

Case: 03784292

This case is Closed and is no longer being supported. Any comments added will NOT be received by Qualcomm. For assistance, contact support.cdmatech@qualcomm.com

Case Number	03784292	Account Name	Wingtech Mobile Communications Co., Ltd.
Customer Tracking Number		Contact Name	zk001 zk001
Product Destination/Market		Contact Email	zk001_sw@wingtech.com
Status	Closed	Contact Phone	
Priority	1 - Critical	Date/Time Opened	12/4/2018 10:35 PM
Important to me	<input type="checkbox"/>	Date/Time Closed	1/3/2019 6:22 PM
Customer Project	S87567-8937		
Any CR Related To This Case	No		
Related CRs			
Feature Request	<input type="checkbox"/>		

Customer Project or Hardware Configuration

Customer Project	<div>S87567-8937</div>		
Chipset	<div>MSM8937</div>		
PM	<div><div>None</div><div>PM8937</div><div>PMI8937</div><div>PMI8952</div><div>PMI8952</div></div>	<div>Other</div>	
Other PM IC	<div><div>None</div><div>Other</div><div>WTR2655</div><div>WTR2955</div></div>	<div>WTR2965</div>	
Transceiver		Power Amplifier/Module	<div><div>None</div><div>QFE2340</div><div>QFE4301</div><div>QFE4302</div><div>QFE4303</div></div> <div>Third Party</div>
Antenna Tuner	<div><div>Third Party</div><div>QAT2514</div><div>QAT3514</div><div>QAT3514 (x2)</div><div>QAT3514 (x3)</div></div>	<div>None</div>	PA Power Management IC
			<div><div>Third Party</div><div>QFE2101</div></div> <div>None</div>
Antenna Switch/Module	<div><div>None</div><div>QFE1040</div><div>QSW6310</div><div>QSW8573</div><div>QSW8574</div></div>		LNA/Module
			<div><div>Other</div><div>None</div></div>
			DRX Module
			<div><div>Other</div><div>None</div></div>
			Antenna Switch Diversity
			<div><div>Other</div><div>None</div><div>QAT2522</div></div>
			60Ghz (WiGig) IC/Module
Other RF IC			Bluetooth IC/Module
WLAN IC/Module	<div>WCN3615</div>		<div>WCN3615</div>
Summit DC/DC Converter			NFC IC/Module

AMSS/DMSS Software

AMSS/DMSS Software	AMSS8937
AMSS/DMSS Build ID	1258644
OS Version	
Official SBA Delivered	<input type="checkbox"/>
Official SBA Delivery Date	

Brew Software

Brew Version	
--------------	--

TAM Comments

External TAM Comments

Problem Description Information

Subject

Description

[AMT]功耗[P][WW]3G下打电话电流值过高 (N : 144.17 P : 196.76)

注：N为Android 7.0；P为Android 9.0

测试步骤：

(1) 外接电源供应器电压设定4.0V.

(2) 使用中国电信 3G 卡 或 中国联通 3G卡，并且强迫在3G模式下并且关闭行动数据，讯号强度 -70dBm~-80dBm.

(3) 拨打电话，等待接通后，遮蔽P_Sens。

(4) 确认荧幕关闭，并开启纪录耗电 10分钟

功耗部分分析：在飞行模式待机正常的版本上，按照测试手法，psensor灭屏功耗在185mA左右；power key灭屏功耗在184mA左右，可以排除sensor的影响，并且期间没看到有异常唤醒的波形，请modem分析3G模式下功耗问题；

Modem部分：尝试将N版本Non-HLOS.bin挂载，并将其中的modem.b00 ~ modem.b21文件拷贝到P版本Non-HLOS.bin中，进行sudo fastboot flash modem Non-HLOS.bin操作，并测试功耗，降低至150mA左右。那么究竟如何对P版本代码修改。

对此问题已进行初步分析，详细信息查看qcom case :03772287

需要麻烦分析一下modem log.

联系人：宋开明

联系电话:15996365392

Lab Region

Lab

Problem Area 1

Problem Area 2

Problem Area 3

Case Type

Is this a Security Vulnerability?

Interoperability device

Software Tool Problem?

BSP/HLOS

Power/Thermal (BSP/HLOS)

Power-Modem

Bug/Issue

☐

☐

Resolution Information

Responsiveness To The Case

Quality Of Technical Support

Professionalism Of QC Engineer

Customer Closing Comments

Case Team List

Case Team

Action	Team Member	Account	Member Role	Case Access	Modified By
Edit Remove	Customer Portal User: zk zk	Wingtech Mobile Communications Co., Ltd.	Customer (Read/Write)	Read/Write	zk001 zk001 12/12/2018 10:08 PM

Service Tasks

Service Tasks

No record(s) to display

Contact Information

Name

Account Name

Company Name

Division Name

Contact Office Country

zk001 zk001

Wingtech Mobile Communications Co., Ltd.

Wingtech Mobile Communications Co., Ltd.

China

Customer Number

Contact Number

Email

Created By

Start Date

End Date

Contact Export Flag

163692

3511332

zk001_sw@wingtech.com

tibco provision, 3/5/2018 12:07 AM

3/5/2018 8:05 AM

System Information

Contact Owner

tibco provision

Last Modified By

tibco provision, 1/4/2019 12:49 AM

NEW Case Attachments**QCAPReport.html**

Description **new qcap report**
Uploaded By **Customer**
Owner Alias **zk_sw**
Import Date **12/21/2018 2:53 AM**
File Size **1.197 MB**
Created Date **12/21/2018**
Visible to Customer ☒

Port_COM8.rar

Description **elf**
Uploaded By **Customer**
Owner Alias **zk_sw**
Import Date **12/18/2018 10:07 PM**
File Size **713.099 MB**
Created Date **12/18/2018**
Visible to Customer ☒

railway_config.c

Description **对应qcap report的vdd电压档位定义文件**
Uploaded By **Customer**
Owner Alias **zk_sw**
Import Date **12/18/2018 9:10 PM**
File Size **6.220 KB**
Created Date **12/18/2018**
Visible to Customer ☒

QCAPReport (2).html

Description **修改vddcx vddmx之后的qcap report**
Uploaded By **Customer**
Owner Alias **zk_sw**
Import Date **12/18/2018 9:09 PM**
File Size **1.207 MB**
Created Date **12/18/2018**
Visible to Customer ☒

QCAPReport -N.html

Description **qcap report**
Uploaded By **Customer**
Owner Alias **zk_sw**
Import Date **12/17/2018 5:13 AM**
File Size **3.361 MB**
Created Date **12/17/2018**
Visible to Customer ☒

N版本3g_call ramdump.rar

Description **N 版本ramdump&qcap report**
Uploaded By **Customer**
Owner Alias **zk_sw**
Import Date **12/17/2018 5:13 AM**
File Size **776.055 MB**
Created Date **12/17/2018**
Visible to Customer ☒

QCAPReport.html

Description **1217-p-randump-qcapreport**
Uploaded By **Customer**
Owner Alias **zk_sw**
Import Date **12/17/2018 12:52 AM**
File Size **1.126 MB**
Created Date **12/17/2018**
Visible to Customer ☒

p-mp-debug-ramdump-1217.pt4

Description **对应1217 ramudmp波形**
Uploaded By **Customer**
Owner Alias **zk_sw**
Import Date **12/17/2018 12:51 AM**
File Size **1.415 MB**
Created Date **12/17/2018**
Visible to Customer ☒

1217-p-randump.rar

Description **update ramdump&elf&vmlinux**
 Uploaded By **Customer**
 Owner Alias **zk_sw**
 Import Date **12/17/2018 12:48 AM**
 File Size **0.985 GB**
 Created Date **12/17/2018**
 Visible to Customer ☒

1214-p-3g-call-dump-qcap-report.html

Description **qcap report**
 Uploaded By **Customer**
 Owner Alias **zk_sw**
 Import Date **12/14/2018 3:00 AM**
 File Size **1.108 MB**
 Created Date **12/14/2018**
 Visible to Customer ☒

1214-p-3g-call-dump.rar

Description **ramdump&pt4&ELF**
 Uploaded By **Customer**
 Owner Alias **zk_sw**
 Import Date **12/14/2018 2:49 AM**
 File Size **1.105 GB**
 Created Date **12/14/2018**
 Visible to Customer ☒

Info.zip

Description **log**
 Uploaded By **Customer**
 Owner Alias **zk001_sw**
 Import Date **12/4/2018 10:42 PM**
 File Size **88.712 MB**
 Created Date **12/4/2018**
 Visible to Customer ☒

Case Comments

12/23/2018 6:10 PM

User **Xiaohong Hong**
 Comment **OK, waiting for your result.**

12/21/2018 2:56 AM

User **zk zk**
 Comment **Dear sir :
 我重新抓了一个ramdump, qcap解析结果如下 :
 : npa_resource (name: "/vdd/mx") (handle: 0x8A310518) (sequence: 0x29F00) (units: VReg Corner) (resource max: 8) (active max: 8) (active state: 8) (active headroom: 0) (request state: 8) (required state: 0) (resource attributes: 0x1480) (node_lock: 0x8A310650) (event_lock: 0x8A2DDD60) (l_internal: 0x8A30C370 (request_dur: (max: 17342) (count: 671))) (request_latency: 15000) (fork_latency: 2250) (notify_latency: 300)

 request就是8

 可以参考附件最新report
 BRs**

12/23/2018 5:49 PM

User **zk zk**
 Comment **Dear sir:
 另外补充一点,上周我们同步提供case modem, 分析定位在GPS相关; GPS vote BMIC In turbo mode :

 Please have look into below logs ,we could see that WCDMA_VOICE+GSP NON DPO has been enaled , As per the discussion with GPS team,We are having some issue with GPS has been voting of BIMC to be at NOMINAL rather Turbo in Turbo,
 FIX :The mca vote from GPS is voting for 100MHz. We expect BIMC to be at SVS(120MHz) for GPS NON-DPO

 贵司提供两笔CR
<https://orbit/CR/938726>
<https://orbit/CR/939753>

 目前正常申请中, 待合入后验证是否有效~
 BRs**

12/21/2018 12:53 AM

User **zk zk**
 Comment **Dear sir :
 npa_resource (name: "/vdd/mx") (handle: 0x8A310518) (sequence: 0xB000) (units: VReg Corner) (resource max: 8) (active max: 8) (active state: 4)
 -----> QCAP解析的结果不是现实active state=4吗? 这个对应的应该及时SVS Model吧?

 BRs**

12/21/2018 1:48 AM

User **Xiaohong Hong**
 Comment **Dear customer,

 1) 对的, active state=4 是SVS, 不是turbo.
 2) 目前是同样的 P dump, 从hansei 解析的结果和QCAP有出入。
 我用原生RPM代码解析, 你们可以试下这个方式, 在你们的rpm代码里解析看看。

 Hansei转换RPM dump:
 1. 安装python2.7.
 2. 复制CODERAM.BIN DATARAM.BIN MSGRAM.BIN RPM_AAAAAANAAR.elf 到 rpm_proc/core/bsp/rpm/scripts/hansei目录下。
 3. 执行下列命令
 \$ cd rpm_proc/core/bsp/rpm/scripts/hansei
 \$ python hansei.py --elf RPM_AAAAAANAAR.elf
 CODERAM.BIN DATARAM.BIN MSGRAM.BIN --output rpm_logs/

 然后可以在rpm_logs目录下看到关于mx的输出文件: railway.txt**

12/19/2018 10:59 PM

User **Xiaohong Hong**
 Comment **Dear customer,
 1) 测试步骤请参考文档 80-N6837-1 的 4.1 节。**

12/19/2018 10:22 PM

User **Xiaohong Hong**
 Comment **Dear customer,
 1) 内部确认还没明确结果。
 2) 请注册仪表测试, 测试WCDMA通话, 验证下电流是否正常, 还是在实网下, 才有存在异常。**

12/19/2018 4:04 AM

User zk001 zk001

Dear Supporter,

目前项目时间很紧，基本上不会考虑升基线了，所以请尽快分析modem 投票 Turbo 的原因。

Thanks.

12/19/2018 1:52 AM

User Xiaohong Hong

Dear customer,

1) 目前还没结果。

2) 另外，你们也排查下modem 端的修改。

根据我们如下文档的测试报告，这个基线，注册仪表测试 WCDMA call 电流是正常的。

KBA-181128035230

12/19/2018 12:28 AM

User Xiaohong Hong

Dear customer,

正在内部确认MPSS相关资源投票turbo问题。

12/18/2018 11:55 PM

User zk zk

Dear sir:

2)---->修改如下：

```
void railway_init_proxies_and_pins(void)
{
+ const int cx_rail_id = rail_id("vddcx");
+ const int mx_rail_id = rail_id("vddmx");
+ assert(RAIL_NOT_SUPPORTED_BY_RAILWAY != cx_rail_id);
+ railway_voter_t cx_pin = railway_create_voter(cx_rail_id, true,
+ RAILWAY_RPM_INIT_VOTER);
+ railway_corner_vote(cx_pin, RAILWAY_NOMINAL);
+
+ assert(RAIL_NOT_SUPPORTED_BY_RAILWAY != mx_rail_id);
+ railway_voter_t mx_pin = railway_create_voter(mx_rail_id, true,
+ RAILWAY_RPM_INIT_VOTER);
+ railway_corner_vote(mx_pin, RAILWAY_NOMINAL);
}
```

-----> pin cx&mx到NOMINAL mode；

验证failed！

3)----> 在2)的基础上修改如下：

```
--- a/RPM.BF.2.2/rpm_proc/core/power/railway_v2/src/railway_adapter.c
+++ b/RPM.BF.2.2/rpm_proc/core/power/railway_v2/src/railway_adapter.c
@@ -154,6 +154,8 @@ railway_corner rpm_rail_level_remap(rail_voltage_level
voltage_level)
default:
CORE_VERIFY(0);
}
+
+ corner_val = RAILWAY_NOMINAL;
return corner_val;
```

验证依旧如此；

请问是否还有其他方案修改验证！

BRs

12/18/2018 10:16 PM

User zk zk

dear sir：

bin档已上传完毕，请check

BRs

12/18/2018 9:11 PM

User zk zk

Dear sir:

修改过vddcx vddmx电压定义的code和report已同步上传，帮忙check下修改是否生效！

BRs

12/18/2018 7:12 PM

User Xiaohong Hong

Dear customer,

1) 没发现直接API修改modem侧。每个资源投票，最终是到RPM去执行的。如果要改电压验证，请把cx和mx同时改。如下是之前dump，P和N的区别。如果要验证修改后的电压状态，请再抓取dump分析。

VDDMX:
RAILWAY_SUPER_TURBO vs RAILWAY_NOMINAL

3) 针对dump 解析结果有差异，建议你们用硬件分解来确认，这个可以准确确认多出的电流耗在哪个模块。

12/20/2018 12:45 AM

User Xiaohong Hong

Dear customer,

1) 根据目前的确认，解析出来的RPM log 和 QCAP log，mx 投票等级不一致，qcap 里的请求是4，对应的是 RAILWAY_SVS_HIGH 等级。

请在P上，再抓取个dump，尽量在kernel 睡眠下触发。提供下对应的dump和符号文件，以及另加这个hash文件。
modem_proc/build/myps/qshrik/msg_hash.txt

Comment ----logs-----

RPM hansei log：

~~ RAIL vddmx ~~

CURRENT ACTIVE:
mode: RAILWAY_SUPER_TURBO

QCAP log：

npa_resource (name: "/vdd/mx") (handle: 0x8A310518) (sequence: 0xB000) (units: VReg Corner) (resource max: 8) (active max: 8) (active state: 4)

12/19/2018 10:51 PM

User zk001 zk001

Dear Supporter,

还请帮忙尽快确认。

Comment 我们这边也尝试看是否能用仪表测试，还请告诉仪表侧关于 wcdma通话的具体参数配置。

Thanks.

12/19/2018 6:17 PM

User zk001 zk001

Comment Any update?

12/19/2018 1:57 AM

User Xiaohong Hong

Dear customer,

1) 另外，看下你们的基线是这个：

Snapdragon_High_Med_2016.SPF.3.1.2 N/A 0.0.003.0

我们测试数据用的是这个，你们可以尝试用这个的 modem 代码去试下。

Snapdragon_High_Med_2016.SPF.3.1.2 N/A 0.0.009.0

12/19/2018 1:30 AM

User zk001 zk001

Dear Supporter,

请问有确认结果了吗？

Comment 这个问题已经block fota 版本，很紧急，请帮忙加快处理。

Thanks.

12/19/2018 12:09 AM

User zk001 zk001

Dear Supporter,

在提供测试用的验证方法之外，还请分析为什么会投票到 turbo模式？

Comment

Thanks.

12/18/2018 11:02 PM

User Xiaohong Hong

Comment Dear customer,

1) 从dump解析结果看，CX和MX 还是和之前的log一样。

2) 尝试用 KBA-160828185136 的最后一种方式，通过修改代码，看能否固定在某个等级。

3) 如果上述KBA也没法固定，试着在电压等级判断时，把 corner_val 的值设置一样。

rpm_proc/core/power/railway_v2/src/railway_adapter.c

<https://qualcomm-cdmatech-support.my.salesforce.com/5003A00000sa8hW/p?retURL=/5003A00000sa8hW> 6/8

User Xiaohong Hong
Dear customer,

1) 需要解析RPM 来分析系统电压状态；请抓取能正常解析RPM、AP、modem的对比dump及符号文件。

2) 请试下这个配置，adb 设置好后，请按一下 power 键，看能否进入dump。如果可以，请在通话稳定，用power 键触发dump。

Comment
adb root;
adb shell;
cd /sys/kernel/debug/spmi/spmi-0;
echo 0x840 > address;
echo 0 > data;
echo 0x841 > address;
echo 0 > data;
echo 0x842 > address;
echo 1 > data;
echo 0x843 > address;
echo 0x80 > data;

12/14/2018 5:17 AM

User Xiaohong Hong
Dear customer,

1) 从QCAP解析结果看，RPM的符号表不匹配，请确认dump和符号表是同一时间的软件版本。

Symbol Mismatch:
=====

Comment Yes

2) power key长按进入dump，从kernel的log看，kernel 已经被唤醒了，没法准确表示通话时的状态。因为通话时，kernel 是睡眠的。请尝试用 PS_HOLD 或 配置音量键的方式抓取触发dump。

197.210543: <6> PM: suspend exit 2018-12-14 05:05:22.028503538 UTC
197.698939: <6> [NVT-ts] nvt_ts_resume 1716: end

12/11/2018 12:42 AM

User Xiaohong Hong
Dear customer,

Comment 试着在adb 执行这个指令，验证机器是否进入dump：
adb root;
adb shell;
echo c >/proc/sysrq-trigger

12/10/2018 11:32 PM

User Xiaohong Hong
Dear customer,

Comment 1) 电流瞬间变为0，是USB灌电流引起的。
请按下音量下键后，等电流基本稳定在一个数值后，接上usb抓取dump。

12/10/2018 11:28 PM

User Xiaohong Hong
Dear customer,

Comment 1) 按下音量下键后，电流是否会稳定在一个数值？
如果是，应该可以进入dump；
接入usb数据线关机，请确认下这个节点，是否使能了download 模式，或者你们是否关闭进dump：
echo 1 > /sys/module/msm_poweroff/parameters/download_mode

12/6/2018 1:16 AM

User Xiaohong Hong
Comment Dear customer,

1) 抓取ramdump方式：触发进入ramdump后，用QPST 工具抓取。这个不清楚的话，可以和你们 BSP stability的同事沟通下，他们分析死机问题，经常要dump。
2) 触发dump方式：
在通话电流稳定时，将PS_HOLD 引脚短触一下到GND(接触时间小于200ms)，机器会进入dump，电流会稳定在一个数值，再接上usb，用QPST 工具抓取。

如果没有将PS_HOLD 飞线出来，可以尝试用这种方式触发dump：
adb root;
adb shell;
cd /sys/kernel/debug/spmi/spmi-0;
echo 0x844 > address;
echo 0 > data;
echo 0x845 > address;
echo 0 > data;
echo 0x846 > address;
echo 1 > data;
echo 0x847 > address;
echo 0x80 > data;
然后拔掉usb测试，在通话电流稳定时，按一下 "音量减" 按键，机器会进入dump。
这个可以在配置完后，按一下 "音量减" 按键，验证下是否可用。如果可用，再测试。

12/18/2018 12:38 AM

User zk zk
Dear sir:
如上位置只有对电压档位的支持，并没有对clock的修改~
...
62 .default_uvsnv = (const unsigned[])
63 {
64 0, // RAILWAY_NO_REQUEST
65 750000, // RAILWAY_RETENTION
66 1050000, // RAILWAY_SVS_LOW
67 1050000, // RAILWAY_SVS_SOC
68 1225000, // RAILWAY_SVS_HIGH
69 1225000, // RAILWAY_NOMINAL
70 1287500, // RAILWAY_NOMINAL_HIGH
71 1350000, // RAILWAY_TURBO
72 1350000, // RAILWAY_SUPER_TURBO
73 1350000, // RAILWAY_SUPER_TURBO_NO_CPR
74 1400000, // RAILWAY_SUPER_TURBO_HIGH
75 },
BRs

12/17/2018 11:36 PM

User zk zk
Dear sir:
另外请教下，root版本下可否手动调节这个VDD MX最大值到384MHZ，这样我可以在P版本上验证下是否有效，方便定位下这个问题！
BRs

12/17/2018 10:57 PM

User Xiaohong Hong
Dear customer,

1) 从 P 的dump看，对clock的投票值应该是384000。你们是哪个log 有Q6 Clock 不同差异的？请提供下log。

Comment
npa_resource (name: "/clk/cpu") (handle: 0x8A31B148) (sequence: 0x39E00) (units: KHz) (resource max: 691200) (active max: 691200) (active state: 384000)

12/17/2018 7:05 PM

User zk zk
Dear sir:
modem部分通过对比P和N版本的log也定位到，P版本Q6 Clock : 691200khz；N版本Q6 Clock : 384000khz；
6870473 cfc_m_cpu_monitor.c 349 H CFCM using CLM: CPU percentage utilization is 27, dne_attempts 0, Current Q6 Clock : 691200 KHz
10148550 cfc_m_cpu_monitor.c 349 H CFCM using CLM: CPU percentage utilization is 23, dne_attempts 0, Current Q6 Clock : 384000 KHz
帮忙check下这个Q6 Clock如何debug？
BRs

12/17/2018 5:15 AM

User zk zk
Dear sir:
N 版本对应的ramdump和qcac report已经提供，再帮忙check下！
另外请问下正常情况下应该是哪种模式？
BRs

12/17/2018 12:53 AM

User zk zk
Dear sir :
新的ramdump&QCAC&PT4已经提供，请帮忙协助分析~
BRs

12/16/2018 7:25 PM

User zk zk
Comment Dear sir:
我本地只导入了vmlinux和modem的ELF文件，所以RPM的符号表显示mismatch；
提供给你的ELF和vmlinux都是同版本编译出来的，肯定是匹配的；
请帮忙解析下，因为PS_hold在主板背面，没法飞线出来接她，目前只能通过power key方式进入dump，能否针对当前

3) 分析一下modem log, 需要让modem CDMA 协议看, 需要指出对应的modem log文件, 让他们对比两个版本的协议行为是否有差异。建议选择这个PA, 不然, 可能又转到power这边了。

PA: modem --> CDMA1x--> Call

BR
Hong Xiaohong
0755-36655803

12/5/2018 12:22 AM

User zk001 zk001
Comment 是否可以提供一下抓ramdump的方法。

抓取的log, 分析下在power key唤醒之前的部分log协助定位问题呢?

我本地再同步尝试修改音量键进入dump~

BRs

12/14/2018 3:33 AM

User zk zk
Dear sir :
P上3G call相关dump已经提供, ramdump进入方式是通过power key长按进入的, 请再协助查看相关modem log
BRs

12/10/2018 11:46 PM

User zk001 zk001
使能
echo 1 >
/sys/module/msm_poweroff/parameters/download_mode
Comment 接入USB电流还是变0, 然后就一直是0了。
是否可以给个电话。0755-36655803这个打不通
联系人: 宋开明
联系电话:15996365392

12/10/2018 11:28 PM

User zk001 zk001
Comment 是电流瞬间变为0, 没有关机。拔了USB之后电流又回到稳定状态了。

12/10/2018 11:20 PM

User zk001 zk001
操作步骤 :
adb root;
adb shell;
cd /sys/kernel/debug/spmi/spmi-0;
echo 0x844 > address;
echo 0 > data;
echo 0x845 > address;
echo 0 > data;
echo 0x846 > address;
echo 1 > data;
echo 0x847 > address;
echo 0x80 > data;
拔掉USB数据线, 观察电流变化, 等待稳定后按下音量下键, 再接入usb数据线时手机自动关机。这是什么情况

12/6/2018 12:28 AM

User zk001 zk001
Comment 是否可以提供一下抓ramdump的方法。