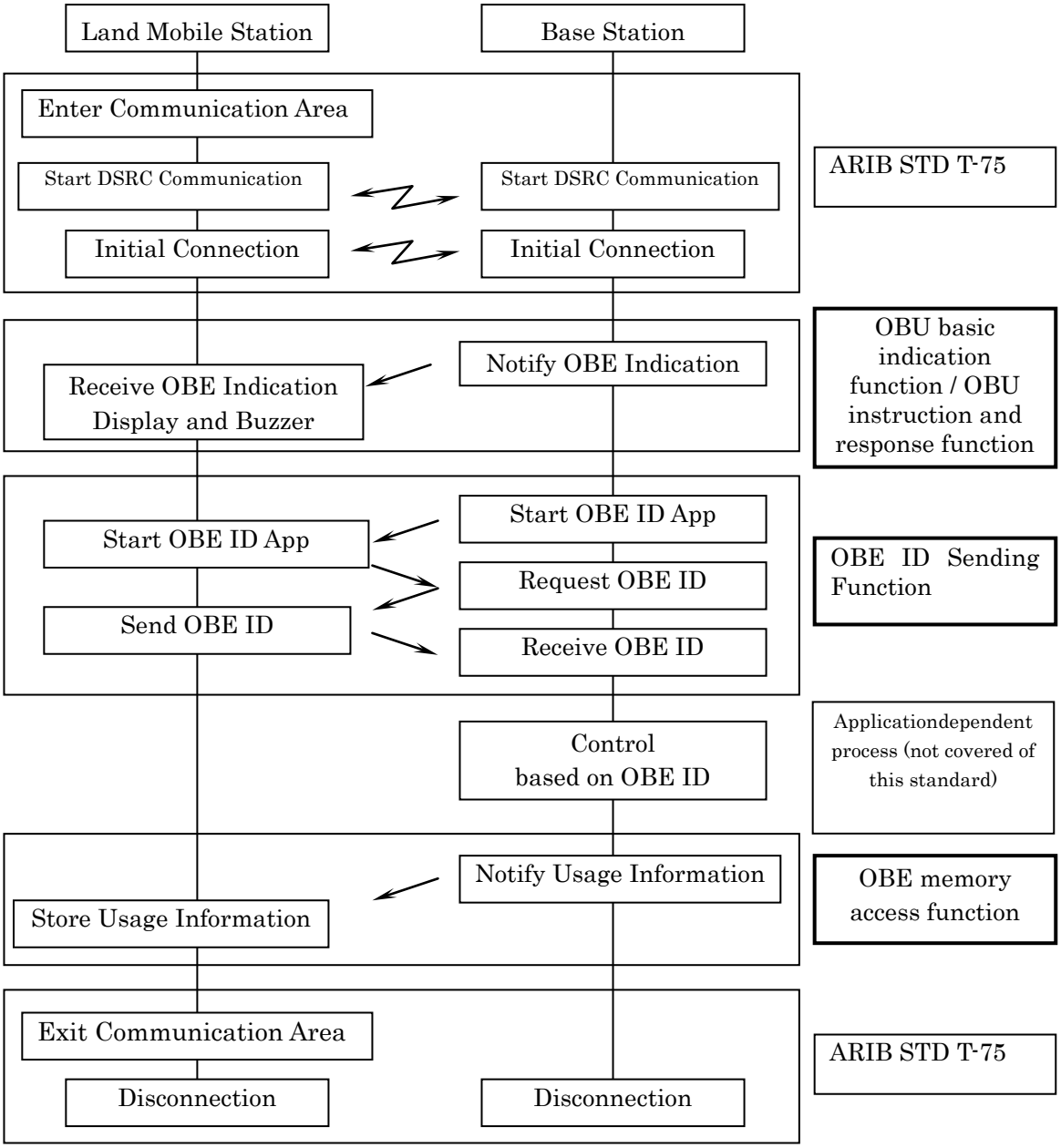

Figure A2-3 Procedure of Vehicle specific information control system

(2)Information provision system interlocking with the image display unit

System to provide traffic information and road information, and distribute information for maps, music, etc. through interlock with the information display unit (such as Vehicle navigation equipment) attached to the Land Mobile Station

a) Function to connect the information server through IP connection, and access information in accordance with requests from the Land Mobile Station (Request/response type information provision)

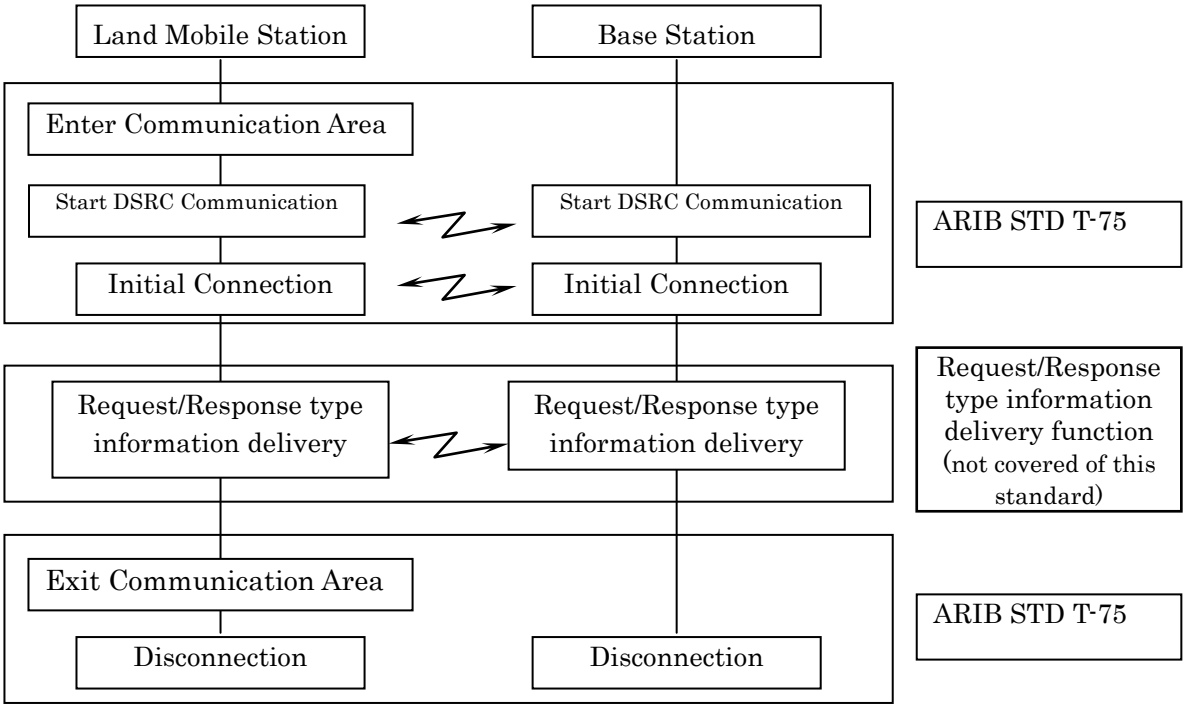

Figure A2-4 Processing flow in the request/response type information provision system

b) Function to distribute the URL of the start page for provided services and diversified information from the information server to the Land Mobile Station (Push type information provision)

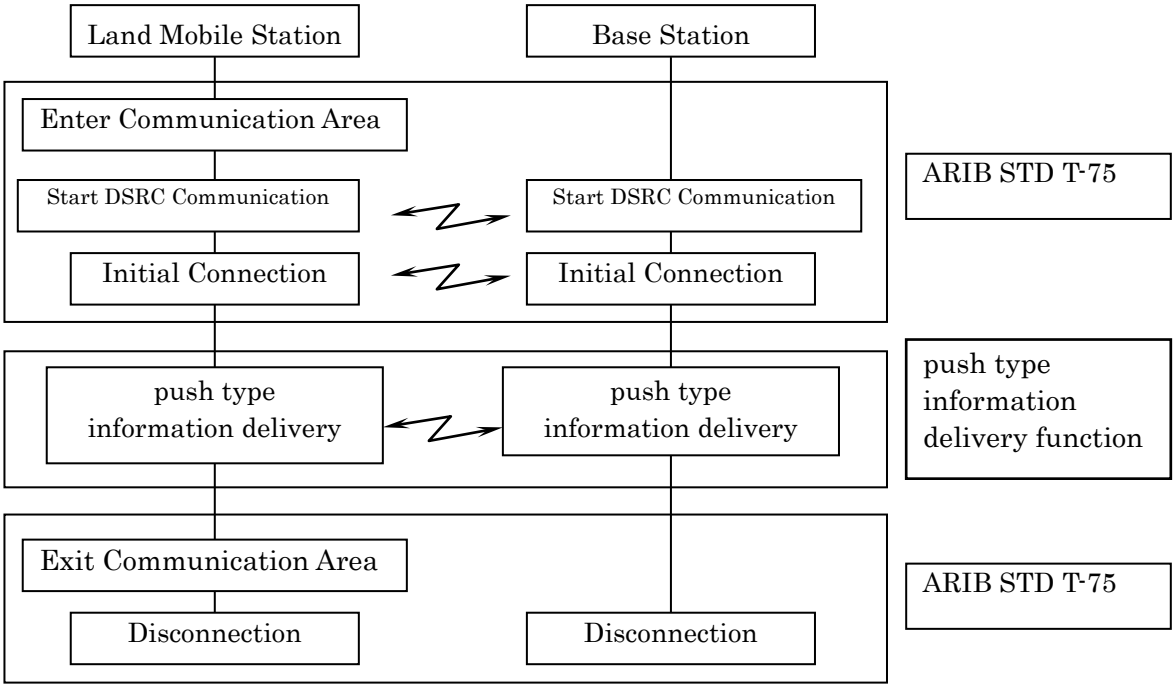

Figure A2-5 Processing flow in the push type information delivery system

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AnnexB Relationship with Security Platform

This section describes the relationship with the security platform located between the DSRC basic application interface and the local port protocol (LPP).

The security platform (DSRC-SPF) executes mutual authentication between the DSRC Land Mobile Station and the Base Station, and authenticates the equipment. The DSRC-SPF is available for cryptographic communication of the DSRC basic application interface by using a key exchanged in mutual authentication. The security used by the DSRC-SPF is selectable among several types.

B.1 Security Platform Configuration

The security platform located between the DSRC basic application interface and the LPP as shown in Attached Figure B1-1 executes the security type negotiation, mutual authentication and key exchange processing using the local port number (LP1) assigned to the DSRC-SPF, as well as encrypts send data given by the basic application interface and decrypts received data given by the LPP using the selected security type and exchanged key acquired in the authentication/key exchange phase.

Each basic application interface has two ports, a port using the DSRC-SPF (secure port LP3) and a port not using the DSRC-SPF (normal port LP2), and incorporates the function to select whether data is processed using the DSRC-SPF in units of transaction of the LPP (through sending to the secure port) or the DSRC-SPF is bypassed (through sending to the normal port).

Note: It is not necessary to increase the local port for each security type even if security type choices available in the SPF increase.

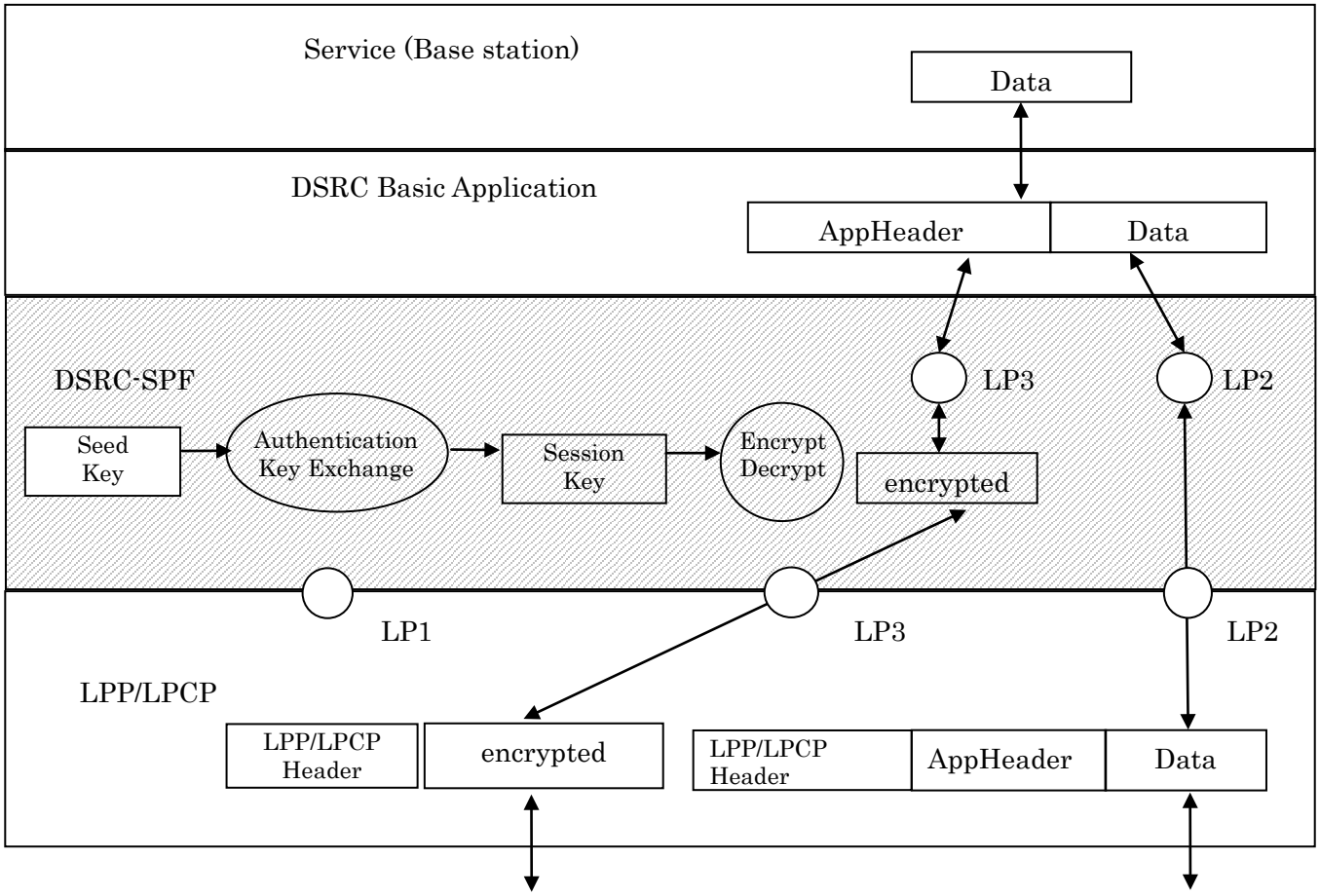


Figure B1-1 Security Platform configuration

Details of the security processing specified by the security type are outside the range of this standard, and shall be specified separately.

B.2 Local Port Number List

When the SPF is not used, the conventional area from “0x0C00” to “0x0C1F" is used as the normal port area for the local port number of the basic application interface, and the area from “0x0C20” to “0x0C3F” is used as the secure port area. The classification and layout of the basic application interface in the secure port area conforms to the classification and layout of the basic application interface in the normal port area.

The port number “0x0C3F” is used as the control port for the basic application interface security platform, and used in the authentication/key exchange phase.

Table B2-1 shows the list of local port numbers of the basic application interface.

Table B2-1 Local Port Number of Basic Application

Normal Port	Secure Port	Application	Remarks
0x0C00	0x0C20	OBE ID Communication Application	<data flow> RSU<-OBU
0x0C01-0x0C07	0x0C21-0x0C27	For future use	
0x0C08	0x0C28	OBE Basic Indication Application	<data flow> RSU->OBU
0x0C09	0x0C29	OBE Instruction Response Application	
0x0C0A	0x0C2A	Push-type information delivery application	
0x0C0B-0x0C0F	0x0C2B-0x0C2F	For future use	
0x0C10	0x0C30	ICCard Access Application	<data flow> RSU<->OBU using IC Card
0x0C11	0x0C31	Contactless IC Smart Card Access Application	
0x0C12-0x0C17	0x0C32-0x0C37	For future use	
0x0C18	0x0C38	OBE Memory Access Application	<data flow> RSU<->OBU using Memory
0x0C19-0x0C1F	0x0C39-0x0C3E	For future use	
-	0x0C3F	Security Platform Management Entity	

B.3 Important Notice about Basic Application Interface using SPF

B.3.1 Relationship with In-Application Security

The in-application security attribute and common SPF are available independently. Accordingly, it is possible in secure ports to use the SPF independently or use both the SPF and the in-application security together.

When using only the common SPF, use data without any security (as plain text) in the application, and execute encryption and decryption in the SPF.

B.3.2 Access Control Using SPF for Land Mobile Station

It is postulated that communication is enabled at secure ports in each application only after the SPF authentication/key exchange phase is completed.

(1)OBE ID communication application

For enabling sending the OBE ID using the SPF in the OBE ID communication application, set the OBE ID to “spf (true (1))”.

When using the SPF to control accesses of maintenance commands, disable maintenance commands from normal ports, and enable maintenance commands only from secure ports (except in the mutual confirmation test, etc.).

(2) IC card access application

Accesses from normal ports are disabled in the IC card access application (except in the mutual confirmation test, etc.).

(3) Push type information delivery application

Issue the client information notice “ClientInformation” when secure ports become ready for communication in the push type information delivery application.

When normal ports are used at the same time, it is possible to issue “ClientInformation” for each port and give different settings of receivable contents to secure ports and normal ports.

(4) OBE memory access application

It is recommended to use secure port when using commands with password in the OBE memory access application.

AnnexC Service Application Examples using Basic Application Interface

This section describes service application examples using the basic application interface specification.

This section describes the already introduced DSRC system in parking lots, demonstration experiment system in parking lots and demonstration experiment system for information providing services on access roads of expressway service areas, etc. This section is available as reference for utilizing the DSRC basic application interface.

C.1 Settlement Processing Using OBE ID

The figure below shows a transaction example in the settlement processing system using the OBE ID application interface.

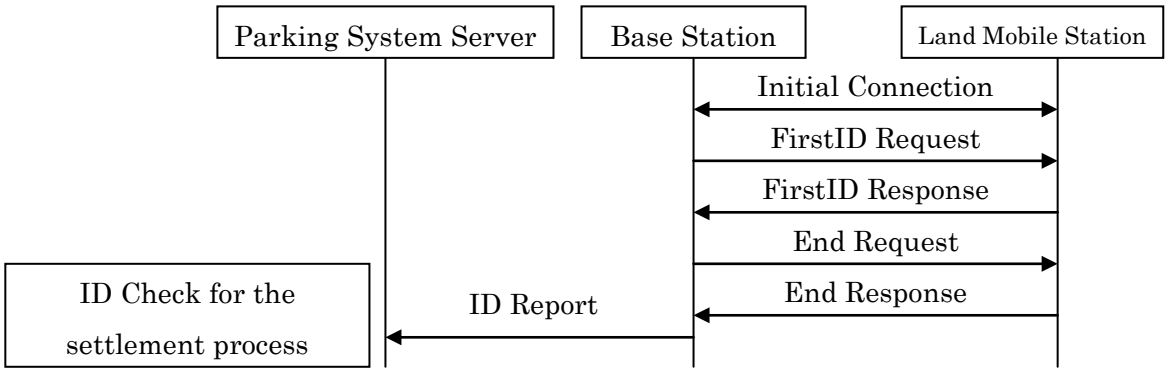


Figure C1-1 Communication transaction example (for plain text) in the settlement processing system using the OBE ID application interface

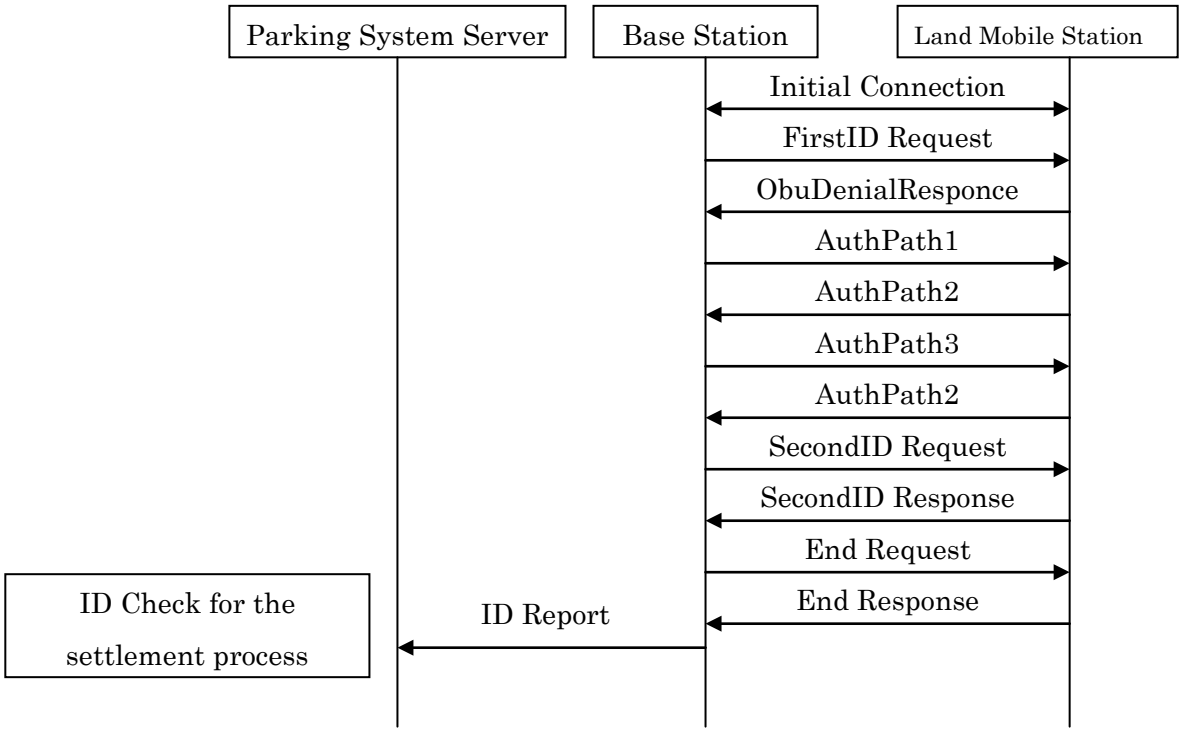


Figure C1-2 Communication transaction example (for encrypted text) in the settlement processing system using the OBE ID application interface

C.2 Prepaid Type Settlement Processing Using IC Card Access

The figure below shows a transaction example of the prepaid type settlement processing system using both the IC card access application interface and the push type information delivery application interface.

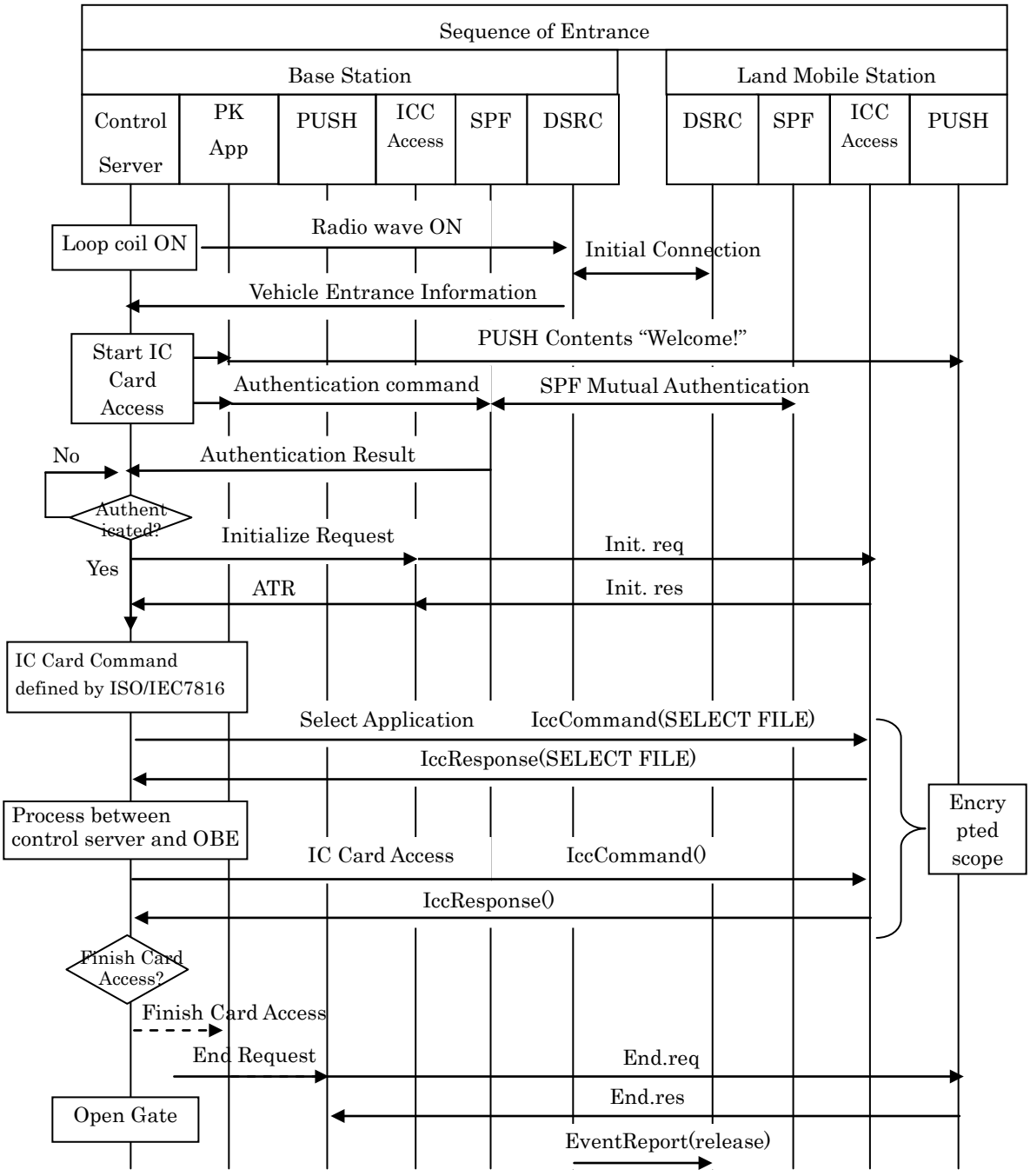


Figure C2-1 Processing Sequence of Entrance

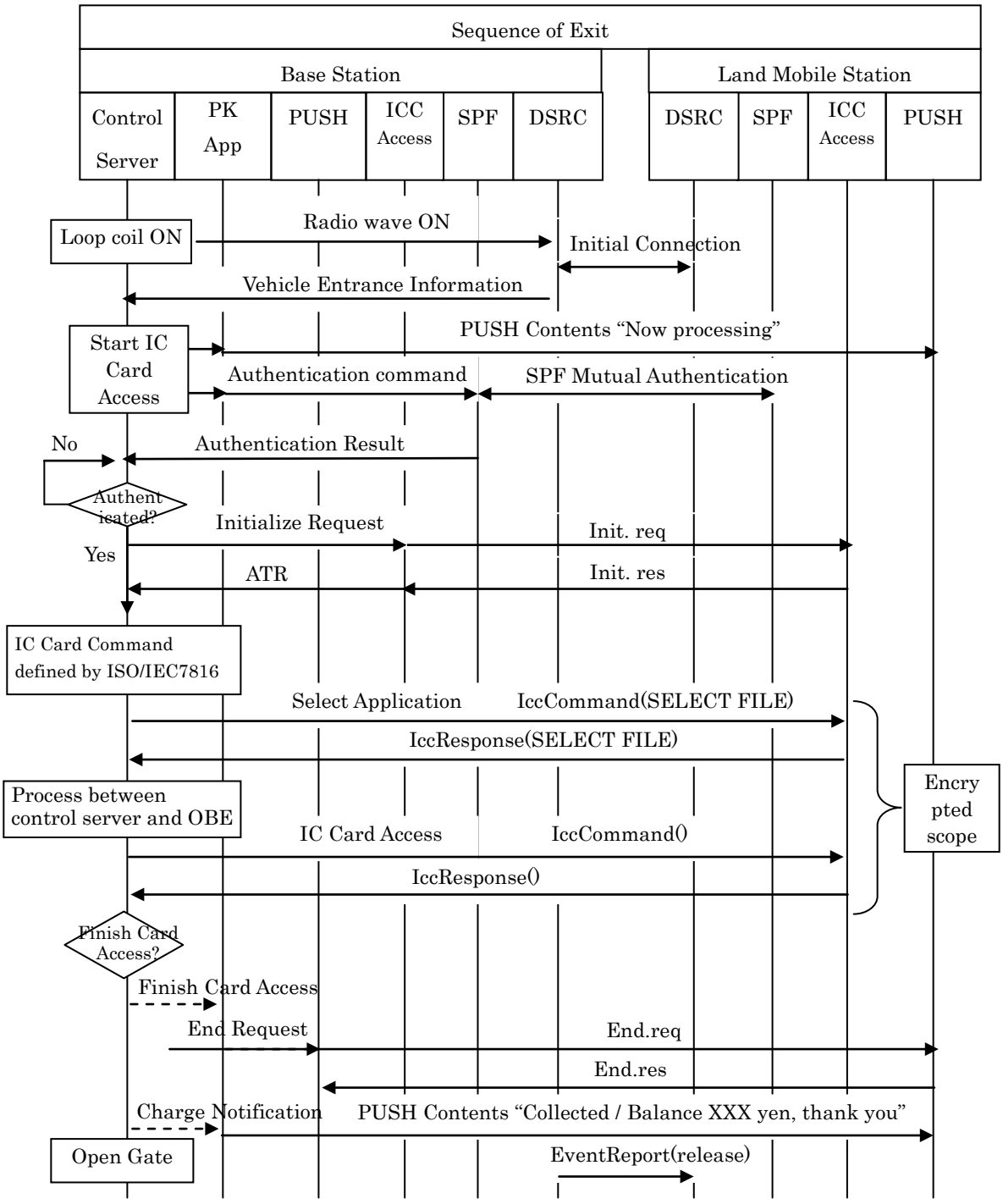
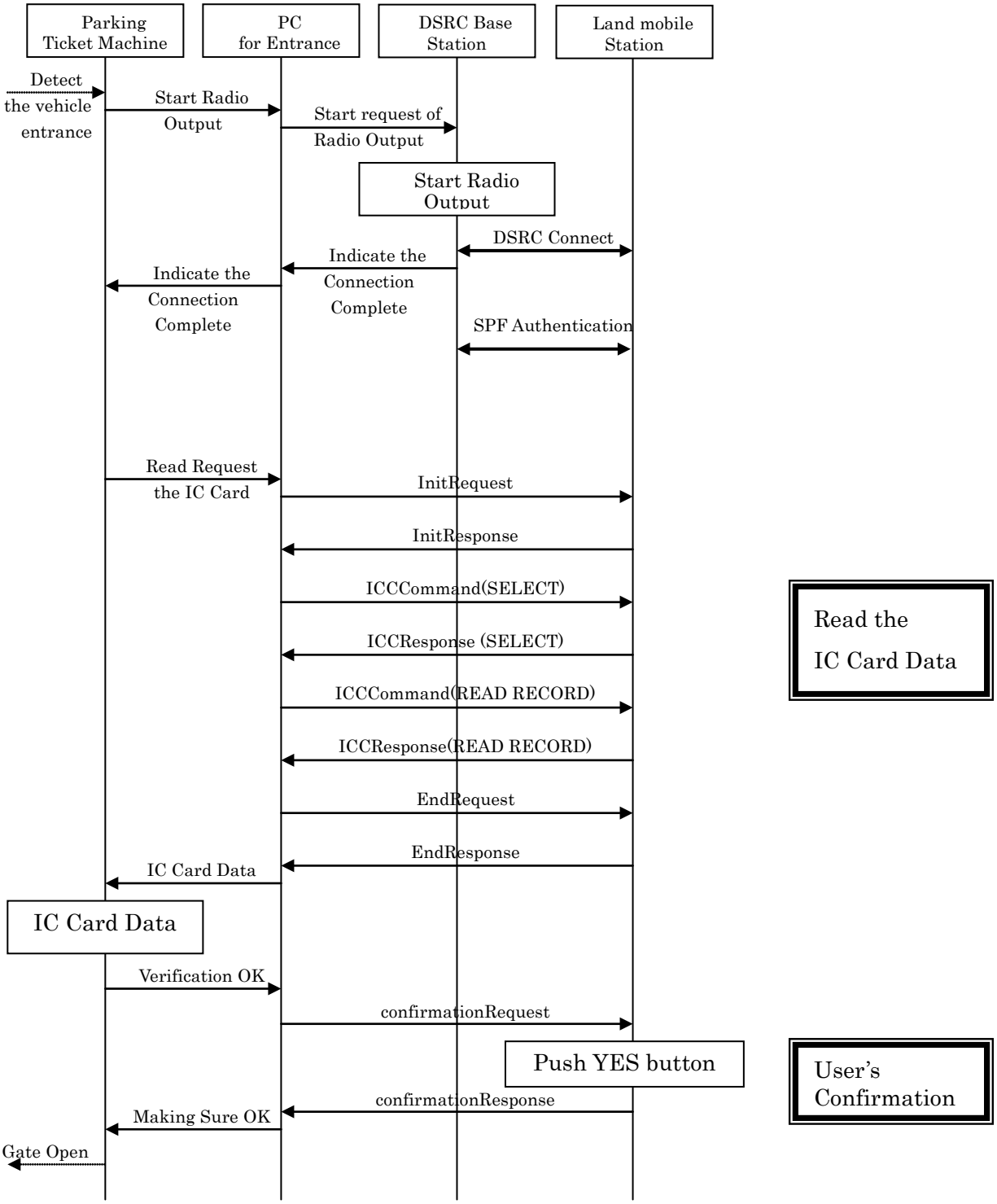


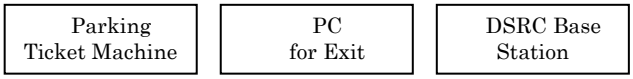
Figure C2-2 Processing Sequence of Exit

C.3 Settlement Processing using IC Card ID

The figure below shows a transaction example of the settlement processing system using the IC card access application interface.



Fugure C3-1 Processing Sequence of Entrance



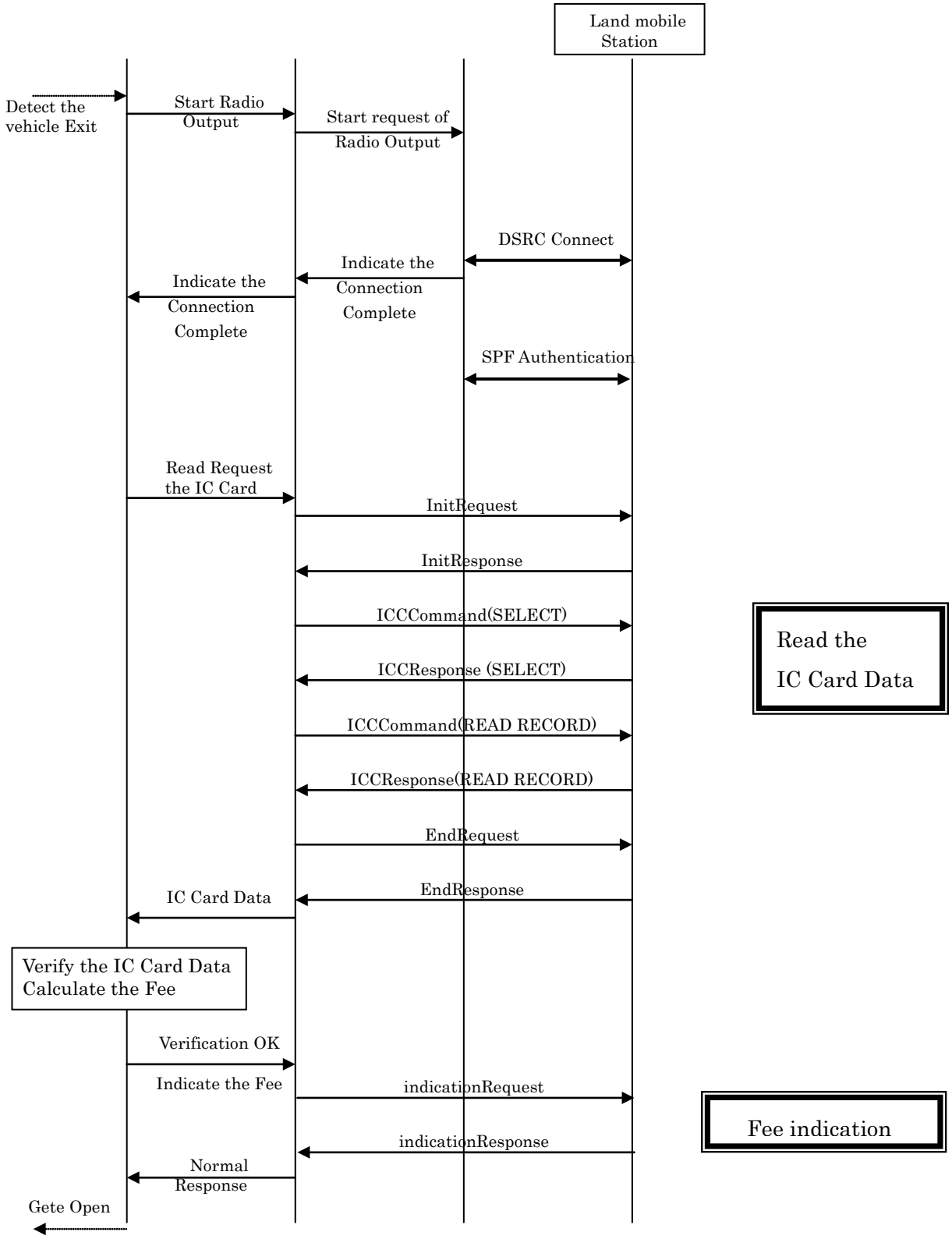


Figure C3-2 Processing Sequence of Exit

C.4 Information Providing Service Using Push-type Information Delivery

a) Point-to-point information providing service using the OBE ID

The figure below shows a transaction example in the push type information providing system using both the push type information delivery application interface and the OBE ID application interface.

In this transaction example, distributed push data is presented as voice data.

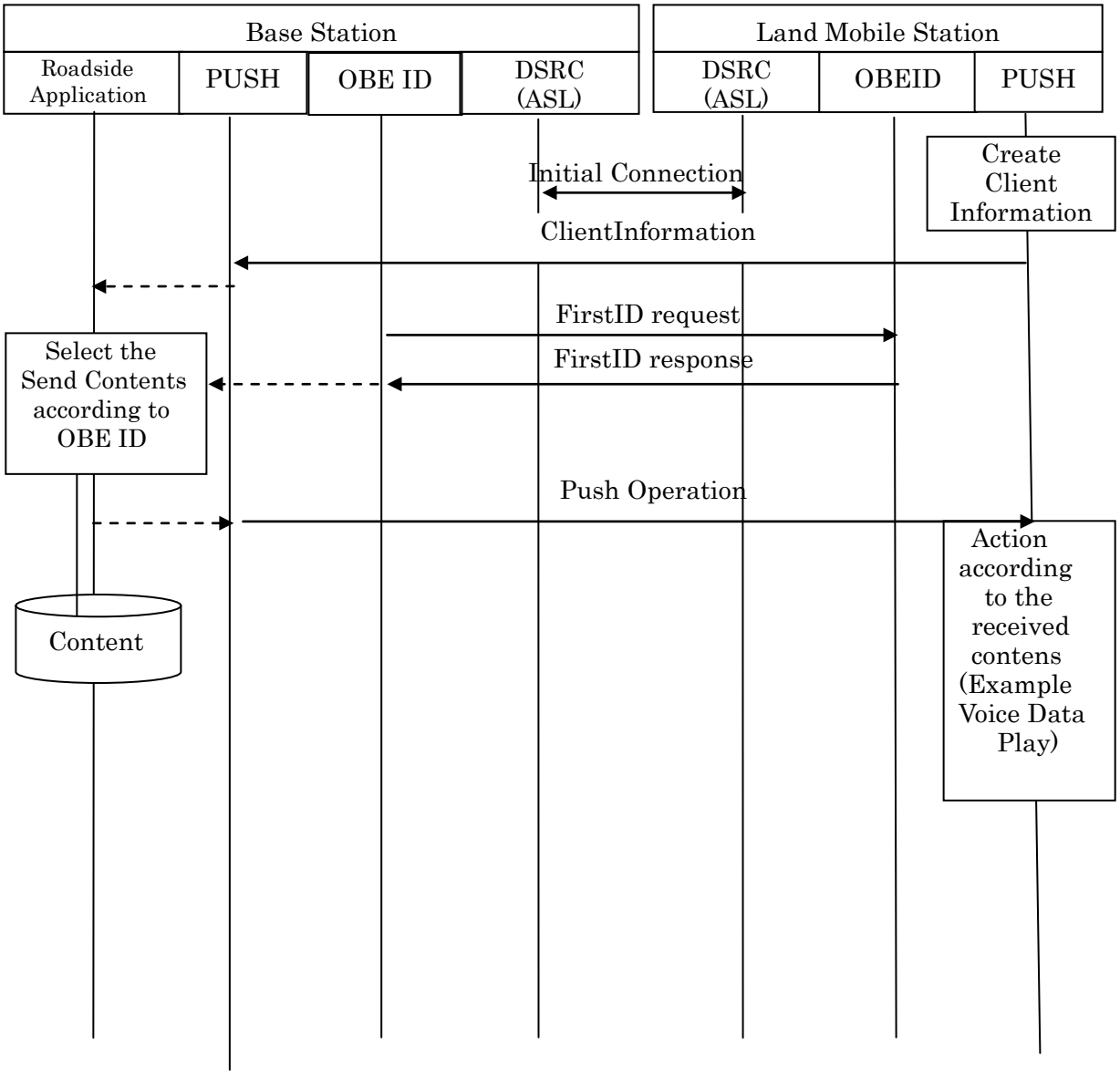


Figure C4-1 Sequence in the push type information providing service system

b) Point-to-point information providing service for many contents

The figure below shows a transaction example in the many contents delivery service using the push type information delivery application.

In this transaction example, several voice messages are played sequentially using the push delivery function with confirmation response.

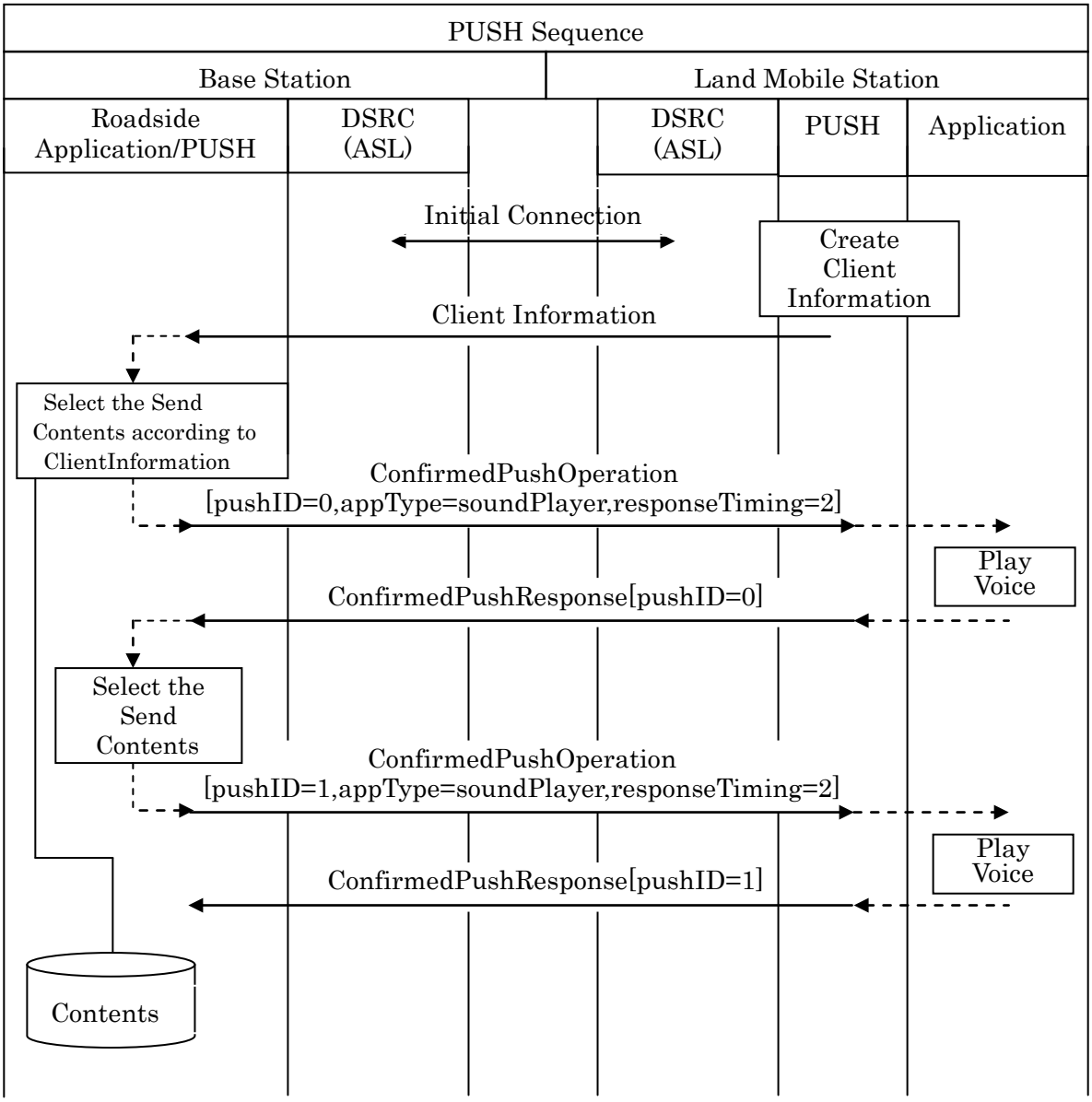


Figure C4-2 Many contents distribution sequence using the push delivery function with confirmation response

c) Broadcast information providing service using the repeated send function

The figure below shows a transaction example in the push type information providing system using the broadcast repeated send function in the push type information delivery application.

In this transaction example, voices and images are distributed one by one.

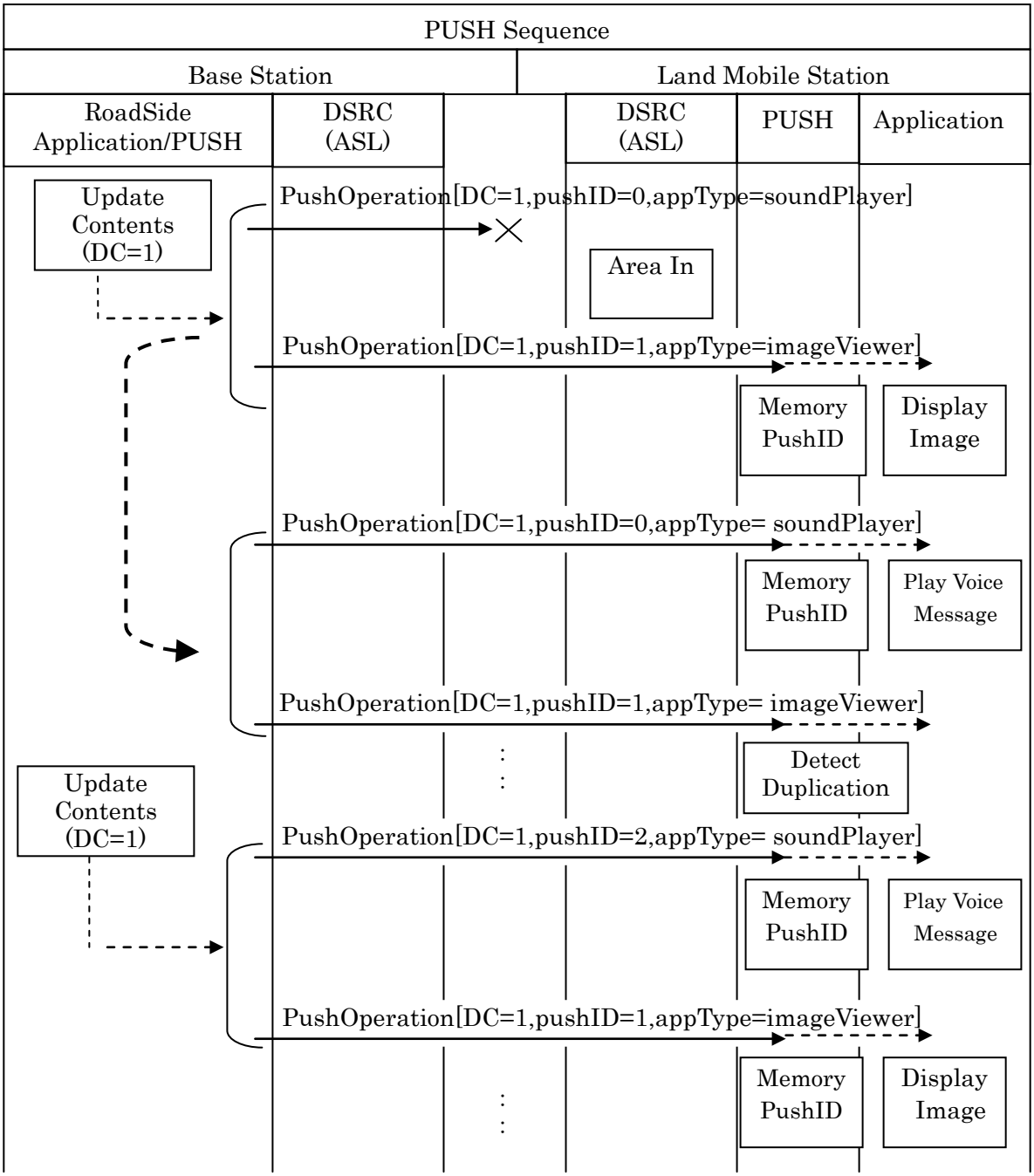


Figure C4-3 Sequence in the push type information providing service system (Broadcast, Repeat Transmission)

d) Broadcast information providing service using the dedicated application

The figure below shows a transaction example in the push type information providing system executing the division/assembly and duplicate check in the execution application.

This transaction example shows the execution application which divides a content into segments in the Base Station, distributes segments, assembles segments in the Land Mobile Station, and then displays images in the Land Mobile Station.

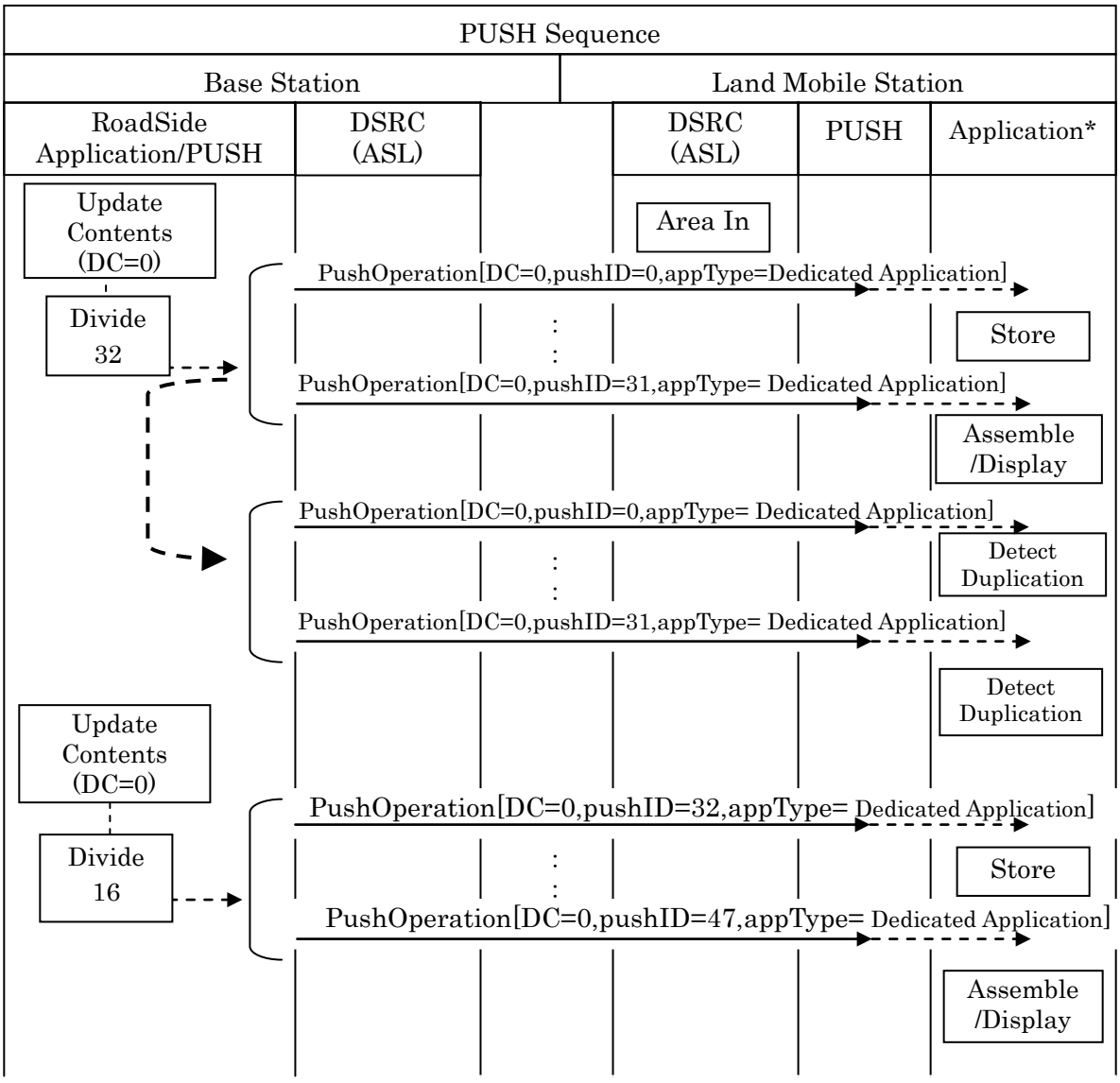


Figure C4-4 Sequence in the push type information providing service system (Broadcast, Dedicated Application)

C.5 Settlement Processing Using IC Card

The figure below shows a transaction example in the settlement processing using the IC card access application interface.

Items inside parentheses in commands indicate the contents of “CommandAPDU" or “ResponseAPDU” stored in the operation data area of commands.

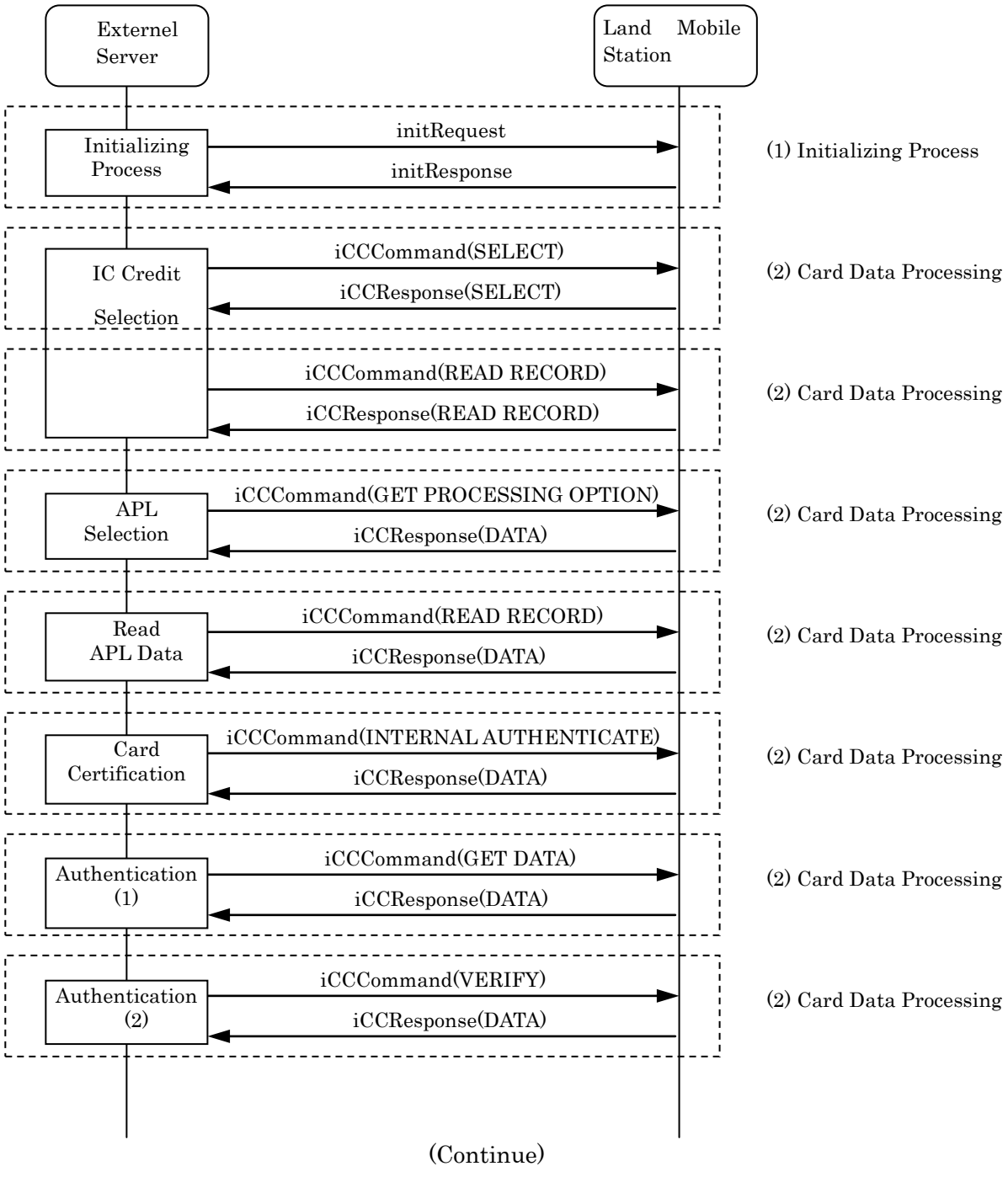


Figure C5-1 Sequence example in the settlement processing using the IC card (1/2)

(Continued)

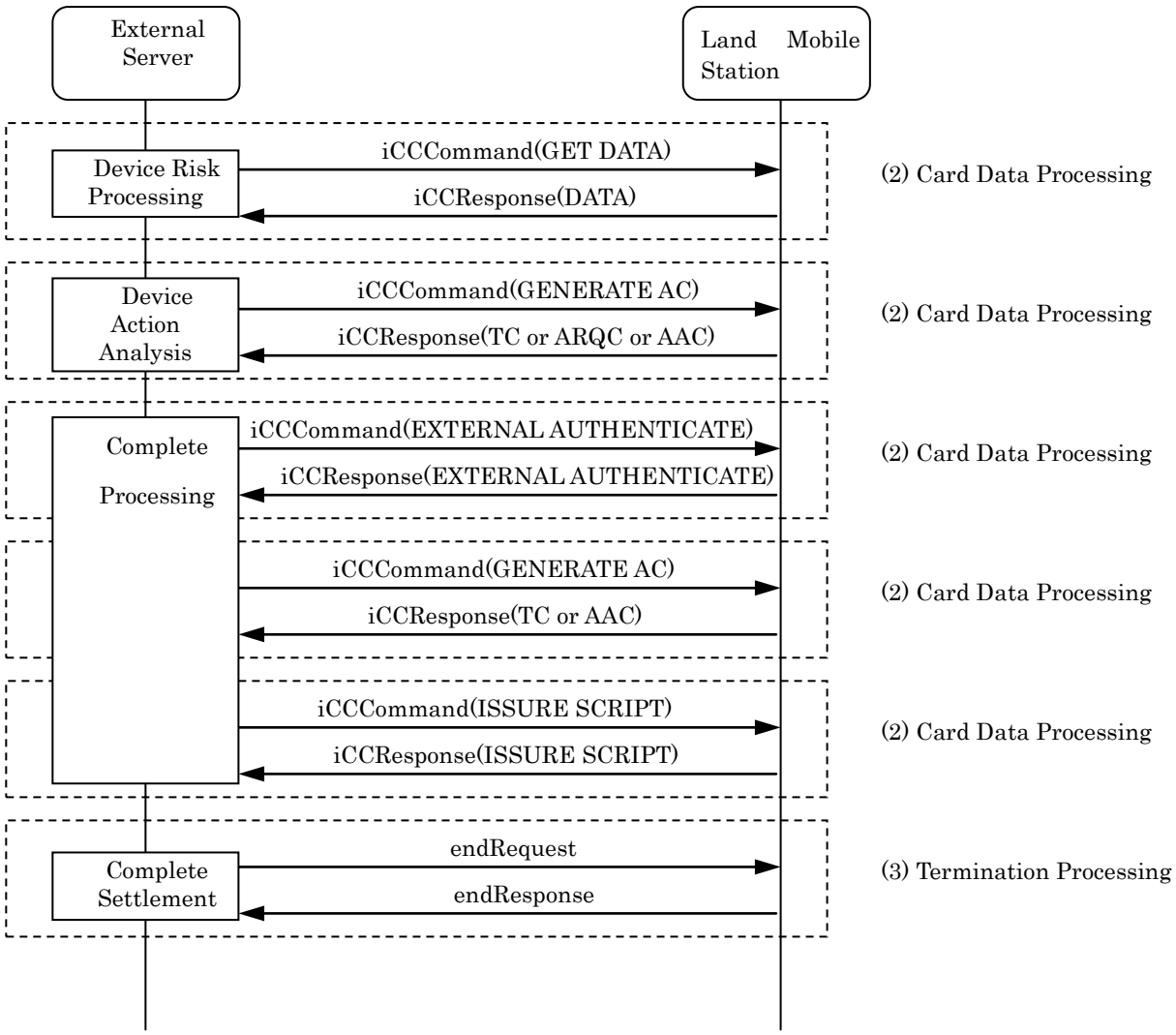


Figure C5-1 Sequence example in the settlement processing using the IC card (2/2)

AnnexD OBE Memory Access Application

D.1 Memory Tag Configuration

The memory tag consists of 8 bytes.

Table D1-1 Memory Tag Format

	7 (MSB)	6	5	4	3	2	1	0 (LSB)
1	Memory Record Assurance	Memory Control Type	don't care (Reserved)					
2-8	Memory Tag Address (7 Octets)							

(1) Memory Record Assurance

This item indicates the storage memory attribute of data corresponding to the memory tag.

a) Set "0" when the memory is located in the nonvolatile area.

b) Set "1" when the memory is located in the volatile area.

(2) Memory Control Type

a) Set "0" when the memory tag can be allocated by the Base Station.

b) Set "1" when the memory tag is controlled by the Land Mobile Station.

(3) Memory Tag Address

Set a unique value assigned to each system or provider.

The assignment method is outside the range of this standard.

Note: Lower 6 bits of the 1st octet are handled as "don't care (reserved)". The Base Station and Land Mobile Station in accordance with the current version of this standard ignore values set in areas specified as "don't care (reserved)". In concrete, when the memory tag is "0x01", it is handled as "0x00" by the Base Station and Land Mobile Station in accordance with the current version of this standard.

D.2 Important Notice about Options

D.2.1 Memory allocation function option

The following points should be kept in mind when the Land Mobile Station is not equipped with the memory allocation function and the memory free function:

(1) When receiving “memoryallocRequest” or “memoryFreeRequest” from the Base Station, the Land Mobile Station shall send the OBU denial response command “obuDenialResponse” whose status is “12: No support command" to the Base Station.

(2) When receiving “readRequest”, “writeRequest”, “readRequestWithCredence” or “writeRequestWithCredence” for the Base Station allocatable memory tag from the Base Station, the Land Mobile Station shall send the OBU denial response command “obuDenialResponse” whose status is “6: There is no requested memory tag" to the Base Station.

(3) When receiving “readBulkRequest”, “writeBulkRequest”, “readBulkRequestWithCredence” or “writeBulkRequestWithCredence” for the Base Station allocatable memory tag from the Base Station, the Land Mobile Station shall regard that reading or writing of the corresponding memory tag has failed, and shall continue processing for the next memory tag.

(4) When receiving “resourceInfoRequest” from the Base Station, the Land Mobile Station shall set “0” to all “storageProperty” (Property of Memory Area) of “resourceInfo” type variables.

The following point should be kept in mind when the Land Mobile Station is equipped with the memory allocation function and the memory free function:

(1) When receiving “resourceInfoRequest” from the Base Station, the Land Mobile Station shall set “storageProperty” (Property of Memory Area) of “resourceInfo” type variables.

D.2.2 Password option

The following points should be kept in mind when the Land Mobile Station is not equipped with the password as an attribute of memory tags:

(1) Memory cannot be allocated for memory tags dedicated to the Land Mobile Station having the password attribute.

(2) When receiving “memoryAllocRequestWithCredence”, “memoryFreeRequestWithCredence”, “readRequestWithCredence”, “writeRequestWithCredence”, "readBulkRequestWithCredence” or “writeBulkRequestWithCredence” from the Base Station, the Land Mobile Station shall send the OBE denial response command “obuDenialResponse” whose status is “12: No support command" to the Base Station.

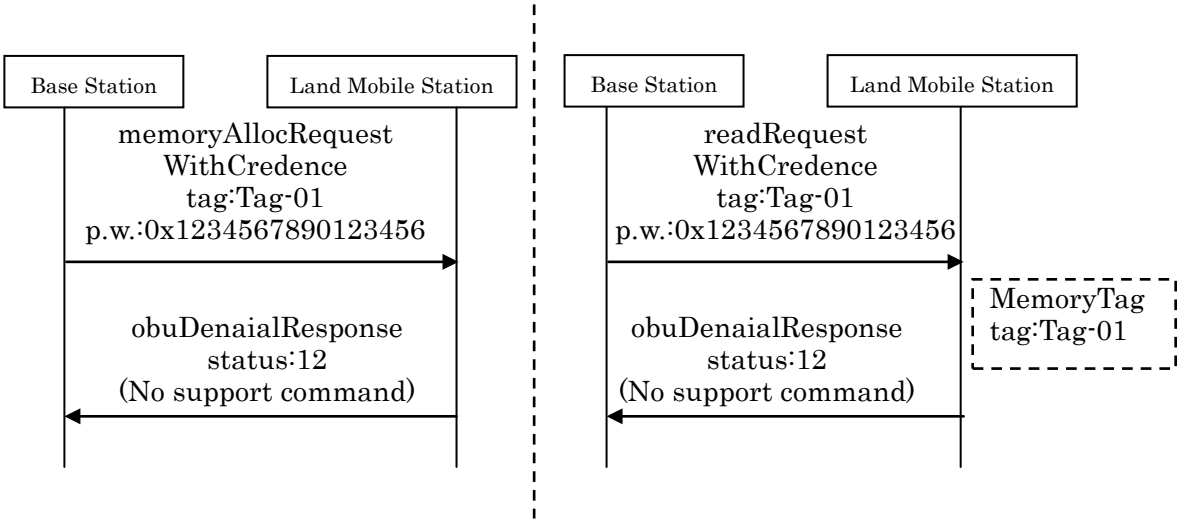


Figure D2-1 Example1 of Password Command

The following points should be kept in mind when the Land Mobile Station is equipped with the password as an attribute of memory tags:

(1) When receiving “memoryAllocRequest” from the Base Station, the Land Mobile Station shall allocate memory without setting the password in the memory tag. When receiving “memoryAllocRequestWithCredence” from the Base Station, the Land Mobile Station shall allocate memory with setting the password in the memory tag.

(2) When receiving “memoryFreeRequestWithCredence”, “readRequestWithCredence” or “writeRequestWithCredence” for a memory tag having the password setting from the Base Station and the password disagrees, the Land Mobile Station shall send the OBU denial response command “obuDenialResponse” whose status is “10: The password incompatible" to the Base Station.

(3) When receiving “readBulkRequestWithCredence” or “writeBulkRequestWithCredence” including a memory tag having the password setting from the Base Station and the password

disagrees, the Land Mobile Station shall regard that reading or writing of the corresponding memory tag has failed, and shall continue processing for the next memory tag.

(4) When receiving “memoryFreeRequest”, “readRequest” or “writeRequest” for a memory tag having the password setting from the Base Station, the Land Mobile Station shall send the OBU denial response command “obuDenialResponse” whose status is “10: The password incompatible" to the Base Station.

(5) When receiving “readBulkRequest” or “writeBulkRequest” including a memory tag having the password setting from the Base Station, the Land Mobile Station shall regard that reading or writing of the corresponding memory tag has failed, and shall continue processing for the next memory tag.

(6) When receiving “memoryFreeRequestWithCredence”, “readRequestWithCredence” or “writeRequestWithCredence” for a memory tag not having the password setting from the Base Station, the Land Mobile Station shall send the OBU denial response command “obuDenialResponse” whose status is “10: The password incompatible" to the Base Station.

(7) When receiving “readBulkRequestWithCredence” or “writeBulkRequestWithCredence” including a memory tag not having the password setting from the Base Station, the Land Mobile Station shall regard that reading or writing of the corresponding memory tag has failed, and shall continue processing for the next memory tag.

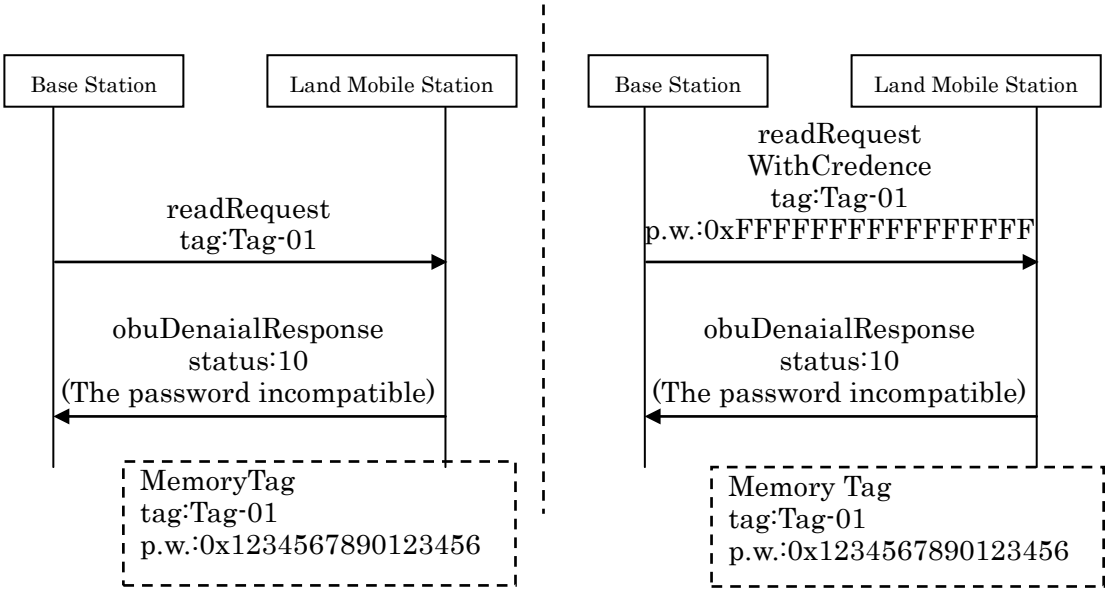


Figure D2-2 Example2 of Password Command

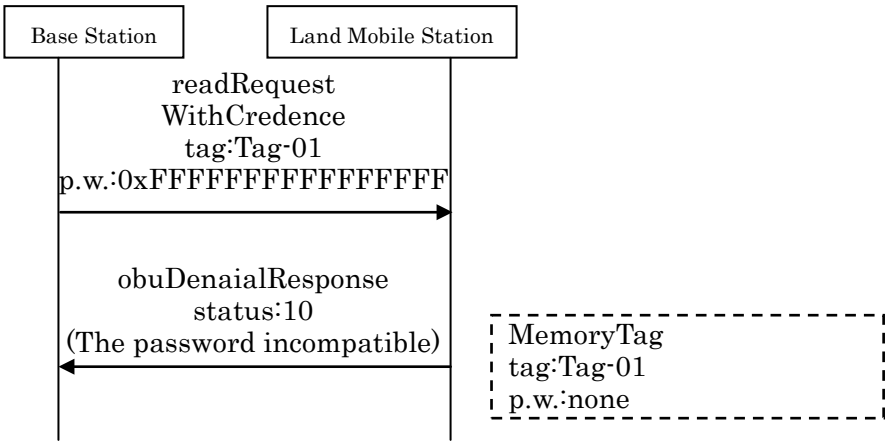


Figure D2-3 Example3 of Password Command

D.3 Protection Mode

The memory access application has two ports, a port using the DSRC-SPF (secure port LP3) and a port not using the DSRC-SPF (normal port LP2) as described in Annex 2. When allocating a memory area, select whether or not the DSRC-SPF is essential.

For memory tags for which the SPF is essential, the Land Mobile Station accepts only commands by way of the LP3, and sends the OBE denial response command "obuDenialResponse" whose status is "11: SPF violation" to the Base Station for commands by way of the LP2. For memory tags for which the SPF is inessential, the Land Mobile Station accepts commands by way of the LP2 and commands by way of the LP3.

Note that memory allocation with the setting "SPF in Protection Mode essential" is disabled for the Land Mobile Station not having the LP3.

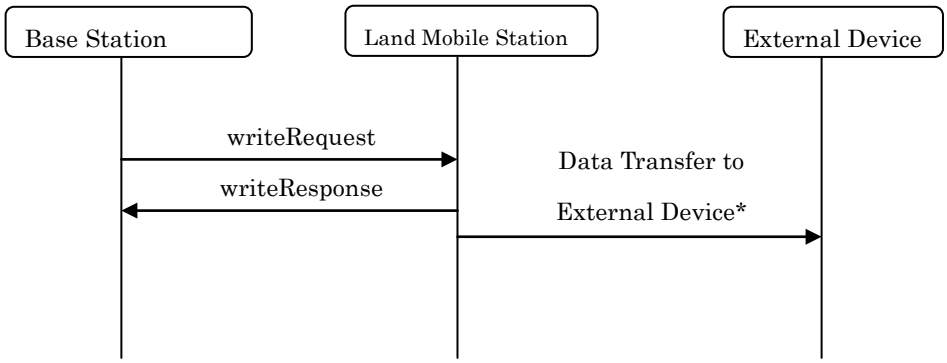
D.4 Memory Access Management

D.4.1 Management of OBE Controlling Memory

D.4.1.1 Application to Data Exchange with External Device

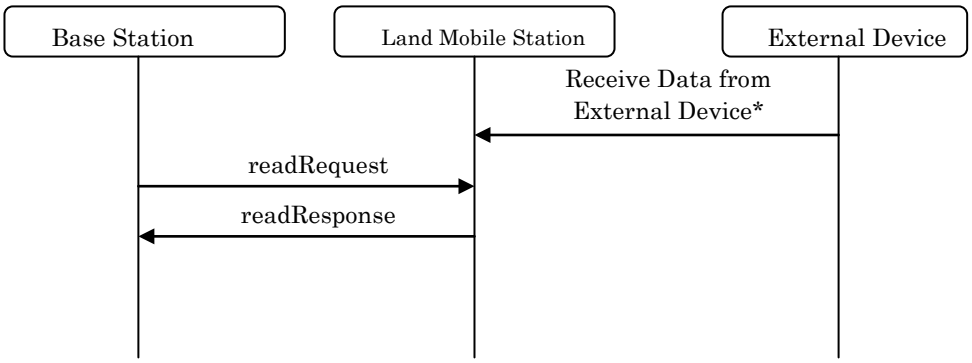
Memory tags are determined in advance between the Base Station and the Land Mobile Station for the OBE controlling memory. The OBE controlling memory is available for reading and writing data stored in the Land Mobile Station, and exchanging data between the Land Mobile Station and the external device (such as vehicle navigation equipment and mobile telephone) connected to the Land Mobile Station.

This standard does not specify the data transfer method and timing with the external device. When executing data exchange with the external device, however, required items shall be determined in advance between the Base Station and the Land Mobile Station. Examples are shown below.



Note: The data sending method and timing to the external device are not specified because they depend on the external device.

Figure D4-1 Data sending to the external device using the OBE controlling memory



Note: The data receiving method and timing from the external device are not specified because they depend on the external device. If data has not reached (or is being received) from the external device when the Land Mobile Station receives "readRequest", the Land Mobile Station immediately gives the response "no data", or may delay giving "readResponse" until data receiving is finished. The actual response to be given depends on the specification determined for each data between the Base Station and the Land Mobile Station.

Figure D4-2 Data receiving from the external device using the OBE controlling memory

D.4.1.2 Application Example of OBE Controlling Memory to Uplink

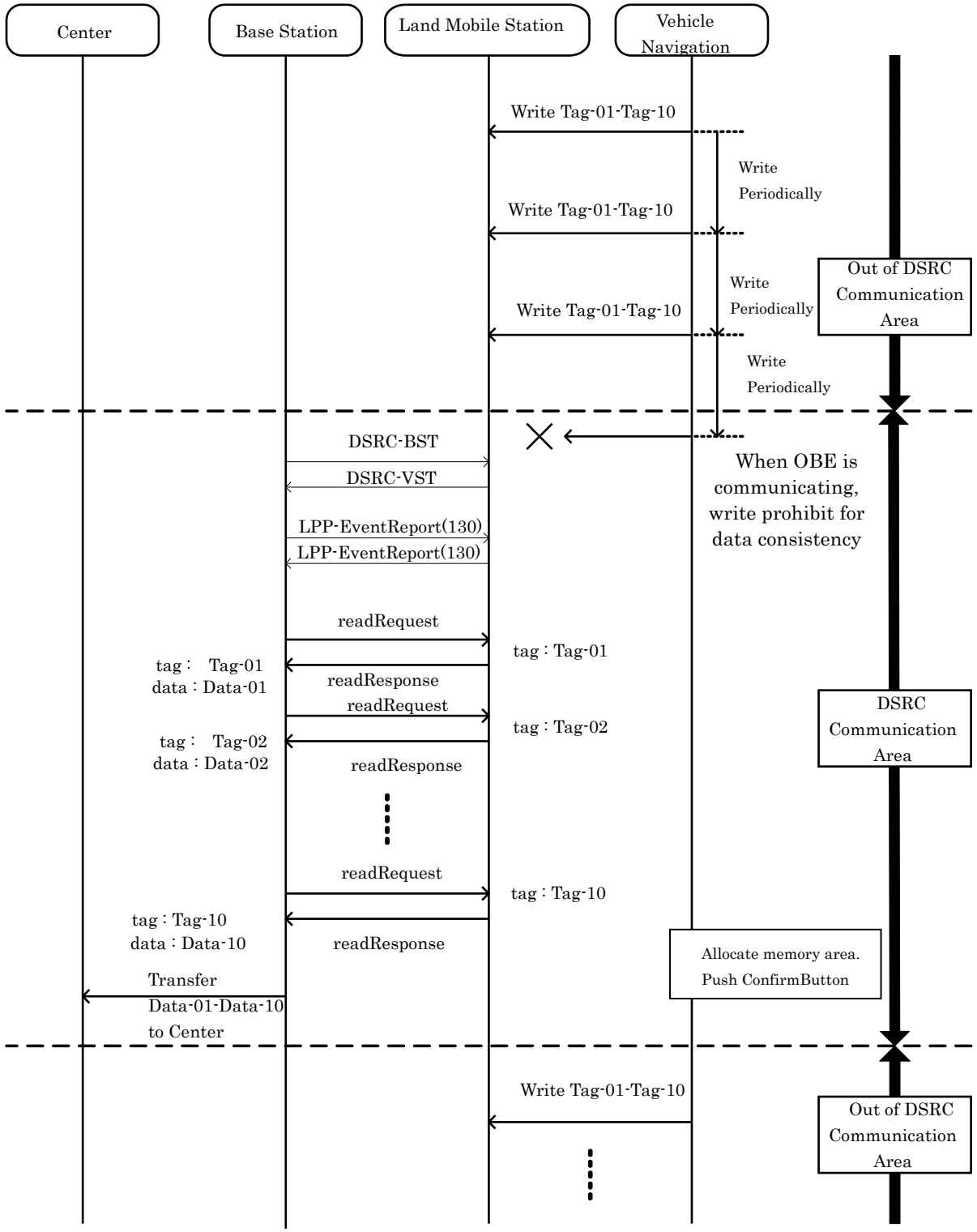
The figure below shows an example in which the travel history information from the vehicle navigation equipment is uploaded using the OBE controlling memory.

Table D4-1 shows an example of allocating the memory, and Figure D4-3 shows a sequence example.

This standard does not specify the data transfer method and timing with the vehicle navigation equipment. When several tags make sense as some information, however, attention should be paid to ensure consistency so that tag information being uploaded is not overwritten by other tag information.

Table D4-1 Example of OBE controlling memory tag

Tag	Protection Mode	Password	Memory allocation size	Content
Tag-01	ReadOnly/without SPF	without	250 bytes	current driving position
Tag-02	ReadOnly/without SPF	without	250 bytes	driving history data1
:	:	:	:	:
Tag-10	ReadOnly/without SPF	without	250 bytes	driving history data9



Note: Data-** is data corresponding to Tag-**

Figure D4-3 Example of upload sequence in the Land Mobile Station using the OBE controlling memory

D.4.2 Management of Base Station Allocatable Memory

This standard postulates that use of the Base Station allocatable memory is started when the Base Station allocatable memory area dedicated to the provider is allocated in the DSRC Land Mobile Station based on a contract or agreement between the provider and the user (Land Mobile Station purchaser). After that, the provider manages the system in conformity to laws and regulations such as the Private Information Protection Law.

It is preferable that the Land Mobile Station handling memory allocation request commands has the function to confirm the user's intention when receiving such commands. The user's intention confirmation function depends on the manufacturer's arbitrary specification, and is outside the range of this standard.

Figure D4-4 and Figure D4-5 show examples of memory writing sequence using the Base Station allocatable memory. Figure D4-4 shows a case in which the Land Mobile Station has the function to confirm the user's intension when allocating the memory.

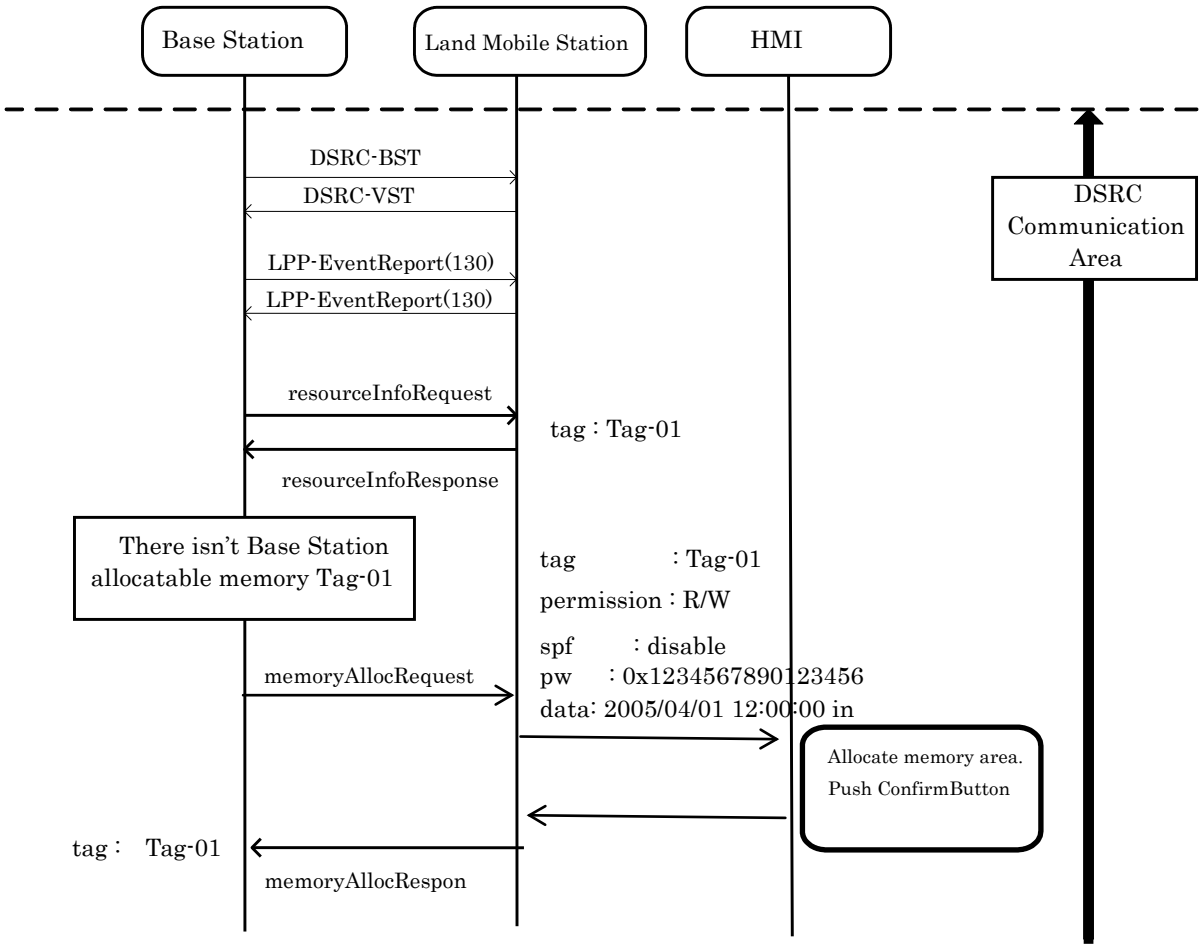


Figure D4-4 Example of memory writing sequence using the Base Station allocatable memory (1st time)

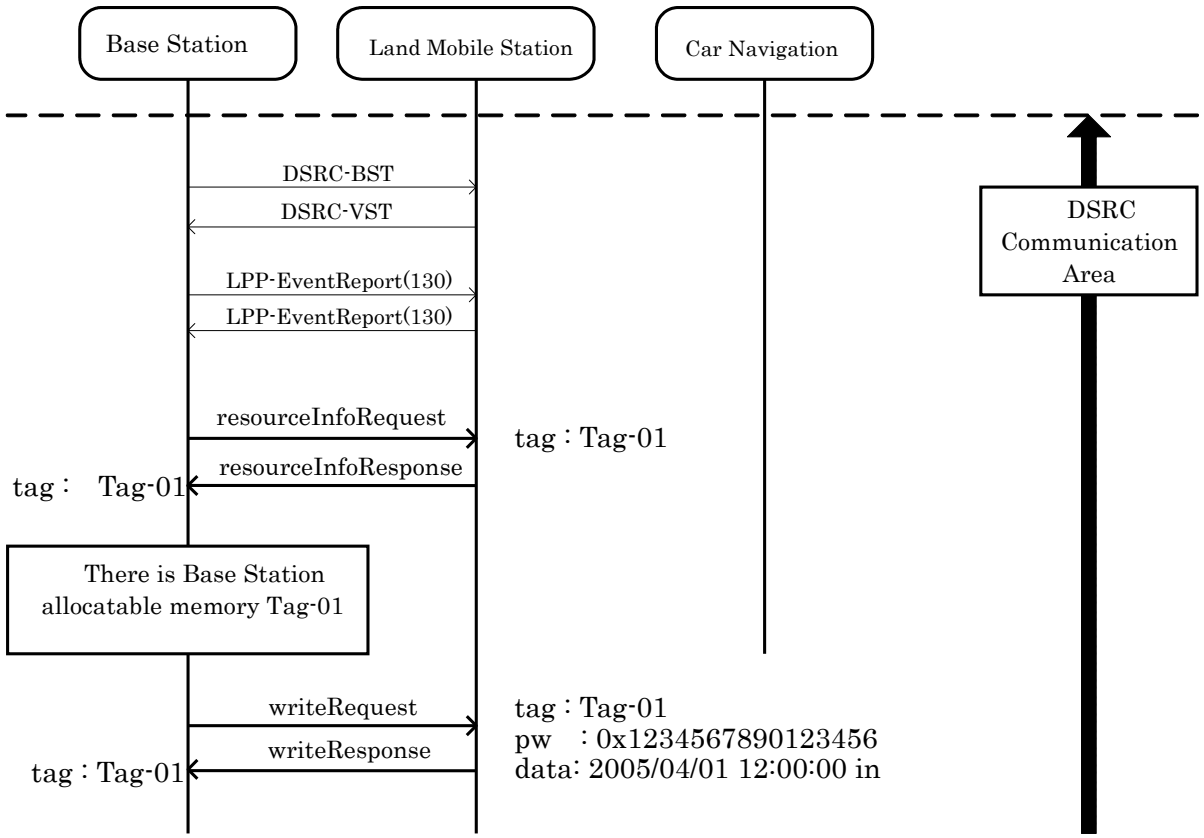


Figure D4-5 Example of memory writing sequence using the Base Station allocatable memory (after2nd time)

Data written to the OBE memory should be information encrypted by the provider. It is preferable that encrypted data cannot be decrypted by the user or third parties. It is preferable also that the Land Mobile Station can delete memory tags and stored data without using the password for keeping out malicious providers and using resources effectively.

This management example for the Base Station allocatable memory postulates a consolidated framework which can be confirmed by the Land Mobile Station user (through access to website, etc.) with regard to the uniqueness of Base Station allocatable memory tags and linking between the memory allocated provider and the Base Station allocatable memory tags (linking between memory tags and the provider name who allocated the memory).

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AnnexE Implementation Example and Important Notice about OBE ID Communication Application

This annex shows an example of adopting the (library used in the) DSRC-SPF as the in-application security in the OBE ID communication application, and describes important notice when the in-application security is handled and when the in-application security is not handled. The setup method is outside the range of this standard, and shall be specified separately.

E.1 Example When DSRC-SPF Is Adopted as In-Application Security

This example adopts the DSRC-SPF as the in-application security in the OBE ID communication application.

E.1.1 Positions and Functions of In-Application Security and DSRC-SPF

Figure E1-1 shows the positions of the DSRC-SPF and in-application security in the OBE ID communication application. The DSRC-SPF intends authentication and cryptographic communication among equipment, and cannot offer access control different for each provider.

On the other hand, the execution method and key issue can be selected and determined for each provider for the in-application security. Accordingly, it is possible to execute different access control and cryptographic communication for each provider. The DSRC-SPF (library) is available as the in-application security. At this time, the used SPF and parameters for the SPF are selected using the security profile set up in the Land Mobile Station.

The security profile indicates data on the SPF type and parameters used for the SPF. The security profile is linked with the acquirer ID, and the used SPF and parameters used for the SPF are selected in accordance with the security profile. The security profile is specified respectively for each SPF.

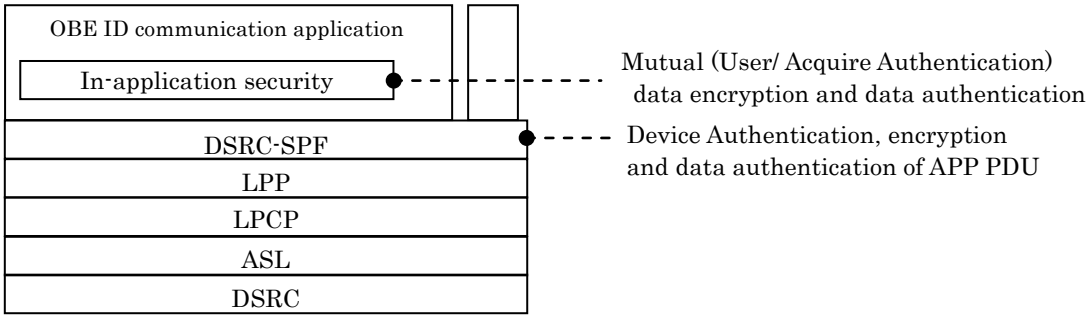

Figure E1-1 Positions of in-application security and DSRC-SPF

E.1.2 Concrete specification

This paragraph describes concrete specification when the DSRC-SPF is adopted as the in-application security in the OBE ID communication application.

E.1.2.1 Command Format

This paragraph describes the detailed definition of “AuthenticateCommand” type variables (authPath1 to authPath4) and use method of “SecondIDRequest” type variables.

E.1.2.1.1 authPath1(NegotiateRequest)

NegotiateRequest of DSRC-SPF is set as authPath1.

Table E1-1 authPath1 Command Format

	7(MSB)	6	5	4	3	2	1	0
1	version				fill(0)			
2	Command Type authenticateCommand(0)							
3	Operation Type authPath1(0)							
4	Length of NegotiateRequest							
	NegotiateRequest							

E.1.2.1.2 authPath2(NegotiateResponse)

NegotiateResponse of DSRC-SPF is set as authPath2

Table E1-2 authPath2 Command Format

	7(MSB)	6	5	4	3	2	1	0
1	version				fill(0)			
2	Command Type authenticateCommand(0)							
3	Operation Type authPath2(1)							
4	Length of NegotiateResponse							
	NegotiateResponse							

E.1.2.1.3 authPath3 (SetupMessageRequest)

SetupMessageRequest of DSRC-SPF is set as authPath3.

Table E1-3 authPath3 Command Format

	7(MSB)	6	5	4	3	2	1	0
1	version				fill(0)			
2	Command Type authenticateCommand(0)							
3	Operation Type authPath3(2)							
4	Length of SetupMessageRequest							
	SetupMessageRequest							

E.1.2.1.4 authPath4 (SetupMessageResponse)

SetupMessageResponse of DSRC-SPF is set as authPath4.

Table E1-4 authPath4 Command Format

	7 (MSB)	6	5	4	3	2	1	0
1	version				fill(0)			
2	Command Type authenticateCommand(0)							
3	Operation Type authPath4(3)							
4	Length of SetupMessageResponse							
	SetupMessageResponse							

E.1.2.1.5 “SecondIDResponse” type variable use method

```
SecondIDResponse::=SEQUENCE{
    encryptionAlgorithmId        INTEGER(0..255),
        -- Cryptographic algorithm to keep the ID confidential
        -- (for in-application security)
    keyNumber                    INTEGER(0..255),
        --Key number to keep the ID confidential (for in-application security)
    encryptedId                  OCTET STRING
        -- Encrypted ID information (for in-application security)
}
```

Values of the variables “encryptionAlgorithmId” and “keyNumber” are specified separately for each SPF. The variable “encryptedId” stores “SpfPDU” of the DSRC-SPF.

E.1.2.1.6 Denial Response Status

Table A5-5 shows the status notified in the denial response used for the in-application security. The status code shown in the table below subtracted by “32” is equivalent to the status code of the DSRC-SPF. However, "32” and “255” are used for “Authentication not completed” and “Other error inside Land Mobile Station” respectively.

Table E1-6 Contents of “status” in the negative acknowledgment for the in-application security

Status code	Remarks
33 (32+1)	Security type error
34-35	For future use
36 (32+4)	DSRC-SPF version disagreed
37 (32+5)	SPF internal error
38-47	For future use
48 (32+16)	Illegal Service Primitive
49	For future use
50 (32+18)	Provider identifier not supported
51-63	For future use

E.1.2.2 Sequence Example

Figure E1-2 shows a sequence example when the DSRC-SPF is adopted as the in-application security.

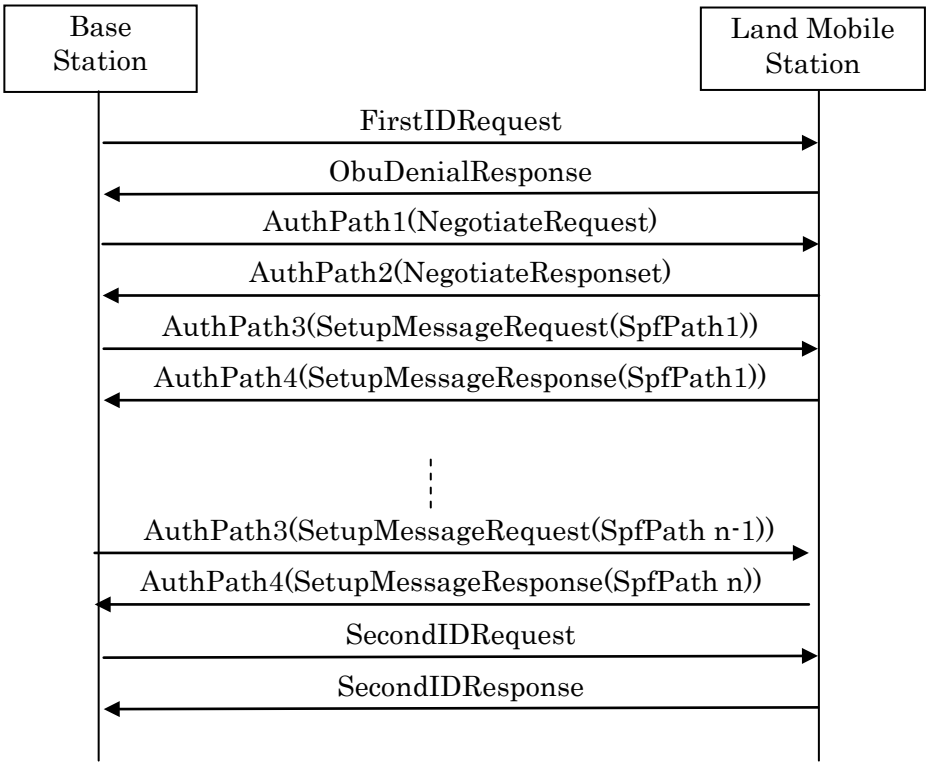

Figure E1-2 Sequence Example

E.1.2.3 ID acquisition Procedure When DSRC-SPF Is Adopted as In-Application Security

This paragraph describes the procedure when the DSRC-SPF is adopted as the in-application security.

(1) The Base Station sends “firstIDRequest” to the Land Mobile Station.

(2) When receiving “firstIDRequest”, the Land Mobile Station refers to the ID registration information, and sends “firstIDResponse” or “obuDenialResponse” to the Base Station as follows:

a) When the condition of the OBE ID corresponding to the acquirer ID is “plaintextIDRefusal (false (0))”, the Land Mobile Station sends “firstIDRequest” to the Base Station. When the condition is “plaintextIDRefusal (true (1))”, the Land Mobile Station sends “obuDenialResponse” whose status is "32: Plain text send refused, authentication failed, or no authentication” to the Base Station.

b) When the OBE ID is not registered at all in the Land Mobile Station, the Land Mobile Station sends “obuDenialResponse” whose status is “12: OBE ID not registered at all” to the Base Station.

c) When the OBE ID corresponding to the specified acquirer is not registered, the Land Mobile Station sends “obuDenialResponse” whose status is “2: No OBE ID corresponding to acquirer ID” to the Base Station.

(3)When receiving “obuDenialResponse” whose status is “32” from the Land Mobile Station in the processing in the step (2)-a), the Base Station sends “authPath1(NegotiateRequest)” to the Land Mobile Station for notifying the list of parameters available in the DSRC-SPF.

(4)When receiving “authPath1(NegotiateRequest)”, the Land Mobile Station refers to the security profile corresponding to the acquirer ID specified in “firstIDRequest”, and sends “authPath2(NegotiateResponse)” or “obuDenialResponse” to the Base Station as follows:

a) The Land Mobile Station selects a parameter to be used from the parameter list specified in “authPath1(NegotiateRequest)”, and sends “authPath2(NegotiateResponse)” to the Base Station for notifying the selected parameter.

b) When no available parameter is included in the parameter list specified in “authPath1(NegotiateRequest)”, the Land Mobile Station sends “obuDenialResponse” whose status is “33: Security type error” to the Base Station.

(5) When receiving “authPath2(NegotiateResponse)” from the Land Mobile Station in the processing in the step (4)-a), the Base Station acquires the parameter specified by the Land Mobile Station in “authPath2(NegotiateResponse)”.

(6) The Base Station creates a request using the parameter specified by the Land Mobile Station, and sends “authPath3(SetupMessageRequest)” to the Land Mobile Station.

(7)When receiving “authPath3(SetupMessageRequest)”, the Land Mobile Station creates a response using the specified parameter, and sends “authPath4(SetupMessageResponse)” to the Base Station.

(8)The processing in the steps (6) and (7) are repeated until the SPF sequence is finished.

(9)When the SPF sequence is finished, the Base Station sends “secondIDRequest” to the Land Mobile Station.

(10)When receiving “secondIDRequest”, the Land Mobile Station refers to the ID registration information, and sends “secondIDResponse” or “obuDenialResponse" to the Base Station as follows:

a) When the OBE ID condition corresponding to the acquirer ID agrees with the result acquired by the processing in the steps (4) to (8), the Land Mobile Station sends “secondIDResponse” to the Base Station.

b)When the OBE ID condition corresponding to the acquirer ID does not agree with the result acquired by the processing in the steps (4) to (8), the Land Mobile Station sends “obuDenialResponse” whose status is "32: Plain text send refused, authentication failed, or no authentication” to the Base Station.

E.2 Important Notice When In-Application Security Is Not Handled

When the Land Mobile Station not handling the in-application security receives the following command, it sends back “ObuDenialResponse” whose status is “32”.

(1) AuthenticateCommand

(2) secondIDRequest

To the ID condition (IDCondition), set values indicating that the in-application security is not used.

E.3 Important Notice for Handling In-Application Security

The in-application security shall be selected or determined properly on the responsibility of the provider.

Keep the following points in mind when handling the in-application security.

(1) ID condition

In the “ciphertextIDRefusal” and “mutualAuthentication” fields indicating the ID condition (shown in Table 3.5-1), set the necessity of encryption and authentication in advance in accordance with the provider’s policy. When setting the necessity through

DSRC communication, use the ID condition change request command (maintenance command). Use of other means is not hindered.

(2) Data authentication

When data authentication is required for the OBE ID, use “mACForOriginalText” in “ObuID” (described in “3.5.3 Definition of Data Structures”.)

(3) AuthenticateCommand

Use “AuthenticateCommand” (“IDAcquisitionCommand” described in “3.5.3 Definition of Data Structures”) to exchange required information and perform mutual authentication between the Base Station and the Land Mobile Station based on the specification of the mounted in-application security.

(4) SecondIDResponse

Determine the contents of “SecondIDResponse” through exchange of information required in the security executed by “AuthenticateCommand”.

(5) OBE denial response

The definition of status 32 to status 63 used in “obuDenialResponse” (shown in Table 3.5-9) is provided for the in-application security. Use the status 33 to 63 in accordance with the specification of in-application security.

E.3.1 When There Are Several Providers and Several In-Application Securities

The following two cases are postulated:

a) When one provider uses one or more in-application securities

b) When one or more providers share a same in-application security

In the case a), it is preferable that the Land Mobile Station provides proper firewall among securities, has the function to control the correspondence between the acquirer ID and several in-application securities, and specifies the in-application security selection procedure using “AuthenticateCommand”. The concrete specification shall be specified for each in-application security.

In the case b), it is preferable that the Land Mobile Station has the function to control the correspondence between the in-application security and several acquirer IDs.

AnnexF Version of Basic Application Interface

F.1 Definition

The version of the basic application interface (API) means a unique combination of available API for additional definitions of the basic API and specification update of the basic API.

F.2 Intended Purpose

The version of the basic API is used to select the basic API by the Base Station in a session between the Base Station and the Land Mobile Station.

Note: Base Station should have the mechanism to select applicable the basic API in accordance with the architecture of the basic API

F.3 Elements of Version Management

F.3.1 Version Management Table

The version management table is used to uniquely determine a combination of the basic API used in each version. This management table is stored local port numbers assigned to the basic API used in the corresponding version.

The Base Station shall have the version management table corresponding to the installed version of the basic API.

F.3.2 Version Number

The version number is the identifier stored in the basic API commands. The version number shall be "1".

F.4 Version Update

The version of the basic API is updated in units of API. When the basic API version is updated, local port numbers assigned to the basic API shall be also updated.

Table F4-1 shows version update and the contents of version management tables.

This table indicates the added version management table with revised version (Version 2) from update of the API1 specifications, the revised version (Version 3) from update of the API2 and API3 specifications, and the revised versions (Version 4) from the addition of API5.

Table F4-1 Version update and contents of version management tables

Version of Basic API	Version Management Table				
	API1	API2	API3	API4	API5
4(New)	0x0001	0x0011	0x0021	0x0030	0x0040
3	0x0001	0x0011	0x0021	0x0030	-
2	0x0001	0x0010	0x0020	0x0030	-
1(Old)	0x0000	0x0010	0x0020	0x0030	-

F.5 Compatibility

Base Stations and Land Mobile Stations which are equipped with the updated basic API shall also be equipped with at least the first version of the basic API, so they are compatible to the minimum degree necessary with existing Land Mobile Stations and Base Stations.

F.6 Selection of Version

F.6.1 Setting of Version Information

The procedure to set the basic API version information is as follows:

(1) The Base Station sets the version management table which identifies the basic API versions mounted in it.

(2) The Base Station makes valid local ports assigned to the basic API of all versions installed in it.

F.6.2 Selection Procedure

The procedure to select the version of the basic API is as follows:

(1) The Base Station acquires from each API local port numbers whose connection is completed at initial connection, and creates the local port list for the Land Mobile Station.

(2) The Base Station acquires local port number combinations specified by the latest version registered in its version management table, and compares them with the local port list for the Land Mobile Station.

(3) When there is a same combination in the local port list for the Land Mobile Station, the Base Station specifies local port numbers to be used fo each API (Figure F6-1).

(4) When there isn't a same combination in the local port list for the Land Mobile Station, the Base Station acquires local port number combinations specified by the next candidate version registered in its version management table, compares them with the local port list for the Land Mobile Station, and searches for a same combination. The Base Station shall repeat the processing until a same combination is found.

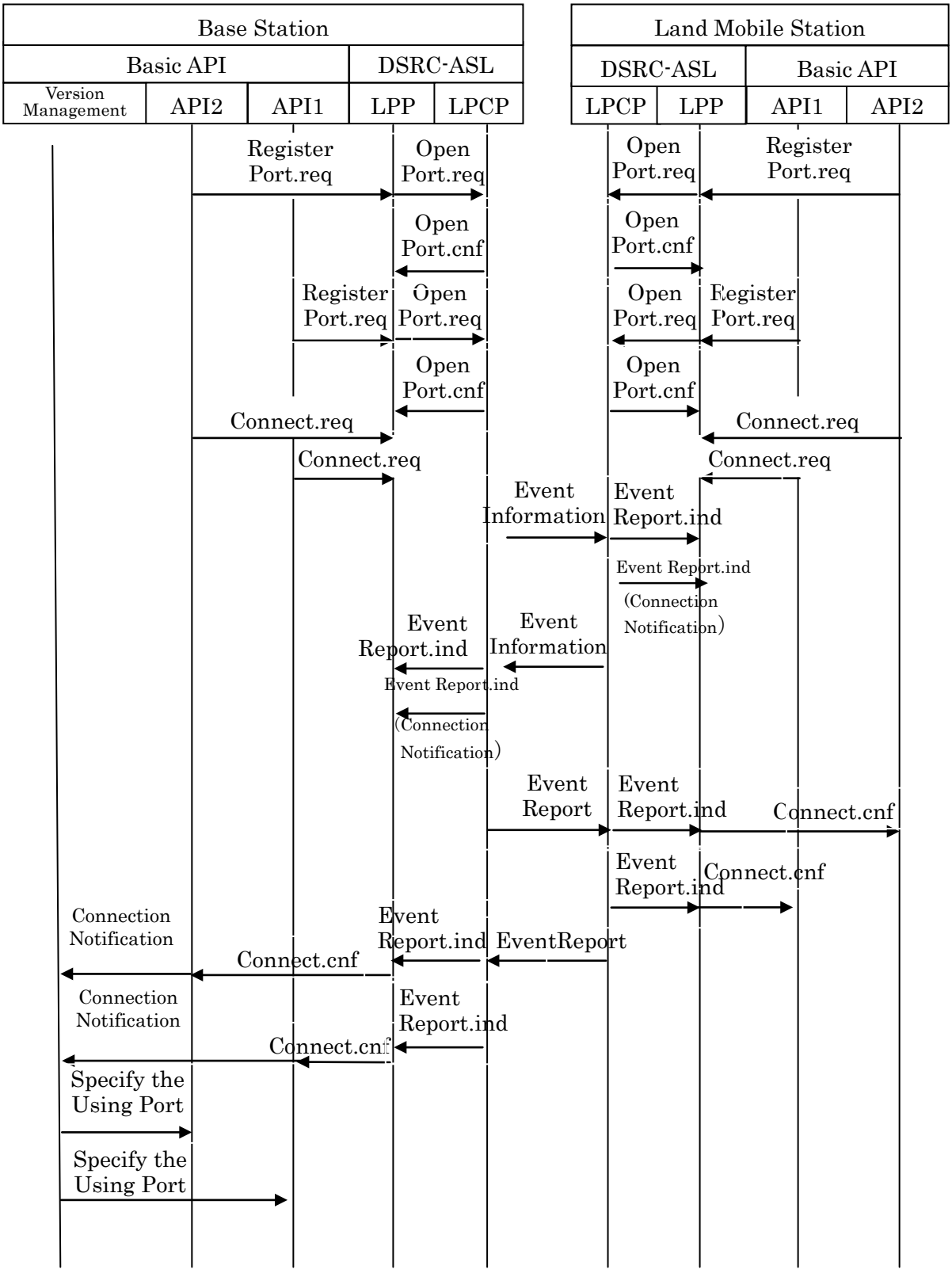

Figure F6-1 Selection Procedure of Version

AnnexG Push-type Information Delivery Application

G.1 Client Information Notification Command [Informative]

For client information notification command, it is possible to prescribe “supplementInfo” domain separately for individual service and future expansion.

A regulation regarding to “supplementInfo” is not a scope of this specification, but an example of items, which are stipulated by Standard of ITS On-Board Unit (JEITA TT6001 - 6004), are described in attached table G1-1,table G1-2 for your reference.

Table G1-1 Format of supplementInfo

	7(MSB)	6	5	4	3	2	1	0(LSB)
1	Supplement Informatioon Code							
2 :	Supplement Information of each code							

Table G1-2 Supplement Information List

code	type	remarks
0	don’t use	
1	ITS On-Board Unit	OBE based on JEITA TT6001~6004 Supplement Information of this code is defined in TT6002
2~255	Reserved	Reserved For future use

G.2 Important Notice about Push-type Information Delivery Application

G.2.1 Important Notice about Number Assignment of "PushID"

Note for number assignment of "PushID" in Base Station is shown below:

a) Common important notice about both point-to-point communication and broadcast communication

- As a general rule, same "PushID" should be used for identical contents*; different "PushID" should be used by contents.
- "PushID" may be managed as different systems by link address as a unit

b) Important notice about broadcast communication

- In the case of content, that includes DC=0/1, is transmitted, it is recommended that a "PushID" different from the DC flag be used.
- In broadcast communication if plural contents are transmitted by repeating transmit system; do not carry out repeat transmission of more than 129 contents
- In broadcast communication if multiple contents are transmitted by a repeating transmit system in broadcast communications, when new content is transmitted with the same "PushID", the "PushID" should be used after more than 128 other "PushID" commands (DC=1) are transmitted.

Note: Identical content means same type of contents and contents, which contain same data.

G.2.2 Other Notices

- If massage to be conveyed is same and contents are different, transmit with proper judgment by the Base Station as transmitting only one.
- It is recommended that repeating transmission system in broadcast communication is used when service is carried out by using application/contents type, which repetition checks are not carried out in executing application.

G.3 Operation Example of Land Mobile Station triggered by RC/DC Flag

Table G3-1 Operation of the Land Mobile Station triggered by the RC flag (point-to-point communication)

			Existence of cache data of same PushID			
			Present		Not Present	
Event	PushOperation (Point-to-point communication)	RC=1	Transfer to application	Register to Cache	Transfer to application	Update Cache data
		RC=0	Transfer to application	-	Transfer to application	-

Table G3-2 Operation of the Land Mobile Station triggered by the DC flag (broadcast communication)

			Existence of same PushID memory (for duplicate check)			
			There		Not there	
Event	PushOperation (Broadcast Communication)	DC=1	Transfer to application	Memory PushID*	Detect duplication	-
		DC=0	Transfer to application	-	Transfer to application	-
	Disconnect.ind		-	Abort all PushID		Abort all PushID

Note: 128 “PushID” commands can be stored, and if more than 129 “PushID” commands are received, they are deleted starting with the oldest in time.

Amendement History

DSRC (Dedicated Short Range Communication) Basic Application Interfaces Specification

ARIB STANDARD
(ARIB STD-T110)
The 1.1th edition amendment history

<table>
<tr><th>Page</th><th>Para.no</th><th>Content of Amendment</th><th>Present</th><th>Reason</th></tr>
<tr><td>142
-145</td><td>3.4.3</td><td>ApplicationType ::= CHOICE {
default [0] NULL,
browser [1] NULL,
mailer [2] NULL,
sound-player [3] NULL,
video-player [4] NULL,
tts [5] NULL,
mobile-device-browser [6] NULL,
store [7] NULL,
vics [8] NULL,
text-display [9] NULL,
safety [10] NULL,
image-display [11] NULL,
payment [12] NULL,
automated-drive [13] NULL,
dynamic-map [14] NULL,
multignss-payment [15] NULL,
qzs [16] NULL,
other [17..254] NULL,
private [255] OCTET STRING
}</td><td>ApplicationType ::= CHOICE {
default [0] NULL,
browser [1] NULL,
mailer [2] NULL,
sound-player [3] NULL,
video-player [4] NULL,
tts [5] NULL,
mobile-device-browser [6] NULL,
store [7] NULL,
vics [8] NULL,
text-display [9] NULL,
safety [10] NULL,
image-display [11] NULL,
payment [12] NULL,
other [13-254] NULL,
private [255] OCTET STRING
}</td><td>Addition of ApplicationType</td></tr>
<tr><td>138
-142</td><td>3.4.3</td><td>ContentType ::= CHOICE{
everyType [0] OCTET STRING,
text [1] OCTET STRING,
: :
: :
dsrc-safety [132] NULL,
dsrc-multipart [133] NULL,
dsrc-privateSpot_text_plain [134] NULL,
dsrc-privateSpot_image_jpeg [135] NULL,
dsrc-privateSpot_image_gif [136] NULL,
dsrc-privateSpot_image_bmp [137] NULL,
dsrc-privateSpot_image_tiff [138] NULL,
dsrc-privateSpot_image_png [139] NULL,
dsrc-automatedDrive [140] NULL,
dsrc-dynamicMap [141] NULL,
dsrc-multignssPayment [142] NULL,
dsrc-qzs [143] NULL,
otherType [144..239] NULL,
private [240..255] NULL
}</td><td>ContentType ::= CHOICE{
everyType [0] OCTET STRING,
text [1] OCTET STRING,
: :
: :
dsrc-safety [132] NULL,
dsrc-multipart [133] NULL,
dsrc-privateSpot_text_plain [134] NULL,
dsrc-privateSpot_image_jpeg [135] NULL,
dsrc-privateSpot_image_gif [136] NULL,
dsrc-privateSpot_image_bmp [137] NULL,
dsrc-privateSpot_image_tiff [138] NULL,
dsrc-privateSpot_image_png [139] NULL,
otherType [140..239] NULL,
private [240..255] NULL
}</td><td>Addition of Content Type</td></tr>
<tr><td>165</td><td>3.4.6</td><td>Table 3.4-15 Application type list
<table><tr><th>Application</th><th>Identifier</th><th>Value</th><th>Remarks</th></tr><tr><td>default</td><td>default</td><td>0x00</td><td></td></tr><tr><td>Web Browser</td><td>browser</td><td>0x01</td><td></td></tr><tr><td>Mailer</td><td>mailer</td><td>0x02</td><td></td></tr><tr><td>Sound Player</td><td>sound-player</td><td>0x03</td><td></td></tr><tr><td>Movie Player</td><td>video-player</td><td>0x04</td><td></td></tr><tr><td>TTS</td><td>tts</td><td>0x05</td><td></td></tr><tr><td>Mobile Browser</td><td>mobile-device
-browser</td><td>0x06</td><td></td></tr><tr><td>Store</td><td>store</td><td>0x07</td><td></td></tr><tr><td>VICS</td><td>vics</td><td>0x08</td><td></td></tr><tr><td>Text display</td><td>text-display</td><td>0x09</td><td></td></tr><tr><td>Driving Safety Support</td><td>safety</td><td>0x0A</td><td></td></tr></table></td><td>Table 3.4-15 Application type list
<table><tr><th>Application</th><th>Identifier</th><th>Value</th><th>Remarks</th></tr><tr><td>default</td><td>default</td><td>0x00</td><td></td></tr><tr><td>Web Browser</td><td>browser</td><td>0x01</td><td></td></tr><tr><td>Mailer</td><td>mailer</td><td>0x02</td><td></td></tr><tr><td>Sound Player</td><td>sound-player</td><td>0x03</td><td></td></tr><tr><td>Movie Player</td><td>video-player</td><td>0x04</td><td></td></tr><tr><td>TTS</td><td>tts</td><td>0x05</td><td></td></tr><tr><td>Mobile Browser</td><td>mobile-device
-browser</td><td>0x06</td><td></td></tr><tr><td>Store</td><td>store</td><td>0x07</td><td></td></tr><tr><td>VICS</td><td>vics</td><td>0x08</td><td></td></tr><tr><td>Text display</td><td>text-display</td><td>0x09</td><td></td></tr><tr><td>Driving Safety Support</td><td>safety</td><td>0x0A</td><td></td></tr></table></td><td>Addition of Application Type</td></tr>
</table>

Image Display	image-display	0x0B	
Payment	payment	0x0C	
Automated Drive	automated-drive	0x0D	
Dynamic Map	dynamic-map	0x0E	
Multignss Payments	multignss-payment	0x0F	
Qzs	qzs	0x10	
Others	others	0x11-0xFE	
Any	private	0xFF	

Image Display	image-display	0x0B	
Payment	payment	0x0C	
Others	others	0x0D -0xFE	
Any	private	0xFF	

166 -168	3.4.6		Addition of Content Type

Table 3.4-16 Content type list

Contents Type	Value	fprmat of pushBody	Remarks
/	0x00		(Note 1)
text/*	0x01		(Note 1)
:	:	:	:
:	:	:	:
dsrc/safety	0x84		
dsrc/multipart	0x85	multipart contents format	Refer to JEITA TT6003
dsrc/privateSpot_text_plain	0x86	Shift JIS line feed code CR+LF	
dsrc/privateSpot_text_plain	0x86	Shift JIS line feed code CR+LF	Refer to Guideline for In-vehicle Display Systems
dsrc/privateSpot_image_jpeg	0x87	Image File Binary Format	
dsrc/privateSpot_image_gif	0x88		
dsrc/privateSpot_image_bmp	0x89		
dsrc/privateSpot_image_tiff	0x8A		
dsrc/privateSpot_image_png	0x8B		
dsrc/automatedDrive	0x8C		Automated Drive service
dsrc/dynamicMap	0x8D		Dynamic Map service
dsrc/multignssPayment	0x8E		Multignss Payments service
dsrc/qzs	0x8F		Qzs service
otherType	0xA0-0xEF		(Note 2)
private	0xF0-FF		

Table 3.4-16 Content type list

Contents Type	Value	fprmat of pushBody	Remarks
/	0x00		(Note 1)
text/*	0x01		(Note 1)
:	:	:	:
:	:	:	:
dsrc/safety	0x84		
dsrc/multipart	0x85	multipart contents format	Refer to JEITA TT6003
dsrc/privateSpot_text_plain	0x86	Shift JIS line feed code CR+LF	
dsrc/privateSpot_text_plain	0x86	Shift JIS line feed code CR+LF	Refer to Guideline for In-vehicle Display Systems
dsrc/privateSpot_image_jpeg	0x87	Image File Binary Format	
dsrc/privateSpot_image_gif	0x88		
dsrc/privateSpot_image_bmp	0x89		
dsrc/privateSpot_image_tiff	0x8A		
dsrc/privateSpot_image_png	0x8B		
otherType	0x8C-0xEF		(Note 2)
private	0xF0-FF		

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Attn: Secretariat of Standard Assembly Meeting of ARIB

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Nittochi Bldg. 11th Floor, 1-4-1 Kasumigaseki, Chiyoda-ku, Tokyo 100-0013, Japan

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Page / Section	(Please describe your proposal or present your questions or comments in concrete terms.)		
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		Remarks	

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DEDICATED SHORT-RANGE COMMUNICATION (DSRC)

BASIC APPLICATION INTERFACE

ARIB STANDARD

ARIB STD-T110 Version 1.1

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