Company confidential

LV81-LV82 Trouble Shooting

Publisher：NJD HW Team

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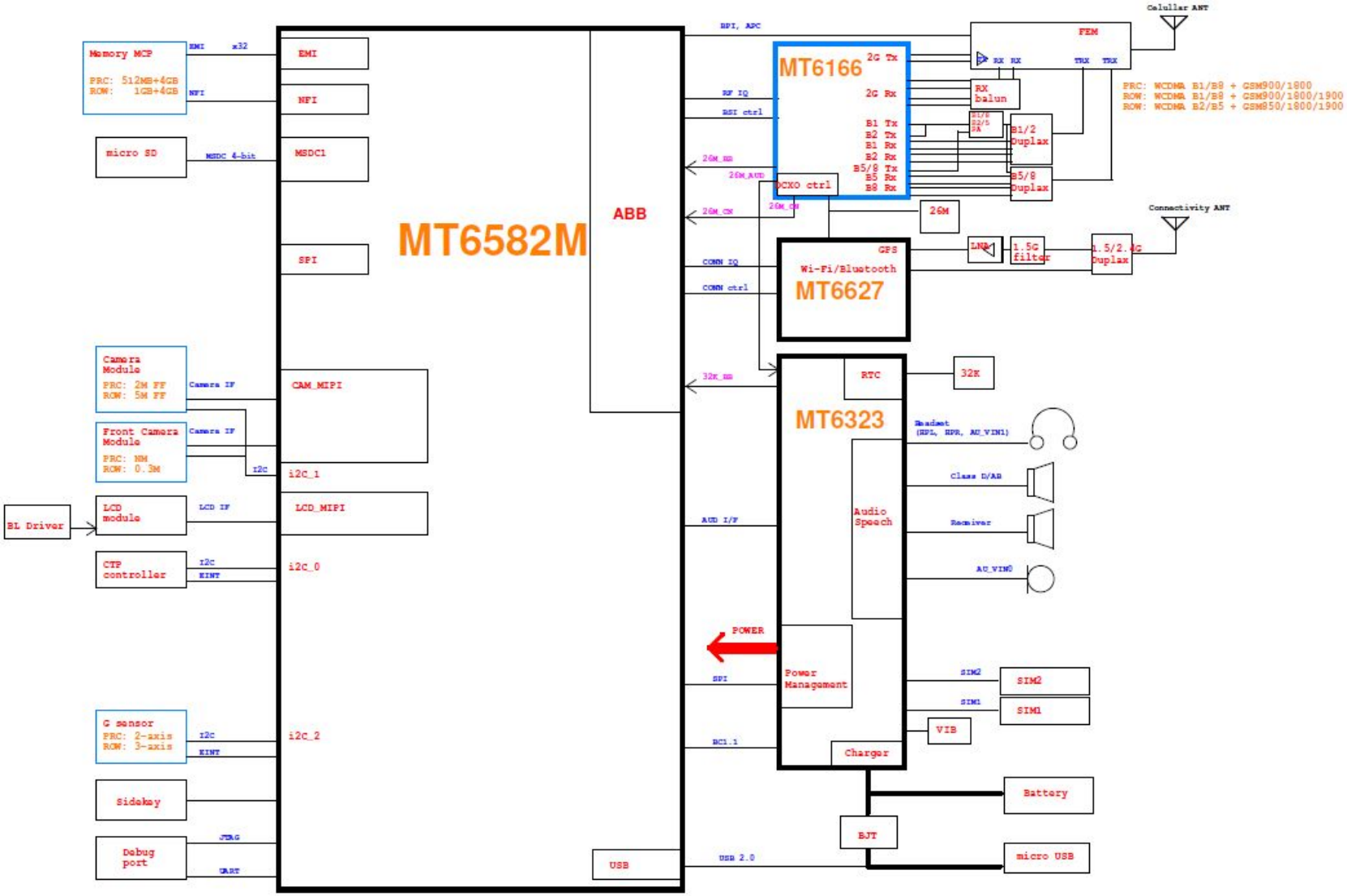
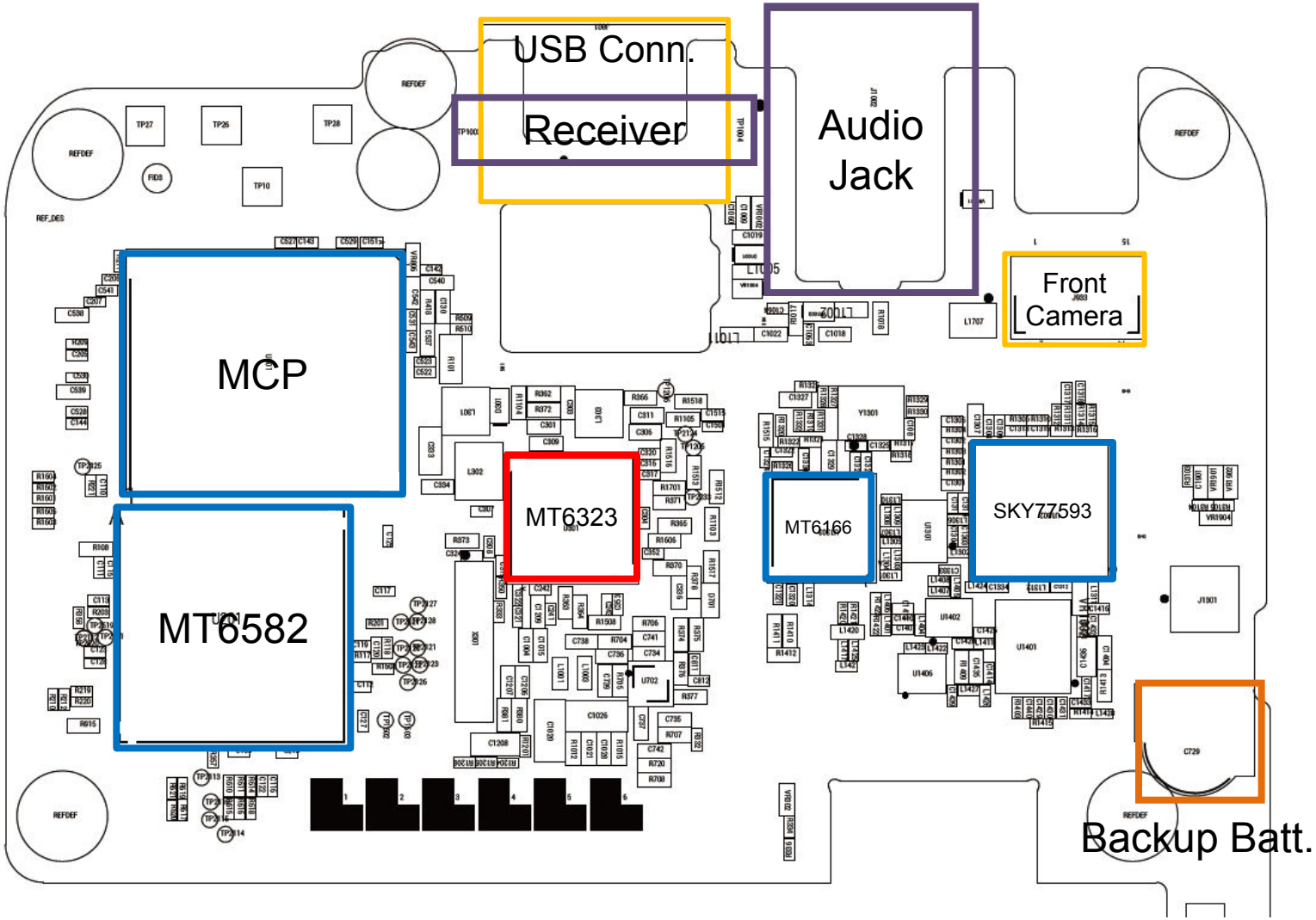
CompalComm | 華寶通訊

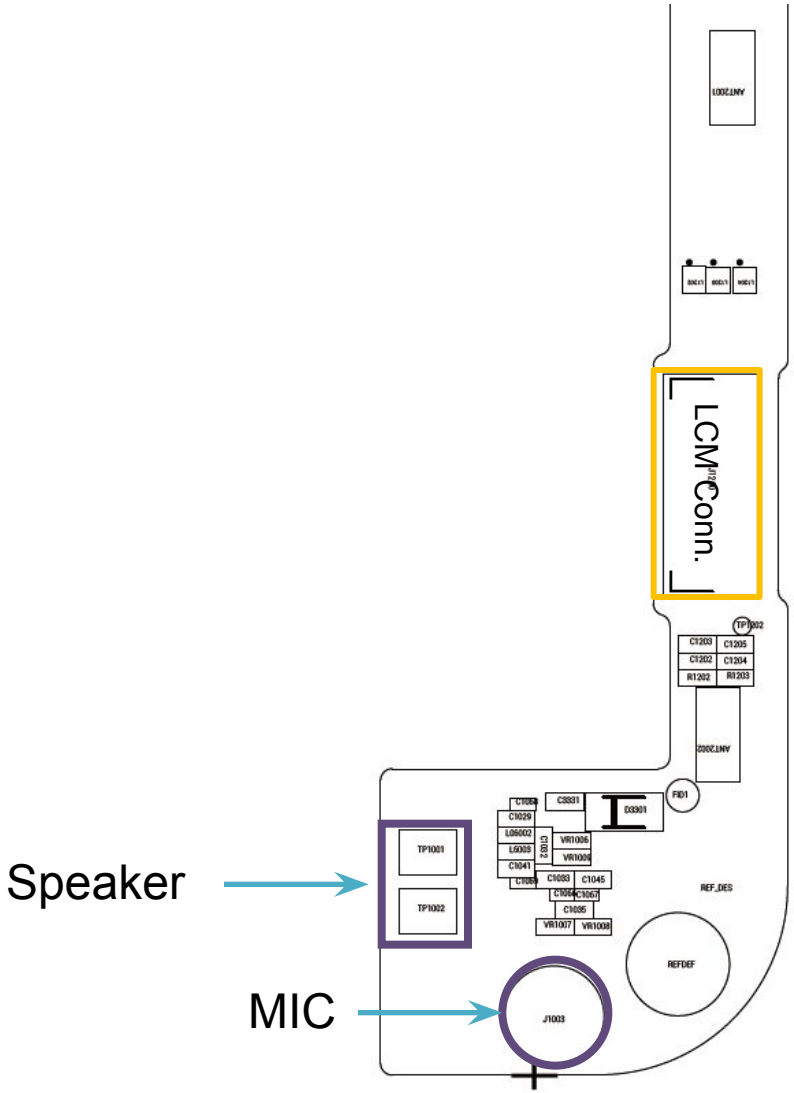
Function Block



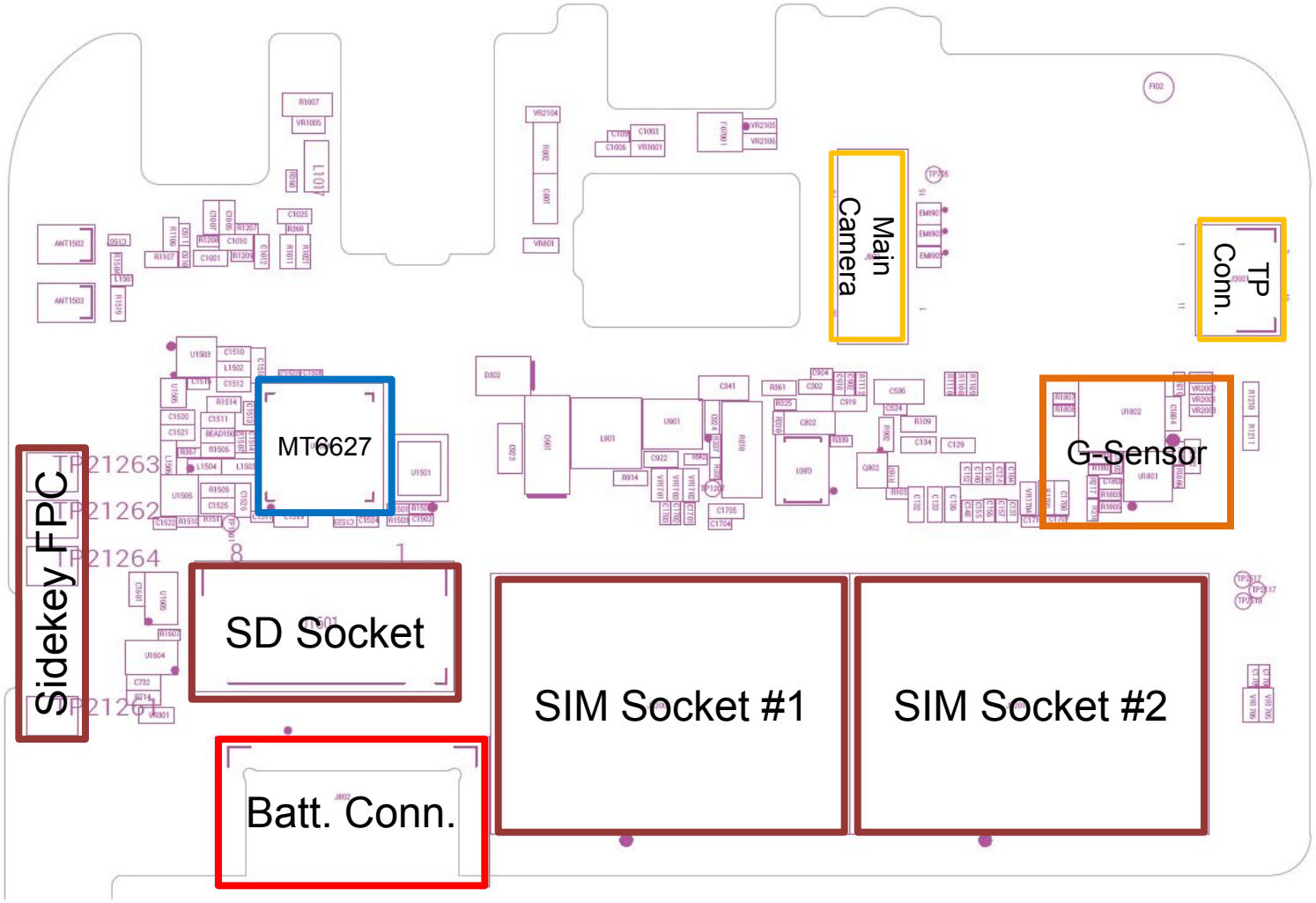
M/B Top Placement #1



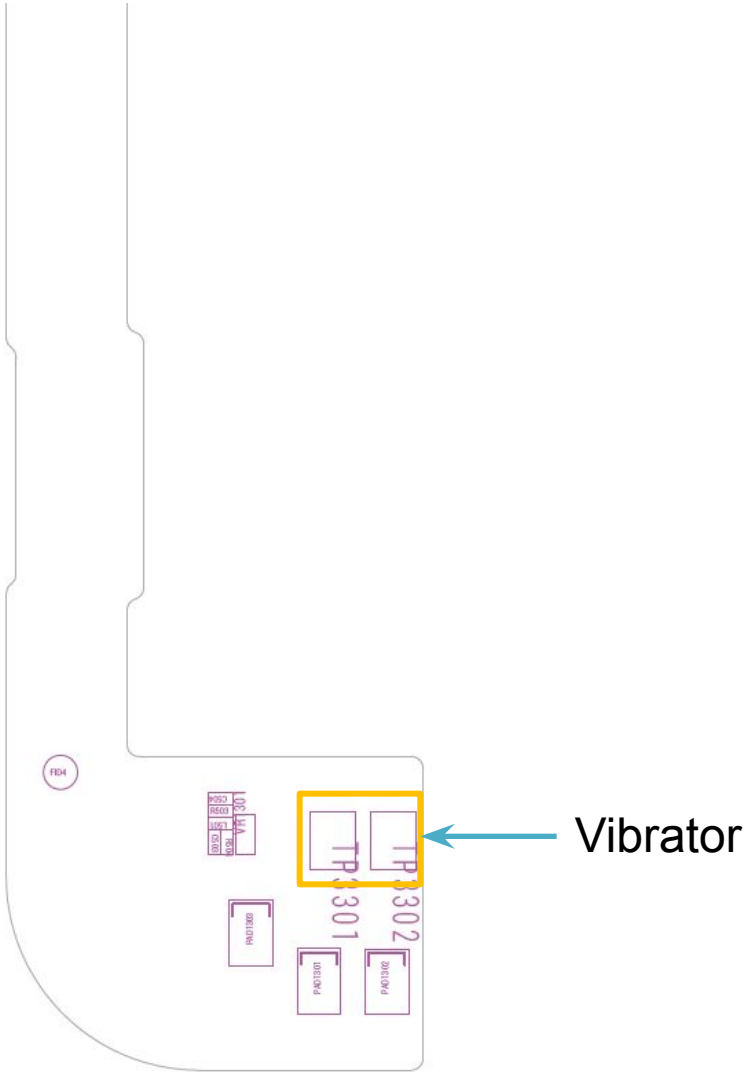
M/B Top Placement #2



M/B Bottom Placement #1



M/B Bottom Placement #2

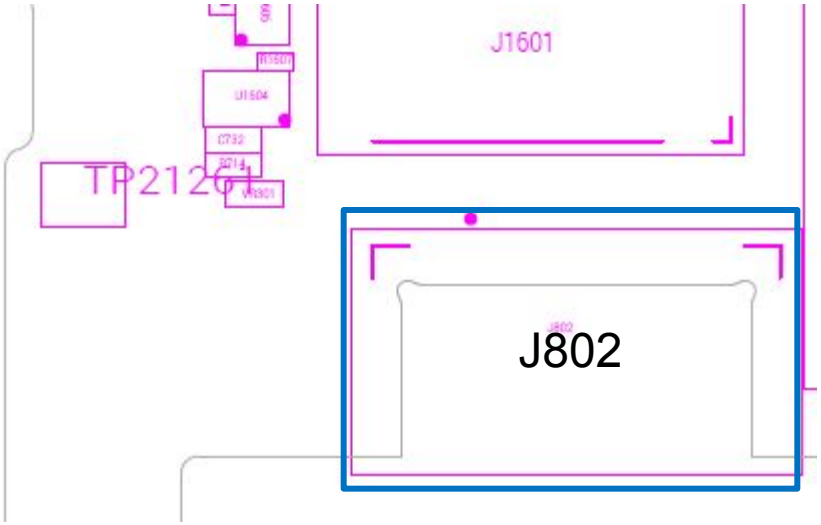


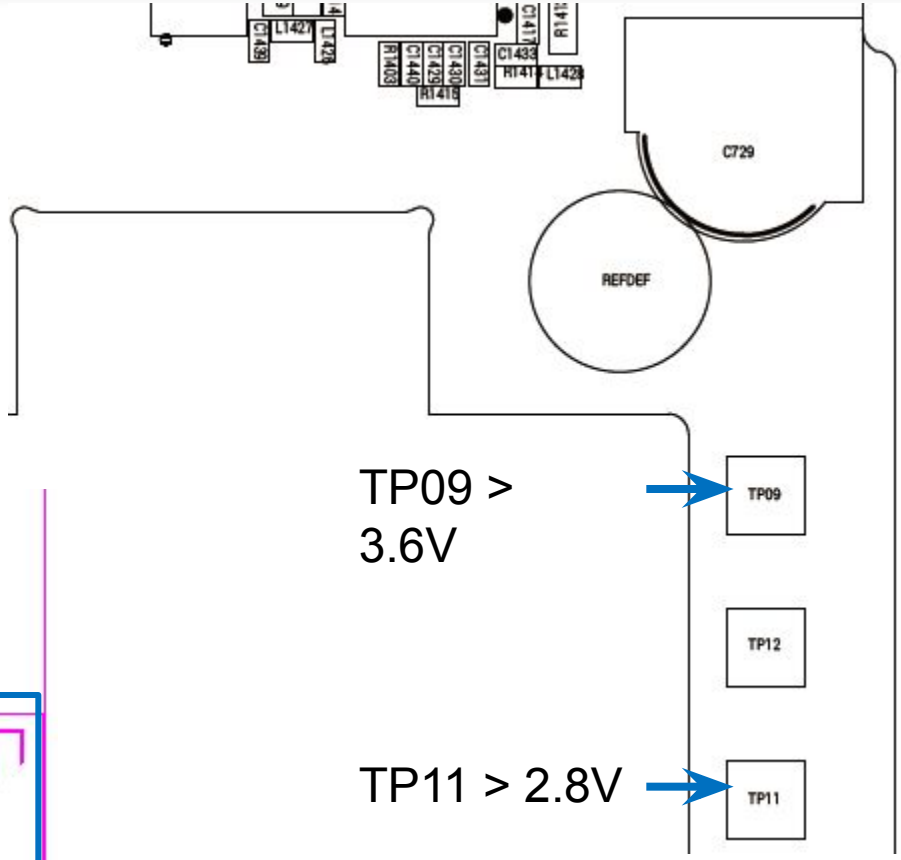
BB Common Question

- BB-1 Can not power on (無法開機)
- BB-2 Can not download (無法更新軟件)
- BB-3 Can not charging (無法充電)
- BB-4 SIM Card Identification error (SIM卡無法識別)
- BB-5 Can not display (畫面無法顯示或顯示異常)
- BB-6 sensor function fail (感測器不良)
- BB-7 Touch Panel no function (無法觸屏)
- BB-8 Vibrator no function (馬達無振動)
- BB-9 Camera can not turn on (無法攝像)
- BB-10 MIC no function (麥克風無作用)
- BB-11 Speaker no function (喇叭無聲)
- BB-12 Audio function fail (Audio 不良)
- BB-13 SD Card no function (SD Card無作用)

BB-1 Can not power on (無法開機) (1/4)

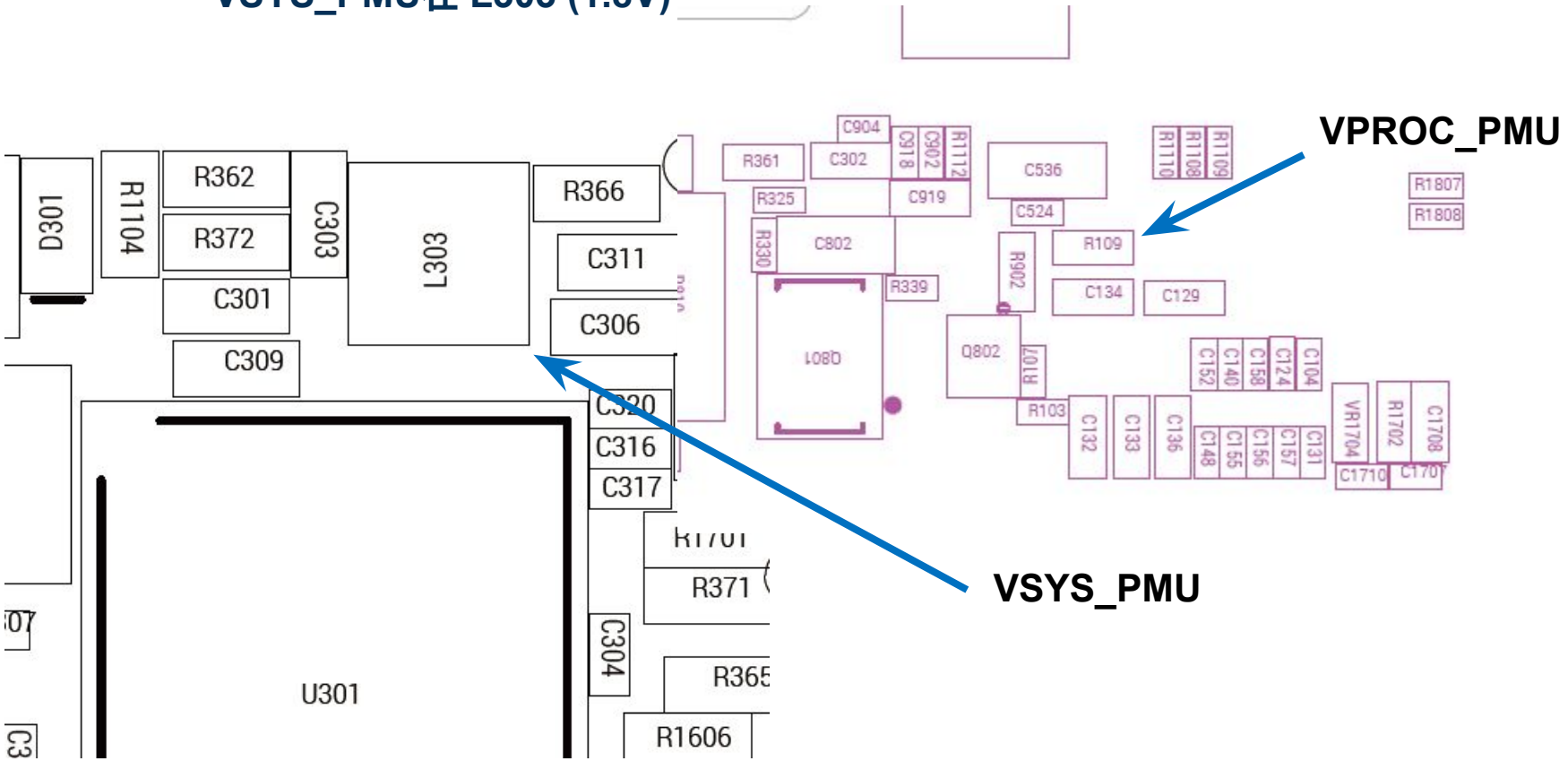
- 1. 確認電池是否有電?
  - VBATT (TP09 > 3.6V)
- 2. 確認J802吃錫狀況是否正常?
- 3. 確認開機鍵是否正常?
  - PWRKEY(TP11 > 2.8V)
  - TP11跟地短路後可將系統開機





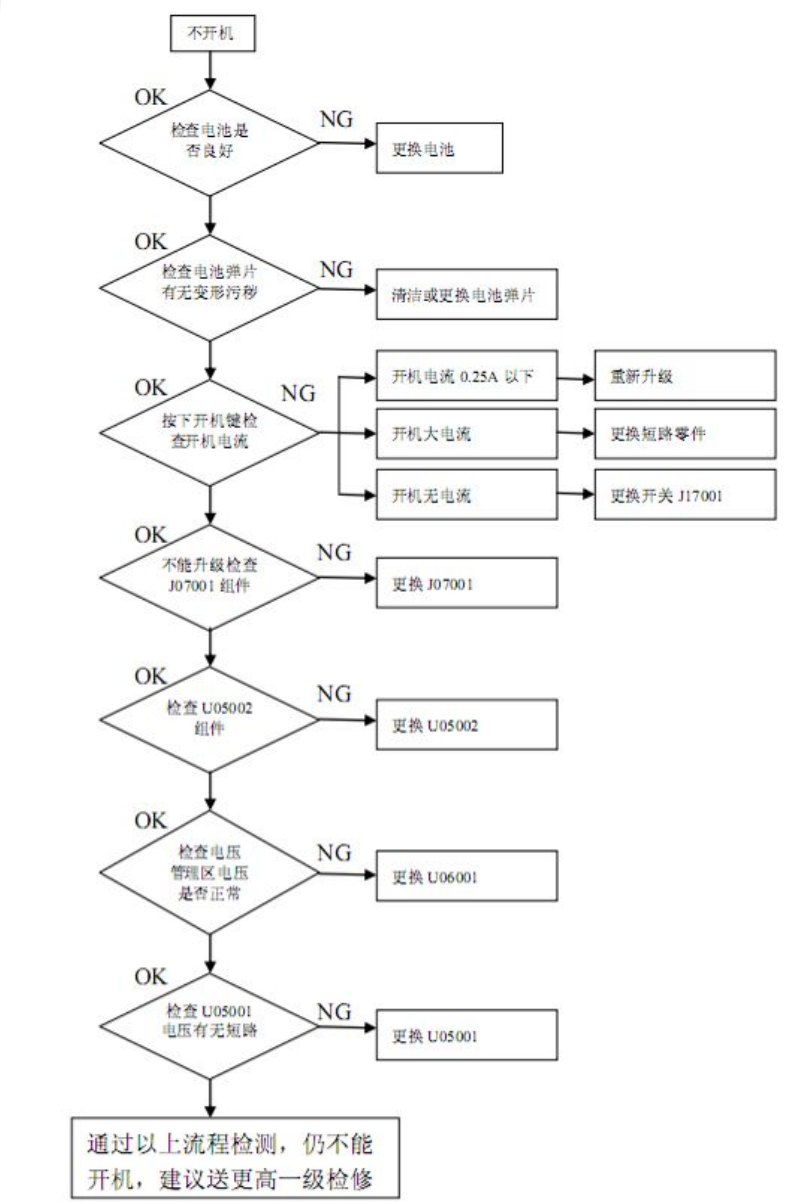
BB-1 Can not power on (無法開機) (2/4)

- **5. 請確認MT6323周圍電壓是否正常?**
  - **VPROC_PMU在 R109 (0.9V~1.1V)**
  - **VSYS_PMU在 L303 (1.8V)**



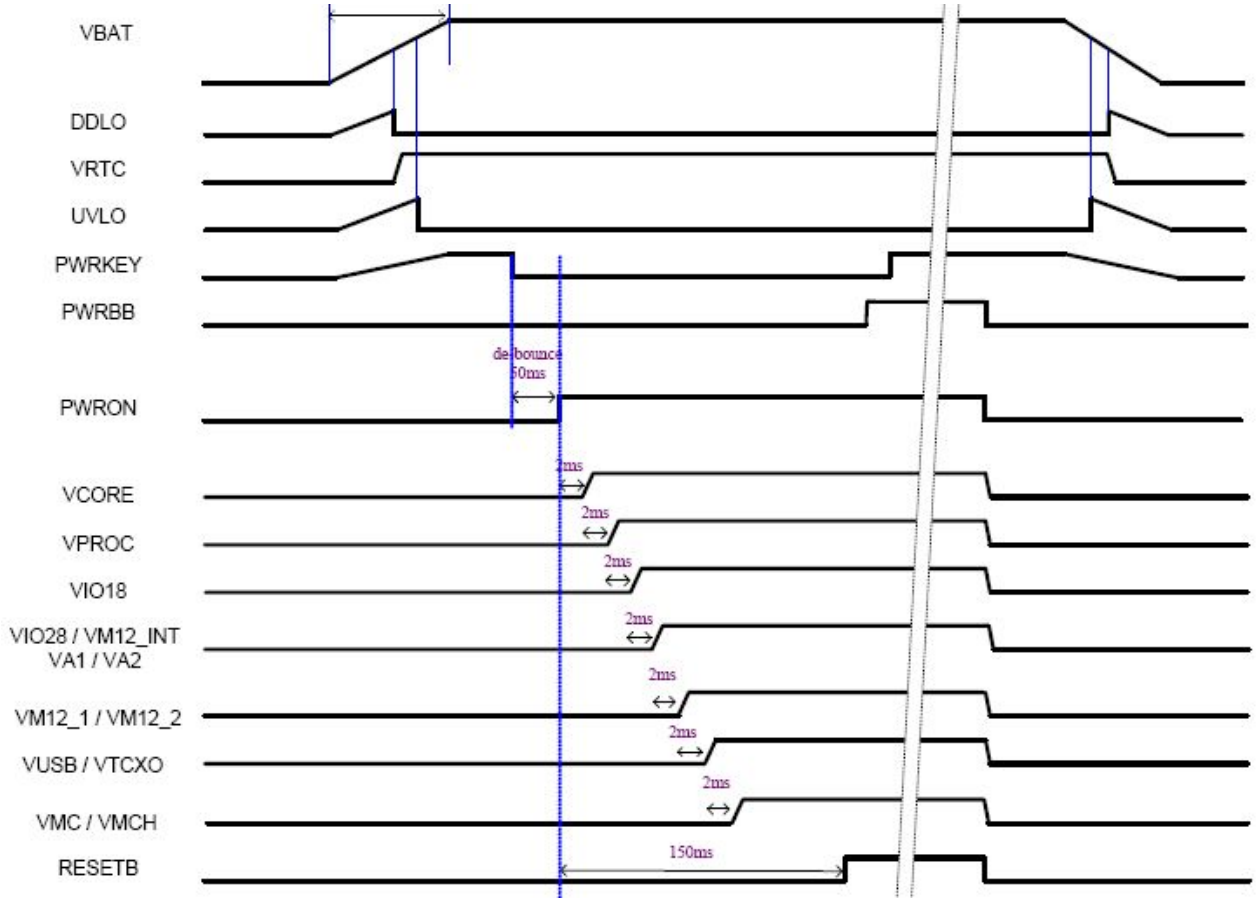
BB-1 Can not power on (無法開機) (3/4)

Debug Flowchart



BB-1 Can not power on (無法開機) (4/4)

MT6323 Power On/Off sequence



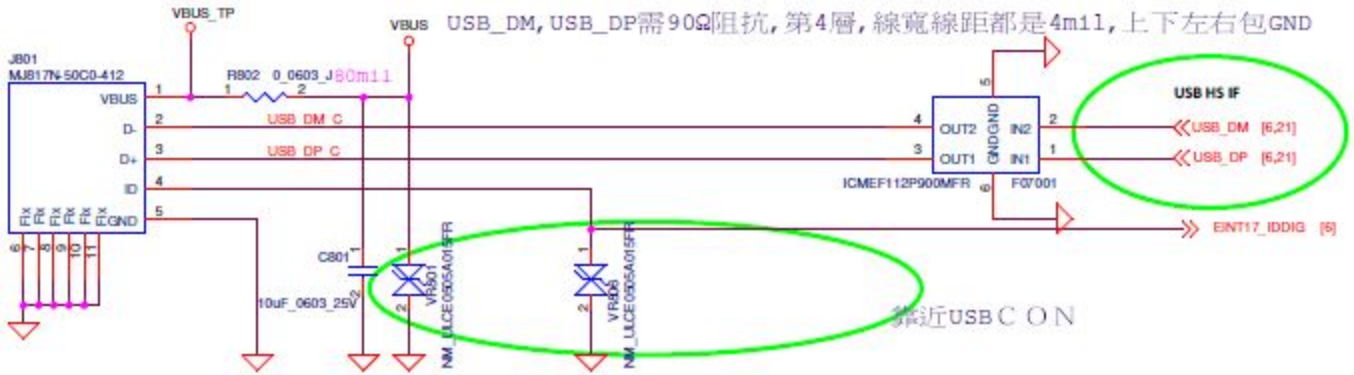
VCORE≈0.7V~1.3V
VPORC≈0.7V~1.3V
VIO18=1.8V
VIO28=2.8V
VM12_INT=1.2V
VA1=2.5V
VA2=2.5V
VUSB=3.3V
VTCXO=2.8V
VMC=3.3V
VMCH=3.3V
RESET=1.8V

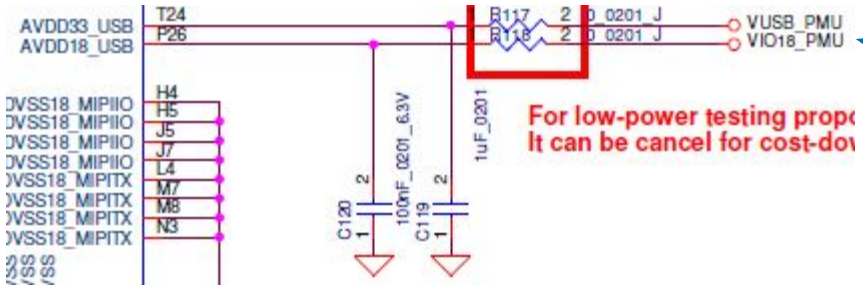
6. 若以上行為均正常，可使用電源供應器供應3.6V電源，並由開機電流狀態來判斷手機狀態。

正常啟動，電池電流約可操作在250~300mA左右的開機電流。
若有開機大電流，表示板端有零件短路，檢查零件做交叉驗證，找出短路點。
若開機電流過低，表示軟體啟動失敗，更新軟件或對MCP進行更換。

BB-2 Can not download (無法更新軟件) (1/3)

- 1. 確認開機後電流起跳正常。(記憶體中無代碼時，電池電流約在0.109A左右)
- 2. 開機過程中如果電流過大或過小，會造成USB port無法識別。
- 3. 檢查F07001是否空焊

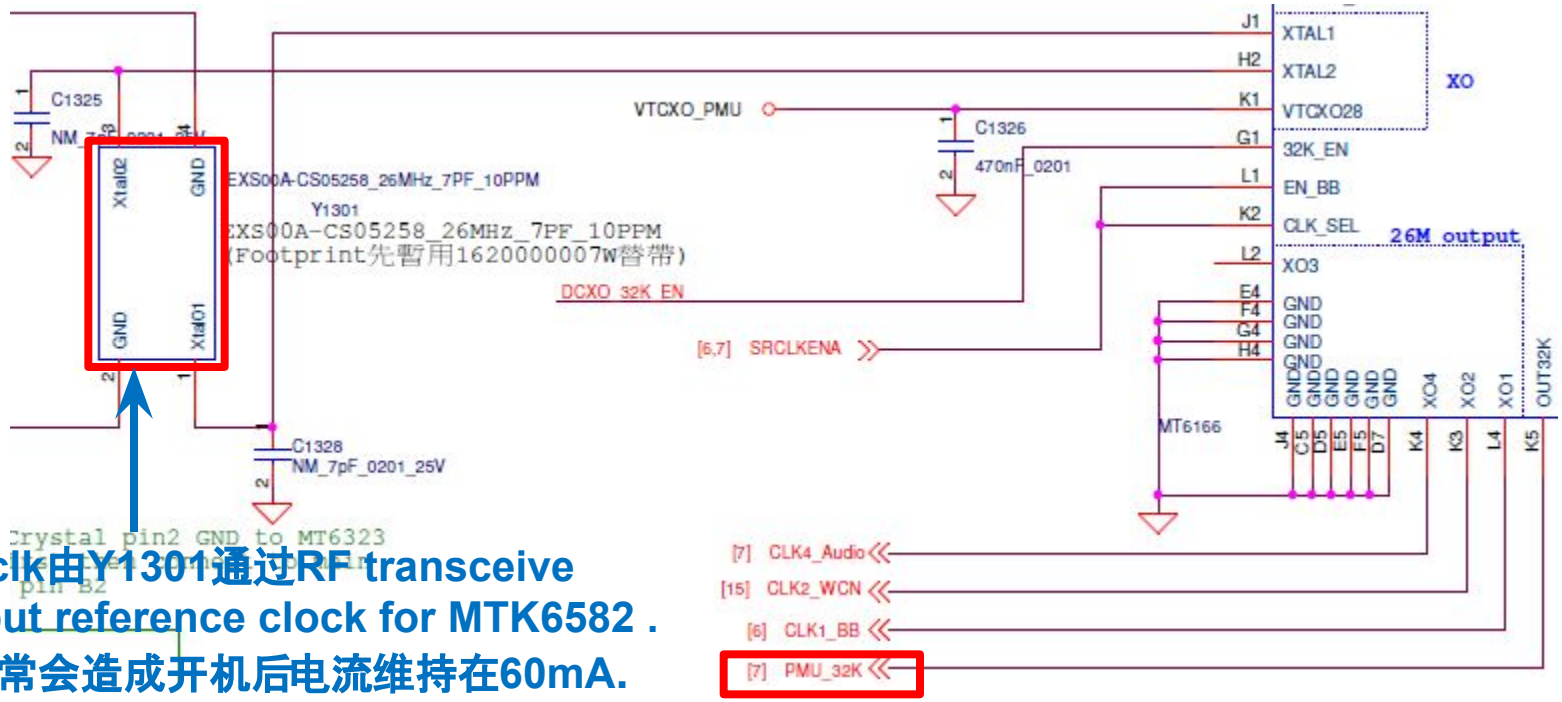




提供CPU内部USB驱动电路供电电源,电压为3.3V左右

BB-2 Can not download (無法更新軟件) (2/3)

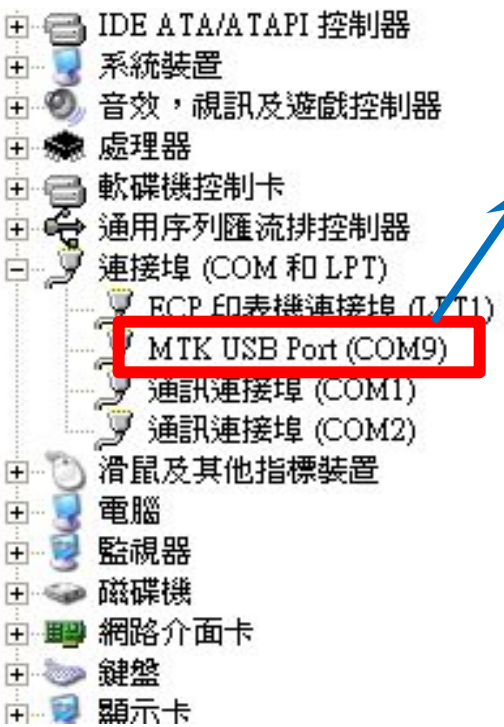
- **4. 若可以正常DL，但無法進入META mode，檢查RF transceiver 26MHz及RF chip是否正常。**



Sysclk由Y1301通过RF transceive output reference clock for MTK6582 .
此异常会造成开机后电流维持在60mA.

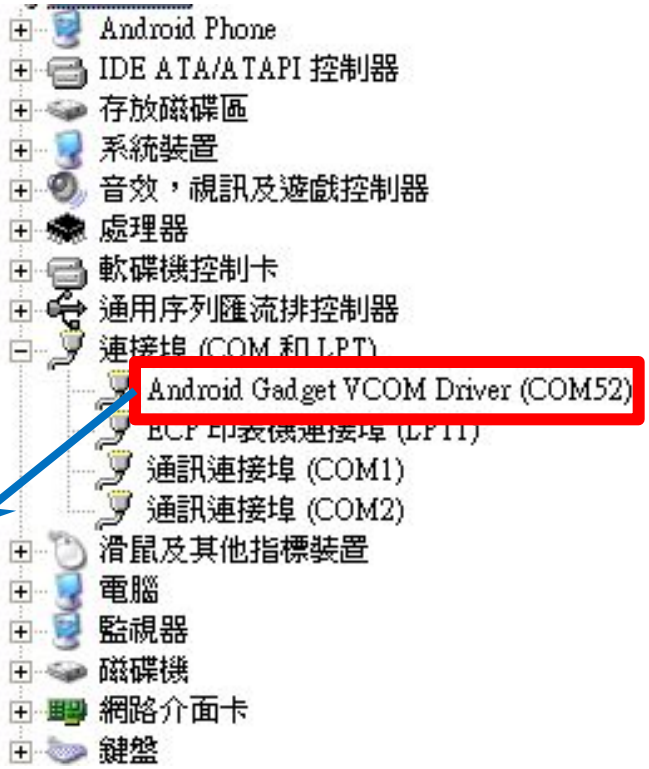
BB-2 Can not download (無法更新軟件) (3/3)

- **5. 確認com port是否正確**



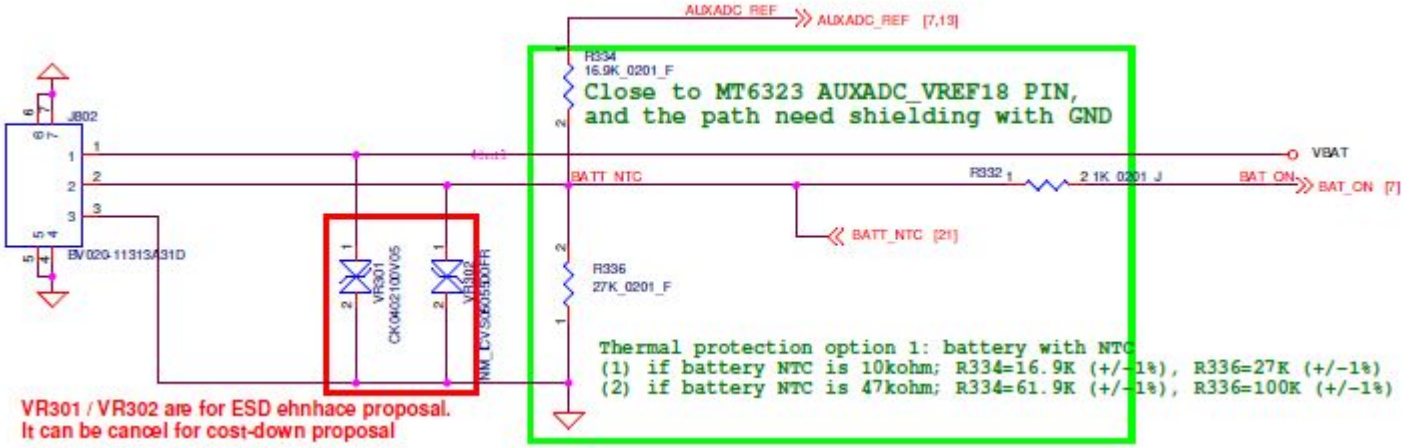
1:DL时在无code情况下show MTK USB Port

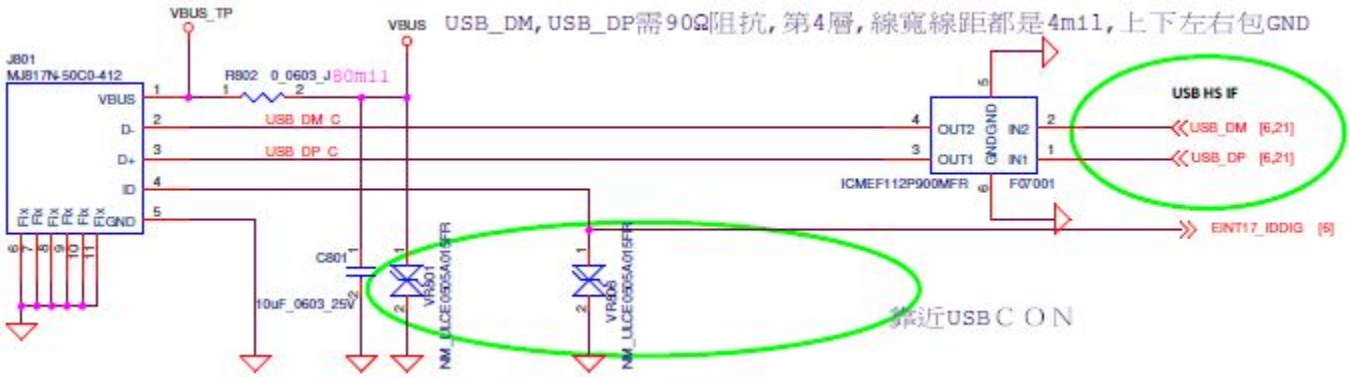
2:DL完img后,在BB/RF META tool开启下应show META mode



BB-3 Can not charging (無法充電) (1/2)

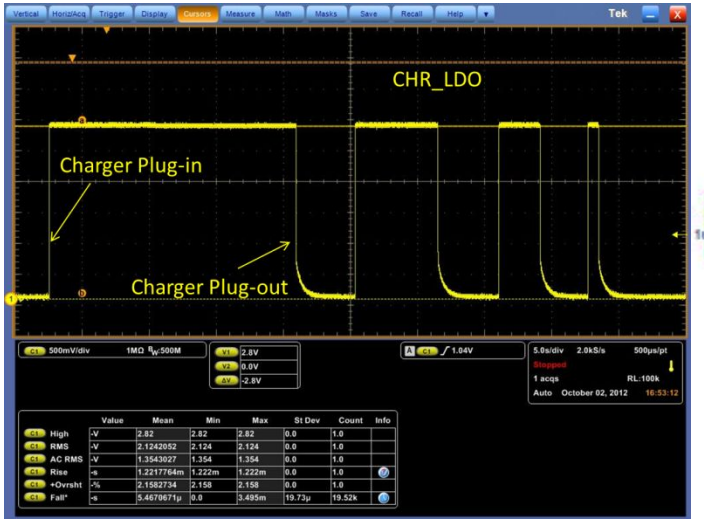
- 1. 確認電池內阻R332 Pin1 (BAT_ID)，當接上電池後阻抗應該約10kΩ.
- 2. 確認電池電壓是否為正常，異常為0V (開路)
- 3. 確認J801 USB connector是否有異狀?

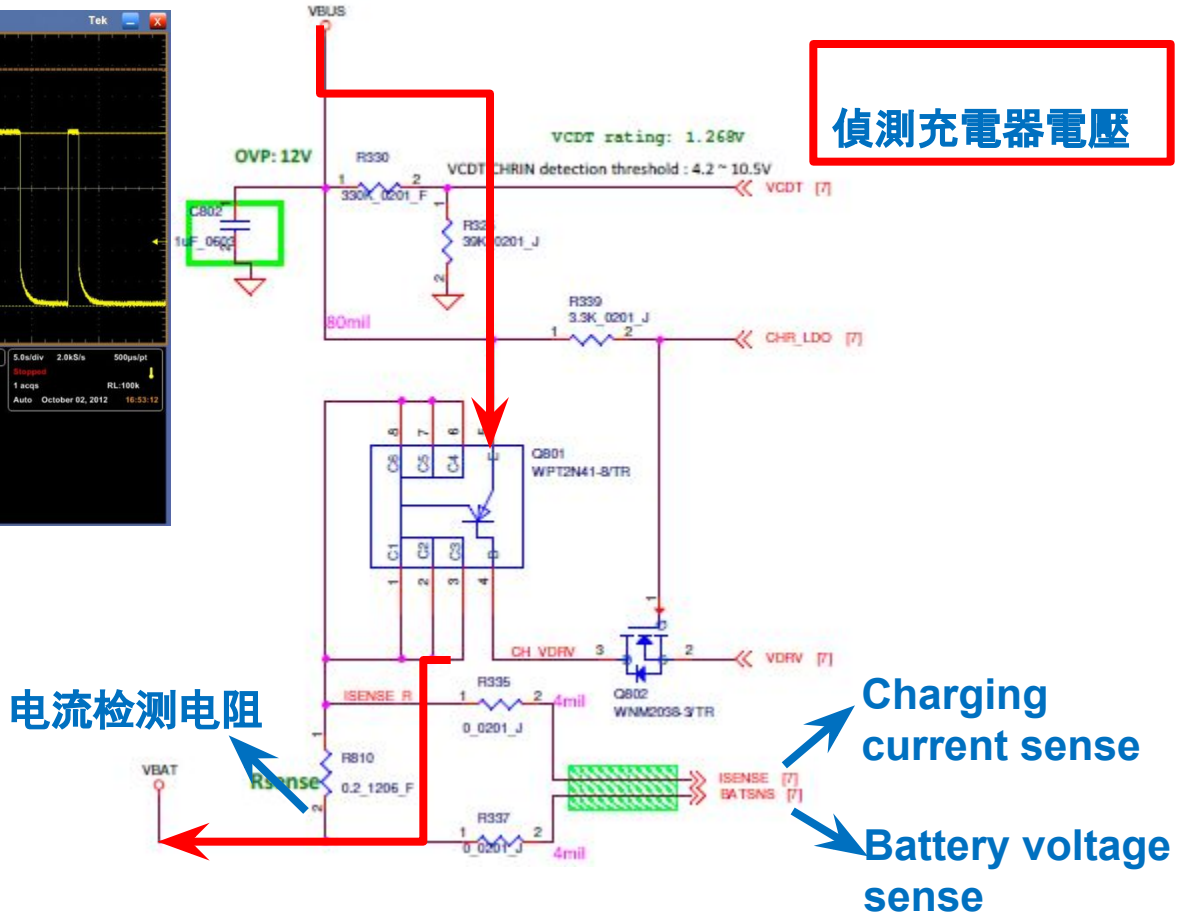




BB-3 Can not charging (無法充電) (2/2)

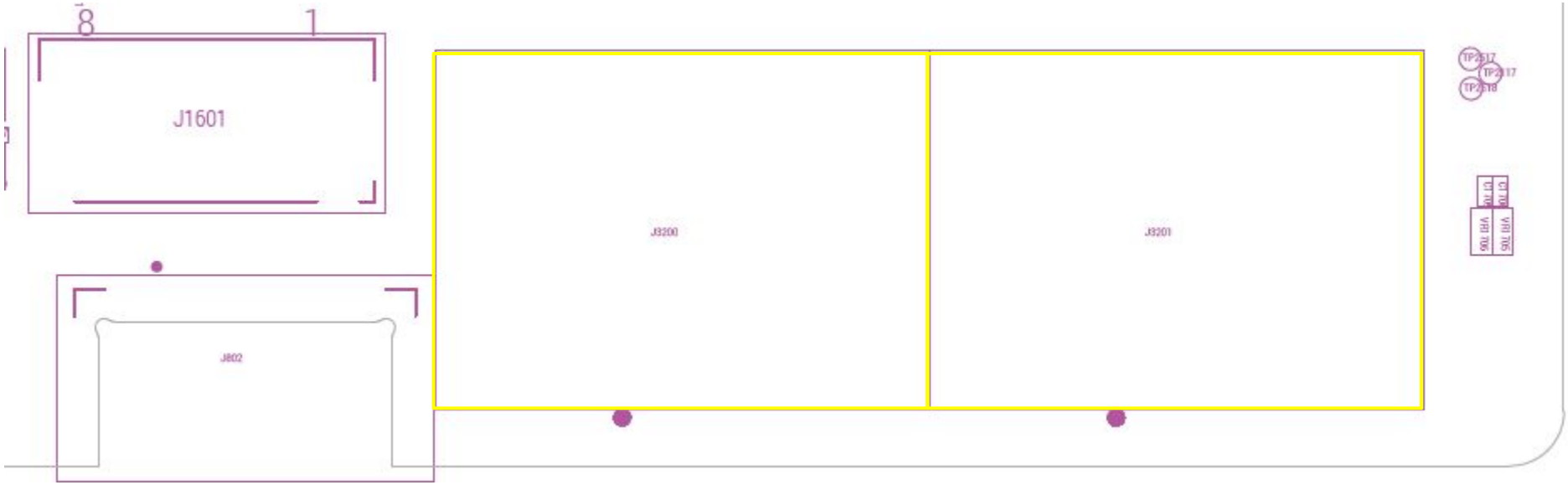
- **4. 確認充電電路行為是否正常。**
  - **CHR_LDO在USB插入時, 會拉高準位**



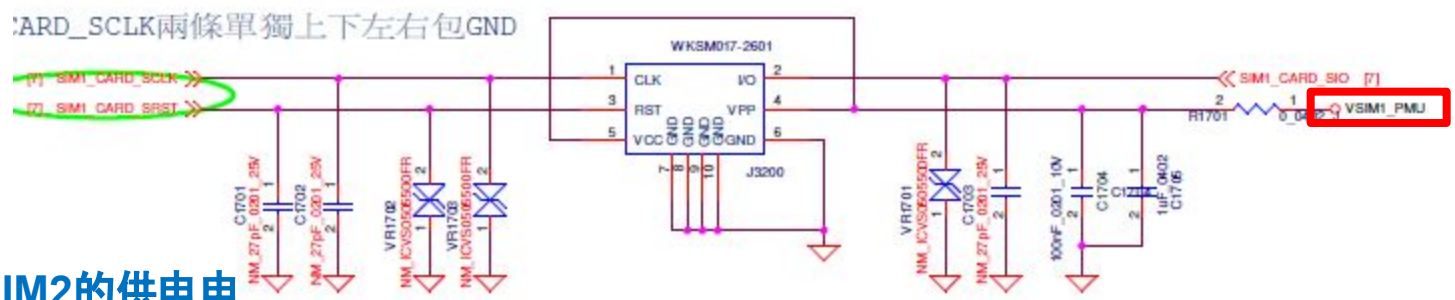


BB-4 SIM Card Identification error (SIM卡無法識別) (1/2)

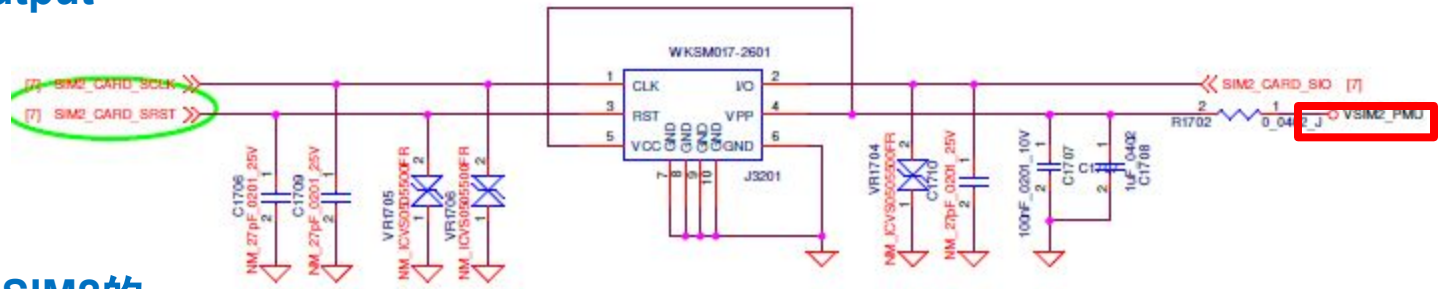
- 1. 更換SIM卡, 確認卡片是否正常
- 2. 確認J3200, J3201吃錫狀況是否正常?
- 3. 確認SIM 相關訊號
  - SRST, VSIM,SIO and SCLK



BB-4 SIM Card Identification error (SIM卡無法識別) (2/2)



SIM1/SIM2的供电电压各来自PMU的两组LDO output

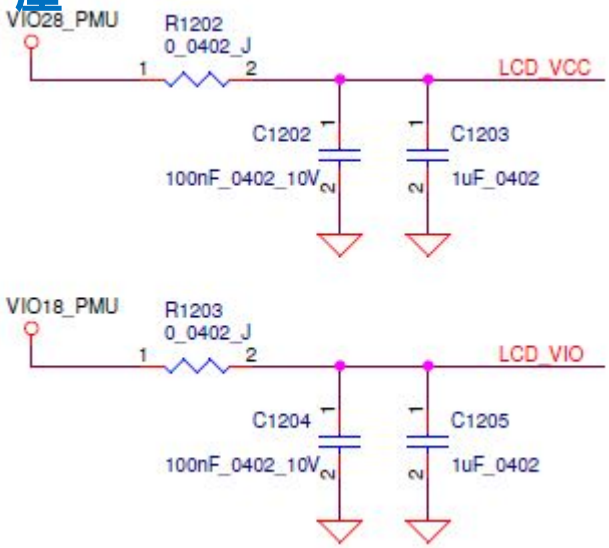


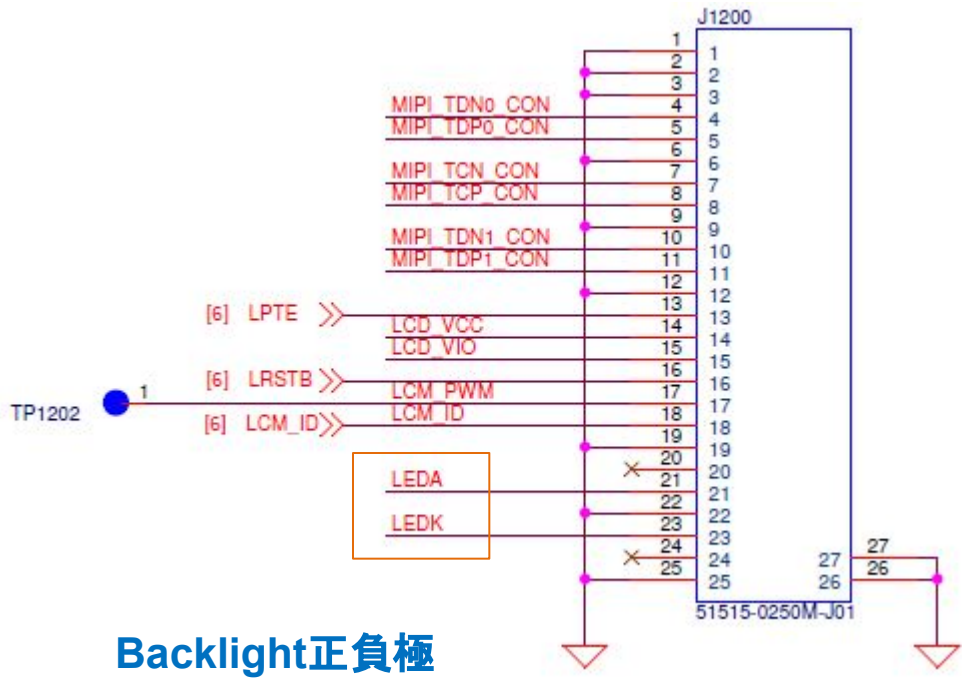
SIM1和SIM2的DATA/RST/CLOCK单独分开使用

BB-5 Can not display (畫面無法顯示或顯示異常) (1/2)

- 1. 確認J1200是否有異狀[錫短 or 空焊]?
- 2. 更換LCM.
- 若更換良品後, 現象還存在,
- 3. 檢查R1202, R1203及L1202, L1203, L1204否有異狀?
- 4. 確認LCM 電壓 (VIO28_PMU及VIO18_PMU)位準是否正確?
- 5. 若無背光, 確認U901, R1914, R915, D901, R903

LCM兩組工作電壓



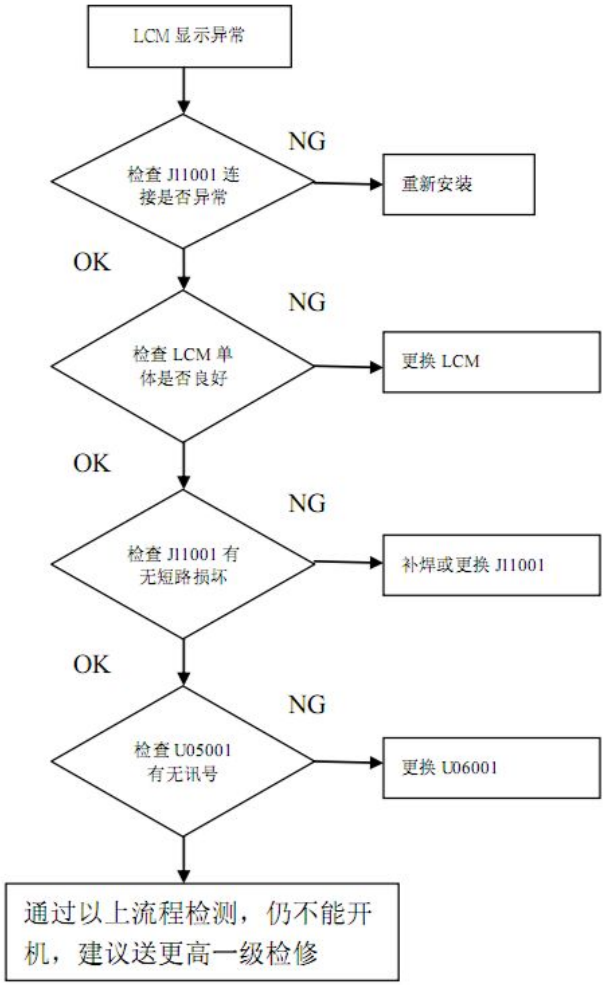


Backlight正負極

BB-5 Can not display (畫面無法顯示或顯示異常) (2/2)

- **分析流程圖**

LCM 显示异常故障分析流程图



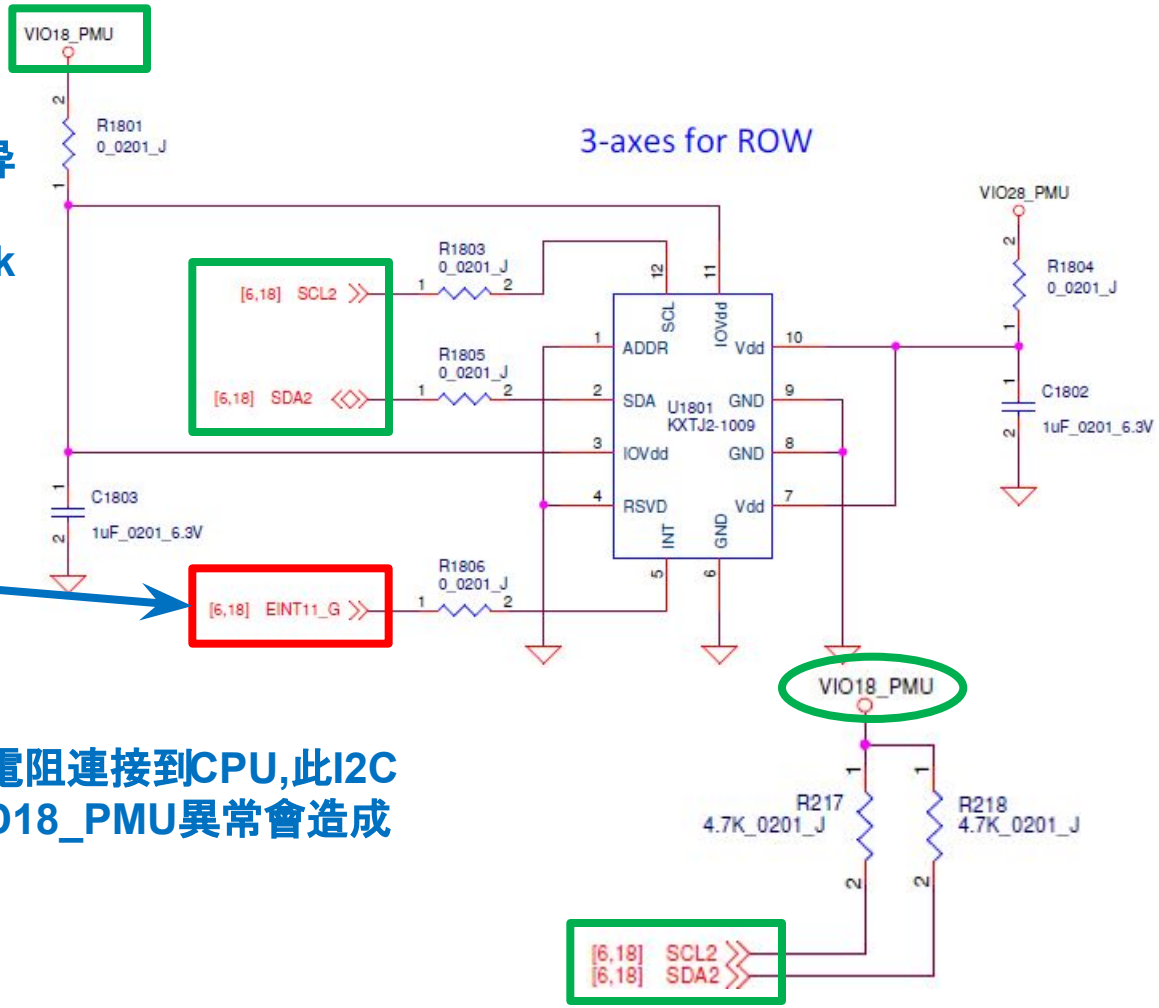
BB-6 sensor function fail (感測器不良)

- 所有的sensor都是由I2C總線,中斷信號,電源組成.I2C總線上sensor間會相互影響,所以維修某個 sensor不良時需要同步檢查其他sensor路徑.
- G-sensor

G-sensor供电电压.该电压等同于VIO18,该电压异常系统就无法开起来,所以sensor不良不用check此电位

G-sensor中斷信號

G-sensor I2C通過上拉電阻連接到CPU,此I2C與touch panel共用,VDD18_PMU異常會造成所有sensor fail

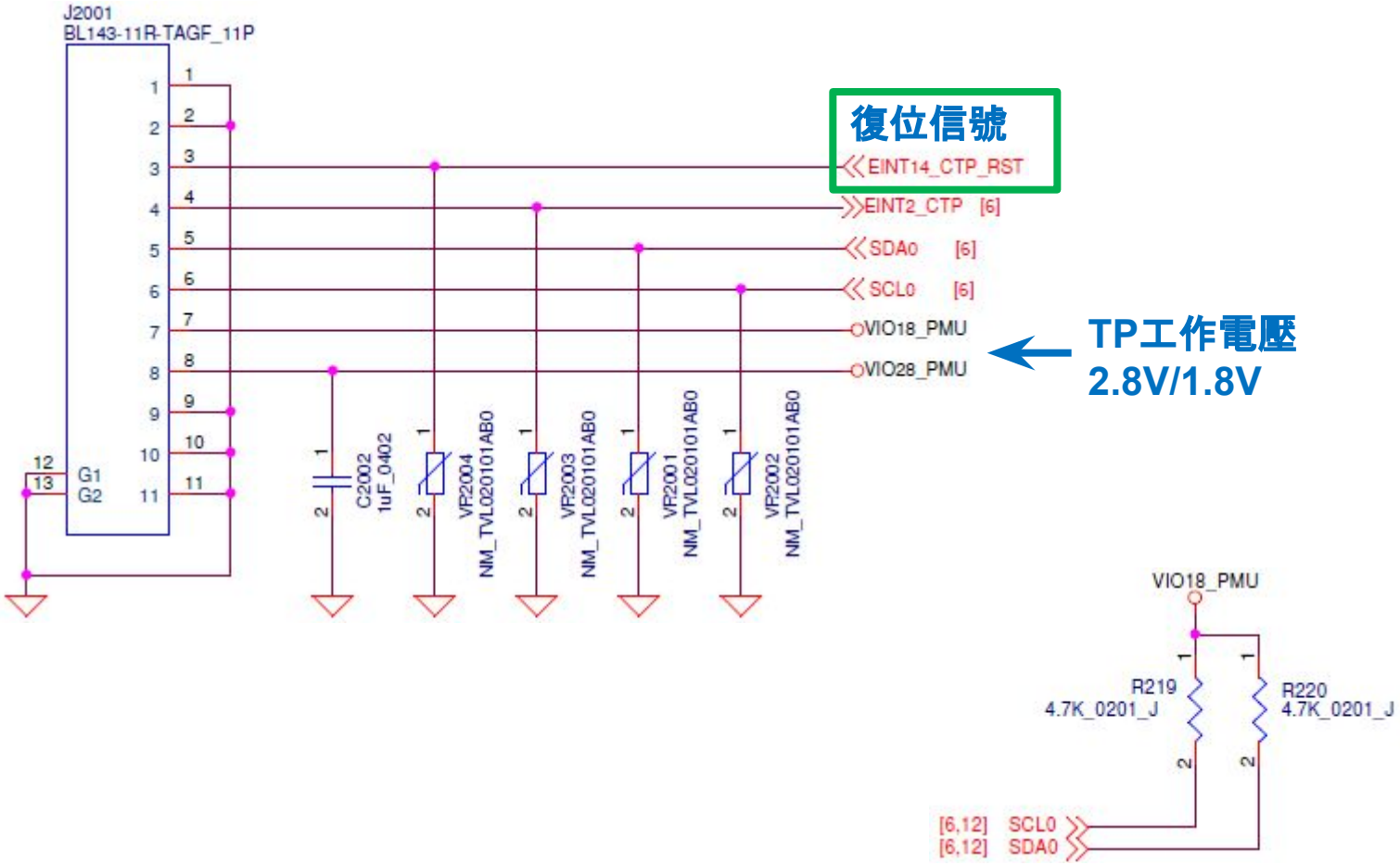


BB-7 Touch Panel no function (無法觸屏) (1/2)

- 1. 確認TP Connector 是否鬆脫?
- 2. 更換TP.
- 若更換後良品後, 現象還存在,
- 3. 確認J2001是否有異狀[錫短 or 空焊]?
- 4. 確認TB 電壓 (VDD28_PMU及VDD1V8_PMU)位準是否正確?
- 5. 確認控制訊號 I2C, Reset, INT動作是否正常?

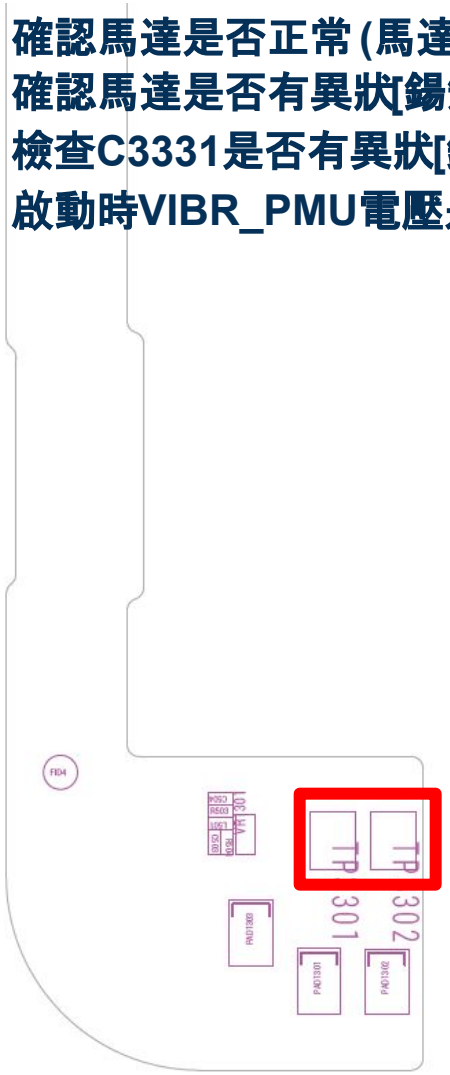
BB-7 Touch Panel no function (無法觸屏) (2/2)

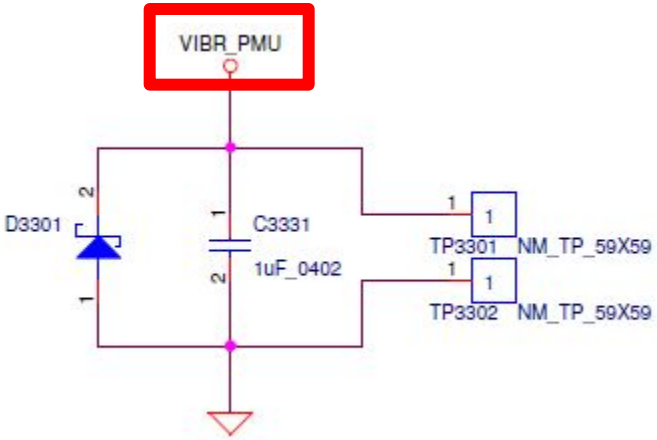
- **TP circuit**



BB-8 Vibrator no function (馬達無振動)

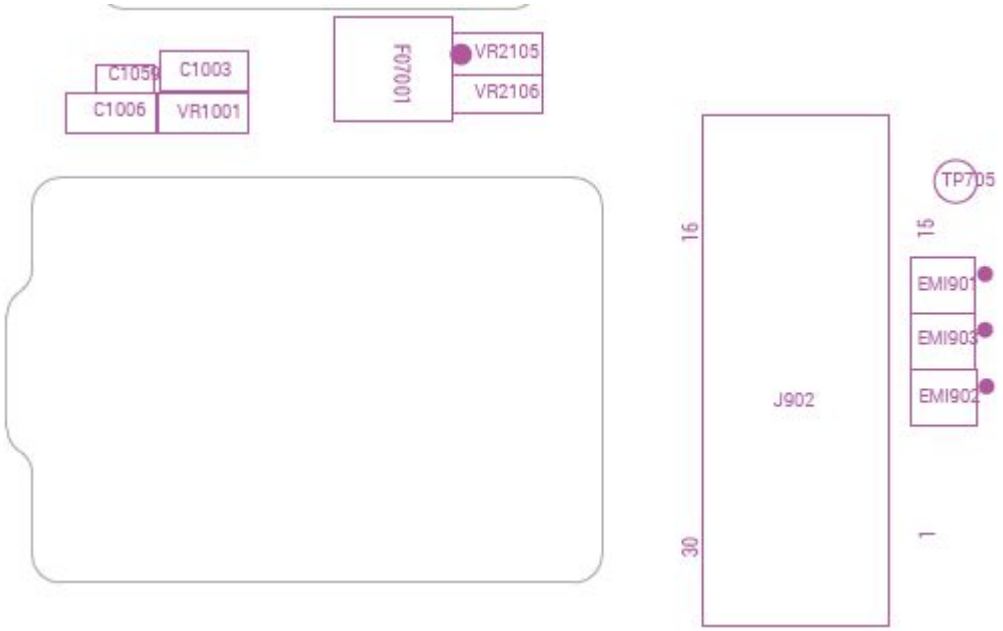
- 1. 確認馬達是否正常 (馬達阻抗約30Ω)
- 2. 確認馬達是否有異狀[錫短 or 空焊]?
- 3. 檢查C3331是否有異狀[錫短 or 空焊]?
- 4. 啟動時VIBR_PMU電壓是否正常





BB-9 Camera can not turn on (無法攝像) (1/3)

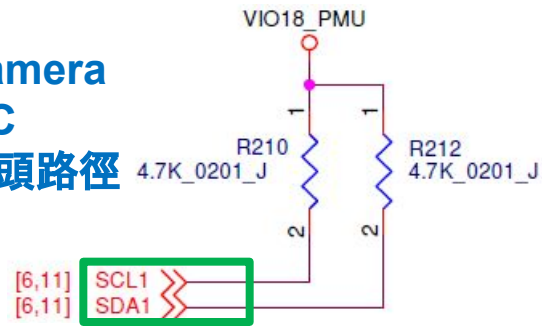
- 1. 確認組裝是否到位?
- 2. 更換Camera module.
- 若更換後良品後, 現象還存在,
- 3. 確認J902是否有異狀[錫短 or 空焊]?
- 4. 確認EMI901, EMI902, EMI903是否有異狀[錫短 or 空焊]?
- 5. 確認Camera 電壓 (VCAMD_IO_PMU, VCAMA_PMU)位準是否正確?

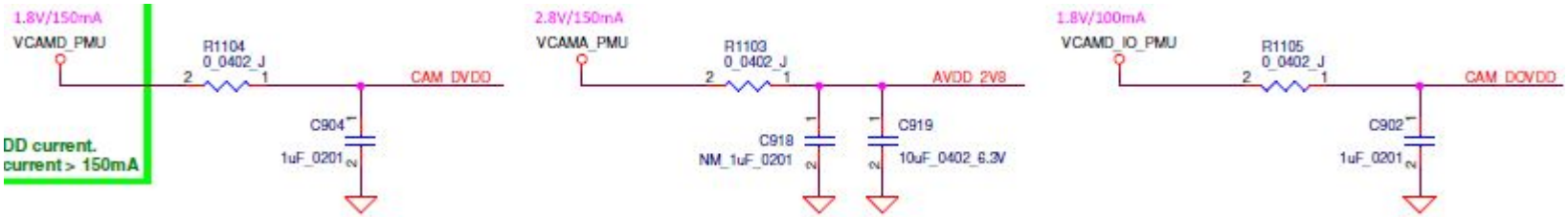


BB-9 Camera can not turn on (無法攝像) (2/3)

- **主camera的2組工作電壓均是由PMU LDO輸出通過0Ω電阻給camera.**

Camera I2C 源頭路徑

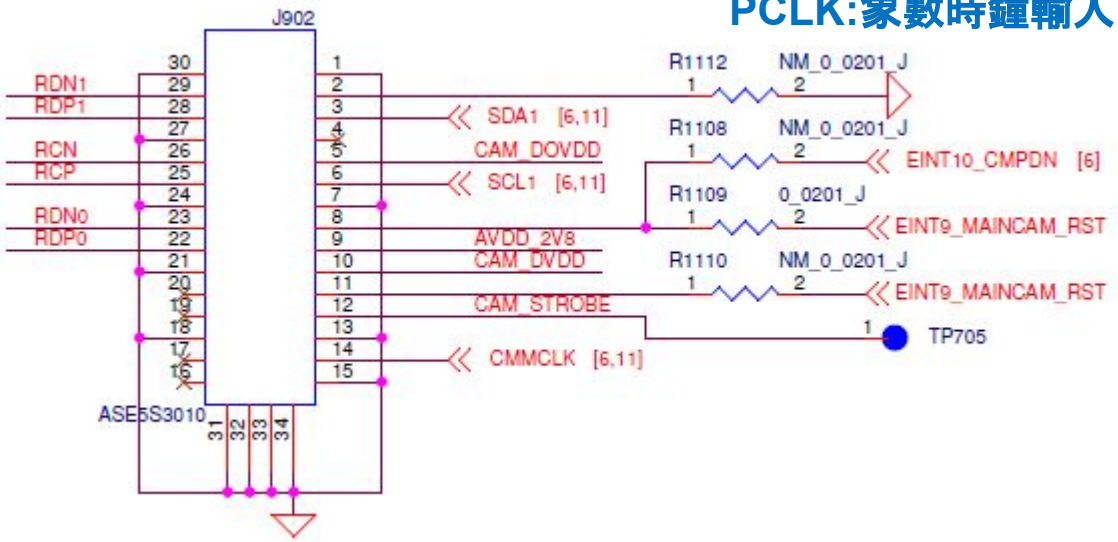




BB-9 Camera can not turn on (無法攝像) (3/3)

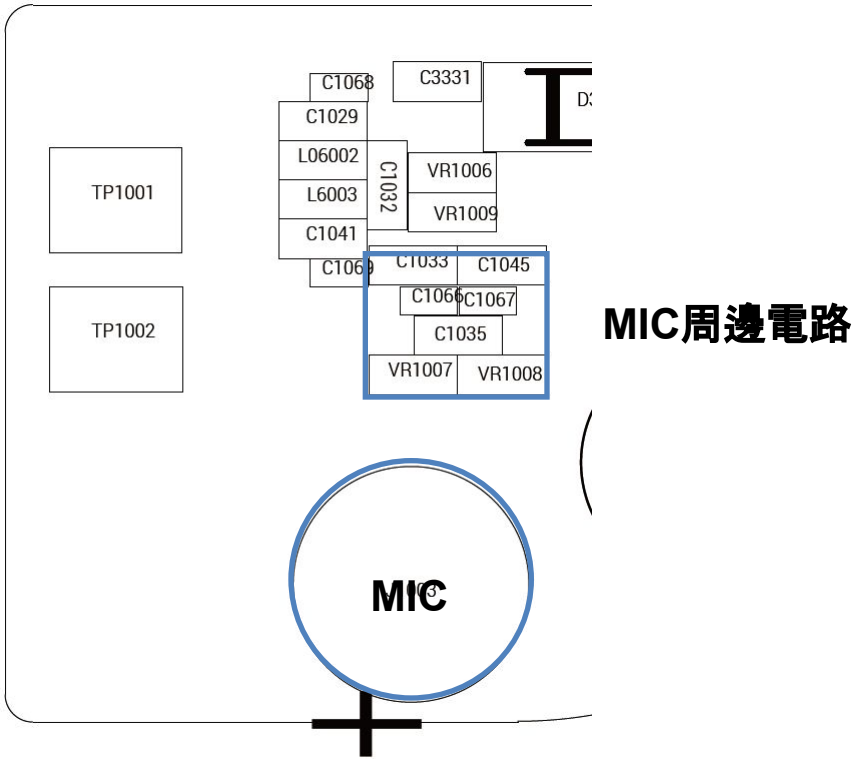
- 1:無法進入拍攝模式,此為camera無法通過I2C信號被CPU正常識別造成,此不良主要查供電/reset/CLK/PWD是否正常
- 2:拍攝黑屏/油畫:此現象為手機進入拍攝模式后,但無法讀取景物,此類不良主要是camera無法通過DATA路徑將信號傳給CPU正常處理造成,此類不良主要檢查camera的DATA。

VREF/HREF: Sensor垂直/水平參考信號
MCLK:來自CPU的主時鐘輸出
PCLK:象數時鐘輸入



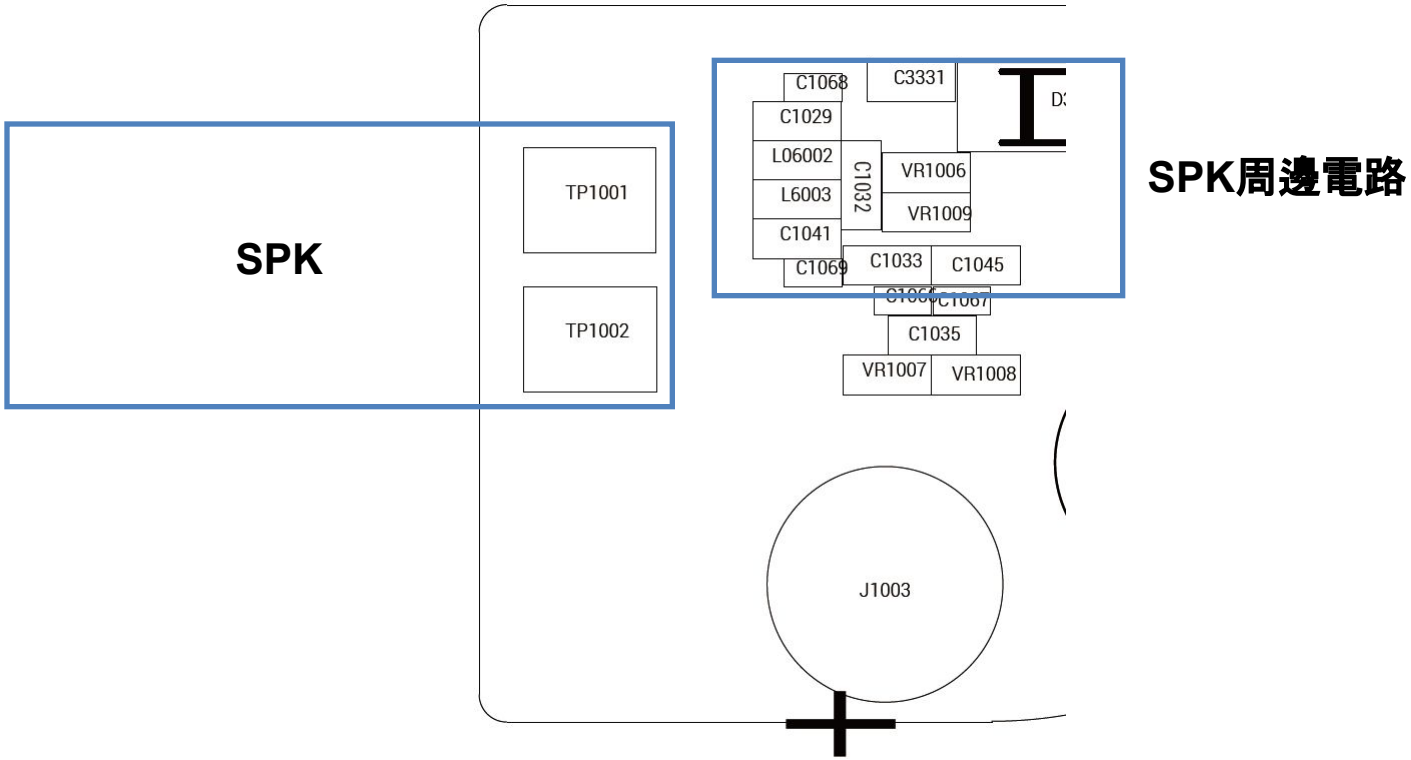
BB-10 MIC no function (麥克風無作用)

- **1. 確認J1003 Microphone是否正常 (正常Mic阻抗約0.95KΩ)**
- **2. 確認MIC 周邊電路是否有異狀[錫短 or 空焊]?**



BB-11 Speaker no function (喇叭無聲)

- **1. 確認Speaker彈腳及阻抗是否正常 (正常阻抗約8Ω)**
- **2. 確認Speaker周邊電路是否異常？[錫短 or 空焊]?**



BB-12 Audio function fail (Audio 不良) (1/4)

Audio类不良针对不同测试项fail,检查不同的路径.

1:wave play back fail□测的是SPK路径.

2:receiver fail □测的是手机听筒路径.

3:headset fail □测的是耳机左右声道路径.

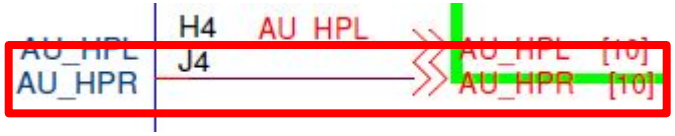
4:phone mic to headset fail □测的是手机MIC路径.

5:headsetmic to headset fail □测的是耳机MIC路径.

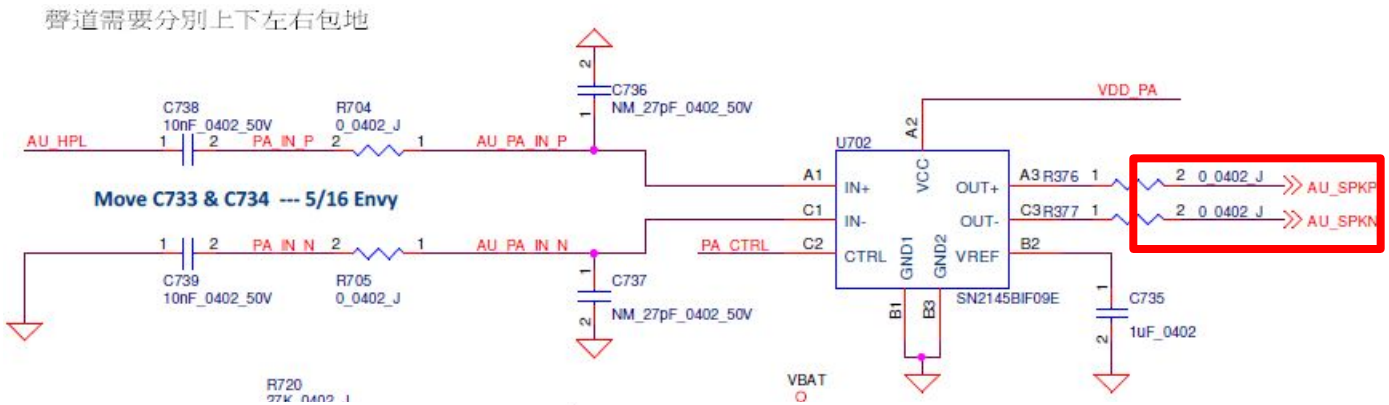
以上面不同fail项目对audio电路拆解分析:

BB-12 Audio function fail (Audio 不良) (1/4)

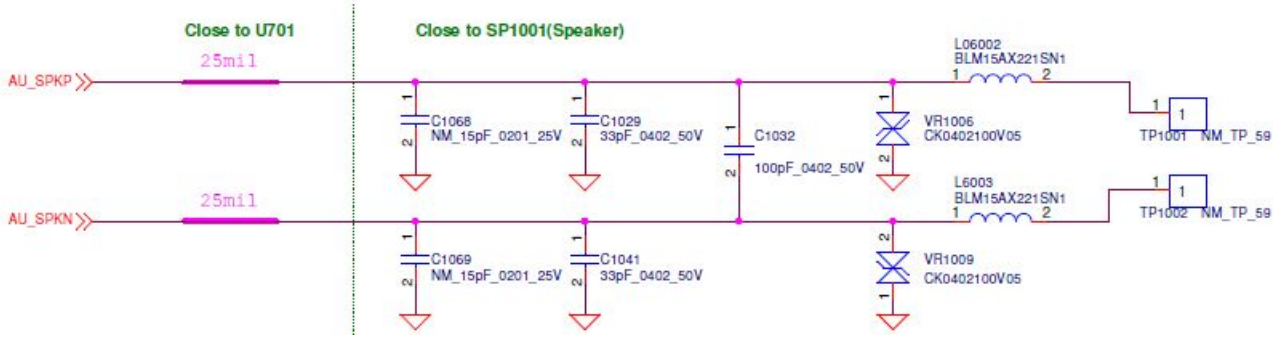
- **Speaker路徑:**



PMU給出SPK信號進入AA進行放大處理



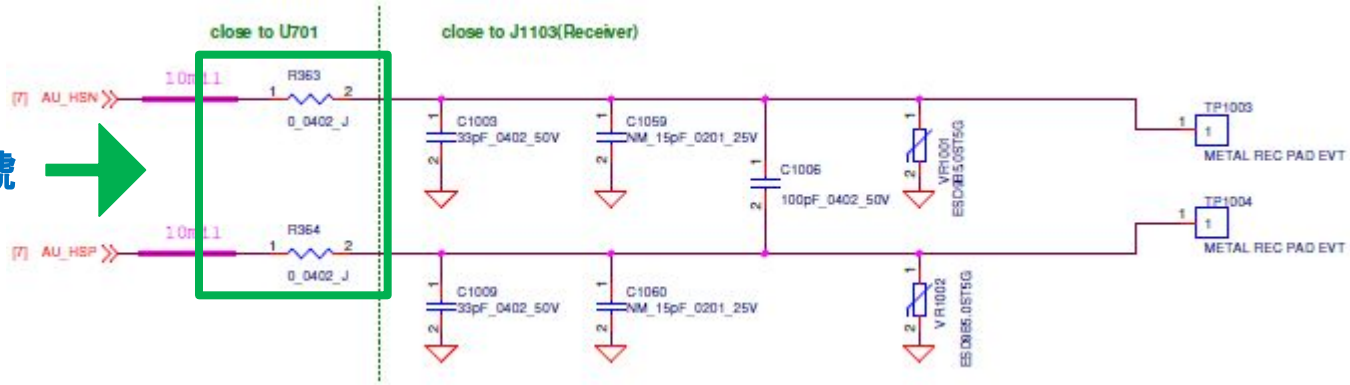
AA輸出放大后的SPK信號



BB-12 Audio function fail (Audio 不良) (2/4)

- **receiver路径:** 聽筒無聲,優先check 0om是否導通

CPU輸出音頻信號

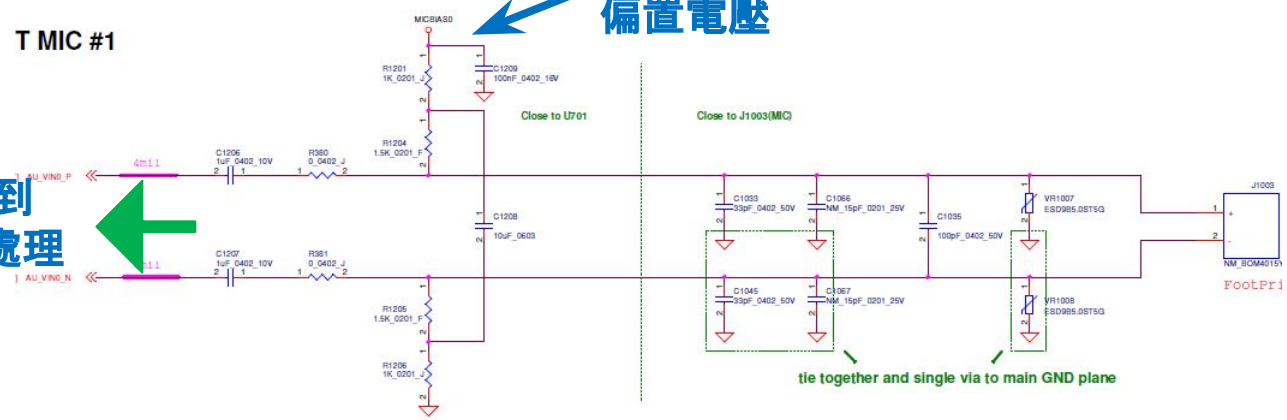


- **手机MIC路径**

為MIC1提供偏置電壓

T MIC #1

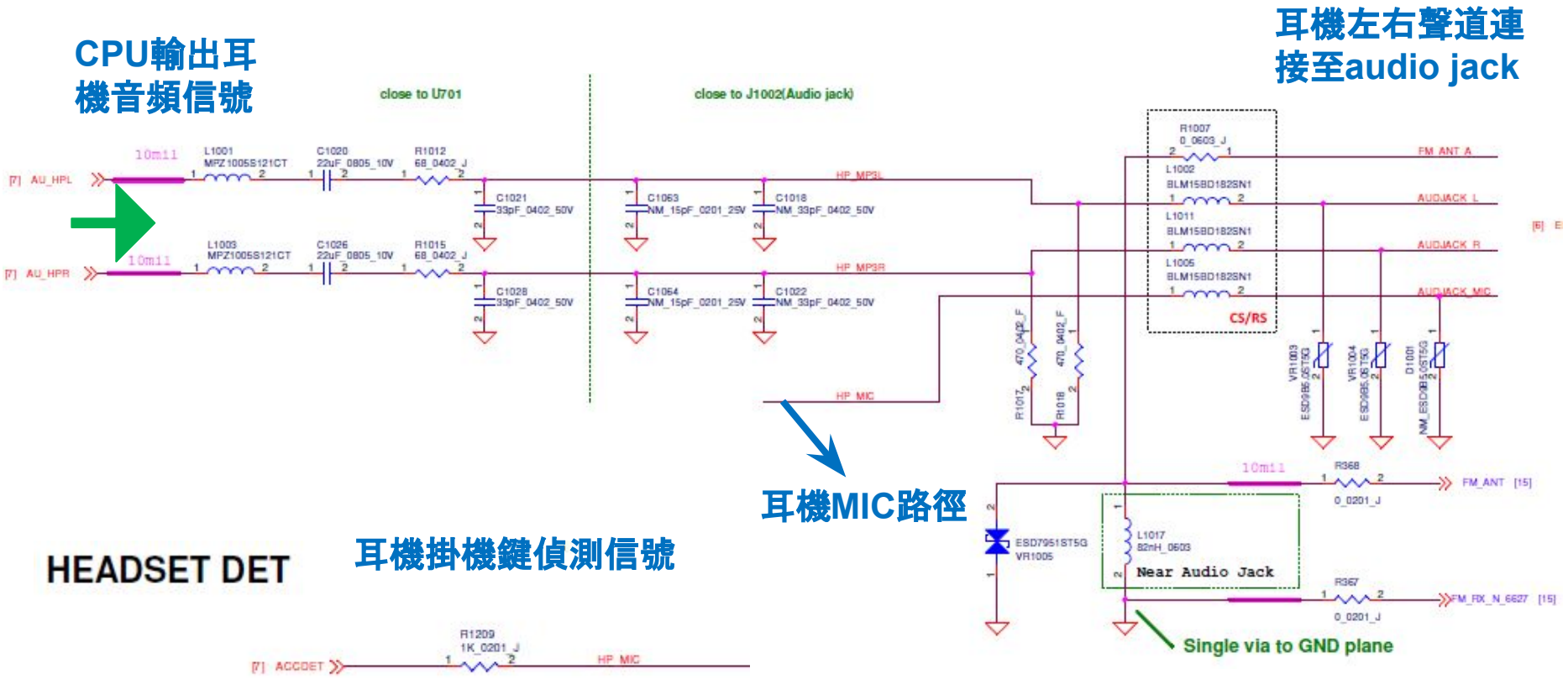
MIC1信號輸入到CPU進行音頻處理



MIC

BB-12 Audio function fail (Audio 不良) (3/4)

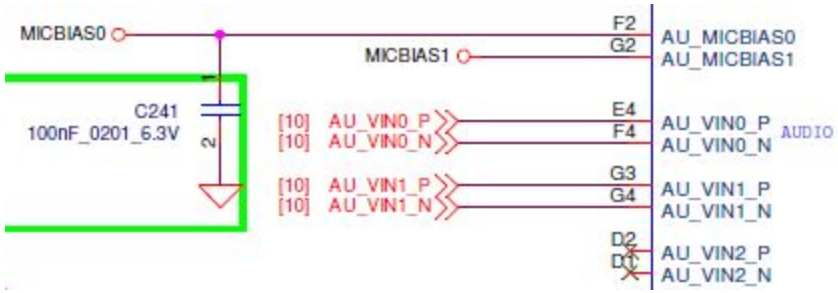
- 耳機左右聲道電路:



BB-12 Audio function fail (Audio 不良) (4/4)

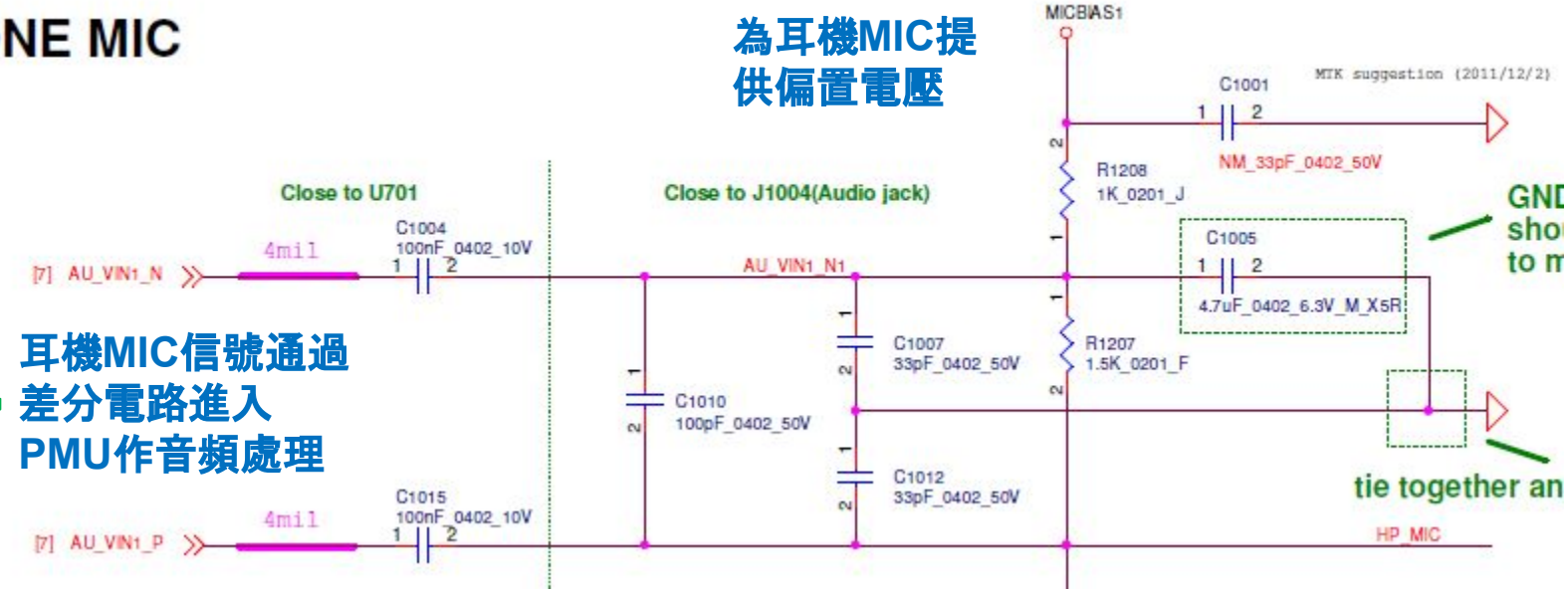
- 耳機MIC電路:

PMU 處理Audio信號路徑



EARPHONE MIC

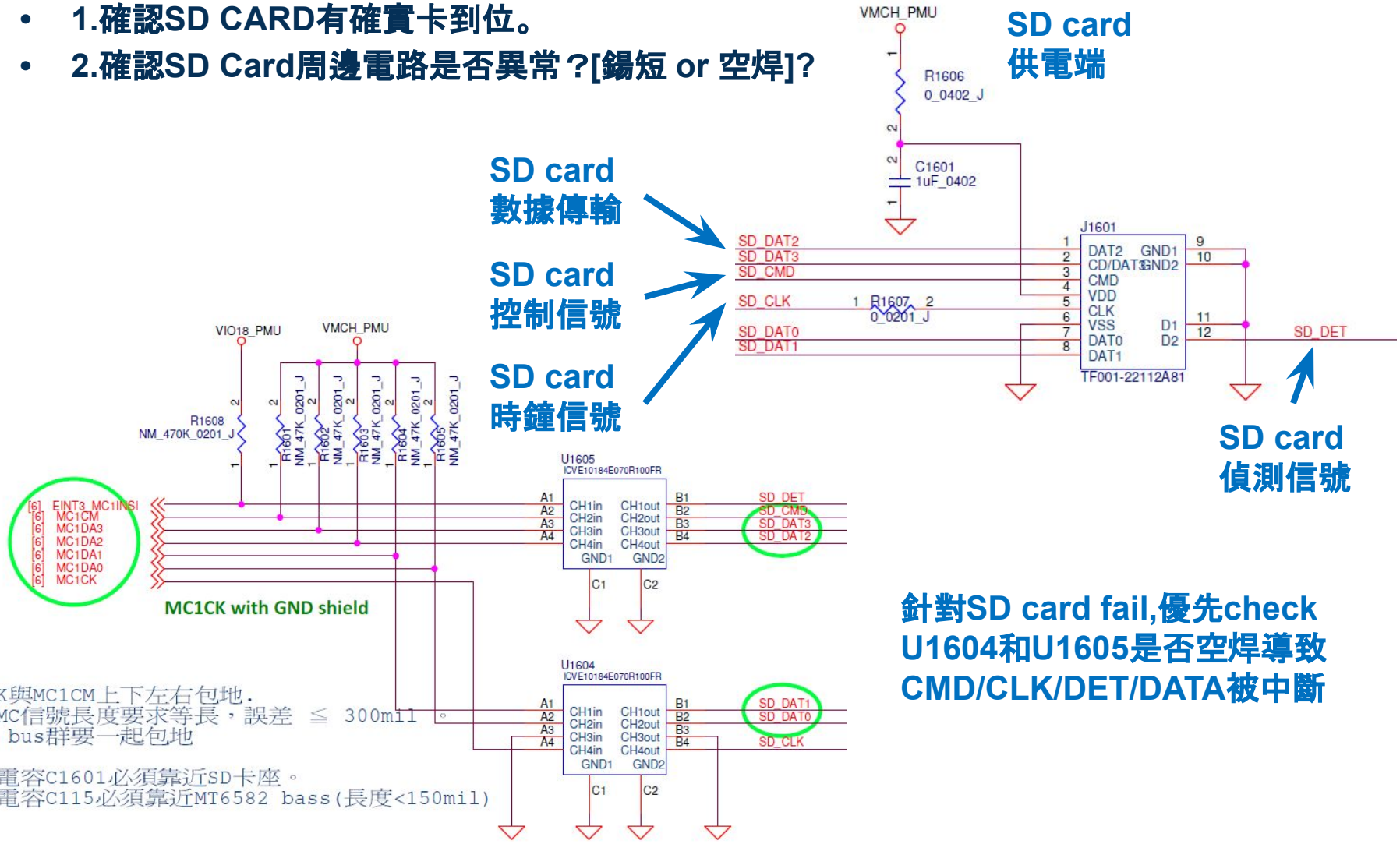
為耳機MIC提供偏置電壓



耳機MIC信號通過差分電路進入PMU作音頻處理

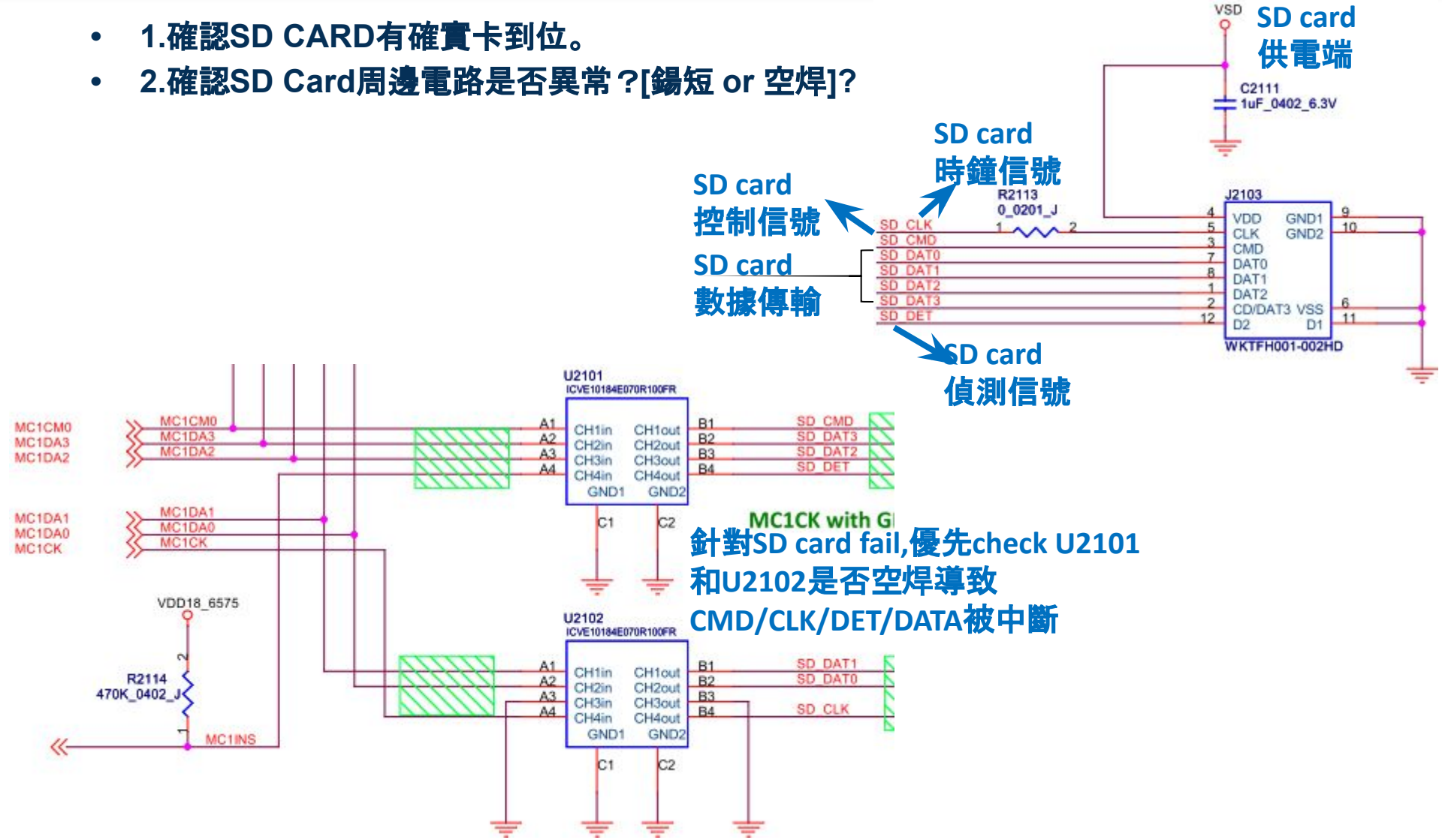
BB-13 SD Card no function (SD Card無作用)

- 1.確認SD CARD有確實卡到位。
- 2.確認SD Card周邊電路是否異常？[錫短 or 空焊]?



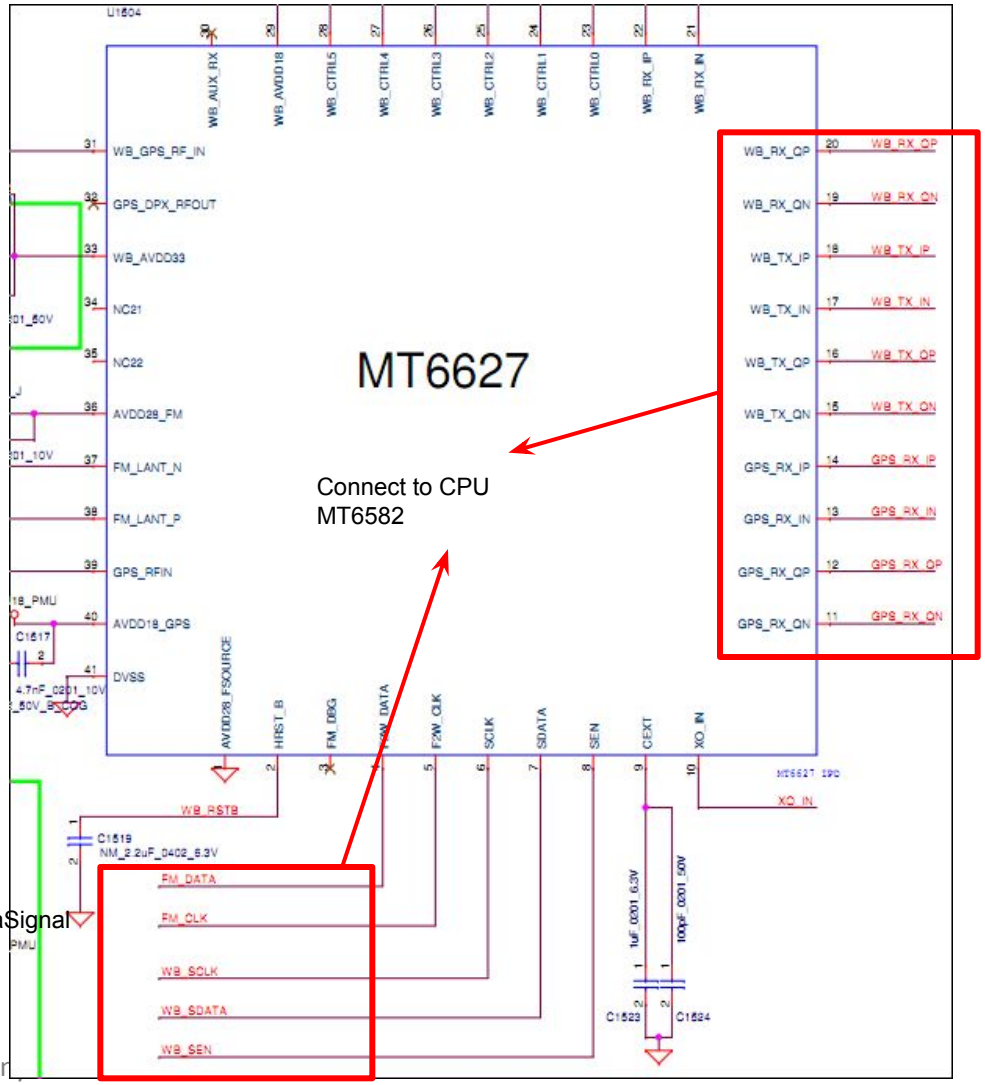
BB-13 SD Card no function (SD Card無作用)

- 1.確認SD CARD有確實卡到位。
- 2.確認SD Card周邊電路是否異常？[錫短 or 空焊]?



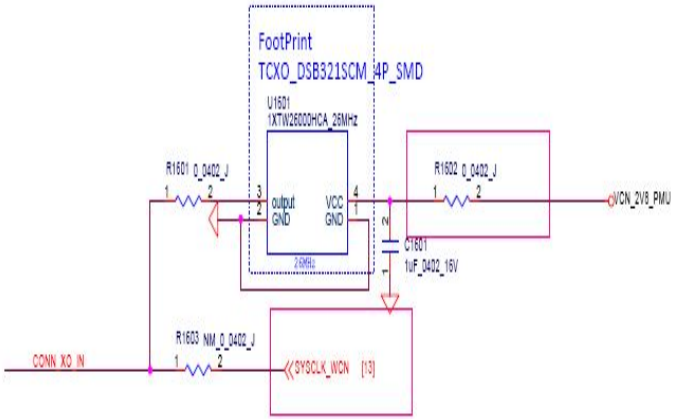
WIFI/BT/GPS

WIFI/BT/GPS 功能使用的IC為MTK MT6627



I/Q Signal

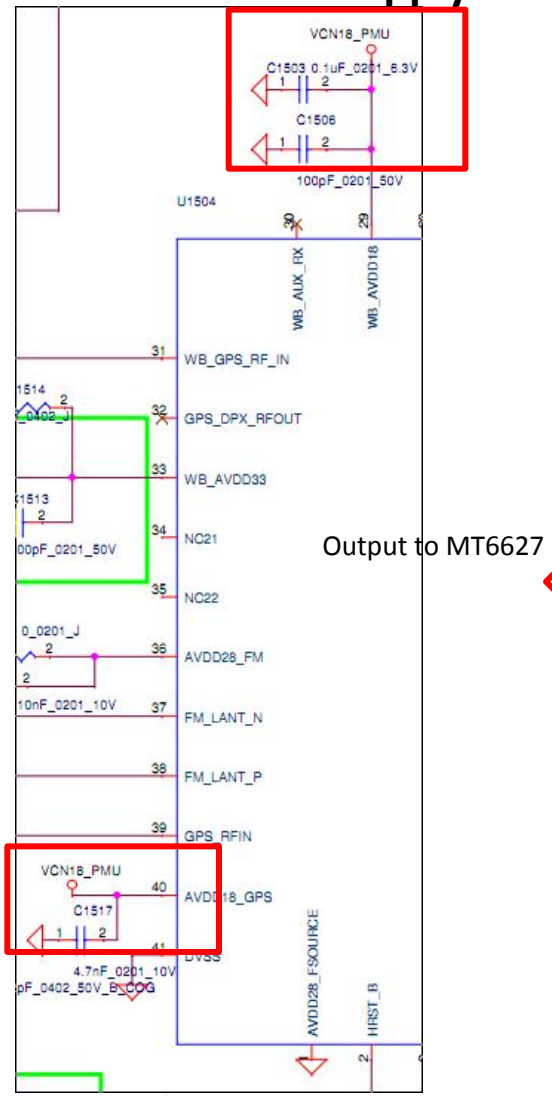
SCLK,DataSignal



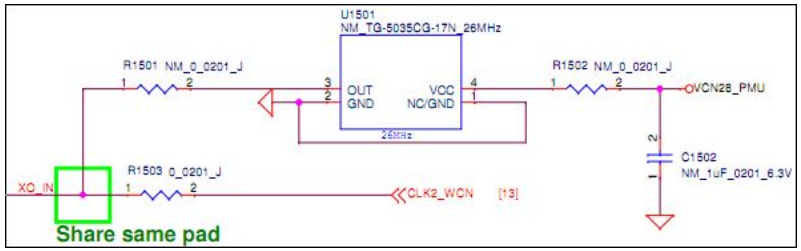
獨立的26M TCXO，Output Clock to MT6627

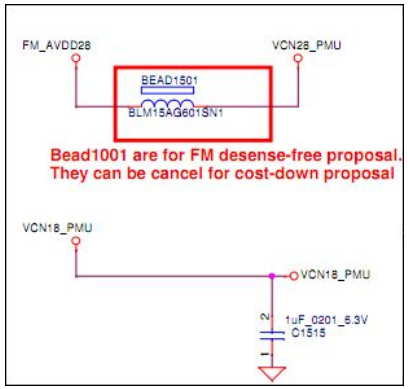
WIFI/BT/GPS

MT6627 Power supply



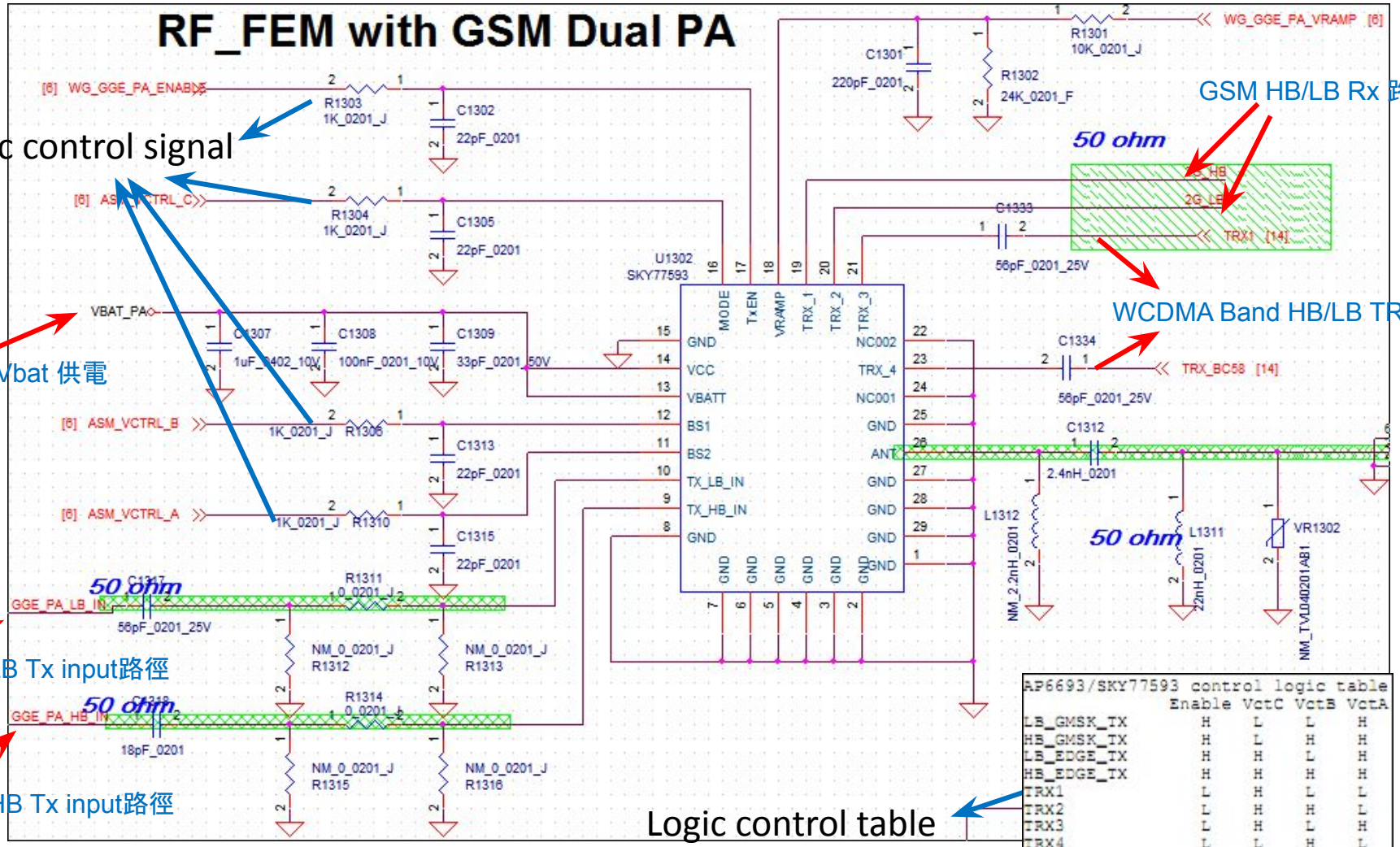
Output to MT6627





From PMU MT6323

GSM PA + Switch



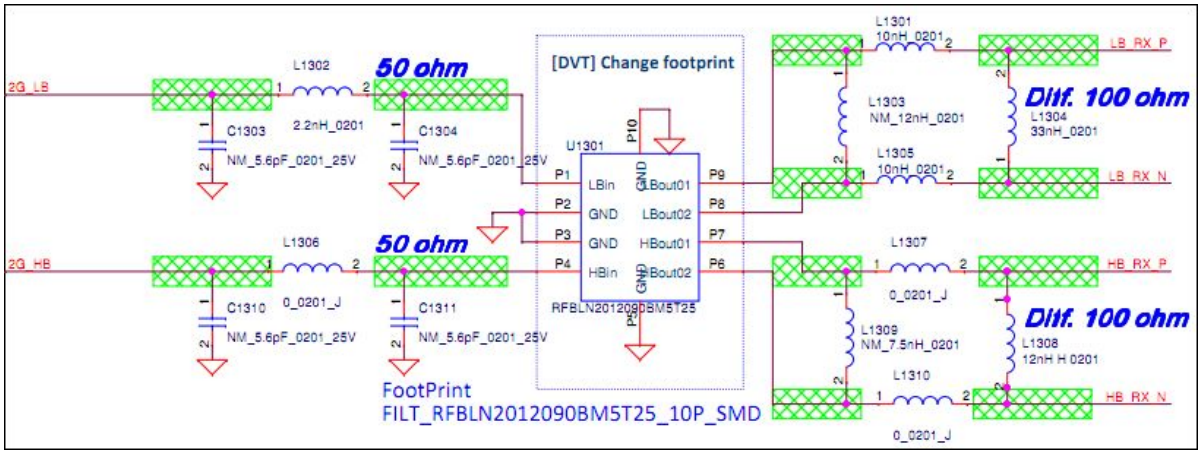
AP6693/SKY77593 control logic table

	Enable	VctC	VctB	VctA
LB_GMSK_TX	H	L	L	H
HB_GMSK_TX	H	L	H	H
LB_EDGE_TX	H	H	L	H
HB_EDGE_TX	H	H	H	H
TRX1	L	H	L	L
TRX2	L	H	H	L
TRX3	L	H	L	H
TRX4	L	L	H	L
STANDBY	L	L	L	L

GSM HB/LB電路:

2G LB Rx

2G HB Rx



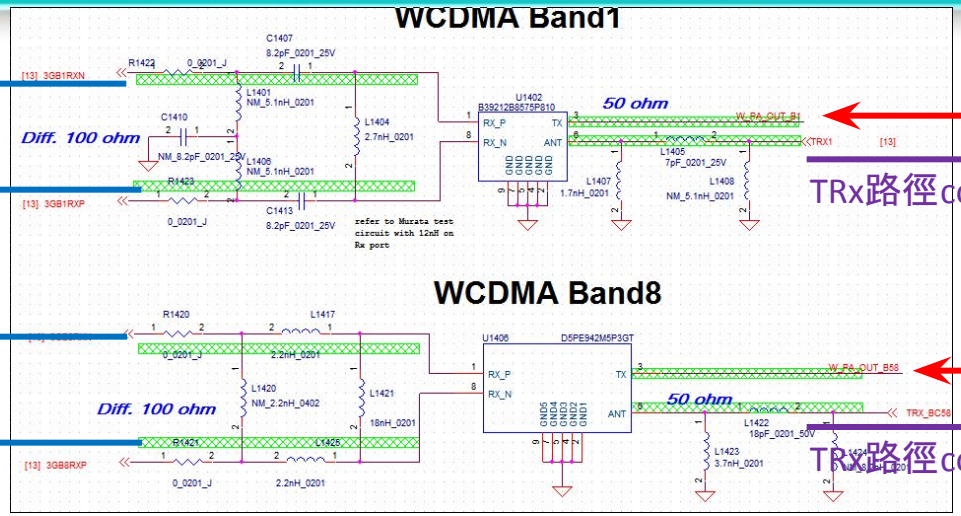
Balance output to transceiver LB Port

Balance output to transceiver HB Port

WCDMA Band1/8 TRx (LV82)

Rx 路徑 balance to transceiver

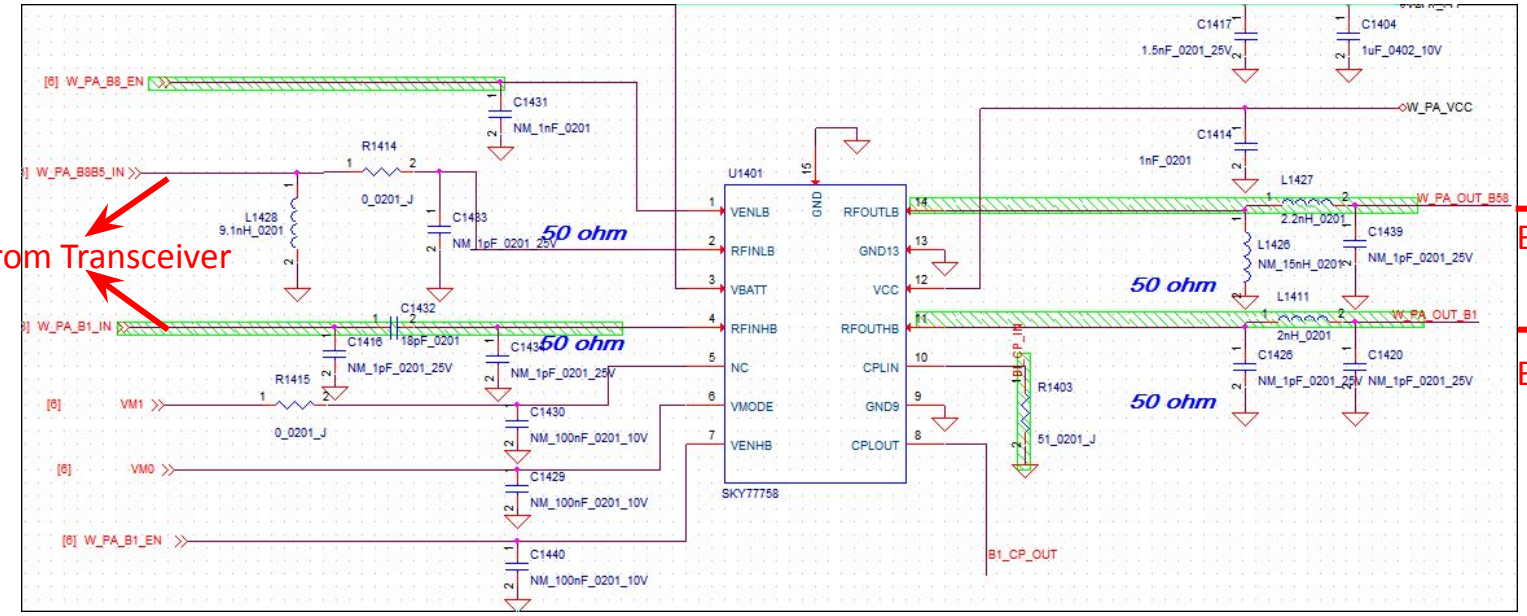
Rx 路徑 balance to transceiver



TRx路徑connect with ANT Switch

TRx路徑connect with ANT Switch

Tx 路徑 from Transceiver



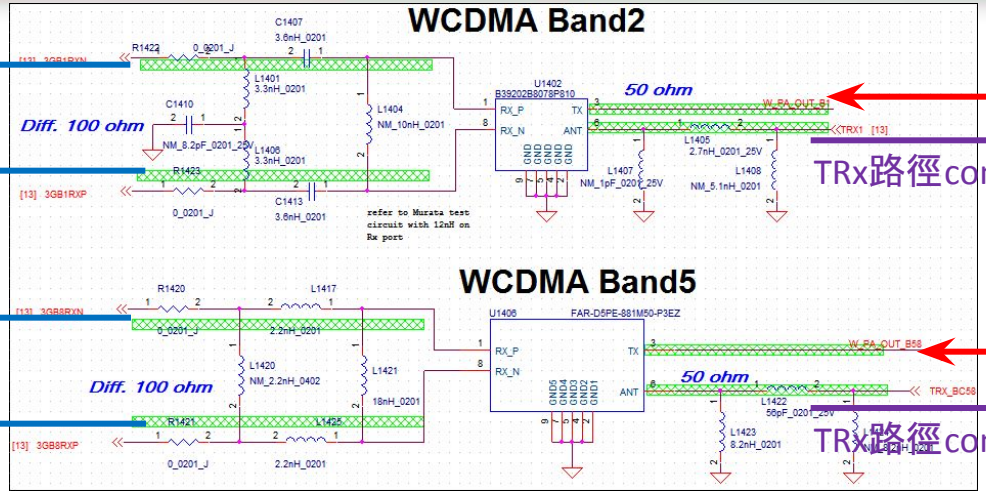
Band 8 Tx 路徑

Band 1 Tx 路徑

WCDMA Band2/5 TRx (LV81)

Rx 路徑 balance to transceiver

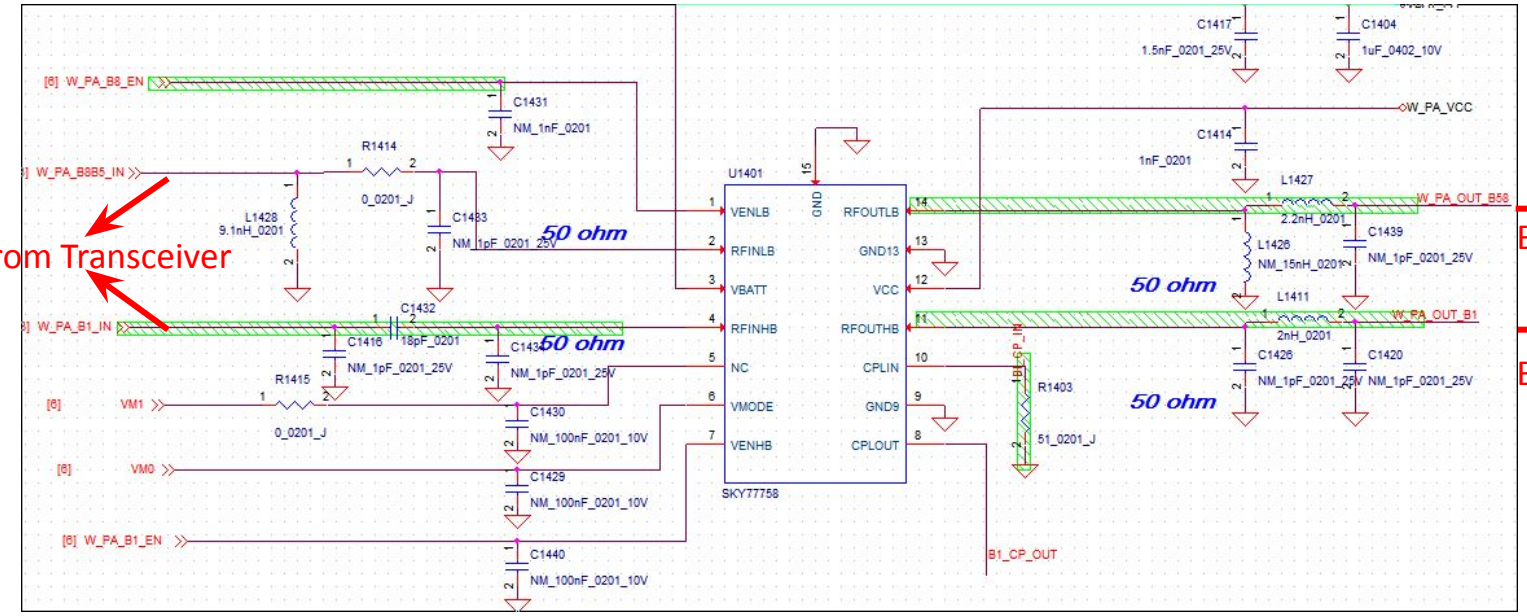
Rx 路徑 balance to transceiver



TRx路徑connect with ANT Switch

TRx路徑connect with ANT Switch

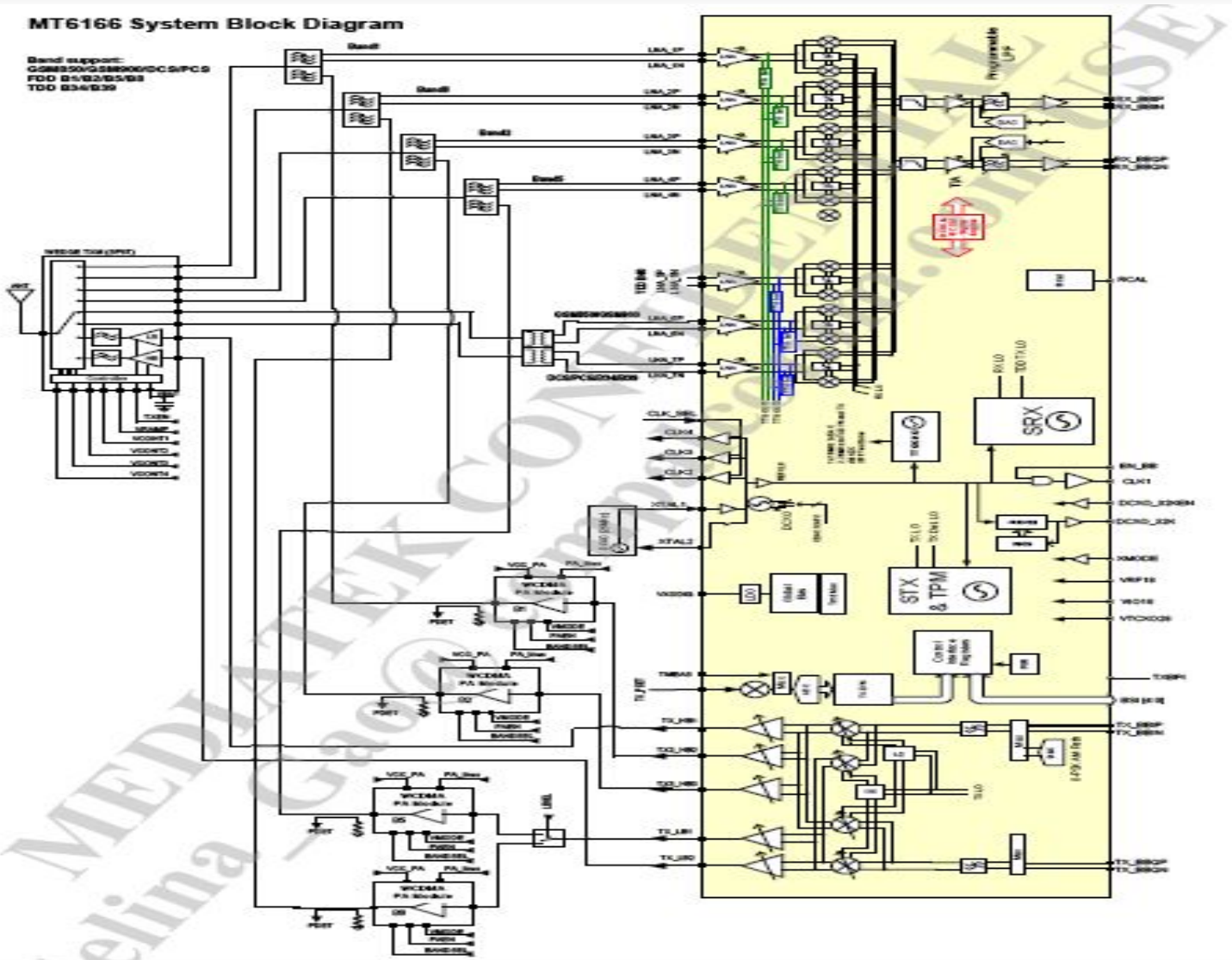
Tx 路徑 from Transceiver



Band 5 Tx 路徑

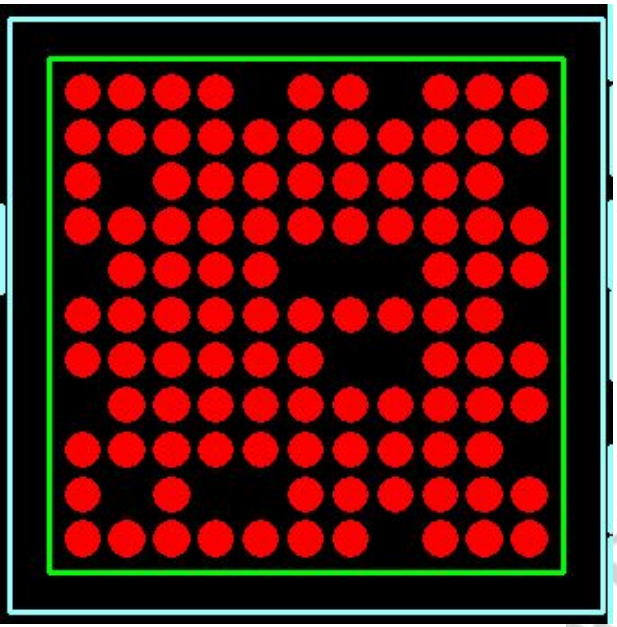
Band 2 Tx 路徑

RF introduction: MT6166 Function Block



MEDIATEK CONFIDENTIAL
Gao@mpcom.com.cn
elina

RF introduction: MT6166 Pin assignment



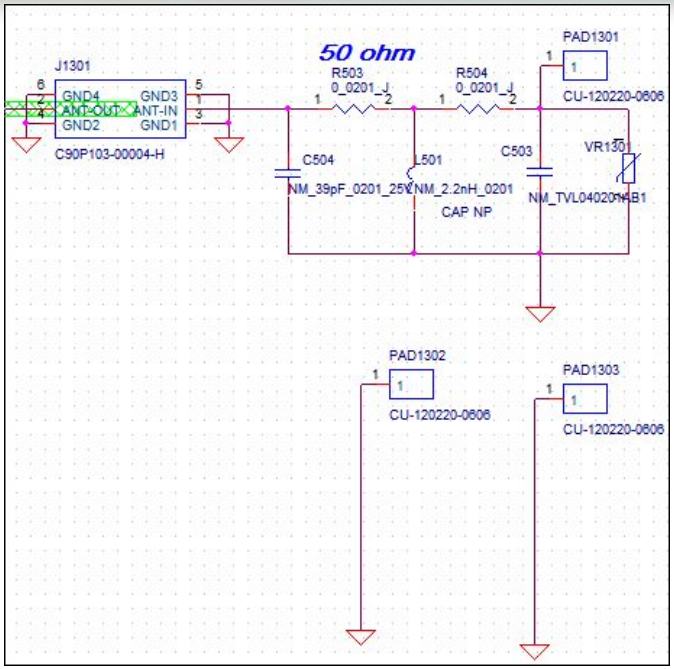
Ball Assignment

	1	2	3	4	5	6	7	8	9	10	11	
A	B40_RXP	3GB1_RXP	3GB1_RXN		3GB2_RXP	3GB8_RXP		3GH1_TX	3GH2_TX	3GL5_TX	2GLB_TX	A
B	B40_RXN		3GB5_RXP	3GB5_RXN	3GB2_RXN	3GB8_RXN	GND	2GHB_TX		GND	VTXHF	B
C	LB_RXP	GND	GND	GND	GND	GND	GND	GND	GND	GND	TMEAS	C
D	LB_RXN		GND	GND	GND	GND	GND	GND	GND	DETGND	DET	D
E	HB_RXP		GND	GND	GND	GND	GND	GND	GND	V28		E
F	HB_RXN	VRXHF	GND	GND	GND	GND		BSI_DATA0	GND	3GTX_QP	3GTX_QN	F
G	32K_EN	RFVCO_MON	GND	GND		BSI_EN		BSI_DATA2	GND	3GTX_IP	3GTX_IN	G
H		XTAL2	GND	GND		BSI_CLK		BSI_DATA1	GND	TXBPI		H
J	XTAL1	GND	GND	GND	GND	GND	GND	GND	GND	RCAL	VTXLF	J
K	VTCXO28	CLK_SEL	XO2	XO4	OUT32K	AVDD_VIO18	VXODIG	RX_IN	RX_QN	RX_QP	TST2	K
L	EN_BB	XO3		XO1	XMODE		VRXLF	RX_IP		TST1	TXVCO_MON	L
	1	2	3	4	5	6	7	8	9	10	11	

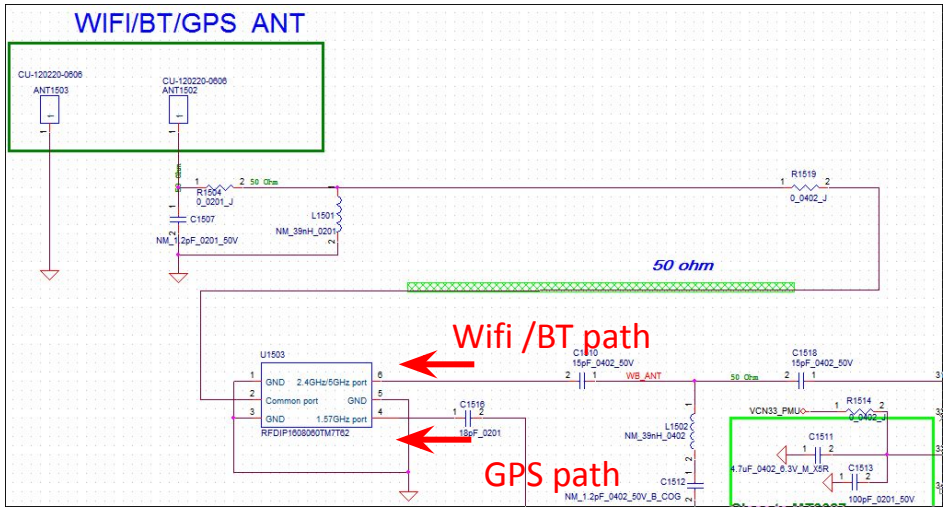
RF introduction: Antenna Circuit

- **Antenna Circuit**
- **RF天線主要包含了2G/3G/WIFI/GPS,**
  其匹配電路分別描述如下

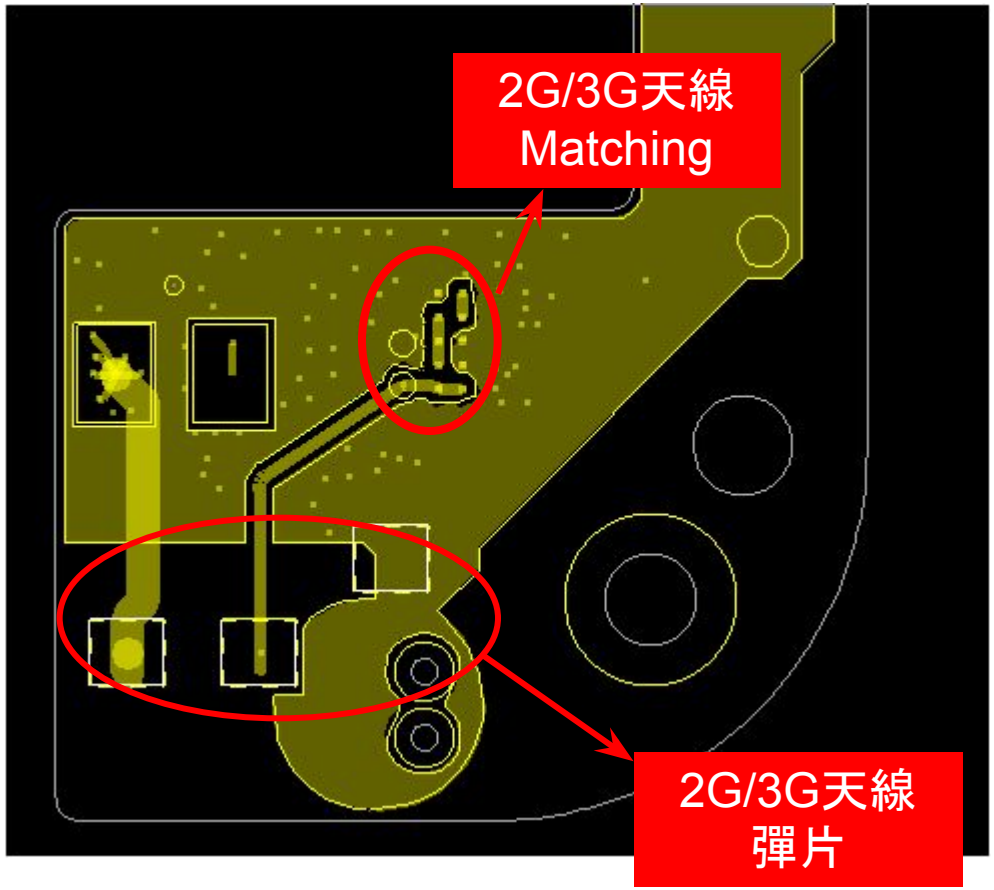
Main ANT RF Paths



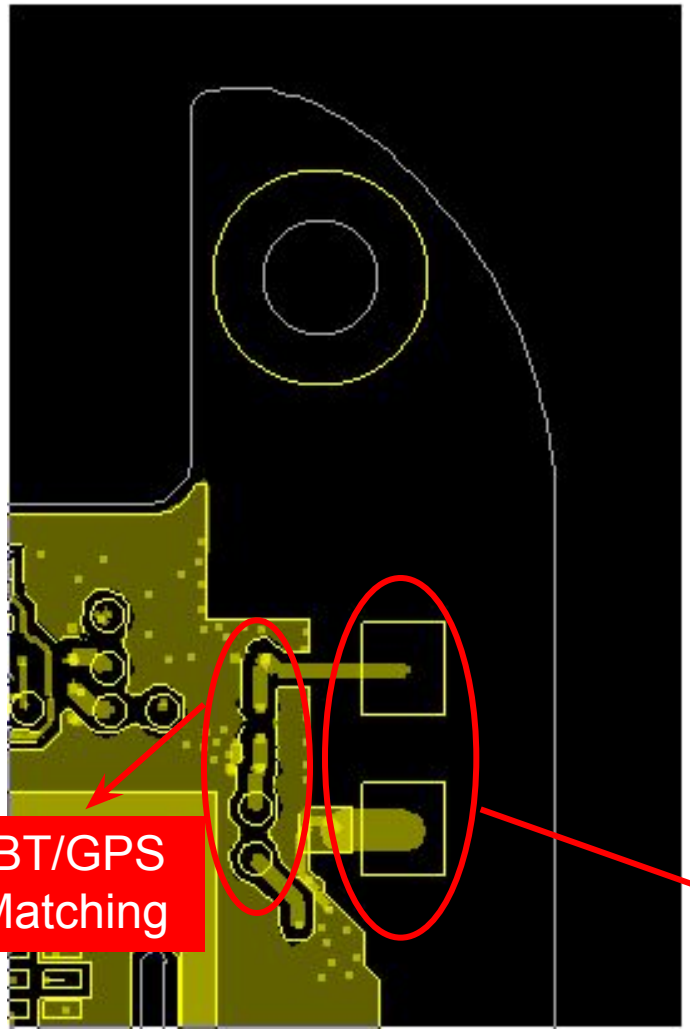
WIFI ANT RF Paths



RF introduction:2G/3G Main Antenna Position



RF introduction: WIFI Antenna Position



RF常見問題

RF-1:網路功能異常

RF-2:GSM problem

RF-3:WCDMA problem

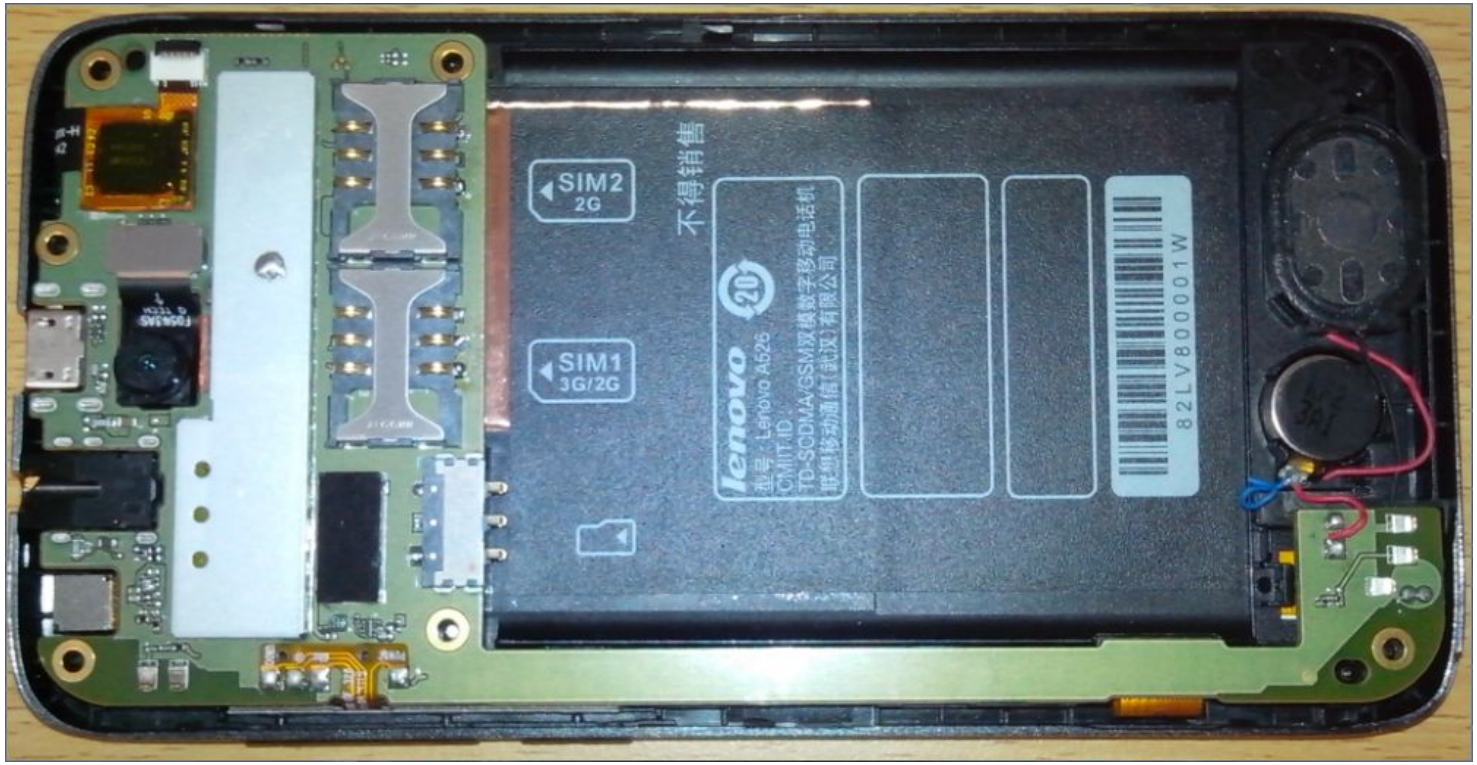
RF-4:GSM/WCDMA Rx有問題

RF-5:WIFI problem

Company confidential

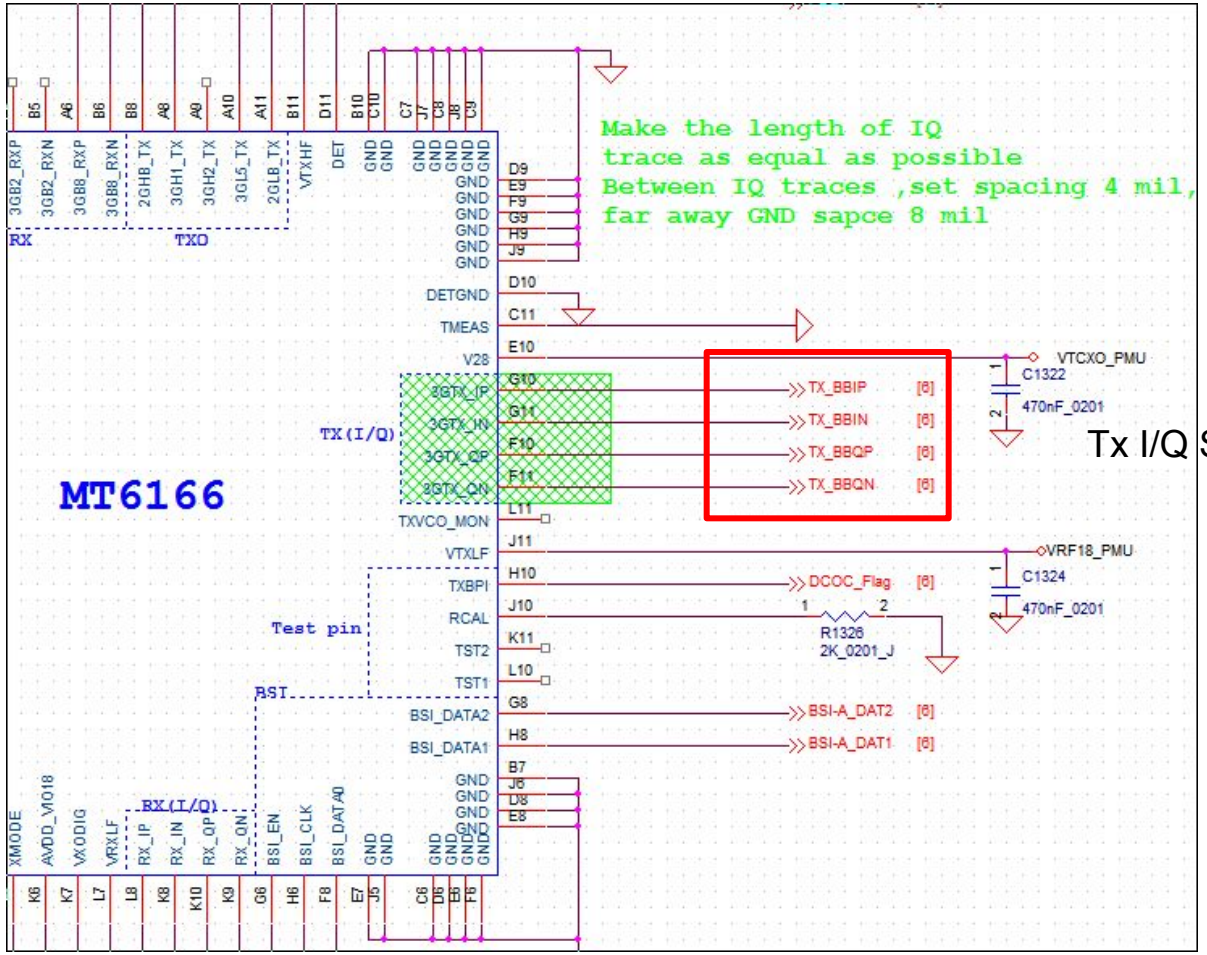
RF-1:網路功能異常

- **若2G/3G 網路功能異常,請檢查螢幕天線格數,SIM card是否裝好? Coaxial cable和是否組好?**



RF-2:GSM Trouble shooting (1/3)

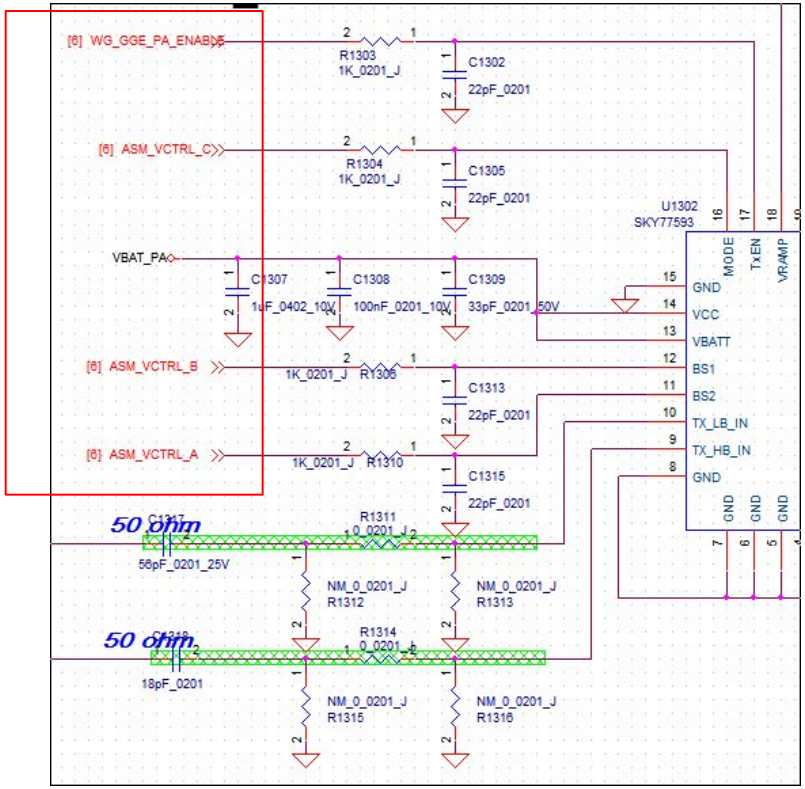
- **檢查GSM發射路徑**



Tx I/Q Signal

RF-2:GSM Trouble shooting (2/3)

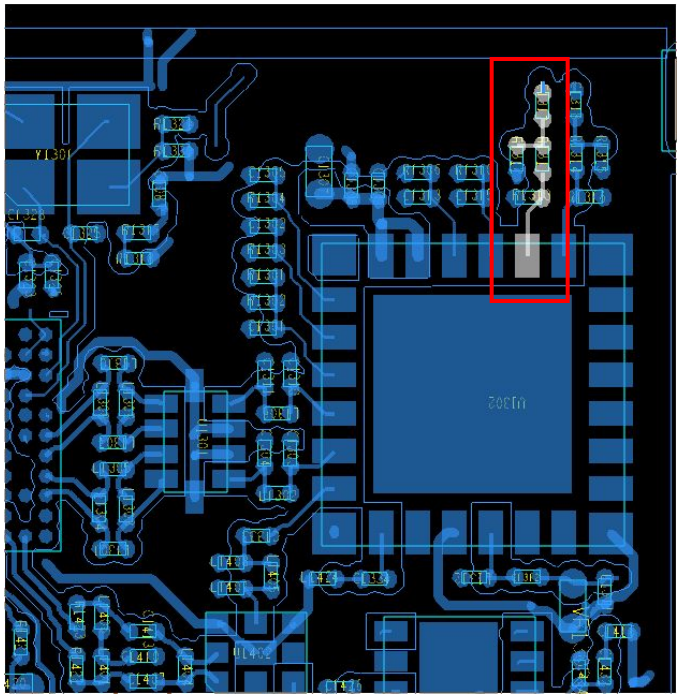
- **GSM發射路徑**
  - **由於2G PA和ASM整合在U1302,檢查發射時對應邏輯控制電壓是否正確?**
  - **使用示波器量測下圖所標腳位的電壓是否符合右下列表**



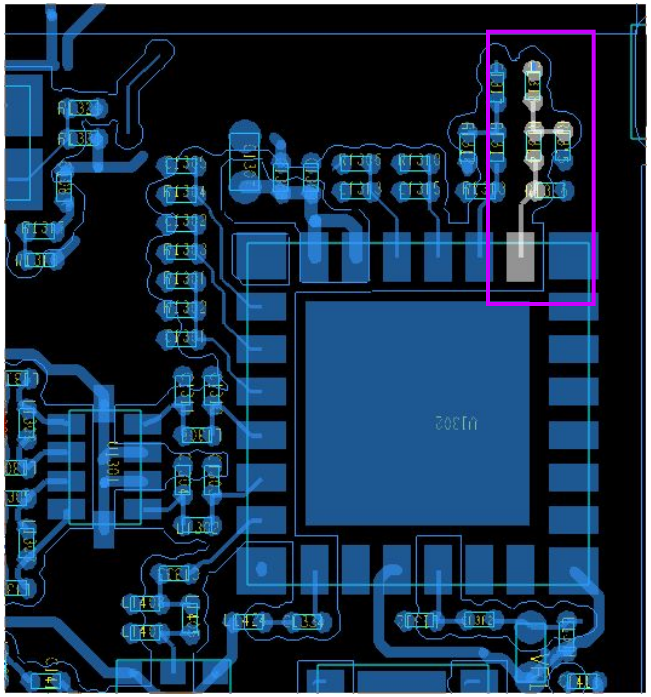
AP6693/SKY77593 control logic table	Enable	VctC	VctB	VctA
LB_GMSK_TX	H	L	L	H
HB_GMSK_TX	H	L	H	H
LB_EDGE_TX	H	H	L	H
HB_EDGE_TX	H	H	H	H
TRX1	L	H	L	L
TRX2	L	H	H	L
TRX3	L	H	L	H
TRX4	L	L	H	L
STANDBY	L	L	L	L

RF-2:GSM Trouble shooting (3/3)

- **GSM發射路徑**
  - **檢查發射路徑的功率**
  - **使用spectrum probe量測下列標駐點,測量其功率**



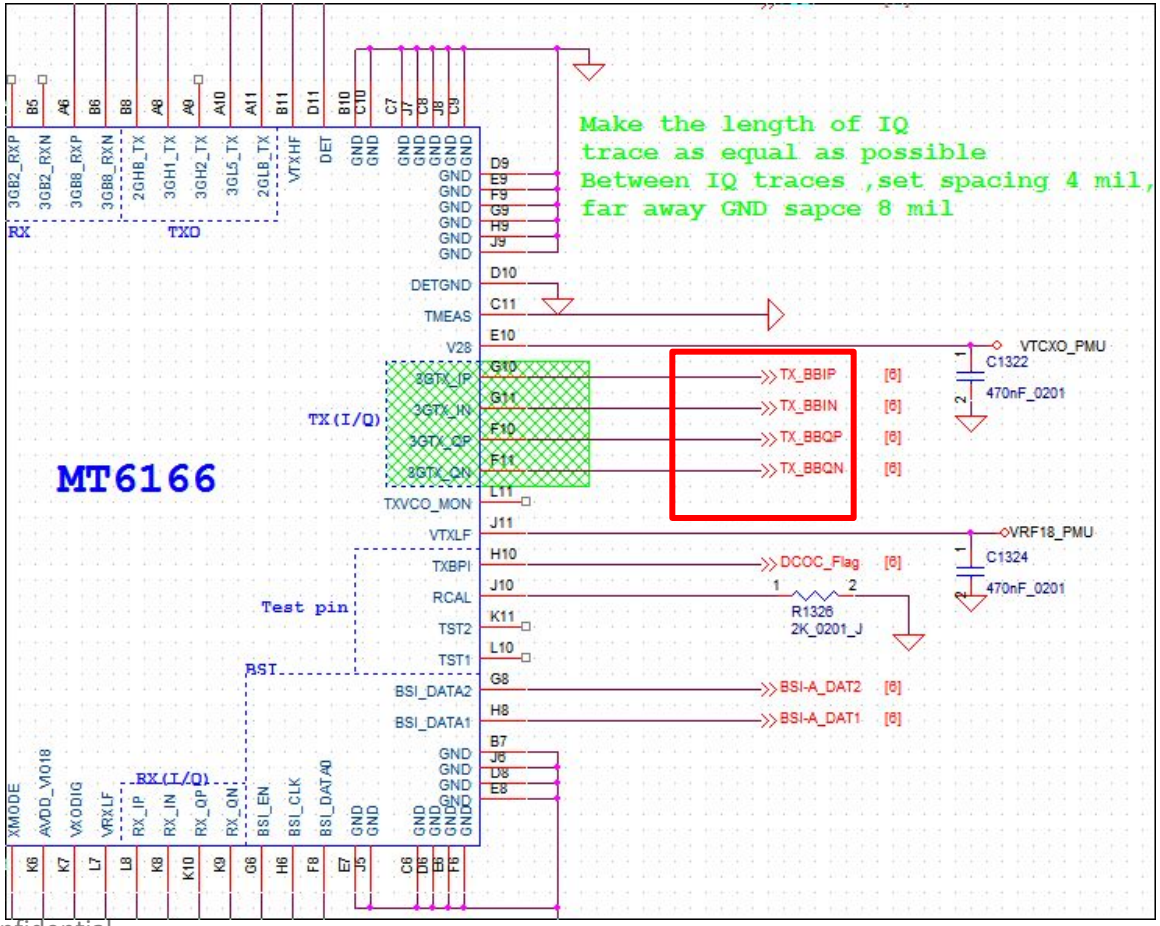
Low band GSM signal



High band GSM signal

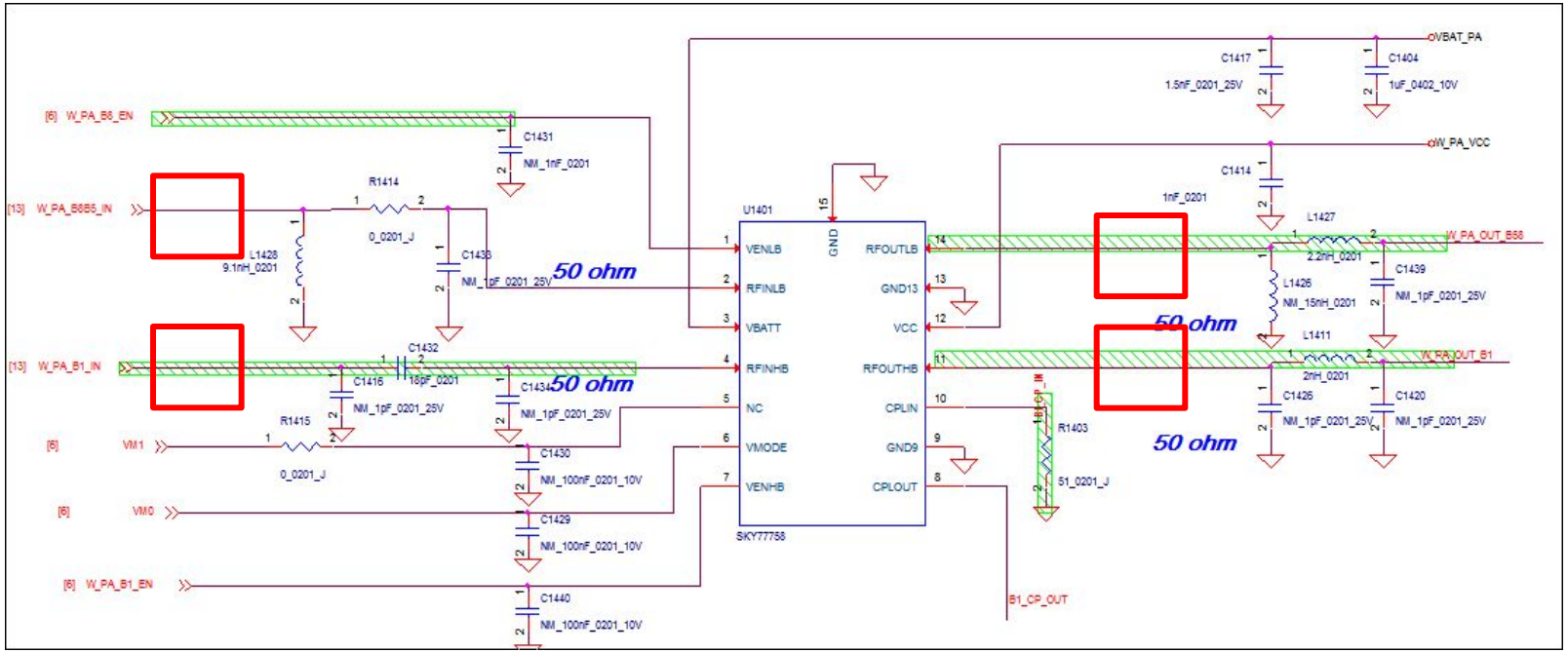
RF-3:WCDMA Trouble shooting (1/5)

- **WCDMA發射路徑**
  - **確認IQ路徑**
  - **使用示波器量測下圖所標之腳位,檢視其波形**



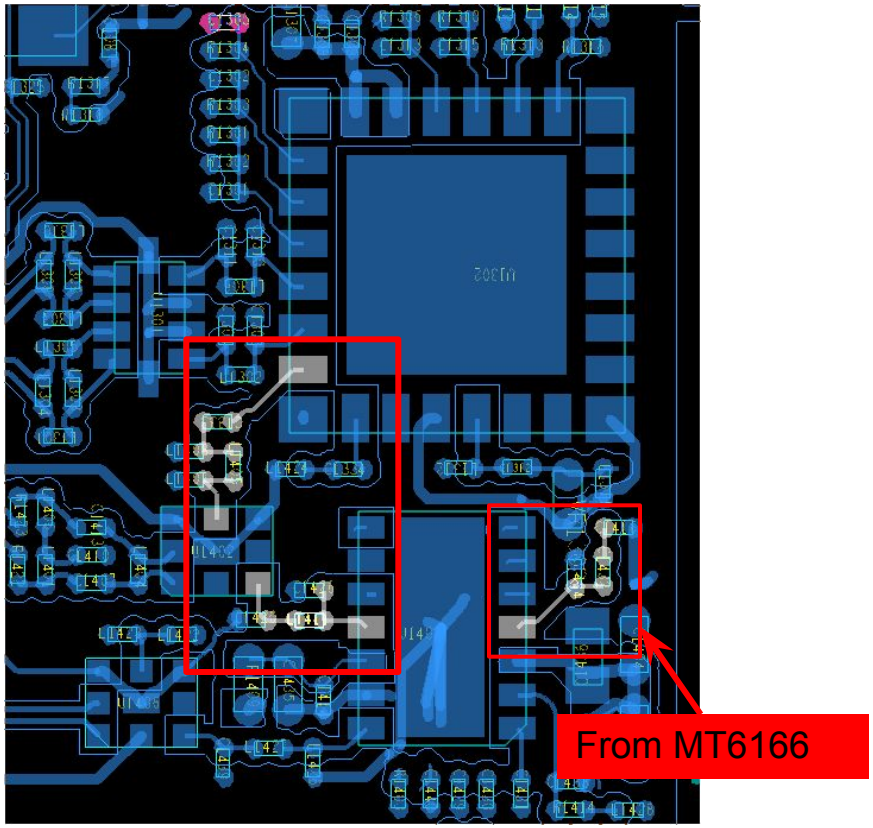
RF-3:WCDMA Trouble shooting (2/5)

- WCDMA發射路徑
  - 確認發射路徑
  - 使用示波器量測下圖所標之腳位,檢視其波形

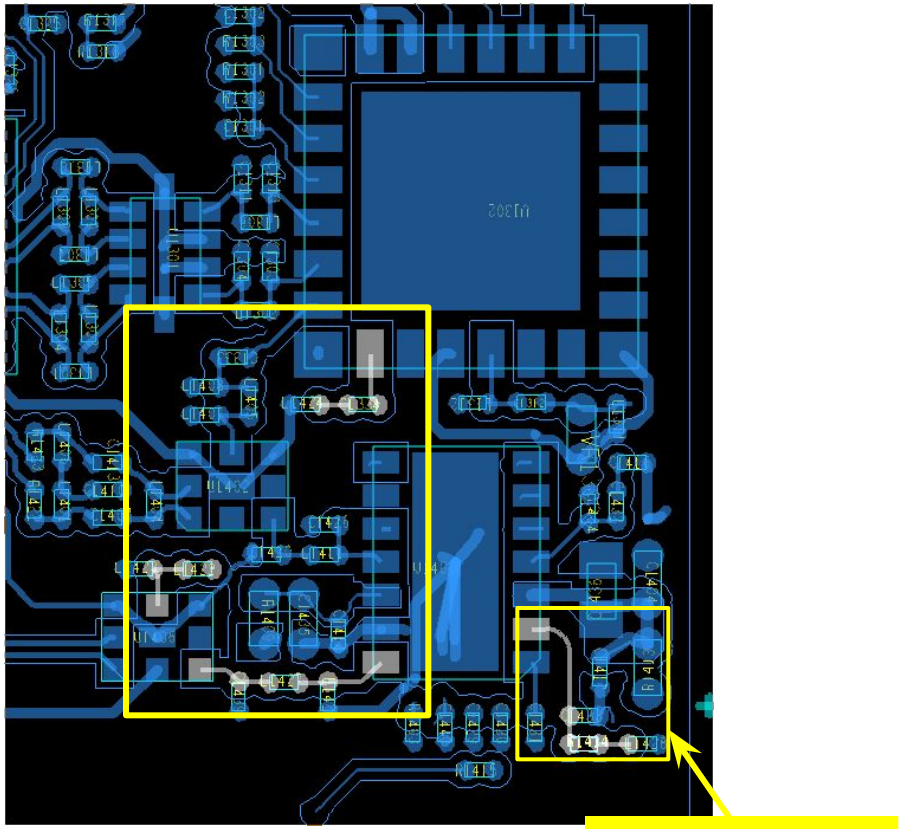


RF-3:WCDMA Trouble shooting (3/5)

- WCDMA發射路徑
  - Transceiver-3G PA, PA-Duplexer



WCDMA BAND 1/2 signal

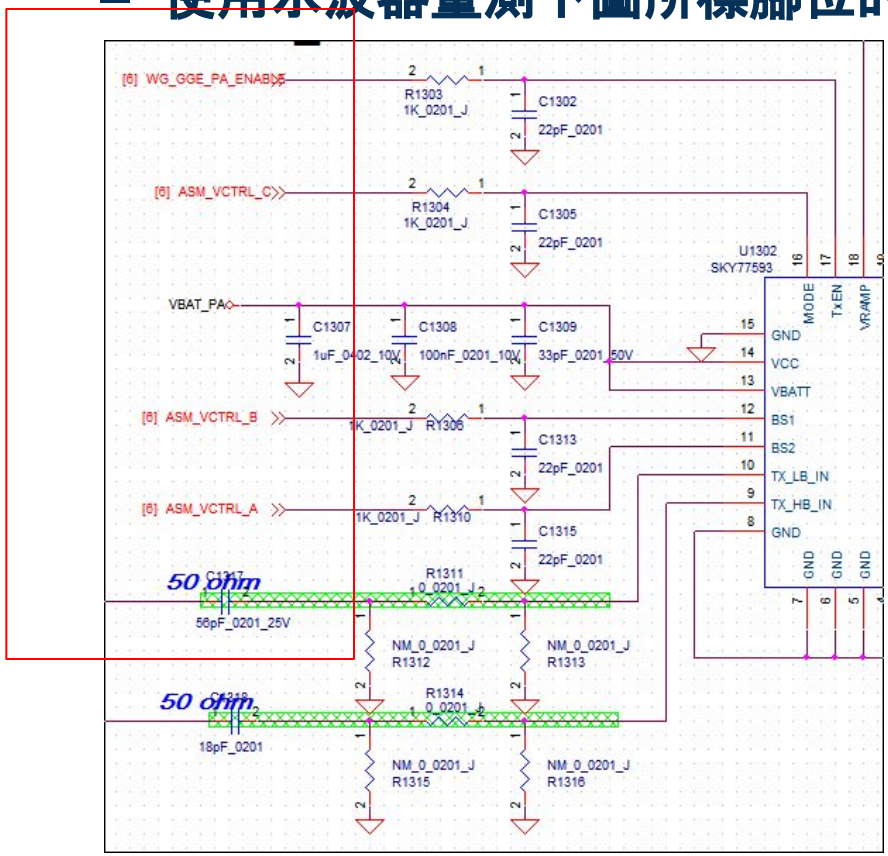


WCDMA BAND 1/2 signal

RF-3:WCDMA Trouble shooting (4/5)

WCDMA發射路徑

- 檢查ASM 邏輯控制電壓
- 使用示波器量測下圖所標腳位的電壓,是否符合右下列表

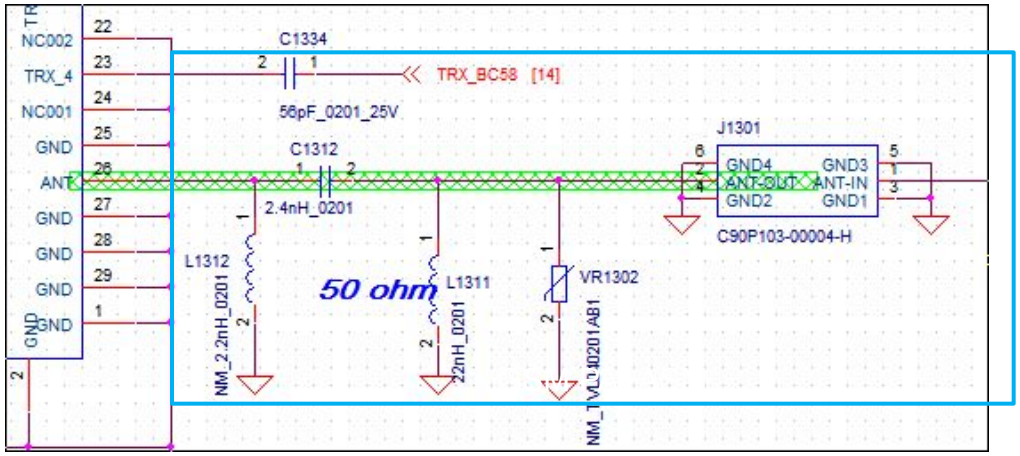


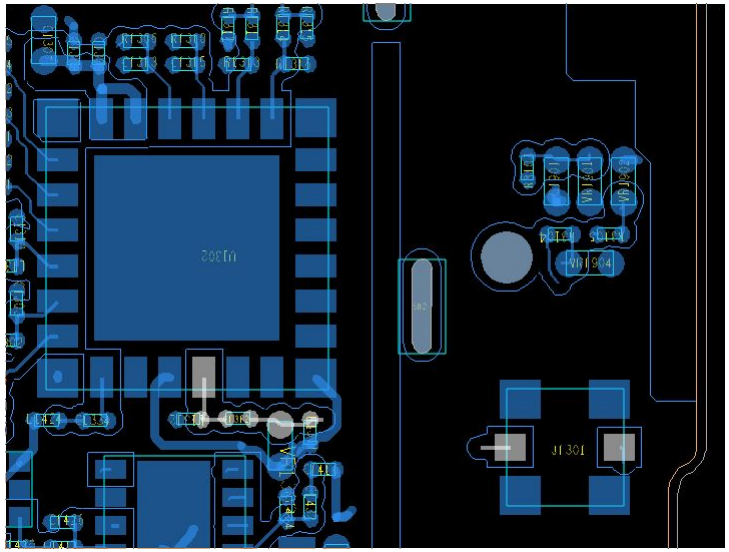
AP6693/SKY77593 control logic table

	Enable	VctC	VctB	VctA
LB_GMSK_TX	H	L	L	H
HB_GMSK_TX	H	L	H	H
LB_EDGE_TX	H	H	L	H
HB_EDGE_TX	H	H	H	H
TRX1	L	H	L	L
TRX2	L	H	H	L
TRX3	L	H	L	H
TRX4	L	L	H	L
STANDBY	L	L	L	L

RF-3:WCDMA Trouble shooting (5/5)

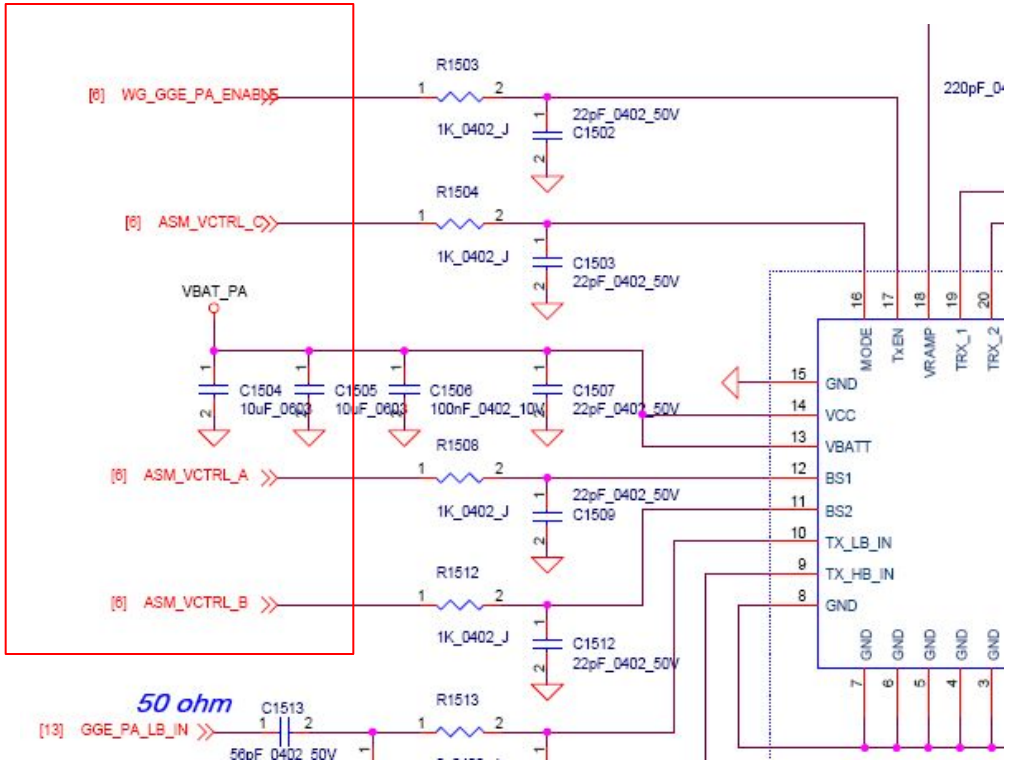
- 發射路徑 ASM-RF Con (GSM + WCDMA)





RF-4:GSM/WCDMA Trouble shooting

- **接收路徑**
  - **檢查 Antenna switch Module邏輯控制電壓**
  - **使用示波器量測下圖所標腳位的電壓是否符合右下列表**

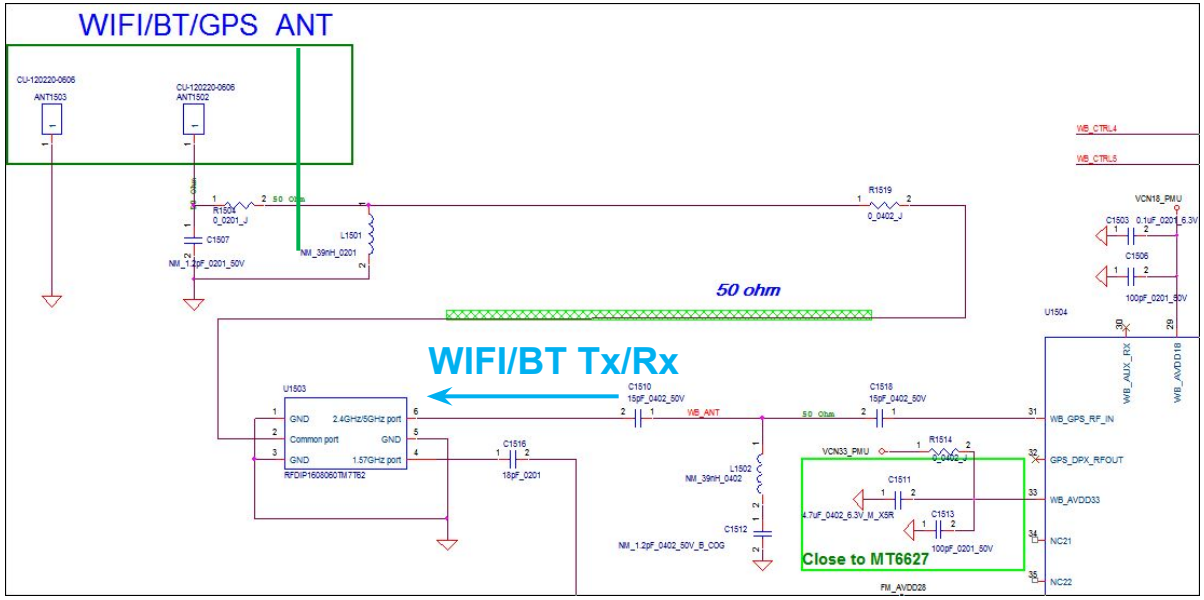


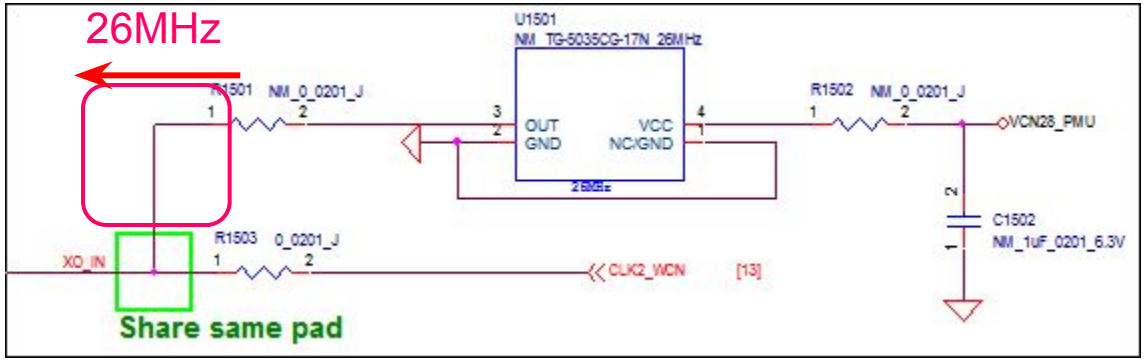
SKY77590 control logic table

	Enable	VctC	VctA	VctB
LB_GMSK_TX	H	L	L	H
HB_GMSK_TX	H	L	H	H
LB_EDGE_TX	H	H	L	H
HB_EDGE_TX	H	H	H	H
TRX1 [2G_HB]	L	H	L	L
TRX2 [2G_LB]	L	H	H	L
TRX3 [3G_B1]	L	H	L	H

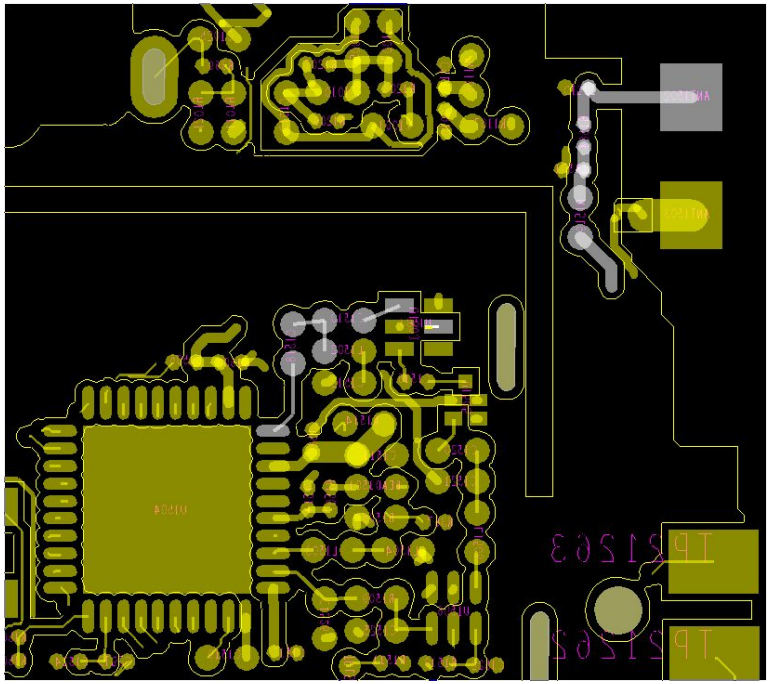
RF-5:WIFI/BT Trouble shooting(1/3)

- **確認U1501是否有26MHz 輸出**

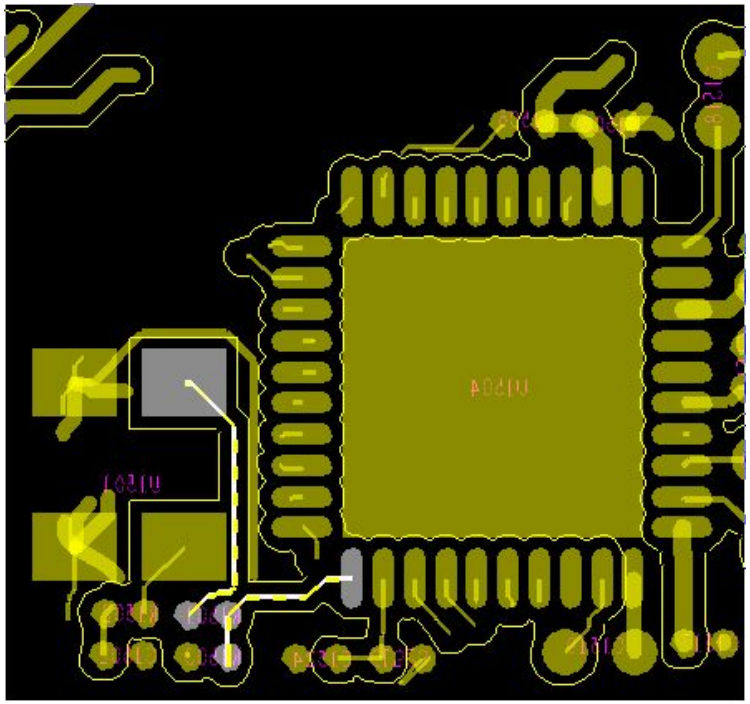




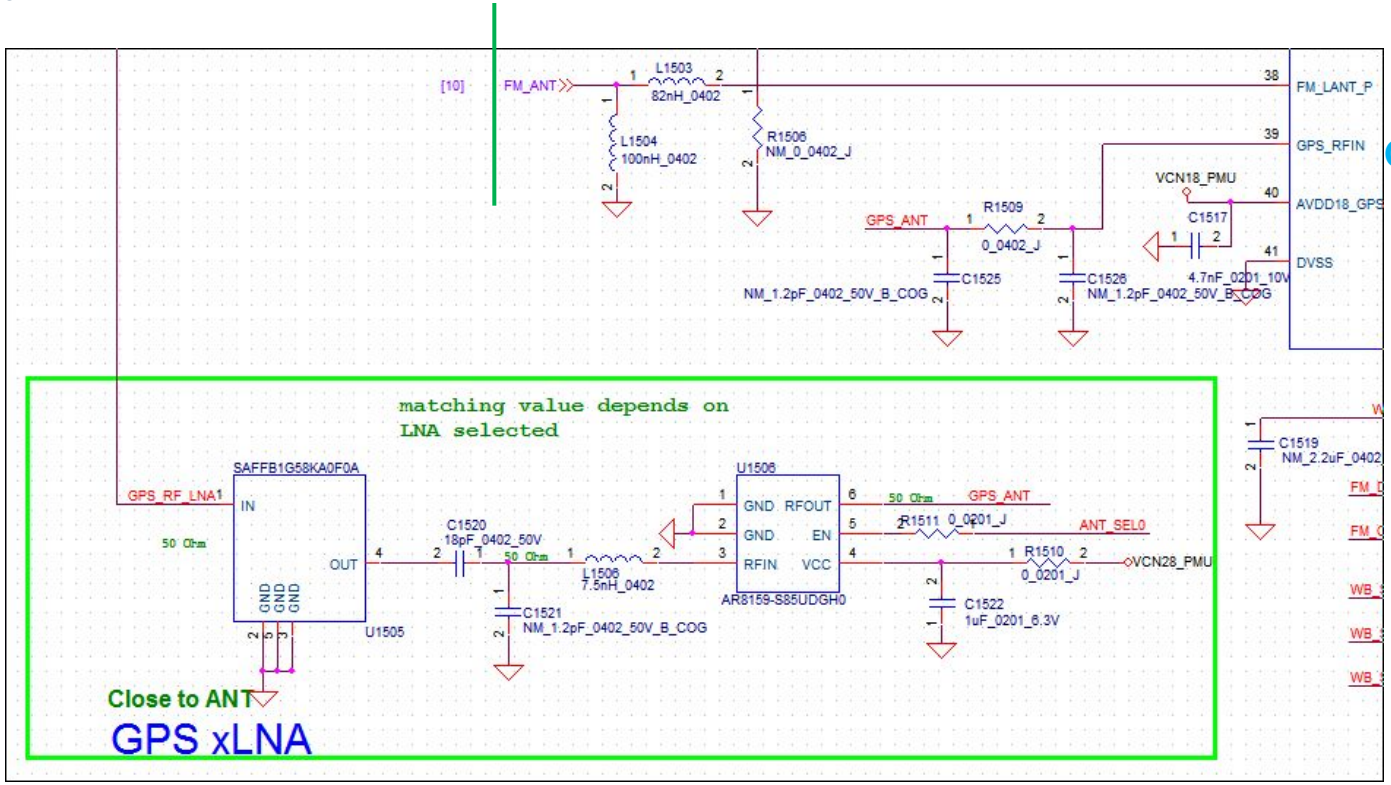
RF-5:WIFI/BT Trouble shooting(2/3)



WIFI Tx/Rx



26MHz

RF-5:GPS Trouble shooting(3/3)

- **除確認U1501是否有26MHz 輸出外，还要检查GPS xLNA是否有输出。**