Voice Assistant Profile (VAP)

***Bluetooth*® Test Suite**

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Contents

1 Scope

This Bluetooth document contains the Test Suite Structure (TSS) and test cases to test the implementation of the Bluetooth Voice Assistant Profile with the objective to provide a high probability of air interface interoperability between the tested implementation and other manufacturers' Bluetooth devices.

2 References, definitions, and abbreviations

2.1 References

This document incorporates provisions from other publications by dated or undated reference. These references are cited at the appropriate places in the text, and the publications are listed hereinafter. Additional definitions and abbreviations can be found in [1] and [2].

[1] Bluetooth Core Specification, Version 5.2 or later

[2] Test Strategy and Terminology Overview

[3] Voice Assistant Profile Specification, Version 1.0

[4] Voice Assistant Service Specification, Version 1.0

[5] ICS Proforma for Voice Assistant Profile

[6] Characteristic and Descriptor descriptions are accessible via the Bluetooth SIG Assigned Numbers

[7] GATT Test Suite, GATT.TS

[8] Document Naming and Marking Document

2.2 Definitions

In this Bluetooth document, the definitions from [1] and [2] apply.

2.3 Acronyms and abbreviations

In this Bluetooth document, the definitions, acronyms, and abbreviations from [1] and [2] apply.

3 Test Suite Structure (TSS)

3.1 Overview

The Voice Assistant Profile [3] requires the presence of GAP, SM, L2CAP, and GATT. This is illustrated in Figure 3.1.

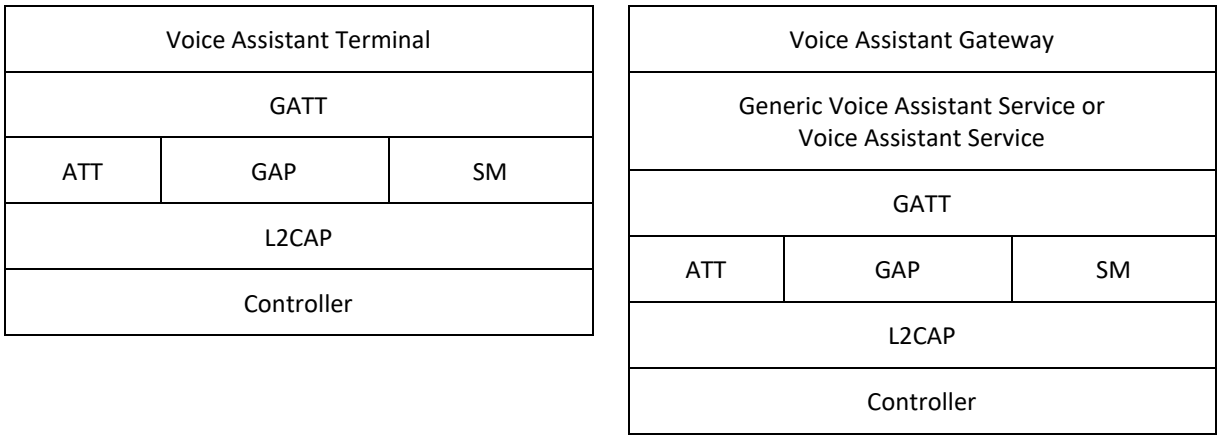

Figure 3.1: Voice Assistant Profile test model

3.2 Test Strategy

The test objectives are to verify the functionality of the Voice Assistant Profile within a Bluetooth Host and enable interoperability between Bluetooth Hosts on different devices. The testing approach covers mandatory and optional requirements in the specification and matches these to the support of the IUT as described in the ICS. Any defined test herein is applicable to the IUT if the ICS logical expression defined in the Test Case Mapping Table (TCMT) evaluates to true.

The test equipment provides an implementation of the Radio Controller and the parts of the Host needed to perform the test cases defined in this Test Suite. A Lower Tester acts as the IUT's peer device and interacts with the IUT over-the-air interface. The configuration, including the IUT, needs to implement similar capabilities to communicate with the test equipment. For some test cases, it is necessary to stimulate the IUT from an Upper Tester. In practice, this could be implemented as a special test interface, a Man Machine Interface (MMI), or another interface supported by the IUT.

This Test Suite contains Valid Behavior (BV) tests complemented with Invalid Behavior (BI) tests where required. The test coverage mirrored in the Test Suite Structure is the result of a process that started with catalogued specification requirements that were logically grouped and assessed for testability enabling coverage in defined test purposes.

3.3 Test groups

The following test groups have been defined:

- Generic GATT Integrated Tests
- Voice Assistant Gateway procedures
- Voice Assistant Terminal procedures

4 Test cases (TC)

4.1 Introduction

4.1.1 Test case identification conventions

Test cases are assigned unique identifiers per the conventions in [2]. The convention used here is:
<spec abbreviation>/<IUT role>/<class>/**<feat>**/<func>/<subfunc>/<cap>/**<xx>-<nn>-<y>**.

Additionally, testing of this specification includes tests from the GATT Test Suite [7] referred to as Generic GATT Integrated Tests (GGIT); when used, the test cases in GGIT are referred to through a TCID string using the following convention:
<spec abbreviation>/<IUT role>/<GGIT test group>/< GGIT class >/<xx>-<nn>-<y>.

Identifier Abbreviation	**Spec Identifier <spec abbreviation>**
VAP	Voice Assistant Profile
Identifier Abbreviation	**Role Identifier <IUT role>**
VAG	Voice Assistant Gateway
VAT	Voice Assistant Terminal
Identifier Abbreviation	**Reference Identifier <GGIT test group>**
CGGIT	Client Generic GATT Integrated Tests
Identifier Abbreviation	**Reference Identifier <GGIT class>**
CHA	Characteristic
SER	Service
Identifier Abbreviation	**Features and Behaviors Identifier <feat>**
VAGP	Voice Assistant Gateway Procedures
VATP	Voice Assistant Terminal Procedures

Table 4.1: VAP TC feature naming conventions

4.1.2 Conformance

When conformance is claimed for a particular specification, all capabilities are to be supported in the specified manner. The mandated tests from this Test Suite depend on the capabilities to which conformance is claimed.

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 not excluded by the specification
- That capabilities enabled by the implementations are sustained over durations expected by the use case
- That the implementation gracefully handles any quantity of data expected by the use case

- That in cases where more than one valid interpretation of the specification exists, the implementation complies with at least one interpretation and gracefully handles other interpretations
- That the implementation is immune to attempted security exploits

A single execution of each of the required tests is required to constitute a Pass verdict. However, it is noted that 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 generated by the Bluetooth SIG qualification tool, with the test case as described in the Test Suite, or with the test system utilized, the member is required to notify the responsible party via an erratum request such that the issue may be addressed.

4.1.3 Pass/Fail verdict conventions

Each test case has an Expected Outcome section. The IUT is granted the Pass verdict when all the detailed pass criteria conditions within the Expected Outcome section are met.

The convention in this Test Suite is that, unless there is 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, then the outcome of the test is a Fail verdict.

4.2 Setup preambles

The procedures defined in this section are used to achieve specific conditions on the IUT and the test equipment within the tests defined in this document. The preambles here are commonly used to establish initial conditions.

4.2.1 ATT Bearer on LE transport

- Preamble Procedure

1. Establish an LE transport connection between the IUT and the Lower Tester.
2. Establish an L2CAP channel 0x0004 between the IUT and the Lower Tester over that LE transport.
3. Establish an encrypted connection between the IUT and the Lower Tester.

4.2.2 EATT Bearer on LE transport

- Preamble Procedure

1. Establish an LE transport connection between the IUT and the Lower Tester.
2. Establish an L2CAP channel 0x0005 for signaling and one L2CAP channel (for ATT bearers) with EATT PSM (as defined in Assigned Numbers) between the IUT and the Lower Tester over that LE transport.

4.3 Generic GATT Integrated Tests

Execute the Generic GATT Integrated Tests defined in Section 6.4, Client test procedures (CGGIT), in [7] using Table 4.2 below as input:

TCID	Service / Characteristic	Reference	Properties	Value Length (Octets)	Service Type
VAP/VAT/CGGIT/SER/BV-01-C [Service GGIT - Generic Voice Assistant]	Generic Voice Assistant Service	[3] 4.1	-	-	Primary Service, Unique
VAP/VAT/CGGIT/SER/BV-02-C [Service GGIT - Voice Assistant]	Voice Assistant Service	[3] 4.1	-	-	Primary Service, Multiple
VAP/VAT/CGGIT/CHA/BV-01-C [Characteristic GGIT - Voice Assistant Name]	Voice Assistant Name characteristic	[3] 4.1.1	0x12 (Read, Notify)	Variable	-
VAP/VAT/CGGIT/CHA/BV-02-C [Characteristic GGIT - Voice Assistant UUID]	Voice Assistant UUID characteristic	[3] 4.1.1	0x12 (Read, Notify)	16	-
VAP/VAT/CGGIT/CHA/BV-03-C [Characteristic GGIT - VAS Control Point]	VAS Control Point characteristic	[3] 4.1.1	0x14 (Write Without Response, Notify)	Skip	-
VAP/VAT/CGGIT/CHA/BV-04-C [Characteristic GGIT - Installed Location]	Installed Location characteristic	[3] 4.1.1	0x12 (Read, Notify)	Variable	-
VAP/VAT/CGGIT/CHA/BV-05-C [Characteristic GGIT - Content Control ID (CCID)]	Content Control ID (CCID) characteristic	[3] 4.1.1	0x12 (Read, Notify)	1	-
VAP/VAT/CGGIT/CHA/BV-06-C [Characteristic GGIT - Voice Assistant Session State]	Voice Assistant Session State characteristic	[3] 4.1.1	0x12 (Read, Notify)	Skip	-
VAP/VAT/CGGIT/CHA/BV-07-C [Characteristic GGIT - Voice Assistant Session Flag]	Voice Assistant Session Flag characteristic	[3] 4.1.1	0x12 (Read, Notify)	1	-
VAP/VAT/CGGIT/CHA/BV-08-C [Characteristic GGIT - Voice Assistant Supported Languages]	Voice Assistant Supported Languages characteristic	[3] 4.1.1	0x12 (Read, Notify)	Variable	-
VAP/VAT/CGGIT/CHA/BV-09-C [Characteristic GGIT - Voice Assistant Supported Features]	Voice Assistant Supported Features	[3] 4.1.1	0x12 (Read, Notify)	1	-

Table 4.2: Input for the GGIT Client test procedure

4.4 Voice Assistant Gateway procedures

4.4.1 VAG Initiated VA Session

- Test Purpose

  Verify that the Voice Assistant Gateway IUT successfully updates the Voice Assistant Session State characteristic and Voice Assistant Session Flag characteristic, if supported, after being triggered by the Upper Tester.

- Reference

  [3] 3.3.1, 3.3.2

- Test Case Configuration

Test Case	Service	Voice Assistant Session Flag
VAP/VAG/VAGP/BV-01-C [VAG Initiated VA Session, GVAS]	GVAS	No
VAP/VAG/VAGP/BV-02-C [VAG Initiated VA Session with Voice Assistant Session Flags, GVAS]	GVAS	Yes
VAP/VAG/VAGP/BV-03-C [VAG Initiated VA Session, VAS]	VAS	No
VAP/VAG/VAGP/BV-04-C [VAG Initiated VA Session with Voice Assistant Session Flags, VAS]	VAS	Yes

Table 4.3: VAG Initiated VA Session test cases

- Test Procedure

  1. The Lower Tester and IUT establish a Bearer connection as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2, if using EATT over an LE transport.
  2. The Lower Tester discovers the GVAS service and, if applicable, all VAS service instances and characteristics.

     Execute Steps 3–4 on all instances of the service specified in Table 4.3:

  3. The Lower Tester configures the VAS Control Point, Voice Assistant Session State, and, if present, the Voice Assistant Session Flag characteristics for Notifications.
  4. The Lower Tester executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Session State characteristic.

     If no instances of the service specified in Table 4.3 are in 0x00 (Session Reset) or if the Voice Assistant Session State value is not 0x01 (Session Unavailable) or 0x00 (Session Reset) for any instance, the test ends in a Fail verdict.

     Execute Steps 5–6 on all instances of the service specified in Table 4.3 in Session Reset state:

  5. The Lower Tester executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x00 (Initialize VA Session).
  6. The IUT sends a notification of the VAS Control Point characteristic with Opcode set to 0x00 (Response Code) and Parameter set to 0x01 (Success) and a notification of the Voice Assistant Session State characteristic with VA Session State set to 0x02 (Session Ready) to the Lower Tester in any order. The IUT may also send a multiple handle value notification with the VAS Control Point characteristic and Voice Assistant Session State characteristic and their values.

Execute Steps 7–14 on an instance of the service specified in Table 4.3 in the Session Ready state:

7. The Upper Tester orders the IUT to enter the Session Active state.
8. The IUT sends a notification of the Voice Assistant Session State characteristic to the Lower Tester with VA Session State set to 0x03 (Session Active).

Execute Steps 9–11 if Voice Assistant Session Flag support is indicated in Table 4.3:

9. The Upper Tester informs the IUT that the VA is attentive and the IUT sends a notification of the Voice Assistant Session Flag characteristic to the Lower Tester with the value set to 0x01 (Listening Now).
10. The Upper Tester informs the IUT that the VA is processing the request and the IUT sends a notification of the Voice Assistant Session Flag characteristic to the Lower Tester with the value set to 0x02 (Processing Now).
11. The Upper Tester informs the IUT that the VA is responding to the request and the IUT sends a notification of the Voice Assistant Session Flag characteristic to the Lower Tester with the value set to 0x04 (Playback Now).
12. The Upper Tester orders the IUT to exit the Session Active state.

Steps 13–14 can be sent in any order and may be sent as a multiple handle value notification:

13. If Voice Assistant Session Flag is supported as indicated in Table 4.3, the IUT sends a notification of the Voice Assistant Session Flag characteristic to the Lower Tester with the value set to 0x00.
14. The IUT sends a notification of the Voice Assistant Session State characteristic to the Lower Tester with VA Session State set to 0x02 (Session Ready).

- Expected Outcome

  Pass verdict

  In Step 4, the Voice Assistant Session State characteristic is set to 0x00 (Session Reset) for at least one instance of the service specified in Table 4.3.

  In Step 8, the IUT successfully transitions the VAS instance to the Session Active state and sends a notification to the Lower Tester indicating such.

  In Step 14, the IUT successfully transitions the VAS instance to the Session Ready state and sends a notification to the Lower Tester indicating such.

  If Voice Assistant Session Flag support is indicated in Table 4.3:

  - In Steps 9–11 and 13, the IUT sends the Voice Assistant Session Flag notifications to the Lower Tester with the values listed.

  Fail verdict

  In Step 5, the Voice Assistant Session State characteristic is set to 0x02-0xFF for any instance of GVAS or VAS.

4.5 Voice Assistant Terminal procedures

4.5.1 VAT Initiated VA Session

- Test Purpose

  Verify that the Voice Assistant Terminal IUT successfully executes the VA Discovery, VA Session Initialization, VAT triggered VA Session Start, and VAT triggered VA Session End procedures.

- Reference

  [3] 4.3.1, 4.3.2, 4.3.3.1, 4.3.4.1

- Initial Condition

  - The Lower Tester contains an instance of GVAS that contains all characteristics set to valid values and Voice Assistant Session State set to 0x00 (Session Reset) after connection establishment with the IUT. If required, Voice Assistant Name and Voice Assistant UUID are set to TSPX_gvas_va_name and TSPX_gvas_va_uuid, respectively.
  - If VAS Discovery support is indicated in Table 4.4, the Lower Tester contains an instance of VAS with a random Voice Assistant Name and Voice Assistant UUID and an instance of VAS with Voice Assistant Name and Voice Assistant UUID set to TSPX_vas_va_name and TSPX_vas_va_uuid, respectively. The instances contain all characteristics set to valid values and have Voice Assistant Session State set to 0x00 (Session Reset) after the connection is established with the IUT.

- Test Case Configuration

Test Case	VAS Discovery	Voice Assistant Session Flag
VAP/VAT/VATP/BV-01-C [VAT Initiated VA Session, GVAS]	No	No
VAP/VAT/VATP/BV-02-C [VAT Initiated VA Session with Voice Assistant Session Flags, GVAS]	No	Yes
VAP/VAT/VATP/BV-03-C [VAT Initiated VA Session, VAS]	Yes	No
VAP/VAT/VATP/BV-04-C [VAT Initiated VA Session with Voice Assistant Session Flags, VAS]	Yes	Yes

Table 4.4: VAT Initiated VA Session test cases

- Test Procedure

  1. The IUT and Lower Tester establish a Bearer connection as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2, if using EATT over an LE transport.
  2. If necessary, the Upper Tester orders the IUT to execute the VA Discovery procedure.
  3. If not previously done, the IUT executes the GATT Discover All Primary Services or GATT Discover Primary Services by Service UUID sub-procedure to discover the GVAS service, the GATT Discover All Characteristics of a Service or GATT Discover Characteristics by UUID sub-procedure to discover the characteristics of the GVAS service, and the GATT Discover All Characteristic Descriptors sub-procedure to discover all characteristic descriptors of the GVAS service.
  4. The IUT optionally executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Name, Voice Assistant UUID, Voice Assistant Supported Features, Installed Location, or Voice Assistant Supported Languages characteristics on the instance of GVAS.

Execute Steps 5–6 if VAS Discovery support is indicated in Table 4.4:

5. If not previously done, the IUT executes the GATT Discover All Primary Services or GATT Discover Primary Services by Service UUID sub-procedure to discover all instances of the VAS service, the GATT Discover All Characteristics of a Service or GATT Discover Characteristics by UUID sub-procedure to discover the characteristics of the VAS service instances, and the GATT Discover All Characteristic Descriptors sub-procedure to discover all characteristic descriptors of the VAS service instances.
6. For each instance of VAS discovered by the IUT: the IUT optionally executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Name, Voice Assistant UUID, Voice Assistant Supported Features, Installed Location, or Voice Assistant Supported Languages characteristics.

Execute Steps 7–11 with at least one instance of VAS if VAS Discovery support is indicated in Table 4.4, otherwise with the instance of GVAS:

7. If necessary, the Upper Tester orders the IUT to execute the VA Session Initialization procedure.
8. The IUT configures the VAS Control Point, Voice Assistant Session State, and if Voice Assistant Session Flag support is indicated in Table 4.4, the Voice Assistant Session Flag characteristics for Notifications.
9. The IUT executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Session State characteristic.
10. The IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x00 (Initialize VA Session).
11. The Lower Tester sends a notification of the VAS Control Point characteristic with Opcode set to 0x00 (Response Code) and Parameter set to 0x01 (Success) and a notification of the Voice Assistant Session State characteristic with VA Session State set to 0x02 (Session Ready) to the IUT.

Execute Steps 12–24 with an instance of VAS if VAS Discovery support is indicated in Table 4.4, otherwise with the instance of GVAS:

12. The Upper Tester orders the IUT to execute the VA Session Start procedure.
13. The IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x01 (Start VA Session).
14. The Lower Tester sends a notification of the VAS Control Point characteristic with Opcode set to 0x00 (Response Code) and Parameter set to 0x01 (Success) and a notification of the Voice Assistant Session State characteristic with VA Session State set to 0x03 (Session Active) to the IUT.

Execute Steps 15–17 if Voice Assistant Session Flag support is indicated in Table 4.4:

15. The Lower Tester sends a notification of the Voice Assistant Session Flag characteristic to the IUT with the value set to 0x01 (Listening Now).
16. The Lower Tester sends a notification of the Voice Assistant Session Flag characteristic to the IUT with the value set to 0x02 (Processing Now).
17. The Lower Tester sends a notification of the Voice Assistant Session Flag characteristic to the IUT with the value set to 0x04 (Playback Now).
18. The Lower Tester sends a notification of the Voice Assistant Session Flag characteristic with the value set to 0x00 and a notification of the Voice Assistant Session State characteristic with VA Session State set to 0x02 (Session Ready) to the IUT.
19. The Upper Tester orders the IUT to execute the VA Session Start procedure.
20. The IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x01 (Start VA Session).

21. The Lower Tester sends a notification of the VAS Control Point characteristic with Opcode set to 0x00 (Response Code) and Parameter set to 0x01 (Success) and a notification of the Voice Assistant Session State characteristic with VA Session State set to 0x03 (Session Active) to the IUT.
22. The Upper Tester orders the IUT to execute the VA Session Stop procedure.
23. The IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x02 (Stop VA Session).
24. The Lower Tester sends a notification of the VAS Control Point characteristic with Opcode set to 0x00 (Response Code) and Parameter set to 0x01 (Success) and a notification of the Voice Assistant Session State characteristic with VA Session State set to 0x02 (Session Ready) to the IUT.

- Expected Outcome

  Pass verdict

  The IUT discovers the GVAS service, characteristics, and descriptors on the Lower Tester.

  If VAS Discovery support is indicated in Table 4.4, the IUT discovers the VAS service instances, characteristics, and descriptors on the Lower Tester.

  If VAS Discovery support is indicated in Table 4.4, the following applies to at least one instance of VAS otherwise an instance of GVAS:

  In Step 8, the IUT configures the VAS Control Point and Voice Assistant Session State characteristics for notifications.

  In Step 9, the IUT reads the Voice Assistant Session State characteristic.

  In Step 10, the IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x00 (Initialize VA Session).

  If VAS Discovery support is indicated in Table 4.4, the following applies to an instance of VAS otherwise an instance of GVAS:

  In Step 13, the IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x01 (Start VA Session).

  After Step 18, the IUT accepts the Lower Tester autonomously transitioning to the Session Ready state.

  In Step 23, the IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x02 (Stop VA Session).

  If Voice Assistant Session Flag support is indicated in Table 4.4:

  - In Step 8, the IUT configures the Voice Assistant Session Flag characteristic for notifications.
  - In Steps 15–18, the IUT receives the Voice Assistant Session Flag notifications.

4.5.2 VAG Initiated VA Session

- Test Purpose

  Verify that the Voice Assistant Terminal IUT successfully accepts a VAG triggered VA Session Start and a VAG triggered VA Session End procedure executed by the Lower Tester.

- Reference

  [3] 4.3.1, 4.3.2, 4.3.3.2, 4.3.4.2

- Initial Condition
  - The Lower Tester contains an instance of GVAS that contains all characteristics set to valid values and Voice Assistant Session State set to 0x00 (Session Reset) after connection establishment with the IUT. If required, Voice Assistant Name and Voice Assistant UUID are set to TSPX_gvas_va_name and TSPX_gvas_va_uuid.
  - If VAS Discovery support is indicated in Table 4.5, the Lower Tester contains an instance of VAS with a random Voice Assistant Name and Voice Assistant UUID and an instance of VAS with Voice Assistant Name and Voice Assistant UUID set to TSPX_vas_va_name and TSPX_vas_va_uuid, respectively. The instances contain all characteristics set to valid values and have Voice Assistant Session State set to 0x00 (Session Reset) after a connection is established with the IUT.
- Test Case Configuration

Test Case	VAS Discovery	Voice Assistant Session Flag
VAP/VAT/VATP/BV-05-C [VAG Initiated VA Session, GVAS]	No	No
VAP/VAT/VATP/BV-06-C [VAG Initiated VA Session with Voice Assistant Session Flags, GVAS]	No	Yes
VAP/VAT/VATP/BV-07-C [VAG Initiated VA Session, VAS]	Yes	No
VAP/VAT/VATP/BV-08-C [VAG Initiated VA Session with Voice Assistant Session Flags, VAS]	Yes	Yes

Table 4.5: VAG Initiated VA Session test cases

- Test Procedure

1. The IUT and Lower Tester establish a Bearer connection as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2, if using EATT over an LE transport.
2. If necessary, the Upper Tester orders the IUT to execute the VA Discovery procedure.
3. If not previously done, the IUT executes the GATT Discover All Primary Services or GATT Discover Primary Services by Service UUID sub-procedure to discover the GVAS service, the GATT Discover All Characteristics of a Service or GATT Discover Characteristics by UUID sub-procedure to discover the characteristics of the GVAS service, and the GATT Discover All Characteristic Descriptors sub-procedure to discover all characteristic descriptors of the GVAS service.
4. The IUT optionally executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Name, Voice Assistant UUID, Voice Assistant Supported Features, Installed Location, or Voice Assistant Supported Languages characteristics on the instance of GVAS.

   Execute Steps 5–6 if VAS Discovery support is indicated in Table 4.5:

5. If not previously done, the IUT executes the GATT Discover All Primary Services or GATT Discover Primary Services by Service UUID sub-procedure to discover all instances of the VAS service, the GATT Discover All Characteristics of a Service or GATT Discover Characteristics by UUID sub-procedure to discover the characteristics of the VAS service instances, and the GATT Discover All Characteristic Descriptors sub-procedure to discover all characteristic descriptors of the VAS service instances.
6. For each instance of VAS discovered by the IUT, the IUT optionally executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Name, Voice Assistant UUID, Voice Assistant Supported Features, Installed Location, or Voice Assistant Supported Languages characteristics.

Execute Steps 7–11 with at least one instance of VAS if VAS Discovery support is indicated in Table 4.5, otherwise with the instance of GVAS:

7. If necessary, the Upper Tester orders the IUT to execute the VA Session Initialization procedure.
8. The IUT configures the VAS Control Point, Voice Assistant Session State, and if Voice Assistant Session Flag support is indicated in Table 4.5, the Voice Assistant Session Flag characteristics for Notifications.
9. The IUT executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Session State characteristic.
10. The IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x00 (Initialize VA Session).
11. The Lower Tester sends a notification of the VAS Control Point characteristic with Opcode set to 0x00 (Response Code) and Parameter set to 0x01 (Success) and a notification of the Voice Assistant Session State characteristic with VA Session State set to 0x02 (Session Ready) to the IUT.

    Execute Steps 12–20 with an instance of VAS if VAS Discovery support is indicated in Table 4.5, otherwise with the instance of GVAS:

12. The Lower Tester sends a notification of the Voice Assistant Session State characteristic to the IUT with VA Session State set to 0x03 (Session Active).

    Execute Steps 13–15 if Voice Assistant Session Flag support is indicated in Table 4.5:

13. The Lower Tester sends a notification of the Voice Assistant Session Flag characteristic to the IUT with the value set to 0x01 (Listening Now).
14. The Lower Tester sends a notification of the Voice Assistant Session Flag characteristic to the IUT with the value set to 0x02 (Processing Now).
15. The Lower Tester sends a notification of the Voice Assistant Session Flag characteristic to the IUT with the value set to 0x04 (Playback Now).
16. The Upper Tester orders the IUT to execute the VA Session Stop procedure.
17. The IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x02 (Stop VA Session).
18. The Lower Tester sends a notification of the VAS Control Point characteristic with Opcode set to 0x00 (Response Code) and Parameter set to 0x01 (Success), a notification of the Voice Assistant Session Flag characteristic with the value set to 0x00, and a notification of the Voice Assistant Session State characteristic with VA Session State set to 0x02 (Session Ready) to the IUT.
19. The Lower Tester sends a notification of the Voice Assistant Session State characteristic to the IUT with VA Session State set to 0x03 (Session Active).
20. The Lower Tester sends a notification of the Voice Assistant Session State characteristic with VA Session State set to 0x02 (Session Ready) to the IUT.

- Expected Outcome

  Pass verdict

  If VAS Discovery support is indicated in Table 4.5, the following applies to an instance of VAS otherwise an instance of GVAS:

  - The IUT accepts the Lower Tester autonomously transitioning to the Session Active state and to the Session Ready state.

  If Voice Assistant Session Flag support is indicated in Table 4.5:

  - In Steps 13–15 and 18, the IUT receives the Voice Assistant Session Flag notification.

4.5.3 VA Initialization Procedure: Session Unavailable

- Test Purpose

  Verify that the Voice Assistant Terminal IUT terminates the VA Initialization procedure when the Voice Assistant Session State characteristic for the GVAS or VAS instance is in the Session Unavailable state and resumes the procedure when the Voice Assistant Session State characteristic is in the Session Reset state.

- Reference

  [3] 4.3.2

- Initial Condition

  - The Lower Tester contains an instance of GVAS that contains all characteristics set to valid values and Voice Assistant Session State set to 0x01 (Session Unavailable). If required, Voice Assistant Name and Voice Assistant UUID are set to TSPX_gvas_va_name and TSPX_gvas_va_uuid, respectively.
  - The Lower Tester contains an instance of VAS specified that contain all characteristics set to valid values and Voice Assistant Session State set to 0x01 (Session Unavailable). If required, Voice Assistant Name and Voice Assistant UUID are set to TSPX_vas_va_name and TSPX_vas_va_uuid, respectively.

- Test Case Configuration

Test Case	VAS Discovery
VAP/VAT/VATP/BV-09-C [VA Initialization Procedure: Session Unavailable, GVAS]	No
VAP/VAT/VATP/BV-10-C [VA Initialization Procedure: Session Unavailable, VAS]	Yes

Table 4.6: VA Initialization Procedure: Session Unavailable test cases

- Test Procedure

  1. The IUT and Lower Tester establish a Bearer connection as described in Section 4.2.1, if using ATT over an LE transport, or Section 4.2.2, if using EATT over an LE transport.
  2. If necessary, the Upper Tester orders the IUT to execute the VA Discovery procedure.
  3. If not previously done, the IUT executes the GATT Discover All Primary Services or GATT Discover Primary Services by Service UUID sub-procedure to discover the GVAS service, the GATT Discover All Characteristics of a Service or GATT Discover Characteristics by UUID sub-procedure to discover the characteristics of the GVAS service, and the GATT Discover All Characteristic Descriptors sub-procedure to discover all characteristic descriptors of the GVAS service.
  4. The IUT optionally executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Name, Voice Assistant UUID, Voice Assistant Supported Features, Installed Location, or Voice Assistant Supported Languages characteristics on the instance of GVAS.

     Execute Steps 5–6 if VAS Discovery support is indicated in Table 4.6:

  5. If not previously done, the IUT executes the GATT Discover All Primary Services or GATT Discover Primary Services by Service UUID sub-procedure to discover all instances of the VAS service, the GATT Discover All Characteristics of a Service or GATT Discover Characteristics by UUID sub-procedure to discover the characteristics of the VAS service instances, and the GATT

Discover All Characteristic Descriptors sub-procedure to discover all characteristic descriptors of the VAS service instances.

6. For each instance of VAS discovered by the IUT, the IUT optionally executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Name, Voice Assistant UUID, Voice Assistant Supported Features, Installed Location, or Voice Assistant Supported Languages characteristics.

   Execute Steps 7–14 with an instance of VAS if VAS Discovery support is indicated in Table 4.6, otherwise with the instance of GVAS:

7. If necessary, the Upper Tester orders the IUT to execute the VA Session Initialization procedure.
8. The IUT configures the VAS Control Point, Voice Assistant Session State, and if Voice Assistant Session Flag support is indicated in Table 4.6, the Voice Assistant Session Flag characteristics for Notifications.
9. The IUT executes the GATT Read Characteristic Value sub-procedure with the Voice Assistant Session State characteristic.
10. The IUT terminates the VA Session Initialization procedure.
11. After 3 seconds, the Lower Tester sends a notification of the Voice Assistant Session State characteristic to the IUT with VA Session State set to 0x00 (Session Reset).
12. The IUT executes the GATT Write Without Response sub-procedure with the VAS Control Point characteristic with Opcode set to 0x00 (Initialize VA Session).
13. The Lower Tester sends a notification of the VAS Control Point characteristic to the IUT with Opcode set to 0x00 (Response Code) and Parameter set to 0x01 (Success).
14. The Lower Tester sends a notification of the Voice Assistant Session State characteristic to the IUT with VA Session State set to 0x02 (Session Ready).

- Expected Outcome

  Pass verdict

  The IUT stops the VA Session Initialization procedure for the instance of GVAS or VAS when Voice Assistant Session State is set to 0x01 (Session Unavailable).

  When the Voice Assistant Session State notification is sent to the IUT with VA Session State set to 0x00 (Session Reset), the IUT resumes the VA Session Initialization procedure and transitions the Voice Assistant Session State to 0x02 (Session Ready) by writing the VAS Control Point with Opcode set to 0x00 (Initialize VA Session).

5 Test case mapping

The Test Case Mapping Table (TCMT) maps test cases to specific requirements in the ICS. The IUT is 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 logical expression based on specific entries from the associated ICS document. Contains a logical expression (using the operators AND, OR, NOT as needed) based on specific entries from the applicable ICS document(s). The entries are in the form of y/x references, where y corresponds to the table number and x corresponds to the feature number as defined in the ICS document for Voice Assistant Profile [5].

If a test case is mandatory within the respective layer, then the y/x reference is omitted.

Feature: A brief, informal description of the feature being tested.

Test Case(s): The applicable test case identifiers are required for Bluetooth Qualification if the corresponding y/x references defined in the Item column are supported. Further details about the function of the TCMT are elaborated in [2].

For the purpose and structure of the ICS/IXIT, refer to [2].

Item	Feature	Test Case(s)
VAP 4/1 AND NOT VAP 5/1	VAG Initiated VA Session, GVAS	VAP/VAG/VAGP/BV-01-C
VAP 4/1 AND VAP 5/1	VAG Initiated VA Session with Voice Assistant Session Flags, GVAS	VAP/VAG/VAGP/BV-02-C
VAP 4/2 AND NOT VAP 5/2	VAG Initiated VA Session, VAS	VAP/VAG/VAGP/BV-03-C
VAP 4/2 AND VAP 5/2	VAG Initiated VA Session with Voice Assistant Session Flags, VAS	VAP/VAG/VAGP/BV-04-C
VAP 8/1	GVAS Service Discovery and VA Session Unavailable	VAP/VAT/CGGIT/SER/BV-01-C VAP/VAT/VATP/BV-09-C
VAP 8/2	VAS Service Discovery and VA Session Unavailable	VAP/VAT/CGGIT/SER/BV-02-C VAP/VAT/VATP/BV-10-C
VAP 9/1 OR VAP 10/1	Voice Assistant Name Characteristic Discovery	VAP/VAT/CGGIT/CHA/BV-01-C
VAP 9/4 OR VAP 10/4	Voice Assistant UUID Characteristic Discovery	VAP/VAT/CGGIT/CHA/BV-02-C
VAP 9/7 OR VAP 10/7	VAS Control Point Characteristic Discovery	VAP/VAT/CGGIT/CHA/BV-03-C
VAP 9/10 OR VAP 10/10	Installed Location Characteristic Discovery	VAP/VAT/CGGIT/CHA/BV-04-C
VAP 9/13 OR VAP 10/13	Content Control ID (CCID) Characteristic Discovery	VAP/VAT/CGGIT/CHA/BV-05-C
VAP 9/16 OR VAP 10/16	Voice Assistant Session State Characteristic Discovery	VAP/VAT/CGGIT/CHA/BV-06-C
VAP 9/19 OR VAP 10/19	Voice Assistant Session Flag Characteristic Discovery	VAP/VAT/CGGIT/CHA/BV-07-C
VAP 9/22 OR VAP 10/22	Voice Assistant Supported Languages Characteristic Discovery	VAP/VAT/CGGIT/CHA/BV-08-C

Item	Feature	Test Case(s)
VAP 9/25 OR VAP 10/25	Voice Assistant Supported Features Characteristic Discovery	VAP/VAT/CGGIT/CHA/BV-09-C
VAP 8/1 AND NOT VAP 9/21	GVAS VAT Procedures without Voice Assistant Session Flag Notifications Support	VAP/VAT/VATP/BV-01-C VAP/VAT/VATP/BV-05-C
VAP 9/21	GVAS VAT Procedures with Voice Assistant Session Flag Notifications Support	VAP/VAT/VATP/BV-02-C VAP/VAT/VATP/BV-06-C
VAP 8/2 AND NOT VAP 10/21	VAS VAT Procedures without Voice Assistant Session Flag Notifications Support	VAP/VAT/VATP/BV-03-C VAP/VAT/VATP/BV-07-C
VAP 10/21	VAS VAT Procedures with Voice Assistant Session Flag Notifications Support	VAP/VAT/VATP/BV-04-C VAP/VAT/VATP/BV-08-C

Table 5.1: Test case mapping

6 Revision history and acknowledgments

Revision History

Publication Number	Revision Number	Date	Comments
0	p0	2025-12-16	Approved by BTI on 2025-11-24. VAP v1.0 adopted by the BoD on 2025-12-15. Prepared for initial publication.

Acknowledgments

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