XR829 Bluetooth RFTest CLI Tool User Guide

Android or Linux系统

Revision 1.0

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Revision History

Version	Data	Summary of Changes
1.0.0	2018-11-13	Initial Version
1.0.1	2018-11-14	增加 BLE RSSI 测试项
1.0.2	2019-04-18	补充测试环境配置成功说明，确认关键节点存在等内容
1.0.3	2019-04-28	补充工具正常使用的检查点等
1.0.4	2019-07-10	修改 BT TX 测试的参数（添加 hopping_mode）
1.0.5	2019-11-27	增加了 3.2 参数说明，修改各项测试的示例
1.0.6	2020-01-19	增加了蓝牙单载波测试 single_tone 测试项
1.0.7	2020-03-11	添加了不同平台 hciattach 工具的说明

表 0-1 Revision History

目 录

图&表

1 概述

1.1 编写目的

介绍 XR829 蓝牙 RF 测试命令行工具（btetf）的使用。

1.2 使用范围

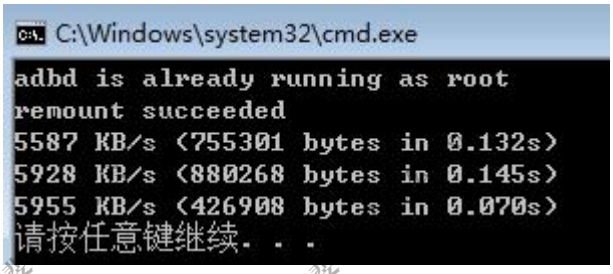
软件环境：Linux & Android

2 测试平台搭建与配置

2.1 搭建测试平台

需要的测试工具为：hciattach，hciconfig，btetf。

运行脚本“ **init_tools_linux.bat** ”或“init_tools_android.bat”进行工具安装：



说明：

（1）在使用安立 MT8850A 综测仪的时候，测试要把 TEST PAUSE 功能设置成关闭状态方可进行测试。

（2）使用 btetf 工具进行测试时依赖于 hciattach 工具加载蓝牙固件，linux 平台自带有 hciattach，因此不需要推该文件，工具包中的 hciattach 工具提供给 Android 使用。

2.2 配置测试环境（启动蓝牙）

配置测试环境有两种方法：1）运行脚本 2）手动输入相关命令

2.2.1 运行脚本进行配置

配置测试环境的命令集合已集成在脚本“ **init_test.bat** ”中。双击运行该脚本，出现“**init success!**”表示测试环境已配置成功：

```
[userial_sync] read buf: 00 00.
[userial_sync] uart sync count: 2.
[userial_sync] read buf: 00 00.
[userial_sync] uart sync count: 3.
[userial_sync] read buf: 4f 4b.
[userial_sync] Receive OK, uart sync done.
[load_btfirmware] start loading firmware...
[load_btfirmware] open firmware file success. loading...
load firmware done.
jump:
set pc 0, val 0
Now the system will jump to 00000000
Set HW FlowControl On
userial_vendor_set_hw_fctrl set hw flowcontrol on
[xradio_init] send reset cmd...
writing
01 03 0c 00
received 7
04 0e 04 05 03 0c 00
[xradio_init] update hci baudrate...
writing
01 18 fc 04 60 e3 16 00
received 7
04 0e 04 05 18 fc 00
Done setting baudrate
[xradio_init] set bdaddr...
generating random bdaddr...
writing
01 0a fc 09 02 00 06 0b b9 f9 fe 22 22
received 7
04 0e 04 05 0a fc 00
writing
01 03 0c 00
received 7
04 0e 04 05 03 0c 00
[xradio_init] bring up hci...
Done setting line discpline
Device setup complete
brom_done
hci0:   Type: Primary  Bus: UART
        BD Address: 22:22:FE:F9:B9:0B  ACL MTU: 1021:8  SCO MTU: 255:4
        UP RUNNING
        RX bytes:1168 acl:0 sco:0 events:56 errors:0
        TX bytes:752 acl:0 sco:0 commands:56 errors:0
        Features: 0xbf 0xfe 0xcd 0xfe 0xdb 0xfd 0x7b 0x87
        Packet type: DM1 DM3 DM5 DH1 DH3 DH5 HV1 HV2 HV3
        Link policy: RSWITCH SNIFF
        Link mode: SLAVE ACCEPT
        Name: 'XR829_BT'
        Class: 0x000000
        Service Classes: Unspecified
        Device Class: Miscellaneous,
        HCI Version: 4.1 (0x7)  Revision: 0xa68
        LMP Version: 4.1 (0x7)  Subversion: 0xa68
        Manufacturer: not assigned (1597)

init success!
```

图 2-1 运行脚本，配置测试环境

2.2.2 手动进行配置

如果选择手动配置测试环境，请依次按照以下步骤进行操作：

1) 加载 XR829 蓝牙固件（请使用实际蓝牙对应的 tty 编号替换黄色部分）

```
venus-a3:/# hciattach -n ttyS1 xradio &
```

```
venus-a3:/ # hciattach -n ttyS1 xradio &
hciattach -n ttyS1 xradio &
[1] 4182
venus-a3:/ # xradio_init
set LPM mode:disabled[userial_sync] uart sync count: 1.
[userial_sync] read buf: 00 00.
[userial_sync] uart sync count: 2.
[userial_sync] read buf: 4f 4b.
[userial_sync] Receive OK, uart sync done.
Set uart mode done
[userial_sync] uart sync count: 1.
[userial_sync] read buf: 00 00.
[userial_sync] uart sync count: 2.
[userial_sync] read buf: 4f 4b.
[userial_sync] Receive OK, uart sync done.
[load_btfirmware] start loading firmware...
[load_btfirmware] open firmware file success. loading...
load firmware done.
jump:
set pc 0, val 0
Now the system will jump to 00000000
Set HW FlowControl On
userial_vendor_set_hw_fctrl set hw flowcontrol on
[xradio_init] send reset cmd...
writing
01 03 0c 00
received 7
04 0e 04 05 03 0c 00
[xradio_init] update hci baudrate...
writing
01 18 fc 04 60 e3 16 00
received 7
04 0e 04 05 18 fc 00
Done setting baudrate
[xradio_init] set bdaddr...
writing
01 0a fc 09 02 00 06 6b 7b eb 13 22 22
received 7
04 0e 04 05 0a fc 00
writing
01 03 0c 00
received 7
04 0e 04 05 03 0c 00
[xradio_init] bring up hci...
Done setting line discpline
Device setup complete
```

图 2-2 手动配置 - 加载蓝牙固件

2) 启动设备

```
venus-a3:/# hciconfig hci0 up
```

```
venus-a3:/ # hciconfig hci0 up
hciconfig hci0 up
venus-a3:/ #
```

图 2-3 手动配置 - 启动设备

3) 检查状态

```
venus-a3:/# hciconfig -a
```

如果检查状态如下图所示，即代表初始化成功:

```
venus-a3:/ # hciconfig -a
hciconfig -a
hci0:   Type: Primary  Bus: UART
        BD Address: 22:22:13:EB:7B:6B  ACL MTU: 1021:8  SCO MTU: 255:4
        UP RUNNING
        RX bytes:1168 acl:0 sco:0 events:56 errors:0
        TX bytes:752 acl:0 sco:0 commands:56 errors:0
        Features: 0xbf 0xfe 0xcd 0xfe 0xdb 0xfd 0x7b 0x87
        Packet type: DM1 DM3 DM5 DH1 DH3 DH5 HV1 HV2 HV3
        Link policy: RSWITCH SNIFF
        Link mode: SLAVE ACCEPT
        Name: 'XR829_BT'
        Class: 0x000000
        Service Classes: Unspecified
        Device Class: Miscellaneous,
        HCI Version: 4.1 (0x7)  Revision: 0xa64
        LMP Version: 4.1 (0x7)  Subversion: 0xa64
        Manufacturer: not assigned (1597)
```

图 2-4 手动配置 - 检查初始化状态

2.3 工具正常使用的检查点

2.3.1 确保相关文件节点存在

配置蓝牙测试环境时，会操作一些关键文件节点；请确认系统存在以下文件节点：

```
venus-a3:/proc/bluetooth/sleep # ls -l
ls -l
total 0
--w--w---- 1 bluetooth net_bt_admin 0 2019-04-18 09:52 btwake
--w--w---- 1 bluetooth net_bt_admin 0 2019-04-18 09:52 btwrite
--w--w---- 1 bluetooth net_bt_admin 0 2019-04-18 09:52 lpm
venus-a3:/proc/bluetooth/sleep #
```

图 2-5 确认系统存在蓝牙相关的关键节点

如不存在，则表明 XR829 蓝牙休眠唤醒模块没有移植好；请确认是否已完成 《XR829 Bluetooth Porting Guide(Android8.1).pdf》 中“2.1 添加休眠唤醒与 FDI 模块” 相关步骤。

2.3.2 确保 bt 固件路径

Android 端的 hciattach 工具会在以下路径寻找 bt 固件：

/system/etc/firmware/fw_xr829_bt.bin 或者 /system/vendor/etc/firmware/fw_xr829_bt.bin

Linux 端默认的 hciattach 工具会在以下路径寻找 bt 固件：

/lib/firmware/fw_xr829_bt.bin

请确认 bt 固件的路径是否为上述路径之一。

2.3.3 确保 HCI UART driver 被编译

btetf 命令行工具依赖于内核自带的蓝牙驱动模块，请确认以下内核编译选项选上：

make ARCH=arm menuconfig --> Networking support --> Bluetooth subsystem support --> Bluetooth device drivers：

```
< > HCI USB driver
< > HCI SDIO driver
<*> HCI UART driver
[*]   UART (H4) protocol support
[ ]   BCSP protocol support (NEW)
[ ]   Atheros AR300x serial support (NEW)
[ ]   HCILL protocol support (NEW)
[ ]   Three-wire UART (H5) protocol support (NEW)
< > HCI BCM203x USB driver
< > HCI BPA10x USB driver
< > HCI BlueFRITZ! USB driver
< > HCI VHCI (Virtual HCI device) driver
< > Marvell Bluetooth driver support
```

图 2-6 确认相关内核编译配置

3 软件介绍

3.1 帮助文档

btetf 工具主要功能是进行 BT TX/RX、BLE TX/RX 测试。

可以使用“btetf -h”命令获取工具的使用帮助信息：

```
venus-a3:/# btetf -h
```

```
venus-a3:/system/bin # btetf -h
btetf -h
BT-ETF Tool Version 1.0.0
Usage:
        btetf [options] <command> [command parameters]
Options:
        --help  Display help
        --debug Dump Debug Info
        -i dev  HCI device
Commands:
        hci_reset       Hci Reset
        get_fwv         Hci Read Local Version Info
        ble_tx          Ble Tx Mode Start
        ble_rx          Ble Rx Mode Start
        ble_close       Ble Test Mode End
        bt_test_mode    Bt Test Mode Open
        bt_tx           Bt Tx Mode Start
        bt_close_tx     Bt Tx Mode End
        bt_rx           Bt Rx Mode Start
        bt_close_rx     Bt Rx Mode End
        auto_test       Auto Test Mode

For more information on the usage of each command use:
        btetf <command> --help
```

图 3-1 “btetf -h”命令获取工具使用帮助

3.2 参数说明

在某些测试项中，可能需要对链路类型和包类型进行设置。数据包类型与使用它们的逻辑传输链路有关，定义了四种不同的链路类型：ACL/SCO(Basic Rate)、eSCO(Basic Rate)、ACL(EDR)和 eSCO(EDR)。

不同传输类型有其相应的数据包类型，对包类型的具体描述见《Bluetooth Core Specification Core5.1》Vol 2, Part B, 6.5 Package type。

4 工具使用说明

4.1 BT 测试

4.1.1 BT RX 测试

可以使用“ btetf bt_rx -h ”命令获取 BT RX 测试的使用帮助信息：

```
venus-a3:/ # btetf bt_rx -h
btetf bt_rx -h
bt_rx: unrecognized option: h
Usage:
        bt_rx [option] [parameters]
Options:
       [--bdaddr=N]
       [--channel_num=N]  Range:0~79 default=1
       [--link_type=N] Range:0~3 default=0
                     0 ACL/SCO (Basic Rate)
                     1 eSCO (Basic Rate)
                     2 ACL (EDR)
                     3 eSCO (EDR)
       [--packet_type=N] Range:0~15 default=3
              ACL/SCO (Basic Rate):
                     0 NULL
                     1 POLL
                     2 FHS
                     3 DM1
                     4 DH1
                     5 HV1
                     6 HV2
                     7 HV3
                     8 DV
                     9 AUX1
                     10 DM3
                     11 DH3
                     14 DM5
                     15 DH5
              eSCO (Basic Rate):
                     0 NULL
                     1 POLL
                     7 EV3
                     12 EV4
                     13 EV5
              ACL (EDR):
                     0 NULL
                     1 POLL
                     2 FHS
                     3 DM1
                     4 2-DH1
                     5 HV1
                     6 HV2
                     7 HV3
                     8 3-DH1
                     9 AUX1
                     10 2-DH3
                     11 3-DH3
                     14 2-DH5
                     15 3-DH5
              eSCO (EDR):
                     0 NULL
                     1 POLL
                     6 2-EV3
                     7 3-EV3
                     12 2-EV5
                     13 3-EV5
Example:
tetf bt_rx --bdaddr 11:22:33:44:22:22 --channel_num 8 --link_type 1 --packet_type 3
```

图 4-1 “btetf bt_rx -h” 命令获取 BT RX 测试使用帮助

BT RX 测试需要指定以下参数：

默认参数列表	示例值	备注
bdaddr	11:22:33:44:22:22	Mac Address
channel_num	1	Channel
link_type	0	Link Type
packet_type	4	Packet Type

例子: BT RX 测试指定接收 1 信道 BR DH1 的包（注：此时应有辅助设备向测试设备发包）：

```
venus-a3:/# btetf -i hci0 -d    bt_rx --bdaddr 11:22:33:44:22:22 --channel_num 1 --link_type 0 --packet_type 4
```

```
venus-a3:/ # btetf -i hci0 -d  bt_rx --bdaddr 11:22:33:44:22:22 --channel_num 8 --link_type 0 --packet
_type 3
2:33:44:22:22 --channel_num 8 --link_type 0 --packet_type 3                    <
bt_rx:channel_num(8) link_type/packet_type(0-3) lpt:(0x 3)
< HCI Command: opcode:(0xfc50) ogf-ocf:(0x3f-0x0050) plen:(13)
   10 11 22 33 44 22 22 00 00 00 08 00 03
> HCI Event: 0x0e plen 17
   05 50 FC 00 10 11 22 33 44 22 22 00 00 00 08 00 03
venus-a3:/ #
```

图 4-2 BT RX 测试启动示例

例子: BT RX 测试指定接收 1 信道 EDR 3-DH5 的包（注：此时应有辅助设备向测试设备发包）：

```
venus-a3:/# btetf -i hci0 -d    bt_rx --bdaddr 11:22:33:44:22:22 --channel_num 1 --link_type 2 --packet_type 15
```

4.1.2 BT RX 测试结束

以下命令用于关闭 BT RX 测试：

```
venus-a3:/# btetf -i hci0 -d    bt_close_rx
```

关闭 BT RX 测试后会显示测试结果。如下图，红框显示本次 RX 测试接收到 90 个包：

```
venus-a3:/ # btetf -i hci0 -d  bt_close_rx
btetf -i hci0 -d  bt_close_rx
< HCI Command: opcode:(0xfc50) ogf-ocf:(0x3f-0x0050) plen:(1)
   F0
> HCI Event: 0x0e plen 21
   05 50 FC 00 F0 5A 00 00 00 00 00 00 00 00 00 00 00 00
   00
event: 04 0E 15 05 50 FC 00 F0 5A 00 00 00 00 00 00 00 00 00 00 00
event: 00 00 00 00
status:0x 0, mode_status:0xf0
receive_packet:90, hec_err_packet:0
crc_err_packet:0, type_err_packet:0
venus-a3:/ #
```

图 4-3 BT RX 测试结束

4.1.3 BT TX 测试

可以使用“ btetf bt_tx -h ”命令获取 BT TX 测试的使用帮助信息：

```
root@TinaLinux:/# btetf  bt_tx  -h
btetf  bt_tx  -h
bt_tx: unrecognized option: h
Usage:
        bt_tx [option] [parameters]
Options:
       [--bdaddr=N]
       [--pattern=N] Range:0~7 Data pattern
                     0 Transmitter test - 0 pattern
                     1 Transmitter test - 1 pattern
                     2 Transmitter test - 1010 pattern
                     3 Transmitter test - 0101 pattern
                     4 Transmitter test 1111 0000 pattern
                     5 Transmitter test-0000 1111 pattern
                     6 Pseudorandom 9 bit sequence
                     7 Pseudorandom 15 bit sequence
                     8-254 reserved
       [--packet_len=N]   Range:0~65535 default=10
       [--channel_num=N]  Range:0~79 default=1
       [--power_level=N]  Range:0~6 default=1
       [--link_type=N] Range:0~3 default=0
                     0 ACL/SCO (Basic Rate)
                     1 eSCO (Basic Rate)
                     2 ACL (EDR)
                     3 eSCO (EDR)
```

```
       [--packet_type=N] Range:0~15 default=3
              ACL/SCO (Basic Rate):
                     0 NULL
                     1 POLL
                     2 FHS  (0-17)
                     3 DM1  (0-17)
                     4 DH1  (0-27)
                     5 HV1  (10)
                     6 HV2  (20)
                     7 HV3  (30)
                     8 DV   (10)
                     9 AUX1 (0-29)
                     10 DM3 (0-121)
                     11 DH3 (0-183)
                     14 DM5 (0-224)
                     15 DH5 (0-339)
              eSCO (Basic Rate):
                     0 NULL
                     1 POLL
                     7 EV3  (30)
                     12 EV4 (120)
                     13 EV5 (180)
              ACL (EDR):
                     0 NULL
                     1 POLL
                     2 FHS      (0-17)
                     3 DM1      (0-17)
                     4 2-DH1    (0-54)
                     8 3-DH1    (0-83)
                     9 AUX1     (0-29)
                     10 2-DH3   (0-367)
                     11 3-DH3   (0-552)
                     14 2-DH5   (0-679)
                     15 3-DH5   (0-1021)
              eSCO (EDR):
                     0 NULL
                     1 POLL
                     6 2-EV3    (60)
                     7 3-EV3    (90)
                     12 2-EV5   (360)
                     13 3-EV5   (540)
Example:
tetf bt_tx --bdaddr 01:02:03:04:05:06 --packet_len 2 --channel_num 8 --power_level 6 --link_type 1 --p
acket type 3
```

图 4-4 “btetf bt_tx -h” 命令获取 BT TX 测试使用帮助

BT TX 测试需要指定以下参数（其中信道、链路类型和包类型要与 RX 测试时的配置一致）：

默认参数列表	示例值	备注
bdaddr	11:22:33:44:22:22	Mac Address
pattern	6	Data Type
packet_len	37	Packet Length
channel_num	1	Channel
power_level	6	Power
link_type	0	Link Type
packet_type	4	Packet Type
hopping_mode	0	关闭跳频模式

例子: BT TX 测试，指定在 1 信道发送 DH1 包，包长度为 37byte，数据为 9bit 随机填充，不打开跳频模式：

```
venus-a3:/# btetf -i hci0 -d    bt_tx --bdaddr 11:22:33:44:22:22 --pattern 6 --packet_len 37 --channel_num 1
--power_level 6 --link_type 0 --packet_type 4 --hopping_mode 0
```

```
venus-a3:/ # btetf -i hci0 -d  bt_tx --bdaddr 11:22:33:44:22:22 --packet_len 10 --channel_num 8 --powe
r_level 6 --link_type 0 --packet_type 3
n 10 --channel_num 8 --power_level 6 --link_type 0 --packet_type 3            <
bt_tx: pattern(0)-packet_len(10)-channel_num(8)-power_level(6) link_type/packet_type(0-3) lpt:(0x 3)
< HCI Command: opcode:(0xfc50) ogf-ocf:(0x3f-0x0050) plen:(13)
   00 11 22 33 44 22 22 00 0A 00 08 06 03
> HCI Event: 0x0e plen 17
   05 50 FC 00 00 11 22 33 44 22 22 00 0A 00 08 06 03
```

图 4-5 BT TX 测试启动示例

例子: BT TX 测试，指定在 1 信道发送 3-DH5 包，包长度为 37byte，数据为 9bit 随机填充，不打开跳频模式：

```
venus-a3:/# btetf -i hci0 -d    bt_tx --bdaddr 11:22:33:44:22:22 --pattern 6 --packet_len 37 --channel_num 1
--power_level 6 --link_type 2 --packet_type 15 --hopping_mode 0
```

4.1.4 BT TX 测试结束

以下命令用于关闭 BT TX 测试：

```
venus-a3:/# btetf -i hci0 -d bt_close_tx
```

```
venus-a3:/ # btetf -i hci0 -d  bt_close_tx
btetf -i hci0 -d  bt_close_tx
< HCI Command: opcode:(0xfc50) ogf-ocf:(0x3f-0x0050) plen:(1)
   F0
> HCI Event: 0x0e plen 5
   05 50 FC 00 F0
```

图 4-6 BT TX 测试结束

4.2 BLE 测试

4.2.1 BLE RX 测试

可以使用 “ btetf ble_rx -h ” 命令获取 BLE RX 测试的使用帮助信息：

```
venus-a3:/# btetf ble_rx -h
```

```
venus-a3:/ # btetf ble_rx -h
btetf ble_rx -h
ble_rx: unrecognized option: h
Usage:
        ble_rx [option] [parameters]
Options:
       [--rx_channel=N] Range:0~27 Frequency Range:2402 MHz to 2480 MHz
       [--auto] Auto test mode, must connect measuring device first
venus-a3:/ #
```

图 4-7 “btetf ble_rx -h” 命令获取 BLE RX 测试使用帮助

BLE RX 测试需要指定以下参数：

默认参数列表	示例值	备注
channel	1	Channel

例子: 指定在信道 1 监听 BLE 数据包：

```
venus-a3:/# btetf -d -i hci0 ble_rx --rx_channel 1
```

```
venus-a3:/ # btetf -d -i hci0 ble_rx --rx_channel 5
btetf -d -i hci0 ble_rx --rx_channel 5
ble_rx:rx_channel:5
< HCI Command: opcode:(0x201d) ogf-ocf:(0x08-0x001d) plen:(1)
   05
> HCI Event: 0x0e plen 4
   05 1D 20 00
```

图 4-8 BLE RX 测试启动示例

4.2.2 BLE RX 测试结束

以下命令用于关闭 BLE RX 测试：

```
venus-a3:/# btetf -d -i hci0 ble_close
```

关闭 BLE RX 测试后会显示测试结果。如下图，红框显示本次 BLE RX 测试接收到 BLE 数据包 3744 个：

```
venus-a3:/ # btetf -d -i hci0 ble_close
btetf -d -i hci0 ble_close
< HCI Command: opcode:(0x201f) ogf-ocf:(0x08-0x001f) plen:(0)
> HCI Event: 0x0e plen 6
   05 1F 20 00 A0 0E
event: 04 0E 06 05 1F 20 00 A0 0E
status:0x 0
send_or_receive_packet:3744
venus-a3:/ #
```

图 4-9 BLE RX 测试结束，显示收到的包个数

4.2.3 BLE RX 测试结束后 Read RSSI

```
venus-a3:/# btetf -i hci0 -d    ble_rssi
```

```
root@TinaLinux:/# btetf -d -i hci0 ble_rssi
btetf -d -i hci0 ble_rssi
< HCI Command: opcode:(0xfc15) ogf-ocf:(0x3f-0x0015) plen:(1)
   00
> HCI Event: 0x0e plen 8
   05 15 FC 00 00 00 00 DF
event: 04 0E 08 05 15 FC 00 00 00 00 DF
status:0x 0
ble_rssi_result:-32
root@TinaLinux:/#
```

图 4-10 BLE RX 测试结束 Read RSSI

4.2.4 BLE TX 测试

可以使用“ btetf ble_tx -h ”命令获取 BLE TX 测试的使用帮助信息：

```
venus-a3:/# btetf ble_tx -h
```

```
venus-a3:/ # btetf ble_tx -h
btetf ble_tx -h
ble_tx: unrecognized option: h
Usage:
        ble_tx [option] [parameters]
Options:
       [--tx_channel=N] Range:0~39 Frequency Range:2402 MHz to 2480 MHz
       [--len=N] Range:0~37 Length in bytes of payload data in each packet
       [--payload=N] Range:0~7 Type of payload
                     0x00 Pseudo-Random bit sequence 9
                     0x01 Pattern of alternating bits '11110000'
                     0x02 Pattern of alternating bits '10101010'
                     0x03 Pseudo-Random bit sequence 15
                     0x04 Pattern of All '1' bits
                     0x05 Pattern of All '0' bits
                     0x06 Pattern of alternating bits '00001111'
                     0x07 Pattern of alternating bits '0101'
       [--auto] Auto test mode, must connect measuring device first
venus-a3:/ #
```

图 4-11 “btetf ble_tx -h” 命令获取 BLE TX 测试使用帮助

BLE TX 测试需要指定以下参数：

默认参数列表	示例值	备注

channel	1	Channel
len	37	Packet length
payload	0	Data Type

例子: 指定在信道 1 发送 BLE 数据包，包长度 37byte，数据为随机填充。

```
venus-a3:/# btetf -d -i hci0 ble_tx --tx_channel 1 --len 37 --payload 0
```

```
root@TinaLinux:/# btetf -d -i hci0 ble_tx --tx_channel 5 --len 10 --payload 0
btetf -d -i hci0 ble_tx --tx_channel 5 --len 10 --payload 0
ble_tx:tx_channel:5, tx_data_len:10, packet_payload:0
< HCI Command: opcode:(0x201e) ogf-ocf:(0x08-0x001e) plen:(3)
   05 0A 00
> HCI Event: 0x0e plen 4
   05 1E 20 00
```

图 4-12 BLE TX 测试启动示例

4.2.5 BLE TX 测试结束

```
venus-a3:/# btetf -d -i hci0 ble_close
```

```
root@TinaLinux:/# btetf -d -i hci0 ble_close
btetf -d -i hci0 ble_close
< HCI Command: opcode:(0x201f) ogf-ocf:(0x08-0x001f) plen:(0)
> HCI Event: 0x0e plen 6
   05 1F 20 00 00 00
event: 04 0E 06 05 1F 20 00 00 00
status:0x 0
send_or_receive_packet:0
root@TinaLinux:/#
```

图 4-13 BLE TX 测试结束

4.3 BT 单载波测试

可以使用 “ btetf single_tone --help” 命令获取 BLE RX 测试的使用帮助信息：

```
venus-a3:/# btetf single_tone --help
```

```
venus-a3:/ # btetf single_tone --help
btetf single_tone --help
Usage:
        single_carrier [option]
Options:
        [--open channel_num]
        [--power_level level]
        [--close]
Example:
tetf single_tone --opne 0 --power_level 6
```

图 4-14 “btetf single_tone --help” 命令获取蓝牙单载波测试使用帮助

蓝牙单载波测试需要指定以下参数：

默认参数列表	示例值	备注
open	1	channel
power_level	6	Power
close	NULL	close

例子: 指定在信道 1 进行单载波测试，power 使用默认值：

```
venus-a3:/# btetf -d -i hci0 single_tone --open 1
```

例子: 关闭单载波测试：

```
venus-a3:/# btetf -d -i hci0 single_tone --close
```

5 FAQ

5.1 配置测试环境失败

如果配置测试环境失败，请首先按照本文档“2.3 工具正常使用的检查点”进行检查；然后按照以下步骤进行排查。

5.1.1 不能打开串口

双击脚本“ init_test.bat ”进行测试环境配置，出现“Cant't open serial port”问题：

```
adbd is already running as root
remount succeeded
kill_hciattach
adb shell kill -9
Can't open serial port: No such file or directory
Can't initialize device: No such file or directory
```

图 5-1 运行“init_test.bat”脚本出现“Cant't open serial port”问题

请确认“ init_test.bat ”脚本中的 tty 编号是否为蓝牙对应的 tty 编号：

init_test.bat

```
1  @echo off
2  adb root
3  adb remount
4
5  ::kill_hciattach
6  echo kill_hciattach
7      adb shell "ps -A| grep hciattach| busybox awk '{print $2}'" >xrTxtemp.txt
8      for /f  %%i in (xrTxtemp.txt) do (
9      set pid=%%i
10     )
11     echo adb shell kill -9 %pid%
12 del xrTxtemp.txt
13 if "%pid%"=="" (goto start_bt_fw_download)
14 adb shell kill -9 %pid%
15
16 :start_bt_fw_download
17 start "" /b  cmd /c "adb shell hciattach -n ttyS1 xradio &"
18 ping 1.1.1.1 -n 15  > nul
19 echo brom_done
```

图 5-2 确认“init_test.bat”脚本中的 tty 编号

其中，蓝牙对应的 tty 编号可以通过查看 /dev/ 目录获得：

```
crw-------  1 root      root            10,  59 2019-04-28 10:48 sunxi-wlan
crw-------  1 root      root            10,  61 2019-04-28 10:48 sunxi_soc_info
crwxrwxrw-  1 media     mediadrm       250,   0 2019-04-28 10:48 tee0
crwxrwxrw-  1 media     mediadrm       250,  16 2019-04-28 10:48 teepriv0
crw-rw-rw-  1 root      root             5,   0 2019-04-28 10:48 tty
crw-------  1 root      root           247,   0 2019-04-28 10:48 ttyS0
crw-rw----  1 bluetooth net_bt_admin   247,   1 2019-04-28 10:50 ttyS1
crw-rw----  1 system    vpn             10, 200 2019-04-28 10:48 tun
crw-rw----  1 uhid      uhid            10, 239 2019-04-28 10:48 uhid
crw-rw----  1 system    bluetooth       10, 223 2019-04-28 10:48 uinput
crw-rw-rw-  1 root      root             1,   9 2019-04-28 10:48 urandom
drwxrwx---  3 shell     shell                60 2019-04-28 10:48 usb-ffs
crw-rw----  1 root      usb             10,  46 2019-04-28 10:48 usb_accessory
crwxrwx---  1 camera    camera          81,   1 2019-04-28 10:48 v4l-subdev0
crwxrwx---  1 camera    camera          81,   2 2019-04-28 10:48 v4l-subdev1
crwxrwx---  1 camera    camera          81,   3 2019-04-28 10:48 v4l-subdev2
crwxrwx---  1 camera    camera          81,   4 2019-04-28 10:48 v4l-subdev3
crwxrwx---  1 camera    camera          81,   5 2019-04-28 10:48 v4l-subdev4
crwxrwx---  1 camera    camera          81,   6 2019-04-28 10:48 v4l-subdev5
crwxrwx---  1 camera    camera          81,   7 2019-04-28 10:48 v4l-subdev6
crwxrwx---  1 camera    camera          81,   8 2019-04-28 10:48 v4l-subdev7
crwxrwx---  1 camera    camera          81,   9 2019-04-28 10:48 v4l-subdev8
crwxrwx---  1 camera    camera          81,   0 2019-04-28 10:48 video0
crw-rw-rw-  1 root      root            10,  53 2019-04-28 10:48 vndbinder
crw-r--r--  1 root      root            10,  52 2019-04-28 10:48 xt_qtaguid
crw-rw-rw-  1 root      root             1,   5 2019-04-28 10:48 zero
venus-a3:/dev #
```

图 5-3 查看设备上蓝牙对应的 tty 编号

5.1.2 Fail To Load FW 的排查

蓝牙启动过程中首先会进行 Brom sync 波特率同步，如果同步失败，则无法正常加载固件。log 如下（一直在同步）：

```
venus-a3:/ # hciattach -n ttyS1 xradio &
hciattach -n ttyS1 xradio &
[1] 11395
venus-a3:/ # xradio_init
set LPM mode:disabled[userial_sync] uart sync count: 1.
[userial_sync] read buf: 00 00.
[userial_sync] uart sync count: 2.
[userial_sync] read buf: 00 00.
[userial_sync] uart sync count: 3.
[userial_sync] read buf: 00 00.
[userial_sync] uart sync count: 4.
[userial_sync] read buf: 00 00.
[userial_sync] uart sync count: 5.
[userial_sync] read buf: 00 00.
```

图 5-4 Brom 同步失败

可能原因如下：

- 蓝牙固件已加载

首先确认 Android 界面蓝牙处于关闭状态（或确认 Linux 系统蓝牙功能已关闭）；然后检查是否有 hciattch

进程，若存在则表明已进行相关配置，无需重复加载固件。

```
venus-a3:/ # ps -A | grep hciattach

venus-a3:/ # kill -9 PID
```

```
venus-a3:/ # ps -A | grep hciattach
ps -A | grep hciattach
root          3398 27197     900    644 poll_schedule_timeout 0 S hciattach
venus-a3:/ #

venus-a3:/ #

venus-a3:/ # kill -9 3398
kill -9 3398
[1] + Killed                 \hciattach -n ttyS1 xradio
venus-a3:/ #
```

图 5-5 检查蓝牙是否已加载

- 芯片 core 没有 reset

通过“cat /sys/class/rfkill/rfkill0/state”命令查看 BT_RST 电平是否为 1，如图所示：

```
venus-a3:/sys/class/rfkill/rfkill0 # cat state
cat state
1
```

图 5-6 检查芯片 core 是否已 reset

- 芯片没有 wake up

通过“echo 1 > /proc/bluetooth/sleep/btwake”命令进行测试，测试前确认 lpm 处于 enable 状态

```
venus-a3:/proc/bluetooth/sleep # cat btwake
cat btwake
bt wake state:1
```

图 5-7 检查芯片是否 wake up