Qualcomm Technologies, Inc.
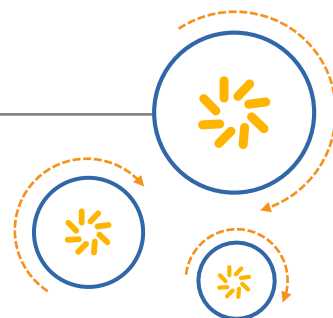
Qualcomm OnDevice Power Dashboard Test Guide

Qualcomm 客户机功耗测试指导手册

80-P1818-1EC A

July 27, 2015

Revision history

Revision	Date	Description
A	Jul 2015	Initial release

Note: There is no Rev. I, O, Q, S, X, or Z per Mil. standards.

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1 Introduction

1.1 Purpose

This document describes the procedures for power dashboard tests on Qualcomm-platform devices.

1.2 Conventions

Function declarations, function names, type declarations, attributes, and code samples appear in a different font, for example, `#include`.

Code variables appear in angle brackets, for example, `<number>`.

Commands to be entered appear in a different font, e.g., `copy a:*.* b:`.

Button and key names appear in bold font, for example, click **Save** or press **Enter**.

Shading indicates content that has been added or changed in this revision of the document.

1.3 Technical assistance

For assistance or clarification on information in this document, submit a case to Qualcomm Technologies, Inc. (QTI) at https://support.cdmatech.com/.

If you do not have access to the CDMATech Support website, register for access or send email to support.cdmatech@qti.qualcomm.com.

2 QC On-Device Power Dashboard

2.1 Test Equipment

Figure 2-1 Power Monitor

2.2 Test Prerequisites

This section outlines the settings that must be applied before performing any multimedia use case procedure.

- The device must be rebooted every time a use case is executed.
- All multimedia use cases must be performed in Airplane mode.
- The software build to be tested must be loaded on the target.
- The USB must not be connected.
- The headset must not be connected.

The settings in Table 2-1 describe the standard UI settings to be applied on the device.

Table 2-1 Standard UI settings

Battery Voltage	4V
Sample rate	5000(Power Monitor)
Test process	Wait for 2mins after screen off and measured as required duration.
Data	Off (Default)
GPS	Off
Wi-Fi	Off
Bluetooth	Off

Battery Voltage	4V
NFC	Off
Auto-rotate screen	Off
Sync	Off
Brightness	Minimal
Volume	1/15
Daydream	Off
Ambient Display	Off
Touch Tones	Off
Stay on plugged	Off
Sensors	Off
Content adaptive backlight	Off

Ensure the Display Brightness is *not* set to auto, e.g., on QTI XPM/MTP(s) it is 102. To check this through the ADB shell, run the following command:

```
cat /sys/class/leds/lcd-backlight/brightness
```

2.3 Test cases and details

Table 2-2 QC On-Device test case

Category	Test Case
Standby	Airplane Mode, rock bottom
	4G live network standby with data service off (single SIM, CMCC TDL;)
	WeChat in 4G live network standby
Talk	GSM Talk in live network (turn off display rotation;)
	TD-SCDMA Talk in live network
Data	4G download 100MB file from 360 cloud disk **(record time to calculate the speed; keep display on and Minimum BL)
Display	Static Image Display, @Fullscreen Resolution, @Vsync
Audio	OFF load mode MP3 Playback 128Kbps_loudspeaker, volume 1/15, SA+ (airplane mode; Display off;)
	NON-OFF load mode MP3 Playback 128Kbps_loudspeaker, volume 1/15, SA+
Video	30fps @ HD 1080p 4Mbps (BP) AAC+ 96kbps 44KHz Stereo
Graphics	3D User Interface, Full Screen Resolution, 30 FPS (PowerLift)
	3D Game, WSVGA, 60 fps (Egypt)
Camcorder	Camcorder(Back)- 1080p_h264_aac
Home screen Pan	Home Screen Pan
Game	Final Fury

3 Test Procedures

3.1 RBSC use case

Preconditions

Perform the following use cases before starting multimedia active use cases:

- RBSC (also referred to as Airplane mode) – Screen is turned off

Power measurement procedure

This procedure assumes that the prerequisite steps and conditions described in Section 2.2 have been followed and are TRUE. If not, ensure that all prerequisites are met before starting.

1. Turn off the device screen and wait 2 min to ensure that the current has stabilized to allow the device to go into Low Power Mode (LPM) or XO shutdown.
2. Take the power measurements.
3. Collect three different measurements on the three different runs. Repeat steps 1 and 2 every time a new measurement is taken.

3.2 4G live net standby with data service off

Preconditions

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case
- The UE is inserted with CMCC 4G SIM, and has camped on 4G (TD-LTE) network.

Power measurement procedure

1. Wait 2 mins after screen off.
2. Measure 3 mins for standby case and save the waveform.
3. Repeat the above steps 3 times.

3.3 WeChat in 4G live network standby

Preconditions

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case
- The UE is inserted with CMCC 4G SIM, and has camped on 4G (TD-LTE) network.

Power measurement procedure

1. Log into the Wechat with test account on the DUT.

2. Wait for 2 mins after screen off.

3. Measure 5 mins for standby case and save the waveform.

4. Repeat above steps 3 times.

3.4 GSM Talk

Preconditions

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case

- The UE is inserted with CMCC 4G SIM, and has camped on 4G (TD-LTE) network.

Power measurement procedure

1. The terminal A initiates a voice call for the main card of terminal B.

2. Terminal B answers the phone.

3. Turn off the terminal screen.

4. Measure the current with the galvanometer.

5. Maintain the voice call, and record the current average.

3.5 TD-SCDMA Talk

Preconditions

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case

- The UE is inserted with CMCC 4G SIM, and has camped on 4G (TD-LTE) network.

Power measurement procedure

1. The terminal A initiates a voice call for the main card of terminal B.

2. Terminal B answers the phone.

3. Turn off the terminal screen.

4. Measure the current with the galvanometer.

5. Maintain the voice call, and record the current average.

3.6 4G download

Preconditions

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case

- The UE is inserted with CMCC 4G SIM, and has camped on 4G (TD-LTE) network.

- Baiduyun v7.8.3 has been installed.

Power measurement procedure

1. Launch Baiduyun and login in with the following account:
   User name: pt017903 password: Abcd1234

2. Select and download `100MB.rar`.

3. Start Measure and save the waveform.

4. Measure until the download is finished and calculate average download speed with download duration as Mbyte/second.

5. Repeat steps 2 through 4 for 3 times

3.7 Static Image Display (LCD04)

Precondition

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case

Power measurement procedure

1. Turn on the screen and wait 30 sec to let the system stabilize.

2. Start power measurement.

3. Collect three different measurements on three different runs. Repeat Steps 1 and 2 every time a new measurement is taken.

4. Calculate the average battery power after 3 runs. Average battery power = (Measurement 1+ Measurement 2+ Measurement 3)/3.

5. MSM™ current contribution can be calculated by removing the LCD, backlight, and touchscreen contributions from the measured average battery power.

3.8 Audio decoding use case (AU4)

3.8.1 Test clip & audio offload mode

Precondition

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case.

1. Power on device.

2. Load the test clip on the device.

The test clip used is AU4, as described below:

Test clip	Description
AU4.mp3	MP3 at 44.1 kHz 128 kbps stereo; see MP3 at 44.1 kHz 128 kbps Stereo Clip for Power Measurements (MH80-VR010-5)

a. Download the clip from https://support.cdmatech.com/.

      b.   Install the clip.

          i   Connect a USB to the device.

          ii   Push the clip to the devices using the following ADB command.

```
adb push <Clip Location>\Au4.mp3 /sdcard0/
```

          iii   Disconnect the USB cable once the installation is complete.

          iv   Reboot the device.

3.   Plug in the headset; the headset calibration is at .1 mW (for FFAs and XPM).

Table 3-1 lists the modes of audio testing available, depending on the chipset and type.

Table 3-1 Audio testing modes

Audio decoding mode	Description	Property to set in build.prop
Compress offload /Tunnel mode	Decoding on ADSP	adb root adb shell setprop audio.offload.disable 0 adb shell getprop | grep off
Non-Offload/Nontunnel mode	Decoding on Krait™	adb root adb shell setprop audio.offload.disable 1 adb shell getprop | grep off

3.8.2 Power measurement procedure

1.   Connect the USB to the device.

2.   Power on device and set correct audio offload mode as above

3.   Once the device boots up, check for the correct property value for audio offload setting and ensure the device is set to the correct audio decoding mode using the following ADB command.

`adb shell getprop audio.offload.disable`

4.   Disconnect the USB from the device.

5.   Wait approximately 2 min to ensure that the current has stabilized.

6.   Play the AU4 clip using the default Android music player.

7.   Adjust the volume from mute so that it is set to 1/15.

8.   Make sure Repeat mode is not selected while playing the clip.

9.   Press the power key to turn off the LCD and backlight.

10. After MP3 playback starts, wait 30 sec and then take the power measurements for 30 sec.

11. Save the waveform and the power measurements.

12. Acquire the power numbers on three different runs; follow Steps 1 to 11 every time a measurement is taken.

13. Calculate the average battery power after 3 runs. Average battery power = (Measurement 1 + Measurement 2 + Measurement 3)/3.

NOTE: The audio decode use case is based on the measurements taken while audio is playing. Therefore, it is advised to avoid taking measurements for the first 5 sec and for the last 5 sec of the audio clip. To compare the power numbers with the published target dashboard numbers, any special sound effects must be disabled to avoid any audio postprocessing.

3.9 Video playback (QTC88)

Precondition

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case.

Power measurement procedure

1. Reboot the device.

2. Load the test clip on the device, e.g., to decode 720p format video, download clip "qtc77."

Available clips for testing are listed in Table 3-2.

Table 3-2 Video playback test clips

Test clip	Description
QTC88.mp4	30 fps at HD 1080p H.264 20 Mbps AAC+ 96 kbps 44 kHz stereo; see 30 fps AT HD 1080p H.264 20 Mbps AAC+ 96 kbps 44 kHz Stereo (QTC88) Clip for MM Power Measurement (MH80-VR010-8)

   a. Download the test clip from https://support.cdmatech.com/login/.

   b. Connect a USB to the device.

   c. On the DOS command prompt using the ADB shell, push the clip to the device:

      adb push <Clip Location>\<Clip> /sdcard0/

   d. Disconnect the USB once done.

   e. Reboot the device.

3. Plug in the headset; the headset calibration is at .1 mW for FFAs and XPM.

4. Play the video clip using the Android Gallery application, *Gallery2.apk*. If the Gallery2.apk application is not installed by default, for QTI MTP/XPM, install the application:

```
adb shell mount -t ext4 -o remount,rw /dev/block/mmcblk0p12 /system
adb shell rm system/app/Gallery2.apk
adb shell rm -rf system/app/Gallery2
adb install -r -d <Gallery2.apk Location>\Gallery2.apk
adb shell sync
```

5. Make sure Repeat mode is *not* selected.

6. When the clip starts playing, adjust the volume to mute and then increase the volume eight times from mute.

7. Video playback must execute in Landscape mode using the *Gallery2.apk* application.

   a. After video playback starts, wait until the progress bar disappears.

   b. Take the power measurement for 30 sec.

    c. Verify that video is being played in Landscape mode on full screen and that autorotation is enabled.

8. Save the waveform and the battery power numbers measured.

9. Get the power number on three different runs. Follow steps 1 to 10 each time a new power measurement is taken.

10. Calculate the average battery power after 3 runs. Average battery power = (Measurement 1 + Measurement 2 + Measurement 3)/3.

11. Remove the LCD, backlight, and touchscreen contributions from the battery power measurement to get the MSM contribution.

NOTE: If the waveforms are not clean, it is possible that some unnecessary daemons are running. Run the following commands to disable some of the processes and see if power is better.

3.10 Graphics PowerLift (QGC23A)

Precondition

Ensure that all prerequisites described in Section 2.2 are met before starting this use case

Power measurement procedure

1. Install Powerlift 3D version 5.2. Download the latest powerlift tool from https://support.cdmatech.com/login/.

    a. Connect the USB to the device.

    b. On the DOS command prompt through the ADB shell, run the following:

```
adb uninstall com.qualcomm.powerlift
adb install <Powerlift location>\PowerLift.apk
adb shell chmod 777 /data/data/com.qualcomm.powerlift
adb shell mkdir /data/data/com.qualcomm.powerlift/files
adb shell chmod 777 /data/data/com.qualcomm.powerlift/files
adb push <Powerlift location>\config.txt
/data/data/com.qualcomm.powerlift/files/config.txt
```

    c. Disconnect the USB.

    d. Reboot the device.

2. Wait approximately 1 min and ensure that the current has stabilized.

3. Ensure that the configuration file has the frame rate set to 30 fps.

4. Go to the main menu and click PowerLift.

5. PowerLift graphics plays in Portrait mode.

6. After PowerLift rendering starts, wait approximately 1 min and take the power measurements for 30 sec.

7. Save the waveform and power numbers.

8. Get the power number on three different runs. Follow steps 1 to 8 each time a new power measurement is taken.

9. Calculate the average battery power after 3 runs. Average battery power = (Measurement 1 + Measurement 2 + Measurement 3)/3.

10. Remove the LCD, backlight, and touchscreen contributions from the battery power measurement to get the MSM contribution.

11. Verify the 3D frame rate at 3

3.11 Gaming Egypt (QGC24A)

Preconditions

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case
- Connect to the device via USB.

Power measurement procedure

1. Reboot the device.

2. After the device boots up, wait 1 min to ensure that the current has stabilized.

3. To start Egypt, go to the main menu and click **GL Benchmark**. Under the performance tests option, select **GLBenchmark 2.X Egypt** (standard). Note that this option is subject to change.

4. After Egypt rendering starts, wait approximately 1 min and take the power measurement for 30 sec.

5. Capture the power numbers.

6. Get the power numbers on three different runs. Follow steps 1 to 7 every time a new power measurement is taken.

7. Calculate the average battery power after 3 runs. Average battery power = (Measurement 1 + Measurement 2 + Measurement 3)/3.

8. Remove the LCD, backlight, and touchscreen contributions from the battery power measurement to get the MSM contribution.

3.12 Home Screen Pan

Precondition

Ensure that all prerequisites described in Section 2.2 are met before starting this use case.

Power measurement procedure

1. System in Airplane mode

2. LCD display = ON,screen timeout set to 30 minutes

3. Minimum Display brightness

4. Go to home screen and pan the home screen for 6 secs and wait for 4secs(Measurement time is 6 secs pan + 4 sec wait)

3.13 Camcorder(Back) 1080p (QMC31)

This section describes the procedure to perform camcorder-1080P video encoding test via rear camera.

Precondition

Ensure that all prerequisites described in Section 2.2 are met before starting this use case.

Power measurement procedure

1. Reboot the device.

2. After boot up, wait 1 min to ensure that the current has stabilized.

3. Plug in the headset and set volume to 8/15; headset calibration is at 1 mW for XPM.

4. Launch the default camera application.

5. Switch to Camcorder mode and apply the settings as shown in **Table 3-3**, which remains after rebooting the phone.

Table 3-3 Camcorder settings

VideoQuality/Resolution	HD 1080p
Video Encoder	H.264
Audio Encoder	AAC
White balance	Incandescent (looks like a bulb)
Resolution	1080p
FlashMode	Disable
Adb shell	
setprop persist.debug.set.fixedfps 30	

NOTE: Recording is done in Portrait mode with the LCD and backlight on.

6. Cover the camera sensor with a black paper.

7. Ensure that recording video is encoding at 30 fps.

8. Start video recording, ensure that it is encoding in Portrait mode, and that the LCD and backlight are on.

9. After video encoding starts, wait approximately 5 sec and then measure power for 30 sec.

10. Save the waveform and the battery power numbers measured.

11. Get the power number on three different runs. Follow Steps 1 to 10 every time a new power measurement is taken.

12. Calculate the average battery power after 3 runs. Average battery power = (Measurement 1+ Measurement 2+ Measurement 3)/3.

13. Remove the LCD, backlight, and touchscreen contributions from the battery power measurement to get the MSM contribution.

14. Verify the FPS of the encoded video after testing. Pull out recording clips and check property of it.

3.14 Game- Final Fury

Preconditions

- Ensure that all prerequisites described in Section 2.2 are met before starting this use case.
- Final Fury installed

Power measurement procedure

1. Power on the device.
2. Enable airplane mode.
3. Launch Game -Final Fury.
4. Tap Left button to enable sound when prompted "Enable sound or not?"
5. Tap screen once to skip animation.
6. Tap to choose female role.
7. Tap anywhere to continue and start the game.
8. Stay on training and leave it alone.
9. Start measuring 2 mins.
10. Quit the Game.
11. Power off the device.

A References

A.1 Related documents

Documents	
Qualcomm Technologies, Inc.	
POWER CONSUMPTION MEASUREMENT PROCEDURE FOR MSM (ANDROID-BASED)/MDM DEVICES	80-N6837-1
30 FPS AT HD 1080P H.264 20 MBPS AAC+ 96 KBPS 44 KHZ STEREO (QTC88) CLIP FOR MM POWER MEASUREMENT	MH80-VR010-8
Standards	
-	-
Resources	
-	-

1 简介

1.1 目的

本文介绍了高通客户机功耗测试的测试步骤。

1.2 约定

函数声明，函数名称，类型声明，属性以及代码举例需要使用不同的字体，例如 `#include`。

代码中的变量应出现在角括号中，例如 `<number>`。

需要输入的命令应使用不同的字体，例如 `copy a:*.* b:`。

按钮和关键字应使用粗体，例如单击 **Save** 或按下 **Enter** 键。

加阴影的文字为本版本中新增或修改的内容。

1.3 技术支持

如需得到与本文相关的帮助或解释，请登录 https://support.cdmatech.com/，向 Qualcomm Technologies, Inc. (QTI) 提交您的问题。

如果您无法登陆 CDMATech 支持服务网站，请注册或发送电子邮件至 support.cdmatech@qualcomm.com 申请权限。

2 高通客户机功耗测试

2.1 测试设备

图 **2-1 Power Monitor**

2.2 测试条件

以下设定适用于所有多媒体相关功耗测试

- 每个测试循环必须重启
- 多媒体相关测试需在飞行模式下进行
- 更新正确的软件版本
- 断开连接
- 不要连接耳机

表 2-1 列出了测试机标准设定项

表 **2-1 标准 UI 设置**

设定项	设置值
输出电压	4V
采样频率	5000 次(Power Monitor)
测试步骤	熄屏后等待 2 分钟然后根据用例要求测量不同的时长
数据	关闭
GPS	关闭
WLAN	关闭

设定项	设置值
蓝牙	关闭
NFC	关闭
自动转屏	关闭
同步	关闭
亮度	最低(Brightness： ~10)
音量	最低(参考值：1/15)
互动屏保	关闭
主动显示	关闭
触摸提示音	关闭
Stay on plugged	关闭
传感器	关闭(Qualcomm Settings)
自动调节亮度	关闭(Qualcomm Settings)

确保"自动调节亮度"已关闭，亮度设为最低(亮度参考值：10，不同厂商定义可能不
同)，可通过以下命令检查确认

```
cat /sys/class/leds/lcd-backlight/brightness
```

2.3 测试用例

表 **2-2** 高通客户机功耗测试用例

Category	Test Case
Standby	Airplane Mode, rock bottom
	4G live network standby with data service off (single SIM, CMCC TDL;)
	WeChat in 4G live network standby
Talk	GSM Talk in live network (turn off display rotation;)
	TD-SCDMA Talk in live network
Data	4G download 100MB file from 360 cloud disk **(record time to calculate the speed; keep display on and Minimum BL)
Display	Static Image Display, @Fullscreen Resolution, @Vsync
Audio	OFF load mode MP3 Playback 128Kbps_loudspeaker, volume 1/15, SA+ (airplane mode; Display off;)
	NON-OFF load mode MP3 Playback 128Kbps_loudspeaker, volume 1/15, SA+
Video	30fps @ HD 1080p 4Mbps (BP) AAC+ 96kbps 44KHz Stereo
Graphics	3D User Interface, Full Screen Resolution, 30 FPS (PowerLift)
	3D Game, WSVGA, 60 fps (Egypt)
Camcorder	Camcorder(Back)- 1080p_h264_aac
Home screen Pan	Home Screen Pan
Game	Final Fury

3 测试步骤

3.1 RBSC/底电

预置条件

测多媒体亮屏用例前先测底电:

- RBSC (飞行模式下) – 熄屏

测试步骤

- 测试之前请确认 2.2 所列测试条件均已正确设定。
1. 将屏幕熄屏 2 分钟以使测试机进入低功耗模式或者 XO 关闭
2. 开启测量 30s
3. 重开机重复步骤 1~2，重复测试 3 次

3.2 4G网络待机(数据关)

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定
- 插入中国移动 4G 卡 并确保 驻留 4G TD-LTE 网络

测试步骤

1. 将屏幕熄屏 2 分钟以使测试机进入低功耗模式或者 XO 关闭
2. 开启测量 3 分钟
3. 重开机重复步骤 1~2，重复测试 3 次

3.3 微信4G待机

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定
- 插入中国移动 4G 卡 并确保 驻留 4G TD-LTE 网络

测试步骤

1. 用测试账号在测试机上登录微信 (提示：账号不可共享使用)

2. 将屏幕熄屏 2 分钟以使测试机进入低功耗模式或者 XO 关闭

3. 开启测量 270 秒

4. 重开机重复步骤 1~3，重复测试 3 次

3.4 2G 通话

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定

- 插入中国移动 4G 卡 并确保 驻留 4G TD-LTE 网络

测试步骤

1. 测试机拨打自动接听热线电话(无操作能保持通话 2 分钟以上，如 95518）

2. 将屏幕熄屏 2 分钟以使测试机进入低功耗模式或者 XO 关闭

3. 开启测量 30 秒

4. 重开机重复步骤 1~3，重复测试 3 次

3.5 3G通话

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定

- 插入中国移动 4G 卡 并确保 驻留 TD-SCDMA 网络(不支持移动网络机型驻留 WCDMA 或 CDMA)

测试步骤

1. 测试机拨打自动接听热线电话(无操作能保持通话 2 分钟以上，如 95518）

2. 将屏幕熄屏 2 分钟以使测试机进入低功耗模式或者 XO 关闭

3. 开启测量 30 秒

4. 重开机重复步骤 1~3，重复测试 3 次

3.6 4G下载

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定
- 插入中国移动 4G 卡 并确保 驻留 TD-SCDMA 网络(不支持移动网络机型驻留 WCDMA 或 CDMA)
- 百度云 v7.8.3 已安装并用测试账号登录 账号: pt017903 密码: Abcd1234

测试步骤

1. 开机后熄屏 2 分钟以使测试机进入低功耗模式或者 XO 关闭
2. 启动百度云并登录
3. 选择并下载 100MB.rar
4. 等待 5 秒后开启测量 30 秒，并记录下载速率 Mbyte/second
5. 重开机重复步骤 1~4，重复测试 3 次

3.7 亮屏待机 (LCD04)

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定
- 设休眠时间为 30 分钟

测试步骤

1. 开机后熄屏 2 分钟以使测试机进入低功耗模式或者 XO 关闭
2. 点亮屏幕
3. 开启测量 30 秒
4. 重开机重复步骤 1~3，重复测试 3 次，计算平均值

3.8 音乐播放 (AU4)

3.8.1 音频文件及Offload模式设定

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定
- 开机，复制以下音频文件到测试机机身存储

测试文件参数如下:

文件名称	详情
AU4.mp3	MP3 at 44.1 kHz 128 kbps stereo; see MP3 at 44.1 kHz 128 kbps Stereo Clip for Power Measurements (MH80-VR010-5)

a. 文件可从以下网址下载 https://support.cdmatech.com/.

b. 复制音频文件

　i　通过 USB 连接手机到 PC.

　ii　执行以下命令 push 测试文件到测试机

```
adb push <Clip Location>\Au4.mp3 /sdcard0/
```

　iii　完成后断开 USB

　iv　重启测试机

表 3-1 列出了不同音频模式如下, 根据芯片及客户设计不同可能会有差异。

表 3-1 音频测试模式

音频解码模式	描述	Build.prop 属性设置
Compress offload /Tunnel mode	Decoding on ADSP	adb root adb shell setprop audio.offload.disable 0 adb shell getprop | grep off
Non-Offload/Nontunnel mode	Decoding on Krait™	adb root adb shell setprop audio.offload.disable 1 adb shell getprop | grep off

3.8.2　测试步骤

1. 开机后通过 USB 连接手机到电脑

2. 根据表 3-1 设定正确的音频播放模式并用以下命令查看确认

3. adb shell getprop audio.offload.disable

4. 断开 USB 连接

5. 熄屏 2 分钟以使测试机进入低功耗模式或者 XO 关闭

6. 调整音量至最低

7. 确保未开启循环播放

8. 通过安卓原生 Music 播放器播放 AU4 音频文件

9. 按关机键熄屏等待 30s

10. 开启测量 30 秒

11. 重开机重复步骤 1~3，重复测试 3 次，计算平均值

说明：   音频播放功耗侧重播放行为本身，需避免测量播放前 5 秒和最后 5 秒。为和高通所发布的
功耗数据做对比，需要关闭所有的声效等后期音频处理.

3.9 视频播放(QTC88)

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定
- 开启手机拷贝以下测试视频文件到手机如表 3-2 所示

表 3-2 视频播放测试文件

文件名称	详情
QTC88.mp4	30 fps at HD 1080p H.264 20 Mbps AAC+ 96 kbps 44 kHz stereo; see 30 fps AT HD 1080p H.264 20 Mbps AAC+ 96 kbps 44 kHz Stereo (QTC88) Clip for MM Power Measurement (MH80-VR010-8)

a.   测试文件可从以下网址下载 https://support.cdmatech.com/.

b.   复制音频文件.

c.   如果测试机无安卓原生 Gallery2 应用，如下重新安装 Gallery2.apk

   i   adb shell mount -t ext4 -o remount,rw /dev/block/mmcblk0p12 /system

   ii   adb shell rm system/app/Gallery2.apk

   iii adb shell rm -rf system/app/Gallery2

   iv   adb install -r -d <Gallery2.apk Location>\Gallery2.apk

   v   adb shell sync

测试步骤

1. 重开机并启动 Gallery2 应用
2. 确保循环播放未开启
3. 设定最低音量播放（调整静音之后按音量上键一次）
4. 熄屏 2 分钟以使测试机进入低功耗模式或者 XO 关闭
5. 视频播放必须在横屏模式全屏播放，播放开始后等待进度条自动隐藏
6. 开始测量 30 秒.
7. 重复步骤 1~6，重复测量三次并计算平均值

3.10 Graphics PowerLift (QGC23A)

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定

- 安装 Powerlift 3D version 5.2. 可从以下网址下载 powerlift 工具 https://support.cdmatech.com/login/.

    a. 连接手机到 PC

    b. 执行一下指令安装 Powerlift

    ```
    adb uninstall com.qualcomm.powerlift
    adb install <Powerlift location>\PowerLift.apk
    adb shell chmod 777 /data/data/com.qualcomm.powerlift
    adb shell mkdir /data/data/com.qualcomm.powerlift/files
    adb shell chmod 777 /data/data/com.qualcomm.powerlift/files
    adb push <Powerlift location>\config.txt
    /data/data/com.qualcomm.powerlift/files/config.txt
    ```

    c. 确保配置文件 config.txt 已成功拷贝到测试机中

    ```
    adb shell ls <Powerlift location>
    ```

测试步骤

1. 熄屏 1 分钟以使测试机进入低功耗模式或者 XO 关闭

2. 打开 PowerLift 应用

3. PowerLift 运行在竖屏模式.

4. 等待 1 分钟后，测量 30 秒.（测试过程中帧率保持在 30FPS）

5. 重复步骤 1~4，重复测量三次并计算平均值

3.11 3D游戏(QGC24A)

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定

- 安装 GLBenchmark_2.5.1_b306a5 APK

- Push 配置文件到手机

```
adb push  2_5_power_F86671_60fps.xml
/sdcard/Android/data/com.glbenchmark.glbenchmark25/cache/2_5_tests_corp.xml
```

- 检查配置文件

```
adb shell ls /sdcard/Android/data/com.glbenchmark.glbenchmark25/cache/
```

测试步骤

1. 重启手机后熄屏 1 分钟以使测试机进入低功耗模式或者 XO 关闭

2. 启动 GL Benchmark 测试程序，选择"Performance Tests"-Start

3. 等待 1 分钟，然后测量 30 秒

4. 重复步骤 1~3，重复测量三次并计算平均值

3.12 划屏功耗

预置条件

测试之前请确认2.2所列测试条件均已正确设定

测试步骤

1. 开启飞行模式

2. 设置休眠为 30 分钟，亮度最低

3. 重启手机，开机后熄屏 1 分钟以使测试机进入低功耗模式或者 XO 关闭

4. 点亮屏幕

5. 开始测量

6. 在主画面长按从左向右慢慢拖动，连续划 6 秒，翻入下一页，等待 4s

7. 重复步骤 6 直到测量 60s

8. 重复步骤 3~7，重复测量三次并计算平均值

3.13 1080P录像(主摄像头)

预置条件

■ 测试之前请确认 2.2 所列测试条件均已正确设定

■ 通过后置摄像头测试，用黑色纸遮盖摄像头镜头，预览画面为全黑

测试步骤

1. 重启手机，开机后熄屏 1 分钟以使测试机进入低功耗模式或者 XO 关闭

2. 启动骁龙相机

3. 切换到录像模式 并设定如表 3-3。

表 **3-3** 录像设定

设定项	设定值
视频画质	HD 1080p
视频编码	H.264
音频编码	AAC
白平衡	白炽灯
闪光灯模式	关
视频高帧率	关闭
Adb shell setprop persist.debug.set.fixedfps 30	

NOTE: 竖屏下录像

4. 确保摄像头镜头已用黑色纸遮盖

5. 启动录像

6. 等待 5 秒钟，启动测量 30 秒

7. 重复步骤 1~5，重复测量三次并计算平均值

8. 拷贝出录像文件，通过属性检查确认录像帧率(29~30fps)

3.14 第三方游戏功耗

预置条件

- 测试之前请确认 2.2 所列测试条件均已正确设定

- 游戏枪火战线已安装

测试步骤

1. 重启手机，开机后熄屏 1 分钟以使测试机进入低功耗模式或者 XO 关闭

2. 启动游戏枪火战线

3. 是否开启音效-"是"

4. 点击屏幕跳过动画

5. 点击选择左边人物(女角色)

6. 点击任意一点开始游戏

7. 停留在训练界面

8. 开始测量 2 分钟

9. 重复步骤 1~8，重复测量三次并计算平均值

A 参考信息

A.1 参考文档

文档	
Qualcomm Technologies, Inc. (QTI)文档	
POWER CONSUMPTION MEASUREMENT PROCEDURE FOR MSM (ANDROID-BASED)/MDM DEVICES	80-N6837-1
30 FPS AT HD 1080P H.264 20 MBPS AAC+ 96 KBPS 44 KHZ STEREO (QTC88) CLIP FOR MM POWER MEASUREMENT	MH80-VR010-8
标准	
-	-
资源	
-	-