

Example: idle_profile_nonos 对整个 CC3200 的电源管理方案进行测试

2016.1.22-Terry Han

测试数据记录:

M4 Active+NWP connect AP =15.9mA

M4 LPDS+NWP connect AP =600uA~2mA 波动 大约平均功耗为 1mA 左右

M4 LPDS+NWP start but do nothing 即 sl_start 但不连接 AP =282uA

M4 LPDS+NWP 进入 Hib 模式 229uA 注意此时网络已经断开, 但是 RAM 还是保存的!

M4 Hib+NWP 进入 Hib 模式 10.65uA(注意 Hib 模式下测试的电流消耗为 CC3200+SPI_Flash 的功耗, 而 Datasheet 上 4uA 是不包括 SPI_Flash 的功耗)

MCU ACTIVE	TX power level = 0	229	mA
54 OFDM	TX power level = 4	166	
RX	1 DSSS	59	
	54 OFDM	59	
NWP idle connected ⁽³⁾			15.3
MCU LPDS	TX power level = 0	229	mA
54 OFDM	TX power level = 4	160	
RX	1 DSSS	53	
	54 OFDM	53	
NWP LPDS ⁽⁴⁾			0.25 250uA-64kRAM 266uA-128kRAM
NWP idle connected ⁽³⁾			0.825

peripheral and pin configurations. 连接AP不发数据空闲模式下, 测试电流为1mA左右, 多数在600uA波动

- Total system current (incl WiFi and network periodic wake-up) as low as 700uA.
- When networking and WiFi subsystems are disabled, chip draws around 120uA.
 - 40MHz XTAL and PLL are turned off. 32.768 KHz XTAL is kept alive.
 - Most of digital logic is turned off. Digital supply voltage is reduced to 0.9V.

相当于把nwp进行sl_stop进入hib模式? 也就是M4=LPDS+NWP=hib模式功耗?
那此时连接也断开了, 也无法连接网络了!! 但是此时M4的RAM还是保存的, 并不需要重启! 测试功耗229uA

---TRM

MCU hibernate ⁽⁵⁾	NWP hibernate ⁽⁶⁾	4	μA
Peak calibration current ⁽⁷⁾	V _{BAT} = 3.3 V	450	mA
	V _{BAT} = 2.1 V	670	
	V _{BAT} = 1.85 V	700	

- (4) LPDS current does not include the external serial flash. The LPDS number reported is with retention of 64KB MCU SRAM. The CC3200 device can be configured to retain 0KB, 64KB, 128KB, 192KB or 256KB SRAM in LPDS. Each 64KB retained increases LPDS current by 4 μA.
- (5) For the 1.85-V mode, the Hibernate current is higher by 50 μA across all operating modes because of leakage into the PA and analog power inputs.
- (6) Serial flash current consumption in power-down mode during hibernate is not included.
- (7) The complete calibration can take up to 17 mJ of energy from the battery over a time of 24 ms. Calibration is performed sporadically.

模式	条件	电流消耗	测试图	Datasheet
M4 Active+NWP connect AP	1	15.9mA	图 1	15.3mA
M4 LPDS+NWP start but do nothing	2	282uA	图 2	(250+16)uA
M4 LPDS+NWP connect AP	3	600uA~2mA	图 3 图 4	825uA
M4 LPDS+NWP Hib	4	229uA	图 5	120uA
M4 Hib+NWP Hib	5	10.65uA	图 6	4uA

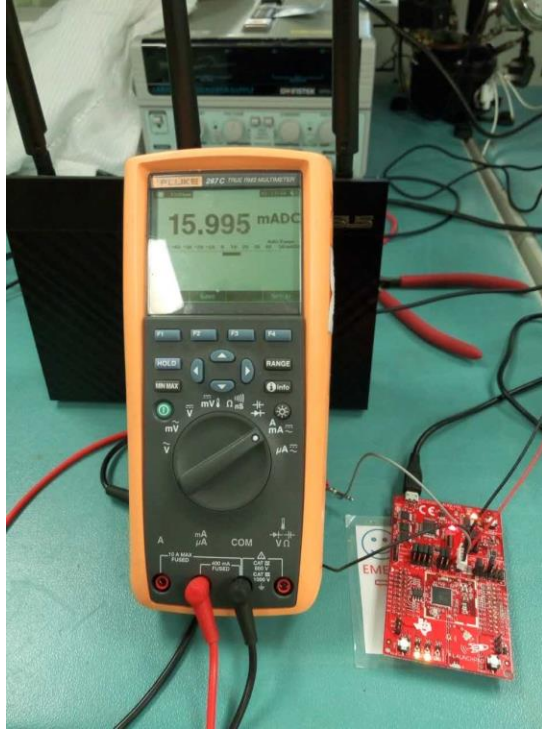


图 1

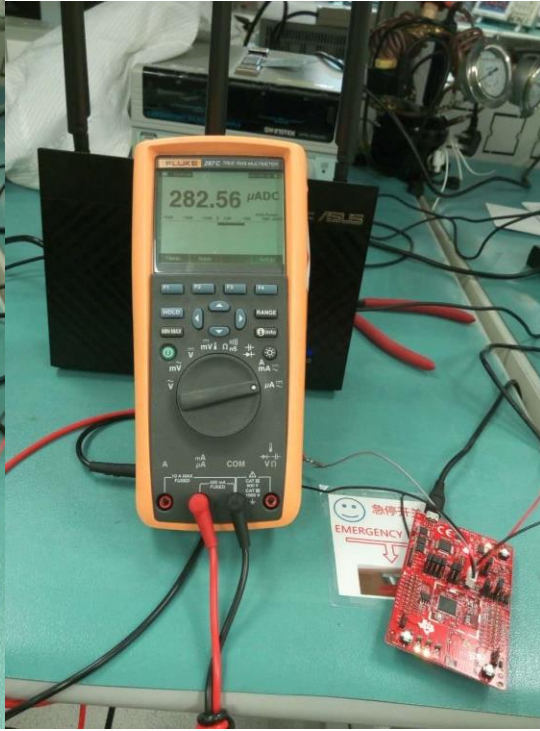


图 2

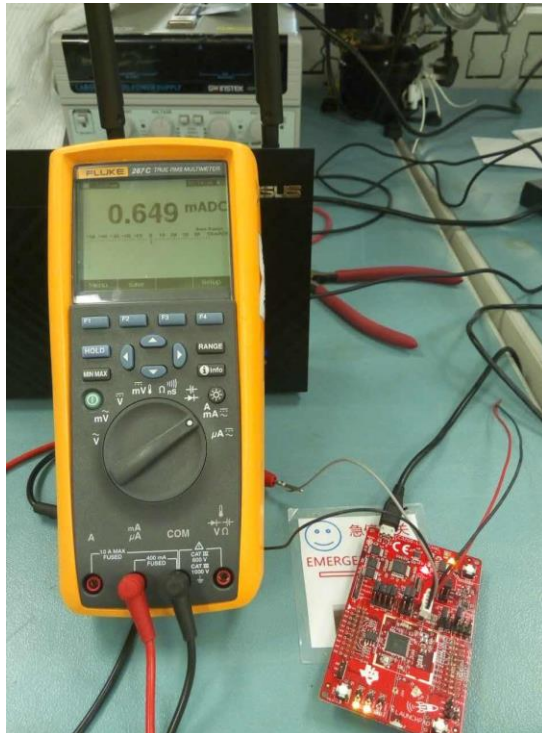


图 3

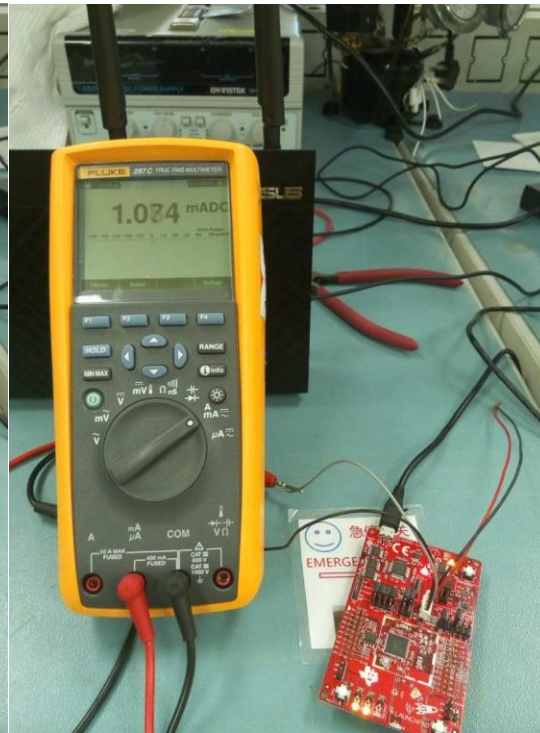


图 4

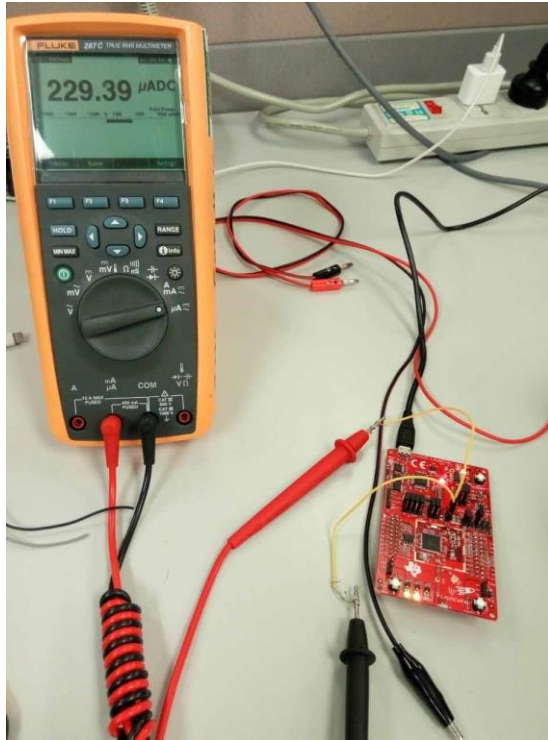


图 5

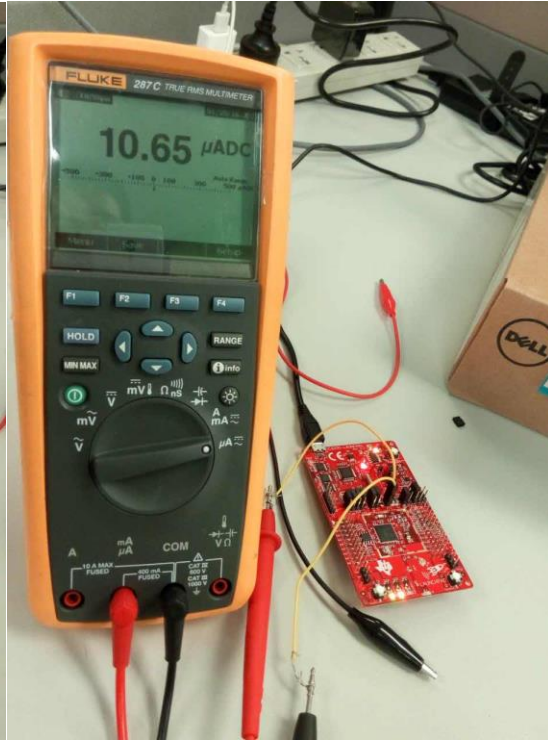


图 6

特别注意从 CC3200 的 Datasheet 中可以发现 NWP 在没有网络活动时会自动休眠！
从测试条件 2 测试就会得出，在启动 NWP 没有连接网络时，NWP 整体功耗很低！