

# [實例]使用 R&S®RT-ZVC 量測物連網設備功 率消耗

### 1 使用 CMWrun 量測電池壽命

使用CMWrun的好處是,CMWrun可以同時結合RT-ZVC與CMW來模擬整個網路 環境並且執行電流電壓的量測。使用多重工作的編程腳本(multi-threaded testplans),同時可以執行CMW的無線環境模擬與執行RT-ZVC的電流電壓量測。 與CMW結合的時候,CMWrun會監測CMW的運行狀況,並且把連線的狀況截取 回來,在電流電壓的量測報告上形成一個事件標記(event markers)。這些事件標 記可以使工程師很容易了解,在連線上時設備的電流電壓有何種變化,或是設 備已經進入節能狀態時電流電壓會有何種反應。

#### 1.1 架設 CMWrun、CMW500 與 RT-ZVC

以下的程序解釋了如何將CMWrun與CMW結合起來:

- 先將CMW與PC(裡面執行CMWrun)用網路線連接起來,並且確認他們是在 同一個網域內。
- 2. 按下CMW上面的"SETUP"按键(位於CMW螢幕左側的實體按鍵)。
- 3. 選擇"System"→"Lan Services",接著選擇"Lan Remote"。
- 根據網路的配置,啟動DHCP或是鍵入固定的IP位置。通常會啟動DHCP, 這樣CMW就會被自動配置到IP位置。
- 5. 接著到CMWrun,選擇"Resources"→"SCPI Connections",接著按下"Add..."
   來新增一個新的CMW連線。
- 6. 按下"Assistant"來設定"Remote interface Assistant",然後填入以下欄位:

- "Alias"是CMW的代稱
  - "Resource Name"可以經由Assistant幫助填寫完成,首先"Interface Type"就選擇"VXI11(Network)",使用網路位置連線,接著將CMW所 顯示的位置,填寫至"Host Name"或"IP Address"。所以最終 的"Resource Name"可以表示成TCPIP::CMW500::inst0::INSTR。
- 7. 按下"OK"之後退出新增連線的頁面。
- 8. 可以在"SCPI Connections"中按下"Test Connection"來測試連線是否成功。

D	Alias	Resource Name	Timeout
	LocalHost	TCPIP0::127.0.0.1::INSTR	20000
	CMW500	TCPIP::CMW50050-101440::inst0::I	20000

#### 圖4-1: 在CMWrun中選擇主要的SCPI連線

只要執行上述的程序,全域的SCPI連線就會被設定完成。之後所有新的測試題 目都會依著主要的全域設定連線來執行。當然個別的測試題目,也可以經由選 擇不同的"Resource",來設定新的連線,如圖4-2所示。

Run 🖾 Abort 🕅 Step 🛛 Idle	🔄 🤪 Parameters 📑 Resources 🔹 🗹 Edit 📲 Save As
	Measurement Report
	SCPI Connections
Steps	SCPI Report
Battery Test	Test Setup

#### 圖4-2: 在個別的測試題目中選擇SCPI連線

只要在灌CMWrun的時候將RT-ZVC的USB驅動程式,並且提供直流6伏特,2安培 的電力,使用USB3.0的USB線材連接至電腦上,不需要個別去設定RT-ZVC,只需 要執行CMWrun中的"Power Consumption Monitor"題目,即可量測電壓電流。



#### 1.2 設定耗電量測題目

只要執行 CMWrun 之中的 CMW-KT051 基本量測功能中的耗電量測題目,即可使用 RT-ZVC 執行電壓電流的量測。

在 CMWrun 中的"File Browser"中,在"Test"的檔案夾之下,尋找並雙擊打

開"PowerConsumptionMonitor"題目,一個新的測試題目就可以產生,如圖 4-3

所示。



#### 圖 4-3: 開啟並新增一個新的耗電測試題目

在開始量測電壓電流之前,要先設定好量測的參數。要設定參數只要雙擊 在"Testplan Details"裡面的"PowerConsumptionMonitor"步驟。點擊這個步驟, 我們就可以把設定頁面"Power Consumption Meas"開啟,如圖 4-4 所示。

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Rower Consumption Meas		( and a second s	×		
Measurement Device: RT-ZVC -					
Calculation Settings Display Settings		Event Marker Settings			
Battery Capacity (mAh) # Of Vertical Grid I 2000 10	Lines	Time For Max Sample Rate After Event (s)			
Measurement Function Diagram Range	×				
Average  Min: -1.000	🚖 Max: 5.000 🖨				
USB Sample Rate Display Sample Ra	otc				
50K5a/s - (0.02ms) - 105a/s - (100ms)	•				
RT_ZVCxx-Muti-Channel Power Probe					
(e) R1-21/LU4 (4 Point)	wer Groups) O H I-	ZVLUZ (Z Power Groups)			
ZVC Ch1	ZVC Ch2 ZVC C	h3 ZVC Ch4			
RT-ZVC 1					
- Power Group					
Enable Power	Enable Current	Enable Voltage			
Power	Current	Votage			
	O Internal Shunt O External Shi	unt Constanting			
	Range: 4.5A		_		
			_		
Channel Scaling: 1	Channel Scaing: 1	Channel Scaling: 1	_		
Line Name ZVC_WCH1	Line Name ZVC_ACH1	Line Name ZVC_VCH1	=11		
✓ Display Average Line	✓ Display Average Line	Display Average Line			
Aver. Color	Avar. Color	Aver. Color			
		OK	Cancel		
			Johnoo		

圖 4-4: Power Consumption Measurement 設定頁面

設定頁面的上面三組的設定為 RT-ZVC 一般功能設定,而下面其他部分則是個別 量測通道的設定。從左上方的欄位開始看,在這邊可以定義一顆電池的電量, 根據量測的功率損耗,就可以反推一顆電池壽命是多少。RT-ZVC 的量測速率為 每秒五百萬個取樣點(5 MSa/s),由於受限於 USB 的傳輸速率,

RT-ZVC 可以將抓取區間的最大值(Peak)或是平均值(Average)回傳。

而目前最高的 USB 傳輸速率,為每秒五萬個取樣點(50 KSa/s)。

上方中間部分"Display Setting"是定義報告網格所呈現的方式。經由選取恰當的 觀察區間,所量測的電壓電流值,以及算出的功率消耗都會依照時間排列清



楚。比如說量測的電壓值為 USB 給電,電壓為 5 伏特直流電壓,所以要選取的 觀察區間就會是-1 至 6。

"Display sample rate"是定義顯示在報告上的時間精細度,當然越高的精細度可 以看到量測值越精細的表現在時間軸上,但是所花的記憶體就會比較多,而且 使用比較低的時間精細度,可以得到比較宏觀並且好觀察的報告。當然預設的 取樣速度會因為事件標記(event marker)的產生而動態增加。這個設定值在右上 的"Event Marker Settings",當事件標記產生時,會驅動顯示取樣速度會加速與 USB 取樣速度一樣快。

在"RT\_ZVCxx-Multi-Channel Power Probe"底下可以選擇不同的 RT-ZVC 模 組,並且開啟想要量測的通道。選擇一個通道,最底下的欄位"Power group", 就可以個別的開啟電壓、電流與電壓的量測;每一個項目的區間要正確的設 定,若是有項目超過設定的區間, RT-ZVC 就會亮起紅色的超流過保的燈號,並 且切斷量測電路。

圖 4-5 展示一個通道的電流電壓量測完整的設定值。這一個設備因為是從 USB 供電,所以大概會有 5 伏特直流的電壓,所以電壓的區間我們就設定在 7.5 伏 特;而我們將顯示的最低區間設定在-1,這樣會讓比較接近 0 的數值容易被觀 察到;因為 IoT 的電流都很小,所以設定在內部分流(internal shunt)並且設定為 4.5 安培,以防止設備抽不到電流;而我們刻意的將量測到的電流值在報告上 放大 10 倍,這樣才不會因為電流太小而不易觀察。

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A Power Consumption Meas									
Measurement Device: RT-ZVC									
Calculation Settings Display Settings	Even	t Marker Settings							
Battery Capacity (mAh) # Of Vertical Grid L	ines Tim	e For Max Sample Rate After Event (s)							
3000 🚖 14	÷	0							
Measurement Function Diagram Range	A Marc 6 000								
USB Sample Rate Display Sample Rate	te								
105a/s - (100ms)	•								
PT 70/Car M # Channel Rever Braha									
RT_ZVCX-Wuti-Channel Power Probe     RT_ZVC04 (4 Power)		(2 Power Groupe)							
✓ ZVC Ch1	ZVC Ch2 ZVC Ch3	ZVC Ch4							
RT-ZVC 1									
Power Group									
Enable Power	Enable Current	Enable Voltage							
Power	Current	Voltage							
	Internal Shunt								
	Range: 4.5A 💌	Range 7.5V -							
	Ext R: 50.000 🔄 mΩ 👻								
Channel Scaling: 1	Channel Scaling: 10	Channel Scaling: 1							
Line Name Power	Line Name Current	Line Name Voltage							
Line Color									
Display Average Line	✓ Display Average Line	Display Average Line							
Aver. Color	Aver. Color	Aver. Color							
		OK Cancel							
		Canter							

圖 4-5: Power Consumption Measurement 設定參考

使用"File Browser"先把既有存在的題目打開,然後編輯既有的題目是最快速創造一個新題目的方式。當然一個題目也可以在每一個步驟中呼叫不同的題目,這樣使得 CMWrun 可以多工並行不同的題目。要編輯一個既有的題目,只要如圖 4-6 一樣,按下"edit"進入到編輯模式,就可以很方便的編輯想要的題目。



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圖 4-6: 開啟、編輯與執行

#### 1.3 創造多工題目

使用 CMWrun 與 RT-ZVC 的最大優點,就是可以一邊的控制 CMW 來模擬網路環境,一邊的控制 RT-ZVC 量測電壓電流,來達成多工的目的。只要在 CMWrun 裡面編輯好,這些題目都可以平行處理。

我們可以藉由在一個題目裡面放置"Start Test Plan",如圖 4-7 所示,在這一個 步驟之中,我們可以呼叫其他的題目平行執行。呼叫的路徑可以是一個絕對路 徑,也可以是一個相對在根目錄底下的相對路徑。而被呼叫的題目所產生的報 告也可以合併至主題目的報告之中。



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🏂 Start Test Plan	×
Settings	
Test Plan Browse	
ABattery Test rstp	
Relative Path - Master Test Plan:     C:\Users\naehring\Documents\MyData\1MA281\1MA281 Testplans\LTE_Threaded.stp	1
Merge Sub Report after finished	
☑ Abort Sub Test Plan on Master "Early Fail" Condition	Hide Execution Info in Measurement Report
	OK Cancel

圖 4-7: 設定平行執行

通常量測電壓電流都是從設備開始抽電,然後整個觀察都結束之後,再將量測 的題目關閉。所以耗電量測的題目通常都會是被呼叫的題目,如圖 4-8 所示, 在主題目一開始的時候,被呼叫起來量測電壓電流,在主題目整個跑完之後, 就再次被呼叫關閉,最終兩份報告也會被合起來。

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#### 圖 4-8: 平行多工流程圖

#### 1.4 事件標籤

事件標籤可以幫助工程師在觀看電壓電流的量測時,追蹤網路端所發生的事件。有兩個方式可以建立事件標籤。

第一種方式就是自定義事件標籤然後放置在題目中,從"Elements"→"Report"中使用"EventChartMarker",就可以手動設定想要在某個步驟放至事件標籤。

第二種方式就是 CMWrun 自動的觸發並且建立事件標籤。通常有幾種狀況會觸發自動建立事件標籤:

- 信令的狀態改變:通常會在建立連線的步驟觸發
- 組態步驟的改變:比如功率的設定改變或是頻寬,調變等資源的改變

## 2 創立題目範例

#### 2.1 USB 供電的 LTE 設備

在這一個範例中,如圖 5-1 的接線方式,LTE 設備從製具中的 USB 孔位抽電, 然後從製具中可以拉出電壓電流的腳位,交給 RT-ZVC 來做量測;LTE 設備連接 到 CMW 模擬網路信令行為。



圖 5-1: LTE 設備量測設置

LTE 設備是由 USB 抽電,為了方便接上電壓電流的探針,使用了一個客製化的 製具,這個製具兩端都是採用 USB 3.0 的接頭,方便 USB 的設備連接。當然另 外一端可以直接使用 USB 給電,也可以使用電源供應器 R&S<sup>®</sup>HMC 8034 來供



電。可以看到這個製具的上端有著電流計與電壓計的接點,方便連接至 RT-ZVC 上,在電流計的部分,製具也提供了外部分流的接頭,所以工程師可以使用內 部分流或是外部分流,端看設備的電流負載。

耗電量測的部分,在 CMWrun 可以使用平行多工的方式,一方面模擬 LTE 在信 令模式下工作的行為,一方面也可以量測耗電。開

啟"PowerConsumptionMonitor",選擇第一個通道量測,選擇開啟電壓、電流與 功率量測,並且依照設備的最大電壓與最大電流選擇量測區間。這一個設備因 為是從 USB 供電,所以大概會有 5 伏特直流的電壓,所以電壓的區間我們就設 定在 7.5 伏特;而我們將顯示的最低區間設定在-1,這樣會讓比較接近 0 的數 值容易被觀察到;因為 IoT 的電流都很小,所以設定在內部分流(internal shunt) 並且設定為 4.5 安培,以防止設備抽不到電流;而我們刻意的將量測到的電流 值在報告上放大 10 倍,這樣才不會因為電流太小而不易觀察,如圖 5-2 的設 定。

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leasurement Device: RT-ZVC	•				
Calculation Settings Display Settin	gs E	vent Marker Settings			
Battery Capacity (mAh) # Of Vertical	Gnd Lines	Time For Max Sample Rate After Event (s)			
3000 🚖 14	×	1.000			
Measurement Function Diagram Ran					
Average  Vin: 1.000 Nin: 1.000 Nin: 1.000 Nin: 1.000	/ Max: 5.000				
1KSa/a (1ma) VIIII 10Sa/a (1ma)					
	Unisy				
RT_ZVCxx-Muti-Channel Power Probe					
<ul> <li>RT-ZVC04</li> </ul>	(4 Power Groups) ORT-ZVC	C02 (2 Pawer Groups)			
ZVC Ch1	ZVC Ch2 ZVC Ch3	ZVC Ch4			
RT-ZVC 1					
Power Group					
Enable Power	Enable Current	Enable Votage			
Enable Power	Enable Current     Current	Enable Votage Voltage			
Enable Power	Enable Current     Current     Internal Shunt     Curtenal Shunt	☑ Enable Votage - Voltage			
Power	Enable Qurrent     Current     Internal Shunt     Range: 4.5A	<ul> <li>✓ Enable Votage</li> <li>Voltage</li> <li>Range 7.5V </li> </ul>			
Enable Power	✓ Enable Current         Ourrent         ● Internal Shunt       External Shunt         Range:       4.5A         Ext R:       50 000         mΩ	<ul> <li>✓ Enable Votage</li> <li>Voltage</li> <li>Range</li> <li>7.5V</li> </ul>			
Enable Power	✓ Enable Current         Ourrent         ● Internal Shunt       ● External Shunt         Range:       4.5A         Ext: R:       50.000       ♠ mΩ	Enable Votage      Voltage      Range 7.5V			
Enable Power Power Charpel Scaling:	✓ Enable Qurrent     Current     ● Internal Shunt ● External Shunt     Range: 4.5A     Ext R: 50 000				
Enable Power Power Channel Scaling:	Current     Current     Internal Shunt     Range: 4.5A     Ext R: 50 000     ♠ mΩ      Channel Scaling: 10     Log Nerre				
Enable Power      Power      Channel Scaling:      I      Line Name     Power      Line Data	<ul> <li>✓ Enable Current</li> <li>Current</li> <li>Internal Shurt</li> <li>External Shurt</li> <li>Ext R: 50 000</li> <li>mΩ</li> <li>Channel Scaling: 10</li> <li>Une Name</li> <li>Current</li> </ul>				
Enable Power  Power  Channel Scaling:  I  Une Name Power  Line Color	<ul> <li>✓ Enable Qurrent</li> <li>Current</li> <li>Internal Shurt</li> <li>External Shurt</li> <li>Ext R: 50 000</li> <li>mΩ</li> </ul>				
Enable Power      Power      Channel Scaling:      Ine Name      Power      Line Color      Deplay (weapon Line	✓ Enable Qurrent Current ● Internal Shunt ● External Shunt Range: 4.5A Ext R: 50 000 ● mΩ ● Channel Scaling: 10 Une Name © Qurrent Une Color ✓ Dealey Average Line				
	<ul> <li>✓ Enable Qurrent</li> <li>Current</li> <li>Internal Shurt</li> <li>External Shurt</li> <li>External Shurt</li> <li>External Shurt</li> <li>External Shurt</li> <li>External Shurt</li> <li>External Shurt</li> <li>To External Shurt</li> <li>External Shurt</li> <li>External Shurt</li> <li>To External Shurt</li></ul>	Enable Votage Voltage Range 7.5V • Channel Scaling: 1 • Une Name Voltage Line Color ✓ Display Average Line			
	Current     Current     Internal Shurt     Range: 4.5A     Ext R: 50 000	Enable Votage Range 7.5V • Channel Scaling: 1 • Une Name Votage Line Color ✓ Display Average Line Aver. Color			

#### 圖 5-2: LTE USB 設備耗電量測設定

主要的題目設置,我們先按下"New"新創一個空的題目,然後使用編輯把題目 設定完成,圖 5-3 為設定好的主題目。剛開始我們先加入"TestPlan\_start",將耗 電量測的題目在這邊加上去,使得主題目在開始執行時就可以去呼叫耗電量 測。在來我們加上"Delay"來做為一個緩衝,使耗電量測的題目準備好再開始下 一個步驟,這裡我們通常會加上 2000 毫秒(milliseconds)。 接下來我們會讓 LTE 設備與 CMW 建立連線,所以我們拉了一個步 驟"LTE\_CallSetup"。然後我們手動設置了事件標籤,這幾個事件標籤將在產出



的報告中分別設置標籤點,這幾個標籤點將有助於工程師直接看出功率消耗。

最後的步驟,設置"TestPlan\_Stop",將耗電量測的題目關閉。



圖 5-3: 主題目的各個步驟

執行之後,CMWrun 會整合所有的報告,包括主題目與耗電量測題目的報告及 合成一份。

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Global Settings         3000.000         mAn           Capacity of Battery         3000.000         mAn           Voltage Average (ZVC VCH1)         4970.202         mV           Voltage Average (ZVC VCH1)         5612.067         mV           Current Max (ZVC VCH1)         252.415         mA           Current Max (ZVC ACH1)         253.361         mW           Dower Average (ZVC ACH1)         1253.361         mW           Power Max (ZVC WCH1)         1253.361         mW           Power Max (ZVC WCH1)         1007.101         mW           Time         0.0138.200         10018           Marker         #####         ######           ##### (ZVC WCH1)         5012.067         mV           Voltage Average (ZVC WCH1)         5012.067         mV           Voltage Average (ZVC WCH1)         372.122         mA           Current Max (ZVC WCH1)         21.211         m           Dower Average (ZVC WCH1)         21.211         mA           Current Max (ZVC WCH1)         0.00.34.000         mV           Time         0.00.34.000         mV           Power Max (ZVC WCH1)         0.00.34.000         mV           Time         0.00.34.000         mV         0.	Settings			Value	Unit	
Image: Capacity of Battery         3000.000         mAh           Cabab Data         Value         Value         Value         Value           Voltage Average (ZVC VCH1)         5612.067         mV           Current Average (ZVC VCH1)         5612.067         mV           Current Max (ZVC ACH1)         252.415         mA           Current Max (ZVC ACH1)         11.885         h           Power Max (ZVC WCH1)         1253.361         mW           Voltage Average (ZVC VCH1)         1697.100         mV           Time         0.0138.200         mV           Voltage Average (ZVC VCH1)         1697.100         mV           Voltage Average (ZVC VCH1)         141.395         mA           Voltage Average (ZVC VCH1)         141.395         mA           Current Max (ZVC ACH1)         141.395         mA           Current Max (ZVC ACH1)         141.395         mA           Current Max (ZVC ACH1)         144.395         mA           Current Max (ZVC ACH1)         0.003.80.00         mA	Global Settings	· ·	•			
Data         Value         Unit           Voltage Narcage (2VC VCH1)         4570-502         mV           Unitage Narcage (2VC VCH1)         5512-567         mV           Current Narcage (2VC ACH1)         5512-567         mV           Current Narcage (2VC ACH1)         5512-567         mV           Current Narcage (2VC ACH1)         1553-361         mV           Dower Average (2VC ACH1)         1553-361         mV           Power Max (2VC WCH1)         1553-361         mV           Power Max (2VC WCH1)         1553-361         mV           Power Max (2VC WCH1)         1553-361         mV           Notage Narcage (2VC WCH1)         1563-250         mV           Unrent Narcage (2VC WCH1)         5612-267         mV           Unrent Narcage (2VC WCH1)         5612-267         mV           Unrent Narcage (2VC ACH1)         1512-267         mV           Unrent Narcage (2VC ACH1)         1523-267         mV           Unrent Narcage (2VC ACH1)         1523-274         mV           Dowe	Capacity of Battery	i i		3000.000	mAh	
Telobal Data         4970-502           Voltage Nerrage (2VC VCH1)         5672-562           Current Max (2VC 2CH1)         5672-562           Current Max (2VC 2CH1)         11835           Current Max (2VC 2CH1)         11835           Dower Average (2VC WCH1)         11835           Power Max (2VC 2CH1)         11835           Power Max (2VC WCH1)         11835           Time         0.0138.200           Marker         #####           Water Control (2VC WCH1)         11835           United Average (2VC WCH1)         11837           Voltage Average (2VC WCH1)         11835           Voltage Average (2VC WCH1)         11835           United Average (2VC WCH1)         11835           United Average (2VC WCH1)         118385           Current Max (2VC WCH1)         11835           United Average (2VC WCH1)         11835           United Average (2VC WCH1)         11835           Dower Average (2VC WCH1)         11835           United Average (2VC WCH1)         11835           United Average (2VC WCH1)         118444           United Average (2VC WCH1)         118444           United Average (2VC WCH1)         118444           United Average (2VC WCH1)         <	Data			Value	Unit	
Notage Average (2VC VCH1)         4470-522         mV           Outage Max (2VC VCH1)         5612-067         mV           Current Max (2VC ACH1)         5512-067         mV           Current Max (2VC ACH1)         5512-067         mV           Current Max (2VC ACH1)         553-361         mV           Power Max (2VC WCH1)         1553-361         mV           Time         0.013-200         1553-371           Marker         1607-010         1553-371         mV           Marker         1607-010         0.013-200         0.013-200           Marker         1607-010         1551-257         mV           Voltage Max (2VC WCH1)         1513-351         mV         1512-257           Voltage Max (2VC WCH1)         1513-557         mV         1512-257           Current Batery Life (dec) (2VC ACH1)         1512-257         mV         1512-257           Power Max (2VC WCH1)         1513-557         mV         1512-567         mV           Current Batery Life (dec) (2VC ACH1)         1513-557         mV         1512-567         mV           Current Batery Life (dec) (2VC ACH1)         1532-567         mV         1502-567         mV           Current Batery Life (dec) (2VC ACH1)         1532-56	Global Data					
Notinge Max (2VC VCH)         Solidation           Current Astronge (2VC ACH)         282.415           Current Max (2VC 4CH)         1885           Power Max (2VC WCH)         197.21           Time         0.0138.200           Marker         199.21           Marker	Voltage Average (ZVC VCH1)			4970 502	mV	
Current Average (2VC ACH1)         282.415         mA           Current Battery Life (dec) (ZVC ACH1)         118.85         h           Power Max (ZVC WCH1)         118.85         mW           Time         0.0138.200         1097.610           Marker         1097.610         mW           ##### Test Start ==> LIE Call - Attached #####         ######         ######           Woltage Average (ZVC WCH1)         141.835         mW           Voltage Average (ZVC WCH1)         141.835         mW           Voltage Average (ZVC WCH1)         141.835         mW           Voltage Average (ZVC WCH1)         141.835         mA           Current Max (ZVC WCH1)         141.335         mA           Current Max (ZVC WCH1)         144.351         mW           Power Max (ZVC WCH1)         144.4351         mW           Time         ######         ######         ######           Voltage Average (ZVC WCH1)         144.4351         mW           Voltage Average (ZVC WCH1)         144.4561         mW	Voltage Max (ZVC VCH1)			5012.967	mV	
Current Nax (ZvC ACH1)         1885 h           Power Average (ZVC WCH1)         1985 h           Power Average (ZVC WCH1)         1987 h           Narker         1997 h           ##### Test Start => LTE Call- Attached #####         ##### Test H           Wolage Average (ZVC WCH1)         0.0138.200           Wolage Average (ZVC WCH1)         4987 h           Wolage Average (ZVC WCH1)         5012.057 m/V           Current Average (ZVC WCH1)         5012.057 m/V           Current Average (ZVC WCH1)         772.124 mA           Current Average (ZVC WCH1)         772.124 mA           Current Max (ZVC WCH1)         772.124 mA           Power Max (ZVC WCH1)         772.124 mA           Current Max (ZVC WCH1)         772.124 mA           Urrent Max (ZVC WCH1)         772.124 mA           Power Max (ZVC WCH1)         772.124 mA           Urrent Max (ZVC WCH1)         18444 m/W           Wolage Average (ZVC WCH1)         18444 m/W           Urrent Max (ZVC WCH1)         194.556 m/M           Urrent Max (ZV	Current Average (ZVC ACH1)			252.415	mA	
Current Battlery Life (dec) (ZVC ACH1)         11885         h           Power Average (ZVC WCH1)         1253.361         mW           Time         0.0137.82.00         1497.610           Marker         0.0138.200         1497.610           Marker         mm###         m####           Woltage Average (ZVC WCH1)         141.835         mW           Voltage Average (ZVC VCH1)         151.267         mV           Voltage Average (ZVC VCH1)         141.339         mA           Current Max (ZVC ACH1)         141.339         mA           Current Max (ZVC ACH1)         21.217         h           Power Max (ZVC WCH1)         144.339         mA           Time         70.3283         mV           Voltage Average (ZVC WCH1)         144.4351         mW           Voltage Average (ZVC WCH1)         144.4351         mW           Voltage Average (ZVC WCH1)         144.4351         mV           Voltage Average (ZVC WCH1)         144.4351         mV           Voltage Average (ZVC WCH1)         144.4351         mW           Voltage Average (ZVC WCH1)         144.4351         mW           Voltage Average (ZVC WCH1)         149.80.237         mV           Voltage Average (ZVC WCH1)	Current Max (ZVC ACH1)			383.034	mA	
Dower Average (ZVC WCH1)         1253.361         mW           Time         0.0138.200         1807.470         mW           Marker         #####         #####         #####         #####           Voltage Average (ZVC VCH1)         5012.607         mV           Voltage Average (ZVC VCH1)         5012.607         mV           Current Average (ZVC ACH1)         141.395         mA           Current Average (ZVC ACH1)         372.124         mA           Current Average (ZVC ACH1)         703.233         mW           Power Average (ZVC ACH1)         703.233         mW           Power Average (ZVC ACH1)         703.233         mW           Power Max (ZVC ACH1)         703.233         mW           Power Max (ZVC ACH1)         703.233         mW           Power Max (ZVC VCH1)         703.233         mW           Unime         0.003.40.00         #####           ##### #####         #####         #####           Unime         0.000.34.00         #####           Unime         0.000.36.00         mA           Current Average (ZVC ACH1)         386.304         mA           Current Max (ZVC ACH1)         1744.108         mW           Voltage Average (ZVC	Current Battery Life (dec) (ZVC ACH1)			11,885	h	
Power flax (2VC WCH1)         fla77.610         mW           Time         0.0138.200         mW           Marker         ##### [lest Start => LTE Call - Attached #####         ##### [######           Woltage Average (2VC VCH1)         64983.278         mV           Voltage Average (2VC VCH1)         141.335         mA           Current Naverage (2VC VCH1)         141.335         mA           Current Naverage (2VC VCH1)         21.217         h           Power Average (2VC VCH1)         1514.355         mA           Current Naverage (2VC VCH1)         1514.356         mW           Power Average (2VC VCH1)         1614.356         mW           Uotage Average (2VC VCH1)         1644.361         mW           Uotage Naverage (2VC VCH1)         1644.361         mW           Uotage Naverage (2VC VCH1)         1644.361         mW           Uotage Naverage (2VC VCH1)         16456.783         mV           Votage Naverage (2VC VCH1)         352.744         mA           Current Naverage (2VC VCH1)         354.304         mA           Current Naverage (2VC VCH1)         1805.844         mW           Time         90000.060         #####         #####           Votage Average (2VC VCH1)         1805.844 <td>Power Average (ZVC WCH1)</td> <td></td> <td></td> <td>1253.361</td> <td>mW</td> <td></td>	Power Average (ZVC WCH1)			1253.361	mW	
Inne         0.0138.200           Marker         Unit           Marker         #####         Unit           Voltage Average (ZVC VCH1)         5012.607         mV           Current Average (ZVC ACH1)         5012.607         mV           Current Average (ZVC ACH1)         141.385         mA           Current Battery Life (dec) (ZVC ACH1)         702.233         mV           Power Average (ZVC WCH1)         703.233         mV           Power Average (ZVC WCH1)         703.233         mV           Power Max (ZVC WCH1)         1644.361         mV           Power Max (ZVC WCH1)         1644.361         mV           Voltage Max (ZVC WCH1)         16458.783         mV           Voltage Average (ZVC WCH1)         4960.238         mV           Current Max (ZVC WCH1)         364.304         mA           Current Max (ZVC WCH1)         364.304         mA           Current Max (ZVC ACH1)         364.304         mA           Current Average (ZVC WCH1)         1749.400         mV           Current Max (ZVC ACH1)         364.304         mA           Current Max (ZVC ACH1)         385.306         mA           Current Max (ZVC ACH1)         385.806         mA	Power Max (ZVC WCH1)			1897.810	mW	
Info         Value         Unit           Marker         ##### Test Start => LTE Call - Attached #####         #####         #####           Woltage Average (2VC VCH1)         4983.278         mV           Current Verage (2VC VCH1)         1413.95         mA           Current Max (2VC VCH1)         21.217         h           Dower Max (2VC VCH1)         21.217         h           Dower Max (2VC VCH1)         21.217         h           Dower Max (2VC VCH1)         1644.361         mW           Utrent Nation (2VC VCH1)         1644.361         mW           Woltage Average (2VC VCH1)         1644.361         mW           Voltage Average (2VC VCH1)         1644.361         mW           Voltage Average (2VC VCH1)         1644.361         mW           Voltage Average (2VC VCH1)         1644.362         mV           Voltage Average (2VC VCH1)         4958.023         mV           Voltage Average (2VC ACH1)         352.744         mA           Current Max (2VC VCH1)         8.505         h           Power Max (2VC VCH1)         1805.844         mW           Time         #####         #####           Voltage Average (2VC VCH1)         1805.841         mW           Cur	Time			0:01:38.200		
Info         Value         Unit           ##### Test Start →> LTE Call - Attached #####         #####         #####         #####           Voltage Average (ZVC VCH1)         5012.661         mV           Current Average (ZVC ACH1)         141.395         mA           Current Average (ZVC ACH1)         372.124         mA           Current Battery Life (dec) (ZVC ACH1)         703.283         mW           Power Average (ZVC WCH1)         1044.391         mW           Power Max (ZVC VCH1)         1044.391         mW           Power Max (ZVC VCH1)         1044.391         mW           Voltage Average (ZVC WCH1)         1044.391         mW           Voltage Average (ZVC VCH1)         4650.238         mV           Voltage Average (ZVC VCH1)         352.744         mA           Voltage Average (ZVC VCH1)         364.304         mA           Current Max (ZVC ACH1)         364.304         mA           Current Max (ZVC VCH1)         1743.100         mV           Voltage Max (ZVC VCH1)         1743.100         mV </td <td></td> <td></td> <td>I</td> <td></td> <td></td> <td></td>			I			
Non-series           Internet Test Start →> LIE Call - Attached #####         ######         ######         ######           Voltage Average (ZVC VCH1)         5012.667         mV           Current Average (ZVC VCH1)         141.395         mA           Current Average (ZVC ACH1)         141.395         mA           Current Max (ZVC VCCH1)         21.217         h           Power Average (ZVC WCH1)         1044.301         mW           Power Average (ZVC WCH1)         1044.301         mW           Voltage Average (ZVC WCH1)         1044.301         mW           Voltage Average (ZVC WCH1)         1045.8783         mV           Voltage Max (ZVC VCH1)         352.744         mA           Current Max (ZVC ACH1)         364.304         mA           Current Max (ZVC ACH1)         8.505         h           Power Average (ZVC WCH1)         1749.100         mW           Unime         0:00.0.000         mW           Unime	Info			Value	Unit	
#####         #####         #####         #####           Voltage Version (ZVC VCH)         4983.276         mV           Voltage Max (ZVC VCH)         5012.067         mV           Current Average (ZVC VCH)         141.395         mA           Current Max (ZVC VCH)         772.124         mA           Current Battery Life (dice) (ZVC ACH)         773.283         mV           Power Average (ZVC WCH)         773.283         mV           Power Max (ZVC VCH)         773.283         mV           Voltage Max (ZVC WCH)         1644.361         mW           Power Max (ZVC VCH)         1644.361         mW           Voltage Max (ZVC VCH)         4058.783         mV           Voltage Max (ZVC VCH)         4658.783         mV           Current Max (ZVC VCH)         352.744         mA           Current Max (ZVC VCH)         1749.100         mV           Voltage Max (ZVC VCH)         1749.100         mV           Time         0.00.00.600         mV           ###### Wait some time==> disable B	Marker					
Voltage Average (2VC VCH/)         4983.278         mV           Voltage Max (2VC VCH/)         5012.967         mV           Current Max (2VC ACH/)         141.395         mA           Current Max (2VC ACH/)         272.124         mA           Current Max (2VC ACH/)         272.124         mA           Current Battery Life (dec) (2VC ACH/)         703.283         mW           Power Max (2VC WCH/)         1644.361         mW           Time         0:00.34.000         ######         ######           Whitege Average (2VC VCH)         0:00.34.000         ####################################	##### Test Start ==> LTE Call - Attached #####	<del>#####</del>	*****	****	****	
Voltage Max (2VC VCH1)         5012.67         mV           Current Average (2VC ACH1)         141.995         mA           Current Battery Life (dec) (2VC ACH1)         21.217         h           Power Nax (2VC WCH1)         703.283         mV           Power Nax (2VC WCH1)         703.283         mV           Time         0.003.4.000         #####           What Acched ==> Wait some time #####         #####         #####           Voltage Average (2VC VCH1)         4958.783         mV           Voltage Average (2VC VCH1)         352.744         mA           Current Average (2VC VCH1)         364.304         mA           Current Battery Life (dec) (2VC ACH1)         364.304         mA           Current Battery Life (dec) (2VC ACH1)         86.055         h           Power Average (2VC WCH1)         1808.844         mW           Time         0:00.00.00         #####           ######         ######         ######         ######           Voltage Average (2VC WCH1)         8805.00         mA           Current Average (2VC WCH1)         1808.844         mW           Voltage Average (2VC WCH1)         1808.844         mW           Voltage Average (2VC WCH1)         1808.946         mA </td <td>Voltage Average (ZVC VCH1)</td> <td></td> <td></td> <td>4983.278</td> <td>mV</td> <td></td>	Voltage Average (ZVC VCH1)			4983.278	mV	
Current Average (2VC ACH1)         141.395         mA           Current Battery Life (dec) (2VC ACH1)         372.124         mA           Qurrent Battery Life (dec) (2VC ACH1)         703.283         mW           Power Norage (2VC WCH1)         1644.361         mW           Time         0.003.4.000         ######         ######         ######           Whitege Average (2VC VCH1)         0.003.4.000         #####         #####         #####           Voltage Max (2VC VCH1)         352.744         mV         0.003.4.000         mV           Current Max (2VC ACH1)         352.744         mA         Current Max (2VC ACH1)         364.304         mA           Current Max (2VC ACH1)         352.744         mA         mW         MW         MW           Current Max (2VC ACH1)         364.304         mA         Current Max (2VC ACH1)         364.304         mA           Current Max (2VC ACH1)         174.9.80         mW         MW         MW         MW           Power Max (2VC VCH1)         174.9.80         mW         MW<	Voltage Max (ZVC VCH1)			5012.967	mV	
Current Max (ZVC ACH1)         372.124         mA           Current Battery Life (dec) (ZVC ACH1)         703.283         m/V           Power Narage (ZVC WCH1)         1844.361         m/V           Unime         0.0034.000         m/W           ##### LIF Call - Attached ==> Wait some time #####         #####         #####         #####           Voltage Average (ZVC VCH1)         4968.783         mV           Current Battery Life (dec) (ZVC ACH1)         384.304         mA           Current Battery Life (dec) (ZVC ACH1)         845.05         h           Power Average (ZVC WCH1)         1805.844         mW           Unime         0:00.00.600         mA           Current Max (ZVC WCH1)         1805.844         mW           Power Average (ZVC WCH1)         1805.844         mW           Voltage Average (ZVC WCH1)         1806.832         mA           Current Max (ZVC ACH1)         338.986         mA           Current Average (ZVC WCH1)         1807.810         mA           Current Average (ZVC WCH1)	Current Average (ZVC ACH1)			141.395	mA	
Current Battery Life (dec) (2VC ACH1)         21 217         h           Power Average (ZVC WCH1)         703 283         mW           Power Max (ZVC WCH1)         1844.361         mW           Time         0:0034.000         #####           ##### UFC Call - Attached ==> Wait some time #####         #####         #####         #####           Voltage Average (ZVC VCH1)         #####         #####         #####           Voltage Average (ZVC VCH1)         364.304         mA           Current Max (ZVC ACH1)         364.304         mA           Current Max (ZVC WCH1)         85.055         h           Power Average (ZVC WCH1)         85.055         h           Power Average (ZVC WCH1)         180.844         mW           Time         0:00.00.600         #####           ##### Wait some time ==> disable BS ####         #####         #####           Voltage Average (ZVC WCH1)         4960.770         mV           Voltage Average (ZVC WCH1)         338.986         mA           Current Max (ZVC ACH1)         338.986         mA           Current Max (ZVC ACH1)         338.986         mA           Current Max (ZVC ACH1)         0:00.30.700         mW           Power Average (ZVC WCH1)	Current Max (ZVC ACH1)			372.124	mA	
Power Average (2VC WCH1)         703.283         mW           Power Max (2VC WCH1)         1644.361         mW           Imme         #####         #####         #####           Voltage Average (2VC VCH1)         4956.783         mV           Voltage Max (2VC ACH1)         364.304         mA           Current Average (2VC VCH1)         364.304         mA           Current Battery Life (dec) (2VC ACH1)         86.505         h           Power Average (ZVC WCH1)         1805.844         mW           Time         0:000.600         #####           ##### Wait some time =>> disable BS ####         #####         #####           Voltage Average (ZVC WCH1)         1805.844         mW           Current Max (ZVC ACH1)         338.3034         mA           Current Max (ZVC ACH1)         338.3034         mA           Current Max (ZVC WCH1)         1671.700         mW           Power Average (ZVC WCH1)         1671.700         mW           Power Average (ZVC WCH1)         1671.700         mW	Current Battery Life (dec) (ZVC ACH1)			21.217	h	
Power Max (2VC WCH1)         1644.361         mW           ##### LTE Call - Attached ==> Wait some time #####         #####         #####         #####           Voltage Average (2VC VCH1)         4558.783         mV           Voltage Average (2VC VCH1)         4558.783         mV           Current Average (2VC ACH1)         352.744         mA           Current Battery Life (dec) (2VC ACH1)         364.304         mA           Current Max (2VC WCH1)         8.605         h           Power Average (2VC WCH1)         1805.844         mW           Time         0:00.00.600         #####           ##### Wait some time =>> disable BS #####         #####         #####           Voltage Average (2VC VCH1)         4960.770         mV           Voltage Max (2VC VCH1)         4960.770         mV           Voltage Average (2VC ACH1)         336.896         mA           Current Max (2VC ACH1)         338.034         mA           Current Max (2VC ACH1)         1807.810         mV           Voltage Max (2VC VCH1)         1807.810         mA           Current Max (2VC ACH1)         0:00.3700         h           Power Max (2VC VCH1)         1807.810         mW           Voltage Average (2VC VCH1)	Power Average (ZVC WCH1)			703.283	mW	
Time         0:00:34.000           ##### [ITE Call - Attached ==> Wait some time #####         #####         #####           Voltage Average (ZVC VCH1)         4950.238         mV           Voltage Max (ZVC VCH1)         4950.238         mV           Current Average (ZVC VCH1)         352.744         mA           Current Battery Life (dec) (ZVC ACH1)         364.304         mA           Power Average (ZVC WCH1)         1749.100         mW           Power Average (ZVC WCH1)         1805.844         mW           Power Max (ZVC VCH1)         1805.844         mW           Time         0:00:00.600         #####           ##### Wait some time ==> disable BS #####         #####         #####           Voltage Average (ZVC WCH1)         4960.770         mV           Current Max (ZVC VCH1)         336.886         mA           Current Max (ZVC VCH1)         383.034         mA           Current Max (ZVC WCH1)         1807.810         mW           Time         0:00:30.000         httm###           ######         #####         #####           Voltage Average (ZVC WCH1)         1807.810         mW           Time         0:00:30.700         mV           Voltage Max (ZVC ACH1)	Power Max (ZVC WCH1)			1844.361	mW	
#####         #####         #####         #####         #####           Voltage Average (ZVC VCH1)         4658.783         mV           Voltage Average (ZVC VCH1)         4950.236         mV           Current Average (ZVC ACH1)         352.744         mA           Current Battery Life (dec) (ZVC ACH1)         364.304         mA           Current Battery Life (dec) (ZVC ACH1)         1805.844         mV           Power Average (ZVC WCH1)         1805.844         mV           Time         0:00.00.600         1749.160           #####         #####         #####         #####           Voltage Average (ZVC WCH1)         1805.844         mV           Time         0:00.00.600         1805.814           #####         #####         #####         #####           Voltage Average (ZVC WCH1)         4960.770         mV           Current Average (ZVC ACH1)         383.034         mA           Current Battery Life (dec) (ZVC ACH1)         8.302         h           Power Average (ZVC WCH1)         1897.810         mV           Time         0:00.30.700         mV           Woltage Max (ZVC WCH1)         1897.810         mV           Time         0:00.30.700         mV	Time			0:00:34.000		
Voltage Average (2/C VCH1)         4968.783         mV           Voltage Max (2/C VCH1)         4960.238         mV           Current Max (2/C ACH1)         352.744         mA           Current Max (2/C ACH1)         364.304         mA           Current Max (2/C ACH1)         86.505         h           Power Average (2/C WCH1)         1749.180         mW           Power Max (2/C WCH1)         1805.844         mW           Time         0.00.000.600         #####           ##### Wait some time=> disable BS #####         #####         #####           Voltage Average (2/C WCH1)         4963.017         mV           Voltage Max (2/C C ACH1)         4963.017         mV           Current Average (2/C ACH1)         4963.017         mV           Current Average (2/C ACH1)         4963.017         mV           Current Average (2/C ACH1)         383.034         mA           Current Average (2/C ACH1)         6.902         h           Power Average (2/C ACH1)         1677.700         mW           Power Average (2/C VCH1)         1897.810         mW           Time         0.00.30.700         mV           Voltage Average (2/C VCH1)         4962.665         mV           Voltage	###### LTE Call - Attached ==> Wait some time #####	#####	#####	######	#####	
Voltage Max (2VC VCH1)         4960.238         mV           Current Average (2VC ACH1)         352.744         mA           Current Battery Life (dec) (2VC ACH1)         8.505         h           Power Average (2VC WCH1)         1749.180         mW           Power Average (2VC WCH1)         1805.844         mW           Time         0:00.00.00         #####           ##### Wait some time => disable BS #####         #####         #####           Voltage Average (2VC VCH1)         4960.770         mV           Current Max (2VC ACH1)         4960.770         mV           Current Max (2VC ACH1)         383.034         mA           Current Max (2VC ACH1)         383.034         mA           Current Max (2VC ACH1)         383.034         mA           Current Max (2VC ACH1)         8.902         h           Power Average (2VC WCH1)         1671.700         mW           Power Max (2VC WCH1)         1897.810         mW           Time         0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:	Voltage Average (ZVC VCH1)			4958.783	mV	
Current Average (2VC ACH1)         382,744         mA           Current Max (2VC ACH1)         364,304         mA           Current Battery Life (dec) (2VC ACH1)         1749,100         mW           Power Max (2VC WCH1)         1805,844         mW           Time         0.00,00,00         #####           ##### Wait some time=> disable BS #####         #####         #####           Voltage Average (2VC VCH1)         4960,770         mV           Voltage Max (2VC VCH1)         338,986         mA           Current Battery Life (dec) (2VC ACH1)         383,034         mA           Current Battery Life (dec) (2VC ACH1)         383,034         mA           Current Battery Life (dec) (2VC ACH1)         8.902         h           Power Max (2VC WCH1)         1897,810         mW           Time         0:00,30,700         #####           Voltage Average (2VC ACH1)         4962,665         mV           Voltage Max (2VC VCH1)         1897,810         mW           Time         0:00,30,700         mW           ##### disable BS> BS disabled #####         #####         #####           Voltage Max (2VC VCH1)         1897,810         mW           Current Max (2VC ACH1)         9,333         h <td>Voltage Max (ZVC VCH1)</td> <td></td> <td></td> <td>4960.238</td> <td>mV</td> <td></td>	Voltage Max (ZVC VCH1)			4960.238	mV	
Current Max (ZVC ACH1)         384.304         mA           Current Battery Life (dec) (ZVC ACH1)         8.505         h           Power Average (ZVC WCH1)         1749.180         mW           Time         0:00.00.600         mm####           ##### Wait some time ==> disable BS ####         #####         #####         #####           Voltage Average (ZVC VCH1)         4960.770         mV           Voltage Max (ZVC VCH1)         336.986         mA           Current Average (ZVC ACH1)         336.986         mA           Current Battery Life (dec) (ZVC ACH1)         338.034         mA           Current Battery Life (dec) (ZVC ACH1)         8.902         h           Power Average (ZVC WCH1)         1671.700         mW           Power Average (ZVC WCH1)         1897.810         mW           Time         0:00.30.700         mW           Woltage Max (ZVC VCH1)         4966.406         mV           Current Battery Life (dec) (ZVC ACH1)         9.333         h           Voltage Max (ZVC VCH1)         4966.406         mV           Current Max (ZVC VCH1)         388.124         mA           Current Max (ZVC VCH1)         1594.192         mW           Current Max (ZVC VCH1)         1594.192	Current Average (ZVC ACH1)			352.744	mA	
Current Battery Life (dec) (ZVC ACH1)         8.505         h           Power Average (ZVC WCH1)         1749.180         mW           Time         0:00.00.00         0           ##### Wait some time =>> disable BS ####         #####         #####         #####           Voltage Average (ZVC VCH1)         4960.770         mV           Voltage Average (ZVC VCH1)         4960.770         mV           Voltage Max (ZVC VCH1)         4963.017         mV           Current Average (ZVC ACH1)         338.034         mA           Current Battery Life (dec) (ZVC ACH1)         1671.700         mW           Power Average (ZVC WCH1)         1897.810         mW           Time         0:00.03.700         mW         1987.810           Power Average (ZVC VCH1)         1897.810         mW         1987.810           Time         0:00.03.700         mW         1987.810         mW           Time         0:00.03.700         mW         1987.810         mW           Current Average (ZVC VCH1)         1897.810         mW         1987.810         mW           Time         0:00.02.100         mA         212.240         mA           Current Average (ZVC VCH1)         1594.192         mW         0:00	Current Max (ZVC ACH1)			364.304	mA	
Power Average (2VC WCH1)         1749.180         mW           Power Max (2VC WCH1)         1805.844         mW           Time         0:00.00.600           ##### Wait some time ==> disable BS ####         #####         #####           Voltage Average (2VC VCH1)         4960.770         mV           Voltage Average (2VC VCH1)         4963.017         mV           Current Average (2VC ACH1)         336.986         mA           Current Battery Life (dec) (2VC ACH1)         8.902         h           Power Average (ZVC WCH1)         1671.700         mW           Power Average (ZVC WCH1)         1671.700         mW           Power Average (ZVC VCH1)         1897.810         mW           Time         0:00.30.700         mW           ######         ######         ######         ######           Voltage Max (ZVC VCH1)         4962.665         mV           Voltage Average (ZVC ACH1)         321.240         mA           Current Max (ZVC ACH1)         328.124         mA           Current Average (ZVC ACH1)         328.124         mA           Current Average (ZVC ACH1)         9.339         h           Power Average (ZVC ACH1)         1594.192         mW           Power Avera	Current Battery Life (dec) (ZVC ACH1)			8.505	h	
Power Max (ZVC WCH1)         1805.844         mW           Time         0:00.00.600         0:00.00.600           ##### Wait some time ==> disable BS #####         #####         #####         #####           Voltage Average (ZVC VCH1)         4960.770         mV           Voltage Max (ZVC ACH1)         336.986         mA           Current Average (ZVC ACH1)         338.034         mA           Current Average (ZVC ACH1)         338.034         mA           Current Average (ZVC WCH1)         1671.700         mW           Power Average (ZVC WCH1)         1677.700         mW           Power Average (ZVC WCH1)         1897.810         mW           Time         0:00.03.700         ######           ##### disable BS> BS disabled #####         #####         #####           Voltage Average (ZVC WCH1)         4964.406         mV           Current Average (ZVC VCH1)         358.124         mA           Current Max (ZVC ACH1)         358.124         mA           Current Max (ZVC ACH1)         1594.192         mW           Power Average (ZVC WCH1)         1594.192         mW           Power Average (ZVC WCH1)         1775.363         mW           Voltage Max (ZVC VCH1)         4986.874 <t< td=""><td>Power Average (ZVC WCH1)</td><td></td><td></td><td>1749.180</td><td>mW</td><td></td></t<>	Power Average (ZVC WCH1)			1749.180	mW	
Time         0:00:00:00:00           ##### Wait some time ==> disable BS ####         #####         #####         #####           Voltage Average (ZVC VCH1)         4960.770         mV           Voltage Max (ZVC VCH1)         4963.017         mV           Current Average (ZVC ACH1)         336.986         mA           Current Battery Life (dec) (ZVC ACH1)         338.034         mA           Current Battery Life (dec) (ZVC ACH1)         83.032         mA           Current Battery Life (dec) (ZVC ACH1)         1671.700         mW           Power Average (ZVC WCH1)         1897.810         mV           Time         0:00:30.700         0           ##### disable BS> BS disabled #####         #####         #####           Voltage Average (ZVC VCH1)         1897.810         mV           Current Average (ZVC VCH1)         4956.406         mV           Current Average (ZVC ACH1)         221.240         mA           Current Average (ZVC ACH1)         358.124         mA           Current Average (ZVC WCH1)         1775.363         mW           Power Average (ZVC WCH1)         1775.363         mW           Time         0:00:02.100         #####         #####           Witheff Average (ZVC WCH1)	Power Max (ZVC WCH1)			1805.844	mW	
#####         #####         #####         #####         #####         #####           Voltage Average (ZVC VCH1)         4963.017         mV           Current Average (ZVC ACH1)         4963.017         mV           Current Average (ZVC ACH1)         336.986         mA           Current Battery Life (dec) (ZVC ACH1)         8.902         h           Power Average (ZVC WCH1)         1671.700         mW           Power Average (ZVC WCH1)         1897.810         mW           Time         0:00.30.700         ######           ######         #####         #####           Voltage Average (ZVC VCH1)         1897.810         mW           Time         0:00.30.700         #####         #####           Voltage Average (ZVC VCH1)         4964.406         mV           Voltage Max (ZVC VCH1)         4964.406         mV           Current Max (ZVC ACH1)         358.124         mA           Current Battery Life (dec) (ZVC ACH1)         9.339         h           Power Average (ZVC WCH1)         1594.192         mW           Power Average (ZVC WCH1)         1775.363         mW           Unrent Battery Life (dec) (ZVC ACH1)         284.027         mA           Urenet Average (ZVC WCH1)	Time			0:00:00.600		
Voltage Average (2VC VCH1)         4960.770         mV           Voltage Max (2VC VCH1)         4963.017         mV           Current Max (2VC ACH1)         336.896         mA           Current Max (2VC ACH1)         388.034         mA           Current Battery Life (dec) (2VC ACH1)         8.902         h           Power Average (ZVC WCH1)         1671.700         mW           Power Max (ZVC WCH1)         1897.810         mW           Time         0:00.30.700         #####           ###### disable BS> BS disabled #####         #####         #####           Voltage Max (ZVC VCH1)         1897.810         mW           Outrent Average (ZVC VCH1)         1897.810         mW           Voltage Max (ZVC VCH1)         4962.665         mV           Voltage Max (ZVC VCH1)         4964.406         mV           Current Average (ZVC ACH1)         321.240         mA           Current Max (ZVC ACH1)         9.339         h           Power Average (ZVC ACH1)         9.339         h           Power Max (ZVC WCH1)         1594.192         mW           Power Max (ZVC WCH1)         1775.363         mW           Time         0:00.2100         ######           ###### BS disabled ==> Tes	##### Wait some time ==> disable BS #####	#####	#####	######	****	
Voltage Max (ZVC VCH1)         4963.017         mV           Current Average (ZVC ACH1)         336.986         mA           Current Max (ZVC ACH1)         838.034         mA           Current Battery Life (dec) (ZVC ACH1)         8.902         h           Power Average (ZVC WCH1)         1671.700         mW           Power Max (ZVC WCH1)         1671.700         mW           Time         0:00.30.700         mW           ##### disable BS> BS disabled #####         #####         #####           Voltage Max (ZVC VCH1)         4962.665         mV           Voltage Max (ZVC VCH1)         4962.665         mV           Voltage Max (ZVC VCH1)         4962.665         mV           Current Max (ZVC ACH1)         4962.665         mV           Current Max (ZVC ACH1)         328.124         mA           Current Max (ZVC ACH1)         338.124         mA           Current Max (ZVC WCH1)         9.339         h           Power Average (ZVC WCH1)         1775.363         mW           Time         0:0:0:0:0:000         mA           Current Max (ZVC WCH1)         4966.861         mV           Voltage Average (ZVC WCH1)         4966.861         mV           Voltage Average (ZVC WCH1)<	Voltage Average (ZVC VCH1)			4960.770	mV	
Current Average (ZVC ACH1)         338,986         mA           Current Max (ZVC ACH1)         383,034         mA           Current Battery Life (dec) (ZVC ACH1)         8,902         h           Power Average (ZVC WCH1)         1671,700         mW           Power Max (ZVC WCH1)         1897,810         mW           Time         0:00:30,700         ######           ###### disable BS> BS disabled #####         ######         ######           Voltage Average (ZVC VCH1)         0:00:30,700           Voltage Average (ZVC VCH1)         4962,665         mV           Voltage Max (ZVC VCH1)         4964,406         mV           Current Average (ZVC ACH1)         328,124         mA           Current Max (ZVC ACH1)         328,124         mA           Current Max (ZVC ACH1)         358,124         mA           Current Max (ZVC ACH1)         1594,192         mW           Power Average (ZVC WCH1)         1775,363         mW           Time         0:00:02:100         #####           Voltage Average (ZVC VCH1)         4966,861         mV           Voltage Average (ZVC VCH1)         284,027         mA           Current Average (ZVC ACH1)         284,027         mA           Current Average	Voltage Max (ZVC VCH1)			4963.017	mv	
Current Max (2VC ACH1)         383.034         mA           Current Battery Life (dec) (ZVC ACH1)         8.902         h           Power Average (ZVC WCH1)         1671.700         mW           Power Max (ZVC WCH1)         1897.810         mW           Time         0:00.30.700         ######           With### disable BS> BS disabled #####         ######         ######           Voltage Max (ZVC VCH1)         4962.665         mV           Voltage Max (ZVC ACH1)         321.240         mA           Current Average (ZVC ACH1)         3258.124         mA           Current Battery Life (dec) (ZVC ACH1)         3258.124         mA           Current Battery Life (dec) (ZVC ACH1)         358.124         mA           Current Battery Life (dec) (ZVC ACH1)         1594.192         mW           Power Average (ZVC WCH1)         1594.192         mW           Power Max (ZVC WCH1)         1775.363         mW           Time         0:00:02.100         #####           With### BS disabled ==> Test End #####         ######         ######           Voltage Average (ZVC VCH1)         284.027         mA           Current Max (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         284.027	Current Average (ZVC ACH1)			336.986	mA	
Current Battery Life (dec) (ZVC ACH1)       8.902       h         Power Average (ZVC WCH1)       1671.700       mW         Power Max (ZVC WCH1)       1897.810       mW         Time       0:00.30.700       #####       #####         Witage Average (ZVC VCH1)       4962.665       mV         Voltage Max (ZVC VCH1)       4964.406       mV         Current Average (ZVC ACH1)       321.240       mA         Current Battery Life (dec) (ZVC ACH1)       9.339       h         Current Battery Life (dec) (ZVC ACH1)       9.339       h         Power Average (ZVC WCH1)       1594.192       mW         Power Average (ZVC WCH1)       1594.192       mW         Power Average (ZVC WCH1)       1775.363       mW         Time       0:0:0:02.100       #####         ##### BS disabled ==> Test End #####       #####       #####         Voltage Average (ZVC VCH1)       4986.861       mV         Voltage Max (ZVC VCH1)       4986.874       mV         Current Max (ZVC ACH1)       284.027       mA         Current Max (ZVC ACH1)       336.533       mA         Current Max (ZVC ACH1)       10.562       h         Power Average (ZVC WCH1)       1410.711       mW </td <td>Current Max (ZVC ACH1)</td> <td></td> <td></td> <td>383.034</td> <td>mA</td> <td></td>	Current Max (ZVC ACH1)			383.034	mA	
Power Average (ZVC WCH1)       1671.700       mW         Power Max (ZVC WCH1)       1897.810       mW         time       0:00.30.700         ##### disable BS> BS disabled #####       #####       ######         Voltage Average (ZVC VCH1)       4962.665       mV         Voltage Max (ZVC VCH1)       4962.665       mV         Current Average (ZVC ACH1)       3261.24       mA         Current Battery Life (dec) (ZVC ACH1)       9.339       h         Power Average (ZVC WCH1)       1594.192       mW         Power Max (ZVC WCH1)       1775.363       mW         Time       0:00:02.100       #####         ##### BS disabled ==> Test End #####       #####       ######         Voltage Max (ZVC VCH1)       0:00:02.100       #####         Voltage Average (ZVC VCH1)       1775.363       mW         Time       0:00:02.100       #####       #####         Voltage Average (ZVC VCH1)       14966.861       mV         Voltage Max (ZVC VCH1)       284.027       mA         Current Average (ZVC ACH1)       284.027       mA         Current Max (ZVC ACH1)       336.533       mA         Current Max (ZVC ACH1)       10.562       h         Power Av	Current Battery Life (dec) (ZVC ACH1)			8.902	h	
Power Max (2VC WCH1)         1897.810         mW           Time         0:00:30.700         0           ###### disable BS> BS disabled #####         #####         #####         #####           Voltage Average (ZVC VCH1)         4962.665         mV           Voltage Max (ZVC VCH1)         4964.406         mV           Current Average (ZVC ACH1)         321.240         mA           Current Battery Life (dec) (ZVC ACH1)         9.339         h           Power Average (ZVC WCH1)         9.339         h           Power Max (ZVC WCH1)         1594.192         mW           Power Max (ZVC WCH1)         0:00:02.100         #####           Woltage Average (ZVC VCH1)         0:00:02.100         ######           Voltage Average (ZVC VCH1)         4966.861         mV           Voltage Max (ZVC VCH1)         4966.861         mV           Voltage Max (ZVC VCH1)         4986.874         mV           Current Average (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         336.533         mA           Current Max (ZVC ACH1)         10.562         h           Power Average (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW     <	Power Average (ZVC WCH1)			16/1./00	mvv	
Imme         0:00/30.700           ##### disable BS> BS disabled #####         #####         #####           Voltage Average (ZVC VCH1)         4962.665         mV           Voltage Max (ZVC VCH1)         4964.406         mV           Current Average (ZVC ACH1)         321.240         mA           Current Max (ZVC ACH1)         358.124         mA           Current Battery Life (dec) (ZVC ACH1)         9.339         h           Power Average (ZVC WCH1)         1594.192         mW           Power Average (ZVC WCH1)         1775.363         mW           Time         0:00.02.100         #####           ###### BS disabled ==> Test End #####         #####         ######           Voltage Average (ZVC VCH1)         0:00.02.100         ######           Voltage Average (ZVC VCH1)         4966.861         mV           Voltage Max (ZVC VCH1)         4966.861         mV           Voltage Max (ZVC VCH1)         284.027         mA           Current Max (ZVC ACH1)         336.533         mA           Current Battery Life (dec) (ZVC ACH1)         10.562         h           Power Max (ZVC WCH1)         1440.711         mW           Power Max (ZVC WCH1)         1669.018         mW	Power Max (ZVC WCH1)			1897.810	mvv	
mmm disable bs> bs disabled mmm         mmm mmm         mmmm         mmm         mmm         mmmm         mmm         mmm         mmm	Time			0:00:30.700		
Voltage Average (ZVC VCH1)         4902.000         mV           Voltage Max (ZVC VCH1)         4964.406         mV           Current Average (ZVC ACH1)         321.240         mA           Current Max (ZVC ACH1)         358.124         mA           Current Battery Life (dec) (ZVC ACH1)         9.339         h           Power Average (ZVC WCH1)         1594.192         mW           Power Max (ZVC WCH1)         1775.363         mW           Time         0:00:02.100         ######           ###### BS disabled ==> Test End #####         ######         ######           Voltage Max (ZVC VCH1)         0:00:02.100           Current Average (ZVC VCH1)         0:00:02.100           Voltage Average (ZVC VCH1)         4966.861         mV           Voltage Max (ZVC VCH1)         4986.874         mV           Current Max (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         336.533         mA           Current Battery Life (dec) (ZVC ACH1)         10.562         h           Power Max (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW			<del>11811311</del>	1111111	HIIIKII	
Voltage Max (2VC VCH1)         4904.400         IIIV           Current Average (ZVC ACH1)         321.240         mA           Current Max (ZVC ACH1)         358.124         mA           Current Battery Life (dec) (ZVC ACH1)         9.339         h           Power Average (ZVC WCH1)         1594.192         mW           Power Max (ZVC WCH1)         1775.363         mW           Time         0:00:02.100         ######           ###### BS disabled ==> Test End ######         ######         ######           Voltage Average (ZVC VCH1)         0:00:02.100           Voltage Max (ZVC VCH1)         0:00:02.100           Current Average (ZVC VCH1)         0:00:02.100           Voltage Max (ZVC VCH1)         4966.861         mV           Voltage Max (ZVC VCH1)         4986.874         mV           Current Average (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         10.562         h           Power Average (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW           Time         0:00.30.800         0	Voltage Average (2VC VCH1)			4902.000	mV	
Current Max (ZVC ACH1)         3521.240         mA           Current Max (ZVC ACH1)         358.124         mA           Power Average (ZVC WCH1)         9.339         h           Power Max (ZVC WCH1)         1594.192         mW           Power Max (ZVC WCH1)         1775.363         mW           Time         0:00:02.100         ######           ###### BS disabled ==> Test End #####         ######         ######           Voltage Average (ZVC VCH1)         0:00:02.100         mV           Voltage Max (ZVC VCH1)         4966.861         mV           Voltage Max (ZVC VCH1)         4986.874         mV           Current Max (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         10.562         h           Power Average (ZVC WCH1)         10.562         h           Power Max (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW	Current Average (7VC ACL/4)			4904.400	m A	
Current Battery Life (dec) (ZVC ACH1)       9.339       h         Power Average (ZVC WCH1)       1594.192       mW         Power Max (ZVC WCH1)       1775.363       mW         Time       0:00:02.100       0:00:02.100         ###### BS disabled ==> Test End #####       ######       ######       ######         Voltage Average (ZVC VCH1)       0:00:02.100       0:00:02.100         Urrent Average (ZVC VCH1)       0:00:02.100       0:00:02.100         Current Average (ZVC VCH1)       4966.861       mV         Voltage Max (ZVC VCH1)       4986.874       mV         Current Max (ZVC ACH1)       284.027       mA         Current Battery Life (dec) (ZVC ACH1)       10.562       h         Power Average (ZVC WCH1)       1410.711       mW         Power Max (ZVC WCH1)       1669.018       mW         Time       0:00:30.800       10.502				250 124	mA	
Power Average (ZVC WCH1)       1594.192       mW         Power Max (ZVC WCH1)       1775.363       mW         Time       0:00:02.100       0:00:02.100         ###### BS disabled ==> Test End #####       ######       ######       ######         Voltage Average (ZVC VCH1)       0:00:02.100       0:00:02.100         United a state of the image	Current Battery Life (dec) (7VC ACH1)			0 330	h	
Power Max (ZVC WCH1)         1334,132         mW           Time         1775.363         mW           ###### BS disabled ==> Test End #####         0:00:02.100         0:00:02.100           ###### Woltage Average (ZVC VCH1)         ######         ######         ######           Voltage Max (ZVC VCH1)         4966.861         mV           Current Average (ZVC VCH1)         4986.874         mV           Current Max (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         336.533         mA           Current Battery Life (dec) (ZVC ACH1)         10.562         h           Power Max (ZVC WCH1)         1410.711         mW           Time         0:00.30.800         1	Dower Average (ZVC WCH1)			150/ 102	mW	
Time         0:00:02.100           ###### BS disabled ==> Test End #####         ######         ######         ######           Voltage Average (ZVC VCH1)         ######         ######         ######           Voltage Max (ZVC VCH1)         4966.861         mV           Current Average (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         336.533         mA           Current Battery Life (dec) (ZVC ACH1)         10.562         h           Power Average (ZVC WCH1)         1410.711         mW           Time         0:00:30.800	Power Max (7//C W/CH1)			1775 262	mW	
Inne         0.00.02.100           ###### BS disabled ==> Test End #####         ######         ######         ######           Voltage Average (ZVC VCH1)         4966.861         mV           Voltage Max (ZVC VCH1)         4986.874         mV           Current Average (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         336.533         mA           Current Battery Life (dec) (ZVC ACH1)         10.562         h           Power Average (ZVC WCH1)         1410.711         mW           Time         0:00.30.800         100.002				0:00:02 100	11100	
Voltage Average (ZVC VCH1)         Mmm         Mmm           Voltage Max (ZVC VCH1)         4966.861         mV           Current Average (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         336.533         mA           Current Battery Life (dec) (ZVC ACH1)         10.562         h           Power Average (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW           Time         0:00.30.800         10.502	##### BS disabled ==> Test End #####	<u>#####</u>	<del>#####</del> #	######	######	
Voltage Max (ZVC VCH1)         4986.874         mV           Current Average (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         336.533         mA           Current Battery Life (dec) (ZVC ACH1)         100.562         h           Power Average (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW           Time         0:00.30.800         100.502	Voltage Average (ZVC VCH1)		annan	4966.861	mV	
Current Average (ZVC ACH1)         284.027         mA           Current Max (ZVC ACH1)         336.533         mA           Current Battery Life (dec) (ZVC ACH1)         100.562         h           Power Average (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW           Time         0:00.30.800         100.502	Voltage Max (ZVC VCH1)			4986 874	mV	
Current Max (ZVC ACH1)         336.533         mA           Current Battery Life (dec) (ZVC ACH1)         10.562         h           Power Average (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW           Time         0:00.30.800         mW	Current Average (ZVC ACH1)			284 027	mA	
Current Battery Life (dec) (ZVC ACH1)         10.562         h           Power Average (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW           Time         0:00.30.800         10.502	Current Max (ZVC ACH1)			336 533	mA	
Power Average (ZVC WCH1)         1410.711         mW           Power Max (ZVC WCH1)         1669.018         mW           Time         0:00:30.800         mW	Current Battery Life (dec) (ZVC ACH1)			10.562	h	
Power Max (ZVC WCH1) 1669.018 mW Time 0:00:30.800	Power Average (ZVC WCH1)			1410.711	mW	
Time 0:00:30.800	Power Max (ZVC WCH1)			1669.018	mW	
	Time			0:00:30.800		

圖 5-4:每個事件標籤之間的耗電量測



圖 5-4 展示了耗電量測的報告。第一個是"Global Data",顯示了在這段量測期間的所有總耗能。之後的"Marker",顯示了每一個事件標籤,以及每個事件標籤之間的個別耗能報告。

<ul> <li>Current (A</li> <li>Power (W</li> <li>Voltage Ax</li> <li>Current Ax</li> <li>Power Ax</li> </ul>	A x 0.1) () verage (V) verage (A x 0.1) erage (A0)										
T UNELAW	erage (w)		1	Power	consu	mption m	onitor				
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圖 5-5: 第一個部份的耗能量測圖

圖 5-5 則顯示了第一個建立連線時的耗能圖形,工程師可以清楚的看到,哪一個時間點已經建立了連線,會有一個事件標籤提示。