



MSM8974 Linux Android™ Current Consumption Data

80-NA437-7 Y

August 21, 2014

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Revision history

Revision	Date	Description
A	Aug 2012	Initial release
B	Sep 2012	Updated power tree information; minor updates to test definitions and commercial software release top-level current consumption targets
C	Oct 2012	Updated Chapters 2, 3, and 4; removed Chapter 5
D	Nov 2012	Updated Chapter 4
E	Dec 2012	Updated Tables 3.1 and 4.1
F	Feb 2013	Updated Section 1.9, Figure 2-1, and Table 4-1
G	Feb 2013	Updated Section 4.2
H	Mar 2013	Updated Table 4-1
J	Apr 2013	Updated Chapter 4
K	Apr 2013	Updated Table 4-2; added Tables 4-13 through Table 4-20
L	May 2013	Updated Sections 1.9 and 2.2 and Tables 3.1, 4.1, and 4.2
M	May 2013	Updated Table 4-2
N	Jun 2013	Updated Tables 3-1, 4-1, and 4-2
P	Jun 2013	Updated Tables 3-1, 4-1, and 4-2
R	Jun 2013	Updated Table 3-1 and Table 4-1; numerous changes in Section 4.3
T	Jul 2013	Updated Table 4-1 and Table 4-2
U	Nov 2013	Updated Section 4.1, Tables 1-2 and 4-2
V	Jan 2014	Updated Section 4.1
W	Feb 2014	Updated Table 3-1
Y	Aug 2014	Added Section 1.8.1 and Section 1.8.2

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

1 Introduction

1.1 Purpose

This document provides current consumption data for the MSM8974 device with AMSS 8974 software. The consumption is highly dependent on software optimization.

NOTE: Multiple MSM™ chipsets are addressed in this document, i.e., MSM8974, MSM8674, and MSM8274 devices. When the material being presented applies equally to all, they are jointly referred to as the MSM8x74 device.

This document is intended for engineers who are currently using or are planning to use MSM8x74 devices and/or AMSS 8974 software.

1.2 Expectations

1.2.1 Device variation

The current consumption measurements recorded in this document are not expected to match the current consumption measurements of a customer design. They are also not expected to exactly match the current consumption measurements of another CDP of identical part numbers loaded with identical software.

Variations in measurement when compared to the customer device are caused by the CDP using different components than the customer design, e.g., memory ICs, display ICs, peripheral ICs, etc. Potential variations in measurement when compared to an identical CDP loaded with identical software are caused by normal silicon process variations in both the Qualcomm Technologies, Inc. (QTI) and non-QTI components and power-supply tolerances. Any differences in measurement technique, equipment, or temperature will also cause variations. Other factors, e.g., floating CMOS inputs or taking measurements at maximum Tx power, can affect both the reliability and repeatability of current consumption measurements.

The targets and measurements contained herein are typical values measured on a single CDP in a lab bench environment (room temperature). They are provided as a relative reference point, not as an absolute goal to attain.

1.2.2 Test case selection

The test cases selected for measurement in this document are intended to provide a wide range of coverage. Although the specific conditions a customer needs may not appear in this list, generally there is a test case or combination of test cases that is close enough to the customer requirement to be used for a baseline comparison.

1.3 Customer platform power optimization

Customer platform power optimization is best started with comparisons to the QTI platform under one or more baseline test conditions given in this document. When the customer platform and CDP8974 platform are compared and optimized in this known test case, then the differences between baseline and required test cases can be measured on the customer platform and analyzed with QTI for optimization, if necessary.

Power optimization of a customer platform is an iterative process. The process involves:

- Identifying power consumption differences between a customer platform and QTI platform in similar test conditions
- Determining the source of those differences; these could be test conditions, hardware configuration differences, software control differences, etc.
- Deciding whether the source is an error that must be corrected, or is intentional
- Correcting errors that are identified
- Repeating until all differences are corrected or determined to be intentional

As customers update their hardware platform or integrate new software releases from QTI, power consumption may change, triggering additional power optimization. It is important to understand that during the software development process, current consumption for some test cases may increase, as power improvement features may need to be delayed to a later release to meet stability requirements. Figure 1-1 is an example of customer power consumption vs CDP power consumption.

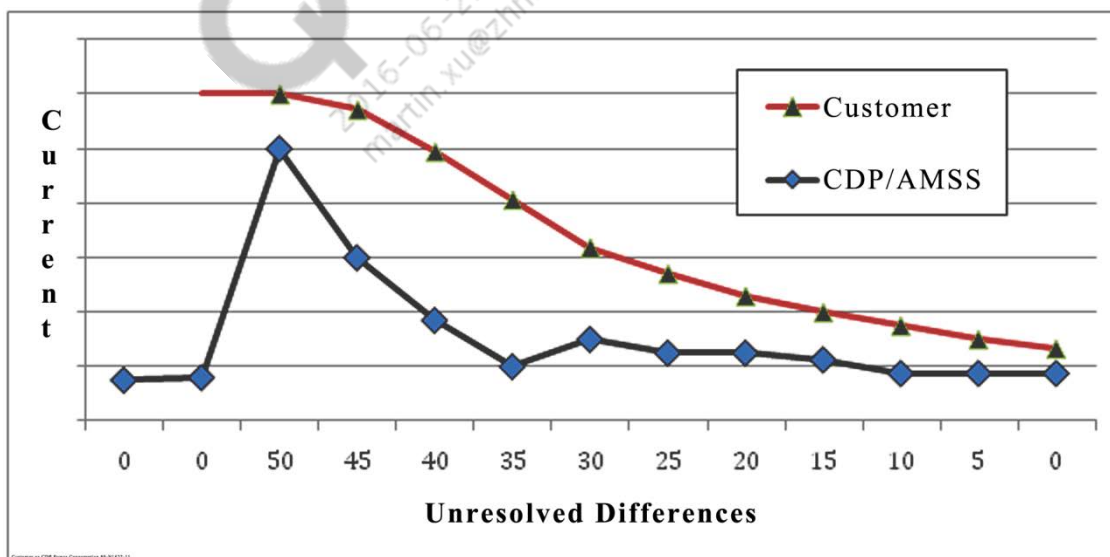


Figure 1-1 Representation of customer vs CDP power consumption

When discussing power optimization with QTI, try to provide as much information as possible, including:

- Specific test conditions
- Available history of power measurements for these test conditions
- Goals for power optimization

- Recent hardware or software changes that may have affected power consumption
- Power consumption breakdown per voltage rail, if possible

1.4 Publication timeline for power measurement data

This document will be updated approximately monthly with the latest available current consumption goals and battery-level measurements. Following the Feature Complete (FC) software release, key power rail breakdowns will be included as they become available. Measurement of these power rail breakdowns depend upon customer requests for specific test cases and software releases. Table 1-1 lists the publication timeline for current consumption data.

Table 1-1 Timeline for publishing current consumption data

Information provided	Guideline for availability
Target current consumption for commercial software release	Available at the time of hardware engineering samples
Battery-level measured values for Table 3-1 test cases	Available for FC software release and for each software release thereafter; these measurements can also be found within the software release notes
Key power rail breakdowns for Table 3-1 test cases	Provided on an as-requested basis for FC and later software releases; submit requests at https://support.cdmatech.com

1.5 GPIO configuration

To minimize current consumption, the user must configure any and all unused GPIOs in one of two ways:

- As outputs in their logic low state
- As inputs with their internal pull-downs enabled

In addition, any GPIO pin configured as an input that is normally driven by a peripheral device, e.g., Bluetooth® (BT), WLAN, NFC, etc. must be programmed with an internal pull-down when the corresponding peripheral signal is set to its high impedance state. The GPIO should then be reprogrammed to remove the pull-down when the peripheral signal is taken out of its high impedance state.

These steps are required to prevent unwanted oscillation or high current leakage on the device's pins. For additional information, see [Q6].

1.6 Conventions

Function declarations, function names, type declarations, and code samples appear in a different font, e.g., #include.

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

1.7 References

Reference documents are listed in [Table 1-2](#). Reference documents that are no longer applicable are deleted from this table; therefore, reference numbers may not be sequential.

Table 1-2 Reference documents and standards

Ref.	Document	
Qualcomm Technologies		
Q1	Application Note: Software Glossary for Customers	CL93-V3077-1
Q2	MSM8274/MSM8674/MSM8974 Device Specification	80-NA437-1
Q3	MSM8274/MSM8674/MSM8974 Software Interface	80-NA437-2
Q4	MSM8274/MSM8674/MSM8974 Device Revision Guide	80-NA437-4
Q6	Configuration of Input Pins During Device Sleep	80-VN499-7
Q7	EXE, PowerLift 3D OpenGL ES Graphics Benchmark Tool V.4.6.01 for Linux Android™-Enabled Devices	72-N5481-1
Q8	EXE, IBENCH V.4.6.01 for Linux Android™-Enabled Devices	72-N7696-1

1.8 Technical assistance

For assistance or clarification on information in this document, submit a case to QTI at <https://support.cdmatech.com/>.

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

1.8.1 Submitting core modem power consumption measurement requests

NOTE: This section was added to this document revision.

To submit a request for a power measurement not currently found in this document, open a Wireless Device Support Case at <https://support.cdmatech.com>. The following information must be included in the case:

- Correct chipset, AMSS build ID, and Operating System (OS)
- Initial problem type – Software
- Problem area 1 – BSP/HLOS
- Problem area 2 – Power(BSP/HLOS)
- Problem area 3 – Customer-appropriate selection
- Problem Description field – Include battery level or breakdown and test case

Priority is given to standard test cases, as listed in [Table 3-1](#), and can typically be provided within one week. Requests for nonstandard test conditions are evaluated on a case-by-case basis.

1.8.2 Submitting multimedia power consumption measurement requests

NOTE: This section was added to this document revision.

To submit a request for a multimedia power measurement not currently found in this document, open a Wireless Device Support Case at <https://support.cdmatech.com>. The following information must be included in the case:

- Correct chipset, AMSS software build ID, and OS
- Initial problem type – Software
- Problem area 1 – Multimedia
- Problem area 2 – Power
- Problem area 3 – Customer-appropriate selection
- Problem Description field – Include battery level or breakdown and test case

Priority is given to standard test cases, as listed in [Table 3-1](#), and the measurement can typically be provided within one week. Requests for nonstandard test conditions are evaluated on a case-by-case basis.

1.9 Acronyms

For definitions of terms and abbreviations, see [Q1].

2 Test Setup

2.1 Devices used for testing

The following hardware and software configurations are used for the measurements:

- MSM8x74 device and the two PMIC devices, PM8941 and PM8841, installed on the specially configured CDP8974 evaluation platform, for power measurement purposes only; the memory configuration is interleaved 2 GB (2x2x512 MB) LPDDR3
- Various AMSS 8974 software releases as defined throughout this document, along with the current consumption data presented
- Display resolution used is 720 HD DSI (1280x768).
- All current consumption measurements are performed using the QTI Xerxes tool.

Table 2-1 lists the chipset's device revisions used on the CDP8974 power measurement platform for each set of tests. Throughout this document, the phrase *MSM8x74chipset* means this particular combination of devices.

Table 2-1 Chipset ICs tested

QTI IC	PRR code*
MSM8x74	Not applicable
PM8941 and PM8841	Not applicable

*Because measured values are not available at the time of this document release, PRR codes are not applicable.

2.2 Air interface test equipment

Chipset current consumption is measured with the MSM8974 platform configured for an air interface operating in a specific mode. The tested modes are defined in Chapter 3. The test equipment used to emulate the air interface is:

- Most CDMA measurements – Agilent 8960 Wireless Communications Test Set
- Most LTE measurements – Anritsu MT8820C
- Most WCDMA measurements – Agilent 8960 or the Anritsu MT8820C Radio Communication Analyzer
- Most GSM measurements – Agilent 8960 or Anritsu MT8820C



3



3 Test Definitions

Definitions of test conditions, i.e., air interface configuration, multimedia, display activity, lighting status, etc., for the current consumption tests are listed in [Table 3-1](#).

Table 3-1 Test definitions

Test case	Code	Operating band	Definition
Airplane mode	AIR1		Airplane mode selected through UI; if no UI support, configure modem in Low Power mode with no wakeups for paging processing; backlight and display off
WCDMA standby 2.56 sec	WS1	IMT	WCDMA idle, Stationary A, Discontinuous Receive (DRX) 2.56 sec, RxAGC at phone ~ -50 dBm, duration 64 sec; Sintrasearch (intrafrequency) and Sintersearch (interfrequency) CPICH $E_d/I_0 < -10$ dB; backlight and display off
WCDMA talk +0 dBm, IMT	WT1	IMT	WCDMA AMR voice, muted, empty frames on UL and DL, total Tx 0 dBm, RxAGC at phone ~ -50 dBm, IMT, no Receive Diversity (RxD); backlight and display off
CDMA QPCH standby 5.12 sec	CS2	Cell	CDMA QPCH Standby mode, SCI = 2 (5.12 sec), RxAGC at phone ~ -50 dBm, single sector, no neighbors; cell band; backlight and display off
CDMA talk +0 dBm, cell band	CT1	Cell	CDMA Only mode, muted, empty frames on UL and DL, total Tx = 0 dBm, RxAGC at phone ~ -50 dBm, EVRC RC3 full rate, no headset, cell band; backlight and display off
GSM standby 1.18 sec	GS1	PGSM	GPRS standby, MFRM5 [1.17 sec], RxAGC at phone ~ -50 dBm, PGSM, no neighbor, duration 59 sec; backlight and display off
GSM talk 5 dBm, no Discontinuous Transmit (DTX), PGSM	GT1	PGSM	GSM full-rate voice, muted, DTX off, empty frames on UL and DL, total Tx = 5 dBm, RxAGC at phone ~ -50 dBm, PGSM, 100% voice activity; backlight and display off
LTE standby 2.56 sec	LS1	Band 13	LTE Standby mode, DRX = 2.56 sec, RxAGC at phone ~ -50 dBm, no neighbors, duration 64 sec; backlight and display off
SVLTE Cat 2 (50 Mbps, + 0 dBm, B13) and 1X voice	L2CT1E	Band 13	LTE data socket DL Cat 2 – 2x2 MIMO, RB 50, MCS 28, 64 QAM, CP normal; PCFICH 3 sym, DCI 1A, type 0, PHICH 1/6, Tx = 0 dBm, RxAGC at phone ~ -10 MHz bandwidth + CDMA Active mode, muted, empty frames on UL and DL, total Tx = 0 dBm, RxAGC at phone ~ -50 dBm, EVRC RC3 full rate, no headset, cell band; backlight and display off

Test case	Code	Operating band	Definition
HSDPA DL 7.2 Mbps + 0 dBm, IMT (RxD/no RxD)	HS22E /HS21E	IMT	HSDPA embedded, data socket initiated through the UI, DL 7.2 Mbps, FTP, Tx = +0 dBm, no USB, RxD on/RxD off
HSDPA DC 42 Mbps + 0 dBm, IMT (RxD)	HS62E	IMT	HSPA+ Cat 24 data socket initiated through the UI, dual-carrier [42 Mbps], UDP, 64 QAM, RxD on, IMT band
LTE Cat 3 (68/23 Mbps, + 0 dBm, B13)	LTE1E	Band 13	LTE data Cat 3, 2x2 MIMO, RB 50, MCS 28, 64 QAM, CP normal; PCFICH 3 sym, DCI 1A, type 0, PHICH 1/6, Tx 0 dBm, DL spectrum bandwidth 10 MHz; backlight and display off; embedded
LTE Cat 3 (100/50 Mbps, 0 dBm, B7)	LTE6E	Band 7	
LTE Cat 4 (150/50 Mbps, 0 dBm, B7)	LTE7E	Band 7	
LTE Cat 3 CA 10+10 (100/25 Mbps, 0 dBm, B4+B17, Tx B17)	LTE8E	Band 4, 17	
TD-SCDMA standby 1.28 sec	TCS1	Band 39	TD-SCDMA idle stationary A, DRX 1.28 sec, Rx power level -50 dBm at phone antenna connector, test duration 64 sec; Sintrasearch (intrafrequency) and Sintersearch (interfrequency) CPICH E_c/I_0 is ~ -15 dB; backlight and display off
TD-SCDMA talk 0 dBm, B34	TCT1	Band 34	TD-SCDMA voice, muted, empty frames on UL and DL, total Tx 0 dBm, Rx power level -50 dBm at phone antenna connector, IMT [B1]; backlight and display off
EV-DO DL 3.1 Mbps + 0 dBm, cell, RxD off	DD2E	Cell	EV-DO data DL at 3.1 Mbps [Rev A], 0 dBm on UL, single carrier, Tx 0 dBm. RxD disabled; cell band, with USB, cell power or I_{or} = -45 dBm, with rake receiver
VoLTE talk 0 dBm 50% DTX, 40 ms CDRx, SPS	VoLTE1	Band 5	Embedded LTE AMR-WB full-rate voice, Tx power 0 dBm, LTE 10 MHz bandwidth, 40 ms CDRx, HARQ 4; SPS scheduling in UL and DL, 40% voice activity + 40% listen state + 20% silent state; backlight and display off, on-duration of 2 ms; inactivity timer of 2 ms 1. Average the power over three runs a. First run with 0% voice activity (play 100% VA file in the remote device, mute local device) b. Second run with 100% voice activity (mute remote device, play 100% VA file in the local device) c. Third run with 0% activity with both devices (mute remote device and local device)
MP3 playback 128 kbps TM	AU4A	IMS	MP3 at 44.1 kHz 128 kbps stereo
Video decode (H.264 720p, 30 fps)	QTC77A	IMS	30 fps at HD 720p H.264 10 Mbps AAC + 96 kbps 44.1 kHz stereo
Video decode (H.264 30 fps 1080p, 20 Mbps)	QTC88A	IMS	30 fps at HD 1080p 20 Mbps AAC+ 96 kbps 44 kHz stereo

Test case	Code	Operating band	Definition
Video encode (H.264 30 fps 1080p, 20 Mbps)	QMC31A	IMS	<p>30 fps at HD 1080p 20 Mbps normal power encode, AAC 128 kbps 44.1 kHz stereo</p> <ol style="list-style-type: none"> 1. In the Camcorder settings menu, set the setting to 1080p resolution, H.264 encoding, ZSL on, and ACC audio. 2. Insert the USB and run the following command at the command prompt. Reboot the phone. This is done one time. <pre>adb shell setprop persist.audio.handset.mic analog adb shell setprop persist.camera.mem.usecache 0 adb shell sync adb reboot</pre> <ol style="list-style-type: none"> 3. Turn off AWB stats. To do this, in the camcorder preview screen, press Settings (the white circle in the lower right corner of the screen). From the pop-up menu, ensure that instead of AW, the icon that looks like a light bulb is selected. 4. Via the Camera app, set encode to Normal Power Encode. 5. Make sure fps is 30.
Graphics (3D UI full screen resolution, 30 fps (PowerLift))	QGC23A	IMS	3D user interface, full screen resolution, 30 fps (PowerLift) (see the video in [Q7])
3D gaming (Egypt GLB 2.1.1), 60 fps	QGC24A	IMS	<p>GLB2.1 Egypt, scene57, at VSync, at full screen resolution; Airplane mode, display on, Full Screen mode, fps (full speed, capped by platform VSync)</p> <p>Note: It is expected that every platform yields differing power results. These results are a function of LCD intensity, serial interface, display resolution, and fps.</p>
Static image display	LCD04A	IMS	Static image display, at full screen resolution, at VSync
Browser over Wi-Fi	WB1A	Wi-Fi	Loading and rendering of low-complexity web page (no JavaScript, no Flash), reload every 40 sec (see the video in [Q8])
Video streaming over Wi-Fi	VS6A	Wi-Fi	Video streaming over Wi-Fi (720p 2.3 Mbps)
GPS 1 Hz Trk (DPO) with WCDMA standby	GPS2	IMT	GPS standalone 1 Hz tracking (DPO); GPS standalone 1 Hz tracking in strong signal conditions; backlight and display off
GNSS 1 Hz Trk high sensitivity with WCDMA standby	GNSS1	IMT	GLONASS standalone 1 Hz tracking high sensitivity; backlight and display off
BT (page scan + sniff) with WCDMA standby	BT2	IMT	Bluetooth headset bonded, connected, and UE accepting other Bluetooth connection requests; Bluetooth sniff cycle 1.28 sec and page scan cycle of 1.28 sec; backlight and display off

Test case	Code	Operating band	Definition
WLAN DTIM1 with WCDMA standby	WLS1	IMT	<ol style="list-style-type: none"> 1. Turn on Airplane mode. 2. In the config file, Listen Interval = 100 ms and BET is enabled. 3. Turn on Wi-Fi and connect to the AP. 4. Turn off the display. <p>Note: Measurement should be in a shielded environment.</p>
Accelerometer background processing at 10 Hz	SNS5A	—	<p>Accelerometer 10 Hz background processing:</p> <ul style="list-style-type: none"> ▪ Triggered via a QXDM Professional™ command followed by disconnecting the USB, or in the future with an apps trigger ▪ LPASS wakes up every 10 Hz, samples the accelerometer, gets accelerometer data into sensors SRAM, and goes back to sleep <p>This use case is analogous to predomometer, motion classifier use cases.</p>
Accelerometer active processing at 15 Hz	SNS4A	—	<p>Accelerometer 15 Hz active processing:</p> <ul style="list-style-type: none"> ▪ An app on LA registers for accelerometer data at 15 Hz rate and gets the report without any UI update ▪ Baseline assumption (static image) – UI on, static image on the display, Airplane mode ▪ Hexagon wakes up every 15 Hz, samples the accelerometer, and sends the report to an app in the apps processor at 15 Hz; the data goes all the way to the HAL callback but does not update the UI <p>This use case is analogous to an auto-rotate use case that uses an accelerometer sampling rate of 15 Hz.</p>

Note: All test codes ending in A were performed in Airplane mode.

4 Chipset Current Consumption

4.1 Commercial software release target values – Top level

Commercial software release target values are predictions of current consumption for the first commercial-quality software release for an OS. These targets *will not be updated* after the commercial software is released.

Commercial software release target values for operational modes defined in Table 3-1 are listed in Table 4-1. These values reflect optimized hardware and software configurations. These values are normalized to a 3.7 V supply voltage.

The power ranges shown below are the projected power distribution across approximately 50 to 95% of the device population. Devices that fall outside this range are to be expected; therefore, RMA decisions must not be based on the results of power measurements described in this document. (Legitimate candidates for power consumption RMAs require devices that violate the maximum power specifications provided in [Q2]).

NOTE: 28 nm manufacturing process variation across parts and foundries leads to a power distribution. The exact shape and median of this distribution is expected to vary over time with the maturing of the 28 nm process across foundries.

Table 4-1 Commercial software release top-level current consumption targets

	Test case	Code	MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x720) estimated power range goal (mA)	MSM8974 WTR1625 + WFR1620 2x2x512 MB LPDDR3 720HD DSI (1280x720) estimated power range goal (mA)	MSM8974 WTR1625 + WFR1620 2x2x512 MB LPDDR3 1080HD DSI (1920x1080) estimated power range goal (mA)
Modem	Airplane mode	AIR1	2.9 to 3.5	2.9 to 3.5	
	WCDMA standby 2.56 sec	WS1	3.2 to 3.8	3.2 to 3.8	
	WCDMA talk +0 dBm, IMT	WT1	103 to 108	98 to 103	
	CDMA QPCH standby 5.12 sec	CS2	3.4 to 4.0	3.4 to 4.0	

	Test case	Code	MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x720) estimated power range goal (mA)	MSM8974 WTR1625 + WFR1620 2x2x512 MB LPDDR3 720HD DSI (1280x720) estimated power range goal (mA)	MSM8974 WTR1625 + WFR1620 2x2x512 MB LPDDR3 1080HD DSI (1920x1080) estimated power range goal (mA)
Modem (cont.)	CDMA talk +0 dBm, cell band	CT1	112 to 116	107 to 111	
	GSM standby 1.18 sec	GS1	3.5 to 4.2	3.5 to 4.2	
	GSM talk +5 dBm, no DTX, PGSM	GT1	70 to 75	70 to 75	
	HSDPA DL 7.2 Mbps +0 dBm, IMT (RxD/no RxD)	HS22E/ HS21E	165 to 180/ 146 to 161	157 to 172/ 140 to 156	
	HSDPA DC 42 Mbps +0 dBm, IMT (RxD/no RxD)	HS62E	210 to 218	202 to 210	
	LTE standby (2.56 sec)	LS1	3.5 to 4.1	3.5 to 4.1	
	LTE Cat 3 (68/23 Mbps, 0 dBm, B13)	LTE1E	270 to 290	252 to 272	
	LTE Cat 3 (100/50 Mbps, 0 dBm, B7)	LTE6E	400 to 430	370 to 400	
	LTE Cat 4 (150/50 Mbps, 0 dBm, B7)	LTE7E	440 to 470	410 to 440	
	LTE Cat 3 CA 10+10 (100/25 Mbps, 0 dBm, B4+B17, Tx B17)	LTE8E	430 to 460	400 to 420	
	TD-SCDMA standby 1.28 sec	TCS1	3.4 to 4	3.4 to 4.0	
	TD-SCDMA talk 0 dBm, B34	TCT1	74 to 78	74 to 78	
	EV-DO DL 3.1 Mbps +0 dBm, cell	DD2E	159 to 175	151 to 167	
	SVLTE Cat 2 (50 Mbps, 0 dBm, B13) and 1X voice	L2CT1E	375 to 400	355 to 380	
	VOLTE (40 ms DRX, SPS, 40% VAF)	VOLTE1	111 to 120	NA	
GPS	LTE TDD standby 2.56 sec	LS3	3.5 to 4.1	3.5 to 4.1	
	LTE TDD Cat 3 20 MHz (60/18 Mbps, +0 dBm, B38)	LTE5E	292 to 310	274 to 292	
	GPS 1 Hz Trk (DPO) + with W standby	GPS2	11.9 to 12.5	11.9 to 12.5	
	GNSS 1 Hz Trk high sensitivity with W standby	GNSS1	42 to 48	42 to 48	

	Test case	Code	MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x720) estimated power range goal (mA)	MSM8974 WTR1625 + WFR1620 2x2x512 MB LPDDR3 720HD DSI (1280x720) estimated power range goal (mA)	MSM8974 WTR1625 + WFR1620 2x2x512 MB LPDDR3 1080HD DSI (1920x1080) estimated power range goal (mA)
Multimedia	MP3 playback 128 kbps TM	AU4A	19.5 to 22.5	19.5 to 22.5	
	Listen (40% silence, 40% stationary noise, and 20% speech)	AU30A	8.2-9.6	8.2 to 9.6	
	Video decode: H.264 720p, 30 fps	QTC77A	93 to 108	93 to 108	110 to 125
	Video decode: H.264 30 fps 1080p, 20 Mbps	QTC88A	124 to 140	124 to 140	140 to 162
	30 fps at HD 1080p 20 Mbps normal power encode, AAC 128 kbps 44.1 kHz stereo	QMC31A	340 to 365	340 to 365	380 to 420
	Graphics: 3D UI full screen resolution, 30 fps (PowerLift)	QGC23A	110 to 120	110 to 120	155 to 175
	3D gaming (Egypt GLB2.1.1), 60 fps	QGC24A	295 to 330	295 to 330	550 to 630*
	Static image display	LCD04A	49 to 52	49 to 52	72 to 74
Connectivity	Bluetooth (page scan + sniff) with WCDMA standby	BT2	3.9 to 4.5	3.9 to 4.5	
	WLAN (DTIM1) with WCDMA standby	WLS1	4.9 to 5.8	4.9 to 5.8	
Sensors	Accelerometer background processing at 10 Hz	SNS5A	4.4 to 5.5	4.4 to 5.5	
	Accelerometer active processing at 15 Hz	SNS4A	58 to 65	58 to 65	
Netapps	Browser over Wi-Fi	WB1A	78 to 84	78 to 84	107 to 120
	Video streaming over Wi-Fi	VS6A	135 to 145	135 to 145	165 to 185

NOTE: For the 3D gaming case, QTI assumed a uniform MSM T_j (junction temperature) of 55°C (vs 25°C for the other cases) owing to high power dissipation. The exact power profile depends on the dissipation and form-factor thermal.

NOTE: Power targets for the respective APQ design are expected to be the same as the MSM, provided the same XO solution is used. A power delta caused due to a change in the XO solution, i.e., TCXO, should be completely attributed to the design difference.

4.2 Measured values – Top level

Table 4-2 lists the measured current consumption data for various software releases.

Table 4-2 Measured current consumption data for various software releases

	Test case	Code	Pre-CS 2.0 (1025.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x768) measurements (mA)	CS (1030.3) MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x768) measurements (mA)	Post-CS (1031.12) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)	Post-CS (1032.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)	Post-CS (1336A.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)
Modem	Airplane mode	AIR1	3.2	2.45	2.45	2.45	2.46
	WCDMA standby 2.56 sec	WS1	3.49	2.82	2.8	2.87	2.99
	WCDMA talk +0 dBm, IMT	WT1	102	97	99	99.13	95.57
	CDMA QPCH standby 5.12 sec	CS2	3.3	2.73	2.66	2.69	2.8
	CDMA talk +0 dBm, cell band	CT1	109	104.7	104.6	104	101.44
	GSM standby 1.18 sec	GS1	3.58	3.11	3.06	2.92	2.95
	GSM talk +5 dBm, no DTX, PGSM	GT1	70.9	70	69	67.78	66.03
	HSDPA DL 7.2 Mbps + 0 dBm, IMT (Rx/D/no Rx/D)	HS22E HS21E	130	124	122	123	114
	HSDPA DC 42 Mbps + 0 dBm, IMT (Rx/D/no Rx/D)	HS62E	204	203	203	203	174
	LTE standby (2.56 sec)	LS1	3.8	2.94	3.04	3.03	2.99

	Test case	Code	Pre-CS 2.0 (1025.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x768) measurements (mA)	CS (1030.3) MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x768) measurements (mA)	Post-CS (1031.12) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)	Post-CS (1032.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)	Post-CS (1336A.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)
Modem (cont.)	LTE Cat 3 (68/23 Mbps, 0 dBm, B13)	LTE1E	252	255	260	260	237
	LTE Cat 3 (100/50 Mbps, 0 dBm, B7)	LTE6E	479	456	446	428	392
	LTE Cat 4 (150/50 Mbps, 0 dBm, B7)	LTE7E	485	485	475	473	406
	LTE Cat 3 CA 10+10 (100/25 Mbps, 0 dBm, B4 + B17, Tx B17)	LTE8E	438	436	430	430	390
	TD-SCDMA standby 1.28 sec	TCS1	4.61	3.22	3.2	3.14	3.18
	TD-SCDMA talk 0 dBm, B34	TCT1	116	72	74.4	68.49	63
	EV-DO DL 3.1 Mbps + 0 dBm, cell	DD2E	140	128	129	130	119
	SVLTE (LTE cat2 DL 50 Mbps [0 dBm] + 1X talk) – Embedded	L2CT1E	379	364	380	374	330
	VOLTE (40 ms DRX, SRS, 40% VAF)	VOLTE1	122.18	103	104	129.7	104.11
	LTE TDD standby 2.56 sec	LS3	4.61	3.92	3.64	3.58	3.13
	LTE TDD Cat 3 20 MHz (60/18 Mbps, +0 dBm, B38)	LTE5E	332	321	327	329.32	272

	Test case	Code	Pre-CS 2.0 (1025.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x768) measurements (mA)	CS (1030.3) MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x768) measurements (mA)	Post-CS (1031.12) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)	Post-CS (1032.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)	Post-CS (1336A.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)
GPS	GPS 1 Hz Trk (DPO) + with W standby	GPS2	13.3	11	11	10.8	10.1
	GNSS 1 Hz Trk high sensitivity with W standby	GNSS1	49	43	44.8	44.4	44
Multimedia	MP3 playback 128 kbps TM	AU4A	21.9	20.7	20.4	21.4	21.2
	Listen (40% silence, 40% stationary noise, 20% speech)	AU30A	—	—	—	8.9	6.2
	Video decode – H.264 720p, 30 fps	QTC77A	89.25	84.5	94.3	83.14	91.6
	Video decode – H.264 30 fps 1080p, 20 Mbps	QTC88A	111.84	102.6	121.8	104.33	113.1
	30 fps at HD 1080p 20 Mbps normal power encode, AAC 128 kbps 44.1 kHz stereo	QMC31A	350.36	336.42	337.2	352.62	384.1
	Graphics – 3D UI full screen resolution, 30 fps (PowerLift)	QGC23A	148.21	152.7	152	149.17	108
	3D gaming (Egypt GLB2.1.1), 60 fps	QGC24A	286.14	310.6	311.7	308.76	276.5
	Static image display	LCD04A	41.71	39.8	39.7	42.84	43.7

	Test case	Code	Pre-CS 2.0 (1025.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x768) measurements (mA)	CS (1030.3) MSM8974 WTR1605 2x2x512 MB LPDDR3 720HD DSI (1280x768) measurements (mA)	Post-CS (1031.12) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)	Post-CS (1032.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)	Post-CS (1336A.2) MSM8974 WTR1605 2x2x512 MB LPDDR3 720 HD DSI (1280x768) measurements (mA)
Connectivity	Bluetooth (page scan + sniff) with WCDMA standby	BT2	4.15	3.54	3.48	3.56	4
	WLAN (DTIM1) with WCDMA standby	WLS1	5.78	5.23	4.97	5.07	5.52
Sensors	Accelerometer background processing at 10 Hz	SNS5A	4.95	4.33	4.15	4.15	19.5
	Accelerometer active processing at 15 Hz	SNS4A	45.39	47.5	48.4	48.66	51.3
Netapps	Browser over Wi-Fi	WB1A	66.43	81.5	65	65.24	76.2
	Video streaming over Wi-Fi	VS6A	216.74	183	147	131.33	134.7

Notes:

- LTE Cat 3 68/23 Mbps 10 MHz measured in band 5
- LTE Cat 3 100/50 Mbps 20 MHz measured in band 1
- LTE Cat 4 150/50 Mbps 20 MHz measured in band 1
- LTE Cat 3 CA 100/25 Mbps 10+10 MHz measured in band 3 and band 5
- VoLTE measured in band 5

4.3 Breakdown measurements per regulator values

This section shows breakdown data for modem use cases based on the MSM8974 1030 (CS) release.

Table 4-3 Airplane mode

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.681	0.44
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.604	1.13
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.685	0.46
AI_23	GFX	SMPS, S4B	0.004	0.00
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.000	0.00
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.000	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.000	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.000	0.00
8A	S1A_OUTPUT	RF1, SMPS, S1A	1.257	1.73
0H	S2A_OUTPUT	RF2, SMPS, S2A	2.159	0.01
11B	S3A_OUTPUT	MSME, SMPS, S3A	1.804	0.70
3L(0E)	WCN_PA_2.9V	LDO, L19	0.013	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	0.157	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.018	0.01
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.905	0.06
18J	REG_5V	Torch, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.344	0.02
18M	SD_MMC	LDO, L21, sub sboost	0.000	0.01
6H	PX2	LDO, L13, sub sboost	0.001	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.140	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.015	0.00
0F	MEM_EMMC	LDO, L20	2.928	0.02
3M(16G)	L17_SUM	CAM123, LDO, L17	0.014	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	0.000	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.000	0.00
AI_13_14	—	PWR_EXT	3.702	0.00
16D	VIN_FLASH	VCHG	3.350	0.00
1G	—	RF_CARD_INPUT	3.703	0.00
—	—	Battery (measured)	3.701	2.42

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Table 4-4 WCDMA standby 2.56 sec

Xerxes channel	Regulator	Description	Sleep		Awake	
			V (volts)	I (mA)	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.681	0.42	0.949	11.29
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.606	1.16	0.814	32.89
8K	S3B_SUM_MO DEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.679	0.39	0.813	26.19
AI_23	GFX	SMPS, S4B	0.642	0.04	0.885	1.77
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.000	0.00	0.000	0.04
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.000	0.00	0.000	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.000	0.00	0.000	0.10
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.000	0.00	0.000	0.06
8A	S1A_OUTPUT	SMPS, S1A	1.254	1.40	1.252	17.32
0H	S2A_OUTPUT	SMPS, S2A	2.157	0.00	2.151	8.15
11B	S3A_OUTPUT	SMPS, S3A	1.800	0.84	1.795	5.32
3L(0E)	WCN_PA_2.9V	LDO, L19	0.004	0.00	0.004	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	0.000	0.00	1.753	1.52
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.000	0.02	2.133	3.00
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.830	0.05	2.823	0.05
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, BOOST	3.341	0.00	3.332	0.00
18M	SD_MMC	LDO, L21, SUB SBOOST	0.000	0.02	0.001	0.02
6H	PX2	LDO, L13, SUB SBOOST	0.000	0.00	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, SUB SBOOST	1.222	0.00	1.160	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.00	0.000	0.00
0F	MEM_EMMC	LDO, L20	2.937	0.06	2.930	0.06
3M(16G)	L17_SUM	CAM123, LDO, L17	0.023	0.00	0.023	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.000	0.00	0.000	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.810	0.02	1.805	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.000	0.00	0.000	0.00
AI_13_14	—	PWR_EXT	3.700	0.02	3.691	0.16
16D	VIN_FLASH	VCHG	3.298	0.00	3.289	0.00
1G	—	RF_CARD_INPUT	3.701	0.00	3.692	0.00
—	—	Battery (measured)	3.700	2.45	3.699	40

Table 4-5 WCDMA talk + 0 dBm, IMT

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.956	15.99
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.819	52.08
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.821	37.22
AI_23	GFX	SMPS, S4B	0.818	0.36
AI_4	APC0	Krait 0, SMPS, S5B	0.000	0.02
AI_5	APC1	Krait 1, SMPS, S6B	0.000	0.01
AI_6	APC1	Krait 2, SMPS, S7B	0.000	0.01
AI_78	APC1	Krait 3, SMPS, S8B	0.000	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.252	69.39
0H	S2A_OUTPUT	SMPS, S2A	2.149	37.12
11B	S3A_OUTPUT	SMPS, S3A	1.799	8.17
3L(0E)	WCN_PA_2.9V	LDO, L19	0.004	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.796	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.659	1.72
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.856	0.06
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, BOOST	3.342	0.02
18M	SD_MMC	LDO, L21, SUB SBOOST	0.000	0.02
6H	PX2	LDO, L13, SUB SBOOST	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, SUB SBOOST	1.211	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.00
0F	MEM_EMMC	LDO, L20	2.969	0.05
3M(16G)	L17_SUM	CAM123, LDO, L17	0.032	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.000	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.798	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.000	0.00
AI_13_14	—	PWR_EXT	3.696	7.96
16D	VIN_FLASH	VCHG	3.303	0.00
1G	—	RF_CARD_INPUT	3.700	0.00
—	—	Battery (measured)	3.700	96.08
1B	—	CONN2_CDMA_GSM (PA current)	3.697	5.95

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Table 4-6 GSM standby 1.18 sec

Xerxes channel	Regulator	Description	Sleep		Awake	
			V (volts)	I (mA)	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.68	0.42	0.95	11.04
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.61	1.16	0.81	30.60
8K	S3B_SUM_MO DEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.68	0.39	0.82	15.47
AI_23	Gfx	SMPS, S4B	0.64	0.04	0.80	2.53
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.00	0.00	0.00	0.10
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.00	0.00	0.00	0.07
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.00	0.00	0.00	0.14
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.00	0.00	0.00	0.09
8A	S1A_OUTPUT	SMPS, S1A	1.25	1.40	1.25	12.66
0H	S2A_OUTPUT	SMPS, S2A	2.16	0.00	2.09	10.43
11B	S3A_OUTPUT	SMPS, S3A	1.80	0.84	1.80	4.23
3L(0E)	WCN_PA_2.9V	LDO, L19	0.00	0.00	0.02	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	0.00	0.00	1.74	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.00	0.02	2.13	3.94
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.83	0.05	2.86	0.06
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.34	0.00	3.34	0.04
18M	SD_MMC	LDO, L21, sub sboost	0.00	0.02	0.00	0.01
6H	PX2	LDO, L13, sub sboost	0.00	0.00	0.00	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, SUB SBOOST	1.22	0.00	1.27	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.00	0.00	0.00	0.02
0F	MEM_EMMC	LDO, L20	2.94	0.06	2.97	0.05
3M(16G)	L17_SUM	CAM123, LDO, L17	0.02	0.00	0.00	-0.01
10F	L10_SUM	PX6, UIM2, LDO, L10	0.00	0.00	0.00	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.81	0.02	1.79	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.00	0.00	0.00	-0.02
AI_13_14	—	PWR_EXT	3.70	0.02	3.69	0.27
16D	VIN_FLASH	VCHG	3.30	0.00	3.35	0.00
1G	—	RF_CARD_INPUT	3.70	0.00	3.69	0.00
—	—	Battery (measured)	3.700	2.45	3.699	34.31

Table 4-7 GSM talk + 5 dBm, no DTx, PGSM

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.952	12.88
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.818	50.04
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.826	20.17
AI_23	GFX	SMPS, S4B	0.822	0.45
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.000	0.00
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.000	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.000	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.000	0.01
8A	S1A_OUTPUT	SMPS, S1A	1.255	17.63
0H	S2A_OUTPUT	SMPS, S2A	2.155	22.45
11B	S3A_OUTPUT	SMPS, S3A	1.803	7.99
3L(0E)	WCN_PA_2.9V	LDO, L19	0.013	0.01
5C	L8_SUM	AMUX_PU, LDO, L8	1.798	0.02
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.664	0.51
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.904	0.08
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.342	0.23
18M	SD_MMC	LDO, L21, sub sboost	0.000	0.03
6H	PX2	LDO, L13, sub sboost	0.002	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.190	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.030	0.00
0F	MEM_EMMC	LDO, L20	2.929	0.01
3M(16G)	L17_SUM	CAM123, LDO, L17	0.002	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.002	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.797	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.000	0.01
AI_13_14	—	PWR_EXT	3.699	18.00
16D	VIN_FLASH	VCHG	3.349	0.00
1G	—	RF_CARD_INPUT	3.702	0.23
—	—	Battery (measured)	3.701	69.40
1B	—	CONN2_CDMA_GSM (PA current)	3.699	18.00

Table 4-8 CDMA QPCH standby 5.12 sec

Xerxes channel	Regulator	Description	Sleep		Awake	
			V (volts)	I (mA)	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.68	0.42	0.95	15.91
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.61	1.16	0.82	42.46
8K	S3B_SUM_MO DEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.68	0.39	0.82	22.82
AI_23	GFX	SMPS, S4B	0.64	0.04	0.80	1.89
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.00	0.00	0.00	0.00
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.00	0.00	0.00	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.00	0.00	0.00	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.00	0.00	0.00	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.25	1.40	1.25	22.50
0H	S2A_OUTPUT	SMPS, S2A	2.16	0.00	2.09	12.76
11B	S3A_OUTPUT	SMPS, S3A	1.80	0.84	1.80	4.66
3L(0E)	WCN_PA_2.9V	LDO, L19	0.00	0.00	0.02	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	0.00	0.00	0.14	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.00	0.02	2.31	3.03
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.83	0.05	2.86	0.05
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.34	0.00	3.34	0.08
18M	SD_MMC	LDO, L21, sub sboost	0.00	0.02	0.00	0.00
6H	PX2	LDO, L13, sub sboost	0.00	0.00	0.00	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.22	0.00	1.23	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.00	0.00	0.00	0.03
0F	MEM_EMMC	LDO, L20	2.94	0.06	2.97	0.02
3M(16G)	L17_SUM	CAM123, LDO, L17	0.02	0.00	0.00	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.00	0.00	0.00	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.81	0.02	1.80	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.00	0.00	0.00	0.00
AI_13_14	—	PWR_EXT	3.70	0.02	3.69	0.15
16D	VIN_FLASH	VCHG	3.30	0.00	3.35	0.00
1G	—	RF_CARD_INPUT	3.70	0.00	3.70	0.00
—	—	Battery (measured)	3.700	2.45	3.699	50.31

Table 4-9 CDMA talk + 0 dBm, cell band

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.956	13.98
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.820	51.01
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.821	33.96
AI_23	GFX	SMPS, S4B	0.819	0.39
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.000	0.05
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.000	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.000	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.000	0.01
8A	S1A_OUTPUT	SMPS, S1A	1.252	73.87
0H	S2A_OUTPUT	SMPS, S2A	2.149	46.70
11B	S3A_OUTPUT	SMPS, S3A	1.800	7.73
3L(0E)	WCN_PA_2.9V	LDO, L19	0.004	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.800	0.09
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.659	1.64
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.856	0.06
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.342	0.00
18M	SD_MMC	LDO, L21, sub sboost	0.001	0.02
6H	PX2	LDO, L13, sub sboost	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, SUB SBOOST	1.212	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.00
0F	MEM_EMMC	LDO, L20	2.969	0.03
3M(16G)	L17_SUM	CAM123, LDO, L17	0.013	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.000	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.798	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.000	0.00
AI_13_14	—	PWR_EXT	3.696	7.73
16D	VIN_FLASH	VCHG	3.303	0.00
1G	—	RF_CARD_INPUT	3.699	0.00
—	—	Battery (measured)	3.700	103.75
1B	—	CONN2_CDMA_GSM (PA current)	3.697	5.67

Table 4-10 TD-SCDMA standby 1.28 sec

Xerxes channel	Regulator	Description	Sleep		Awake	
			V (volts)	I (mA)	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.68	0.63	0.95	15.89
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.61	0.96	0.85	45.79
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.69	0.46	0.82	19.84
AI_23	GFX	SMPS, S4B	0.00	0.00	0.80	1.92
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.00	0.00	0.00	0.18
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.00	0.00	0.00	0.18
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.00	0.00	0.00	0.08
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.00	0.00	0.00	0.13
8A	S1A_OUTPUT	SMPS, S1A	1.24	1.66	1.26	15.90
0H	S2A_OUTPUT	SMPS, S2A	2.05	0.27	2.14	10.78
11B	S3A_OUTPUT	SMPS, S3A	1.80	0.87	1.80	5.15
3L(0E)	WCN_PA_2.9V	LDO, L19	0.01	0.00	0.00	0.02
5C	L8_SUM	AMUX_PU, LDO, L8	0.12	0.00	1.77	1.87
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.01	0.00	2.47	3.82
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.85	0.07	2.87	0.00
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.35	0.16	3.34	0.00
18M	SD_MMC	LDO, L21, sub sboost	0.00	0.04	0.00	0.00
6H	PX2	LDO, L13, sub sboost	0.00	0.00	0.00	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.19	0.00	1.13	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.00	0.01	0.00	0.02
0F	MEM_EMMC	LDO, L20	2.95	0.02	2.95	0.02
3M(16G)	L17_SUM	CAM123, LDO, L17	0.00	0.01	0.00	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.00	0.00	0.00	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.80	0.02	1.79	0.15
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.00	0.01	0.00	0.00
AI_13_14	—	PWR_EXT	3.70	0.01	3.69	0.45
16D	VIN_FLASH	VCHG	3.35	0.00	3.34	0.01
1G	—	RF_CARD_INPUT	3.70	0.00	3.69	0.00
—	—	Battery (measured)	3.700	2.45	3.699	45.94

Table 4-11 TD-SCDMA talk 0 dBm, B34

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.96	16.24
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.82	49.49
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.82	34.93
AI_23	Gfx	SMPS, S4B	0.82	0.44
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.00	0.01
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.00	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.00	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.00	0.02
8A	S1A_OUTPUT	SMPS, S1A	1.26	32.65
0H	S2A_OUTPUT	SMPS, S2A	2.15	28.12
11B	S3A_OUTPUT	SMPS, S3A	1.80	7.99
3L(0E)	WCN_PA_2.9V	LDO, L19	0.00	0.04
5C	L8_SUM	AMUX_PU, LDO, L8	1.80	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.65	0.79
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.88	0.02
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.34	0.22
18M	SD_MMC	LDO, L21, sub sboost	0.00	0.00
6H	PX2	LDO, L13, sub sboost	0.00	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.13	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.00	0.02
0F	MEM_EMMC	LDO, L20	2.96	0.02
3M(16G)	L17_SUM	CAM123, LDO, L17	0.00	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.00	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.80	0.03
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.00	0.00
AI_13_14	—	PWR_EXT	3.70	6.50
16D	VIN_FLASH	VCHG	3.35	0.01
1G	—	RF_CARD_INPUT	3.70	0.00
—	—	Battery (measured)	3.700	73.13
1B	—	CONN2_CDMA_GSM (PA current)	3.697	5.10

Table 4-12 EV-DO DL 3.1 Mbps + 0 dBm, cell

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.96	26.18
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.91	84.52
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.91	62.44
AI_23	GFX	SMPS, S4B	0.82	0.48
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.79	16.08
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.79	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.79	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.79	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.26	84.17
0H	S2A_OUTPUT	SMPS, S2A	2.15	46.51
11B	S3A_OUTPUT	SMPS, S3A	1.80	7.84
3L(0E)	WCN_PA_2.9V	LDO, L19	0.00	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.80	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.65	0.07
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.88	0.00
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, BOOST	3.33	0.17
18M	SD_MMC	LDO, L21, SUB SBOOST	0.00	0.00
6H	PX2	LDO, L13, SUB SBOOST	0.00	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, SUB SBOOST	1.13	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.00	0.02
0F	MEM_EMMC	LDO, L20	2.94	0.10
3M(16G)	L17_SUM	CAM123, LDO, L17	0.00	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.00	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.80	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.00	0.00
AI_13_14	—	PWR_EXT	3.68	5.74
16D	VIN_FLASH	VCHG	3.33	0.01
1G	—	RF_CARD_INPUT	3.70	0.00
—	—	Battery (measured)	3.700	128.67
1B	—	CONN2_CDMA_GSM (PA current)	3.679	5.94

Table 4-13 HSDPA DL 7.2 Mbps + 0 dBm, IMT (no Rx/D)

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.953	25.29
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.820	59.78
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.819	56.53
AI_23	GFX	SMPS, S4B	0.819	0.32
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.798	25.78
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.798	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.798	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.798	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.243	91.19
0H	S2A_OUTPUT	SMPS, S2A	2.099	40.30
11B	S3A_OUTPUT	SMPS, S3A	1.796	7.25
3L(0E)	WCN_PA_2.9V	LDO, L19	0.006	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.796	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.652	1.72
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.848	0.04
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.340	0.00
18M	SD_MMC	LDO, L21, sub sboost	0.001	0.02
6H	PX2	LDO, L13, sub sboost	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, SUB SBOOST	1.185	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.002	0.00
0F	MEM_EMMC	LDO, L20	2.943	0.14
3M(16G)	L17_SUM	CAM123, LDO, L17	0.001	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.797	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.000	0.00
AI_13_14	—	PWR_EXT	3.696	5.82
16D	VIN_FLASH	VCHG	3.348	0.00
1G	—	RF_CARD_INPUT	3.699	0.00
—	—	Battery (measured)	3.700	123.69
1B	—	CONN2_CDMA_GSM (PA current)	3.696	5.55

Table 4-14 HSDPA DC 42 Mbps + 0 dBm, IMT (RxD On)

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.953	40.47
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.904	90.42
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.898	140.19
AI_23	GFX	SMPS, S4B	0.819	0.48
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.802	47.22
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.802	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.802	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.802	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.240	129.81
0H	S2A_OUTPUT	SMPS, S2A	2.099	64.86
11B	S3A_OUTPUT	SMPS, S3A	1.796	8.48
3L(0E)	WCN_PA_2.9V	LDO, L19	0.006	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.796	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.651	1.70
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.848	0.07
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.338	0.16
18M	SD_MMC	LDO, L21, sub sboost	0.001	0.03
6H	PX2	LDO, L13, sub sboost	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.174	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.002	0.01
0F	MEM_EMMC	LDO, L20	2.941	0.10
3M(16G)	L17_SUM	CAM123, LDO, L17	0.001	0.01
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.797	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.000	0.00
AI_13_14	—	PWR_EXT	3.693	8.89
16D	VIN_FLASH	VCHG	3.348	0.00
1G	—	RF_CARD_INPUT	3.698	0.00
—	—	Battery (measured)	3.700	202.87
1B	—	CONN2_CDMA_GSM (PA current)	3.693	8.54

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Table 4-15 LTE standby (2.56 sec)

Xerxes channel	Regulator	Description	Sleep		Awake	
			V (volts)	I (mA)	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.68	0.63	0.95	16.95
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.61	0.96	0.82	41.67
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.69	0.46	0.82	25.93
AI_23	GFX	SMPS, S4B	0.00	0.00	0.89	1.55
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.00	0.00	0.00	0.00
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.00	0.00	0.00	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.00	0.00	0.00	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.00	0.00	0.00	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.24	1.66	1.24	29.72
0H	S2A_OUTPUT	SMPS, S2A	2.05	0.27	2.15	10.70
11B	S3A_OUTPUT	SMPS, S3A	1.80	0.87	1.80	5.19
3L(0E)	WCN_PA_2.9V	LDO, L19	0.01	0.00	0.00	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	0.12	0.00	2.18	3.15
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.01	0.00	2.25	2.02
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.85	0.07	2.83	0.05
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.35	0.16	3.33	0.00
18M	SD_MMC	LDO, L21, sub sboost	0.00	0.04	0.00	0.02
6H	PX2	LDO, L13, sub sboost	0.00	0.00	0.00	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.19	0.00	1.14	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.00	0.01	0.00	0.01
0F	MEM_EMMC	LDO, L20	2.95	0.02	2.93	0.03
3M(16G)	L17_SUM	CAM123, LDO, L17	0.00	0.01	0.01	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.00	0.00	0.00	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.80	0.02	1.81	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.00	0.01	0.00	0.00
AI_13_14	—	PWR_EXT	3.70	0.01	3.69	0.54
16D	VIN_FLASH	VCHG	3.35	0.00	3.29	0.00
1G	—	RF_CARD_INPUT	3.70	0.00	3.69	0.00
—	—	Battery (measured)	3.700	2.46	3.699	55.08

Table 4-16 LTE Cat 3 (68/23 Mbps, 0 dBm, B13)

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.952	64.45
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.819	100.34
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.814	170.28
AI_23	GFX	SMPS, S4B	0.818	0.73
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.796	89.84
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.796	0.02
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.796	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.796	0.04
8A	S1A_OUTPUT	SMPS, S1A	1.253	146.98
0H	S2A_OUTPUT	SMPS, S2A	2.146	61.41
11B	S3A_OUTPUT	SMPS, S3A	1.799	14.60
3L(0E)	WCN_PA_2.9V	LDO, L19	0.000	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.793	0.00
16F	L16_SUM	QF,QPA, GPS, LDO, L16	2.652	1.68
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.842	0.00
18J	VREG_5V	TORCH,SPKRDRV, USB_OTG, DISP_HDMI, boost	3.284	0.03
18M	SD_MMC	LDO, L21, sub sboost	0.000	0.04
6H	PX2	LDO, L13, sub sboost	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.138	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.00
0F	MEM_EMMC	LDO, L20	2.929	0.08
3M(16G)	L17_SUM	CAM123, LDO, L17	0.000	0.01
10F	L10_SUM	PX6, UIM2, LDO, L10	0.000	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.797	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.001	0.00
AI_13_14	—	PWR_EXT	3.689	5.45
16D	VIN_FLASH	VCHG	3.296	0.00
1G	—	RF_CARD_INPUT	3.694	0.00
—	—	Battery (measured)	3.702	254.10
1B	—	CONN2_CDMA_GSM (PA current)	3.688	4.76

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Table 4-17 LTE Cat 3 (100/50 Mbps, 0 dBm, B7)

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	1.047	128.66
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.900	151.22
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.879	300.77
AI_23	GFX	SMPS, S4B	0.817	0.92
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.806	146.41
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.806	49.83
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.806	0.09
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.806	0.13
8A	S1A_OUTPUT	SMPS, S1A	1.271	173.34
0H	S2A_OUTPUT	SMPS, S2A	2.142	95.59
11B	S3A_OUTPUT	SMPS, S3A	1.788	24.76
3L(0E)	WCN_PA_2.9V	LDO, L19	0.000	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.793	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.652	1.68
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.842	0.01
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.276	0.03
18M	SD_MMC	LDO, L21, sub sboost	0.000	0.04
6H	PX2	LDO, L13, sub sboost	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.138	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.00
0F	MEM_EMMC	LDO, L20	2.938	0.09
3M(16G)	L17_SUM	CAM123, LDO, L17	0.000	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.797	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.001	0.00
AI_13_14	—	PWR_EXT	3.680	6.69
16D	VIN_FLASH	VCHG	3.287	0.00
1G	—	RF_CARD_INPUT	3.688	0.00
—	—	Battery (measured)	3.702	447.43
1B	—	CONN2_CDMA_GSM (PA current)	3.679	5.34

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Table 4-18 LTE Cat 4 (150/50 Mbps, 0 dBm, B7)

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	1.047	138.18
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.925	188.40
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.878	321.74
AI_23	GFX	SMPS, S4B	0.817	1.03
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.864	112.01
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.864	116.34
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.864	8.56
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.864	8.75
8A	S1A_OUTPUT	SMPS, S1A	1.236	176.61
0H	S2A_OUTPUT	SMPS, S2A	2.143	95.22
11B	S3A_OUTPUT	SMPS, S3A	1.788	25.75
3L(0E)	WCN_PA_2.9V	LDO, L19	0.001	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.793	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.652	1.68
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.842	0.00
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.273	0.03
18M	SD_MMC	LDO, L21, sub sboost	0.000	0.04
6H	PX2	LDO, L13, sub sboost	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.138	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.00
0F	MEM_EMMC	LDO, L20	2.932	0.09
3M(16G)	L17_SUM	CAM123, LDO, L17	0.000	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.797	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.001	0.00
AI_13_14	—	PWR_EXT	3.677	6.74
16D	VIN_FLASH	VCHG	3.286	0.00
1G	—	RF_CARD_INPUT	3.686	0.00
—	—	Battery (measured)	3.702	481.41
1B	—	CONN2_CDMA_GSM (PA current)	3.677	5.32

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Table 4-19 GNSS 1 Hz Trk high sensitivity with W standby

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.958	13.50
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.822	35.95
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.823	22.21
AI_23	GFX	SMPS, S4B	0.820	0.40
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.001	0.00
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.001	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.001	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.001	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.260	24.18
0H	S2A_OUTPUT	SMPS, S2A	2.099	8.17
11B	S3A_OUTPUT	SMPS, S3A	1.800	4.94
3L(0E)	WCN_PA_2.9V	LDO, L19	0.003	0.07
5C	L8_SUM	AMUX_PU, LDO, L8	1.797	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.652	4.19
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.874	0.04
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.343	0.22
18M	SD_MMC	LDO, L21, sub sboost	0.004	0.00
6H	PX2	LDO, L13, sub sboost	0.005	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.133	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.001	0.02
0F	MEM_EMMC	LDO, L20	2.955	0.03
3M(16G)	L17_SUM	CAM123, LDO, L17	0.001	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.797	0.03
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.000	0.00
AI_13_14	—	PWR_EXT	3.700	0.60
16D	VIN_FLASH	VCHG	3.351	0.01
1G	—	RF_CARD_INPUT	3.700	0.00
—	—	Battery (measured)	3.701	43.03

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Table 4-20 GPS 1 Hz Trk (DPO) + with W standby

Xerxes channel	Regulator	Description	Sleep		Awake	
			V (volts)	I (mA)	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.700	0.55	0.954	11.90
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.607	1.02	0.819	35.08
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.686	0.51	0.821	22.30
AI_23	GFX	SMPS, S4B	0.090	0.00	0.818	0.29
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.000	0.00	0.000	0.00
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.000	0.00	0.000	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.000	0.00	0.000	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.000	0.00	0.000	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.260	1.77	1.257	16.97
0H	S2A_OUTPUT	SMPS, S2A	2.054	0.26	2.101	7.55
11B	S3A_OUTPUT	SMPS, S3A	1.797	1.36	1.796	4.15
3L(0E)	WCN_PA_2.9V	LDO, L19	0.006	0.02	0.006	0.01
5C	L8_SUM	AMUX_PU, LDO, L8	0.230	0.00	1.796	0.01
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.064	0.00	2.602	2.97
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.848	0.06	2.847	0.06
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.346	0.20	3.343	0.21
18M	SD_MMC	LDO, L21, sub sboost	0.000	0.03	0.001	0.03
6H	PX2	LDO, L13, sub sboost	0.000	0.00	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.195	0.00	1.194	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.001	0.01	0.002	0.01
0F	MEM_EMMC	LDO, L20	2.953	0.05	2.953	0.05
3M(16G)	L17_SUM	CAM123, LDO, L17	0.001	0.02	0.001	0.01
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.00	0.001	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.797	0.02	1.797	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.001	0.02	0.001	0.02
AI_13_14	—	PWR_EXT	3.700	0.08	3.698	0.00
16D	VIN_FLASH	VCHG	3.348	0.00	3.346	0.00
1G	—	RF_CARD_INPUT	3.701	0.00	3.700	0.00
—	—	Battery (measured)	3.700	3.81	3.699	45.70

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Table 4-21 SVLTE Cat 2 (50 Mbps, 0 dBm, B13) and 1X Voice

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.947	73.65
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.900	109.82
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon, SMPS, S3B	0.894	223.27
AI_23	GFX	SMPS, S4B	0.818	1.15
AI_4	Multiphase Phase0	Krait, SMPS, S5B	0.800	61.22
AI_5	Multiphase Phase0	Krait, SMPS, S6B	0.800	0.00
AI_6	Multiphase Phase0	Krait, SMPS, S7B	0.800	0.00
AI_78	Multiphase Phase0	Krait, SMPS, S8B	0.800	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.238	237.50
0H	S2A_OUTPUT	SMPS, S2A	2.124	104.64
11B	S3A_OUTPUT	SMPS, S3A	1.799	22.10
3L(0E)	WCN_PA_2.9V	LDO, L19	0.016	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.797	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	2.661	0.00
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.863	0.07
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.333	0.05
18M	SD_MMC	LDO, L21, sub sboost	0.002	0.00
6H	PX2	LDO, L13, sub sboost	0.000	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.186	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.002	0.02
0F	MEM_EMMC	LDO, L20	2.973	0.04
3M(16G)	L17_SUM	CAM123, LDO, L17	0.002	-0.01
10F	L10_SUM	PX6, UIM2, LDO, L10	0.000	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	1.798	0.02
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.001	-0.02
AI_13_14	—	PWR_EXT	3.686	22.01
16D	VIN_FLASH	VCHG	3.345	0.00
1G	—	RF_CARD_INPUT	3.695	0.00
—	—	Battery (measured)	3.700	363.54
1B	—	CONN2_CDMA_GSM (PA current)	3.687	19.59

Table 4-22 MP3 playback 128 kbps TM

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.956	6.55
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.817	29.50
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.823	0.26
AI_23	GFX	SMPS, S4B	0.819	0.27
AI_4	APC0	Krait 0, SMPS, S5B	0.087	1.54
AI_5	APC1	Krait 1, SMPS, S6B	0.087	0.04
AI_6	APC1	Krait 2, SMPS, S7B	0.087	0.04
AI_78	APC1	Krait 3, SMPS, S8B	0.087	0.03
8A	S1A_OUTPUT	SMPS, S1A	1.249	4.21
0H	S2A_OUTPUT	SMPS, S2A	2.157	6.20
11B	S3A_OUTPUT	SMPS, S3A	1.800	5.86
3L(0E)	WCN_PA_2.9V	LDO, L19	0.014	0.17
5C	L8_SUM	AMUX_PU, LDO, L8	1.800	0.01
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.000	0.01
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.825	0.06
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.341	0.00
18M	SD_MMC	LDO, L21, sub sboost	0.001	0.01
6H	PX2	LDO, L13, sub sboost	0.002	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.212	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.01
0F	MEM_EMMC	LDO, L20	2.932	0.04
3M(16G)	L17_SUM	CAM123, LDO, L17	0.002	0.03
10F	L10_SUM	PX6, UIM2, LDO, L10	0.002	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	0.000	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	0.000	0.00
AI_13_14	—	PWR_EXT	3.700	0.15
16D	VIN_FLASH	VCHG	3.311	0.00
1G	—	RF_CARD_INPUT	3.700	0.20
—	—	Battery (measured)	3.699	20.69

Dashboard data = 20.69 mA

Table 4-23 Static image display

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.958	9.51
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.820	48.34
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.828	0.00
AI_23	GFX	SMPS, S4B	0.820	0.70
AI_4	APC0	Krait 0, SMPS, S5B	0.170	2.80
AI_5	APC1	Krait 1, SMPS, S6B	0.170	0.00
AI_6	APC1	Krait 2, SMPS, S7B	0.170	0.00
AI_78	APC1	Krait 3, SMPS, S8B	0.170	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.262	22.77
0H	S2A_OUTPUT	SMPS, S2A	2.152	17.17
11B	S3A_OUTPUT	SMPS, S3A	1.802	7.22
3L(0E)	WCN_PA_2.9V	LDO, L19	0.000	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.797	0.01
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.001	0.02
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.849	2.05
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.337	0.00
18M	SD_MMC	LDO, L21, sub sboost	0.003	0.00
6H	PX2	LDO, L13, sub sboost	0.001	0.01
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.203	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.001	0.02
0F	MEM_EMMC	LDO, L20	2.920	0.06
3M(16G)	L17_SUM	CAM123, LDO, L17	0.000	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.01
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	0.001	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	2.989	48.85
AI_13_14	—	PWR_EXT	3.701	78.40
16D	VIN_FLASH	VCHG	3.328	0.00
1G	—	RF_CARD_INPUT	3.697	0.17
—	—	Battery (measured)	3.702	122.83

Dashboard data = 122.83 – 83 mA (touchscreen + display) = 39.83 mA

Table 4-24 Video decode – H.264 720p, 30 fps

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.958	25.50
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.843	113.32
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.821	0.16
AI_23	GFX	SMPS, S4B	0.820	0.91
AI_4	APC0	Krait 0, SMPS, S5B	0.749	40.20
AI_5	APC1	Krait 1, SMPS, S6B	0.749	0.00
AI_6	APC1	Krait 2, SMPS, S7B	0.749	0.01
AI_78	APC1	Krait 3, SMPS, S8B	0.749	0.01
8A	S1A_OUTPUT	SMPS, S1A	1.248	28.89
0H	S2A_OUTPUT	SMPS, S2A	2.155	19.39
11B	S3A_OUTPUT	SMPS, S3A	1.800	13.85
3L(0E)	WCN_PA_2.9V	LDO, L19	0.014	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.799	0.01
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.000	0.01
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.847	2.06
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.336	0.01
18M	SD_MMC	LDO, L21, sub sboost	0.001	0.00
6H	PX2	LDO, L13, sub sboost	0.002	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.208	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.00
0F	MEM_EMMC	LDO, L20	2.946	0.60
3M(16G)	L17_SUM	CAM123, LDO, L17	0.002	0.00
10F	L10_SUM	PX6,UIM2, LDO, L10	0.002	0.00
15M	L9_SUM	PX5,UIM1, UICC, LDO, L9	0.000	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	2.992	43.07
AI_13_14	—	PWR_EXT	3.692	74.06
16D	VIN_FLASH	VCHG	3.305	0.00
1G	—	RF_CARD_INPUT	3.697	0.14
—	—	Battery (measured)	3.700	163.95

Dashboard data = 163.95 – 77 mA (touchscreen + display) = 86.95 mA

Table 4-25 Video decode – H.264 30 fps 1080p, 20 Mbps

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.959	34.69
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.851	148.45
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.821	0.03
AI_23	GFX	SMPS, S4B	0.820	2.82
AI_4	APC0	Krait 0, SMPS, S5B	0.750	40.06
AI_5	APC1	Krait 1, SMPS, S6B	0.750	0.01
AI_6	APC1	Krait 2, SMPS, S7B	0.750	0.00
AI_78	APC1	Krait 3, SMPS, S8B	0.750	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.246	44.74
0H	S2A_OUTPUT	SMPS, S2A	2.155	19.45
11B	S3A_OUTPUT	SMPS, S3A	1.800	18.66
3L(0E)	WCN_PA_2.9V	LDO, L19	0.000	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.799	0.01
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.000	0.01
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.847	2.06
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.335	0.01
18M	SD_MMC	LDO, L21, sub sboost	0.001	0.00
6H	PX2	LDO, L13, sub sboost	0.002	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.207	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.01
0F	MEM_EMMC	LDO, L20	2.946	1.14
3M(16G)	L17_SUM	CAM123, LDO, L17	0.000	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.002	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	0.000	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	2.992	43.60
AI_13_14	—	PWR_EXT	3.691	75.22
16D	VIN_FLASH	VCHG	3.304	0.00
1G	—	RF_CARD_INPUT	3.696	0.17
—	—	Battery (measured)	3.700	181.63

Dashboard data = 181.63 – 77.68 (touchscreen + display) = 103.95 mA

Table 4-26 Graphics – 3D UI full screen resolution, 30 fps (PowerLift)

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.956	51.02
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.810	97.25
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.827	0.70
AI_23	GFX	SMPS, S4B	0.810	44.12
AI_4	APC0	Krait 0, SMPS, S5B	0.810	57.65
AI_5	APC1	Krait 1, SMPS, S6B	0.810	0.00
AI_6	APC1	Krait 2, SMPS, S7B	0.810	0.00
AI_78	APC1	Krait 3, SMPS, S8B	0.810	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.245	34.96
0H	S2A_OUTPUT	SMPS, S2A	2.152	18.06
11B	S3A_OUTPUT	SMPS, S3A	1.793	16.08
3L(0E)	WCN_PA_2.9V	LDO, L19	0.000	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.797	0.01
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.001	0.01
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.849	2.05
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.331	0.03
18M	SD_MMC	LDO, L21, sub sboost	0.003	0.01
6H	PX2	LDO, L13, sub sboost	0.001	0.01
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.200	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.001	0.03
0F	MEM_EMMC	LDO, L20	2.921	0.10
3M(16G)	L17_SUM	CAM123, LDO, L17	0.000	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.01
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	0.001	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	2.989	46.21
AI_13_14	—	PWR_EXT	3.701	76.57
16D	VIN_FLASH	VCHG	3.325	0.00
1G	—	RF_CARD_INPUT	3.694	0.18
—	—	Battery (measured)	3.702	233.11

Dashboard data = 233.11 – 80.36 mA (touchscreen + display) = 152.75 mA

Table 4-27 3D gaming (Egypt GLB 2.1.1) 60 fps

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.955	93.40
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.900	200.68
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.827	0.04
AI_23	GFX	SMPS, S4B	0.820	124.56
AI_4	APC0	Krait 0, SMPS, S5B	0.850	185.21
AI_5	APC1	Krait 1, SMPS, S6B	0.850	0.00
AI_6	APC1	Krait 2, SMPS, S7B	0.850	0.00
AI_78	APC1	Krait 3, SMPS, S8B	0.850	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.244	82.56
0H	S2A_OUTPUT	SMPS, S2A	2.153	20.37
11B	S3A_OUTPUT	SMPS, S3A	1.793	27.12
3L(0E)	WCN_PA_2.9V	LDO, L19	0.000	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.797	0.01
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.001	0.01
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.849	2.05
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.323	0.01
18M	SD_MMC	LDO, L21, sub sboost	0.003	0.00
6H	PX2	LDO, L13, sub sboost	0.001	0.01
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.181	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.001	0.02
0F	MEM_EMMC	LDO, L20	2.920	0.06
3M(16G)	L17_SUM	CAM123, LDO, L17	0.000	0.00
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.01
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	0.001	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	2.988	53.38
AI_13_14	—	PWR_EXT	0.000	84.76
16D	VIN_FLASH	VCHG	3.319	0.00
1G	—	RF_CARD_INPUT	3.688	0.19
—	—	Battery (measured)	3.702	398.34

Dashboard data = 398.34 – 87.07 mA (touchscreen + display) = 311.27 mA

Table 4-28 Browser over Wi-Fi

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.966	21.81
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.847	68.68
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.808	0.00
AI_23	GFX	SMPS, S4B	0.825	2.47
AI_4	APC0	Krait 0, SMPS, S5B	0.436	13.44
AI_5	APC1	Krait 1, SMPS, S6B	0.436	2.21
AI_6	APC1	Krait 2, SMPS, S7B	0.436	1.48
AI_78	APC1	Krait 3, SMPS, S8B	0.436	1.28
8A	S1A_OUTPUT	SMPS, S1A	1.281	39.79
0H	S2A_OUTPUT	SMPS, S2A	2.150	17.52
11B	S3A_OUTPUT	SMPS, S3A	1.800	10.67
3L(0E)	WCN_PA_2.9V	LDO, L19	0.241	0.15
5C	L8_SUM	AMUX_PU, LDO, L8	1.797	0.01
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.001	0.01
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.849	2.05
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.334	0.00
18M	SD_MMC	LDO, L21, sub sboost	0.003	0.00
6H	PX2	LDO, L13, sub sboost	0.001	0.01
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, SUB SBOOST	1.202	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.001	0.02
0F	MEM_EMMC	LDO, L20	2.937	0.17
3M(16G)	L17_SUM	CAM123, LDO, L17	0.002	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.01
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	0.001	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	2.989	50.77
AI_13_14	—	PWR_EXT	3.693	79.49
16D	VIN_FLASH	VCHG	3.329	0.00
1G	—	RF_CARD_INPUT	3.696	0.17
—	—	Battery (measured)	3.702	166.77

Dashboard data = 166.77 – 85 mA (touchscreen + display) = 81.77 mA

Table 4-29 Video streaming over Wi-Fi (720p)

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.993	37.66
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.954	139.83
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.823	0.73
AI_23	GFX	SMPS, S4B	0.821	2.87
AI_4	APC0	Krait 0, SMPS, S5B	0.827	74.01
AI_5	APC1	Krait 1, SMPS, S6B	0.827	2.32
AI_6	APC1	Krait 2, SMPS, S7B	0.827	1.48
AI_78	APC1	Krait 3, SMPS, S8B	0.827	0.87
8A	S1A_OUTPUT	SMPS, S1A	1.329	76.56
0H	S2A_OUTPUT	SMPS, S2A	2.146	20.93
11B	S3A_OUTPUT	SMPS, S3A	1.796	18.01
3L(0E)	WCN_PA_2.9V	LDO, L19	2.195	0.58
5C	L8_SUM	AMUX_PU, LDO, L8	1.800	0.01
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.000	0.01
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.847	2.06
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.330	0.02
18M	SD_MMC	LDO, L21, sub sboost	0.001	0.00
6H	PX2	LDO, L13, sub sboost	0.002	0.00
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.208	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	0.000	0.01
0F	MEM_EMMC	LDO, L20	2.947	0.14
3M(16G)	L17_SUM	CAM123, LDO, L17	0.001	0.02
10F	L10_SUM	PX6, UIM2, LDO, L10	0.002	0.00
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	0.000	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	2.993	43.50
AI_13_14	—	PWR_EXT	3.688	74.57
16D	VIN_FLASH	VCHG	3.301	0.00
1G	—	RF_CARD_INPUT	3.694	0.01
—	—	Battery (measured)	3.700	265.69

Dashboard data = 265.69 – 82.24 mA (touchscreen + display) = 183.45 mA

**Table 4-30 30 fps at HD 1080p 20 Mbps normal power encode, AAC 128 kbps
44.1 kHz stereo**

Xerxes channel	Regulator	Description	V (volts)	I (mA)
0L	S1B_SUM	On-chip memory, JC_PLL, EBI1, SMPS, S1B	0.966	89.64
AI_01	S2B_SUM	CX1, ADSP, CDC_SDC, USB, PLLs, SMPS, S2B	0.942	424.25
8K	S3B_SUM_MODEM_MSS	Modem hardware, Unicore Hexagon (firmware/software), SMPS, S3B	0.827	0.00
AI_23	GFX	SMPS, S4B	0.825	36.58
AI_4	APC0	Krait 0, SMPS, S5B	0.890	150.96
AI_5	APC1	Krait 1, SMPS, S6B	0.890	13.60
AI_6	APC1	Krait 2, SMPS, S7B	0.890	2.10
AI_78	APC1	Krait 3, SMPS, S8B	0.890	0.00
8A	S1A_OUTPUT	SMPS, S1A	1.240	212.39
0H	S2A_OUTPUT	SMPS, S2A	2.152	24.45
11B	S3A_OUTPUT	SMPS, S3A	1.793	42.72
3L(0E)	WCN_PA_2.9V	LDO, L19	0.000	0.00
5C	L8_SUM	AMUX_PU, LDO, L8	1.797	0.00
16F	L16_SUM	QF, QPA, GPS, LDO, L16	0.001	0.01
16H	L18_SUM	SNRS, DISP_TS, HUM, GEN, LDO, L18	2.849	2.05
18J	VREG_5V	TORCH, SPKRDRV, USB_OTG, DISP_HDMI, boost	3.320	0.00
18M	SD_MMC	LDO, L21, sub sboost	0.003	0.00
6H	PX2	LDO, L13, sub sboost	0.001	0.01
15J	L24_SUM	USB_HS1_2_3_3.3V, USB_FET, LDO, L24, sub sboost	1.182	0.00
16J	L23_SUM	CAM123_3.0V, LDO, L23	2.998	27.59
0F	MEM_EMMC	LDO, L20	2.923	0.09
3M(16G)	L17_SUM	CAM123, LDO, L17	2.843	49.58
10F	L10_SUM	PX6, UIM2, LDO, L10	0.001	0.01
15M	L9_SUM	PX5, UIM1, UICC, LDO, L9	0.001	0.00
15D	L22_SUM	DISP_LCD_MIPI, LDO, L22	2.989	44.09
AI_13_14	—	PWR_EXT	3.675	172.02
16D	VIN_FLASH	VCHG	3.316	0.00
1G	—	RF_CARD_INPUT	3.687	0.14
—	—	Battery (measured)	3.702	536.08

Dashboard data = 536.08 – 198.68 (touchscreen+ display + camera sensor) = 337.4 mA