Synchronization Profile (SYNC)

Abstract:
This document defines test structures and procedures for the interoperability test of Bluetooth devices implementing the Synchronization Profile.
### Revision History

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4.4.1.2 Auto Sync – vCal

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5 Test Case Mapping
1 Scope

This Bluetooth document contains the Test Suite Structure (TSS) and Test Cases (TC) to test the Synchronization Profile. The tests shall ensure that the tested products can interoperate with each other within the Synchronization Profile.

The objective of this document is to provide a basis for the conformance tests for Bluetooth devices giving a high probability of air interface interoperability between different manufacturers' Bluetooth devices.
2 References, Definitions, and Abbreviations

2.1 References

This Bluetooth document incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter.

[1] Specification of the Bluetooth System, Core System, version 2.0 or later
[2] Synchronization Profile
[5] ICS proforma for Synchronization Profile

2.2 Definitions

For the purpose of this Bluetooth document, the definitions from [1], [2] and [4] apply.

2.3 Abbreviations

For the purpose of this Bluetooth document, the abbreviations from [1], [2] and [4] apply.
3 Test Suite Structure (TSS)

3.1 Overview

Figure 3.1 shows the Synchronization Profile Test Suite Structure (TSS) including its subgroups defined for Early Product testing.

Synchronization Profile Test suite structure

- Synchronization
  - First time Synchronization
  - Subsequent time Synchronization
- Sync command scenario
- Automatic Synchronization scenario

*Figure 3.1: TSS for the Synchronization Profile*

3.1.1 IrMC synchronization / Bluetooth synchronization

The Bluetooth Synchronization Profile is based on IrDA's Infrared Mobile Communication (IrMC) specification [3].

- IrMC is specifying the format of four different object types:
  - Business cards, calendar entries, messages and notes.
- The Bluetooth Synchronization Profile is requesting that the object types are supported with exactly the same format as defined by IrMC.

3.1.2 Applications, Features, Object Formats and Roles

Each Bluetooth Profile defines a series of features and the way they should be implemented using the available protocol stack. Within the Synchronization Profile, the features are synchronization, synchronization command and automatic synchronization.

The Synchronization Profile is based on the Generic Object Exchange (OBEX) profile which uses the pre-defined object formats *vcard*, *vcal*, *vmsg* and *vnote*.

From interoperability testing point of view, features and object formats must be de-correrlated. That means that all the possible combinations (feature and object format to which it is applied) are covered by test cases.

If the same combination of feature/object format is used by several applications the corresponding test case must be carried out in each of these applications, even if the applications are different or do not perfectly match and have only partly overlapping functions.
In Figure 3.2, DUT1 and DUT2 have one application in common, Application 1. A series of tests must be set up with Application 1 running on both devices. They will address the couple (Feature 1, Format 2) and (Feature 2, Format 1). Application 2 (running on DUT 1) and Application 3 (running on DUT 2) are different but both use the couple (Feature 2, Format 3). A series of tests addressing this very couple shall be set up with Application 2 on DUT 1 and Application 3 on DUT 2. Furthermore for Application 1 on DUT 1 there is no need to look at test cases that deal with objects of Format 1 being handled by Feature 1 and on Application 3 on DUT 2 there is no need to look at test cases that deal with objects of Format 3 being handled by Feature 1. Although certain features and formats may not be supported it must be ensured that this can be handled properly by the applications.

3.2 Test Groups

The test groups are organized in three levels. The first level defines the protocol groups representing the protocol services. The second level, if the third level exists, separates the protocol services in functional modules. The last level in each branch contains the standard ISO subgroups BV and BI.

3.2.1 Profile Procedure Groups

The profile procedure groups identify the Bluetooth Synchronization Profile services: Synchronization, Synchronization Command and Automatic Synchronization as defined in section 3.2 of [2].

3.2.2 Main Test Group

The main test groups are the capability group, the valid behavior group and the invalid behavior group.
3.2.2.1  Valid Behavior (BV) Tests

This sub group provides testing to verify that the IUT reacts in conformity with the Bluetooth standard, after receipt or exchange of a valid Protocol Data Units (PDUs). Valid PDUs means that the exchange of messages and the content of the exchanged messages are considered as valid.

3.2.2.2  Invalid Behavior (BI) Tests

This sub group provides testing to verify that the IUT reacts in conformity with the Bluetooth standard, after receipt of a syntactically or semantically invalid PDU.
4 Test Cases (TC)

4.1 Introduction

4.1.1 Test Case Identification Conventions

Test cases shall be assigned unique identifiers per the conventions in [4]. The convention used here is <spec abbreviation>/<IUT role>/<class>/<feat>/<func>/<subfunc>/<cap>/<xx>-<nn>-<y>.

Bolded ID parts shall appear in the order prescribed. Non-bolded ID parts (if applicable) shall appear between the bolded parts. The order of the non-bolded parts may vary from test specification to test specification, but shall be consistent within each individual test specification.

<table>
<thead>
<tr>
<th>Identifier Abbreviation</th>
<th>Spec Identifier &lt;spec abbreviation&gt;</th>
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<tr>
<td>SYNC</td>
<td>Synchronization Profile</td>
</tr>
<tr>
<td>Identifier Abbreviation</td>
<td>Role Identifier &lt;IUT role&gt;</td>
</tr>
<tr>
<td>SR</td>
<td>Server</td>
</tr>
<tr>
<td>CL</td>
<td>Client</td>
</tr>
<tr>
<td>Identifier Abbreviation</td>
<td>Feature Identifier &lt;feat&gt;</td>
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<td>SYN</td>
<td>Synchronization</td>
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<tr>
<td>SYC</td>
<td>Synchronization Command</td>
</tr>
<tr>
<td>ASY</td>
<td>Automatic Synchronization</td>
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</table>

Table 4.1: SYNC TC Feature Naming Conventions

4.1.2 Conformance

When conformance is claimed, all capabilities indicated as mandatory for this Specification shall be supported in the specified manner (process-mandatory). This also applies for all optional and conditional capabilities for which support is indicated. All mandatory capabilities, and optional and conditional capabilities for which support is indicated, are subject to verification as part of the Bluetooth Qualification Program.

The Bluetooth Qualification Program may employ tests to verify implementation robustness. The level of implementation robustness that is verified varies from one Specification to another and may be revised for cause based on interoperability issues found in the market.

Such tests may verify:

• That claimed capabilities may be used in any order and any number of repetitions that is not excluded by the Specification, OR

• That capabilities enabled by the implementations are sustained over durations expected by the use case, OR

• That the implementation gracefully handles any quantity of data expected by the use case, OR
• That in cases where more than one valid interpretation of the Specification exist, the implementation complies with at least one interpretation and gracefully handles other interpretations OR

• That the implementation is immune to attempted security exploits.

A single execution of each of the required tests is required in order to constitute a pass verdict. However, it is noted that in order to provide a foundation for interoperability, it is necessary that a qualified implementation consistently and repeatedly pass any of the applicable tests.

In any case, where a member finds an issue with the Test Plan Generator, the Test Case as described in the Test Specification, or with the Test System utilized, the Member is required to notify the responsible party via an errata request such that the issue may be addressed.

4.1.3 Creating Sample Items

4.1.3.1 Mandatory and Optional Fields

Each applicant is must provide, for each of the four pre-defined formats, the complete list of all the supported fields.

This list must include the following mandatory fields:

• For vcards, Name, Version and Telephone Number.
• For vcals, the event fields Version, Description and Start Date/Time plus the ToDo fields Version, Categories, Date/Time Completed, Description, Priority, Status and Summary
• For vmsgs, Version and Message Body.
• For vNotes, Version and Body.

4.1.3.2 Preparing the items for First-time Synchronization

The following inputs are required to get the initial conditions:

• For vCard, at least 3 different business cards on client and server side:
• For vCal, at least 3 different event/ToDo items on client and server side
• For vMsg, at least 3 different messages on client and server side
• For vNote, at least 3 different Notes on client and server side

By building sample items that include both mandatory supported fields and jointly supported optional fields, it can be verified that these fields are properly processed, and optional fields that are only supported by one of the two devices are not altered or erased upon reception by the other device, i.e., are properly discarded.

4.1.3.3 Preparing Items for Subsequent Time Synchronization

The sample items must be built to check the following changes of the fields for each format:

• Add at least one item on client and server side
• Delete at least one item on client and server side
• Client Modify all client supported fields of at least one item
• Server: Modify all server supported fields of at least one item

To reduce the overall number of tests the modifications are combined for each format; e.g., in case of vCards, the following modifications are required to get the initial conditions:

• At least one different business card is added on each side
• At least one different business card is deleted on each side
• Client The name, version and phone number fields and additional client supported fields of at least one business card are modified
• Server: The name, version and phone number fields and additional server supported fields of at least one business card are modified

Note: Due to User Interface (UI) limitations it may not be possible to delete or modify items on the Sync Server. In this situation, all Client side initial conditions shall be met. These conditions only apply when the Sync Server is the DUT. When testing a Sync Client all conditions of this section shall be met.

4.1.4 Synchronization Settings and Verdicts

Depending on the user settings on client and server, the steps of the procedures and the result of the synchronization operation can differ. This must be taken into account when analyzing the results to get the verdict. Different settings can be, e.g.,

- Acceptance of the client’s, the server’s, or the latest modification of an identical field on both sides
- Hard- or soft-delete of an item deleted by the other side
- The time interval between two pages in the Automatic Synchronization scenario.

If it is not possible for the user to select the formats to be synchronized (e.g., because these are already preselected due to the initial synchronization) it is allowed to run several synchronization test cases in parallel to perform synchronization of different formats in one step.

The general Pass verdict which applies for all synchronization tests is as follows:

Client/Server:

Synchronization must be performed correctly:

- All client/server deleted items must be deleted correctly according to the synchronization settings.
- All client/server added items must be added correctly according to the synchronization settings.
- All client/server modified items must be modified correctly according to the synchronization settings.
- all mandatory fields of the item must be modified correctly.
- all optional fields supported by both must be modified correctly.

Optional fields supported by only one side must not be erased or altered when synchronizing with another side that does not support the optional field.
4.1.5 Pass/Fail Verdict Conventions

Each test case has an Expected Outcome section, which outlines all the detailed pass criteria conditions that shall be met by the IUT to merit a Pass Verdict.

The convention in this test specification is that, unless there are a specific set of fail conditions outlined in the test case, the IUT fails the test case as soon as one of the pass criteria conditions cannot be met. If this occurs the outcome of the test shall be the Fail Verdict.

4.2 Synchronization Test Cases

4.2.1 Initialization (first time) Synchronization

4.2.1.1 List

• Test Purpose
  Client:
  To verify the accuracy of the synchronization application provided client’s list of surrounding devices that support Synchronization.

  Server:
  To verify that the Initialization Sync mode is entered and therefore Synchronization service is registered in the service discovery database and the server is discoverable and connectable.

• Test Case ID(s)
  SYNC/CL/SYN/BV-01-I
  SYNC/SR/SYN/BV-01-I

• Reference
  [2] 3.2.1

• Initial Condition
  Client: Standby mode.

  Server: Standby mode.

• Test Procedure
  Client:
  - After the Initialization Sync Mode on the server is selected activate the synchronization application on the client. If possible, configure the client to look for the surrounding devices that support Synchronization. If requested, the Bluetooth PIN code has to be entered at a certain step of the procedure. The actual step depends on the application and may vary.

  Server:
  - Select Initialization Sync mode. If requested, the Bluetooth PIN code has to be entered at a certain step of the procedure. The actual step depends on the application and may vary.
• Expected Outcome

Pass verdict:

Client:
- The list of surrounding devices (server) that support Synchronization or all services is correct.
- If the client is configured to display also Synchronization format information, this information must be correct corresponding to the supported synchronization formats of the server.

Server:
- Initialization Sync mode is activated.

4.2.1.2 PIN Check

• Test Purpose

Client:
To verify that the PIN code is requested from the user and handled correctly prior to initial synchronization.

Server:
To verify that the PIN code is requested from the user and handled correctly prior to initial synchronization.

• Test Case ID(s)

SYNC/CL/SYN/BV-02-I
SYNC/SR/SYN/BV-02-I

• Reference

[2] 3.2.1

• Initial Condition

No bonding has to be performed before.

Client:
- Synchronization application is activated.
- The items to be synchronized are prepared.
- A server to perform initial synchronization with is selectable.

Server:
- Initialization Sync mode is set.
- The items to be synchronized are prepared.

• Test Procedure

Client:
- Select the server to be connected and synchronized.
- A Bluetooth PIN code is requested.
- Enter the same PIN code as on the server.

Server:
- A Bluetooth PIN code is requested.

• Expected Outcome

Pass verdict:

Client:
- The Bluetooth PIN code is requested from the user prior to initial synchronization.
- The entered PIN code is treated correctly and the application steps to the next state

Server:
- The Bluetooth PIN code is requested from the user prior to initial synchronization.
- The entered PIN code is treated correctly and the application steps to the next state.

• Notes

Depending on the architecture that is to use the synchronization feature the steps how and when a Bluetooth PIN is requested may vary.

4.2.1.3 OBEX password

• Test Purpose

Client:
To verify that the OBEX password is requested from the user and handled correctly prior to initial synchronization.

Server:
To verify that the OBEX password is requested from the user and handled correctly prior to initial synchronization.

• Test Case ID(s)

SYNC/CL/SYN/BV-03-I
SYNC/SR/SYN/BV-03-I

• Reference

[2] 3.2.1

• Initial Condition

Client:
- Synchronization application is activated.
- The items to be synchronized are prepared.
- A server to perform initial synchronization with has been selected.
- The Bluetooth PIN code has been accepted.

Server:
- Initialization Sync mode is set.
- The items to be synchronized are prepared.
- The Bluetooth PIN code has been accepted.

• Test Procedure
  Client:
  - The OBEX password is requested.
  - Enter the same password as on the server.
  Server:
  - The OBEX password is requested.

• Expected Outcome
  Pass verdict:
  Client:
  - The OBEX password is requested from the user prior to initial synchronization.
  - The entered password is treated correctly and the application steps to the next state.
  Server:
  - The OBEX password is requested from the user prior to initial synchronization.
  - The entered OBEX password is treated correctly and the application steps to the next state.

• Notes
  Depending on the architecture that is to use the synchronization feature the steps how and when the OBEX password is requested may vary.

4.2.1.4 Initial Sync – vCard

• Test Purpose
  Client:
  To verify that the Initial Synchronization of vCard items is performed successfully.

  Server:
  To verify that the Initial Synchronization of vCard items is performed successfully.

• Test Case ID(s)
SYNC/CL/SYN/BV-04-I

SYNC/SR/SYN/BV-04-I

• Reference
[2] 3.2.1

• Initial Condition

Client:
- The application for synchronization is activated.
- The vCard items for initial synchronization are prepared (see 4.1.3.2).
- The IrMC server can be selected from a list.

Server:
- Initialization Sync mode is set.
- The vCard items for initial synchronization are prepared (see 4.1.3.2).

• Test Procedure

Client:
- Select the server to perform initial synchronization with.
- Perform Bluetooth PIN exchange.
- Perform OBEX authentication if used.
- Start the synchronization.

Server:
- Perform Bluetooth PIN exchange.
- Perform OBEX authentication if used.

• Expected Outcome

Pass verdict:

Client:
- The initial synchronization of vCard items is processed correctly (see 4.1.4).
- The client may be notified that the initial synchronization was successful.

Server:
- The initial synchronization of vCard items is processed correctly (see 4.1.4).

• Notes

Depending on the architecture that is to use the synchronization feature the steps of the initial synchronization procedure may vary.
4.2.1.5 Initial Sync – vCard not supported

- **Test Purpose**
  
  Client:
  - To verify that if the server does not support the Synchronization of vCard items, this is notified correctly on the client.

  Server:
  - To verify that if the server does not support the Synchronization of vCard items, this is correctly handled on the server side.

- **Test Case ID(s)**
  
  SYNC/CL/SYN/BV-05-I
  SYNC/SR/SYN/BV-05-I

- **Reference**
  
  [2] 3.2.1

- **Initial Condition**

  Client:
  - The application for synchronization is activated.
  - The vCard items for initial synchronization are prepared (see 4.1.3.2).
  - The IrMC server can be selected from a list.

  Server:
  - Initialization Sync mode is set.

- **Test Procedure**

  Client:
  - Select the server to perform initial synchronization with.
  - Perform Bluetooth PIN exchange.
  - Perform OBEX authentication if used.
  - Start the synchronization.

  Server:
  - Perform Bluetooth PIN exchange.
  - Perform OBEX authentication if used.

- **Expected Outcome**

  Pass verdict:
Client:
- The client is notified that Synchronization of vCards is not supported on the server.

Server:
- There may be an error message on the server side. There is no disruption of server operation.

• Notes
Depending on the architecture that is to use the synchronization feature the steps of the initial synchronization procedure may vary.

4.2.1.6 Initial Sync – vCal

• Test Purpose
Client:
To verify that the Initial Synchronization of vCal items is performed successfully.

Server:
To verify that the Initial Synchronization of vCal items is performed successfully.

• Test Case ID(s)
SYNC/CL/SYN/BV-06-I
SYNC/SR/SYN/BV-06-I

• Reference
[2] 3.2.1

• Initial Condition
Client:
- The application for synchronization is activated
- The vCal items for initial synchronization are prepared (see 4.1.3.2).
- The IrMC server can be selected from a list.

Server:
- Initialization Sync mode is set.
- The vCal items for initial synchronization are prepared (see 4.1.3.2).

• Test Procedure
Client:
1. Select the server to perform initial synchronization with.
2. Perform Bluetooth PIN exchange.
3. Perform OBEX authentication if used.
4. Start the synchronization.
Server:

1. Perform Bluetooth PIN exchange.
2. Perform OBEX authentication if used.

• Expected Outcome

Pass verdict:

Client:

- The initial synchronization of vCal items is processed correctly (see 4.1.4).
- The client may be notified that the initial synchronization was successful.

Server:

The initial synchronization of vCal items is processed correctly (see 4.1.4).

• Notes

Depending on the architecture that is to use the synchronization feature the steps of the initial synchronization procedure may vary.

4.2.1.7 Initial Sync – vCal not supported

• Test Purpose

Client:

To verify that if the server does not support the Synchronization of vCal items, this is notified correctly on the client.

Server:

To verify that if the server does not support the Synchronization of vCal items, this is correctly handled on the server side.

• Test Case ID(s)

SYNC/CL/SYN/BV-07-I
SYNC/SR/SYN/BV-07-I

• Reference

[2] 3.2.1

• Initial Condition

Client:

1. The application for synchronization is activated.
2. The vCal items for initial synchronization are prepared (see 4.1.3.2).
3. The IrMC server can be selected from a list.

Server:
- Initialization Sync mode is set.

**Test Procedure**

Client:
- Select the server with which to perform initial synchronization.
- Perform Bluetooth PIN exchange.
- Perform OBEX authentication if used.
- Start the synchronization.

Server:
- Perform Bluetooth PIN exchange.
- Perform OBEX authentication if used.

**Expected Outcome**

**Pass verdict:**

Client:
- The client is notified that Synchronization of vCals is not supported on the server.

Server:
- There may be an error message on the server side. There is no disruption of server operation.

**Notes**

Depending on the architecture that is to use the synchronization feature the steps of the initial synchronization procedure may vary.

4.2.1.8 Initial Sync – vMsg

**Test Purpose**

Client:

To verify that the Initial Synchronization of vMsg items is performed successfully.

Server:

To verify that the Initial Synchronization of vMsg items is performed successfully.

**Test Case ID(s)**

SYNC/CL/SYN/BV-08-I

SYNC/SR/SYN/BV-08-I

**Reference**

[2] 3.2.1

**Initial Condition**
Client:

- The application for synchronization is activated.
- The vMsg items for initial synchronization are prepared (see 4.1.3.2).
- The IrMC server can be selected from a list.

Server:

- Initialization Sync mode is set.
- The vMsg items for initial synchronization are prepared (see 4.1.3.2).

• Test Procedure

Client:

- Select the server to perform initial synchronization with.
- Perform Bluetooth PIN exchange.
- Perform OBEX authentication if used.
- Start the Synchronization.

Server:

- Perform Bluetooth PIN exchange.
- Perform OBEX authentication if used.

• Expected Outcome

Pass verdict:

Client:

- The initial synchronization of vMsg items is processed correctly.
- The client may be notified that the initial synchronization was successful.

Server:

- The initial synchronization of vMsg items is processed correctly (see 4.1.4).

• Notes

Depending on the architecture that is to use the synchronization feature the steps of the initial synchronization procedure may vary.

4.2.1.9 Initial Sync – vMsg not supported

• Test Purpose

Client:

To verify that if the server does not support the Synchronization of VMsg items, this is notified correctly on the client.

Server:
To verify that if the server does not support the Synchronization of VMsg items, this is correctly handled on the server side.

- Test Case ID(s)
  
  **SYNC/CL/SYN/BV-09-I**  
  **SYNC/SR/SYN/BV-09-I**

- Reference
  
  [2] 3.2.1

- Initial Condition

  **Client:**
  - The application for synchronization is activated.
  - The VMsg items for initial synchronization are prepared (see 4.1.3.2).
  - The IrMC server can be selected from a list.

  **Server:**

  Initialization Sync mode is set.

- Test Procedure

  **Client:**

  1. Select the server to perform initial synchronization with.
  2. Perform Bluetooth PIN exchange.
  3. Perform OBEX authentication if used.
  4. Start the synchronization.

  **Server:**

  1. Perform Bluetooth PIN exchange.
  2. Perform OBEX authentication if used.

- Expected Outcome

  **Pass verdict:**

  **Client:**

  - The client is notified that Synchronization of VMs is not supported on the server.

  **Server:**

  - There may be an error message on the server side. There is no disruption of server operation.

- Notes

  Depending on the architecture that is to use the synchronization feature the steps of the initial synchronization procedure may vary.
4.2.1.10 Initial Sync – vNote

• Test Purpose

Client:

To verify that the Initial Synchronization of vNote items is performed successfully.

Server:

To verify that the Initial Synchronization of vNote items is performed successfully.

• Test Case ID(s)

SYNC/CL/SYN/BV-10-I
SYNC/SR/SYN/BV-10-I

• Reference

[2] 3.2.1

• Initial Condition

Client:

- The application for synchronization is activated
- The vNote items for initial synchronization are prepared (see 4.1.3.2).
- The IrMC server can be selected from a list.

Server:

- Initialization Sync mode is set.
- The vNote items for initial synchronization are prepared (see 4.1.3.2).

• Test Procedure

Client:

1. Select the server to perform initial synchronization with.
2. Perform Bluetooth PIN exchange.
3. Perform OBEX authentication if used.
4. Start the Synchronization.

Server:

1. Perform Bluetooth PIN exchange.
2. Perform OBEX authentication if used.

• Expected Outcome

Pass verdict:

Client:

- The initial synchronization of vNote items is processed correctly (see 4.1.4).
- The client may be notified that the initial synchronization was successful.

Server:

- The initial synchronization of vNote items is processed correctly (see 4.1.4).

• Notes

Depending on the architecture that is to use the synchronization feature the steps of the initial synchronization procedure may vary.

4.2.1.11 Initial Sync – vNote not supported

• Test Purpose

Client:

To verify that if the server does not support the Synchronization of vNote items, this is notified correctly on the client.

Server:

To verify that if the server does not support the Synchronization of vNote items, this is correctly handled on the server side.

• Test Case ID(s)

SYNC/CL/SYN/BV-11-I
SYNC/SR/SYN/BV-11-I

• Reference

[2] 3.2.1

• Initial Condition

Client:

- The application for synchronization is activated.
- The vNote items for initial synchronization are prepared (see 4.1.3.2).
- The IrMC server can be selected from a list.

Server:

- Initialization Sync mode is set.

• Test Procedure

Client:

1. Select the server to perform initial synchronization with.
2. Perform Bluetooth PIN exchange.
3. Perform OBEX authentication if used.
4. Start the synchronization.

Server:
1. Perform Bluetooth PIN exchange.
2. Perform OBEX authentication if used.

- **Expected Outcome**
  
  **Pass verdict:**

  **Client:**
  - The client is notified that Synchronization of vNotes is not supported on the server.

  **Server:**
  - There may be an error message on the server side. There is no disruption of server operation.

- **Notes**
  Depending on the architecture that is to use the synchronization feature the steps of the initial synchronization procedure may vary.

### 4.2.2 Subsequent time Synchronization

#### 4.2.2.1 Sync – vCard

- **Test Purpose**
  
  **Client:**
  To verify that the Synchronization of vCard items is performed successfully.

  **Server:**
  To verify that the synchronization of vCard items is performed successfully.

- **Test Case ID(s)**

  **SYNC/CL/SYN/BV-12-I**

  **SYNC/SR/SYN/BV-12-I**

- **Reference**

  [2] 3.2.1

- **Initial Condition**

  **Client:**
  - Initial synchronization with the server is performed before.
  - The Server to synchronize with is selected.
  - The vCard items to synchronize are prepared (see 4.1.3.3).

  **Server:** Initial synchronization with the client is performed before.

  - General Sync mode is set.
  - The vCard items to synchronize are prepared (see 4.1.3.3).
• Test Procedure
  Client:
  - Start the synchronization.
  Server:
  - No user intervention is required.

• Expected Outcome
  Pass verdict:
  Client:
  - The synchronization of vCard items is processed correctly (see 4.1.4).
  Server:
  - The synchronization of vCard items is processed correctly (see 4.1.4).

• Notes
  Depending on the architecture that is to use the synchronization feature the steps of the synchronization procedure may vary.

4.2.2.2 Sync – vCal
• Test Purpose
  Client:
  To verify that the Synchronization of vCal items is performed successfully.
  Server:
  To verify that the synchronization of vCal items is performed successfully.

• Test Case ID(s)
  SYNC/CL/SYN/BV-13-I
  SYNC/SR/SYN/BV-13-I

• Reference
  [2] 3.2.1

• Initial Condition
  Client:
  - Initial synchronization with the server is performed before.
  - Server to synchronize with is selected.
  - The vCal items to synchronize are prepared (see 4.1.3.3).
  Server:
- Initial synchronization with the client is performed before.
- General Sync Mode is set.
- The vCal items to synchronize are prepared (see 4.1.3.3).

**Test Procedure**

**Client:**

Start the synchronization.

**Server:**

No user intervention is required.

**Expected Outcome**

**Pass verdict:**

**Client:**

- The synchronization of vCal items is processed correctly (see 4.1.4).

**Server:**

- The synchronization of vCal items is processed correctly (see 4.1.4).

**Notes**

Depending on the architecture that is to use the synchronization feature the steps of the synchronization procedure may vary.

**4.2.2.3 Sync – vMsg**

**Test Purpose**

**Client:**

To verify that the Synchronization of vMsg items is performed successfully.

**Server:**

To verify that the synchronization of vMsg items is performed successfully.

**Test Case ID(s)**

SYNC/CL/SYN/BV-14-I
SYNC/SR/SYN/BV-14-I

**Reference**

[2] 3.2.1

**Initial Condition**
Client:
- Initial synchronization with the server is performed before.
- Server to synchronize with is selected.
- The vMsg items to synchronize are prepared (see 4.1.3.3).

Server:
- Initial synchronization with the client is performed before.
- General Sync Mode is set.
- The vMsg items to synchronize are prepared (see 4.1.3.3).

• Test Procedure

Client:
- Start the synchronization.

Server:
- No user intervention is required.

• Expected Outcome

Pass verdict:

Client:
- The synchronization of vMsg items is processed correctly (see 4.1.4).

Server:
- The synchronization of vMsg items is processed correctly (see 4.1.4).

• Notes

Depending on the architecture that is to use the synchronization feature the steps of the synchronization procedure may vary.

4.2.2.4 Sync – vNote

• Test Purpose

Client:
To verify that the Synchronization of vNote items is performed successfully.

Server:
To verify that the synchronization of vNote items is performed successfully.

• Test Case ID(s)
SYNC/CL/SYN/BV-15-I

SYNC/SR/SYN/BV-15-I

• Reference
[2] 3.2.1

• Initial Condition
Client:
- Initial synchronization with the server is performed before Server to synchronize with is selected.
- The vNote items to synchronize are prepared (see 4.1.3.3).

Server
- Initial synchronization with the client is performed before.
- General Sync Mode is set.
- The vNote items to synchronize are prepared (see 4.1.3.3).

• Test Procedure
Client:

Start the synchronization.

Server:

No user intervention is required.

• Expected Outcome
Pass verdict:

Client:
- The synchronization of vNote items is processed correctly (see 4.1.4).

Server:
- The synchronization of vNote items is processed correctly (see 4.1.4).

• Notes
Depending on the architecture that is to use the synchronization feature the steps of the synchronization procedure may vary.

4.3 Sync Command Test Cases

4.3.1 Sync Command Scenario

4.3.1.1 Sync Cmd – vCard

• Test Purpose
Client:

To verify that the client accepts and performs Synchronization of vCard by Sync Command from a server successfully.

Server:

To verify that the server can initiate and perform synchronization of vCard by Sync Command successfully.

- Test Case ID(s)

  SYNC/CL/SYC/BV-01-I
  
  SYNC/SR/SYC/BV-01-I

- Reference

  [2] 3.2.2

- Initial Condition

  Client:

  - Initial synchronization with the server is performed before.
  - General Sync Mode is set.
  - The vCard items to synchronize is prepared (see 4.1.3.3).

  Server:

  - Initial synchronization with the client is performed before Synchronization application is started.
  - The client is selected.
  - The vCard items to synchronize is prepared (see 4.1.3.3).

- Test Procedure

  Client:

  - No user intervention is required.

  Server:

  - Start the synchronization.

- Expected Outcome

  Pass verdict:

  Client:

  - The synchronization of vCard items is processed correctly (see 4.1.4).

  Server:
- The synchronization of vCard items is processed correctly (see 4.1.4).

• Notes
  Depending on the architecture that is to use the sync command feature the steps of the
  synchronization procedure may vary.

4.3.1.2 Sync Cmd – vCal

• Test Purpose
  Client:

  To verify that the client accepts and performs Synchronization of vCal items by Sync Command from
  a server successfully.

  Server:

  To verify that the server can initiate and perform synchronization of vCal items by Sync Command
  successfully.

• Test Case ID(s)
  SYNC/CL/SYC/SYC/BV-02-I
  SYNC/SR/SYC/SYC/BV-02-I

• Reference
  [2] 3.2.2

• Initial Condition
  Client:
  - Initial synchronization with the server is performed before.
  - General Sync Mode is set.
  - The vCal items to synchronize are prepared (see 4.1.3.3).

  Server:
  - Initial synchronization with the client is performed before.
  - Synchronization application is started.
  - The client is selected.
  - The vCal items to synchronize are prepared (see 4.1.3.3).

• Test Procedure
  Client:

  No user intervention is required.

  Server:

  Start the synchronization.
• Expected Outcome
  
  **Pass verdict:**
  
  **Client:**
  - The synchronization of vCal items is processed correctly (see 4.1.4).
  
  **Server:**
  - The synchronization of vCal items is processed correctly (see 4.1.4).

• Notes
  
  Depending on the architecture that is to use the synchronization feature the steps of the synchronization procedure may vary.

4.3.1.3  Sync Cmd – vMsg

• Test Purpose
  
  **Client:**
  
  To verify that the client accepts and performs Synchronization of vMsg items by Sync Command from a server successfully.
  
  **Server:**
  
  To verify that the server can initiate and perform synchronization of vMsg items by Sync Command successfully.

• Test Case ID(s)

  **SYNC/CL/SYC/BV-03-I**
  **SYNC/SR/SYC/BV-03-I**

• Reference

  [2] 3.2.2

• Initial Condition
  
  **Client:**
  
  - Initial synchronization with the server is performed before.
  - General Sync Mode is set.
  - The vMsg items to synchronize are prepared (see 4.1.3.3).
  
  **Server:**
  
  - Initial synchronization with the client is performed before.
  - Synchronization application is started.
  - The client is selected.
The vMsg items to synchronize are prepared (see 4.1.3.3).

- **Test Procedure**
  
  **Client:**

  No user intervention is required.

  **Server:**

  Start the Synchronization.

- **Expected Outcome**

  **Pass verdict:**

  **Client:**

  - The synchronization of vMsg items is processed correctly (see 4.1.4).

  **Server:**

  - The synchronization of vMsg items is processed correctly (see 4.1.4).

- **Notes**

  Depending on the architecture that is to use the synchronization feature the steps of the synchronization procedure may vary.

**4.3.1.4 Sync Cmd – vNote**

- **Test Purpose**

  **Client:**

  To verify that the client accepts and performs Synchronization of vNote items by Sync Command from a server successfully.

  **Server:**

  To verify that the server can initiate and perform synchronization of vNote items (see Note) by Sync Command successfully.

- **Test Case ID(s)**

  `SYNC/CL/SYC/BV-04-I`

  `SYNC/SR/SYC/BV-04-I`

- **Reference**

  [2] 3.2.2

- **Initial Condition**

  **Client:**
- Initial synchronization with the server is performed before.
- General Sync Mode is set.
- The vNote items to synchronize are prepared (see 4.1.3.3).

Server:
- Initial synchronization with the client is performed before.
- Synchronization application is started.
- The client is selected.
- The vNote items to synchronize are prepared (see 4.1.3.3).

* Test Procedure

Client:
- No user intervention is required.

Server:
- Start the Synchronization.

* Expected Outcome

Pass verdict:

Client:
- The synchronization of vNote items is processed correctly (see 4.1.4).

Server:
- The synchronization of vNote items is processed correctly (see 4.1.4).

* Notes

Depending on the architecture that is to use the synchronization feature the steps of the synchronization procedure may vary.

4.4 Automatic Synchronization test cases

4.4.1 Automatic Synchronization scenario

4.4.1.1 Auto Sync – vCard

* Test Purpose

Client:

To verify that the client performs automatic Synchronization of vCard items successfully.

Server:

To verify that the server performs automatic Synchronization of vCard items successfully.
• Test Case ID(s)

SYNC/CL/ASY/BV-01-I
SYNC/SR/ASY/BV-01-I

• Reference

[2] 3.2.3

• Initial Condition

Client:
- Initial synchronization with the server is performed before.
- General Sync Mode is set.
- The vCard items to synchronize are prepared (see 4.1.3.3).

Server:
- Initial synchronization with the client is performed before.
- General Sync Mode is set.
- The vCard items to synchronize are prepared (see 4.1.3.3).

• Test Procedure

Client:
- Ensure that the client is out of the communication range of the server.
- Activate the automatic synchronization feature.

Server:
- After the automatic synchronization feature is activated on the client, enter the communication range of the client.

• Expected Outcome

Pass verdict:

Client:
- The synchronization of vCard items is processed correctly (see 4.1.4).

Server:
- The synchronization of vCard items is processed correctly (see 4.1.4).

• Notes

Depending on the architecture that is to use the automatic synchronization feature the steps of the synchronization procedure may vary.
4.4.1.2 Auto Sync – vCal

- **Test Purpose**
  
  **Client:**
  
  To verify that the client performs automatic Synchronization of vCal items successfully.
  
  **Server:**
  
  To verify that the server performs automatic Synchronization of vCal items successfully.
  
- **Test Case ID(s)**
  
  `SYNC/CL/ASY/BV-02-I`
  
  `SYNC/SR/ASY/BV-02-I`
  
- **Reference**
  
  [2] 3.2.3
  
- **Initial Condition**
  
  **Client:**
  
  - Initial synchronization with the server is performed before.
  - General Sync Mode is set.
  - The vCal items to synchronize are prepared (see 4.1.3.3).
  
  **Server:**
  
  - Initial synchronization with the client is performed before General Sync Mode is set.
  - The vCal items to synchronize are prepared (see 4.1.3.3).
  
- **Test Procedure**
  
  **Client:**
  
  - Ensure that the client is out of the communication range of the server.
  - Activate the automatic synchronization feature.
  
  **Server:**
  
  - After the automatic synchronization feature is activated on the client, enter the communication range of the client.
  
- **Expected Outcome**
  
  **Pass verdict:**
  
  **Client:**
  
  - The synchronization of vCal items is processed correctly (see 4.1.4).
Server:

- The synchronization of vCal items is processed correctly (see 4.1.4).

• Notes
Depending on the architecture that is to use the synchronization feature the steps of the synchronization procedure may vary.

4.4.1.3 Auto Sync – vMsg

• Test Purpose
Client:
To verify that the client performs automatic Synchronization of vMsg items successfully.

Server:
To verify that the server performs automatic Synchronization of vMsg items successfully.

• Test Case ID(s)
  SYNC/CL/ASY/BV-03-I
  SYNC/SR/ASY/BV-03-I

• Reference
[2] 3.2.3

• Initial Condition
Client:
- Initial synchronization with the server is performed before.
- General Sync Mode is set.
- The vMsg items to synchronize are prepared (see 4.1.3.3).

Server:
- Initial synchronization with the client is performed before.
- General Sync Mode is set.
- The vMsg items to synchronize are prepared (see 4.1.3.3).

• Test Procedure
Client:
1. Ensure that the client is out of the communication range of the server.
2. Activate the automatic synchronization feature.

Server:
- After the automatic synchronization feature is activated on the client, enter the communication range of the client.
• Expected Outcome

Pass verdict:

Client:
- The synchronization of vMsg items is processed correctly (see 4.1.4).

Server:
- The synchronization of vMsg items is processed correctly (see 4.1.4).

• Notes

Depending on the architecture that is to use the synchronization feature the steps of the synchronization procedure may vary.

4.4.1.4 Auto Sync – vNote

• Test Purpose

Client:
To verify that the client performs automatic Synchronization of vNote items successfully.

Server:
To verify that the server performs automatic Synchronization of vNote items successfully.

• Test Case ID(s)

SYNC/CL/ASY/BV-04-I
SYNC/SR/ASY/BV-04-I

• Reference

[2] 3.2.3

• Initial Condition

Client:
- Initial synchronization with the server is performed before General Sync Mode is set.
- The vNote items to synchronize are prepared (see 4.1.3.3).

Server:
- Initial synchronization with the client is performed before General Sync Mode is set.
- The vNote items to synchronize are prepared (see 4.1.3.3).

• Test Procedure

Client:
1. Ensure that the client is out of the communication range of the server.
2. Activate the automatic synchronization feature.

Server:

- After the automatic synchronization feature is activated on the client, enter the communication range of the client.

• Expected Outcome

  Pass verdict:

  Client:

  - The synchronization of vNote items is processed correctly (see 4.1.4).

  Server:

  - The synchronization of vNote items is processed correctly (see 4.1.4).

• Notes

  Depending on the architecture that is to use the automatic synchronization feature the steps of the synchronization procedure may vary.
## 5 Test Case Mapping

The Test Case Mapping Table (TCMT) maps test cases to specific requirements in the ICS. The product shall be tested in all roles for which support is declared in the ICS document.

The columns for the TCMT are defined as follows:

- **Item:** Contains a y/x reference, where y corresponds to the table number and x corresponds to the feature number as defined in the ICS Proforma for Synchronization Profile (SYNC) [5]. If the Item is defined with Protocol, Profile or Service abbreviation before y/x, the table and feature number referenced are defined in the abbreviated ICS Proforma document.

- **Feature:** Recommended to be the primary feature defined in the ICS being tested or may be the test case name.

- **Test Case(s):** The applicable test case identifiers required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported.

- **Test Case Applicable:** May be used to note if a test is required based on the supported features.

For purpose and structure of the ICS/IXIT Proforma and instructions for completing the ICS/IXIT Proforma refer to the Bluetooth ICS and IXIT Proforma document.

<table>
<thead>
<tr>
<th>Item</th>
<th>Feature</th>
<th>Test Case(s)</th>
<th>Test Case Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Discovery</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>SYNC 2/1</td>
<td>SD Database query / response</td>
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<td></td>
</tr>
<tr>
<td>SYNC 3/1</td>
<td>SD Database query / response</td>
<td>SYNC/SR/SYN/BV-01-I</td>
<td></td>
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<tr>
<td>Authentication</td>
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<td></td>
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<tr>
<td>SYNC 2/2</td>
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<td></td>
</tr>
<tr>
<td>SYNC 3/2</td>
<td>Use of Authentication / Bluetooth PIN exchange</td>
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<td></td>
</tr>
<tr>
<td>SYNC 3/3</td>
<td>Use of OBEX authentication</td>
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<td>SYNC/CL/SYN/BV-06-I</td>
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<tr>
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<td>Synchronization vCal</td>
<td>SYNC/SR/SYN/BV-06-I</td>
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<td>SYNC/SR/SYN/BV-13-I</td>
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<tr>
<td>Item</td>
<td>Feature</td>
<td>Test Case(s)</td>
<td>Test Case Applicable</td>
</tr>
<tr>
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| SYNC 2/7     | Synchronization vMsg | SYNC/CL/SYN/BV-08-I  
SYNC/CL/SYN/BV-14-I |                      |
| SYNC 3/7     | Synchronization vMsg | SYNC/CL/SYN/BV-14-I  
SYNC/CL/SYN/BV-14-I |                      |
| SYNC 2/8     | Synchronization vNote | SYNC/CL/SYN/BV-10-I  
SYNC/CL/SYN/BV-15-I |                      |
| SYNC 3/8     | Synchronization vNote | SYNC/CL/SYN/BV-10-I  
SYNC/CL/SYN/BV-15-I |                      |
| SYNC 2/5     | Synchronization vCard not support | SYNC/CL/SYN/BV-05-I |                      |
| SYNC 1/2 AND NOT 3/5 | Synchronization vCard not support | SYNC/CL/SYN/BV-05-I |                      |
| SYNC 2/6     | Synchronization vCal not support | SYNC/CL/SYN/BV-07-I |                      |
| SYNC 1/2 AND NOT 3/6 | Synchronization vCal not support | SYNC/CL/SYN/BV-07-I |                      |
| SYNC 2/7     | Synchronization vMsg not support | SYNC/CL/SYN/BV-09-I |                      |
| SYNC 1/2 AND NOT 3/7 | Synchronization vMsg not support | SYNC/CL/SYN/BV-09-I |                      |
| SYNC 2/8     | Synchronization vNote not support | SYNC/CL/SYN/BV-11-I |                      |
| SYNC 1/2 AND NOT 3/8 | Synchronization vNote not support | SYNC/CL/SYN/BV-11-I |                      |
| Sync Command |                  |                                          |                      |
| SYNC 2/11    | Sync Command vCard | SYNC/CL/SYC/BV-01-I |                      |
| SYNC 3/11    | Sync Command vCard | SYNC/CL/SYC/BV-01-I |                      |
| SYNC 2/12    | Sync Command vCal  | SYNC/CL/SYC/BV-02-I |                      |
| SYNC 3/12    | Sync Command vCal  | SYNC/CL/SYC/BV-02-I |                      |
| SYNC 2/13    | Sync Command vMsg  | SYNC/CL/SYC/BV-03-I |                      |
| SYNC 3/13    | Sync Command vMsg  | SYNC/CL/SYC/BV-03-I |                      |
| SYNC 2/14    | Sync Command vNote | SYNC/CL/SYC/BV-04-I |                      |
| SYNC 3/14    | Sync Command vNote | SYNC/CL/SYC/BV-04-I |                      |
## Table 5.1: Test Case Mapping

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<th>Item</th>
<th>Feature</th>
<th>Test Case(s)</th>
<th>Test Case Applicable</th>
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