

思澈蓝牙 BQB 认证测试指导手册

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前言

概述

- 本文档主要介绍蓝牙 BQB 认证概念以及 Profile 和 RF 测试内容及方法，方便顺利完成测试

读者对象

- 认证测试工程师以及产品软、硬件研发人员，指导对应产品快速完成 BQB 认证测试以及送测前的测试验证

适用平台

芯片平台	软件版本
SF32LB5XX	Solution 版本

缩略语/术语/关键字

关键字	英文全名	中文释义
BQB	Bluetooth Qualification Body	蓝牙认证
PTS	Profile Tuning Suite	测试套件
DID	Device ID	设备 ID
HFP	Hands-Free Profile	Hands-free 规范
A2DP	Advance Audio Distribution Profile	高级音频分发协议
AVRCP	Audio/Video Remote Control Profile	音频/视频远程控制规范
HID	Human Interface Devices	人机接口设备

更新记录

文档版本	发布日期	作者	修改说明
1.0	2024-10-10	liyu, gaoyun	Initial release.
1.1	2024-11-08	gaoyun	Alter doc name.

1. BQB 认证介绍

- BQB 认证涵盖射频、协议、配置文件兼容性等多项测试，确保蓝牙设备稳定可靠运行
- BQB 认证目的是确保对应产品性能、兼容性、安全性和功能完整性，保障无线通信质量和用户数据安全

2. BQB 认证测试内容及测试方法

- BQB 认证测试主要分为 RF、RFPHY 射频测试、Protocol 底层协议、Profile 测试

2.1 BQB Profile 测试

2.1.1 BQB Profile 测试介绍

- Profile 测试是 BQB 认证测试里面必测试内容，通过测试设备在特定应用场景下的性能表现，验证其是否满足蓝牙规范中的要求，从而确保其在实际应用中的可用性和可靠性
- 注: Profile 测试在整个 BQB 认证测试里相对更容易出现测试失败项，往往需要进行调试整改，所以建议送测前提前进行预测试**
- 常见 Profile 内容列表
 - DID - Device ID，即设备 ID 配置文件
 - HFP - Hands-free Profile，即蓝牙免提协议
 - A2DP - Advanced Audio Distribution Profile，即高级音频分发配置文件
 - AVRCP- Audio/Video Remote Control Profile，即音频/视频远程控制配置文件
 - HID - Human Interface Device，即人机接口设备协议

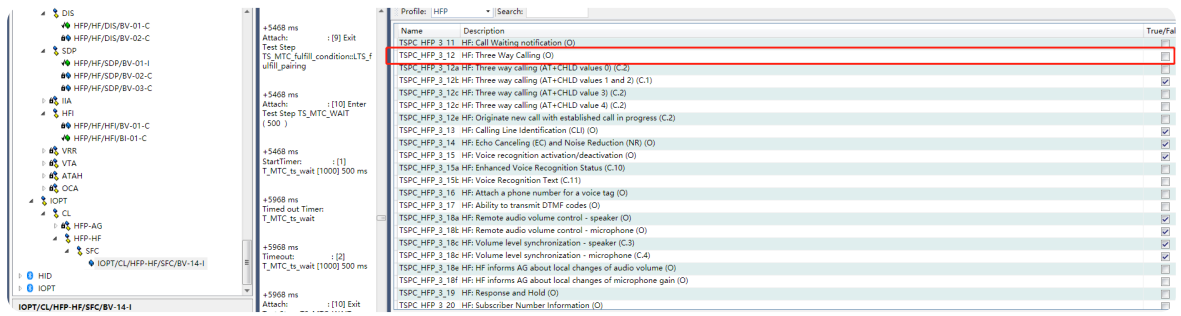
2.1.2 BQB Profile 测试内容及固件准备

- Profile 测试需要准备对应的设备及对应固件，测试 CASE 一般根据设备扫描出的 Profile / Role 功能来确定，同时不同的产品也会存在对应 Profile 支持情况的差异，以如下示例产品的 Profile/Role 配置情况为例，注: 后面的 PTS 测试配置及测试方法均以此产品测试配置为例

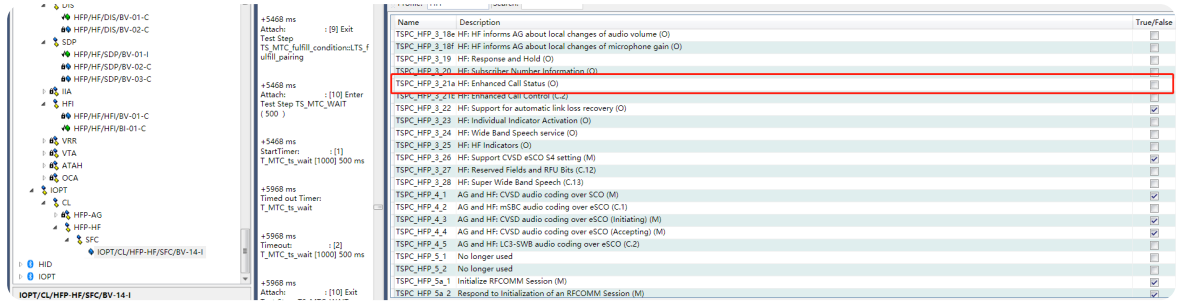
Profile	Role	Version
A2DP	Source/Sink	v1.4/v1.3.2
AVRCP	TG/CT	v1.6.2
HFP	HF	v1.8
HID	Device	v1.0
DID	/	/

- 用于 Profile 送测的设备对应固件需要打开 **BSP_BQB_TEST** 配置，另外增加 Profile / Role 测试配置项可能还需要更新对应 Patch，同时 PTS 测试配置也有对应设置，如关闭对应不支持的设置项，需要关闭的测试项参考如下

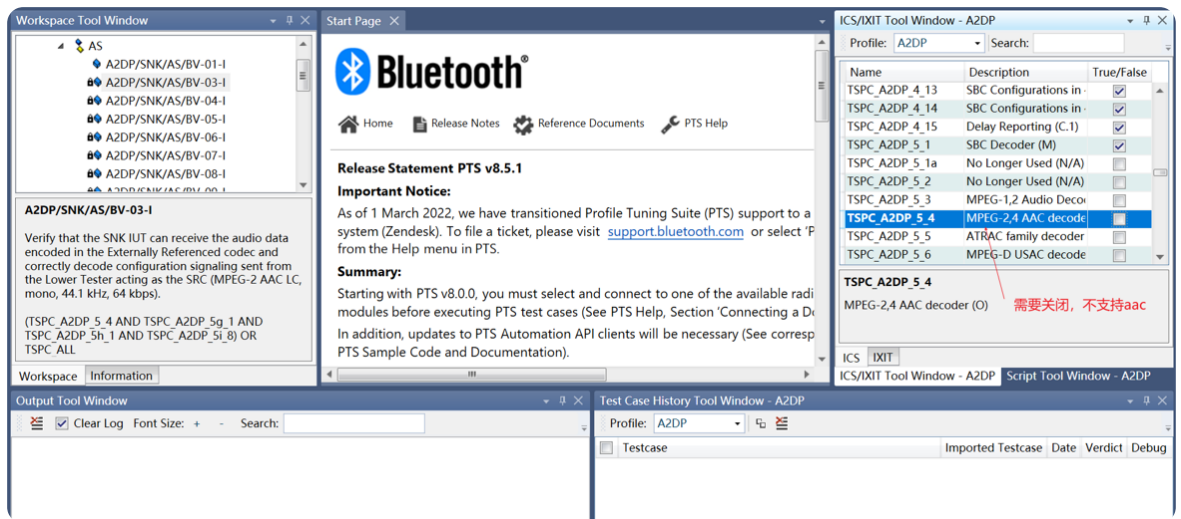
• TSPC_HFP_3_12



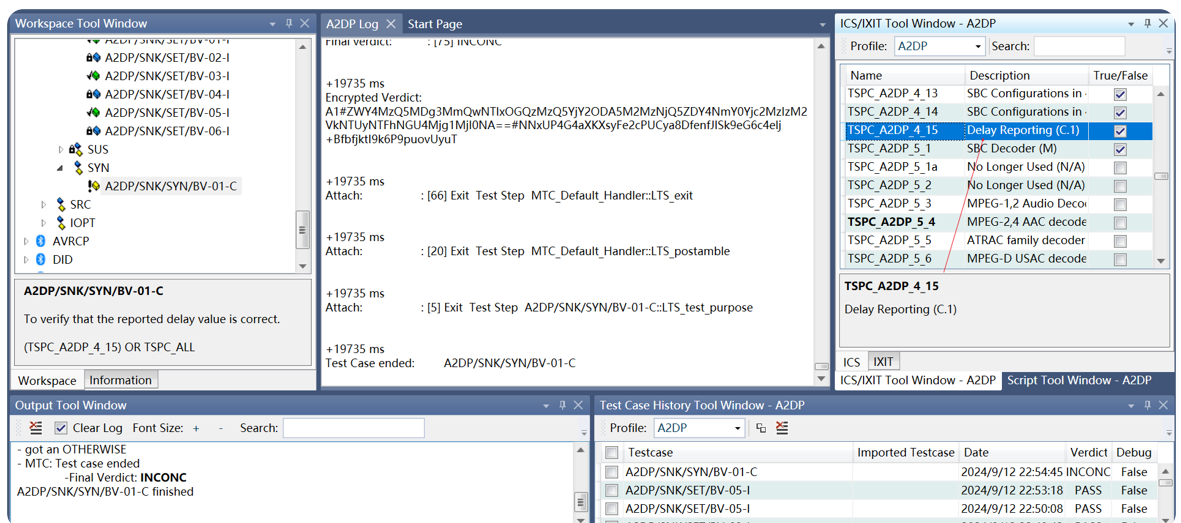
• TSPC_HFP_3_21a



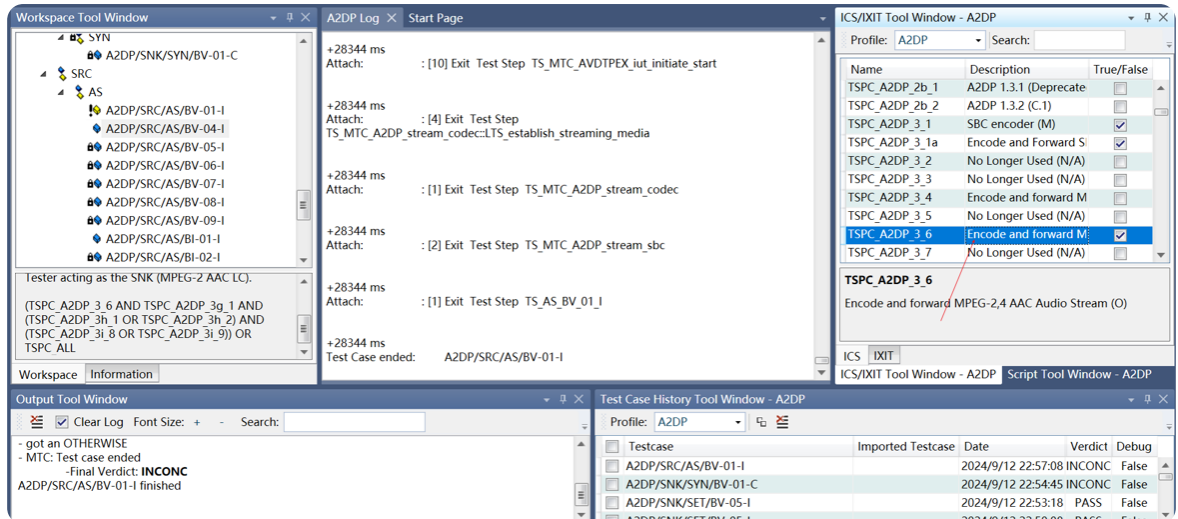
• TSPC_A2DP_5_4



• TSPC_A2DP_4_15



● TSPC_A2DP_3_6



Workspace Tool Window

A2DP Log

Start Page

ICS/IXIT Tool Window - A2DP

Profile: A2DP

Search:

Name	Description	True/False
TSPC_A2DP_2b_1	A2DP 1.3.1 (Deprecate)	
TSPC_A2DP_2b_2	A2DP 1.3.2 (C.1)	
TSPC_A2DP_3_1	SBC encoder (M)	☒
TSPC_A2DP_3_1a	Encode and Forward S	☒
TSPC_A2DP_3_2	No Longer Used (N/A)	
TSPC_A2DP_3_3	No Longer Used (N/A)	
TSPC_A2DP_3_4	Encode and forward M	
TSPC_A2DP_3_5	No Longer Used (N/A)	
TSPC_A2DP_3_6	Encode and forward M	☒
TSPC_A2DP_3_7	No Longer Used (N/A)	

TSPC_A2DP_3_6

Encode and forward MPEG-2.4 AAC Audio Stream (O)

ICS | IXIT

Script Tool Window - A2DP

Output Tool Window

Clear Log Font Size: + - Search:

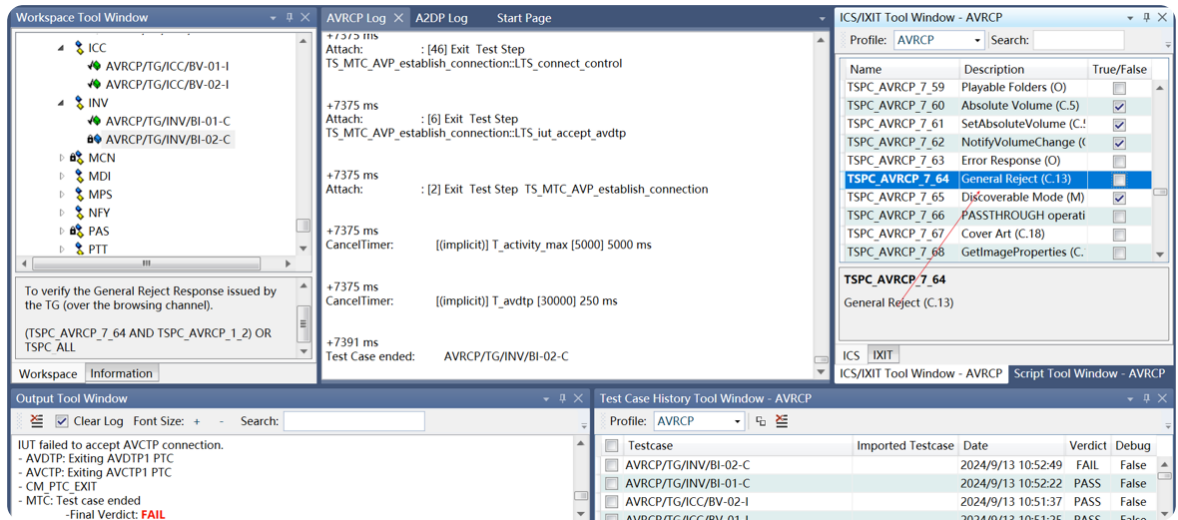
- got an OTHERWISE
- MTC: Test case ended
- Final Verdict: **INCONC**
A2DP/SRC/AS/BV-01-I finished

Test Case History Tool Window - A2DP

Profile: A2DP

Testcase	Imported Testcase	Date	Verdict	Debug
A2DP/SRC/AS/BV-01-I		2024/9/12 22:57:08	INCONC	False
A2DP/SNK/SYN/BV-01-C		2024/9/12 22:54:45	INCONC	False
A2DP/SNK/SET/BV-05-I		2024/9/12 22:53:18	PASS	False
A2DP/SNK/SET/BV-05-I		2024/9/12 22:50:08	PASS	False

● TSPC_AVRCP_7_64



Workspace Tool Window

AVRCP Log

A2DP Log

Start Page

ICS/IXIT Tool Window - AVRCP

Profile: AVRCP

Search:

Name	Description	True/False
TSPC_AVRCP_7_59	Playable Folders (O)	
TSPC_AVRCP_7_60	Absolute Volume (C.5)	☒
TSPC_AVRCP_7_61	SetAbsoluteVolume (C.1)	☒
TSPC_AVRCP_7_62	NotifyVolumeChange (C.1)	☒
TSPC_AVRCP_7_63	Error Response (O)	
TSPC_AVRCP_7_64	General Reject (C.13)	☒
TSPC_AVRCP_7_65	Discoverable Mode (M)	☒
TSPC_AVRCP_7_66	PASSTHROUGH operati	
TSPC_AVRCP_7_67	Cover Art (C.18)	
TSPC_AVRCP_7_68	GetImageProperties (C.1)	

TSPC_AVRCP_7_64

General Reject (C.13)

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Script Tool Window - AVRCP

Output Tool Window

Clear Log Font Size: + - Search:

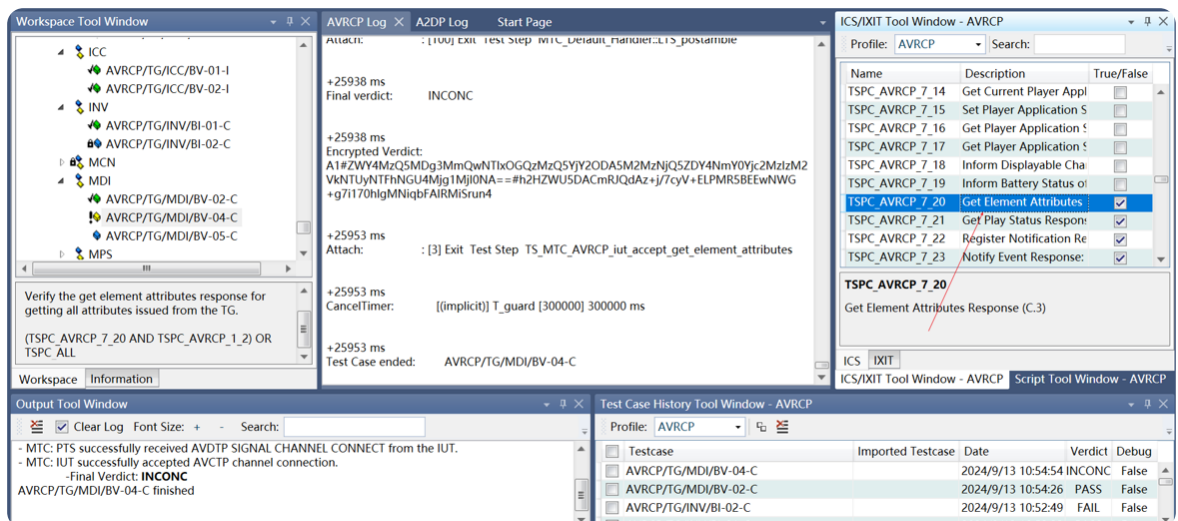
IUT failed to accept AVCTP connection.
- AVDTP: Exiting AVDTP1 PTC
- AVCTP: Exiting AVCTP1 PTC
- CM_PTC_EXIT
- MTC: Test case ended
- Final Verdict: **FAIL**

Test Case History Tool Window - AVRCP

Profile: AVRCP

Testcase	Imported Testcase	Date	Verdict	Debug
AVRCP/TG/INV/BV-02-C		2024/9/13 10:52:49	FAIL	False
AVRCP/TG/INV/BV-01-C		2024/9/13 10:52:22	PASS	False
AVRCP/TG/ICC/BV-02-I		2024/9/13 10:51:37	PASS	False
AVRCP/TG/ICC/BV-01-I		2024/9/13 10:51:05	PASS	False

● TSPC_AVRCP_7_20



Workspace Tool Window

AVRCP Log

A2DP Log

Start Page

ICS/IXIT Tool Window - AVRCP

Profile: AVRCP

Search:

Name	Description	True/False
TSPC_AVRCP_7_14	Get Current Player Appl	
TSPC_AVRCP_7_15	Set Player Application S	
TSPC_AVRCP_7_16	Get Player Application S	
TSPC_AVRCP_7_17	Get Player Application S	
TSPC_AVRCP_7_18	Inform Displayable Cha	
TSPC_AVRCP_7_19	Inform Battery Status o	
TSPC_AVRCP_7_20	Get Element Attributes	☒
TSPC_AVRCP_7_21	Get Play Status Respon	☒
TSPC_AVRCP_7_22	Register Notification Re	☒
TSPC_AVRCP_7_23	Notify Event Response:	☒

TSPC_AVRCP_7_20

Get Element Attributes Response (C.3)

ICS | IXIT

Script Tool Window - AVRCP

Output Tool Window

Clear Log Font Size: + - Search:

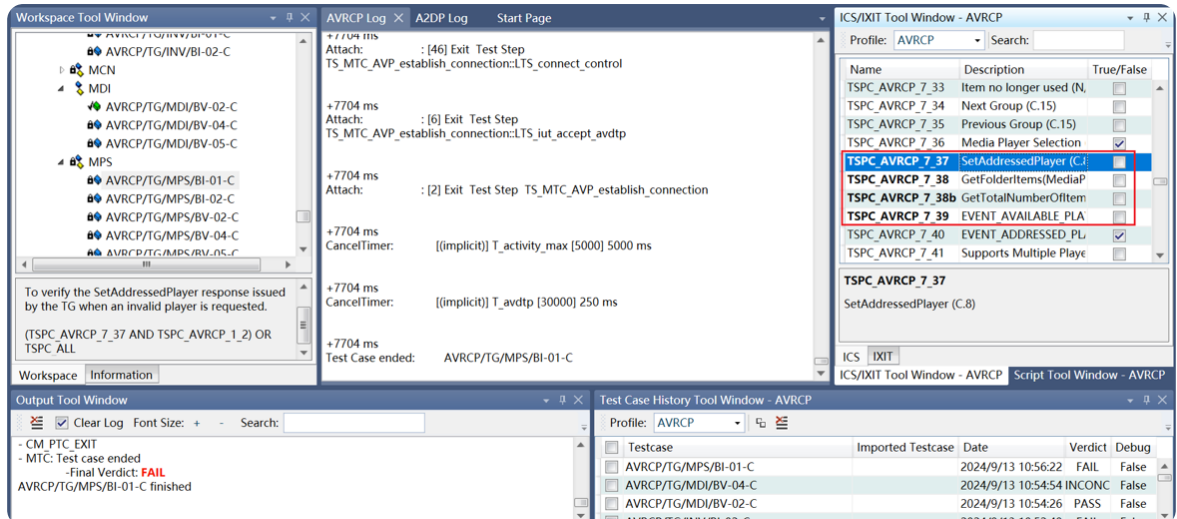
- MTC: PTS successfully received AVDTP SIGNAL CHANNEL CONNECT from the IUT.
- MTC: IUT successfully accepted AVCTP channel connection.
- Final Verdict: **INCONC**
AVRCP/TG/MDI/BV-04-C finished

Test Case History Tool Window - AVRCP

Profile: AVRCP

Testcase	Imported Testcase	Date	Verdict	Debug
AVRCP/TG/MDI/BV-04-C		2024/9/13 10:54:54	INCONC	False
AVRCP/TG/MDI/BV-02-C		2024/9/13 10:54:26	PASS	False
AVRCP/TG/INV/BV-02-C		2024/9/13 10:52:49	FAIL	False
AVRCP/TG/ICC/BV-01-I		2024/9/13 10:52:22	PASS	False

• TSPC_AVRCP_7_X



2.1.3 BQB Profile 测试方法

2.1.3.1 DID 测试

- 测试前设备端需要通过串口先输入 `app_bt sdp_req` 指令然后进行测试

2.1.3.2 HFP 测试

- 更新对应测试固件版本
1. 通过串口给样机发送命令 `app_bt BQB` 以开启 BQB 测试模式, 然后重启设备
 2. 具体测试项及对应指令 / 说明
 - HFP/HF/OOR/BV-02-C
 - `app_bt answer_call` 接听电话
 - 重启后根据提示输入 `app_bt connect_ex 0 mac` (mac 指当前测试使用的 dongle 地址, 类似 001bdcf4b6bd 形式)
 - 需要回连设备时输入 `app_bt connect_ex 0 mac` (mac 指当前测试使用的 dongle 地址, 类似 001bdcf4b6bd 形式)
 - HFP/HF/TRS/BV-01-C
 - `app_bt answer_call`
 - HFP/HF/ACS/BV-03-C
 - HFP/HF/ACS/BV-07-C
 - `app_bt answer_call`
 - HFP/HF/ACS/BV-12-C
 - `app_bt answer_call`
 - HFP/HF/ACS/BI-13-C
 - `app_bt answer_call`
 - HFP/HF/ACS/BV-15-C (注: 需重启后测试)

- `app_bt answer_call`
- HFP/HF/ACR/BV-01-C
 - `app_bt answer_call`
 - 重启
- HFP/HF/ACR/BV-02-C
 - `app_bt answer_call`
- HFP/HF/CLI/BV-01-C
 - `app_bt clip_enable 1`
 - `app_bt answer_call`
- HFP/HF/ICA/BV-01-C
 - `app_bt answer_call`
- HFP/HF/ICA/BV-02-C
 - `app_bt answer_call`
 - `app_bt hang_up` (挂断电话)
 - `app_bt answer_call`
- HFP/HF/ICA/BV-04-C
 - `app_bt answer_call`
- HFP/HF/ICA/BV-05-C
 - `app_bt answer_call`
- HFP/HF/ICA/BV-06-C
- HFP/HF/ICR/BV-01-C
 - `app_bt hang_up`
- HFP/HF/ICR/BV-02-C
 - ``
- HFP/HF/TCA/BV-01-C
 - `app_bt answer_call`
 - `app_bt hang_up`
- HFP/HF/TCA/BV-02-C
 - `app_bt answer_call`
- HFP/HF/TCA/BV-03-C
 - `app_bt answer_call`
- HFP/HF/TCA/BV-04-C
 - `app_bt hang_up`
- HFP/HF/ATH/BV-05-C
- HFP/HF/ATH/BV-06-C
 - `app_bt answer_call`
- HFP/HF/ATA/BV-01-C
 - `app_bt answer_call`

3. HFP/HF/ACR/BV-01-C

- `app_bt audio_transfer 1` (断开 sco 通路)

4. HFP/HF/ACS/BV-15-C

5. HFP/HF/SDP/BV-01-I

6. HFP/HF/TCA/BV-04-C

- 没有界面请输入从命令 `app_bt hang_up` (拒接电话)
- 如果来电需要 Answer call, 可以通过串口给样机发送命令 `app_bt answer_call`

7. HFP/HF/CLI/BV-01-C

- `app_bt clip_enable 1`

2.1.3.3 A2DP、AVRCP、HID 测试

2.1.3.3.1 设置测试项

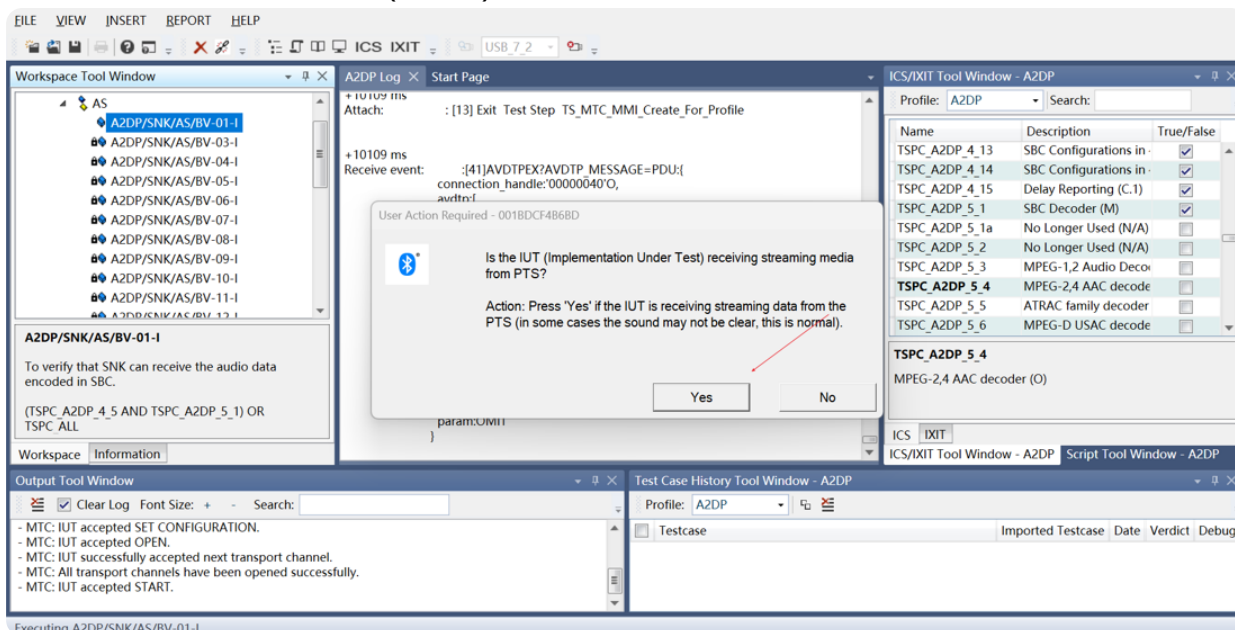
- A2DP 中的一些 case 需要在测试前先设置对应测试项, 即通过串口板给样机发送命令 `app_bt a2dp_bqb X` (X 是一个数字 Index, 与测试项对应关系如下所示)

Code 定义	测试项	X
BQB_BI_03_C	A2DP/SNK/AVP/BI-03-C	0
BQB_BI_08_C	A2DP/SNK/AVP/BI-08-C	1
BQB_BI_10_C	A2DP/SNK/AVP/BI-10-C	2
BQB_BI_11_C	A2DP/SNK/AVP/BI-11-C	3
BQB_BI_12_C	A2DP/SNK/AVP/BI-12-C	4
BQB_BI_13_C	A2DP/SNK/AVP/BI-13-C	5
BQB_BI_14_C	A2DP/SNK/AVP/BI-14-C	6
BQB_BI_15_C	A2DP/SNK/AVP/BI-15-C	7
BQB_BI_16_C	A2DP/SNK/AVP/BI-16-C	8
A2DP_SRC_AS_BV_01_I	A2DP/SRC/AS/BV-01-I	9
A2DP_SRC_AS_BI_01_I	A2DP/SRC/AS/BI-01-I	10
A2DP_SRC_AVP_BI_10_C	A2DP/SRC/AVP/BI-10-C	11
A2DP_SRC_AVP_BI_11_C	A2DP/SRC/AVP/BI-11-C	12
A2DP_SRC_AVP_BI_12_C	A2DP/SRC/AVP/BI-12-C	13
A2DP_SRC_AVP_BI_14_C	A2DP/SRC/AVP/BI-14-C	4
A2DP_SRC_AVP_BI_16_C	A2DP/SRC/AVP/BI-16-C	15
A2DP_SRC_AVP_BI_17_C	A2DP/SRC/AVP/BI-17-C	16
A2DP_SRC_AVP_BI_18_C	A2DP/SRC/AVP/BI-18-C	17

Code 定义	测试项	X
A2DP_SRC_AVP_BI_20_C	A2DP/SRC/AVP/BI-20-C	18
A2DP_SRC_AVP_BI_21_C	A2DP/SRC/AVP/BI-21-C	19
A2DP_SRC_AVP_BI_24_C	A2DP/SRC/AVP/BI-24-C	20
A2DP_SRC_AVP_BI_25_C	A2DP/SRC/AVP/BI-25-C	21
A2DP_SRC_AVP_BI_26_C	A2DP/SRC/AVP/BI-26-C	22
A2DP_SRC_AVP_BI_30_C	A2DP/SRC/AVP/BI-30-C	23
A2DP_SRC_AVP_BI_31_C	A2DP/SRC/AVP/BI-31-C	24
A2DP_SRC_AVP_BI_32_C	A2DP/SRC/AVP/BI-32-C	25
A2DP_SRC_AVP_BI_33_C	A2DP/SRC/AVP/BI-33-C	26
A2DP_SRC_CC_BV_09_I	A2DP/SRC/CC/BV-09-I	27
A2DP_SRC_CC_BV_10_I	A2DP/SRC/CC/BV-10-I	28
A2DP_SRC_REL_BV_01_I	A2DP/SRC/REL/BV-01-I	29
A2DP_SRC_REL_BV_02_I	A2DP/SRC/REL/BV-02-I	30
A2DP_SRC_SET_BV_01_I	A2DP/SRC/SET/BV-01-I	31
A2DP_SRC_SET_BV_02_I	A2DP/SRC/SET/BV-02-I	32
A2DP_SRC_SET_BV_03_I	A2DP/SRC/SET/BV-03-I	33
A2DP_SRC_SET_BV_04_I	A2DP/SRC/SET/BV-04-I	34
A2DP_SRC_SET_BV_05_I	A2DP/SRC/SET/BV-05-I	35
A2DP_SRC_SET_BV_06_I	A2DP/SRC/SET/BV-06-I	36
A2DP_SRC_SUS_BV_01_I	A2DP/SRC/SUS/BV-01-I	37
A2DP_SRC_SUS_BV_02_I	A2DP/SRC/SUS/BV-02-I	38

2.1.3.3.2 测试过程

1. A2DP/SNK/AVP/BV-01-I (PASS)



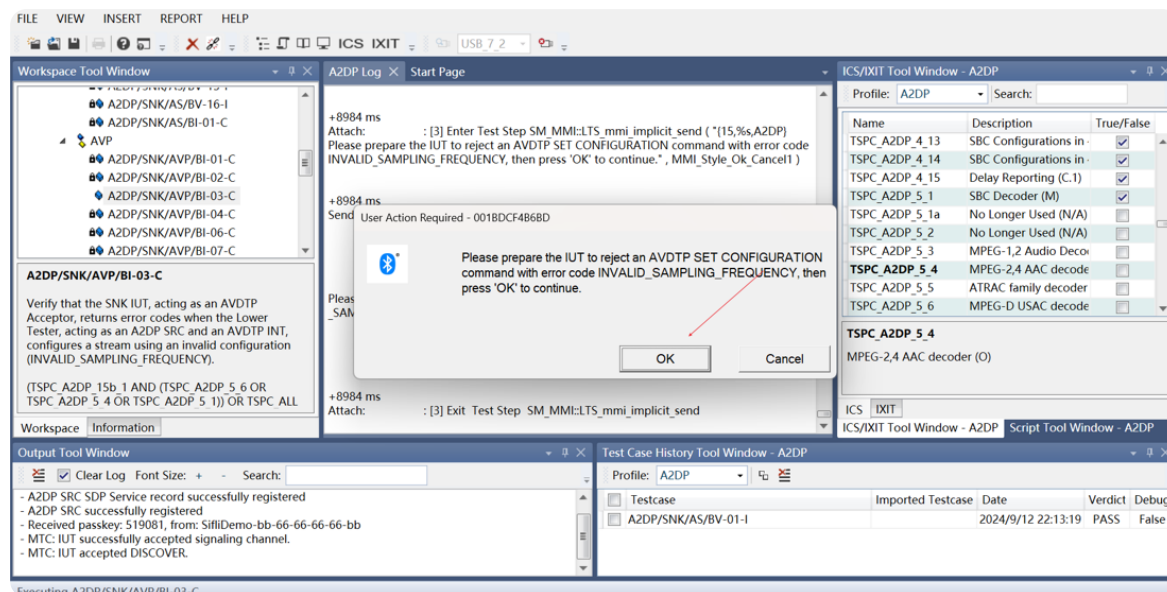
2. A2DP/SNK/AVP/BI-03-C (PASS)

- 准备测 A2DP/SNK/AVP/BI-03-C 这个 case 时，先通过串口工具给样机发送命令 `app_bt a2dp_bqb 0`，在串口工具中可看到如下回复，然后 PTS 再启动这个 case 的测试

```

J9-12 22:19:26:943   btskey 0
J9-12 22:19:26:946   [32m[6893533] I/bt_common bts: 0
J9-12 22:19:26:951   [0m[32m[6893537] I/bt_common bts:
J9-12 22:19:26:957
J9-12 22:19:26:964   [0m[32m[6893541] I/btapp.av bts: BQB_TEST_CASE = 0
J9-12 22:19:26:968
J9-12 22:19:26:980   [0m[32m[6893547] I/bt_common bts:
J9-12 22:19:26:986
  
```

有这个打印

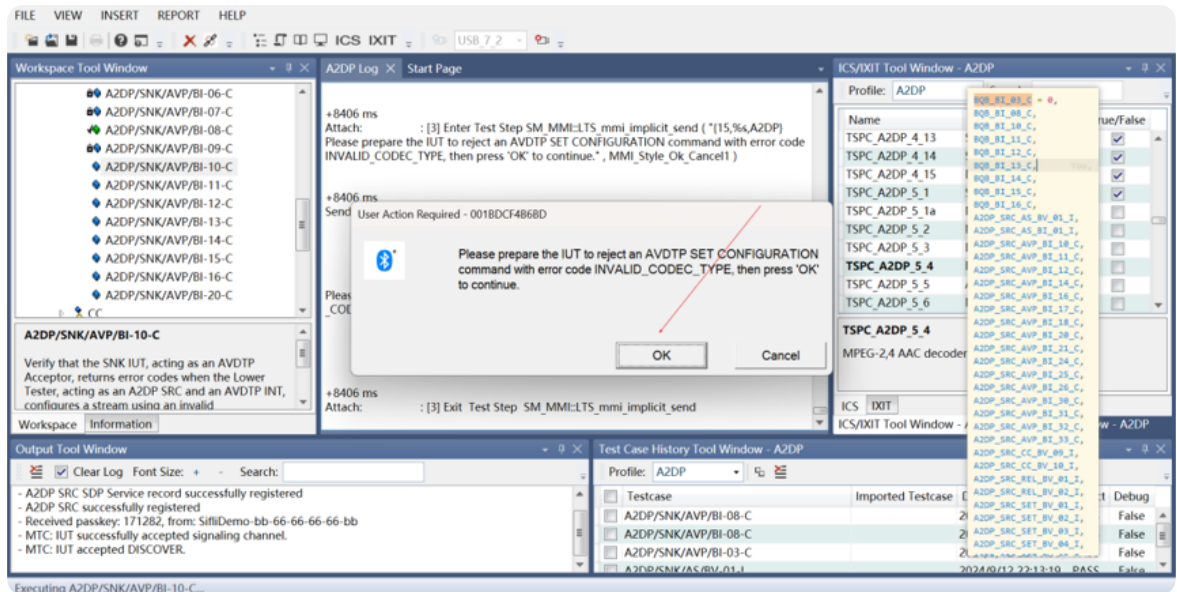


3. A2DP/SNK/AVP/BI-08-C (PASS)

- 准备测 A2DP/SNK/AVP/BI-08-C 这个 case，先通过串口工具给样机发送命令 `app_bt a2dp_bqb 1`，然后 PTS 再启动这个 case 的测试

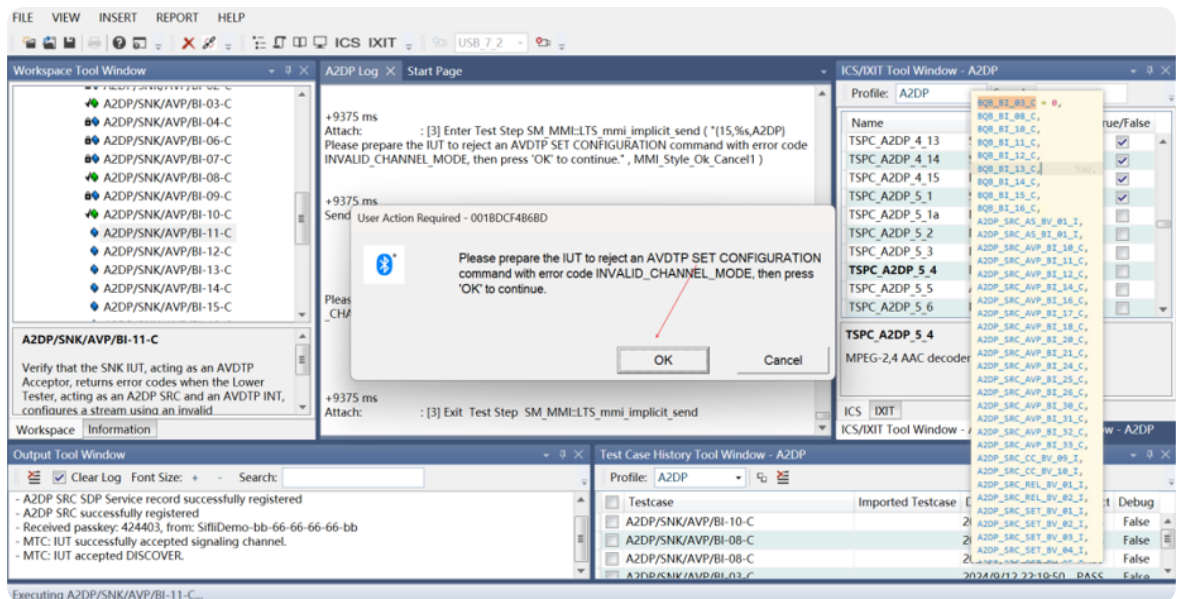
4. A2DP/SNK/AVP/BI-10-C (PASS)

- 准备测 A2DP/SNK/AVP/BI-08-C 这个 case，先通过串口工具给样机发送命令 `app_bt a2dp_bqb 2`，然后 PTS 再启动这个 case 的测试



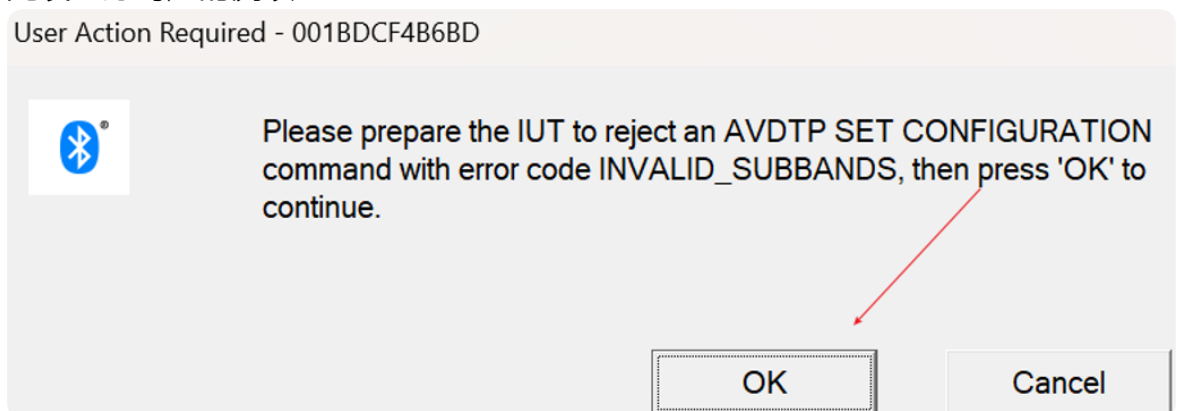
5. A2DP/SNK/AVP/BI-11-C (PASS)

- 先设置好对应的测项



6. A2DP/SNK/AVP/BI-12-C (PASS)

- 先设置好对应的测项



7. A2DP/SNK/AVP/BI-13-C (PASS)

- 先设置好对应的测项

User Action Required - 001BDCF4B6BD



Please prepare the IUT to reject an AVDTP SET CONFIGURATION command with error code INVALID_ALLOCATION_METHOD, then press 'OK' to continue.

OK

Cancel

8. A2DP/SNK/AVP/BI-14-C (PASS)

- 先设置好对应的测项

User Action Required - 001BDCF4B6BD



Please prepare the IUT to reject an AVDTP SET CONFIGURATION command with error code INVALID_MINIMUM_BITPOOL_VALUE, then press 'OK' to continue.

OK

Cancel

9. A2DP/SNK/AVP/BI-15-C (PASS)

- 先设置好对应的测项

User Action Required - 001BDCF4B6BD



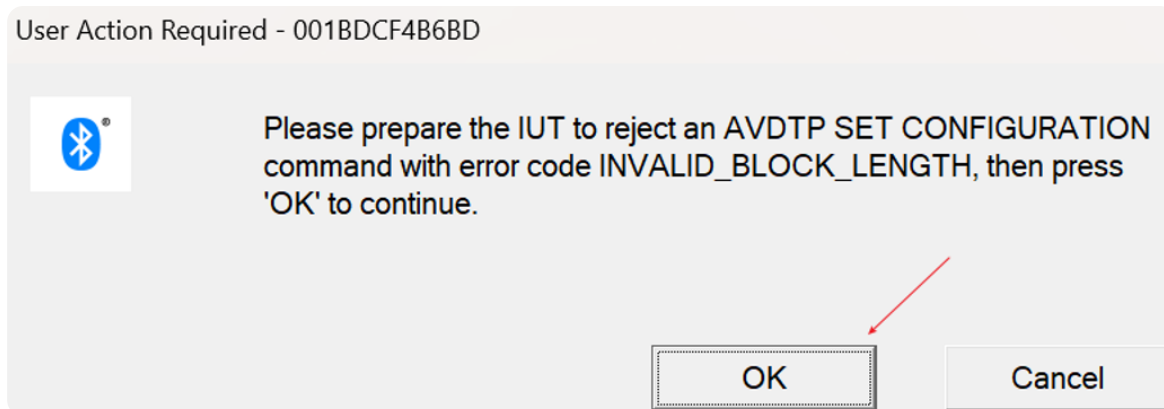
Please prepare the IUT to reject an AVDTP SET CONFIGURATION command with error code INVALID_MAXIMUM_BITPOOL_VALUE, then press 'OK' to continue.

OK

Cancel

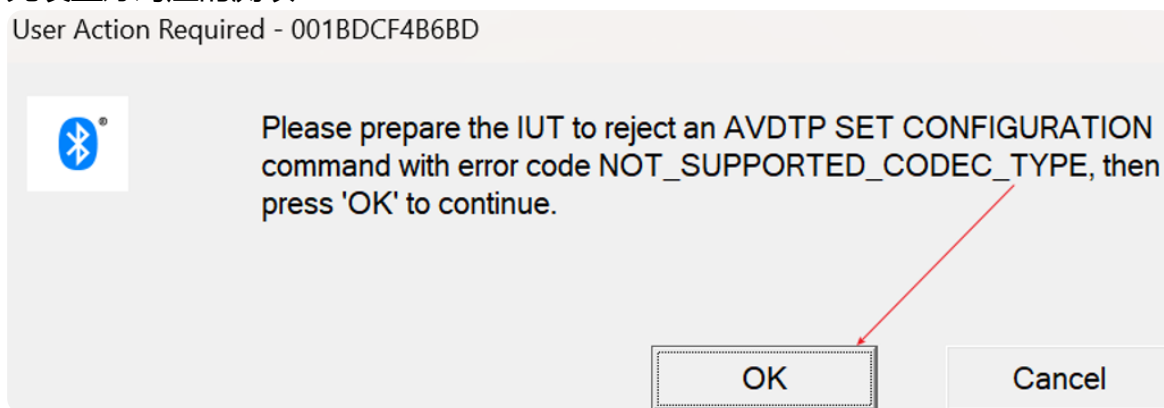
10. A2DP/SNK/AVP/BI-16-C (PASS)

- 先设置好对应的测项

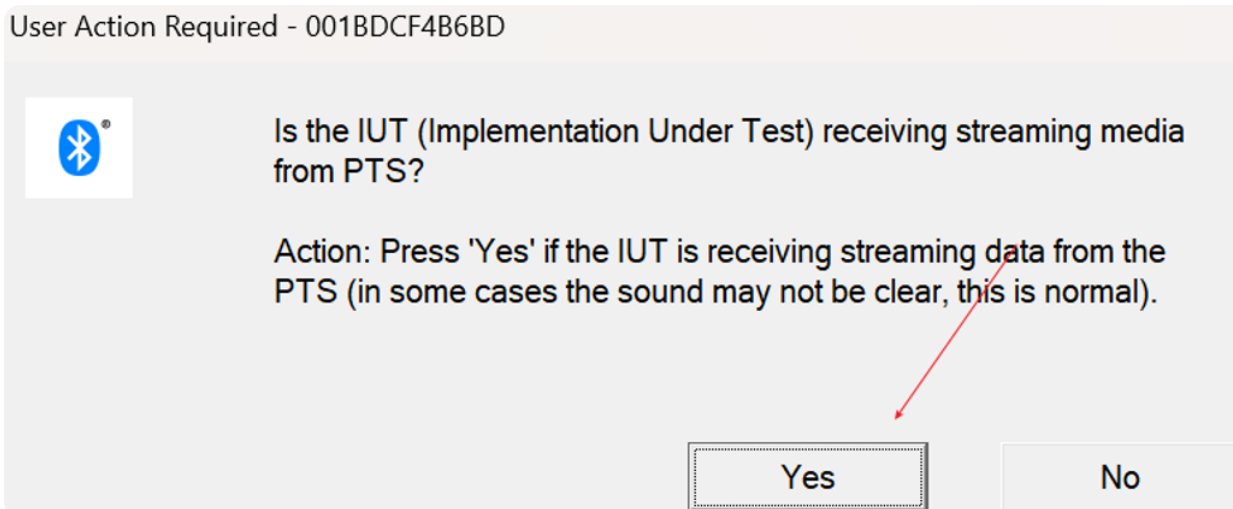


11. A2DP/SNK/AVP/BI-20-C (PASS)

- 先设置好对应的测项



12. A2DP/SNK/CC/BV-01-I (PASS)



13. A2DP/SNK/CC/BV-02-I (PASS)

User Action Required - 001BDCF4B6BD



Is the IUT (Implementation Under Test) receiving streaming media from PTS?

Action: Press 'Yes' if the IUT is receiving streaming data from the PTS (in some cases the sound may not be clear, this is normal).

Yes

No

14. A2DP/SNK/CC/BV-03-I (PASS)

User Action Required - 001BDCF4B6BD



Is the IUT (Implementation Under Test) receiving streaming media from PTS?

Action: Press 'Yes' if the IUT is receiving streaming data from the PTS (in some cases the sound may not be clear, this is normal).

Yes

No

15. A2DP/SNK/CC/BV-04-I (PASS)

User Action Required - 001BDCF4B6BD



Is the IUT (Implementation Under Test) receiving streaming media from PTS?

Action: Press 'Yes' if the IUT is receiving streaming data from the PTS (in some cases the sound may not be clear, this is normal).

Yes

No

16. A2DP/SNK/CC/BV-05-I (PASS)

User Action Required - 001BDCF4B6BD



Is the IUT (Implementation Under Test) receiving streaming media from PTS?

Action: Press 'Yes' if the IUT is receiving streaming data from the PTS (in some cases the sound may not be clear, this is normal).

Yes

No

17. A2DP/SNK/CC/BV-06-I (PASS)

User Action Required - 001BDCF4B6BD



Is the IUT (Implementation Under Test) receiving streaming media from PTS?

Action: Press 'Yes' if the IUT is receiving streaming data from the PTS (in some cases the sound may not be clear, this is normal).

Yes

No

18. A2DP/SNK/CC/BV-07-I (PASS)

User Action Required - 001BDCF4B6BD



Is the IUT (Implementation Under Test) receiving streaming media from PTS?

Action: Press 'Yes' if the IUT is receiving streaming data from the PTS (in some cases the sound may not be clear, this is normal).

Yes

No

19. A2DP/SNK/CC/BV-08-I (PASS)

User Action Required - 001BDCF4B6BD



Is the IUT (Implementation Under Test) receiving streaming media from PTS?

Action: Press 'Yes' if the IUT is receiving streaming data from the PTS (in some cases the sound may not be clear, this is normal).

Yes

No

20. A2DP/SNK/REL/BV-01-I (PASS)

21. A2DP/SNK/SDP/BV-02-I (PASS)

User Action Required - 001BDCF4B6BD

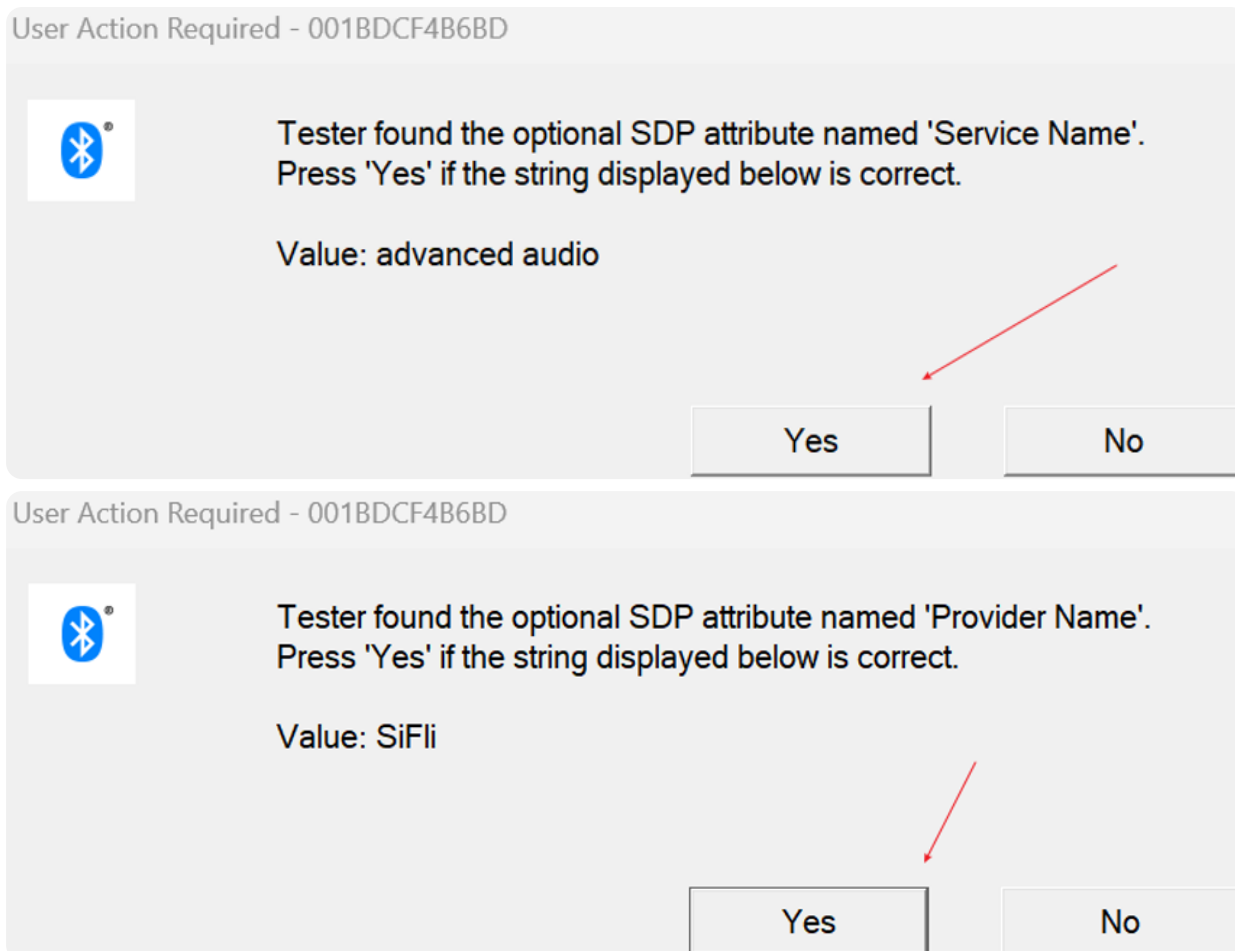


Tester found the optional SDP attribute named 'Supported Features'. Press 'Yes' if the data displayed below is correct.

Value: 0x0000

Yes

No

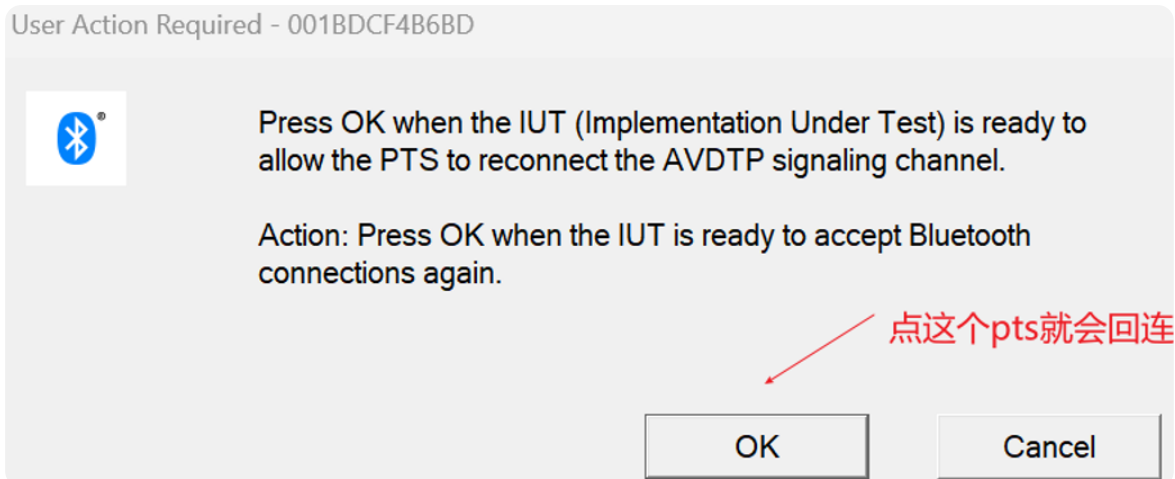
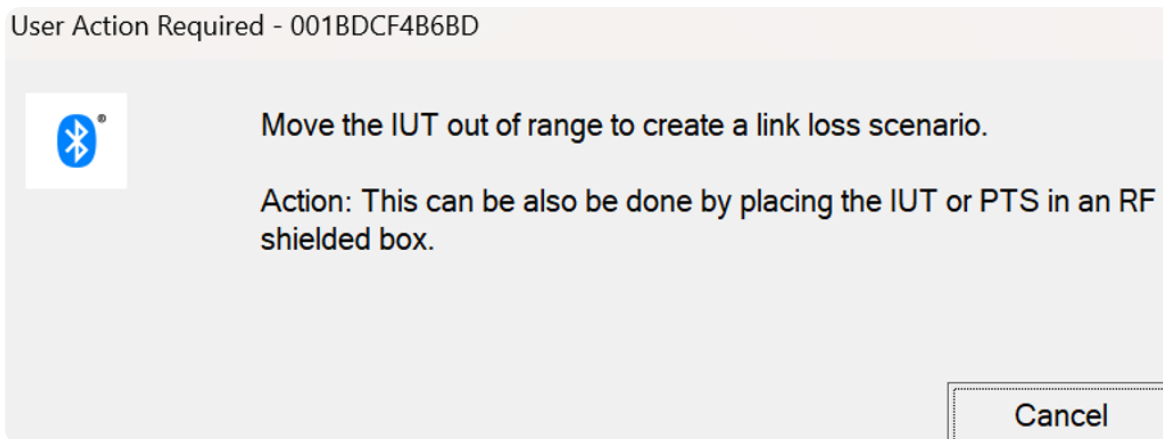


22. A2DP/SNK/SET/BV-01-I (PASS)

23. A2DP/SNK/SET/BV-03-I (PASS)

24. A2DP/SNK/SET/BV-05-I (PASS)

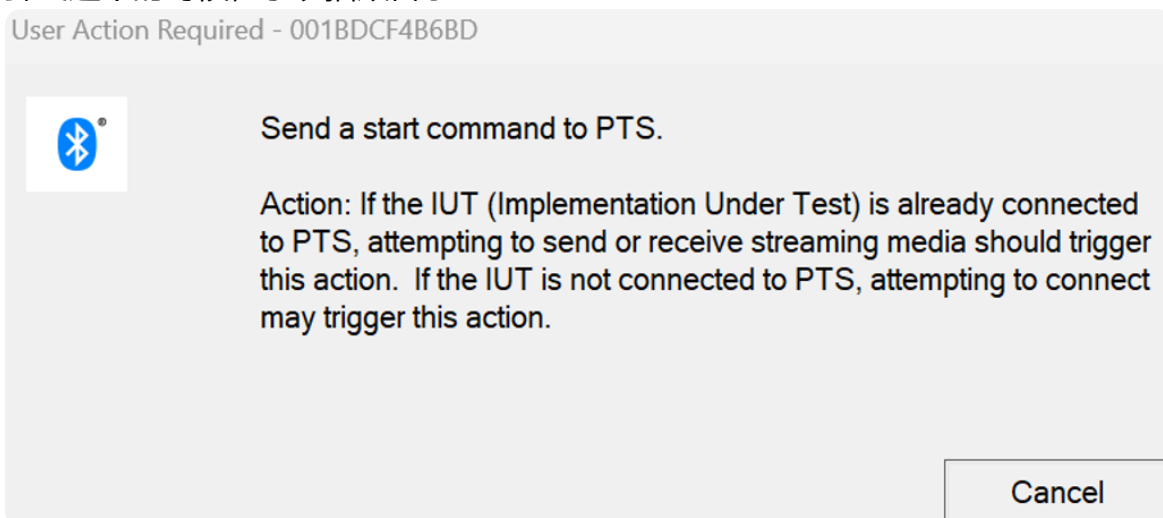
- 弹出这个提示框的时候可以把手表拉锯断开或者重启手表，但是重启之后手表不要发起回连，等 PTS 来连接

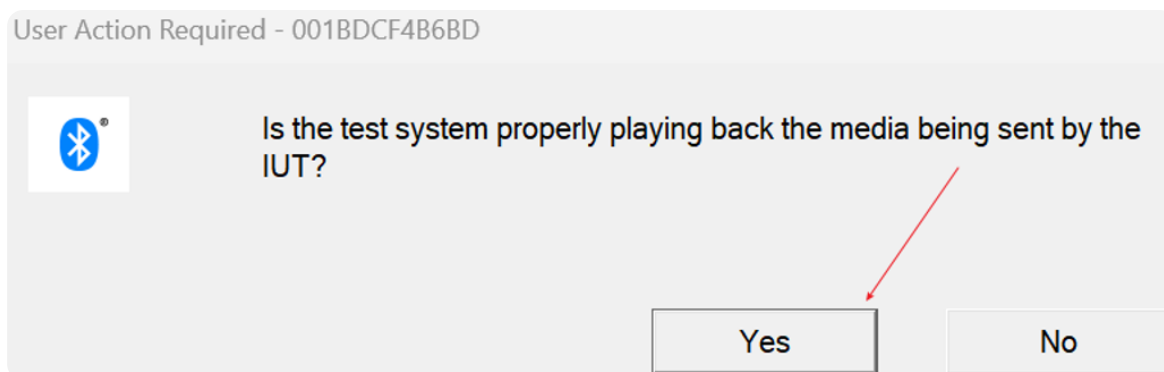


- **Source 的测试要保证手表里有至少两首本地音乐，且手表 app 要切到往耳机播音乐的模式，然后等 PTS 连接**

25. A2DP/SRC/AS/BV-01-I (PASS)

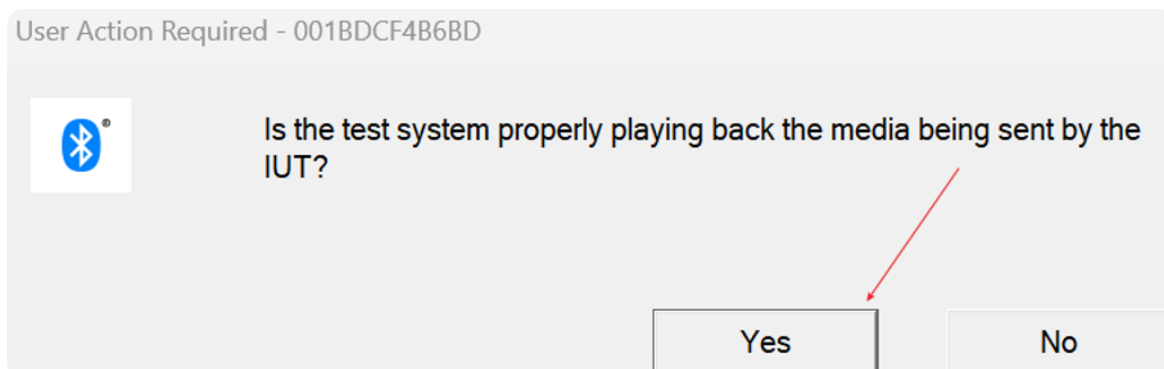
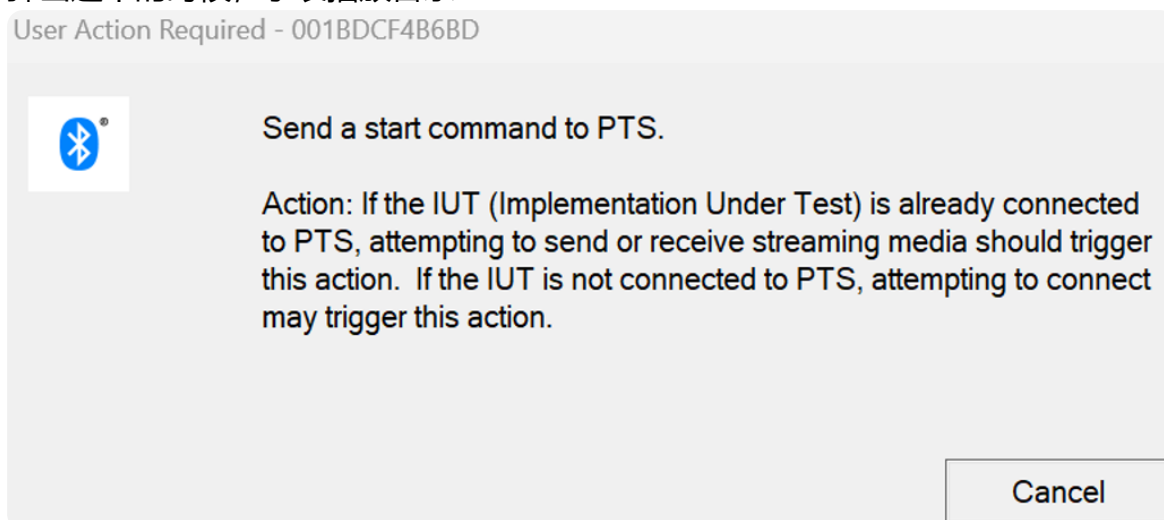
- 先设置好对应的测项
- 弹出这个的时候，手表播放音乐





26. A2DP/SRC/AS/BI-01-I (PASS)

- 先设置好对应的测项
- 弹出这个的时候，手表播放音乐



27. A2DP/SRC/AVP/BI-12-C (PASS)

- 先设置好对应的测项

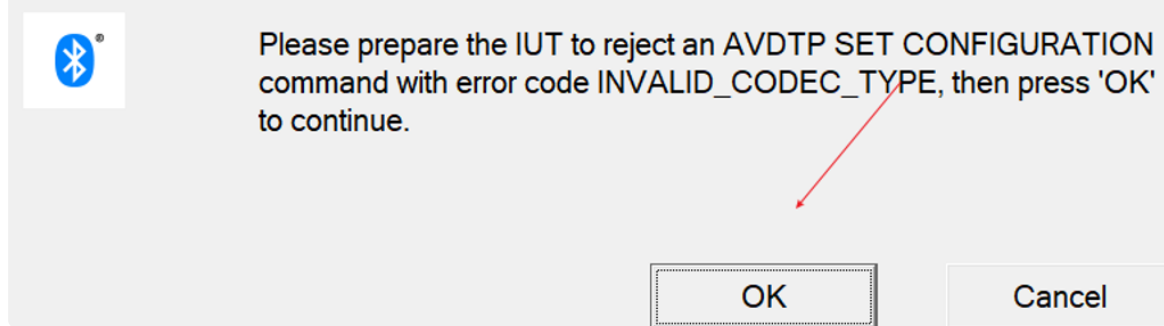
28. A2DP/SRC/AVP/BI-18-C (PASS)

- 先设置好对应的测项

29. A2DP/SRC/AVP/BI-20-C (PASS)

- 先设置好对应的测项

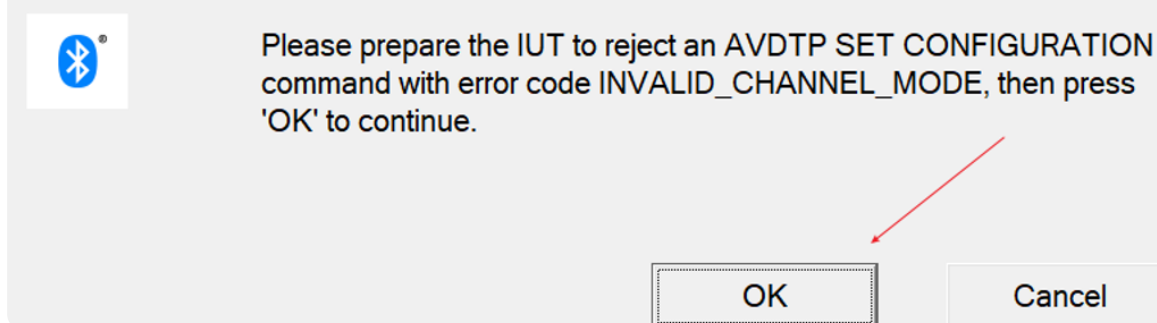
User Action Required - 001BDCF4B6BD



30. A2DP/SRC/AVP/BI-21-C (PASS)

- 先设置好对应的测项

User Action Required - 001BDCF4B6BD



31. A2DP/SRC/AVP/BI-24-C (PASS)

- 先设置好对应的测项

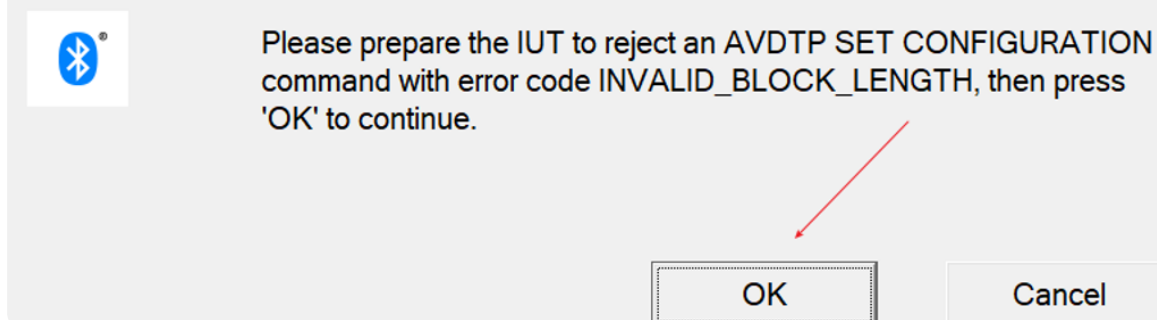
32. A2DP/SRC/AVP/BI-25-C (PASS)

- 先设置好对应的测项

33. A2DP/SRC/AVP/BI-26-C (PASS)

- 先设置好对应的测项

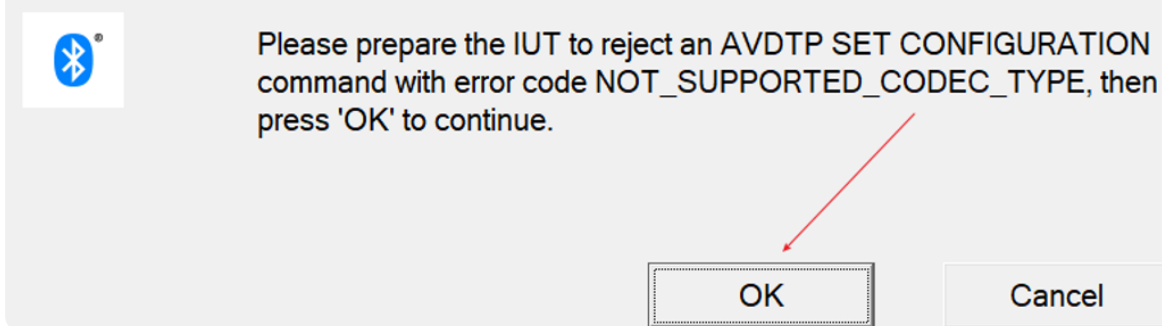
User Action Required - 001BDCF4B6BD



34. A2DP/SRC/AVP/BI-30-C (PASS)

- 先设置好对应的测项

User Action Required - 001BDCF4B6BD



35. A2DP/SRC/AVP/BI-31-C (PASS)

- 先设置好对应的测项

36. A2DP/SRC/AVP/BI-32-C (PASS)

- 先设置好对应的测项

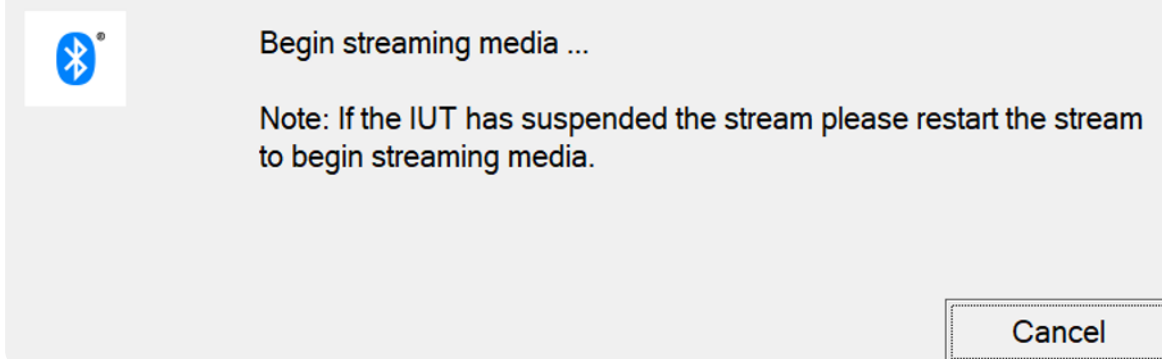
37. A2DP/SRC/AVP/BI-33-C (PASS)

- 先设置好对应的测项

38. A2DP/SRC/CC/BV-09-I (PASS)

- 先设置好对应的测项
- 看到这个弹窗后需要在手表上点一下播放→暂停→播放

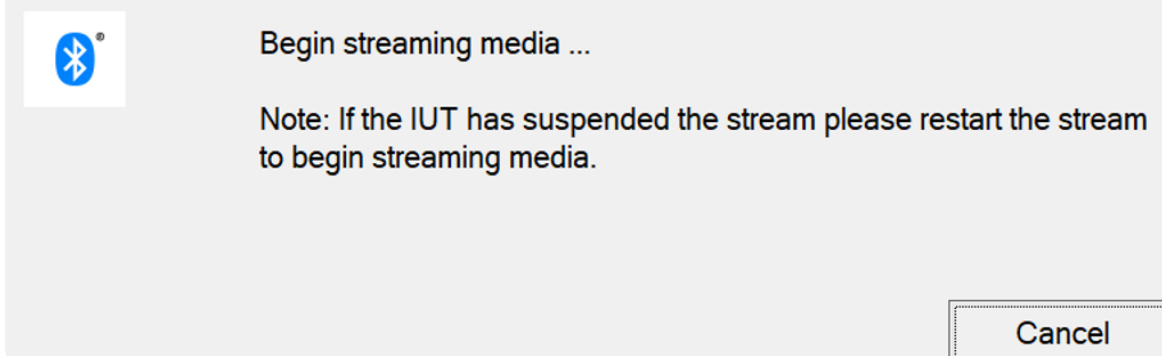
User Action Required - 001BDCF4B6BD



39. A2DP/SRC/CC/BV-10-I (PASS)

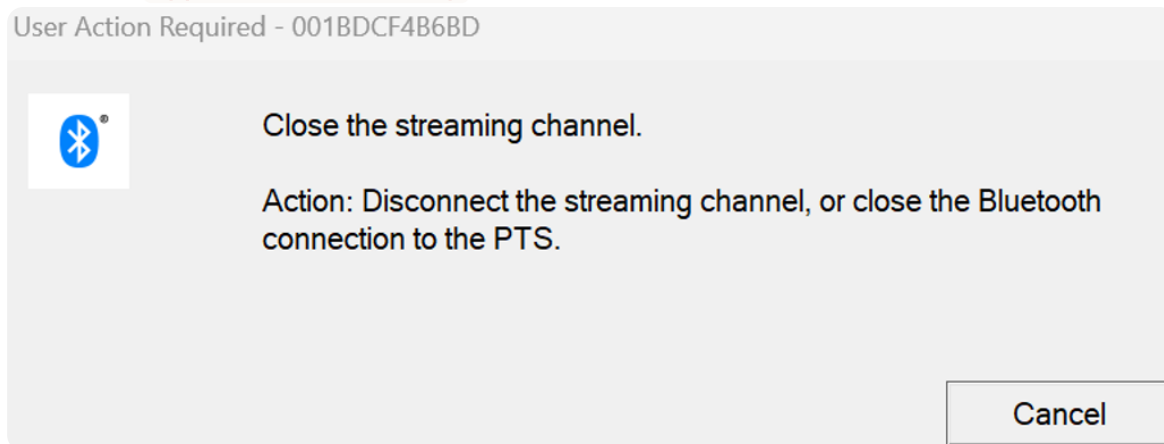
- 先设置好对应的测项
- 看到这个弹窗后需要在手表上点一下播放→暂停→播放

User Action Required - 001BDCF4B6BD



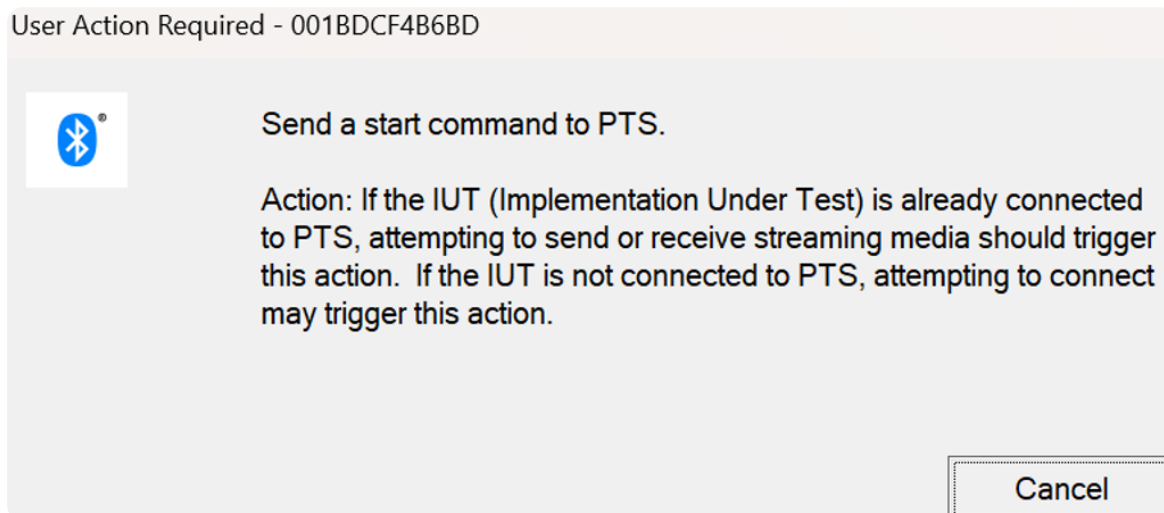
40. A2DP/SRC/REL/BV-01-I (PASS)

- 先设置好对应的测项
- 弹出这个提示框后，需要执行命令断开 a2dp 的 media channel，通过串口给样机发送指令 `app_bt_release_a2dp`



41. A2DP/SRC/REL/BV-02-I (PASS)

- 先设置好对应的测项
- 弹出这个的时候，手表播放音乐



42. A2DP/SRC/SDP/BV-01-I (PASS)

- 先设置好对应的测项
- 弹出提示框一直点 yes

43. A2DP/SRC/SET/BV-01-I (PASS)

- 先设置好对应的测项

44. A2DP/SRC/SET/BV-02-I (PASS)

- 先设置好对应的测项

45. A2DP/SRC/SET/BV-03-I (PASS)

- 先设置好对应的测项
- 提示播音乐的时候就开始播音乐

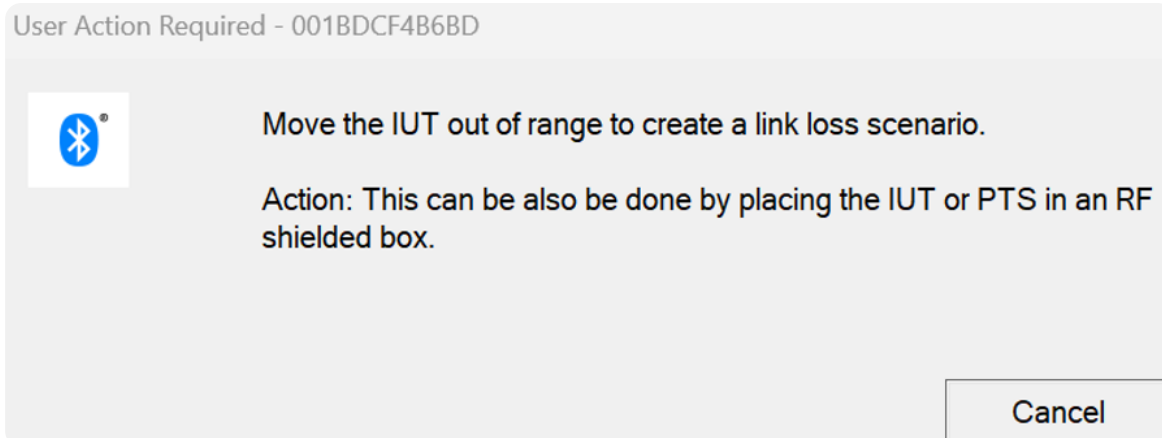
46. A2DP/SRC/SET/BV-04-I (PASS)

- 先设置好对应的测项

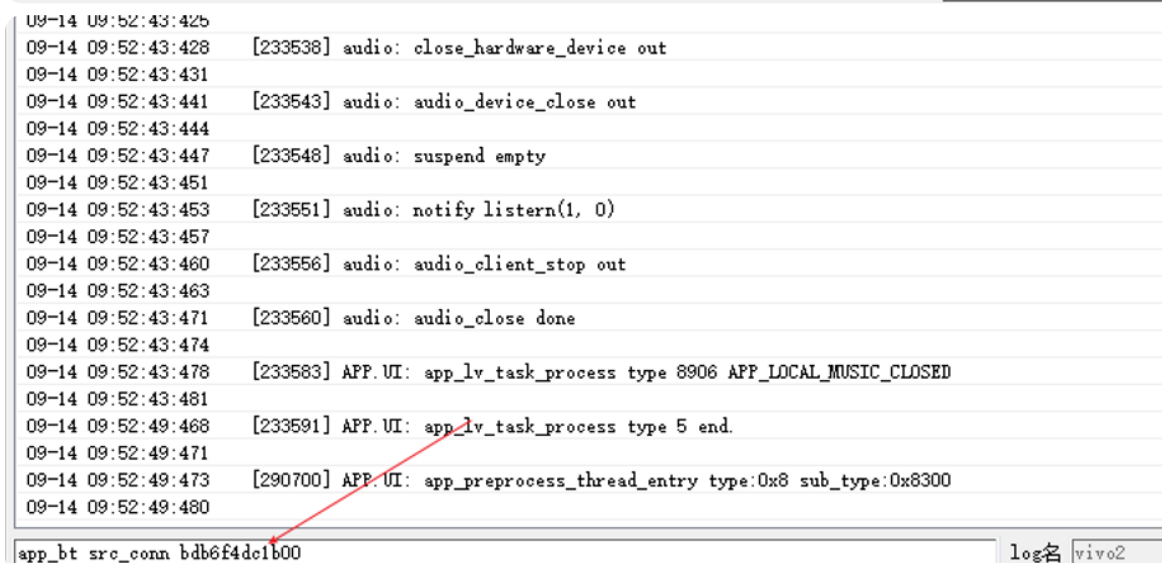
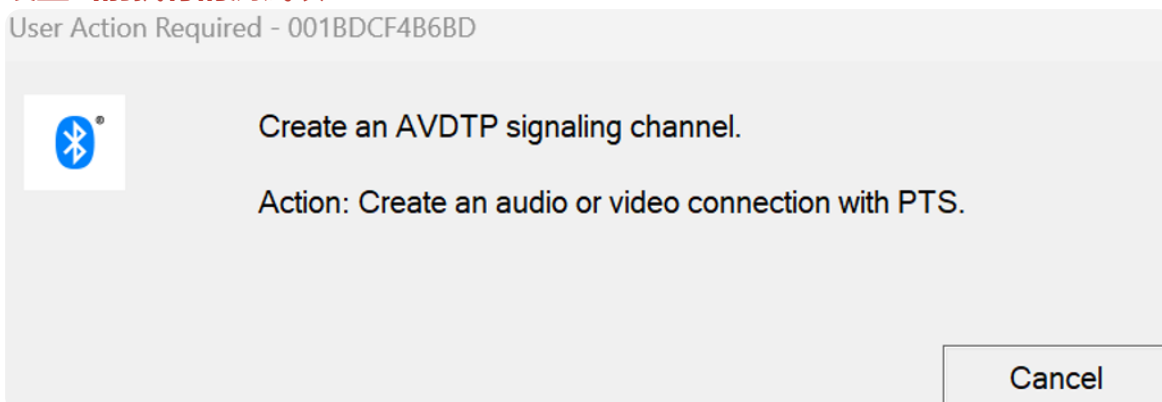
- 提示播音乐的时候就开始播音乐

47. A2DP/SRC/SET/BV-05-I (PASS)

- 先设置好对应的测项
- 提示播音乐的时候就开始播音乐
- 提示这个的时候手表重启或者拉距断开，如果采用重启手表的方法一定要在手表重启后**重新设置当前的测试项**



- 弹出这个提示框的话需要用命令去连接 PTS 的 A2DP，使用串口工具给样机发送指令 `app_bt_src_conn mac` mac 指的是当前 dongle 的地址，**每次开机起来一定要设置当前执行的测试项**



- 后面就是重复这个测试过程

48. A2DP/SRC/SET/BV-06-I (PASS)

- 先设置好对应的测项
- 流程和上一个 case 差不多，但是拉距后不需要手表连 PTS，是 PTS 连接手表

49. IOPT/CL/A2DP-SRC/SFC/BV-01-I (PASS)

User Action Required - 001BDCF4B6BD



Delete the link key with PTS on the Implementation Under Test (IUT), and then click OK to continue.

Description: For end product, this can be achieved by forgetting PTS from the IUT.

OK

Cancel

User Action Required - 001BDCF4B6BD



Is the IUT capable of establishing connection to an unpaired device?

Yes

No

- 弹出这个提示框后需要用命令连接 PTS 的 A2DP，使用串口工具给样机发送 `app_bt connect_ex 2 mac` mac 指的是当前 dongle 的地址，第一次会失败需要再连一次

User Action Required - 001BDCF4B6BD



Create an AVDTP signaling channel.

Action: Create an audio or video connection with PTS.

Cancel

```
09-13 20:34:02:489 TX:app_bt connect_ex 2 001bdcf4b6bd
09-13 20:34:02:491 app_bt connect_ex 2 001bdcf4b6bd
09-13 20:34:02:493 [5208653] APP_IT: cmd:connect_ex
09-13 20:34:02:496
09-13 20:34:02:460 [5208664] bt_common: >> connect mac:bd:b6:f4:dc:1b:0
09-13 20:34:02:463
09-13 20:34:02:466
09-13 20:34:02:470 [5208686] bt_common: << Write scan enable success
09-13 20:34:02:478
09-13 20:34:02:481
09-13 20:34:02:484 [5208700] bt_common: — av conn rmt device... peer_role:0 local_role:1
09-13 20:34:02:487
09-13 20:34:02:492 [5208715] bt_common: << Scan mode: 0
09-13 20:34:02:499
09-13 20:34:02:502 [5208720] bt_common: << No scans enbd.
09-13 20:34:02:514
09-13 20:34:02:517 [5208729] bt_common: — address: 001B:DC:F4B6BD
09-13 20:34:02:526
09-13 20:34:02:528 con_id = 3
09-13 20:34:02:539 [5208743] bt_common: svc_set gap_l2c_conn_req_hdl 2118
09-13 20:34:02:542 [5208753] NO_TAG: fsm: L2C_CH st:0 evt:0
09-13 20:34:02:548 [5208758] NO_TAG: fsm: L2C_CH st:1 evt:5
```

50. AVRCP/CT/CEC/BV-01-I (PASS)

- 弹出这个提示框后需要用命令连接 PTS 的 A2DP，使用串口工具给样机发送 `app_bt connect_ex 2 mac` mac 指的是当前 dongle 的地址

User Action Required - 001BDCF4B6BD



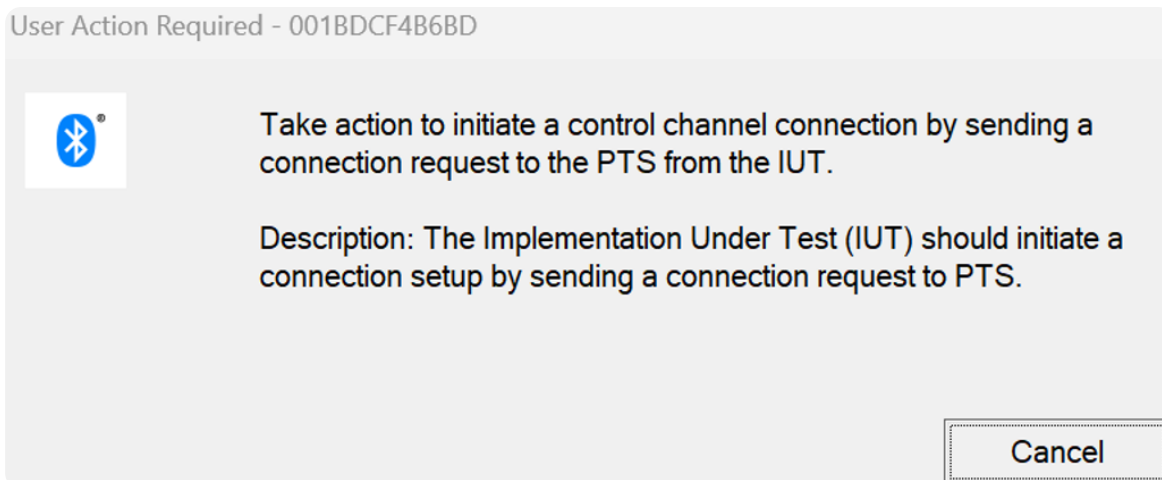
Create an AVDTP signaling channel.

Action: Create an audio or video connection with PTS.

Cancel

```
09-13 20:24:42:631 TX:app_bt connect_ex 2 001bdcf4b6bd
09-13 20:24:42:687 app_bt connect_ex 2 001bdcf4b6bd
09-13 20:24:42:694 [143407] APP.UI: cmd:connect_ex
09-13 20:24:42:698
09-13 20:24:42:701 [143418] bt_common: >> connect mac:bd:b6:f4:dc:1b:0
09-13 20:24:42:704
09-13 20:24:42:713
09-13 20:24:42:717 [143424] bt_common: — av conn rmt device... peer_role:0 local_role:1
09-13 20:24:42:720
09-13 20:24:42:726
09-13 20:24:42:729 [143440] bt_common: << Write scan enable success
09-13 20:24:42:732
09-13 20:24:42:734
09-13 20:24:42:741 [143451] bt_common: — address: 001B:DC:F4B6BD
09-13 20:24:42:744
09-13 20:24:42:747
09-13 20:24:42:750 [143464] bt_common: << Scan mode: 0
09-13 20:24:42:756
09-13 20:24:42:760
09-13 20:24:42:763 [143468] bt_common: << No scans enbd.
09-13 20:24:42:768
09-13 20:24:42:780 con_id = 3
09-13 20:24:42:790 [143485] bt_common: svc_set gap_l2c_conn_req_hdl 2118
09-13 20:24:42:793
09-13 20:24:42:796 [143501] NO_TAG: fsm: L2C_CH st:0 evt:0
09-13 20:24:42:800
09-13 20:24:42:808 [143507] NO_TAG: fsm: L2C_CH st:1 evt:5
09-13 20:24:42:811
09-13 20:24:42:814 [143512] NO_TAG: fsm: L2C_CID st:0 evt:0
09-13 20:24:42:820
09-13 20:24:42:825 [143518] bt_common: ACL connection request with BD: f4b6bd:dc:001b
```

- 用命令去连接 avrcp，使用串口工具给样机发送 `app_bt connect_ex 1 mac mac` 指的是当前 dongle 的地址



```

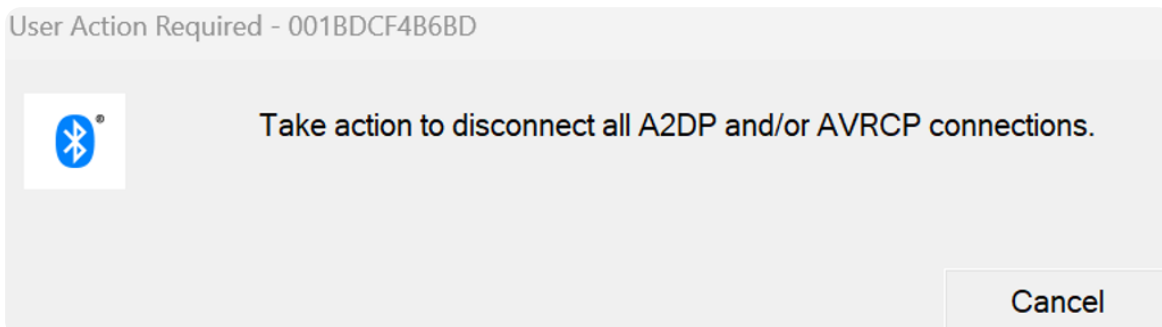
09-13 20:28:20:496 TX:app_bt connect_ex 1 001bdcf4b6bd
09-13 20:28:20:581   app_bt connect_ex 1 001bdcf4b6bd
09-13 20:28:20:589 [2114863] APP IUT: cmd:connect_ex
09-13 20:28:20:592
09-13 20:28:20:595 [2114873] bt_common: >> connect mac:bd:b6:f4:dc:1b:0
09-13 20:28:20:602
09-13 20:28:20:605
09-13 20:28:20:609 [2114886] bt_common: << Write scan enable success
09-13 20:28:20:612
09-13 20:28:20:620
09-13 20:28:20:624 [2114897] bt_common: — avrcp conn remote device...
09-13 20:28:20:627
09-13 20:28:20:632
09-13 20:28:20:636 [2114908] bt_common: << Scan mode: 0
09-13 20:28:20:639
09-13 20:28:20:642
09-13 20:28:20:649 [2114913] bt_common: <<           No scans enbd.
09-13 20:28:20:653
09-13 20:28:20:656
09-13 20:28:20:658 [2114921] bt_common: — address: 001B:DC:F4B6BD
09-13 20:28:20:665
09-13 20:28:20:669
09-13 20:28:20:671 [2114929] bt_common: svc_set gap_l2c_conn_req_hdl 2118
09-13 20:28:20:680
09-13 20:28:20:684 [2114943] bt_connect_fsm: bt_connect_fsm_exit state:0 event:b00a

```

51. AVRCP/CT/CEC/BV-02-I (PASS)

52. AVRCP/CT/CRC/BV-01-I (PASS)

- 弹出这个提示框的时候手表重启

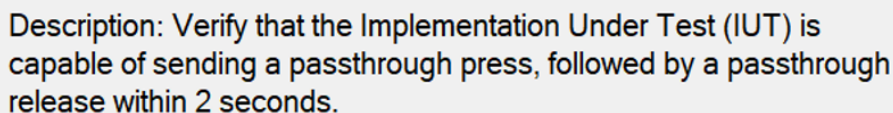


53. AVRCP/CT/CRC/BV-02-I (PASS)

54. AVRCP/CT/NFY/BV-01-C (PASS)

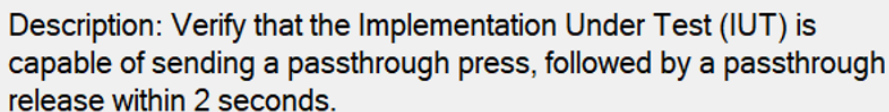
55. AVRCP/CT/PTH/BV-01-C (PASS)

- User Action Required - 001BDCF4B6BD



Cancel

- User Action Required - 001BDCF4B6BD



Cancel

```
watch > service > bt_service > C bt_service.c > cmd_app_bt(int32_t, char **)

1790 #endif
1791 #ifdef BT_USING_DEVICE_TYPE
1792     else if (strcmp(argv[1], "device_type"))
1793     {
1794         bt_device_type_t type = atoi(argv[2]);
1795         ret = app_bt_set_device_type(type);
1796     }
1797 #endif
1798 #ifdef BT_USING_AVRCP
1799     else if (strcmp(argv[1], "phone_play"))
1800     {
1801         ret = app_bt_phone_play();
1802     }
1803     else if (strcmp(argv[1], "phone_play_suspend"))
1804     {
1805         ret = app_bt_phone_play_suspend();
1806     }
1807     else if (strcmp(argv[1], "phone_play_next"))
1808     {
1809         ret = app_bt_phone_play_next();
1810     }
1811     else if (strcmp(argv[1], "phone_play_previous"))
1812     {
1813         ret = app_bt_phone_play_previous();
1814     }
1815     else if (strcmp(argv[1], "phone_play_stop"))
```

- 弹出这个提示框时，使用串口工具给样机发送 `app_bt phone_play`

User Action Required - 001BDCF4B6BD



Send a [PLAY] passthrough press and release to PTS.

Action: Press the corresponding button on the IUT.

Description: Verify that the Implementation Under Test (IUT) is capable of sending a passthrough press, followed by a passthrough release.

Cancel

- 弹出这个提示框时，使用串口工具给样机发送 `app_bt phone_play_suspend`

User Action Required - 001BDCF4B6BD



Send a [PAUSE] passthrough press and release to PTS.

Action: Press the corresponding button on the IUT.

Description: Verify that the Implementation Under Test (IUT) is capable of sending a passthrough press, followed by a passthrough release.

Cancel

57. AVRCP/TG/CEC/BV-01-I (PASS)

58. AVRCP/TG/CFG/BI-01-C (PASS)

59. AVRCP/TG/CFG/BV-02-C (PASS)

60. AVRCP/TG/CRC/BV-01-I (PASS)

61. AVRCP/TG/CRC/BV-02-I (PASS)

- 弹出这个框的时候重启手表

User Action Required - 001BDCF4B6BD



Take action to disconnect all A2DP and/or AVRCP connections.

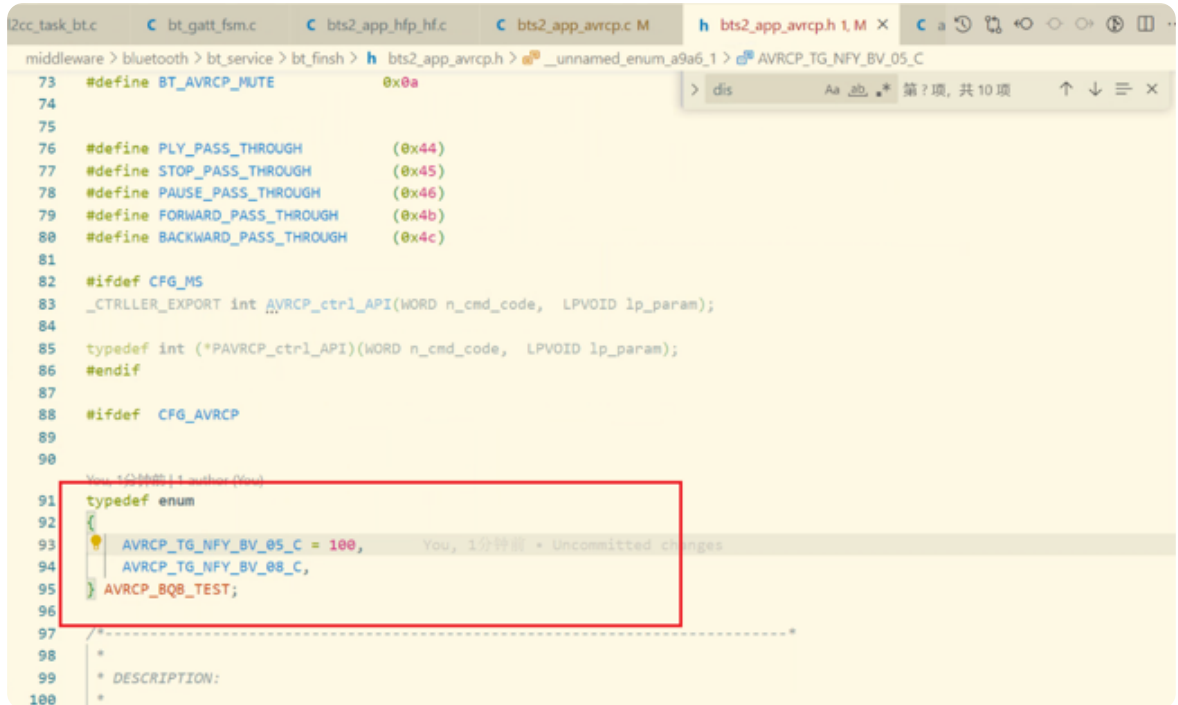
Cancel

62. AVRCP/TG/ICC/BV-01-I (PASS)

63. AVRCP/TG/ICC/BV-02-I (PASS)

- 64. AVRCP/TG/INV/BI-01-C (PASS)
- 65. AVRCP/TG/MDI/BV-02-C (PASS)
- 66. AVRCP/TG/NFY/BI-01-C (PASS)
- 67. AVRCP/TG/NFY/BV-04-C (PASS)
- 68. AVRCP/TG/NFY/BV-05-C (PASS)

- 先设置好对应的测项，通过串口工具给样机发送命令 `app_bt a2dp_bqb 100`，**测完之后重启一下手表**

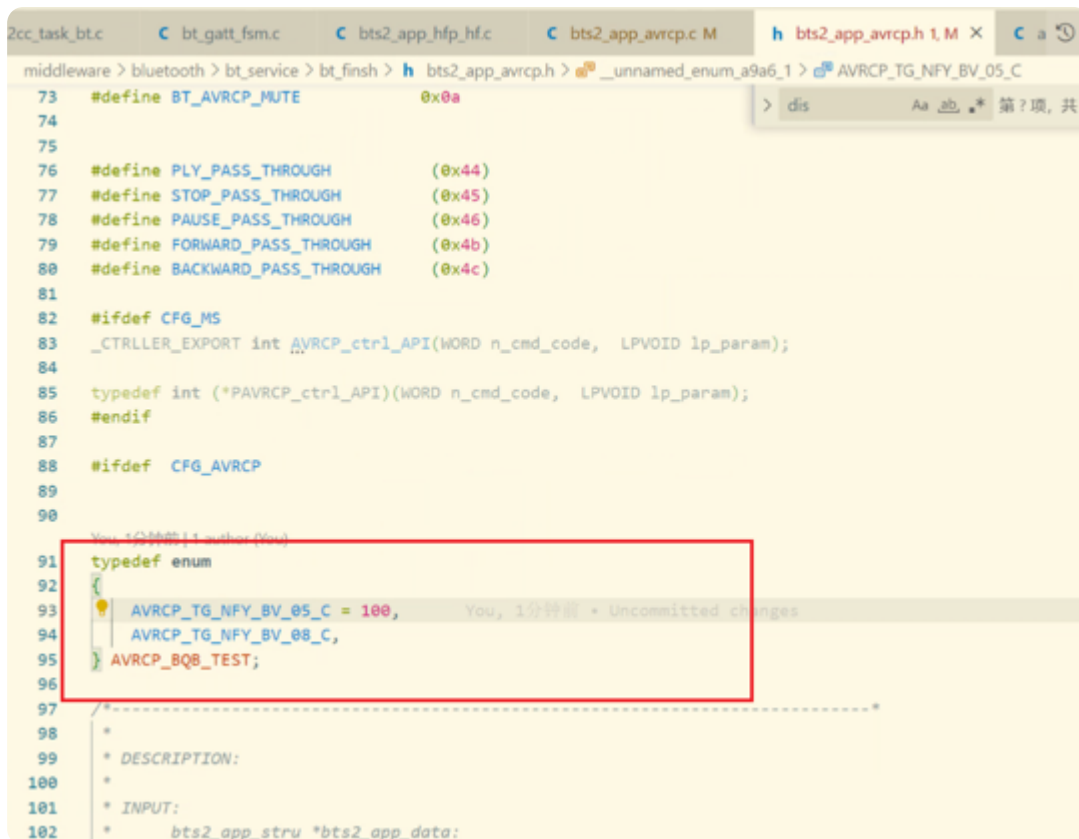


```

73 #define BT_AVRCP_MUTE          0x0a
74
75
76 #define PLY_PASS_THROUGH      (0x44)
77 #define STOP_PASS_THROUGH     (0x45)
78 #define PAUSE_PASS_THROUGH    (0x46)
79 #define FORWARD_PASS_THROUGH  (0x4b)
80 #define BACKWARD_PASS_THROUGH (0x4c)
81
82 #ifdef CFG_MS
83 _CTRLLER_EXPORT int AVRCP_ctrl_API(WORD n_cmd_code, LPVOID lp_param);
84
85 typedef int (*PAVRCP_ctrl_API)(WORD n_cmd_code, LPVOID lp_param);
86 #endif
87
88 #ifdef CFG_AVRCP
89
90
91 typedef enum
92 {
93     AVRCP_TG_NFY_BV_05_C = 100,
94     AVRCP_TG_NFY_BV_08_C,
95     AVRCP_BQB_TEST;
96 }
97
98 /*
99  * DESCRIPTION:
100  */
  
```

- 69. AVRCP/TG/NFY/BV-08-C (PASS)

- 先设置好对应的测项，通过串口工具给样机发送命令 `app_bt a2dp_bqb 101`，**测完之后需要重启一下手表**



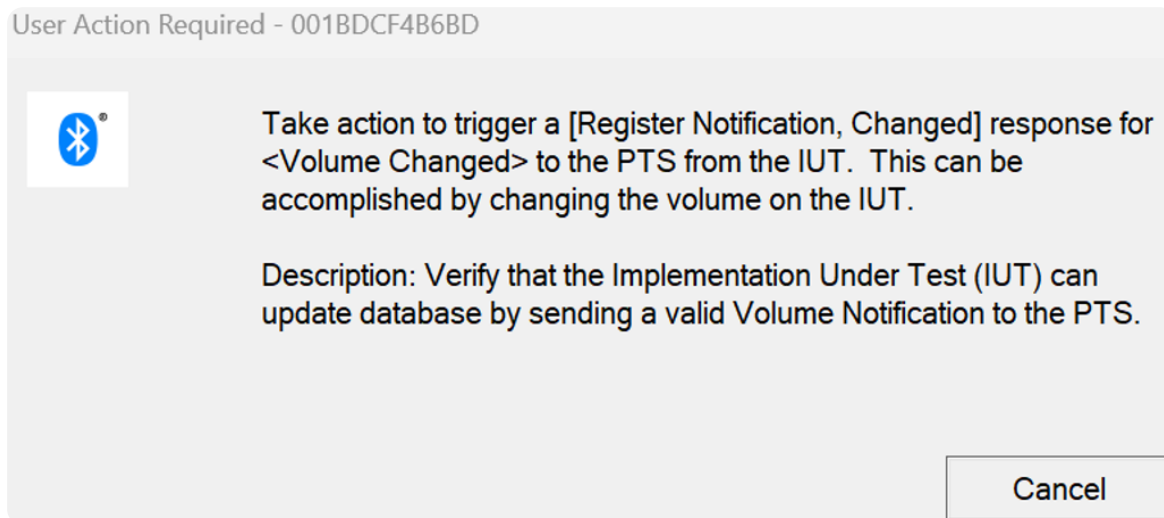
```

73 #define BT_AVRCP_MUTE 0x0a
74
75
76 #define PLY_PASS_THROUGH (0x44)
77 #define STOP_PASS_THROUGH (0x45)
78 #define PAUSE_PASS_THROUGH (0x46)
79 #define FORWARD_PASS_THROUGH (0x4b)
80 #define BACKWARD_PASS_THROUGH (0x4c)
81
82 #ifdef CFG_MS
83 _CTRLER_EXPORT int _AVRCP_ctrl_API(WORD n_cmd_code, LPVOID lp_param);
84
85 typedef int (*PAVRCP_ctrl_API)(WORD n_cmd_code, LPVOID lp_param);
86 #endif
87
88 #ifdef CFG_AVRCP
89
90
91 typedef enum
92 {
93     AVRCP_TG_NFY_BV_05_C = 100,
94     AVRCP_TG_NFY_BV_08_C,
95     AVRCP_BQB_TEST;
96 }
97
98 /*
99  * DESCRIPTION:
100  *
101  * INPUT:
102  *     bts2_app_stru *bts2_app_data:

```

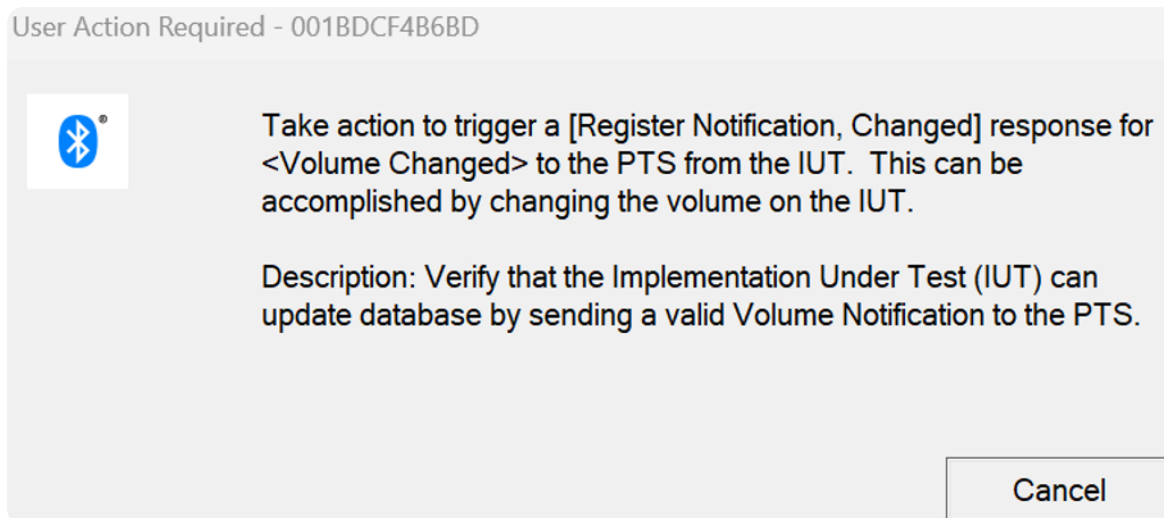
- 70. AVRCP/TG/PTT/BV-01-I (PASS)
- 71. AVRCP/TG/PTT/BV-02-I (PASS)
- 72. AVRCP/TG/RCR/BV-02-C (PASS)
- 73. AVRCP/TG/RCR/BV-04-C (PASS)
- 74. AVRCP/TG/VLH/BI-01-C (PASS)
- 75. AVRCP/TG/VLH/BI-02-C (PASS)
- 76. AVRCP/TG/VLH/BV-02-C (PASS)
- 77. AVRCP/TG/VLH/BV-04-C (PASS)

- 弹出这个提示框后需要调整一下绝对音量



- 78. AVRCP/TG/VLH/BV-01-I (PASS)

- 弹出这个提示框后需要调整一下绝对音量，**这个 CASE 过不了的话可以先执行下一个 CASE 然后再执行这个测试 CASE**

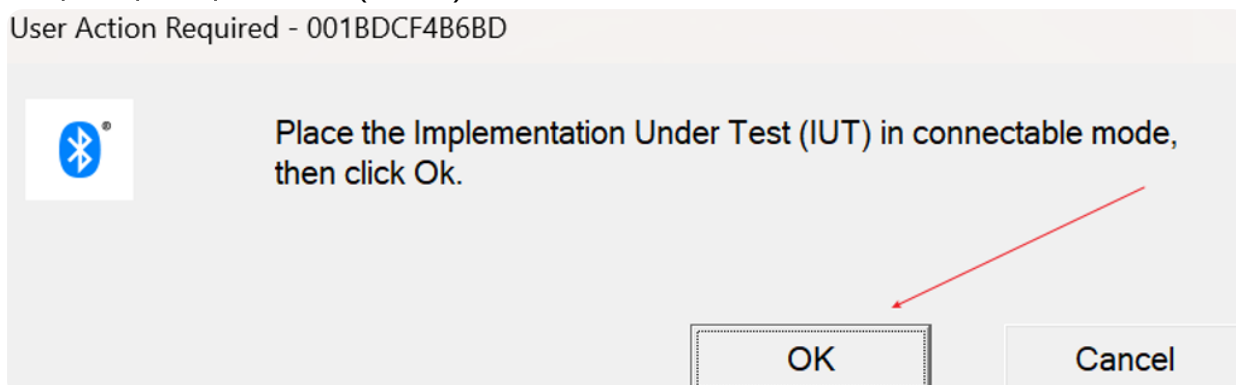


79. AVRCP/TG/VLH/BV-02-I (PASS)

80. IOPT/CL/AVRCP-CT/SFC/BV-03-I (PASS)

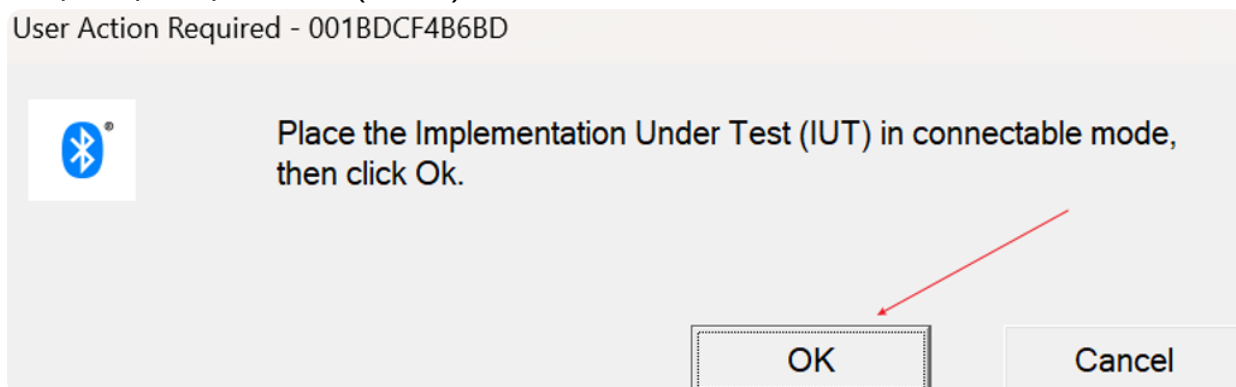
- 按照操作提示去连接 a2dp 和 avrcp, 连接 A2DP 的命令是 `app_bt connect_ex 2 mac`, a2dp 第一次会连接失败, 连接 AVRCP 的命令是 `app_bt connect_ex 1 mac`, mac 指的是当前 dongle 的地址

81. HID/DEV/HCE/BV-01-I (PASS)

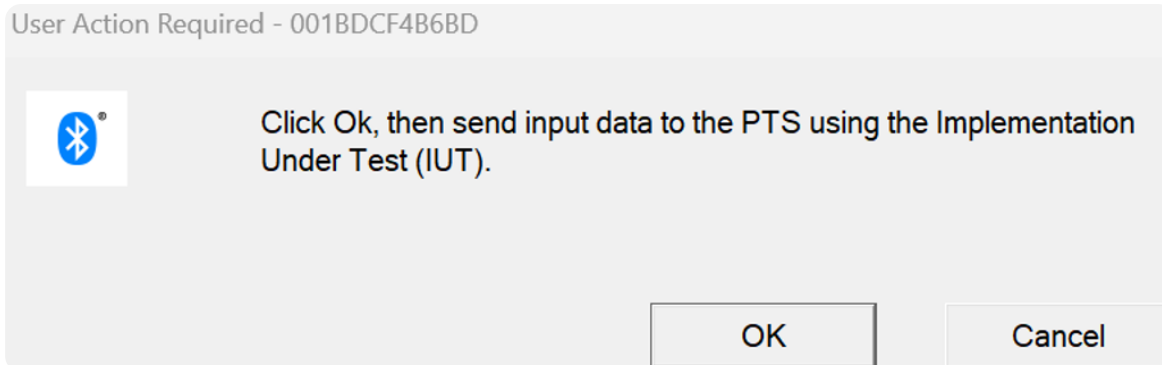


82. HID/DEV/HCR/BV-01-I (PASS)

83. HID/DEV/HDT/BV-01-I (PASS)



- 弹出这个提示框后需要手表给 PTS 发一个 hid 数据



```
bt_service.c 9+, M x  hci_ev.c  h hci_spech  C app_ag.c  C gap_rfc.c  h hfp_hf_misch  > 查找  Aa 无结果  ↑ ↓  ×

watch > service > bt_service > C bt_service.c > cmd_app_bt(int32_t, char **)
1877         return 0;
1878     }
1879     ret = app_bt_change_bd_addr((uint8_t *)&addr);
1880 }
1881 else
1882 {
1883     ret = app_bt_change_bd_addr(RT_NULL);
1884 }
1885 }
1886 else if (strcmp(argv[1], "cfg_mac"))
1887 {
1888     app_bt_cfg_change_bt_addr(atoi(argv[2]), RT_NULL);
1889 }
1890 #ifdef BT_USING_HID
1891 #if defined(BT_USING_SIFLI)
1892     else if (strcmp(argv[1], "hid_set_phone"))
1893     {
1894         uint8_t is_device_ios = atoi(argv[2]);
1895         LOG_I("phone type:%d", is_device_ios);
1896         send_bt_control_msg_to_app_thread(BT_CONTROL_SET_HID_DEVICE, &is_device_ios, sizeof(is_device_ios));
1897     }
1898 #endif
1899     else if (strcmp(argv[1], "hid_drag_up"))
1900     {
1901         send_bt_control_msg_to_app_thread(BT_CONTROL_PHONE_DRAG_UP, RT_NULL, 0);
1902     }
1903     else if (strcmp(argv[1], "hid_drag_down"))
1904     {
1905         send_bt_control_msg_to_app_thread(BT_CONTROL_PHONE_DRAG_DOWN, RT_NULL, 0);
1906     }
1907     else if (strcmp(argv[1], "hid_once_click"))
1908     {
1909         send_bt_control_msg_to_app_thread(BT_CONTROL_PHONE_ONCE_CLICK, RT_NULL, 0);
1910     }
1911 }
```

84. HID/DEV/HID/BI-01-C (PASS)

85. HID/DEV/HID/BI-02-C (PASS)

86. HID/DEV/SDD/BV-03-C (PASS)

87. HID/DEV/SDD/BV-04-I (PASS)

- 这个 case 要多等一会，可能要多执行几次

2.2 BQB RF 测试

2.2.1 BQB RF 测试介绍

- RF 测试目的是验证蓝牙设备的射频性能是否符合蓝牙技术规范的要求
- 包括设备的发射功率、接收灵敏度、频率稳定性、调制精度等关键参数，以确保设备在无线通信过程中能够稳定、可靠地传输数据

2.2.2 BQB RF 测试方法 / 步骤

2.2.2.1 烧录测试软件

- 测试软件一般由原厂提供，根据认证实验室要求准备一定数量的 PCBA，使用量产烧录工具 Impeller 将测试软件烧入到 PCBA 中

2.2.2.2 硬件接线

- RF 测试是传导测试，cab 线选用差损较小的，同时需要在 PCBA 上将这些测试点引线出来，不同芯片平台与测试点对应关系如下

芯片系列	引线测试点
SF32LB55X	VBAT、GND、UART1_TX/RX、UART3_TX/RX
SF32LB56X	VBAT、GND、UART1_TX/RX、UART4_TX/RX
SF32LB52X	VBAT、GND、DBG_UART_TX/RX

2.2.2.3 初步验证

- BQB 认证 RF 测试主要针对蓝牙射频性能，测试过程会涉及到很多仪器设备，建议在送测前在现有条件下测试 RF 的基本指标，确保样品可测，如功率，频偏，灵敏度等符合预期

2.2.2.4 信令测试方法

- 烧入测试软件后，串口板接对应 UART (55X 接 UART3, 56X 接 UART4), PC 通过 sscom 工具发送 hci 命令，命令内容如下所示，然后拿掉串口板，cab 线接综测仪即可测试

芯片系列	HCI 命令
SF32LB55X	01 03 0c 00 01 0a 0c 01 03 01 05 0c 03 02 00 02 01 03 18 00
SF32LB56X	06 ee ff 01
SF32LB52X	06 ee ff 01

3. 注意事项 / FAQ

3.1 关于用于 BQB 认证测试送测的固件版本

- 用于 BQB 认证送测的固件版本如无明确要求，可以为定制修改版本，即不需要保持与项目量产固件版本为同样的版本