

Internal Use Only



Service Manual

LG-D821

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1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of this model.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services. System users are responsible for the security of own system. There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of common carrier telecommunication service of facilities accessed through or connected to it. The manufacturer will not be responsible for any charges that result from such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the phones or compatibility with the net work, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitation

Maintenance limitations on the phones must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs expect as specifically noted in this manual. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

E. Notice of Radiated Emission

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

A phone may interfere with sensitive laboratory equipment, medical equipment, etc. Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Device (ESD), are indicated by the sign. information is ESD handling: Following



- Service personnel should ground themselves by using a wrist strap when exchange system boards.
- When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
- Use a suitable, grounded soldering iron.
- Keep sensitive parts in these protective packages until these are used.
- When returning system boards or parts like EEPROM to the factory, use the protective package as described.

2. PERFORMANCE

2.1 Product Name

LG-D821 : WCDMA(B1,B2,B4,B5,B8)(HSPA+42Mbps(cat24)/ HSUPA 5.8Mbps(cat6) + GSM850/GSM900/DCS/PCS (GPRS Class10/EDGE Class10)+ FDD LTE (B1, B3, B5, B7, B8, B20) (DL:102Mbps, UL:51.0Mbps, Max DL MIMO layers = 2, Release8(Cat3))

2.2 Supporting Standard

Item	Feature	Comment
Supporting Standard	WCDMA(FDD1,2,4,5,8) /EGSM/GSM850/DCS1800/PCS1900 with seamless handover	
Frequency Range	WCDMA(FDD1) TX : 1920 – 1980 MHz WCDMA(FDD1) RX : 2110 – 2170 MHz WCDMA(FDD2) TX : 1850 – 1910 MHz WCDMA(FDD2) RX : 1930 – 1990 MHz WCDMA(FDD4) TX : 1710 – 1755 MHz WCDMA(FDD4) RX : 2110 – 2155 MHz WCDMA(FDD5) TX : 824 – 849 MHz WCDMA(FDD5) RX : 869 – 894 MHz WCDMA(FDD8) TX : 880 – 915 MHz WCDMA(FDD8) RX : 925 – 960 MHz EGSM TX : 880 – 915 MHz EGSM RX : 925 – 960 MHz GSM850 TX : 824 – 849 MHz GSM850 RX : 869 – 894 MHz GSM900 TX : 880 – 915 MHz GSM900 RX : 925 – 960 MHz DCS1800 TX : 1710 – 1785 MHz DCS1800 RX : 1805 – 1880 MHz PCS1900 TX : 1850 – 1910 MHz PCS1900 RX : 1930 – 1990 MHz	
Application Standard	WAP 2.0	

2.3 Main Parts & Solution

Item	Part Name	Comment
Digital Baseband	AP Q8064 : Qualcomm	
Analog Baseband	MDM9215M : Qualcomm	
RF Chip	WTR1605L : Qualcomm	

2.4 HW Features

Item	Feature	Comment
Form Factor	DOP type	
Battery	1) Capacity Standard : Li-Ion Polymer, 2300mAh	
	2) Packing Type : Soft Pack	Embedded
Size	Standard : 133.9 x 68.7 x 9.1 (unit : mm)	
Weight	139.5 g	with Battery
PCB	FR4, 10 Layers , 0.8t	
Stand by time	CDMA Up to 350 hrs GSM Up to 350 hrs WCDMA Up to 350 hrs LTE Up to 350 hrs	@ SCI2 (CDMA) @ Paging Period 5 (GSM) @ DRX 7 (WCDMA) @ DRX7 (LTE)
Charging time	3 hrs 30min	@ Power Off
Talk time	CDMA Up to 690 min GSM Up to 405 min WCDMA Up to 530min LTE Up to 230 min	@ Tx= 10dBm (CDMA) @ TX=LV5(EGSM) @ Tx = 10dBm (WCDMA) @ Tx = 10dBm (LTE)
RX sensitivity	WCDMA(FDD1) : -108 dBm WCDMA(FDD2) : -108 dBm WCDMA(FDD2) : -108 dBm WCDMA(FDD5) : -108 dBm WCDMA(FDD8) : -108 dBm EGSM : -108 dBm GSM850 : -108 dBm DCS 1800 : -108 dBm	

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		PCS 1900 : -108 dBm	
TX output power		WCDMA/ GSM/ GPRS	WCDMA B1,2, 4,8 : 24dBm/3.84MHz,+1/- 3dBm WCDMA B5 : 23.5dBm/3.84MHz,+1/- 3dBm EGSM : 32.5dBm GSM850 : 32.5 dBm DCS 1800 : 30 dBm PCS 1900 : 30 dBm
GPRS compatibility	EDGE	EGSM : 26 dBm GSM850 :26 dBm DCS 1800 : 25 dBm PCS 1900 : 25 dBm	Class3(WCDMA) Class4 (EGSM) Class4 (GSM850) Class1 (PCS) Class1 (DCS)
	GPRS Class 12		E2 (GSM900) E2 (PCS) E2 (DCS)
EDGE compatibility		GPRS Class 12	
SIM card type		Plug-In SIM 3V /1.8V	
Display		Main LCD IPS TFT Main LCD (5.0", 1920 X 1080 Pixels)	
Built-in Camera		8M AF + 1.3M VT	
Status Indicator		Yes	
Keypad		Full Touch Screen Side Key : 3	Side Key : Power On Volume up/down
ANT		Main : Internal Fixed Type	
System connector		5 Pin u-USB	
Ear Phone Jack		3.5Phi,	
PC synchronization		Yes	
Memory(AP)		16Gb(SDRAM DDR2)	

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	+ 16GB eMMC	
Speech coding	FR, EFR, HR,AMR	
Vibrator	Built in Vibrator	
BlueTooth	Bluetooth 3.0	
MIDI(for Buzzer Function)	SW Decoded 72Poly	
Music Player	MP3/WMA/AAC/MIDI/EAAC+/HE AAC/OGG	
Video Player	MPEG4, H.264	
Camcorder	MPEG4 or H.263	
Voice Recording	Yes	
Speaker Phone mode Support	Yes	
Travel Adapter	Yes	
CDROM	No	
Stereo Headset	Yes	
Data Cable	Yes	
T-Flash (External Memory)	No	

2.5 SW Features

Item	Feature	Comment
RSSI	0 ~4 Levels	
Battery Charging	0 ~ 7 Levels	
Key Volume	0 ~ 7 Level	
Audio Volume	0 ~ 15 Level	
Time / Date Display	Yes	
Multi-Language	Yes	English, Espanol, Franch, Korea, Chinese, etc
Quick Access Mode	Camera/Chrome/App/Message/Phone	
PC Sync	No	
Speed Dial	Yes	Voice mail center -> 1 key
Profile	Yes	not same with feature phone setting
CLIP / CLIR	Yes	
Phone Book	Name / Number / Email /Organization/ Website / Postal addresses /Events/ Note / IM / Nickname / Internet call/ Group	
Last Received Number	Yes	There is no limitation on the number of items. It depends on available memory amount.
Last Missed Number	Yes	There is no limitation on the number of items. It depends on available memory amount.
Search by Number / Name	Name / Number	
Group	Yes	There is no limitation on the number of items. It depends on available memory amount.

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Fixed Dial Number	Yes	
Service Dial Number	No	
Own Number	Yes	Read / Write
Voice Memo	No	
Call Reminder	No	
Network Selection	Automatic	
Mute	Yes	
Call Divert	Yes	
Call Barring	No	
Call Charge (AoC)	No	
Call Duration	No	
SMS (EMS)	There is no limitation on the number of items. It depends on available memory amount.	EMS does not support.
SMS Over GPRS	Yes	
EMS Melody / Picture Send / Receive / Save	No No	
MMS MPEG4 Send / Receive / Save	TBD	
Long Message	Yes	
Cell Broadcast	Yes	
Download	Yes	
Game	Yes	
Calendar	Yes	
Memo	No	
World Clock	No	
Unit Convert	Yes	
Stop Watch	Yes	
Wall Paper	No	
WAP Browser	Yes	WAP stack and wml are not supported.
Download Melody / Wallpaper		Over web browser

2. PERFORMANCE

SIM Lock	No	
SIM Toolkit	Class 1, 2, 3, C, E	
MMS	Yes	
EONS	Yes	
CPHS	Yes	V4.2
ENS	No	
Camera	Yes	8M AF VT: 1.3 M HD
JAVA		Android do not support JAVA
Voice Dial	No	
IrDa	No	
Bluetooth	No	Ver.4.0
FM radio	Yes	
GPRS	No	Class 12
EDGE	Yes	Class 12
Hold / Retrieve	Yes	
Conference Call	Yes	Max. 7
DTMF	Yes	
Memo pad	No	
TTY	Yes	
AMR	Yes	
SyncML	No	
IM	Yes	Gtalk
Email	Yes	

2.6 H/W SPEC.

1) GSM transceiver specification

Item	Specification
Phase Error	Rms : 5°/ Peak : 20 °
Frequency Error	GSM : 0.1 ppm/ DCS / PCS : 0.1 ppm
EMC (Radiated Spurious Emission Disturbance)	GSM/DCS : < -28dBm
Transmitter Output power	GSM850, EGSM : 5dBm ~ 32.5dBm ± 3dB DCS/PCS : 0dBm ~ 30dBm ± 3dB
Burst Timing	< 3.69us
Spectrum due to modulation out to less than 1800kHz offset	200kHz : -36dBm 600kHz : -51dBm/-56dBm
Spectrum due to modulation out to larger than 1800kHz offset to the edge of the transmit band	GSM850, EGSM : 1800-3000kHz : < -63dBc(-46dBm) 3000kHz-6000kHz : < -65dBc(-46dBm) 6000kHz < : < -71dBc(-46dBm) DCS, PCS : 1800-3000kHz : < -65dBc(-51dBm) 6000kHz < : < -73dBc(-51dBm)
Spectrum due to switching transient	400kHz : -19dBm/-22dBm(5/0), -23dBm 600kHz : -21dBm/-24dBm(5/0), -26dBm
Reference Sensitivity – TCH/FS	Class II(RBER) : -105dBm(2.439%)
Usable receiver input level range	0.012(-15 - -40dBm)
Intermodulation rejection – Speech channels	± 800kHz, ± 1600kHz : -98dBm / -96dBm (2.439%)
AM Suppression – GSM : -31dBm – DCS : -29dBm	-98dBm/-96dBm (2.439%)
Timing Advance	± 0.5T

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2) WCDMA transmitter specification

Item	Spec.	Min	Typ.	Max	Unit
Maximum Output Power	Power class III	21.0	24	25.0	dBm/3.84MHz
Frequency Accuracy	-	-200	-	+200	Hz
Minimum Output Power	-	-	-	-50	dBm/3.84MHz
Occupied Bandwidth	-	-	-	4.6	MHz
Adjacent Channel Leakage Power Ratio	$\Delta f = \pm 5\text{MHz}$	-	-	-33	dBm/3.84MHz
	$\Delta f = \pm 10\text{MHz}$	-	-	-43	dBm/3.84MHz
Error Vector Magnitude(EVM)	-	-	-	17	%
Peak Code Domain Error	-	-	-	15	dBm/3.84MHz
Open Loop Output Power	lor == 106.7dBm/3.84MHz	-46.7	-	-28.7	dBm/3.84MHz
	lor ==-65.7dBm/3.84MHz	-23.0	-	-5.0	dBm/3.84MHz
	lor ==-25.0dBm/3.84MHz	-0.0	-	14.0	dBm/3.84MHz
Transmit Off Power	-	-	-	-56	dBm/3.84MHz
Spectrum Emission Mask	$\Delta f = 2.5\sim 3.5\text{MHz}$	$-35-15 * (\Delta f-2.5)$			dBc/30KHz
	$\Delta f = 3.5\sim 7.5\text{MHz}$	$-35-1 * (\Delta f-3.5)$			dBc/1MHz
	$\Delta f = 7.5\sim 8.5\text{MHz}$	$-39 10 * (\Delta f-7.5)$			dBc/1MHz
	$\Delta f = 8.5\sim 12.5\text{MHz}$	-49			dBc/1MHz
Transmit Spurious Emission	9kHz ~ 150kHz			-36	dBm
	150kHz ~ 30MHz			-36	dBm
	30MHz ~ 1GHz			-36	dBm
	1GHz ~ 12.5GHz			-30	dBm

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3) WCDMA receiver specification

Item	Spec.	Min	Typ.	Max	Unit
Reference Sensitivity Level	BER < 0.001%	-	-	-106.7	dBm/3.84MHz
Maximum Input Level	Pin = -25dBm	-	-	0.1	BER(%)
Adjacent Channel Selectivity(ACS)	Jammer(Modulation) = -52dBm/3.84MHz $\Delta f = \pm 5\text{MHz}$ BER < 0.001%	-	-	-103	dBm/3.84MHz
In Band Blocking	Jammer(Modulation) = -56dBm/3.84MHz $\Delta f = \pm 10\text{MHz}$ BER < 0.001%	-	-	-103.7	dBm/3.84MHz
	Jammer(Modulation) = -44dBm/3.84MHz $\Delta f = \pm 15\text{MHz}$ BER < 0.001%	-	-	-103.7	dBm/3.84MHz
Inter-modulation Desensitization	Jammer1(CW)=-46dBm Jammer2(Modulation) = -46dBm/3.84MHz $\Delta f = \pm 10\text{MHz}$ BER < 0.001%	-	-	-103.7	dBm/3.84MHz
	Jammer1=-46dBm(CW) Jammer2(Modulation) = -46dBm/3.84MHz $\Delta f = \pm 20\text{MHz}$ BER < 0.001%	-	-	-103.7	dBm/3.84MHz
Spurious Emissions	30kHz ~ 1GHz	-	-	-57	dBm/30kHz
	1GHz ~ 1.92GHz	-	-	-47	dBm/1MHz
	1.92GHz ~ 1.98GHz	-	-	-60	dBm/3.84MHz
	1.98GHz ~ 2.11GHz	-	-	-47	dBm/3.84MHz
	2.11GHz ~ 2.17GHz	-	-	-60	dBm/3.84MHz
	2.17GHz ~ 12.75GHz	-	-	-47	dBm/1MHz

4) HSDPA transmitter / receiver specification

	Item	Spec.	Min	Typ.	Max	Unit	
transmitter	5.2.A Maximum Output Power with HS-DPCCH	$1/15 \leq \beta_c/\beta_d \leq 12/15$ $13/15 \leq \beta_c/\beta_d \leq 15/8$ $15/7 \leq \beta_c/\beta_d \leq 15/0$	21 20 19	23 22.5 22	25 25 25	dBm/3.84MHz	
	5.7A HS-DPCCH	MAX / 0dBm	Step 0	0 dB +/- 1 dB			dB
			Step 1 – Step 0	6 dB +/- 2.3 dB			dB
			Step 2 – Step 3	1 dB +/- 0.6 dB			dB
			Step 5 – Step 4	0 dB +/- 0.6 dB			dB
			Step 6 – Step 7	5 dB +/- 2.3 dB			dB
	5.9A Spectrum Emission Mask with HS-DPCCH	$\Delta f = 2.5 \sim 3.5\text{MHz}$	-35-15 * (Δf -2.5)			dBc/30KHz	
		$\Delta f = 3.5 \sim 7.5\text{MHz}$	-35-1 * (Δf -3.5)			dBc/1MHz	
		$\Delta f = 7.5 \sim 8.5\text{MHz}$	-39 10 * (Δf -7.5)			dBc/1MHz	
		$\Delta f = 8.5 \sim 12.5\text{MHz}$	-49			dBc/1MHz	
	5.10A Adjacent Channel Leakage Power Ratio with HS-DPCCH	$\Delta f = \pm 5\text{MHz}$	-	-	-33	dBm/3.84MHz	
		$\Delta f = \pm 10\text{MHz}$	-	-	-43	dBm/3.84MHz	
	5.13.1A Error Vector Magnitude (EVM) with HS-DPCCH	MAX Power -20 dBm	-	-	17.5	%	
receiver	6.3A Maximum Input Level for HS-PDSCH Reception	Pin = -25dBm	-	-	10	BLER(%)	

5) LTE Transmitter specification

Item	Spec.	Min	Typ.	Max	Unit
Maximum Output Power (Class III)	Power class 3 (Environmental Test)	20.3 (20.3)	23.0 (23.0)	25.7 (25.7)	dBm/ 10MHz
Frequency Error	QPSK	-0.1 PPM -15hz	-	+0.1 PPM +15hz	
EVM	QPSK 16QAM			17.5 12.5	%
IQ-component	QPSK, 12RB			-24.2	dBc
In-band emissions for non allocated RB	QPSK, 12RB			-24.2	dB
Spectrum Flatness	QPSK, 50RB	-2		+3.4	dB
Occupied bandwidth	QPSK, 50RB			10	MHz
ACLR (Adjacent Channel Leakage Power Ratio)	E-UTRA ACLR1			-29.2	dB
	UTRA ACLR1			-32.2	dB
	UTRA ACLR2			-35.2	dB
Transmitter Spurious emissions	9 kHz < f < 150 kHz			-36	dBm/1kHz
	150kHz < f < 30 MHz			-36	dBm/10kHz
	30MHz < f < 1GHz			-36	dBm/100kHz
	1GHz < f < 12.75GHz			-30	dBm/1MHz

6) LTE receiver specification

Item	Spec.	Min	Typ.	Max	Unit
Sensitivity Level (DL : QPSK, 50RB UL : QPSK, 25RB)	Dual Receiver			B2: -95 B4 : -97 B17: -94	dBm/ 10MHz
	Single Receiver (exception in 3GPP)			B2 : -92 B4 : -94.0 B17: -91.0	dBm /10MHz
Maximum input Level	Dual Receiver (DL : 64QAM, 50RB UL : QPSK, 12RB)			-25.7	dBm /10MHz
ACS (Adjacent Channel Selectivity)	Dual Receiver (DL : QPSK, 50RB UL : QPSK, 12RB) $\Delta f = \pm 7.5\text{MHz}$, LTE BW 5MHz			33	dB
In-Band Blocking (DL : QPSK, 50RB UL : QPSK, 20RB)	Dual Receiver $\Delta f = \pm 7.5\text{MHz}$, LTE BW 5MHz $\Delta f = \pm 12.5\text{MHz}$, LTE BW 5MHz			-88.3	dBm /10MHz
Narrow Band Blocking (DL : QPSK, 50RB UL : QPSK, 20RB)	Dual Receiver $\Delta f = \pm 5.2125\text{MHz}$, CW			-81.3	dBm /10MHz
Intermodulation (DL : QPSK, 50RB UL : QPSK, 20RB)	Dual Receiver $\Delta f = \pm 12.5\text{MHz}$, CW $\Delta f = \pm 25\text{MHz}$, LTE BW 5MHz			-88.3	dBm /10MHz
Spurious emissions (DL : QPSK, 0RB UL : QPSK, 0RB)	Dual Receiver $30\text{MHz} < f < 1\text{GHz}$			-57	dBm /100kHz
	$1\text{GHz} < f < 12.75\text{ GHz}$			-47	dBm /1MHz

7) WLAN 802.11a transceiver specification

Item	Specification
Transmit Frequency	5170 ~ 5815 MHz (CH36 ~ 64, CH100 ~ 124, CH149 ~ 161)
Tx Power Level	$\leq 2.5\text{mW/MHz}$ (CH36 ~ 48), $\leq 10\text{mW/MHz}$ (CH52 ~ 161)
Frequency Tolerance	within ± 20 PPM
Chip clock Frequency Tolerance	within ± 20 PPM
Spectrum Mask	≤ -20 @ $\pm 11\text{MHz}$ offset (9MHz ~ 11MHz) ≤ -28 @ $\pm 20\text{MHz}$ offset (11MHz ~ 20MHz) ≤ -40 @ $\pm 30\text{MHz}$ offset (20MHz ~ 30MHz)
Transmitter constellation error (rms EVM)	$\leq -5\text{dB@}6\text{Mbps}$, $\leq -8\text{dB@}9\text{Mbps}$, $\leq -10\text{dB@}12\text{Mbps}$, $\leq -13\text{dB@}18\text{Mbps}$, $\leq -16\text{dB@}24\text{Mbps}$, $\leq -19\text{dB@}36\text{Mbps}$, $\leq -22\text{dB@}48\text{Mbps}$, $\leq -25\text{dB@}54\text{Mbps}$
Spurious Emissions	< -36 dBm @ 30 MHz to 47 MHz < -54 dBm @ 47 MHz to 74 MHz < -36 dBm @ 74 MHz to 87,5 MHz < -54 dBm @ 87,5 MHz to 118 MHz < -36 dBm @ 118 MHz to 174 MHz < -54 dBm @ 174 MHz to 230 MHz < -36 dBm @ 230 MHz to 470 MHz < -54 dBm @ 470 MHz to 862 MHz < -36 dBm @ 862 MHz to 1 GHz < -30 dBm @ 1 GHz to 5.15 GHz < -30 dBm @ 5.35 GHz to 5.47 GHz < -30 dBm @ 5.725 GHz to 26.5 GHz
Rx Min input Sensitivity	PER $\leq 10\%$ $-82\text{dBm@}6\text{Mbps}$, $-81\text{dBm@}9\text{Mbps}$, $-79\text{dBm@}12\text{Mbps}$ $-77\text{dBm@}18\text{Mbps}$, $-74\text{dBm@}24\text{Mbps}$, $-70\text{dBm@}36\text{Mbps}$ $-66\text{dBm@}48\text{Mbps}$, $-65\text{dBm@}54\text{Mbps}$
Rx Max input Sensitivity	$\geq -30\text{dBm}$ (6,9,12,18,24,36,48,54Mbps) @ PER $\leq 10\%$

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Rx Adjacent Channel Rejection	<p>PER ≤ 10%, ACR ≥ 16dB@6Mbps, ACR ≥ 15dB@9Mbps, ACR ≥ 13dB@12Mbps, ACR ≥ 11dB@18Mbps, ACR ≥ 8dB@24Mbps, ACR ≥ 4dB@36Mbps ACR ≥ 0dB@48Mbps, ACR ≥ -1dB@54Mbps</p> <p>※ ACR shall be measured by setting the desired signal's strength 3 dB above the rate-dependent sensitivity specified in min input sensitivity</p>
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8) WLAN 802.11b transceiver specification

Item	Specification
Transmit Frequency	2400 MHz ~ 2483.5 MHz (CH1~CH13)
Tx Power Level	≤ 20dBm under (Europe), ≤ 30dBm under (USA)
Frequency Tolerance	within ±25 PPM
Chip clock Frequency Tolerance	within ±25 PPM
Spectrum Mask	≤ -30 @ $f_c - 22\text{MHz} < f < f_c - 11\text{MHz}$ and $f_c + 11\text{MHz} < f < f_c + 22\text{MHz}$ ≤ -50 @ $f < f_c - 22\text{MHz}$ and $f > f_c + 22\text{MHz}$
Power ramp on/off time	≤ 2us
Carrier Suppression	≤ -15dB
Modulation Accuracy(Peak EVM)	≤ 35%
Spurious Emissions	< -36 dBm @ 30MHz ~ 1GHz < -30 dBm above @ 1GHz ~ 12.75GHz < -47 dBm @ 1.8GHz ~ 1.9GHz < -47 dBm @ 5.15GHz ~ 5.3GHz
Rx Min input Sensitivity	≤ -76dBm(1Mbps,2Mbps,5.5Mbps,11Mbps) @ FER ≤ 8%
Rx Max input Sensitivity	≥ -10dBm(1Mbps,2Mbps,5.5Mbps,11Mbps) @ FER ≤ 8%
Rx Adjacent Channel Rejection	≥ 35dB @FER ≤ 8%, interference input signal -70dBm@ $f_c \pm 25\text{MHz}$ (11Mbps)

9) WLAN 802.11g transceiver specification

Item	Specification
Transmit Frequency	2400 MHz ~ 2483.5 MHz (CH1~CH13)
Tx Power Level	≤ 20dBm under (Europe), ≤ 30dBm under (USA)
Frequency Tolerance	within ±25 PPM
Chip clock Frequency Tolerance	within ±25 PPM
Spectrum Mask	≤ -20 @ ±11MHz offset (9Mhz ~ 11MHz) ≤ -28 @ ±20MHz offset (11MHz ~ 20Mhz) ≤ -40 @ ±30MHz offset (20MHz ~ 30Mhz)
Transmitter constellation error (rms EVM)	≤ -5dB@6Mbps, ≤ -8dB@9Mbps, ≤ -10dB@12Mbps, ≤ -13dB@18Mbps, ≤ -16dB@24Mbps, ≤ -19dB@36Mbps, ≤ -22dB@48Mbps, ≤ -25dB@54Mbps
Spurious Emissions	< -36 dBm @ 30MHz ~ 1GHz < -30 dBm above @ 1GHz ~ 12.75GHz < -47 dBm @ 1.8GHz ~ 1.9GHz < -47 dBm @ 5.15GHz ~ 5.3GHz
Rx Min input Sensitivity	PER ≤ 10% -82dBm@6Mbps, -81dBm@9Mbps, -79dBm@12Mbps -77dBm@18Mbps, -74dBm@24Mbps, -70dBm@36Mbps -66dBm@48Mbps, -65dBm@54Mbps
Rx Max input Sensitivity	≥ -20dBm(6,9,12,18,24,36,48,54Mbps) @ PER ≤ 10%
Rx Adjacent Channel Rejection	PER ≤ 10%, ACR ≥ 16dB@6Mbps, ACR ≥ 15dB@9Mbps, ACR ≥ 13dB@12Mbps, ACR ≥ 11dB@18Mbps, ACR ≥ 8dB@24Mbps, ACR ≥ 4dB@36Mbps ACR ≥ 0dB@48Mbps, ACR ≥ -1dB@54Mbps ※ACR shall be measured by setting the desired signal's strength 3 dB above the rate-dependent sensitivity specified in min input sensitivity

10) WLAN 802.11n(HT20) transceiver specification

Item	Specification
Transmit Frequency	2400 MHz ~ 2473.5 MHz (CH1~CH11) (USA) 5150~5850MHz(CH36,CH40,CH44,CH48~116,CH132~165) (USA) 2400 MHz ~ 2483.5 MHz (CH1~CH13) (Europe) 5150~5725MHz(CH36,CH40,CH44,CH48~140) (Europe)
Tx Power Level	$\leq 20\text{dBm}$ (CH1~13) (Europe), $\leq 30\text{dBm}$ (CH1~11) (USA) $< 50\text{mW}$ (CH36~48), $< 250\text{mW}$ (CH52~140), $< 1\text{W}$ (CH149~165) (USA) $\leq 20\text{dBm}$ (CH36~64), $\leq 27\text{dBm}$ (CH100~140) (Europe)
Frequency Tolerance	within ± 25 PPM(2400 ~ 2483.5 MHz) within ± 20 PPM(5150 ~ 5850 MHz)
Chip clock Frequency Tolerance	within ± 25 PPM(2400 ~ 2483.5 MHz) within ± 20 PPM(5100 ~ 5850 MHz)
Spectrum Mask	≤ -20 @ $\pm 11\text{MHz}$ offset (9MHz ~ 11MHz) ≤ -28 @ $\pm 20\text{MHz}$ offset (11MHz ~ 20MHz) ≤ -45 @ $\pm 30\text{MHz}$ offset (20MHz ~ 30MHz)
Transmitter constellation error (rms EVM)	$\leq -5\text{dB}$ @6.5Mbps, $\leq -10\text{dB}$ @13Mbps, $\leq -13\text{dB}$ @19.5Mbps, $\leq -16\text{dB}$ @26Mbps, $\leq -19\text{dB}$ @39Mbps, $\leq -22\text{dB}$ @52Mbps, $\leq -25\text{dB}$ @58.5Mbps, $\leq -28\text{dB}$ @65Mbps
Spurious Emissions	[2400 MHz ~ 2483.5 MHz (CH1 ~ 13)] < -36 dBm @ 30MHz ~ 1GHz < -30 dBm above @ 1GHz ~ 12.75GHz < -47 dBm @ 1.8GHz ~ 1.9GHz < -47 dBm @ 5.15GHz ~ 5.3GHz [5150 MHz ~ 5850 MHz (CH36 ~ 165)] < -36 dBm @ 30 MHz to 47 MHz < -54 dBm @ 47 MHz to 74 MHz < -36 dBm @ 74 MHz to 87,5 MHz < -54 dBm @ 87,5 MHz to 118 MHz < -36 dBm @ 118 MHz to 174 MHz < -54 dBm @ 174 MHz to 230 MHz < -36 dBm @ 230 MHz to 470 MHz < -54 dBm @ 470 MHz to 862 MHz < -36 dBm @ 862 MHz to 1 GHz < -30 dBm @ 1 GHz to 5.15 GHz < -30 dBm @ 5.35 GHz to 5.47 GHz < -30 dBm @ 5.725 GHz to 26.5 GHz

2. PERFORMANCE

Rx Min input Sensitivity	<p>PER ≤ 10%</p> <p>-82dBm@6.5Mbps, -79dBm@13Mbps, -77dBm@19.5Mbps -74dBm@26Mbps, -70dBm@39Mbps, -66dBm@52Mbps -65dBm@58.5Mbps, -64dBm@65Mbps</p>
Rx Max input Sensitivity	<p>≥ -20dBm @ PER ≤ 10%(2400 ~ 2483.5 MHz) ≥ -30dBm @ PER ≤ 10%(5150 ~ 5850 MHz)</p>
Rx Adjacent Channel Rejection	<p>PER ≤ 10%, ACR ≥ 16dB@6.5Mbps, ACR ≥ 13dB@13Mbps, ACR ≥ 11dB@19.5Mbps, ACR ≥ 8dB@26Mbps, ACR ≥ 4dB@39Mbps, ACR ≥ 0dB@52Mbps ACR ≥ -1dB@58.5Mbps, ACR ≥ -2dB@65Mbps</p> <p>※ACR shall be measured by setting the desired signal's strength 3 dB above the rate-dependent sensitivity specified in min input sensitivity</p>

11) Bluetooth transmitter specification

Item		Spec.	Min	Typ.	Max	Unit
Output Power	DH5 PRBS9	Nominal Pwr	-6	-	+20	dBm
		Peak Pwr	-	-	+23	dBm
Power Density	DH5 PRBS9	@100kHz BW		-	+20	dBm
Frequency Range	DH5 PRBS9	-30dBm @100kHz BW	2400	-	2483	MHz
Tx Output Spectrum (20dB BW)	DH5 PRBS9	$\Delta f = f_H - f_L$		-	1	MHz
Tx Output Spectrum (Adjacent Output Power)	DH5 PRBS9	@M-N = 2		-	-20	dBm
		@M-N >= 3		-	-40	dBm
Modulation Index	DH5 11110000	$f1_{AVG}$	140	-	175	kHz
	DH5 10101010	$f2_{MAX}$	115	-		kHz
		$f2_{AVG}/f1_{AVG}$	0.8	-		
Initial Carrier Freq. Tolerance	DH5 PRBS9		-75	-	+75	kHz
Carrier Frequency Drift	DH1 10101010	Freq. Drift	-25	-	+25	kHz
		Drift Rate	-20	-	+20	kHz/50us
	DH3 10101010	Freq. Drift	-40	-	+40	kHz
		Drift Rate	-20	-	+20	kHz/50us
	DH5 10101010	Freq. Drift	-40	-	+40	kHz
		Drift Rate	-20	-	+20	kHz/50us
Out of Band Spurious Emission	DH1 PRBS9	@ 30MHz ~ 12.75GHz	20			dBc

12) Bluetooth receiver specification

Item	Spec.		Min	Typ.	Max	Unit
Sensitivity (Single Slot Packet)	DH1 PRBS9	BER @ 0.1%		-	-70	dBm
Sensitivity (Multi Slot Packet)	DH5 PRBS9	BER @ 0.1%		-	-70	dBm
C/I Performance	DH1 PRBS9	Co-Channel -60dBm@ BER0.1%		-	11	dB
		C/I @1MHz -60dBm@ BER 0.1%		-	0	
		C/I @2MHz -60dBm@ BER 0.1%		-	-30	
		C/I @≥3MHz -67dBm@ BER0.1%		-	-40	
		C/I @Image -67dBm@ BER 0.1%		-	-9	
		C/I @1MHz Image -67dBm@ BER 0.1%		-	-20	
Blocking Performance	DH1 PRBS9	-10dBm @ 30M ~2 GHz				dBm
		-27dBm @ 2 ~ 2.4 GHz				
		-27dBm @ 2.5 ~ 3 GHz				
		-10dBm @ 3 ~ 12.75 GHz				

2. PERFORMANCE

Intermodulation Performance	DH1 PRBS9	$\Delta f = +5\text{MHz (CW)}$ $\Delta f = +10\text{MHz (BT)}$ BER @ 0.1%		-	-64	dBm
		$\Delta f = -5\text{MHz (CW)}$ $\Delta f = -10\text{MHz (BT)}$ BER @ 0.1%		-	-64	dBm
Maximum Input Level	DH1 PRBS9	BER @ 0.1%	-20	-		dBm

13) GPS receiver specification

Item	Specification
Receive Frequency	1574.42 MHz ~ 1576.42 MHz
Minimum Sensitivity	1 satellite $\geq -142\text{dBm}$, 7 satellites $\geq -147\text{dBm}$ at coarse time aiding

14) NFC

Operate below 3 mode.

- 1) Card mode : Smart Card capability for mobile device(recognition distance : over 20mm)
- 2) Reader mode : Get information from tag(recognition distance : over 20mm)
- 3) Peer-to-peer mode : Device to device communication(recognition distance : over 5mm)

15) Current consumption

Item	Specification			
	LTE	WCDMA	GSM	CDMA
1. Sleep Mode	6mA ↓	6mA ↓	6mA ↓	6mA ↓
2. Sleep : Ear jack connected	6mA ↓	6mA ↓	6mA ↓	6mA ↓
3. Sleep & Idle average	6.5mA ↓ @ SCI2	6.5mA ↓ @ DRX 7	6.5mA ↓ @ P.P 5	6.5mA ↓ @ SCI2
4. BT Connected Sleep& Idle	9.5mA ↓	9.5mA ↓	9.5mA ↓	9.5mA ↓
5. Talk Mode	-Max Pwr : 850mA ↓ @ Avg -Tx 10dBm 400mA ↓ @ Avg	-Max Pwr : 500mA ↓ @ Avg -Tx 10dBm 260 mA ↓ @ Avg	GSM LVL 5 340 mA ↓ @ Avg	-Max Pwr: 650mA ↓ @ Avg -Tx 10dBm 200mA ↓ @ Avg
6. No SVC Mode	200mA ↓	200mA ↓	200mA ↓	200mA ↓
7. Flight mode	6.0mA ↓	6.0mA ↓	6.0mA ↓	6.0mA ↓
8. Power Off Mode	500uA ↓	500uA ↓	500 uA ↓	500 uA ↓

16) Battery life time

Item	Specification	Test Condition
Standby (LTE)	350 hours over 6.5mA ↓	DRX 7 @ BATT : 2300mAh
Standby (GSM)	350 hours over 6.5mA ↓	EGSM P5 @ BATT : 2300mAh
Standby (WCDMA)	350 hours over 6.5mA ↓	DRX7 @ BATT : 2300mAh
Standby (CDMA)	350 hours over 6.5mA ↓	SCI2 @ BATT : 2300mAh
Voice Call (WCDMA)	530 mins over 260mA ↓	10dBm @ BATT :2300mAh (AMR Mode)
Voice Call (GSM)	405 mins over 340mA ↓	EGSM, LV5 @ BATT : 2300mAh
Voice Call (VT)	153 mins over (TBD) 900mA ↓ (TBD)	4G , Tx:+12dBm, Speaker Mode, Max volume @ BATT :2300mAh
Voice Call (LTE)	230 mins over 600mA ↓	LTE Cat2 @ TX 10dBm & LCD ON(Default Brightness)
Voice Call (CDMA)	690 mins over 200mA ↓	10dBm @ BATT : 2300mAh

17) Charging hour

3hour 30min. under (typ. 2300mAh battery, 1.2A TA)

18) RSSI indicator (Based on Cell power) :

	Specification				Unit
	LTE	WCDMA	GSM	CDMA	
BAR 4->3	-85dBm±3dBm	-88dBm±3dBm	-90dBm±3dBm	-76dBm±3dBm	Antenna BAR
BAR 3->2	-95dBm±3dBm	-96dBm±3dBm	-98dBm±3dBm	-86dBm±3dBm	
BAR 2->1	-105dBm±3dBm	-102dBm±3dBm	-104dBm±3dBm	-96dBm±3dBm	
BAR 1->0	-115dBm±3dBm	-106dBm±3dBm	-108dBm±3dBm	- 101dBm±3dBm	

1) WCDMA setting : Uplink Parameters-> Maximum Uplink Transmit Power Level(=24dBm)

2) After cell power change, at least 10sec delay is necessary before RSSI measurement.(RSSI stability)

19) Battery indicator

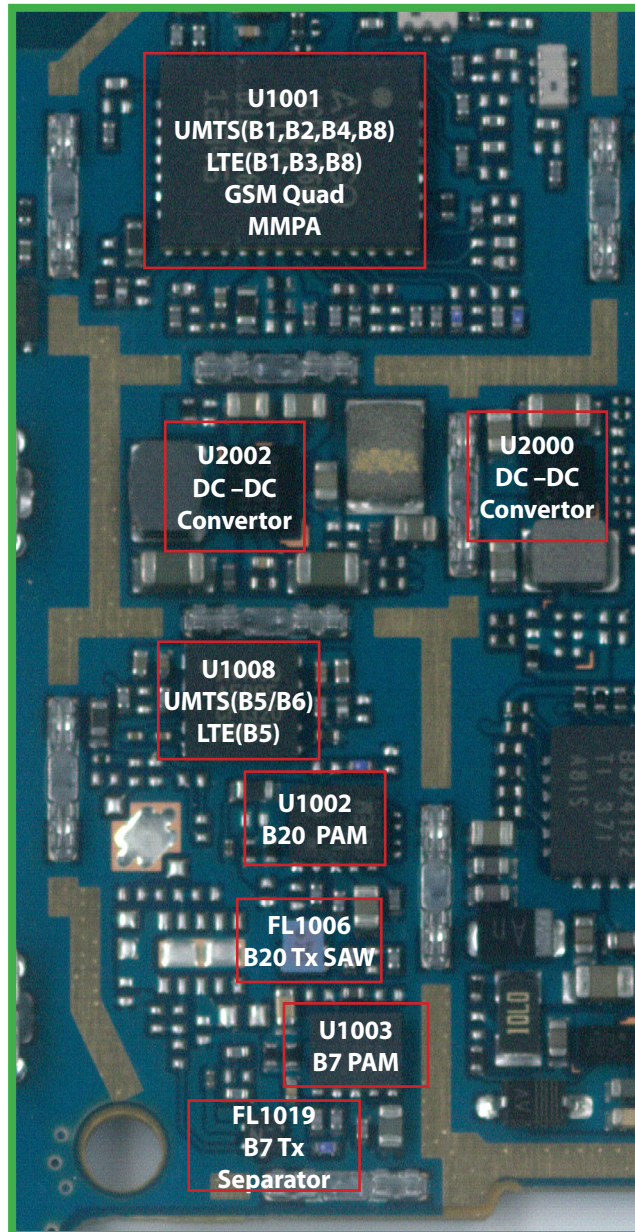
Battery Bar	Specification	Battery Bar	Specification
Bar 20(Full)	98% above	Bar 9 -> Bar 8	43% -> 42%
Bar 20 -> Bar 19	98% -> 97%	Bar 8 -> Bar 7	38% -> 37%
Bar 19 -> Bar 18	93% -> 92%	Bar 7 -> Bar 6	33% -> 32%
Bar 18 -> Bar 17	88% -> 87%	Bar 6 -> Bar 5	28% -> 27%
Bar 17 -> Bar 16	83% -> 82%	Bar 5 -> Bar 4	23% -> 22%
Bar 16 -> Bar 15	78% -> 77%	Bar 4 -> Bar 3	18% -> 17%
Bar 15 -> Bar 14	73% -> 72%	Bar 3 -> Bar 2	13% -> 12%
Bar 14 -> Bar 13	68% -> 67%	Bar 2 -> Bar 1	8% -> 7%
Bar 13 -> Bar 12	63% -> 62%	Bar 1 -> Bar 0	3% -> 2%
Bar 12 -> Bar 11	58% -> 57%	Power off	1% below
Bar 11 -> Bar 10	53% -> 52%	Low battery pop-up	14% ,4%
Bar 10 -> Bar 9	48% -> 47%		

2.7 D821 Figures



3. TROUBLE SHOOTING

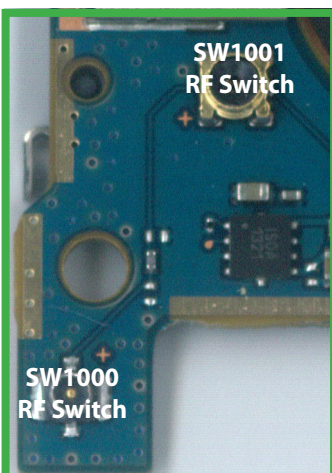
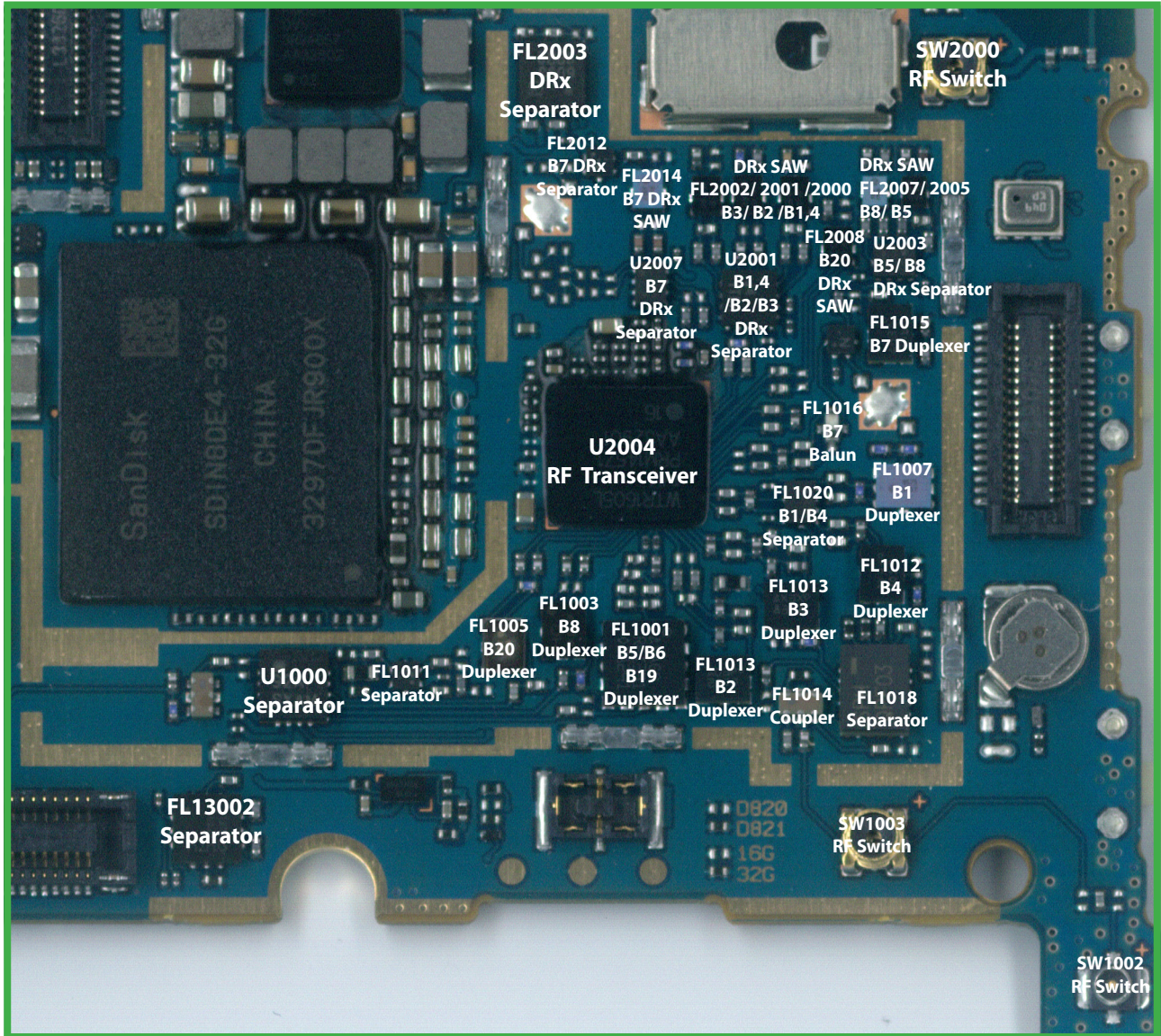
3.1 RF Component



TOP

3. TROUBLE SHOOTING

BOT



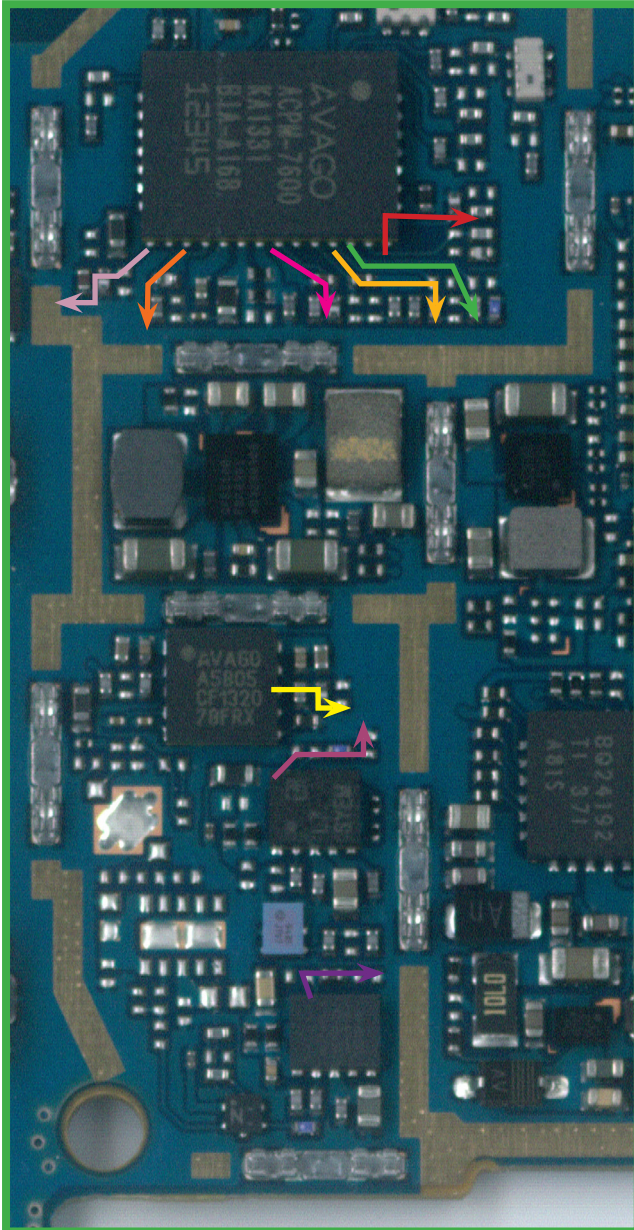
3. TROUBLE SHOOTING

RF component

Reference No.	Description	Reference No.	Description
FL1001	B5, B6 GSM850 Duplexer	FL1002	B5, B6 Low Pass Filter
FL1003	B8, GSM900 Duplexer	FL1004	B8 Low Pass Filter
FL1005	B20 Duplexer	FL1006	B20 Tx Saw Filter
FL1007	B1 Duplexer	FL1008	B2, GSM1900 Duplexer
FL1012	B4 Duplexer	FL1013	GSM 1800 Duplexer
U2005	GPS LNA	FL1018	B1, B2, B4, GSM1800, GSM1900 Separator
FL1020	B1, B4 Separator	FL2000	B1, B4 DRx SAW Filter
FL2001	B2 DRx SAW Filter	FL2003	B1, B2, B4, B5, B6, B8, B20 Separator
FL2005	B5 DRx SAW Filter	FL2007	B8 DRx SAW Filter
FL2008	B20 DRx SAW Filter	FL2009	GPS, B7 Separator
FL2011	GPS SAW Filter	U1002	B20 PAM
U1000	B5, B8, B20, GSM850, GSM900 Separator	U1001	B1, B2, B4, B8 GSM Quad MMPA
U1008	B5, B6 PAM	U2000	DC-DC convertor
U2001	B1, B2, B4 DRx Separator	U2002	DC-DC convertor (QFE1100)
U2003	B5, B6, B8 DRx Separator	U2004	RF Transceiver

3.2 SIGNAL PATH

WCDMA/LTE/CDMA/GSM TX flow



TOP/BOT

<U1001, MMPA>

1. WCDMA, LTE B1 TX PATH

2. WCDMA B4 TX PATH

3. WCDMA B2 TX PATH

4. WCDMA B8 TX PATH

5. GSM_HB TX PATH

6. GSM_LB TX PATH

7. COMMON High Band TX/RX PATH

8. COMMON Low Band TX/RX PATH

<U1008, B5 PAM>

9. WCDMA, LTE B5 / WCDMA B6 / TX PATH

<U1002, B20 PAM>

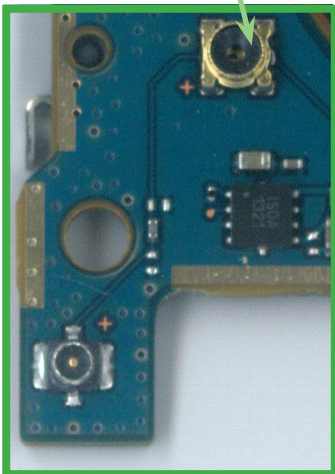
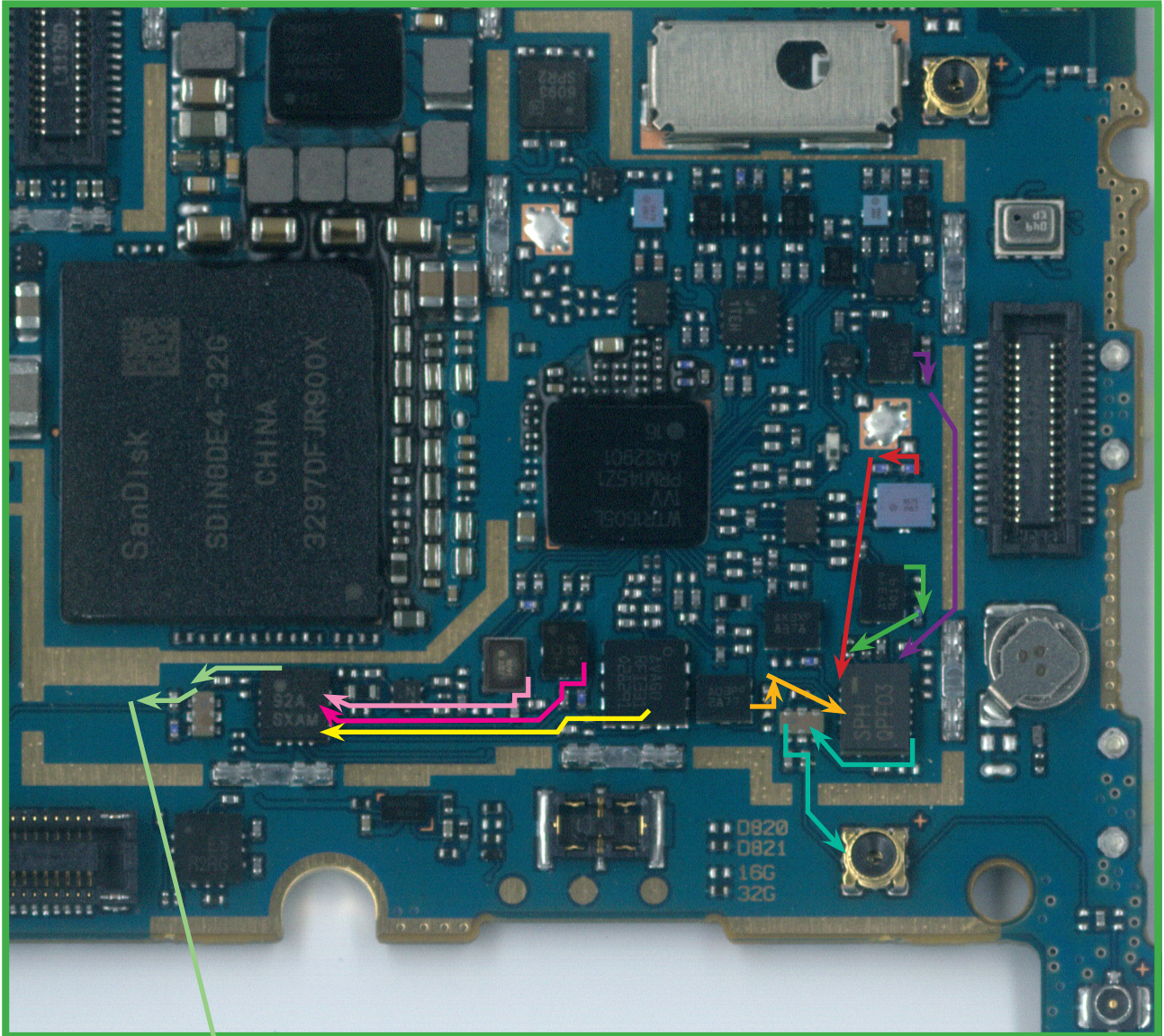
10. LTE B20 TX PATH

<U1003, B7 PAM>

11. LTE B7 TX PATH

TOP

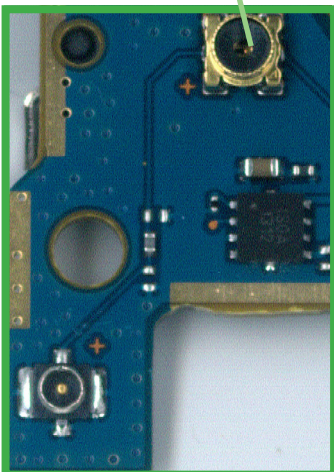
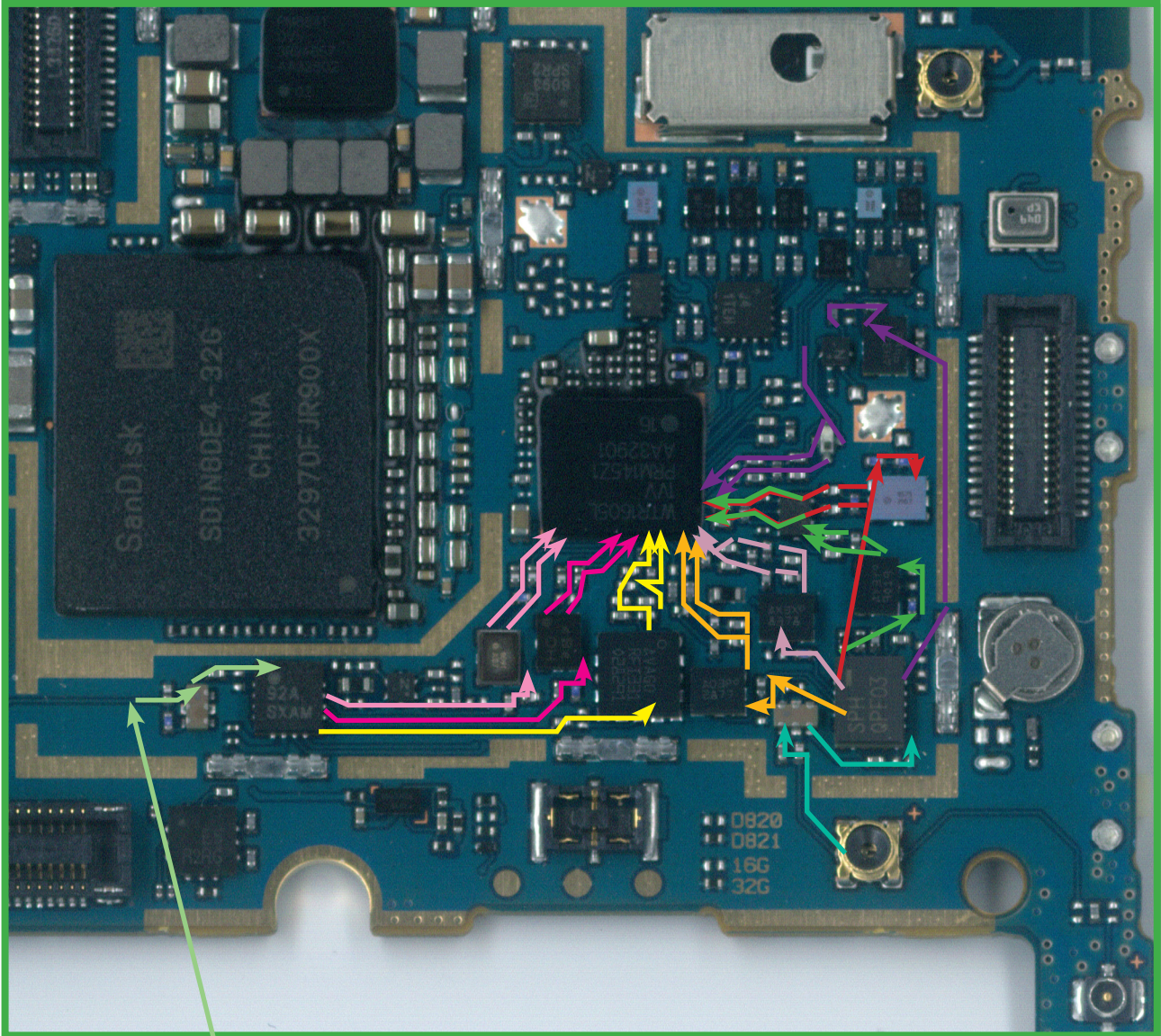
3. TROUBLE SHOOTING



BOT

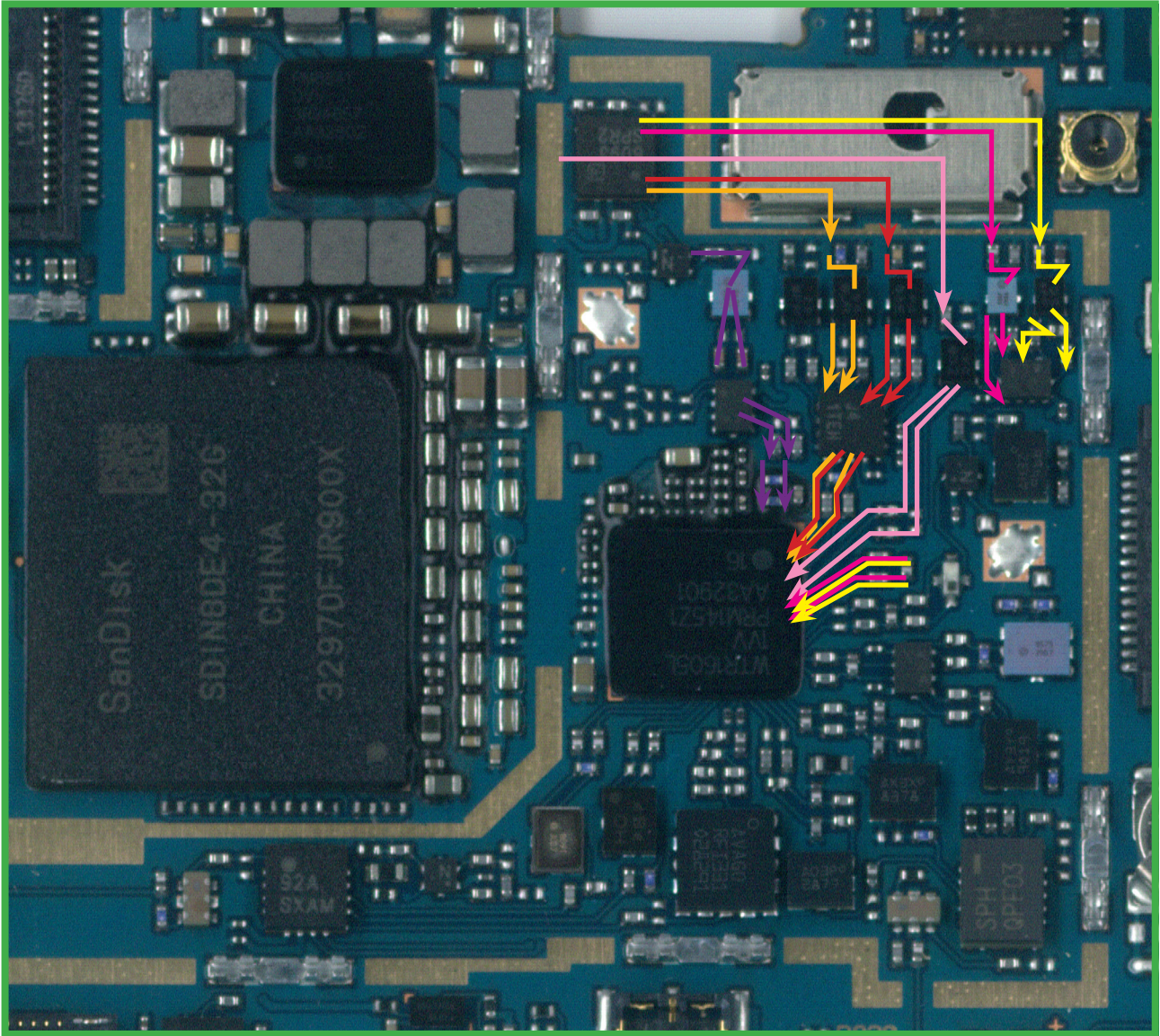
3. TROUBLE SHOOTING

- WCDMA/LTE/CDMA/GSM PRX flow



1. WCDMA, LTE B1 PRX PATH
2. WCDMA B4 PRX PATH
3. WCDMA B2 / GSM 1900 PRX PATH
4. WCDMA, LTE B8 / GSM900 PRX PATH
5. LTE B3 / GSM 1800 PRX PATH
6. COMMON High Band TX/RX PATH
7. COMMON Low Band TX/RX PATH
8. WCDMA, LTE B5 / WCDMA B6 / GSM850 PRX PATH
9. LTE B20 PRX PATH
10. LTE B7 TX PATH

- WCDMA/LTE/CDMA DRX flow



1. WCDMA, LTE B1 / WCDMA B4 DRX PATH

2. WCDMA B2 DRX PATH

3. WCDMA, LTE B8 DRX PATH

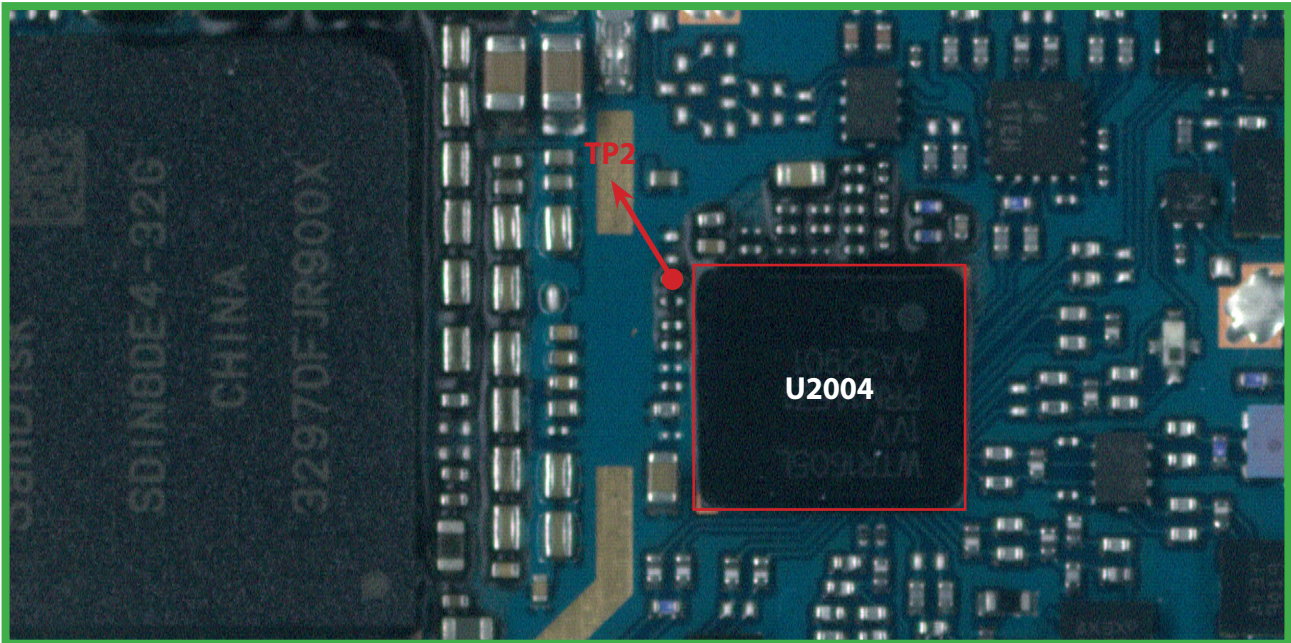
4. WCDMA, LTE B5 / WCDMA B6 DRX PATH

5. LTE B20 DRX PATH

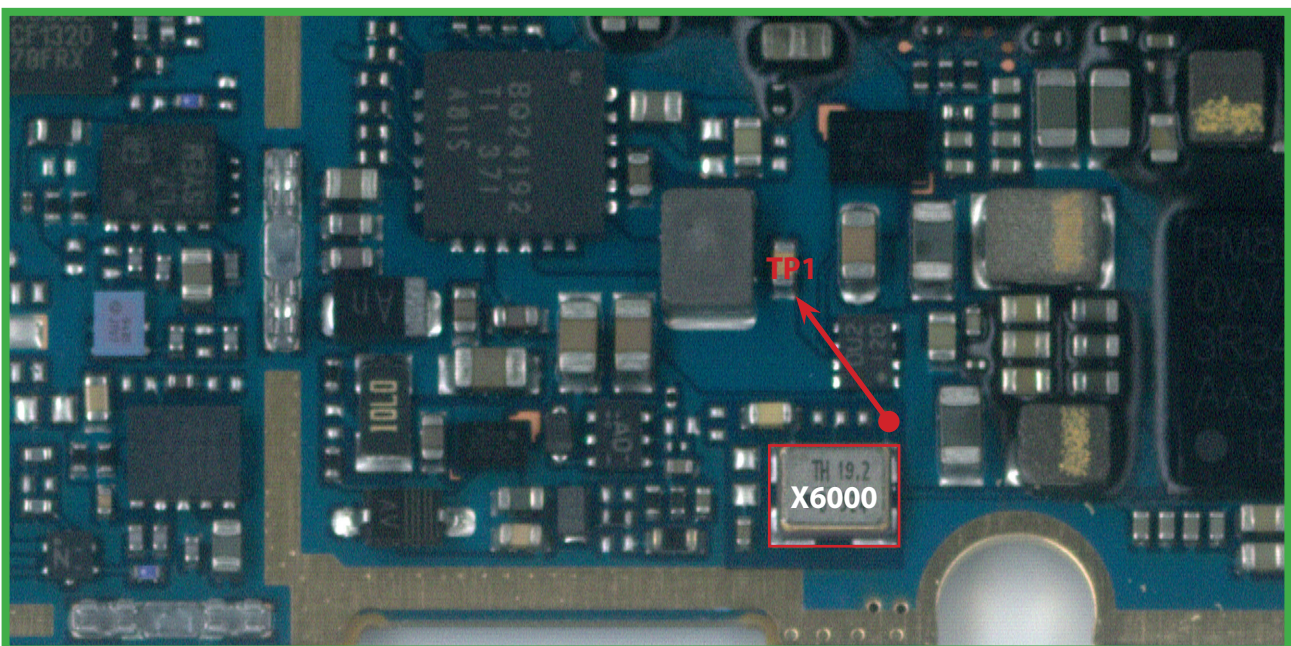
6. LTE B7 DRX PATH

3.3 Checking XO Block

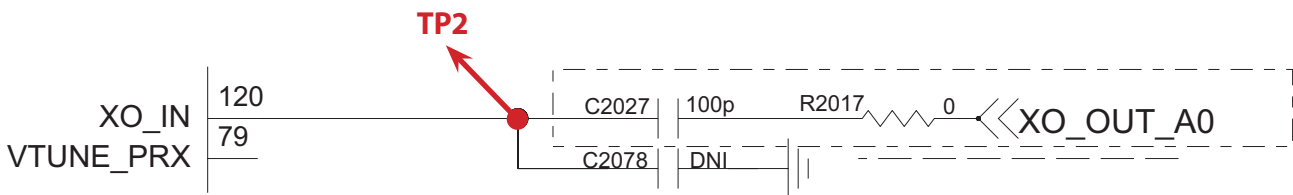
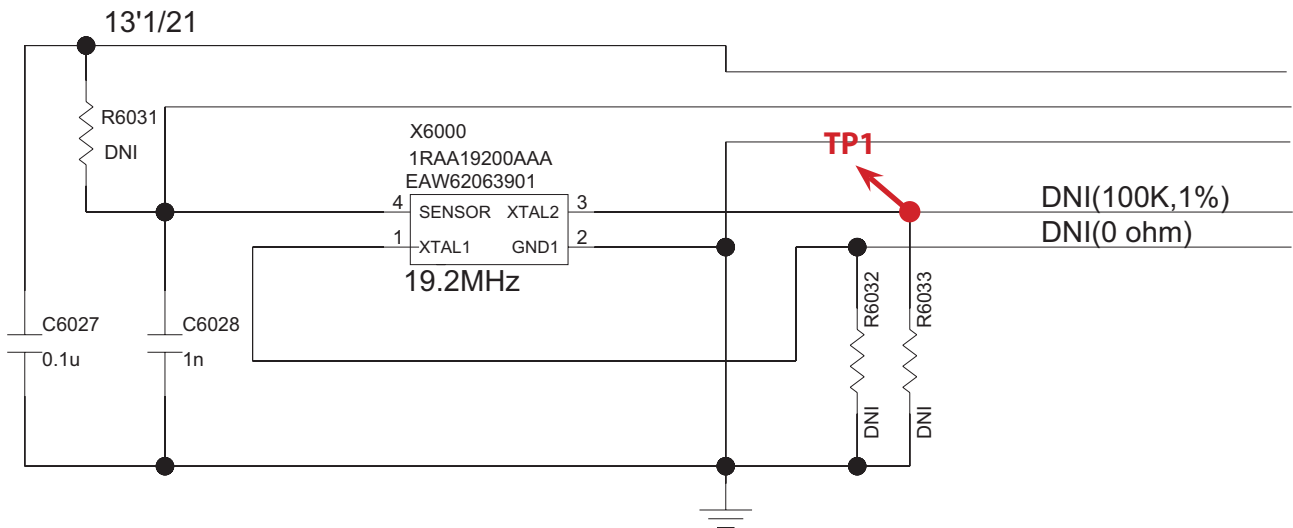
The output frequency (19.2MHz) of XO (X6000) is used as the reference one of WTR1605L(U2004) and PM8941(U6002) internal VCO.



BOT

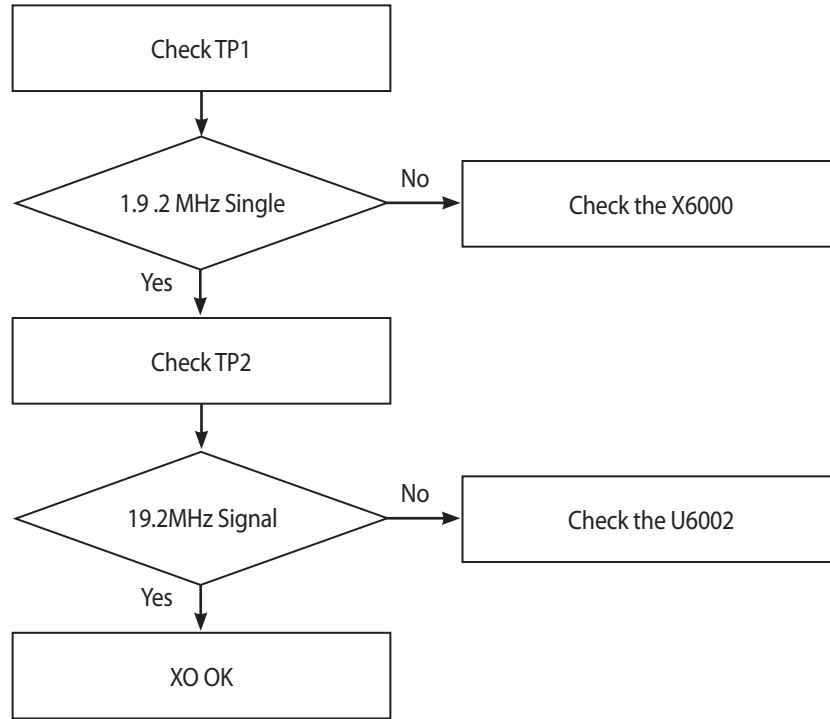


TOP



Schematic of the Crystal Part (19.2MHz)

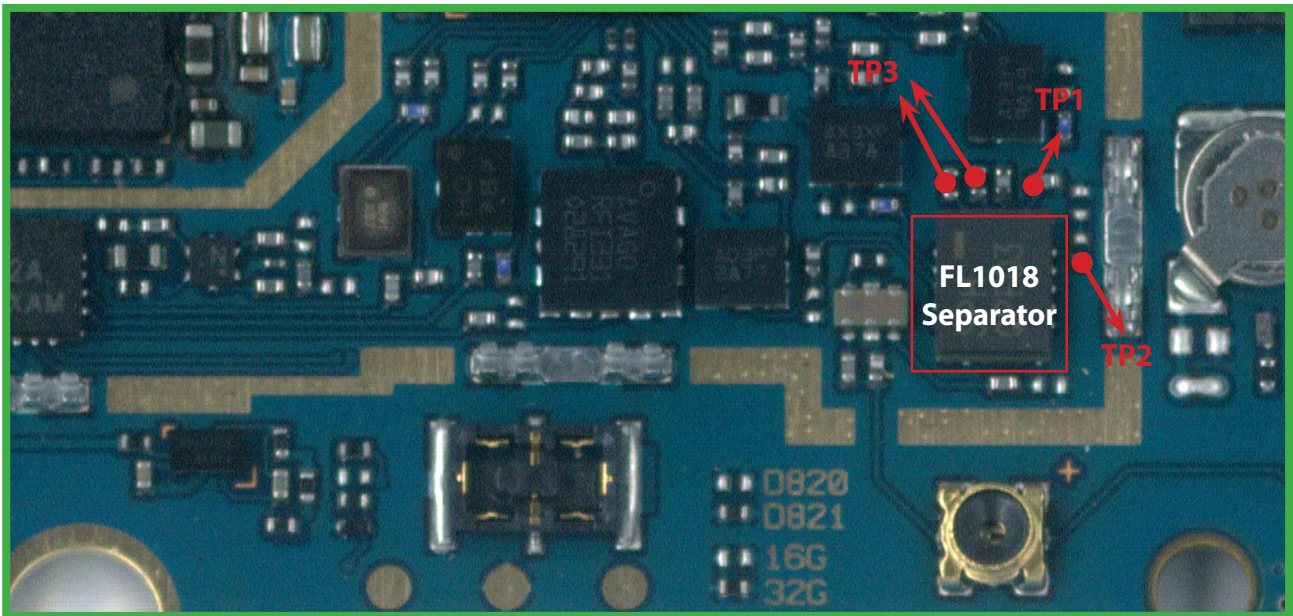
3. TROUBLE SHOOTING



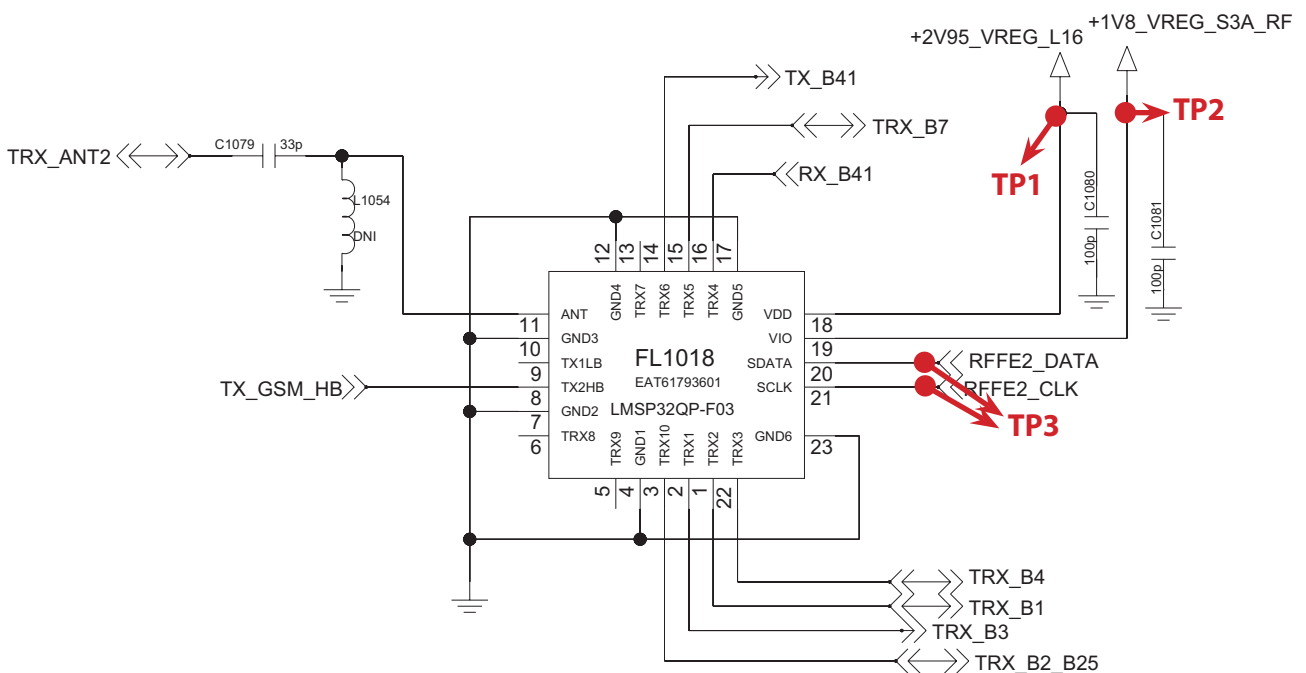
3.4 Checking RF Front-end Separator

3.4.1 FL1018 (High Band)

Check the supply voltage and control level for FL1018/U1000

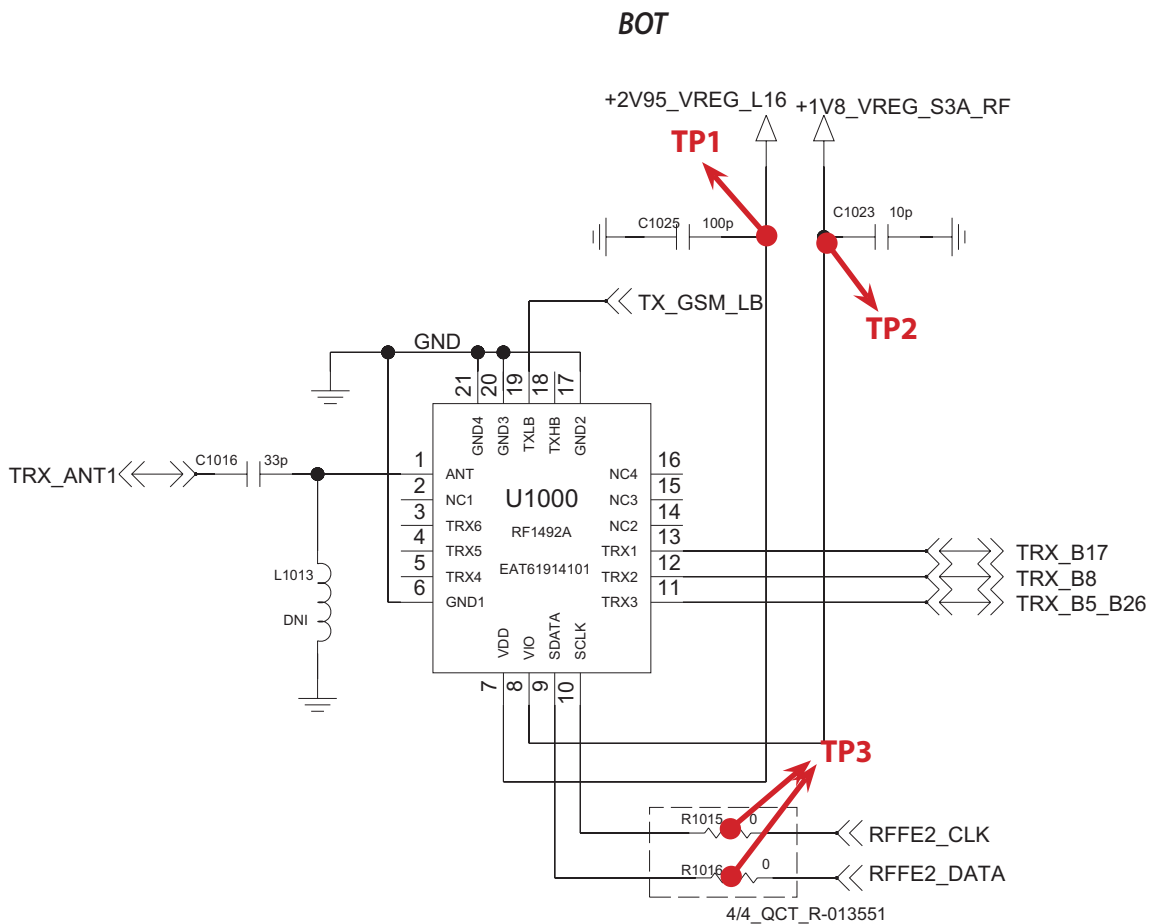
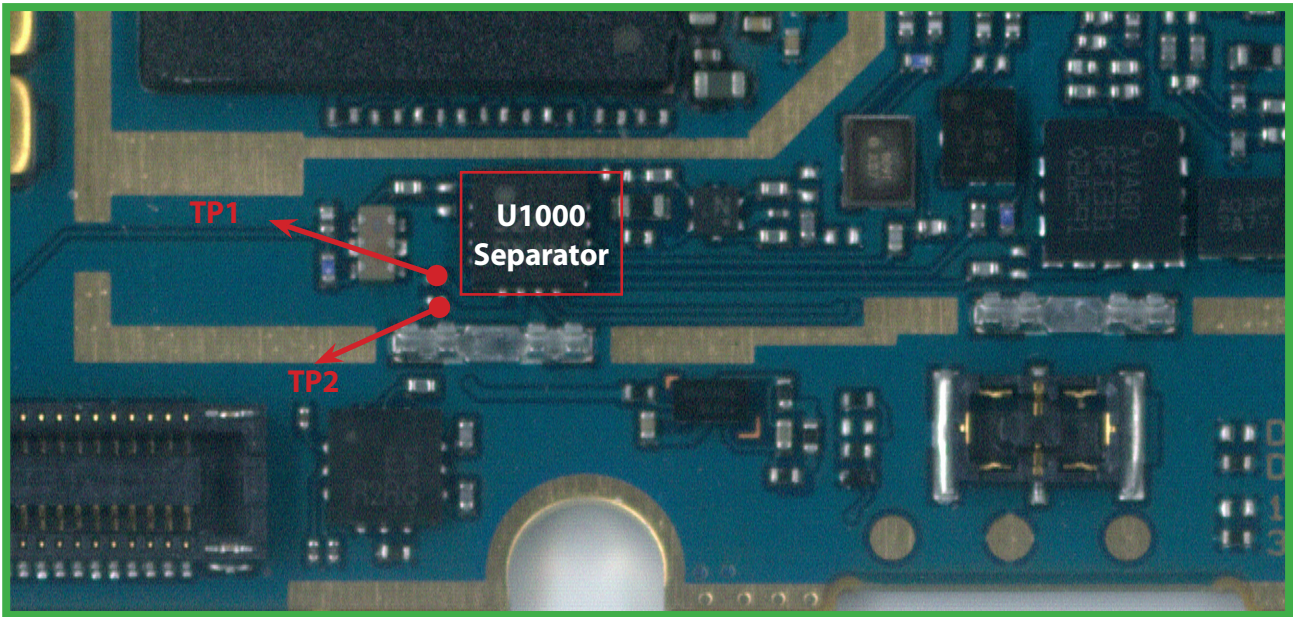


BOT

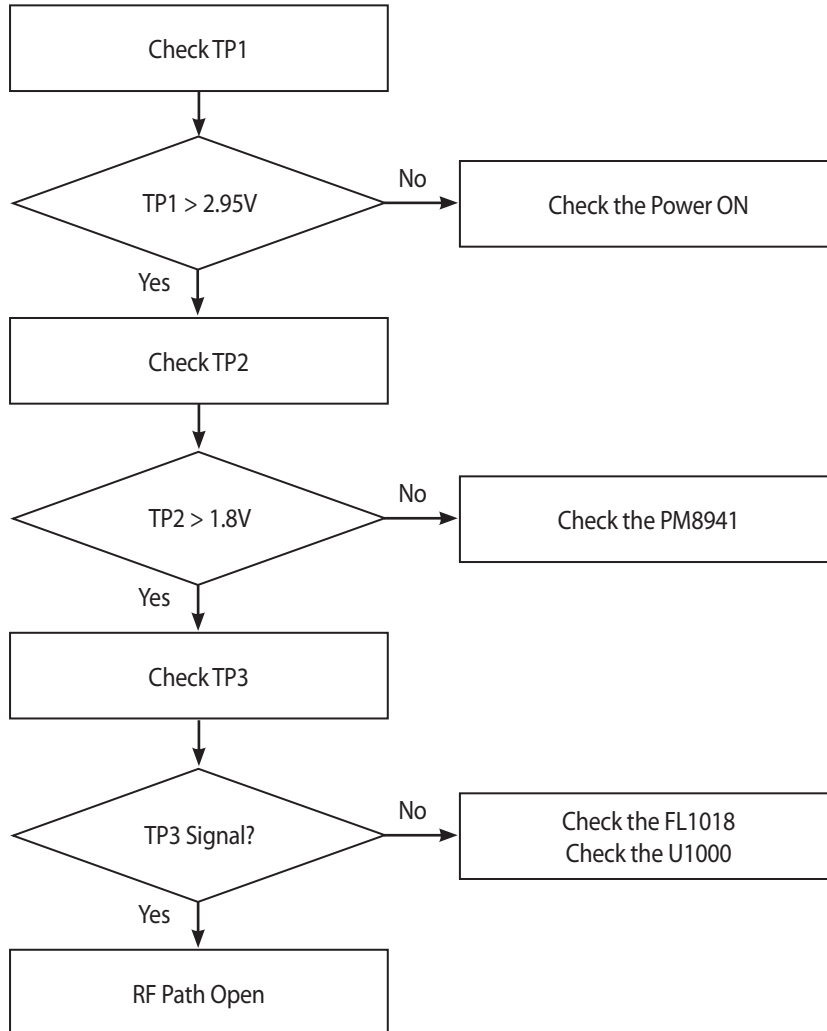


3.4.2 U1000 (Low Band)

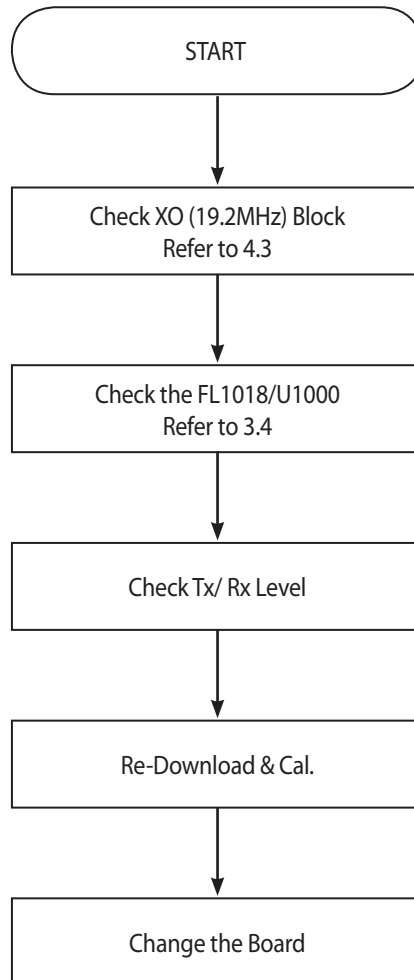
Check the supply voltage and control level for FL1018/U1000



3. TROUBLE SHOOTING



3.5 Checking RF Block



3.5.1 Checking XO (19.2MHz) Block

Refer to 3.3

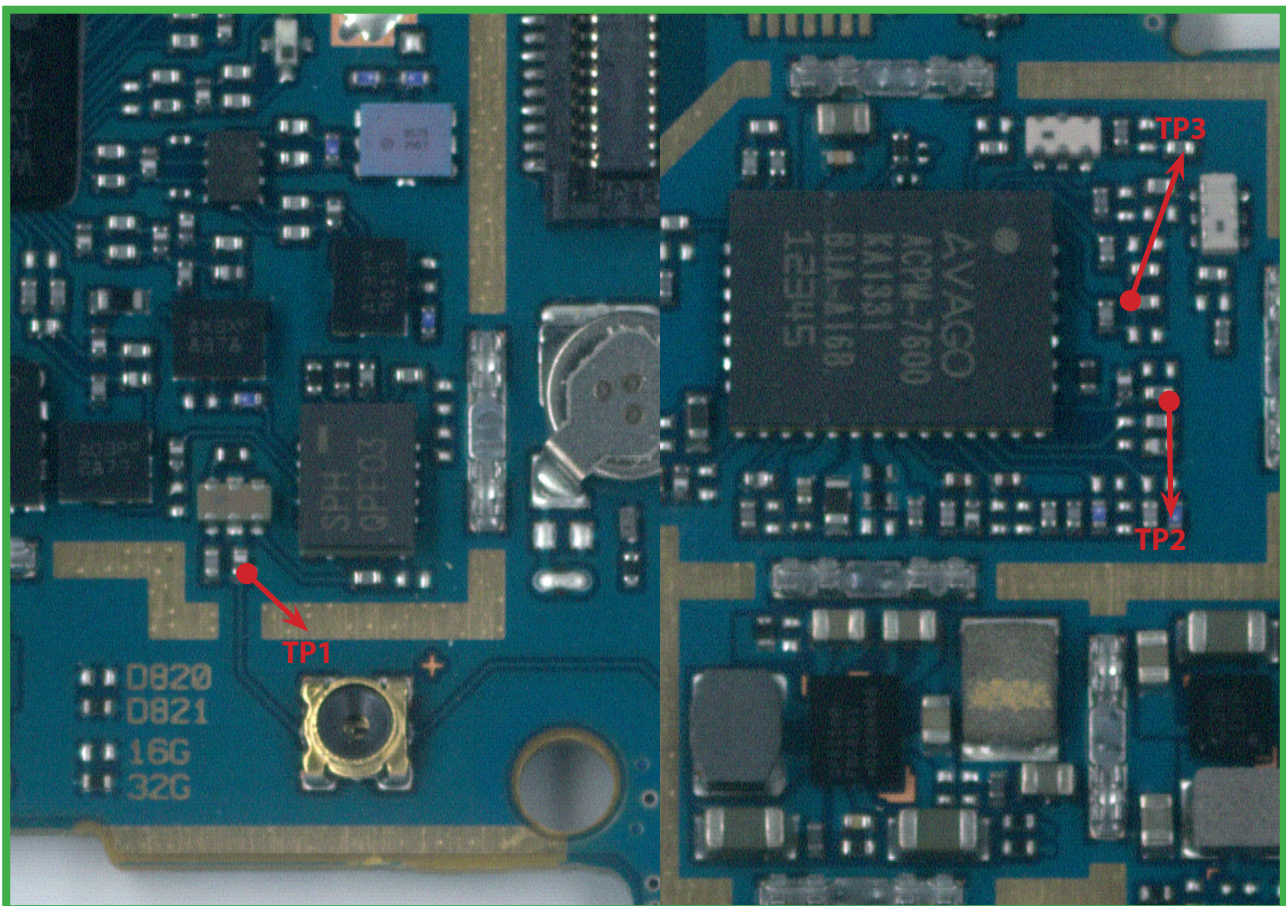
3.5.2 Checking the FL1018/ U1000

Refer to 3.4

3.5.3 Checking RF TX Level

<ACPM-7600 PAM>

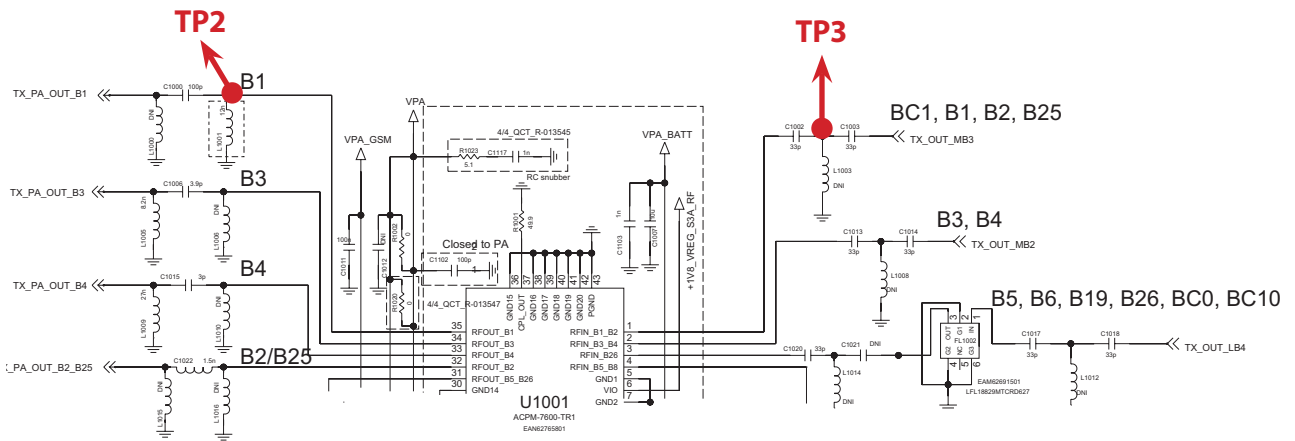
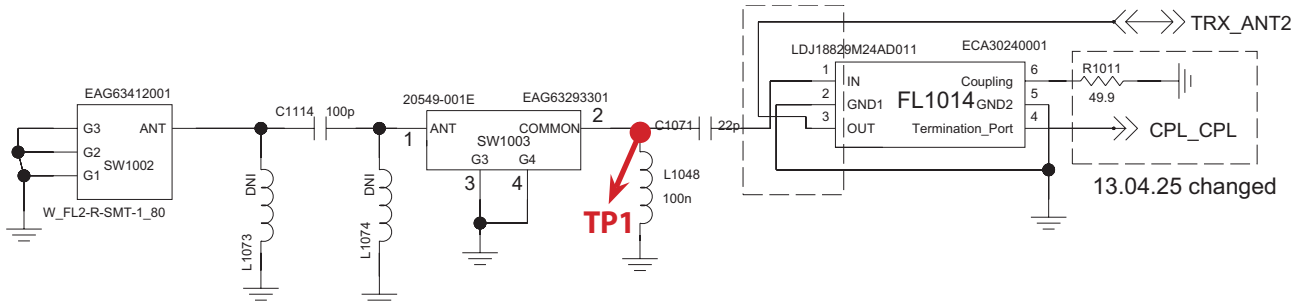
3.5.3.1 WCDMA, LTE B1



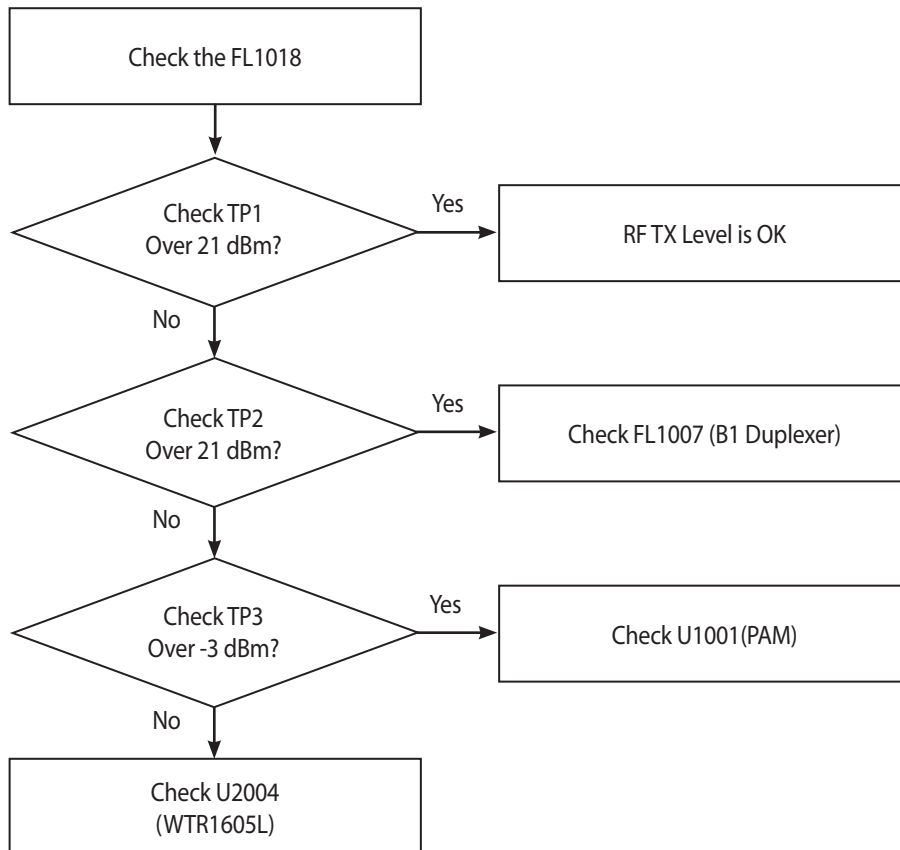
BOT

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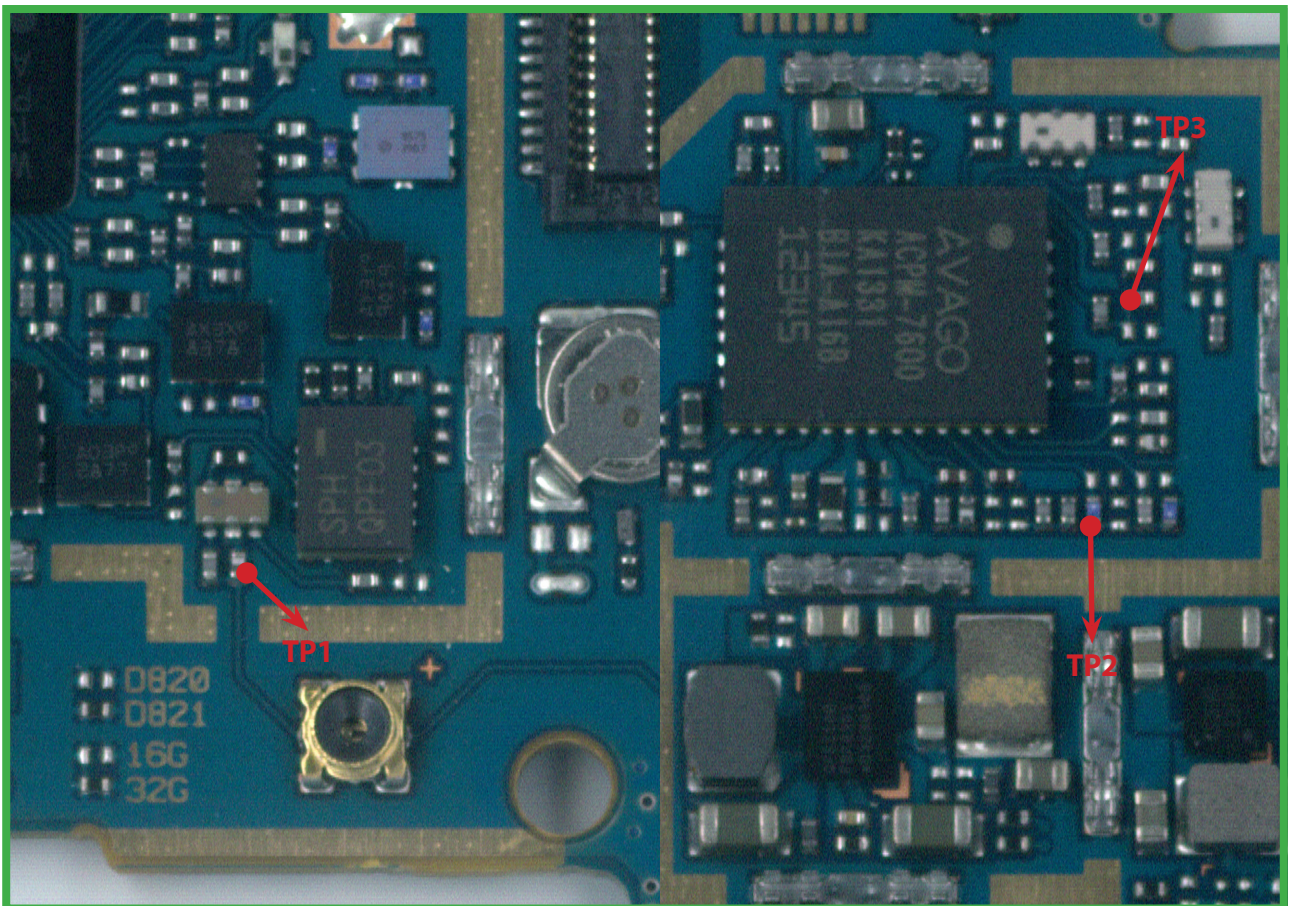
3. TROUBLE SHOOTING



First, Check the conducted Max. Power using the RF Connector



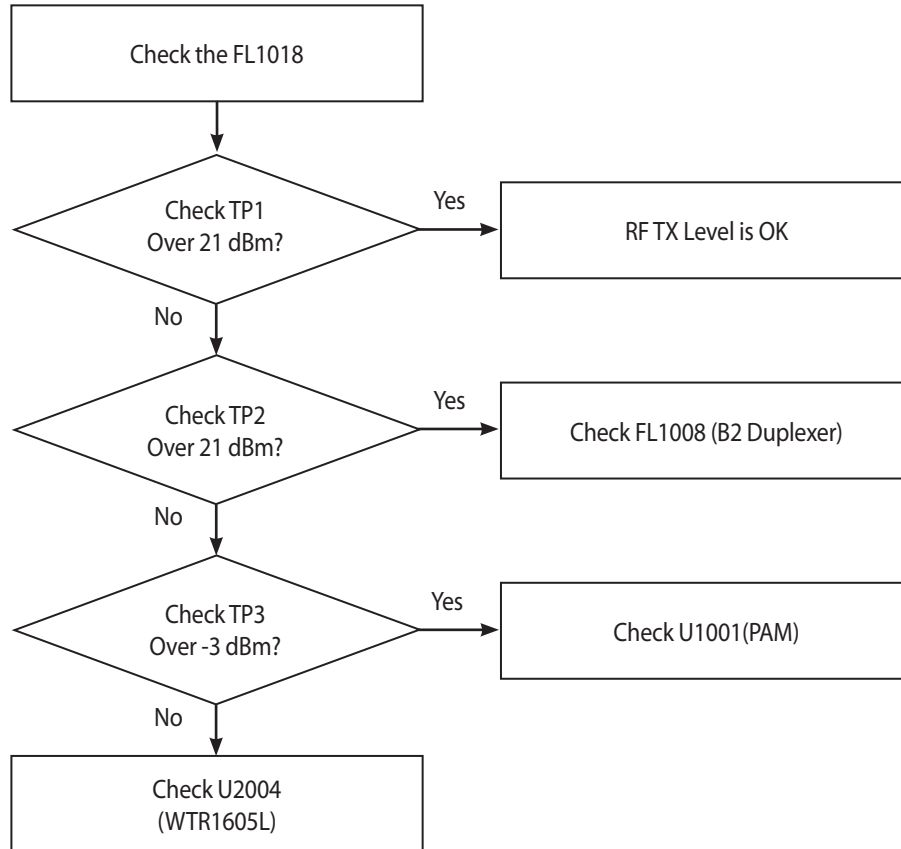
3.5.3.2 WCDMA B2



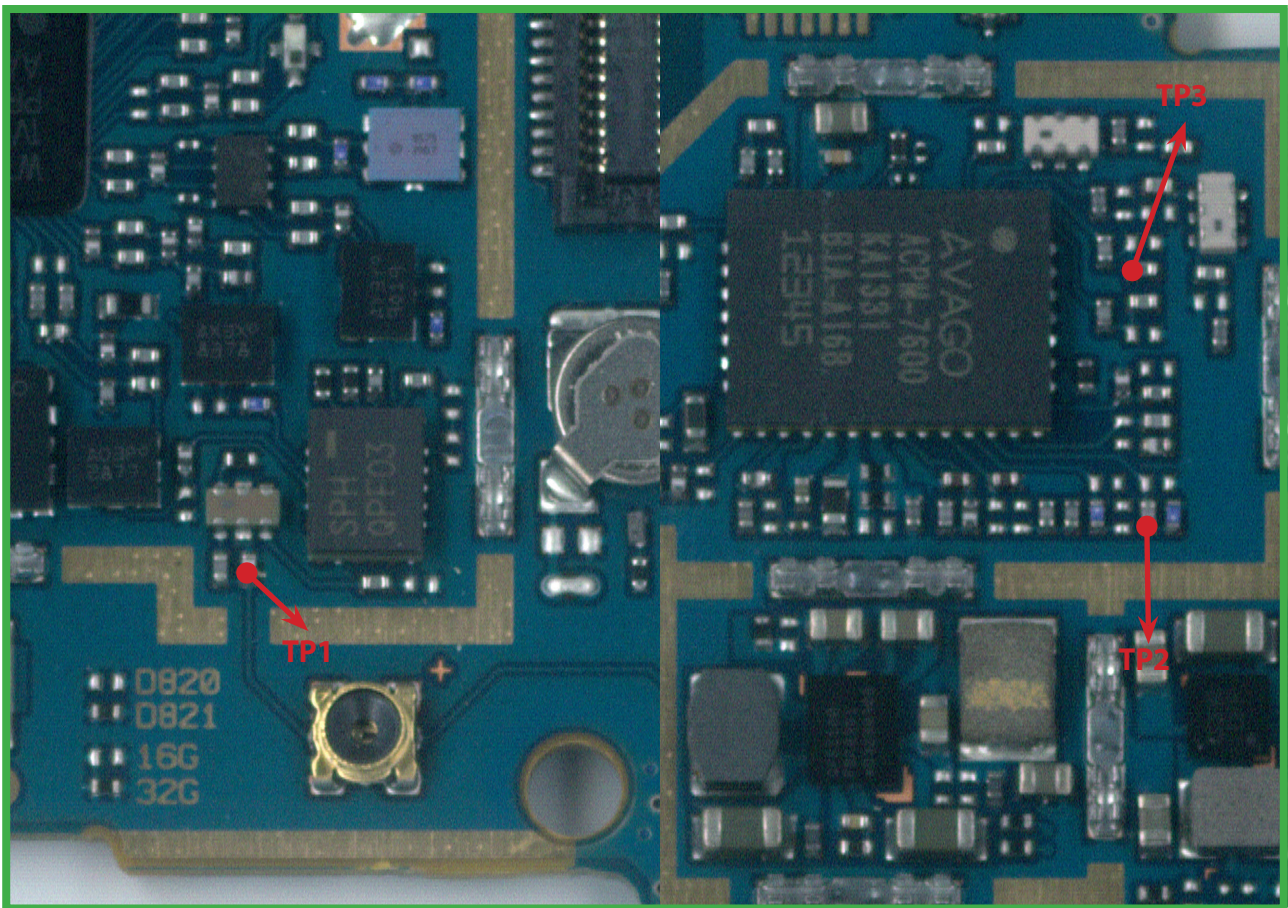
BOT

TOP

3. TROUBLE SHOOTING



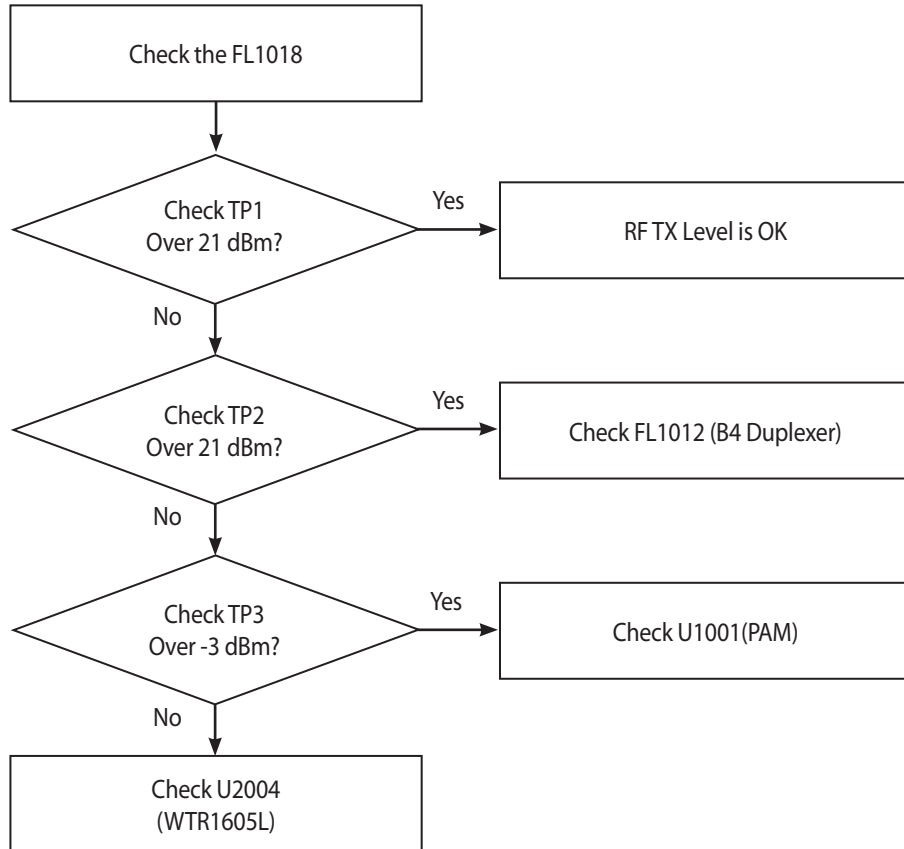
3.5.3.3 WCDMA B4



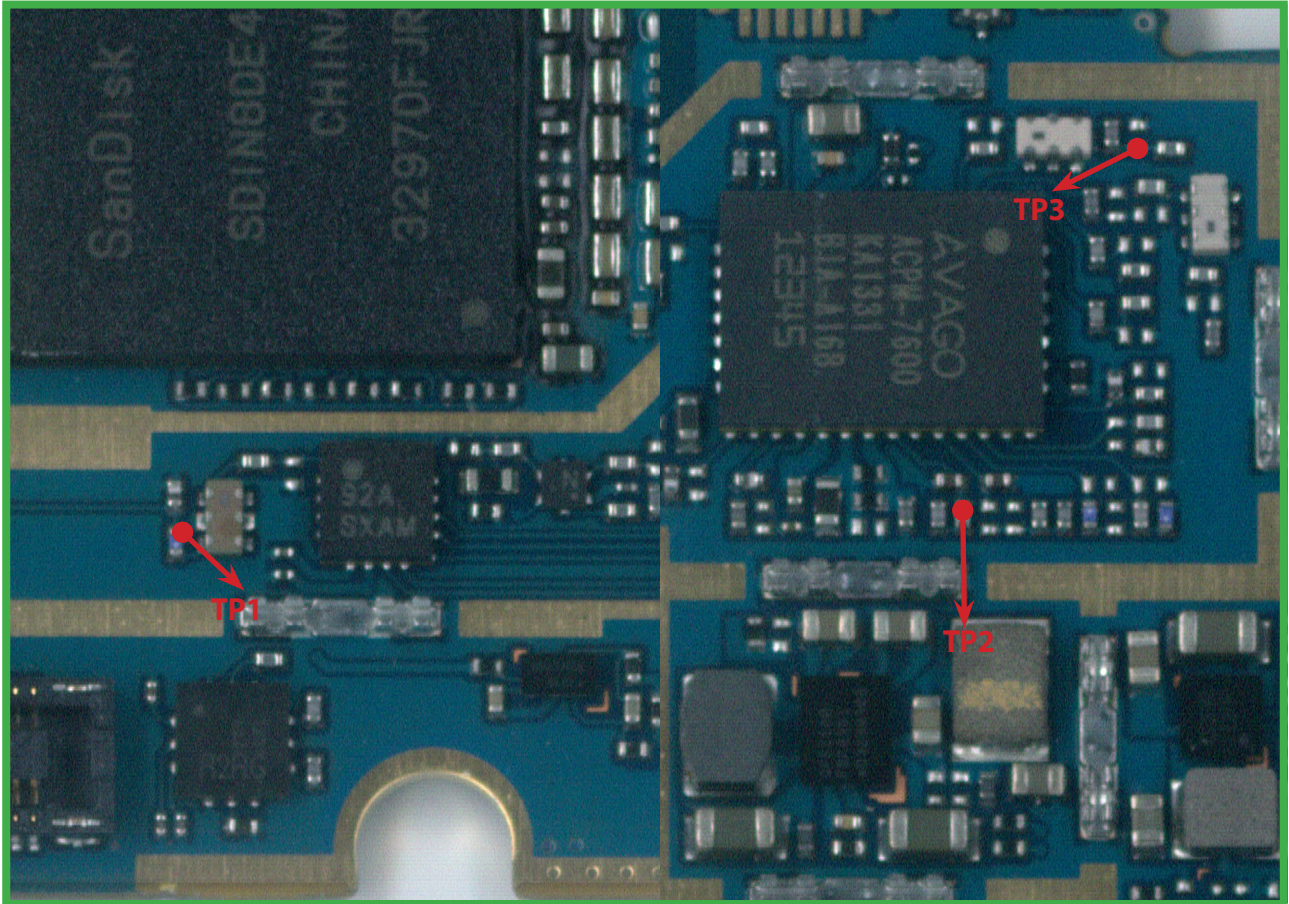
BOT

TOP

3. TROUBLE SHOOTING



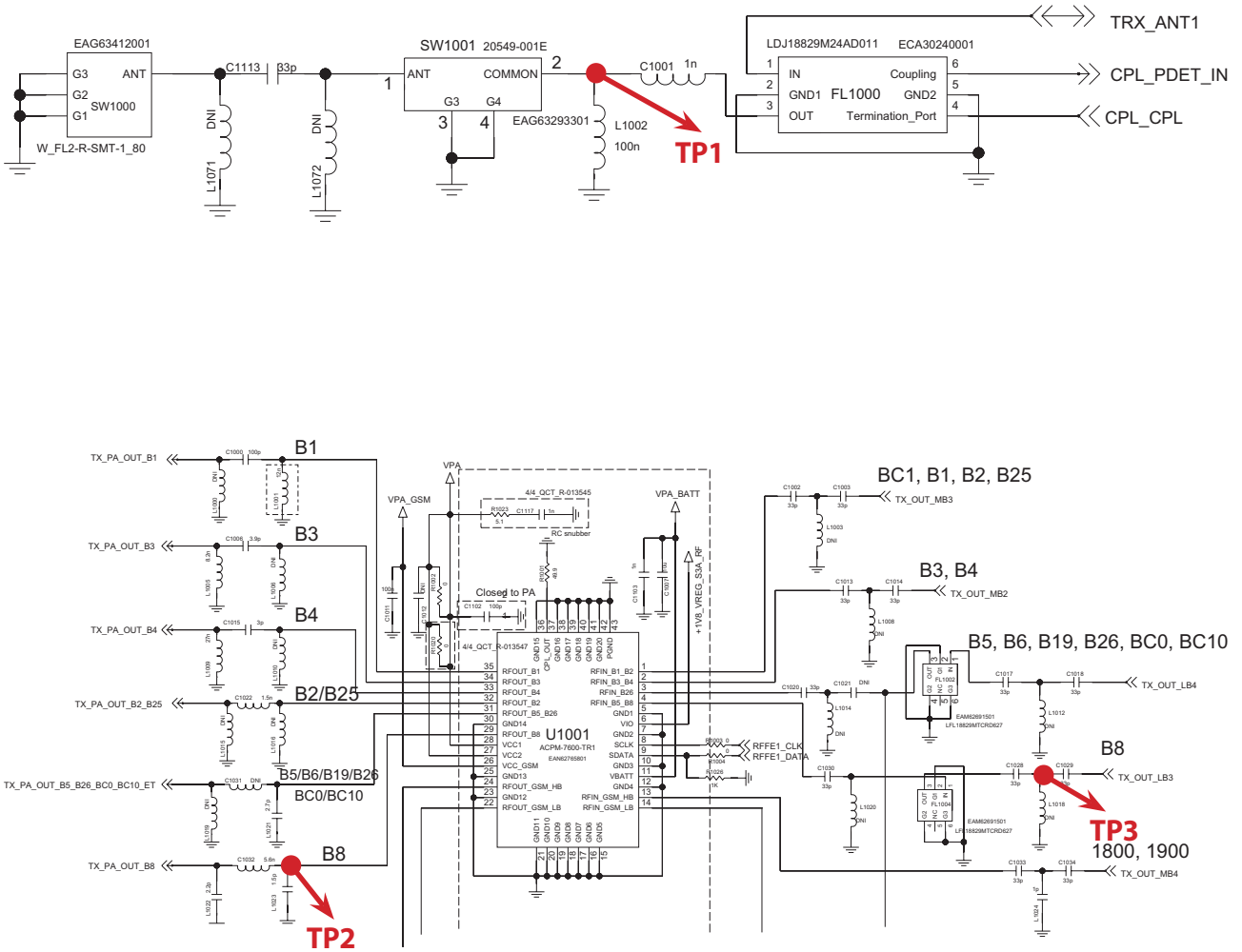
3.5.3.4 WCDMA B8



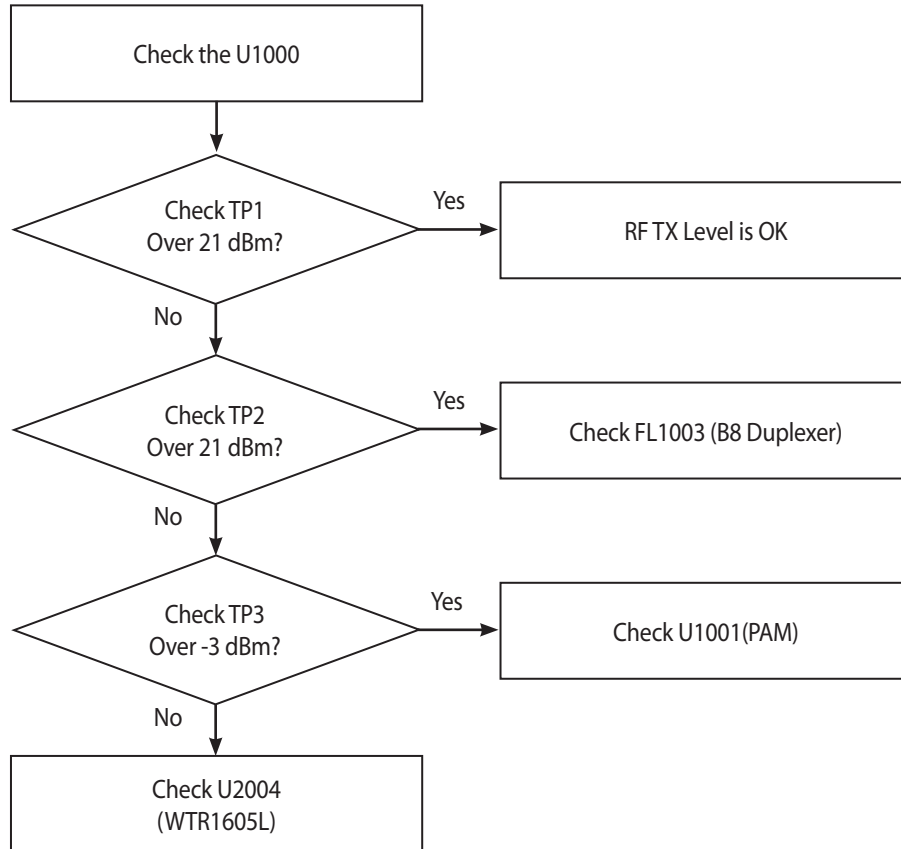
BOT

TOP

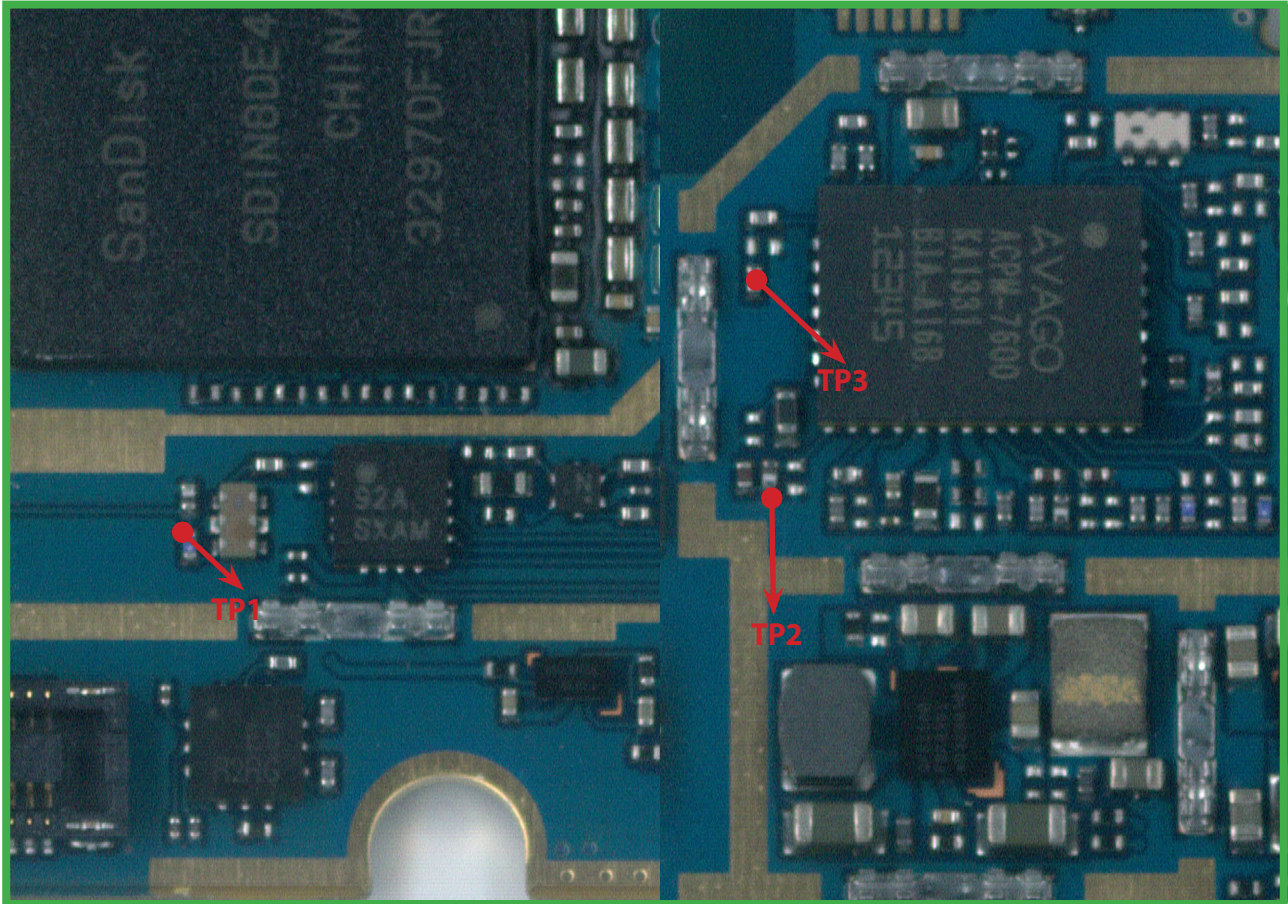
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING



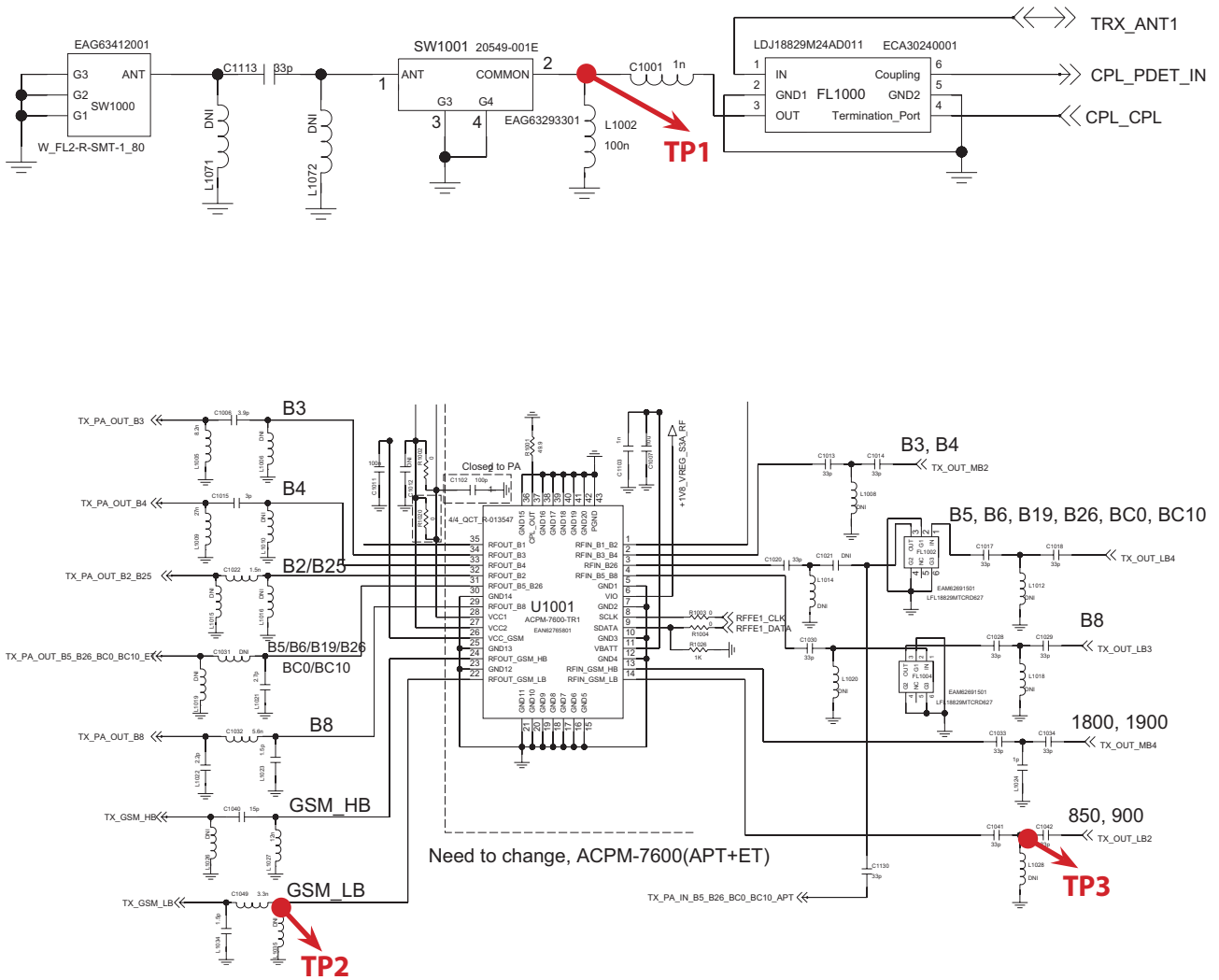
3.5.3.5 GSM Low Band(GSM850, 900)



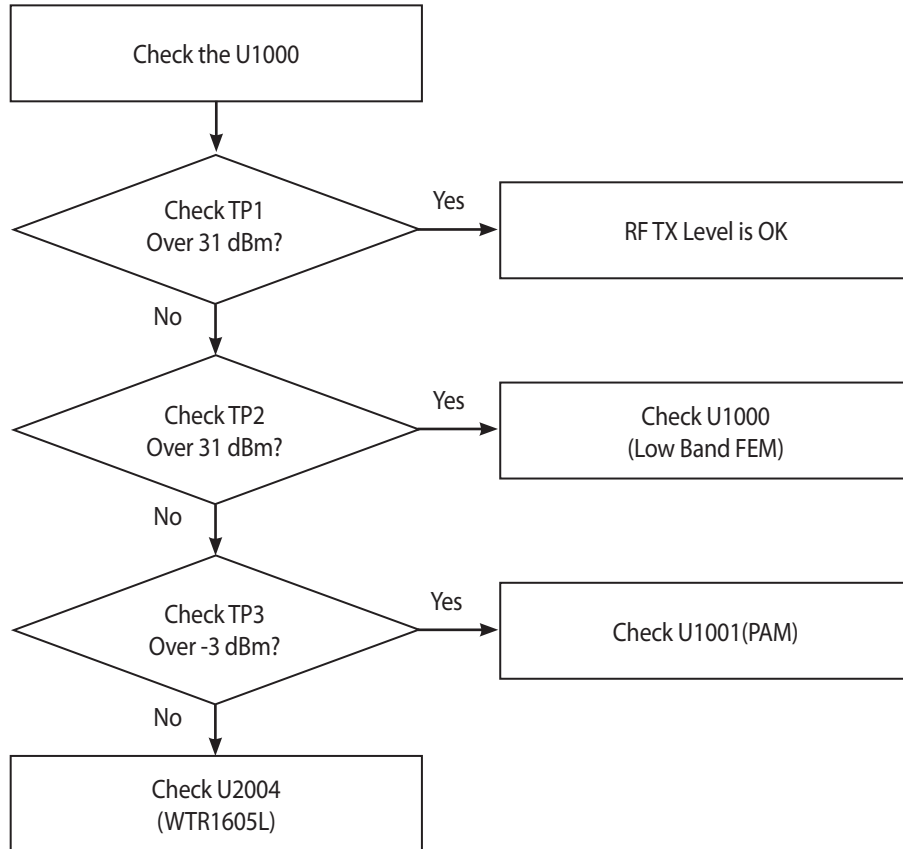
BOT

TOP

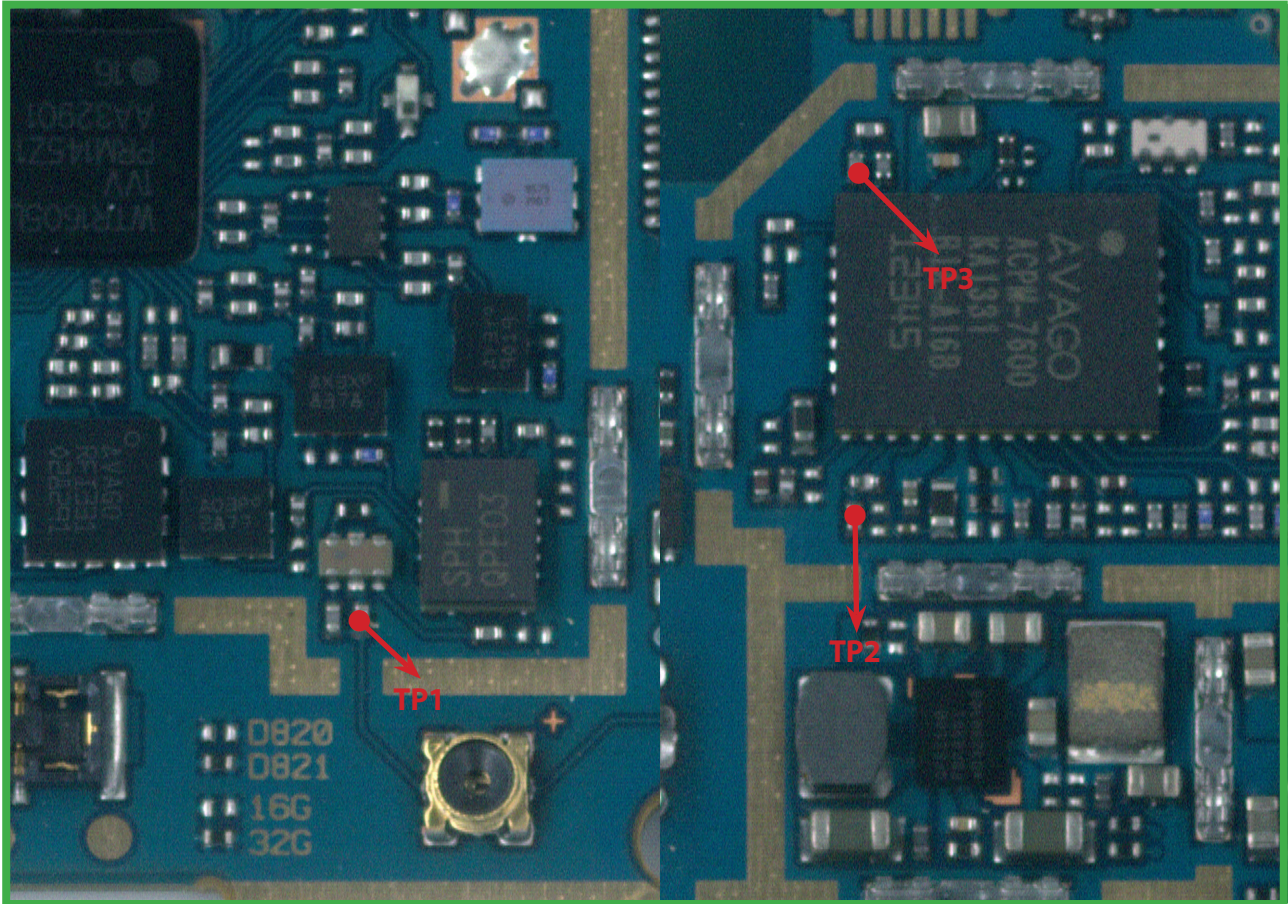
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING



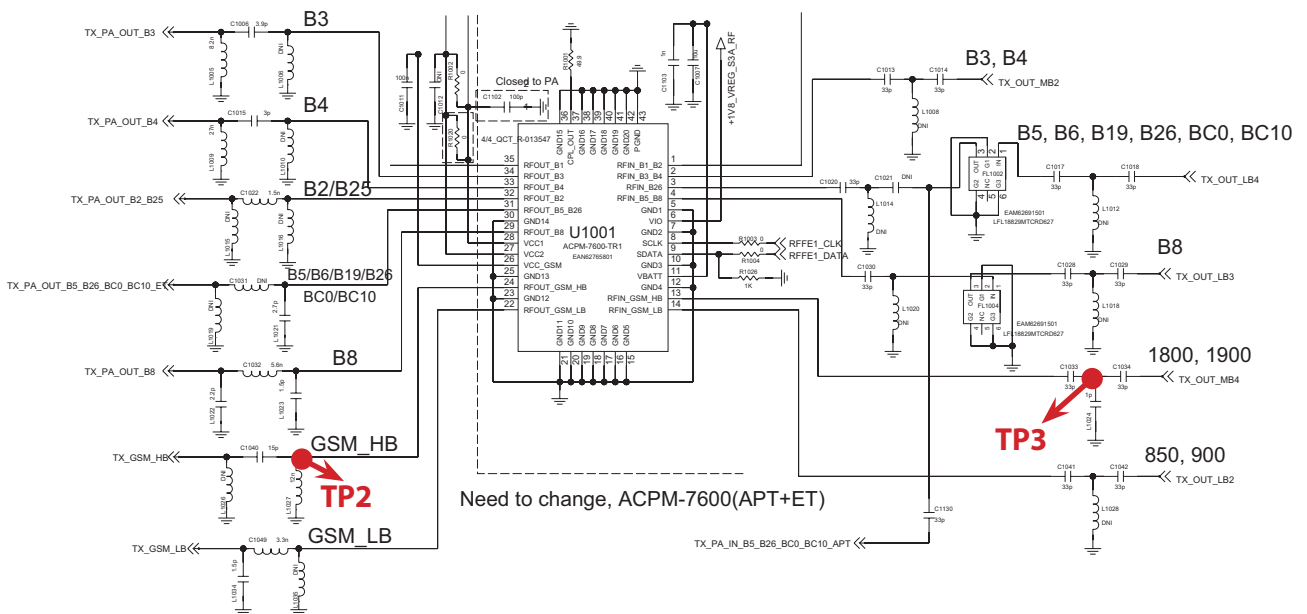
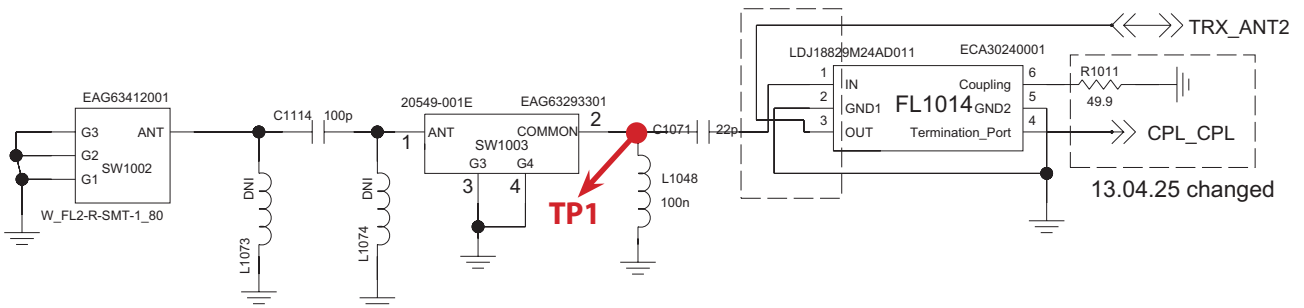
3.5.3.6 GSM High Band(GSM1800, 1900)



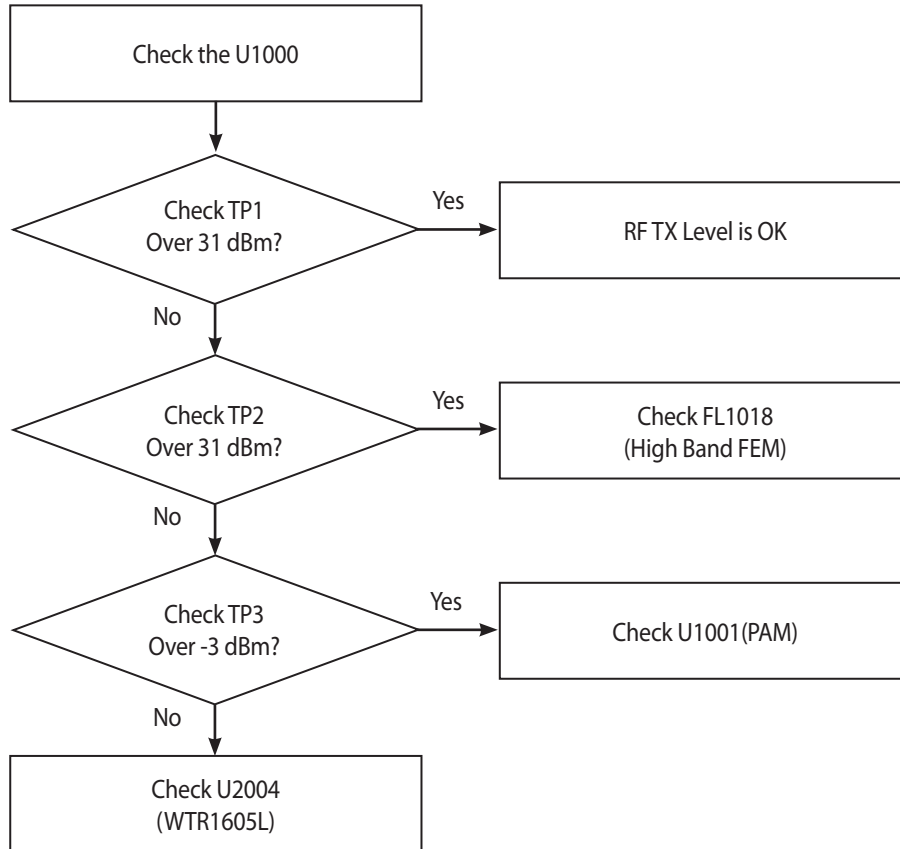
BOT

TOP

3. TROUBLE SHOOTING

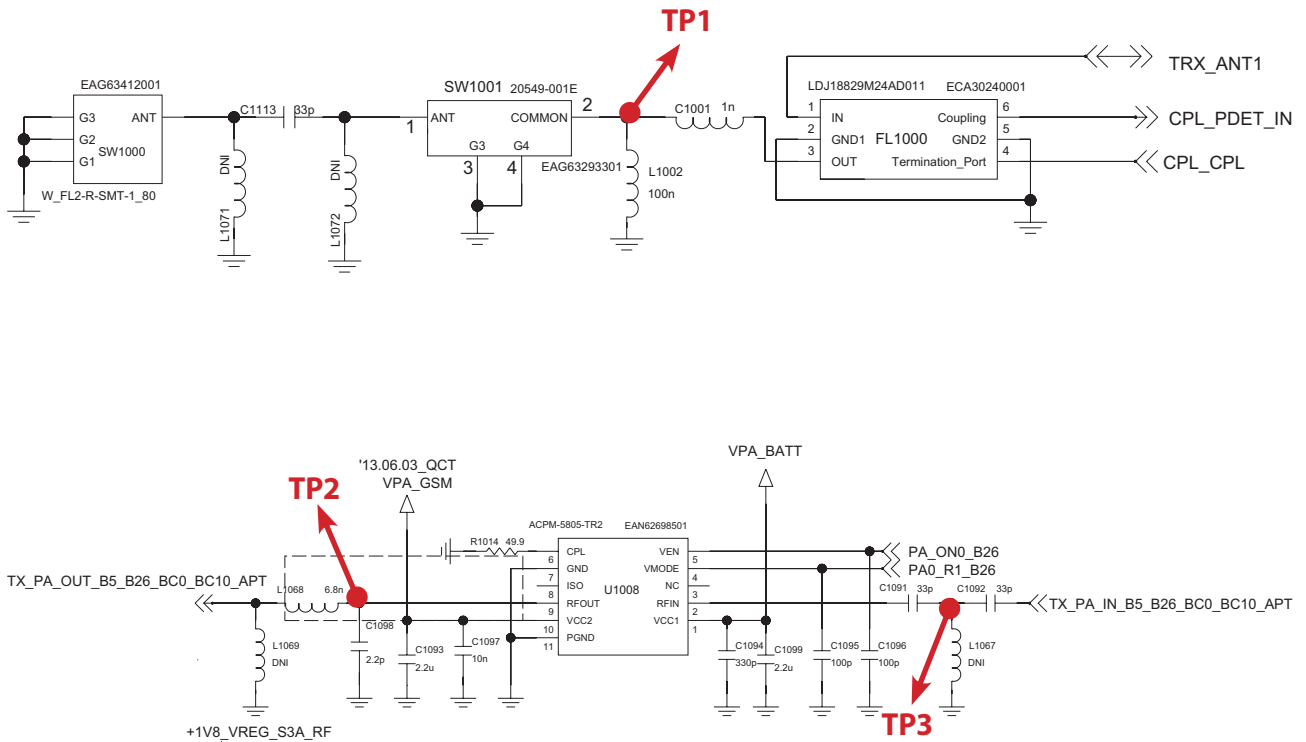


3. TROUBLE SHOOTING

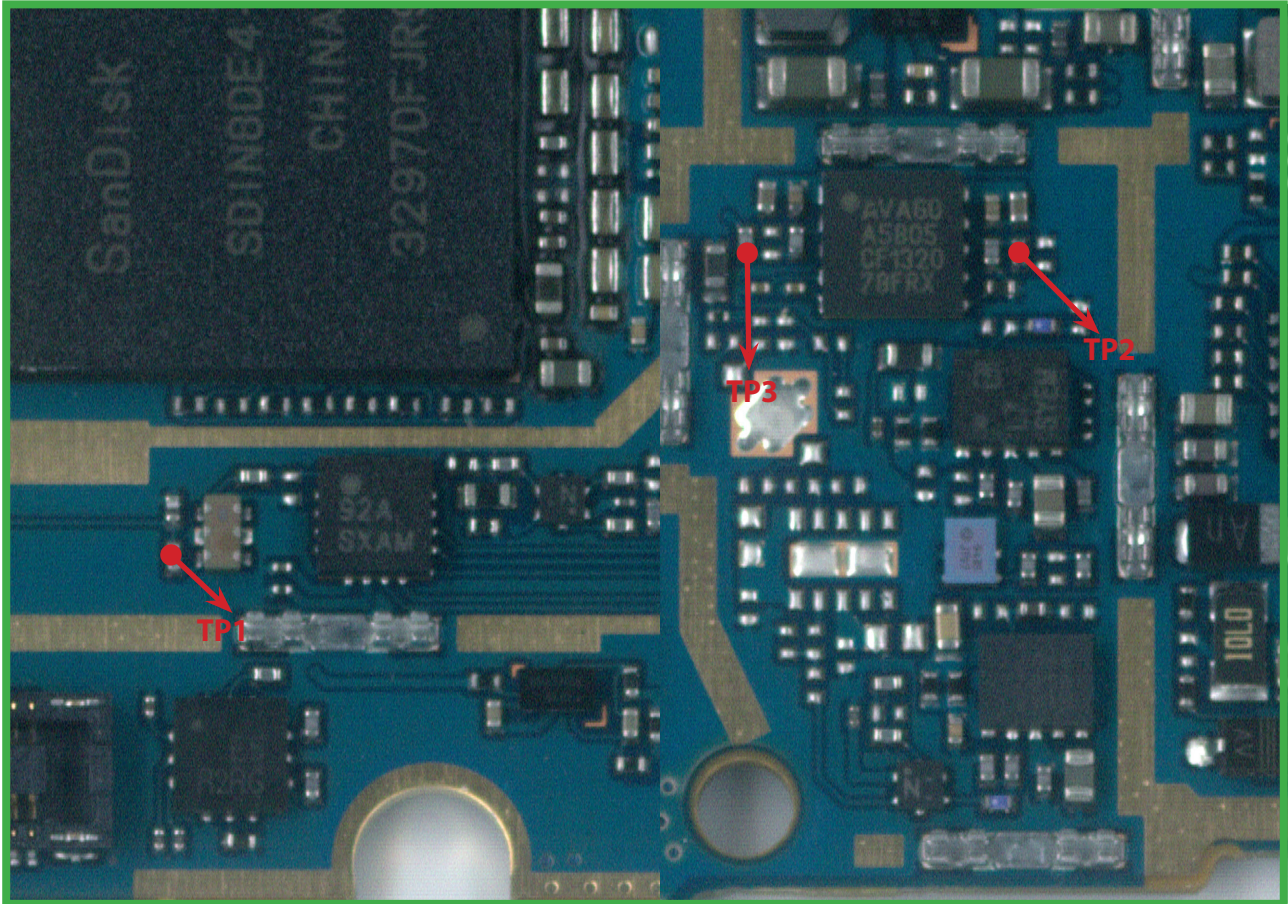


3.5.3.7 WCDMA LTE B5

<ACPM-5805 PAM>



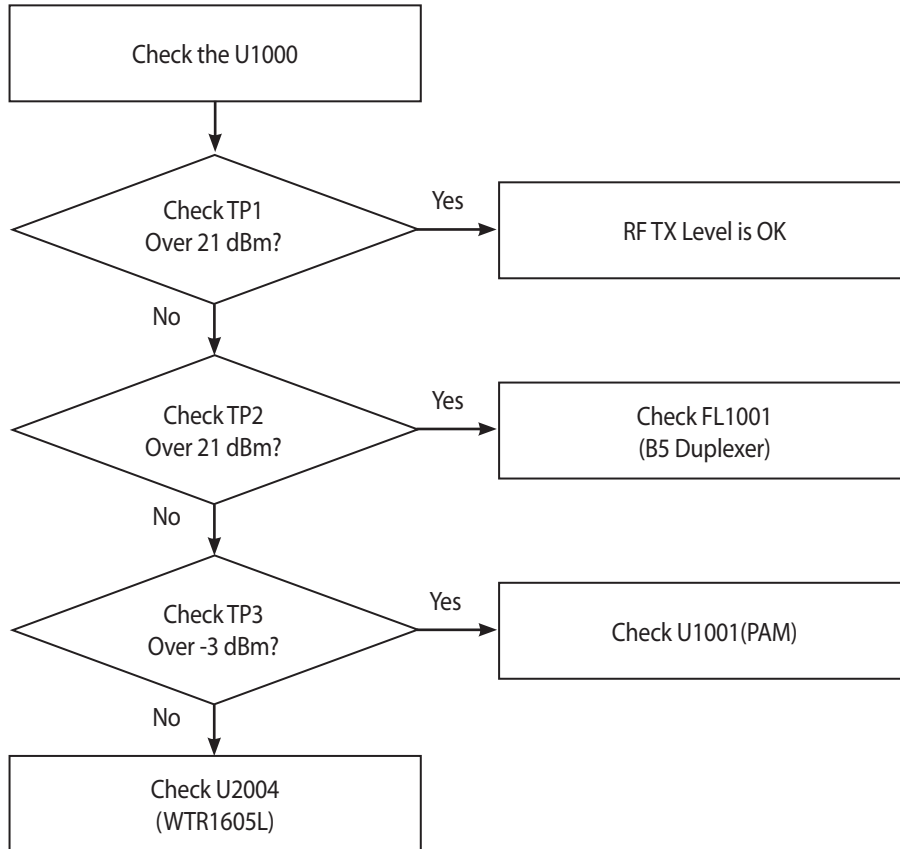
3. TROUBLE SHOOTING



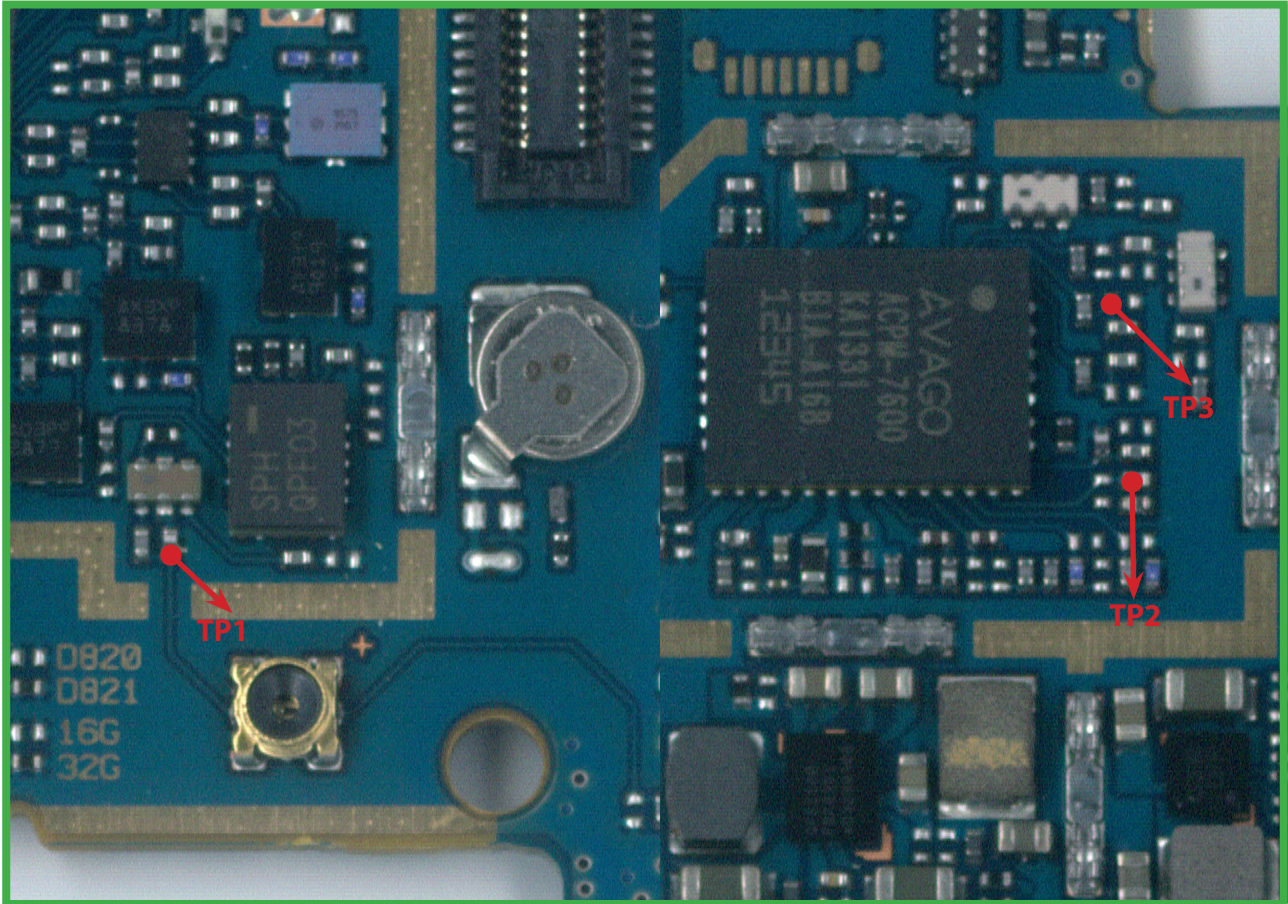
BOT

TOP

3. TROUBLE SHOOTING



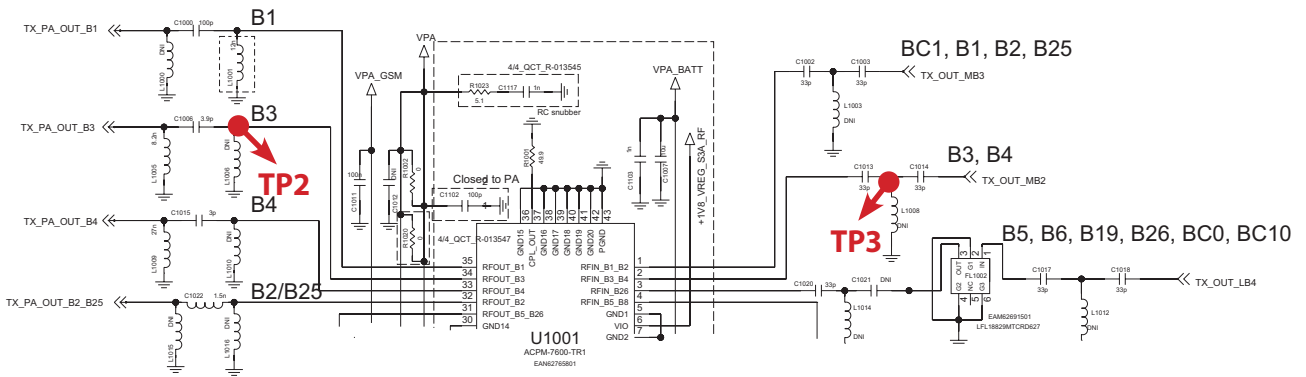
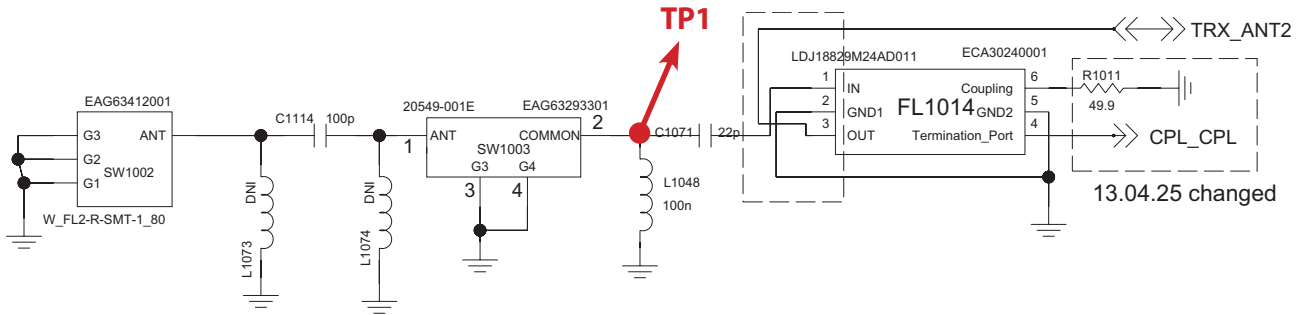
3.5.3.8 LTE B3



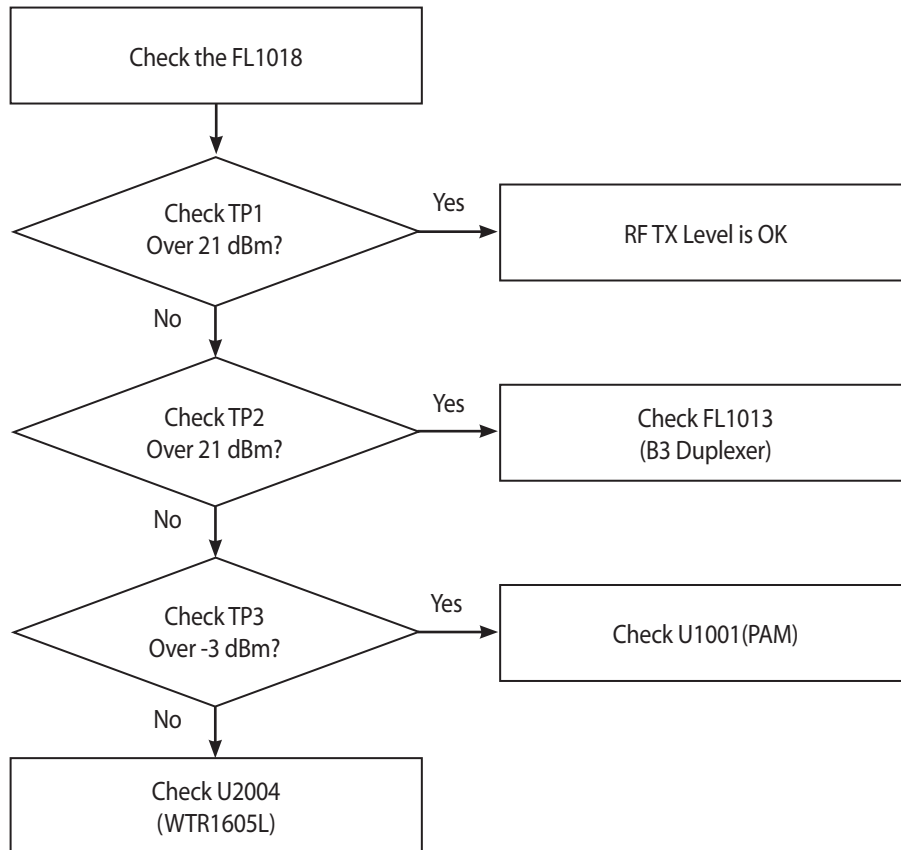
BOT

TOP

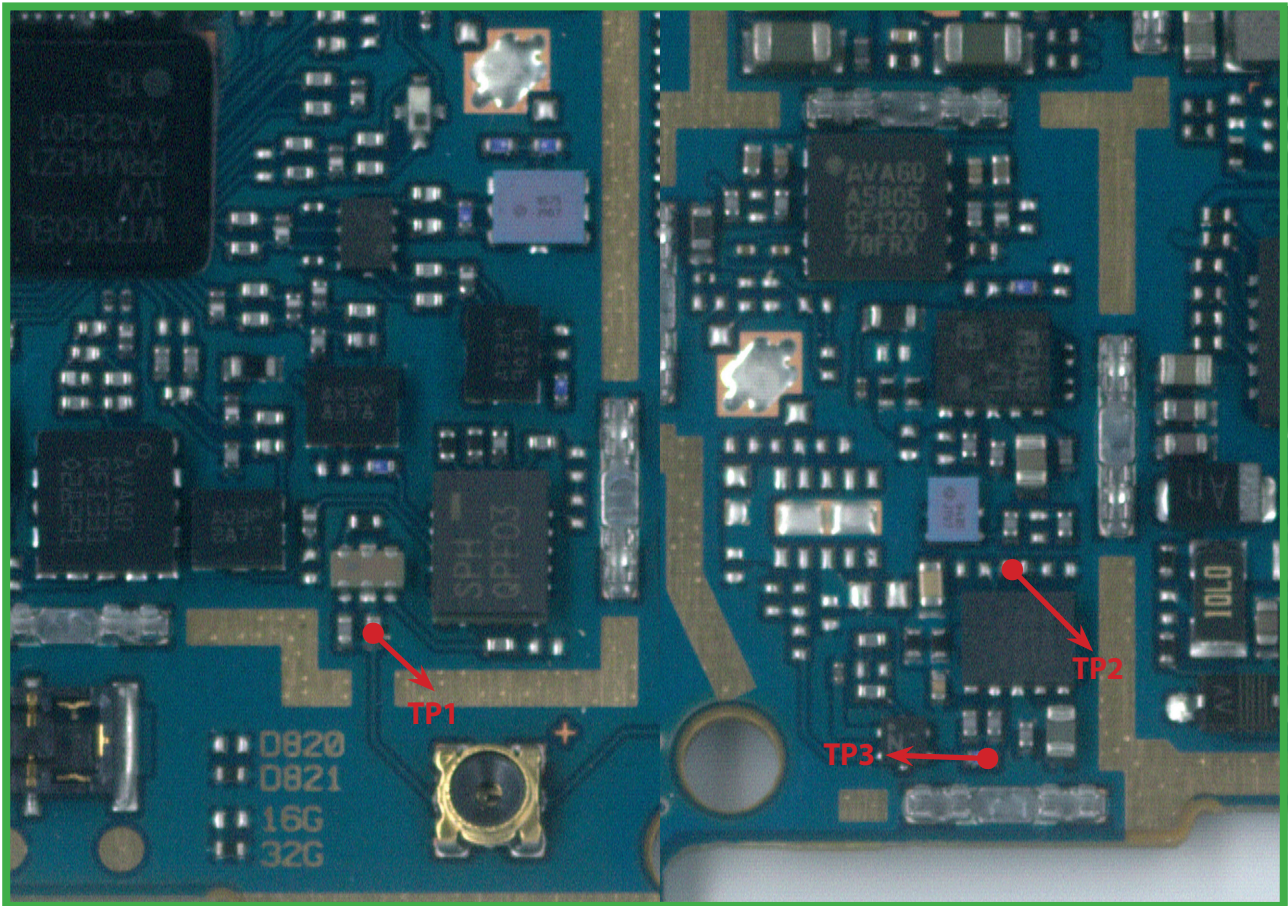
3. TROUBLE SHOOTING



First, Check the conducted Max. Power using the RF Connector



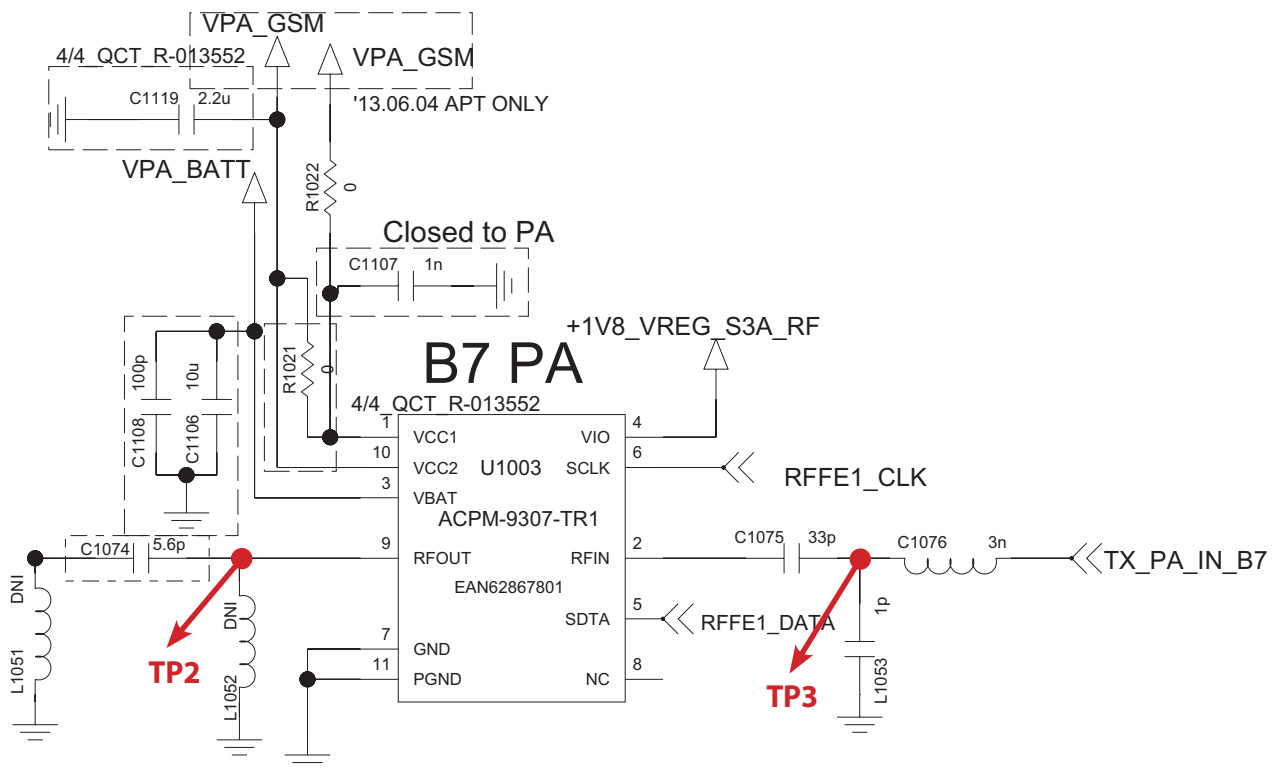
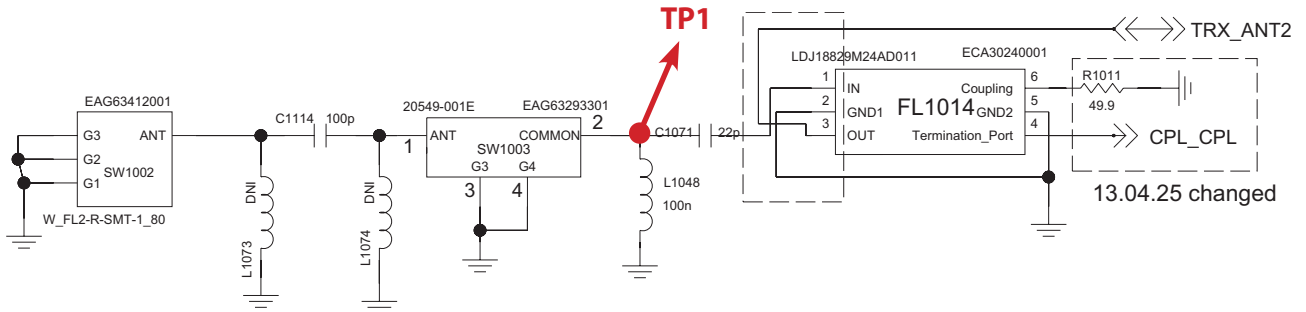
3.5.3.9 LTE B7



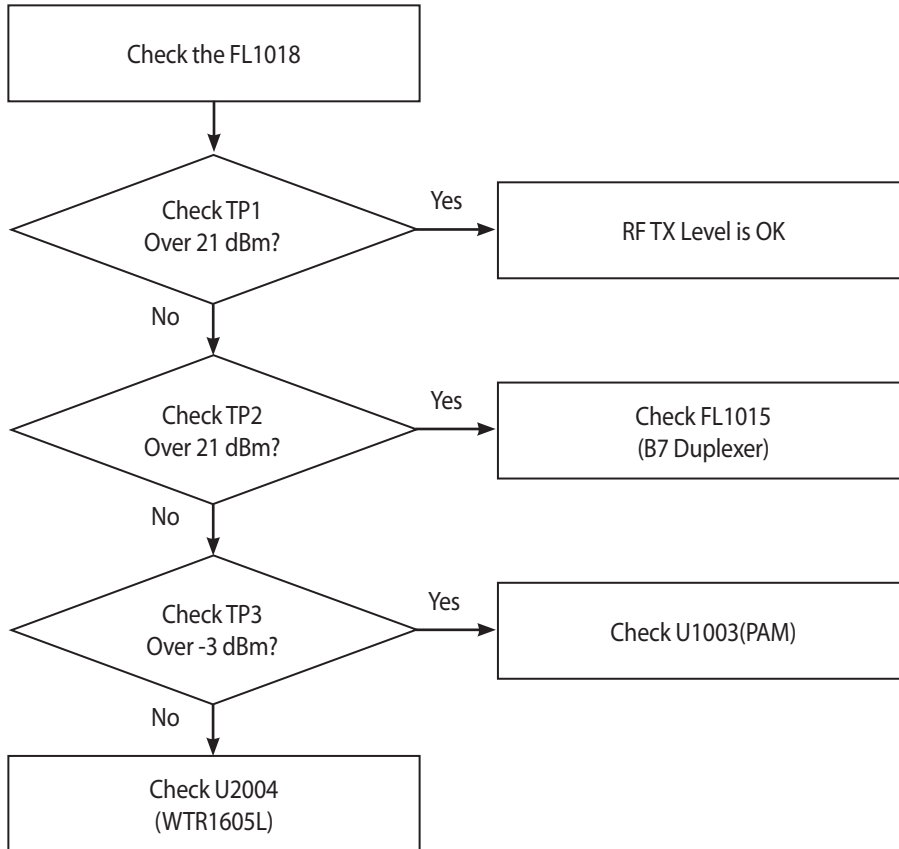
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TOP

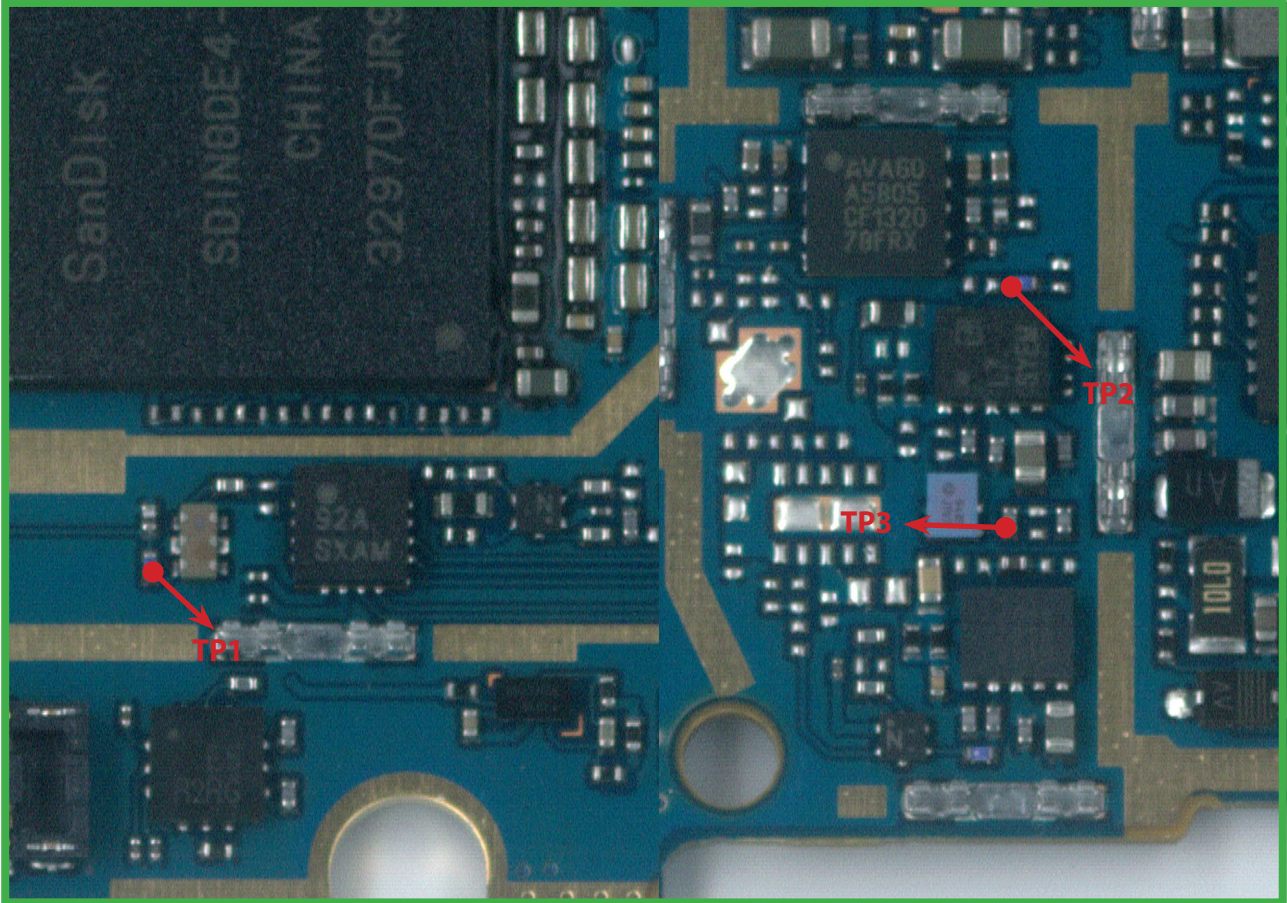
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING



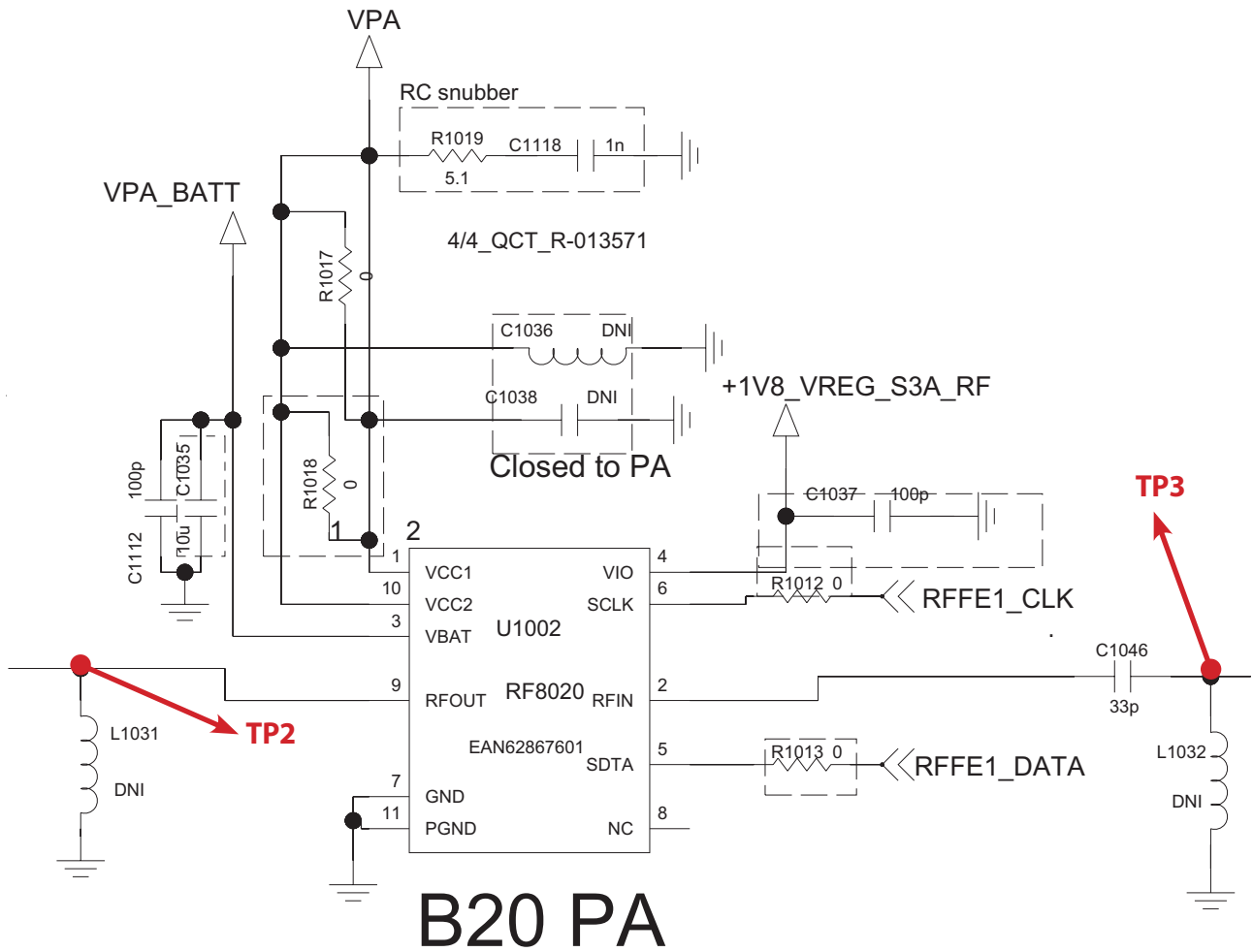
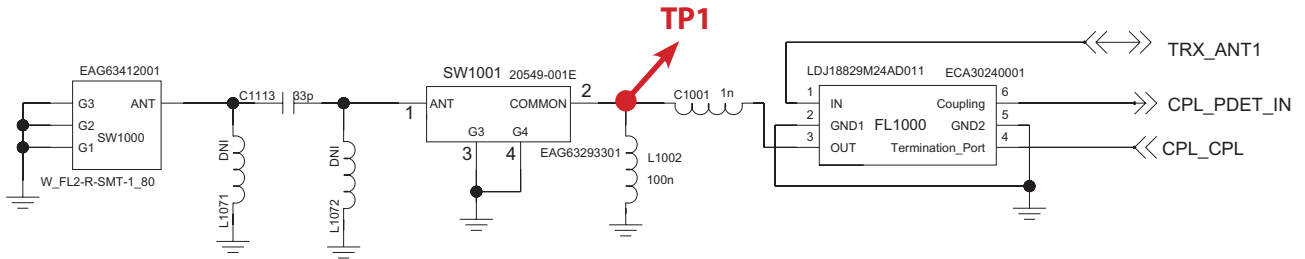
3.5.3.10 LTE B20



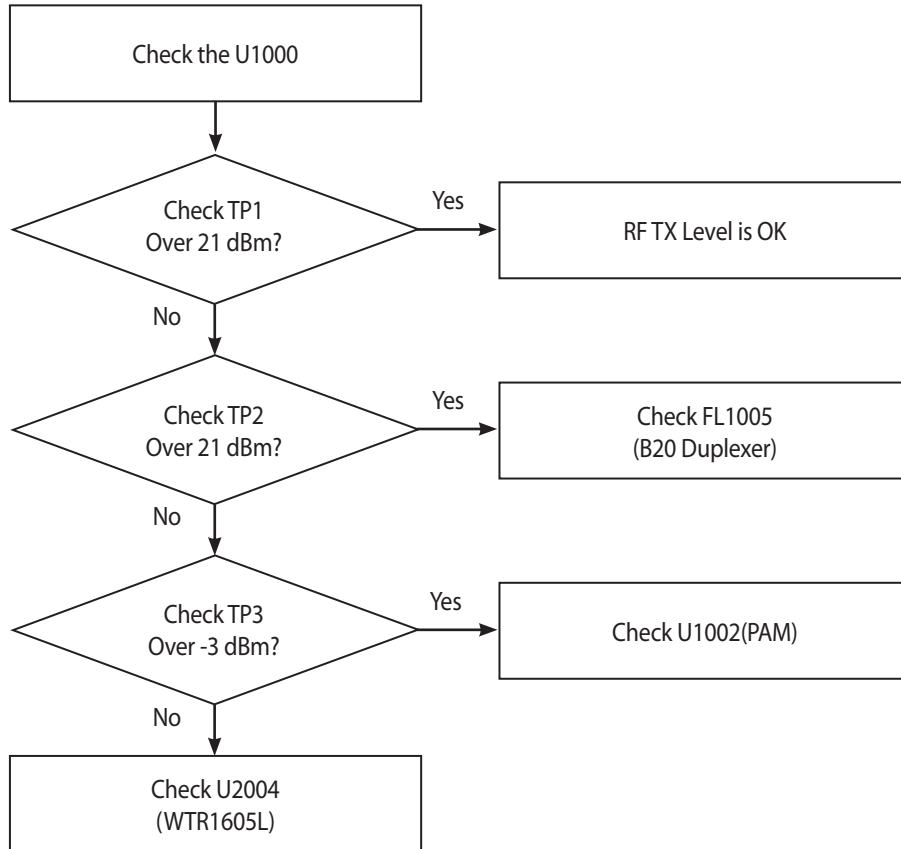
BOT

TOP

3. TROUBLE SHOOTING

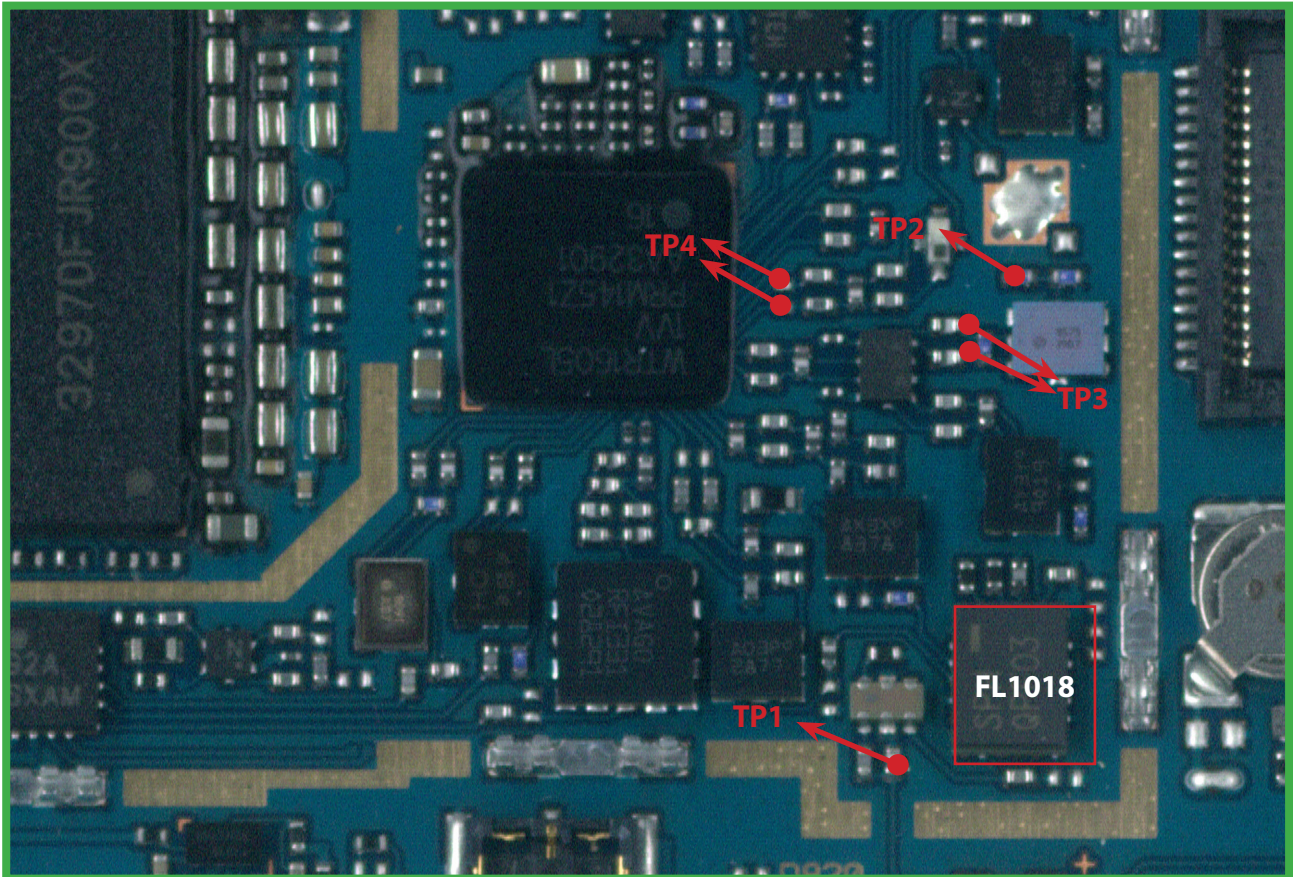


3. TROUBLE SHOOTING



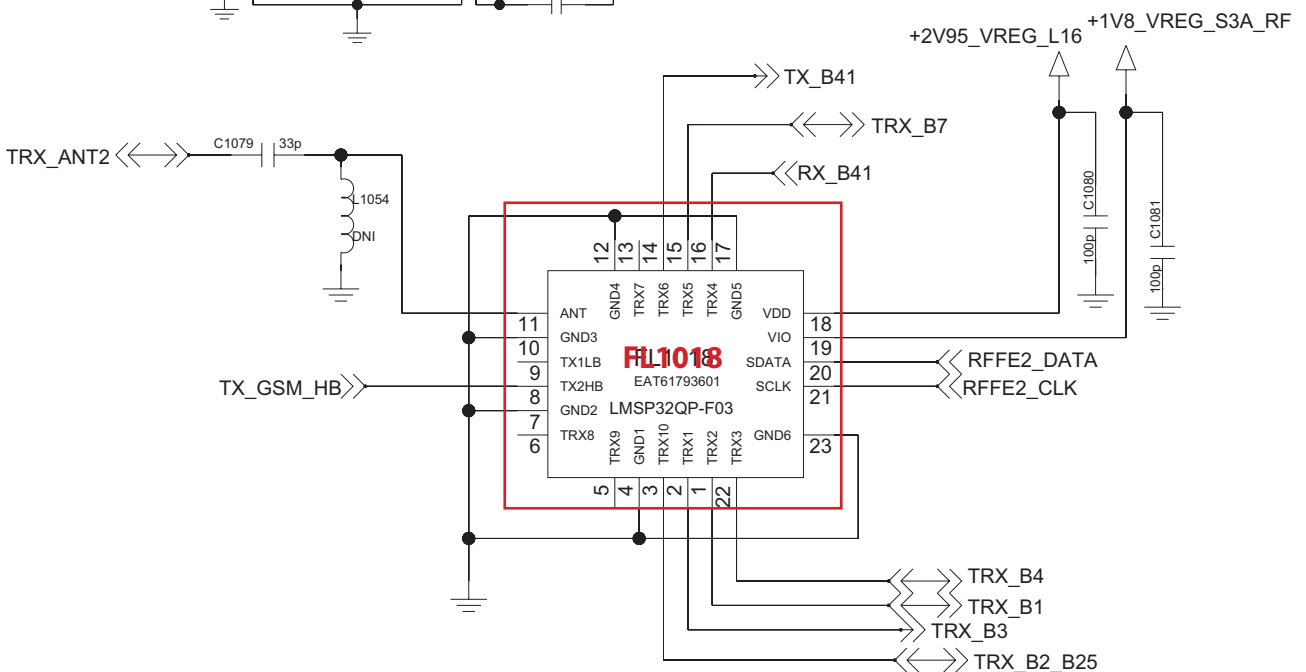
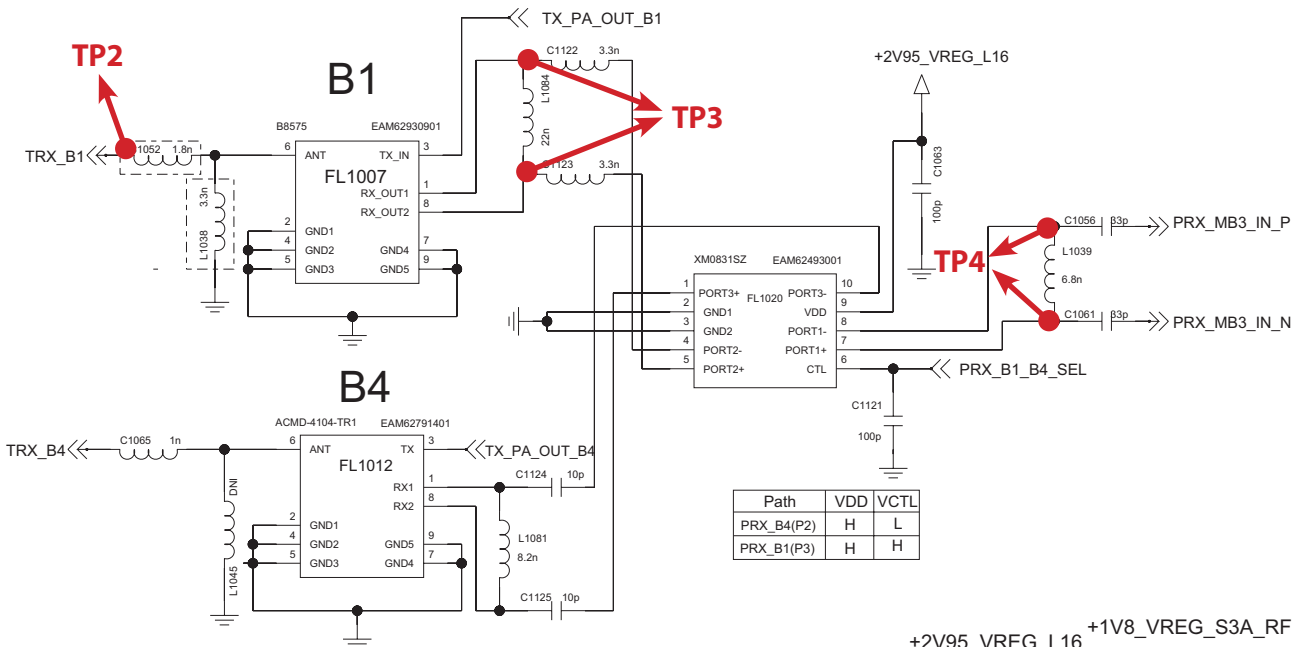
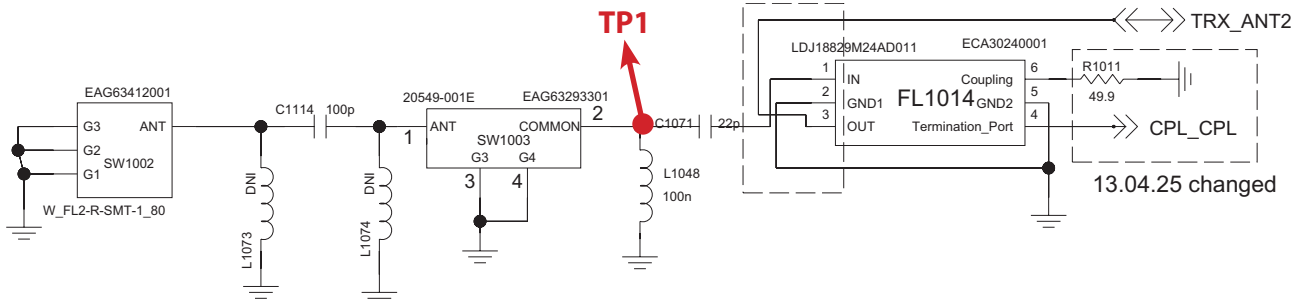
3.5.4 Checking RF Rx Level

3.5.4.1 WCDMA B1/ LTE B1

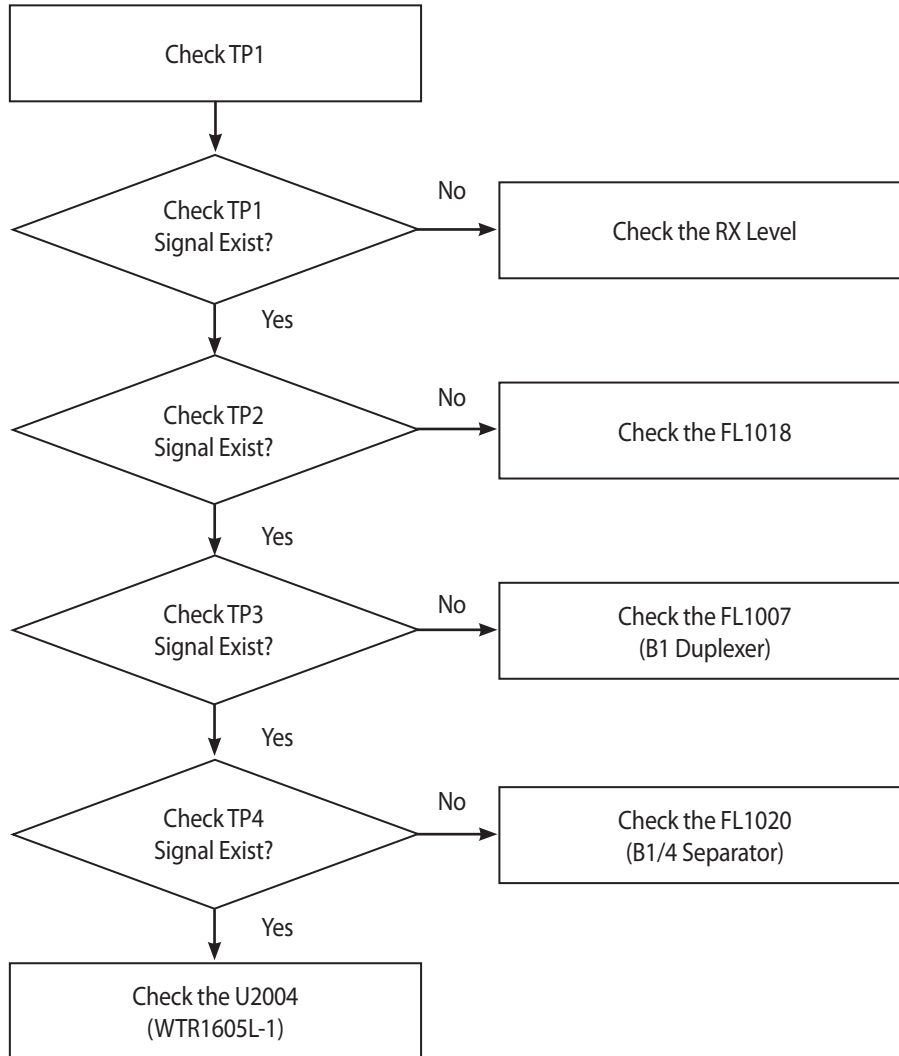


BOT

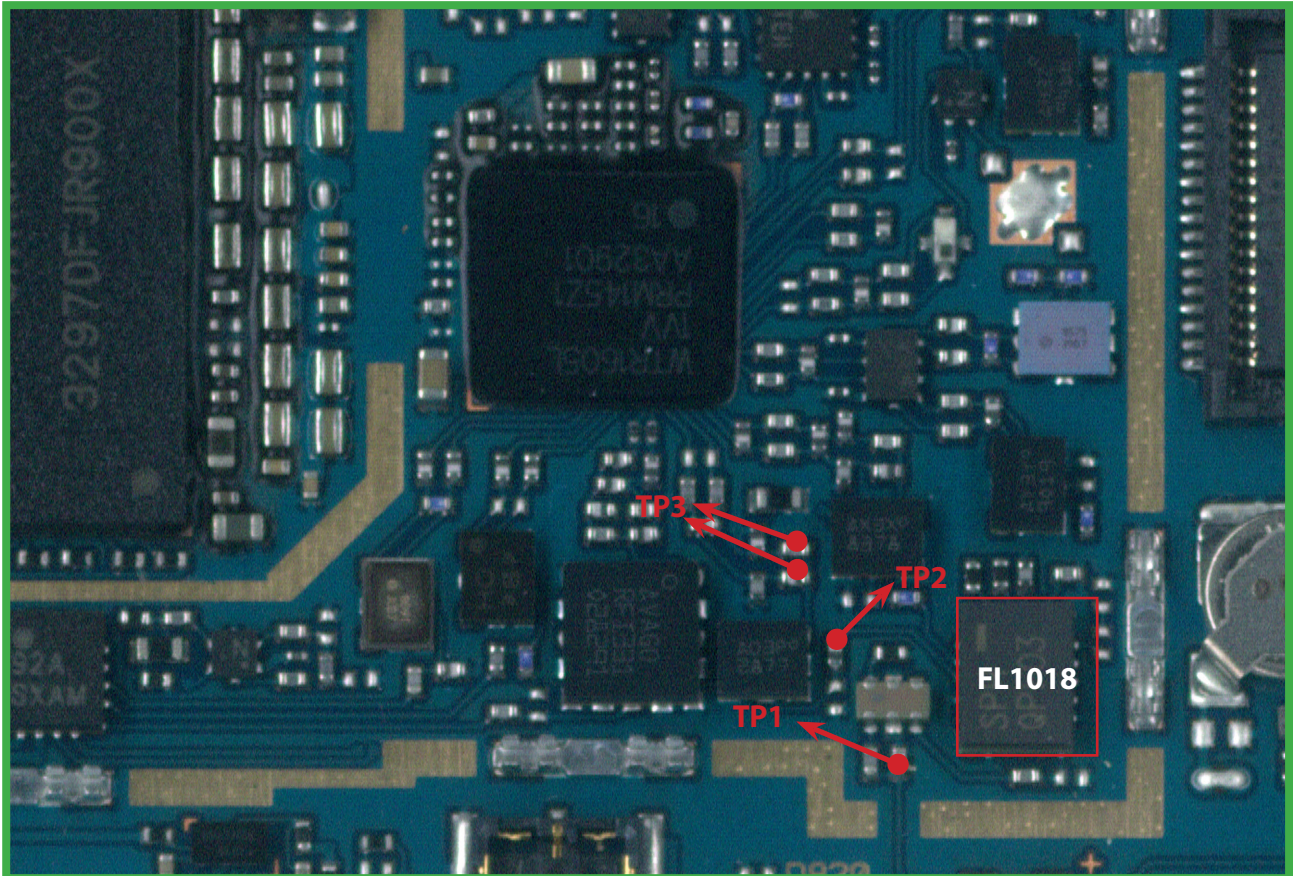
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

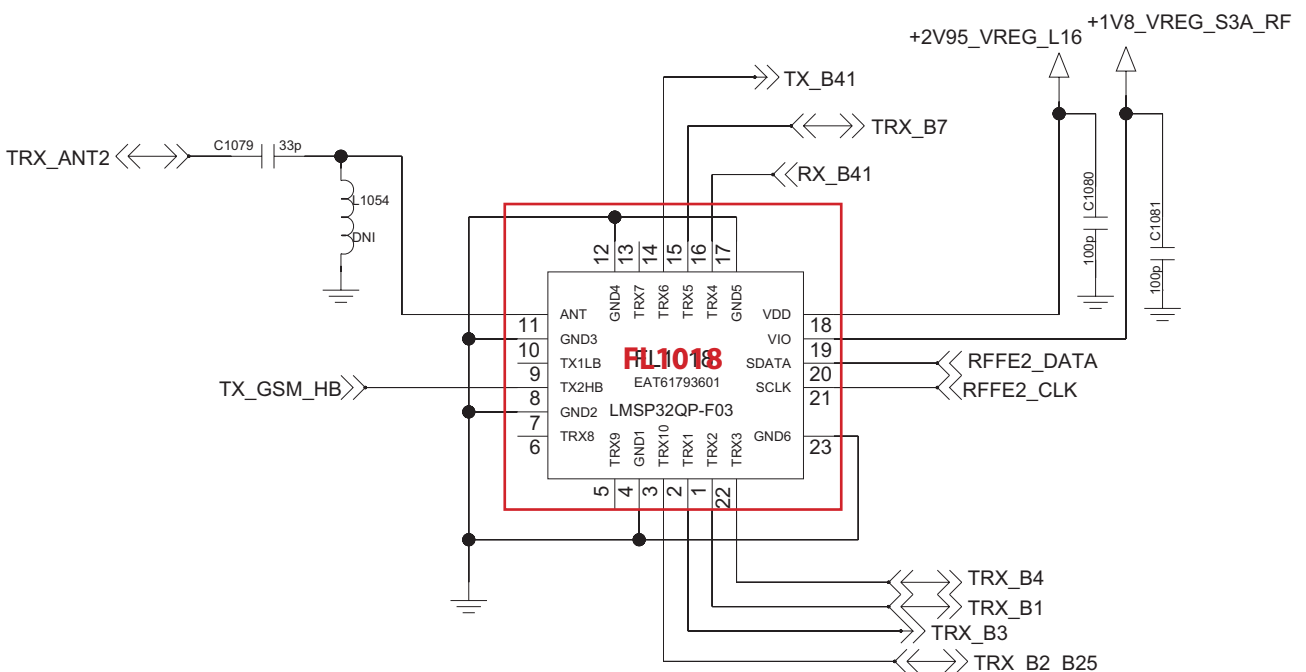
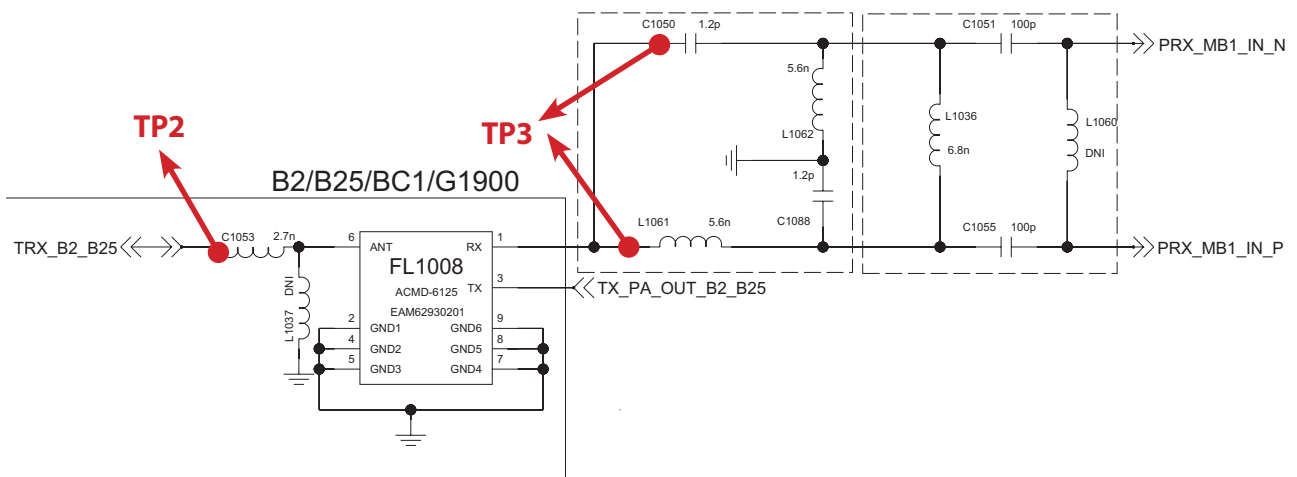
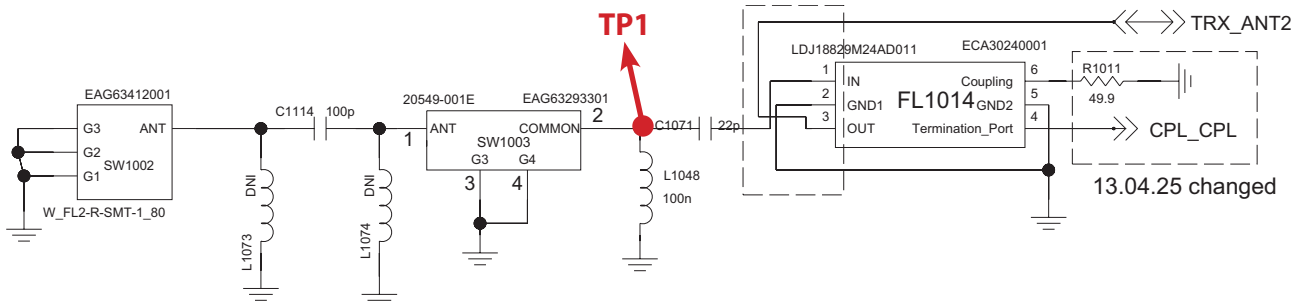


3.5.4.2 WCDMA B2/ PCS1900

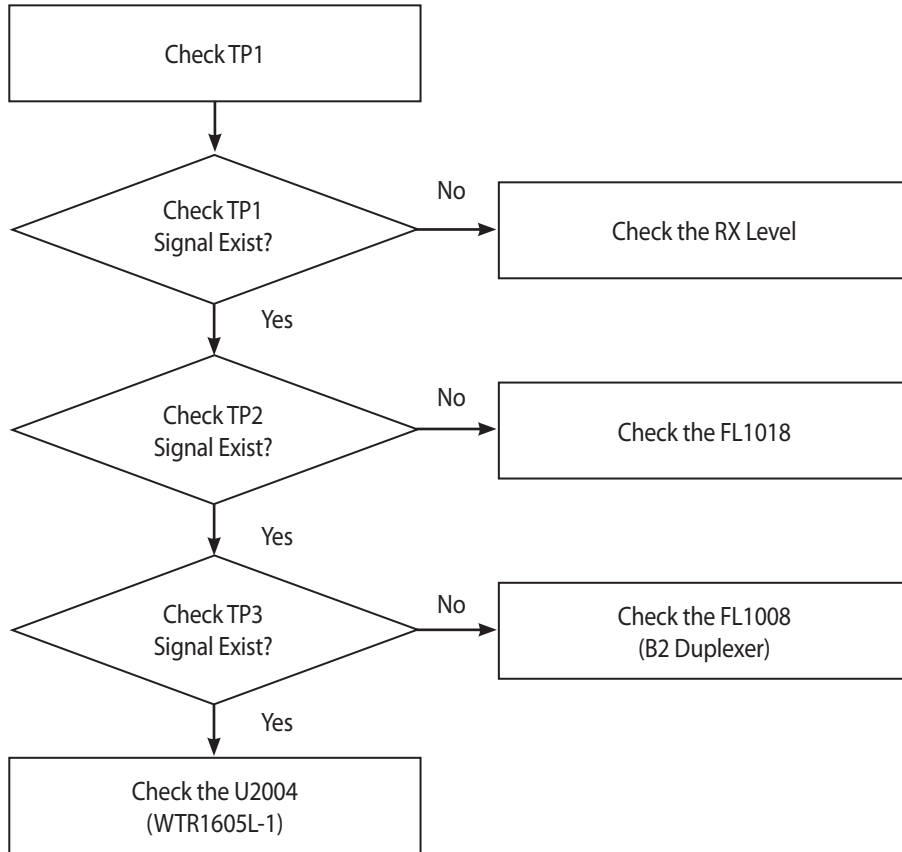


BOT

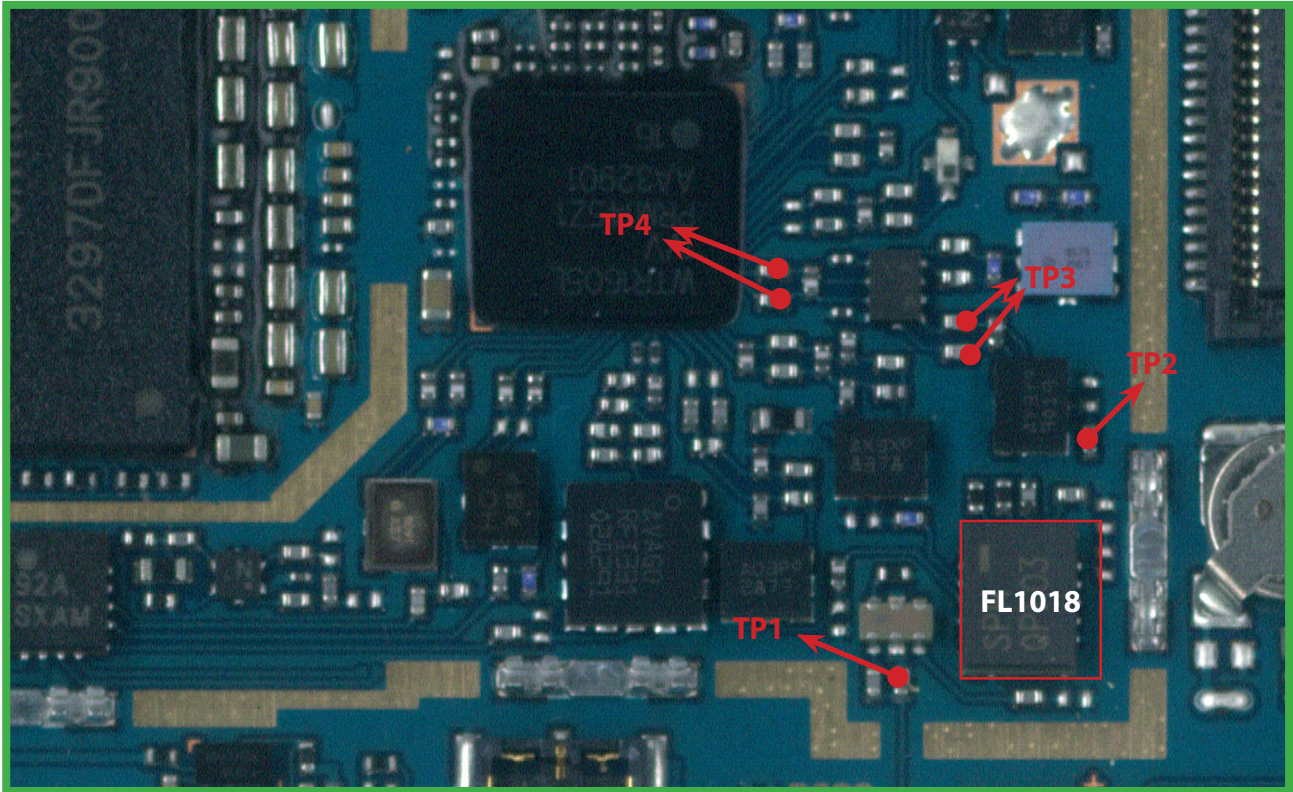
3. TROUBLE SHOOTING



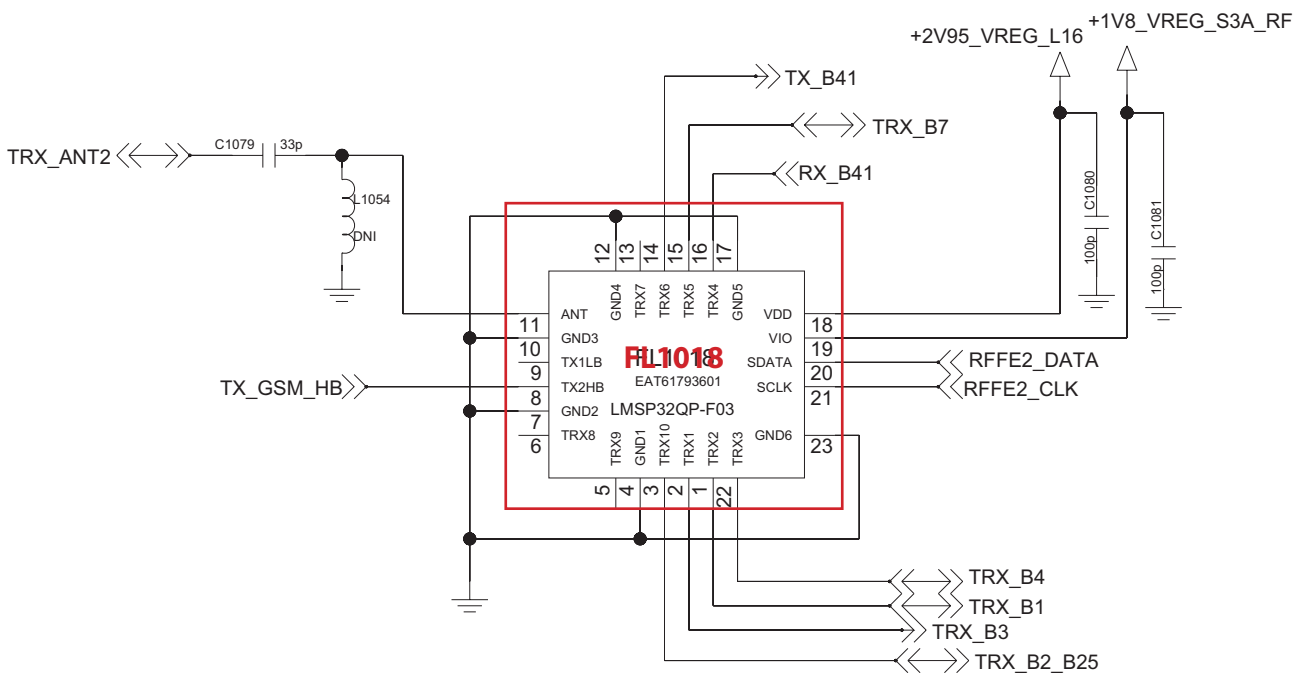
3. TROUBLE SHOOTING



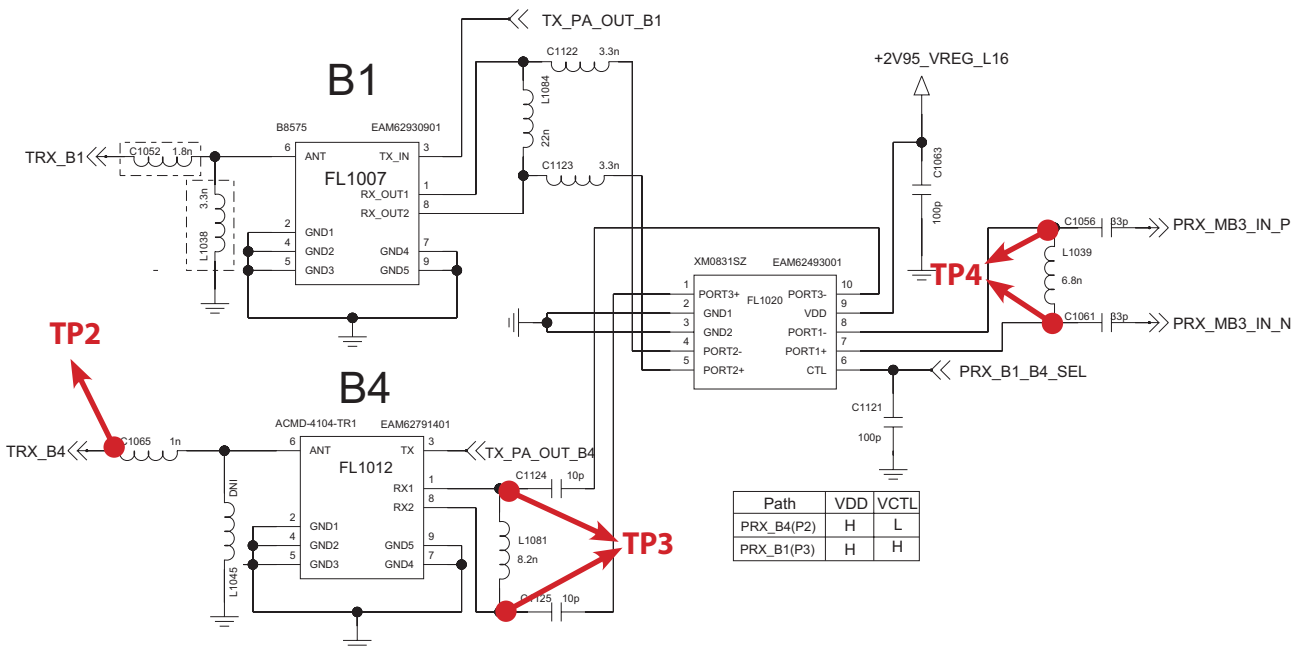
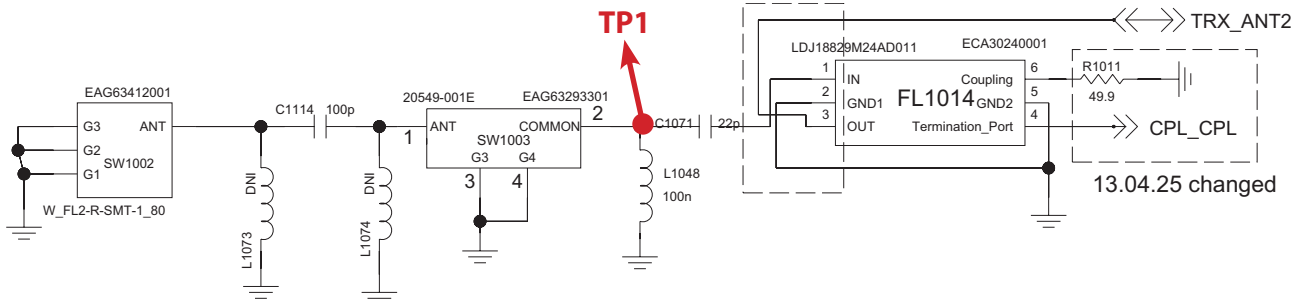
3.5.4.3 WCDMA B4



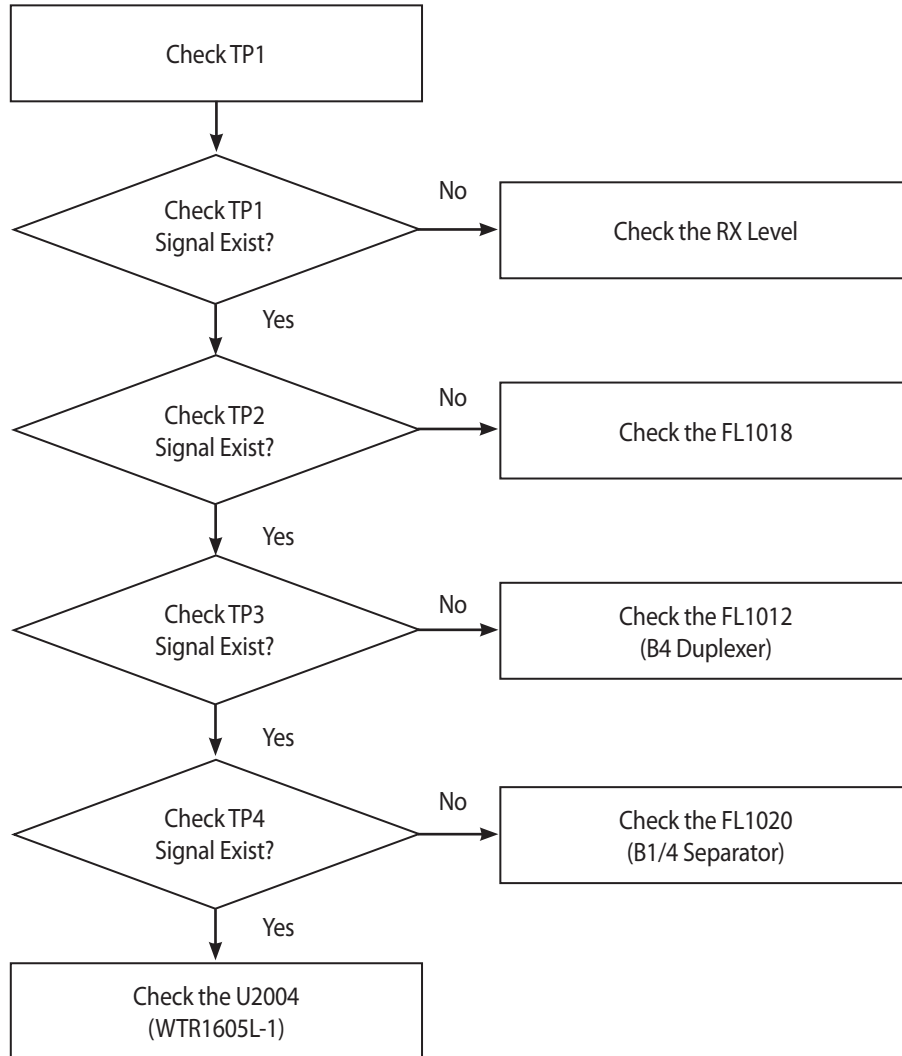
BOT



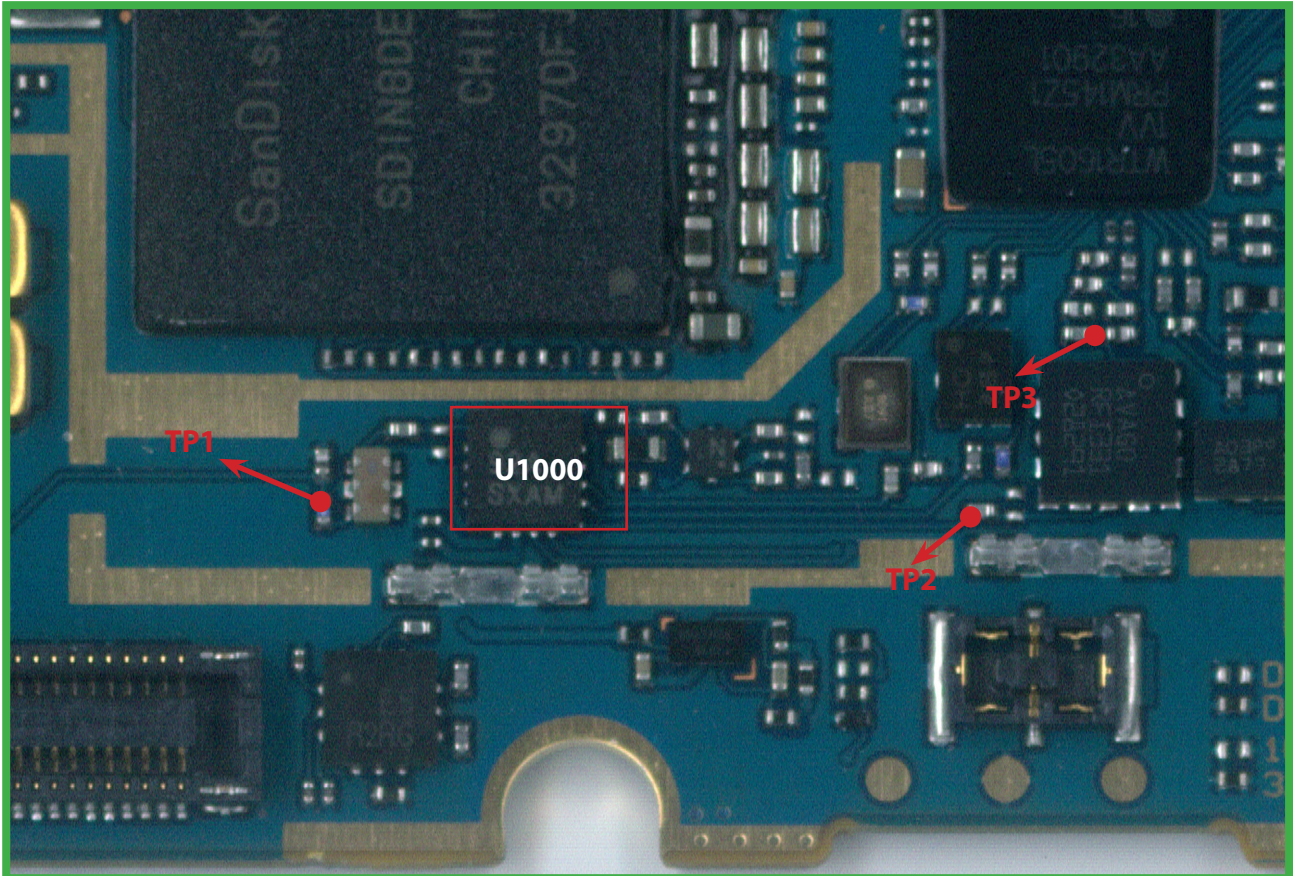
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

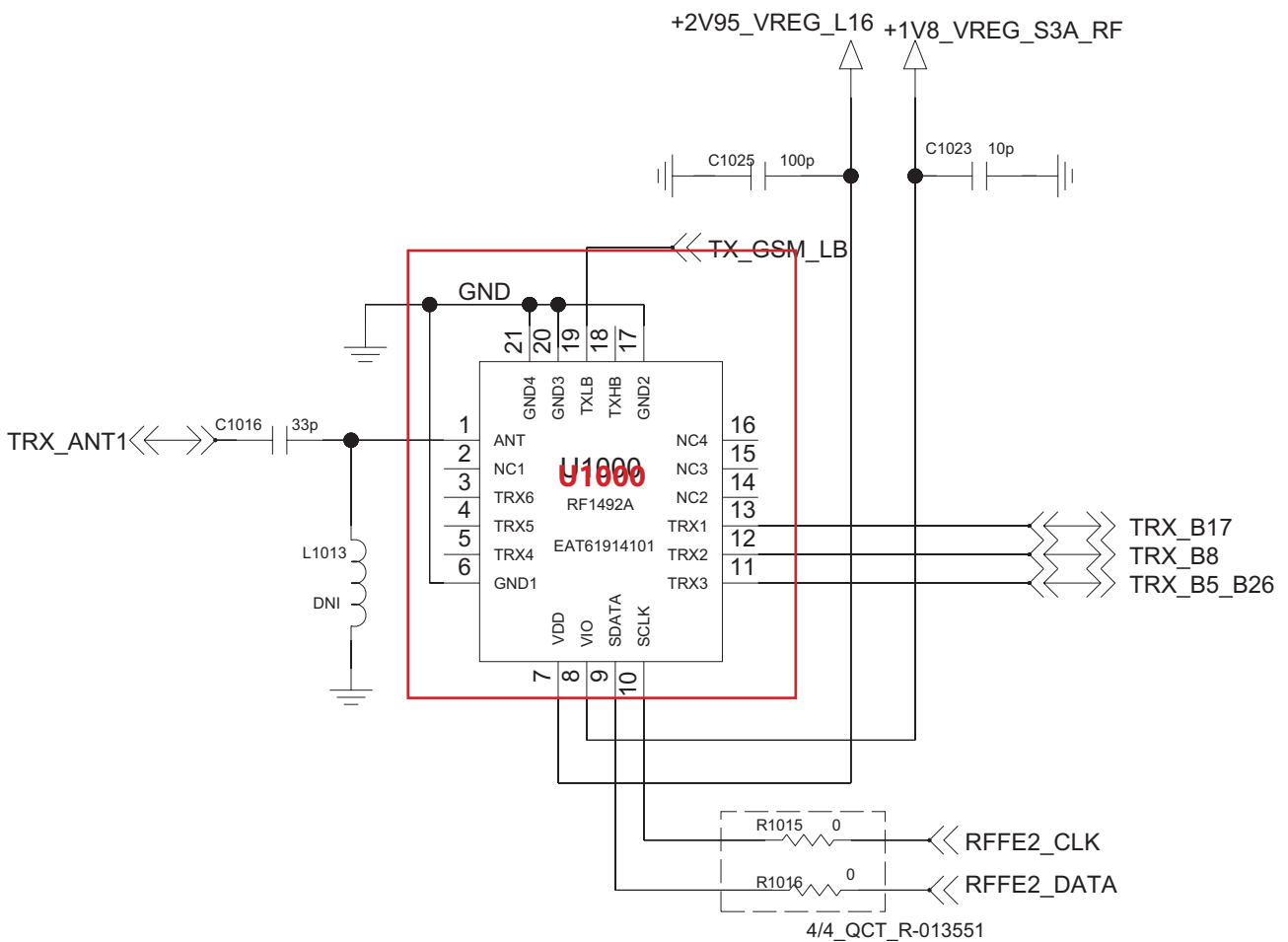
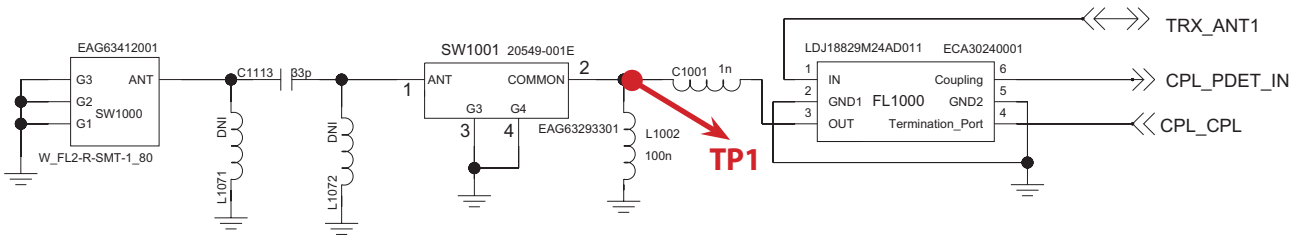


3.5.4.4 WCDMA B5/ LTE B5/ GSM850

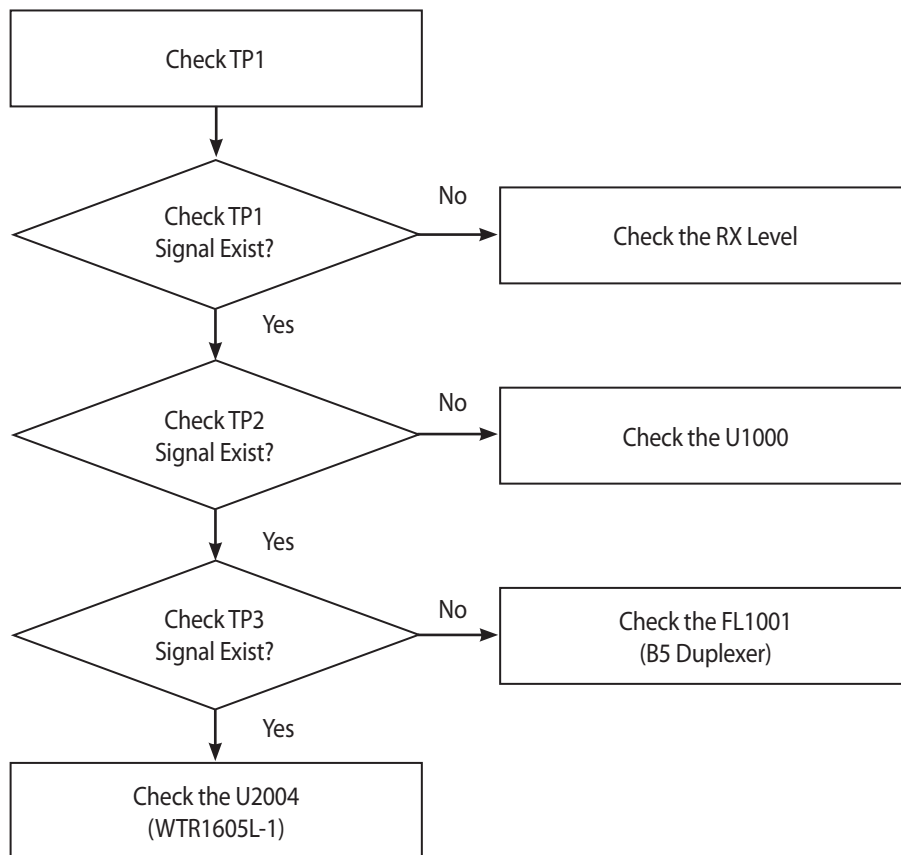
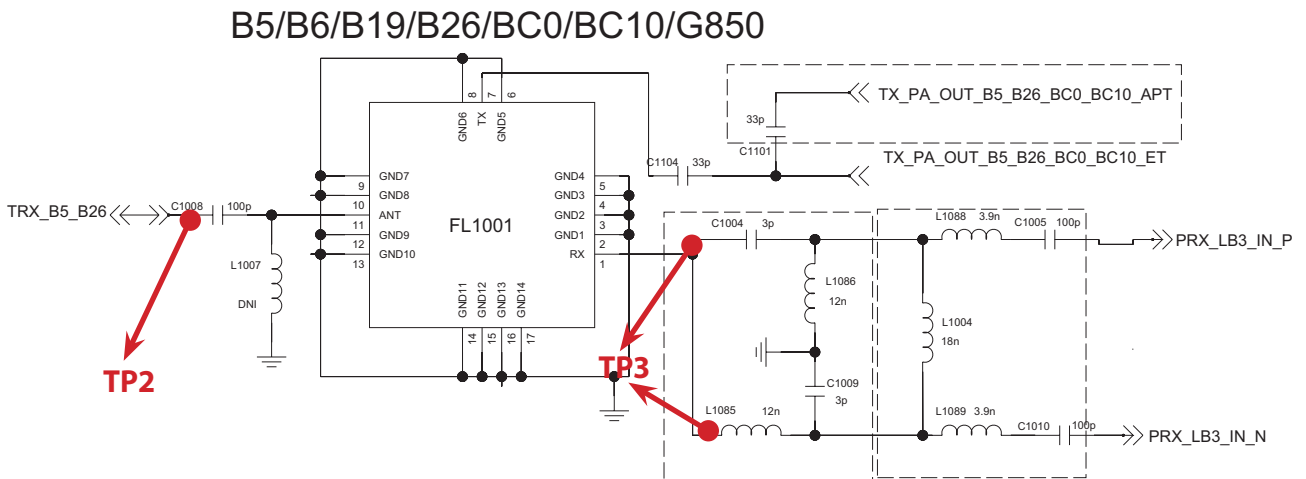


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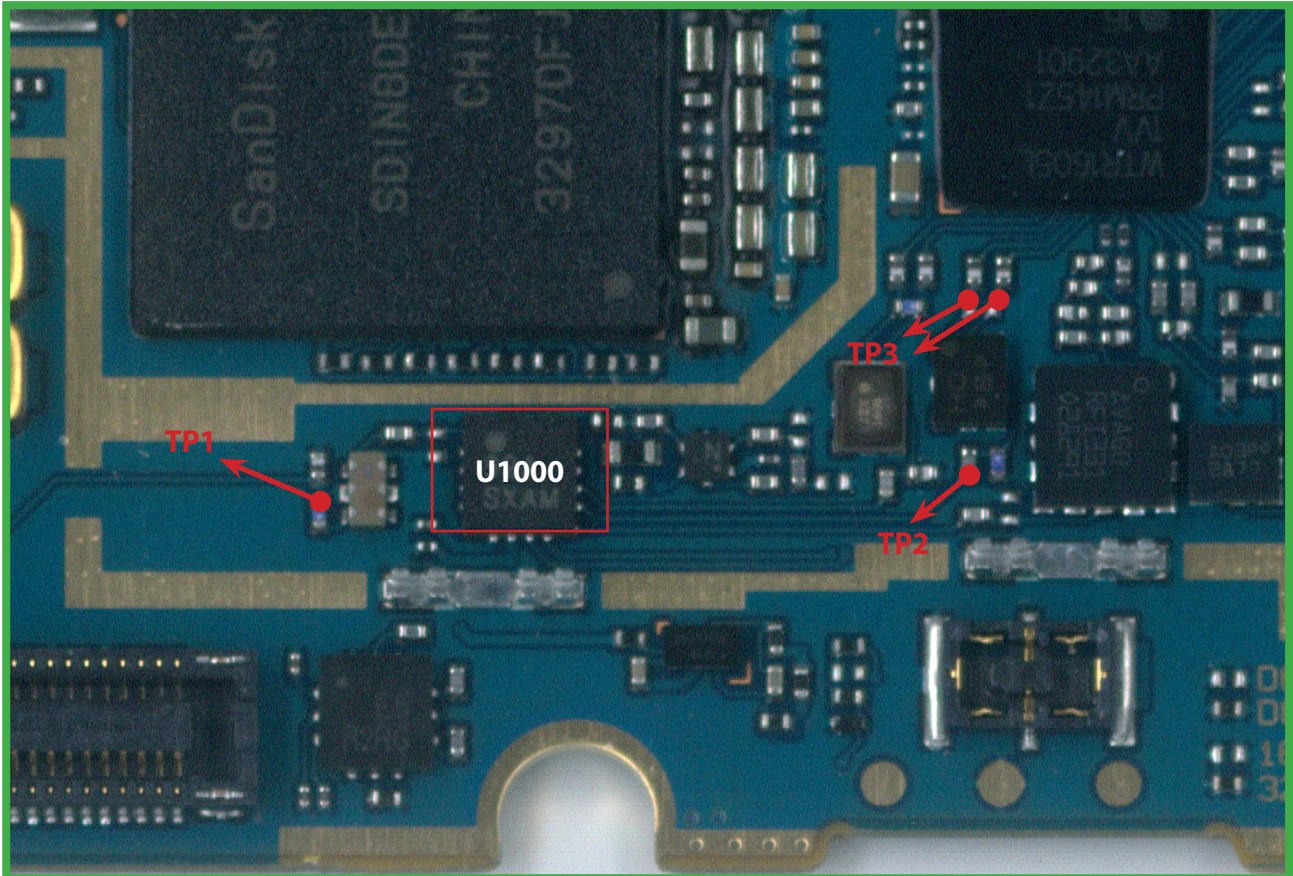
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

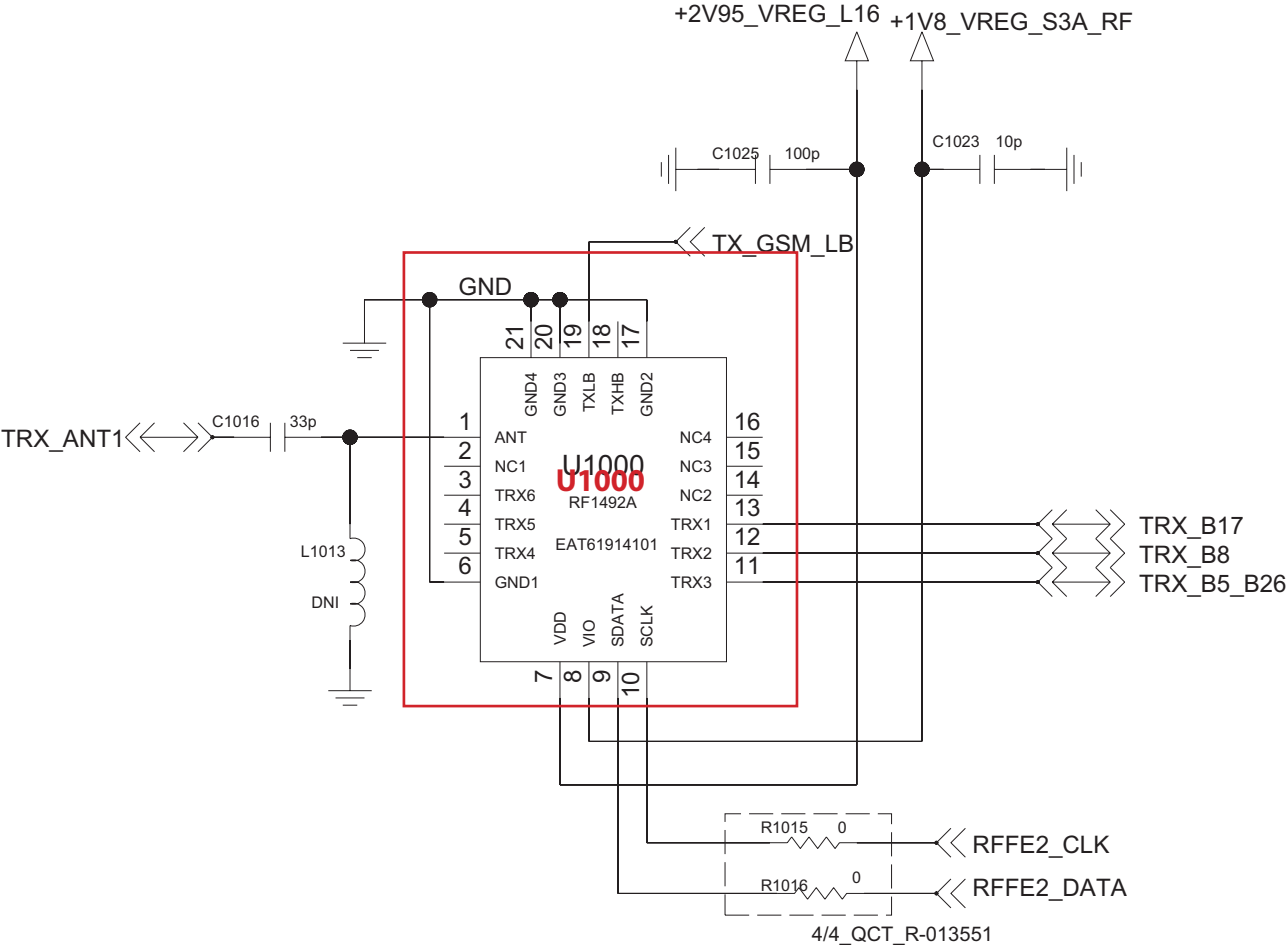
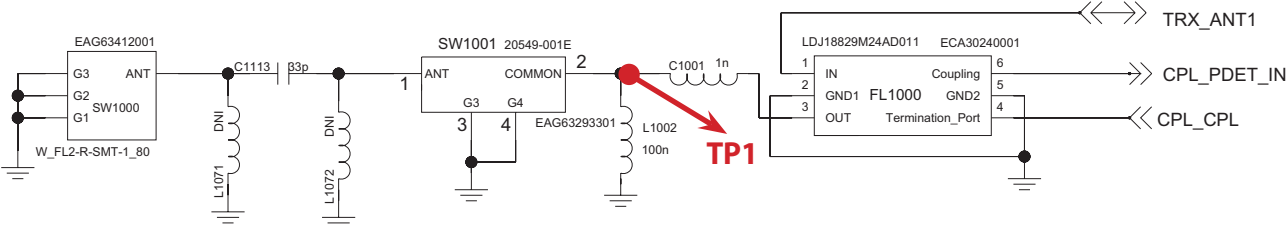


3.5.4.5 WCDMA B8/ GSM900

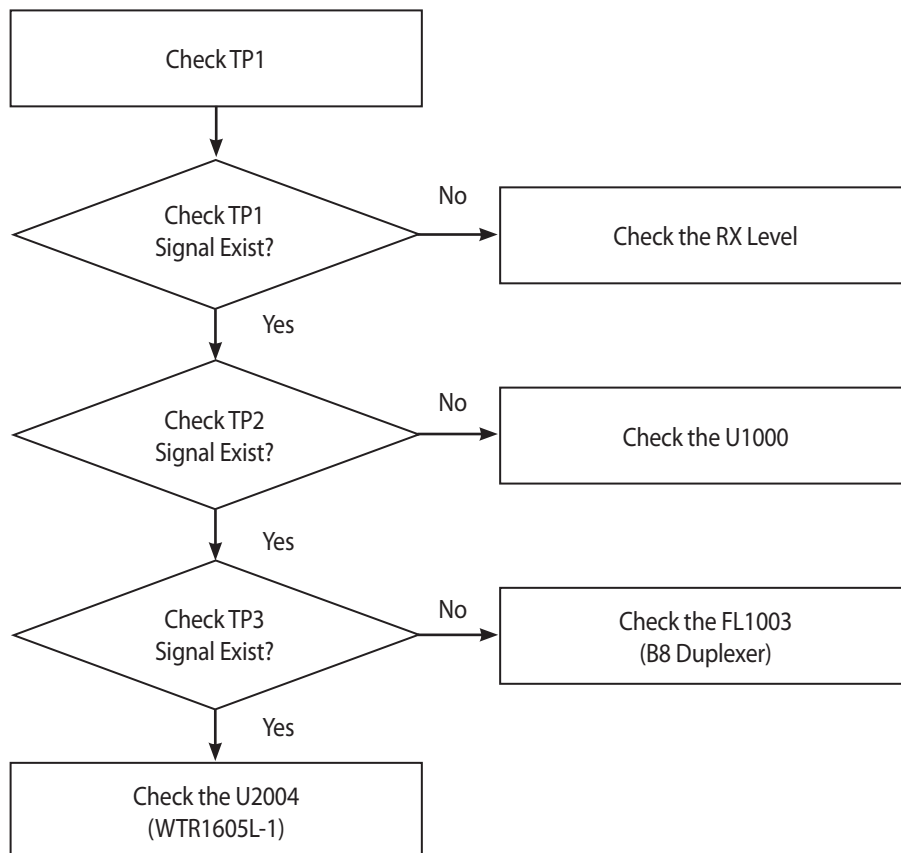
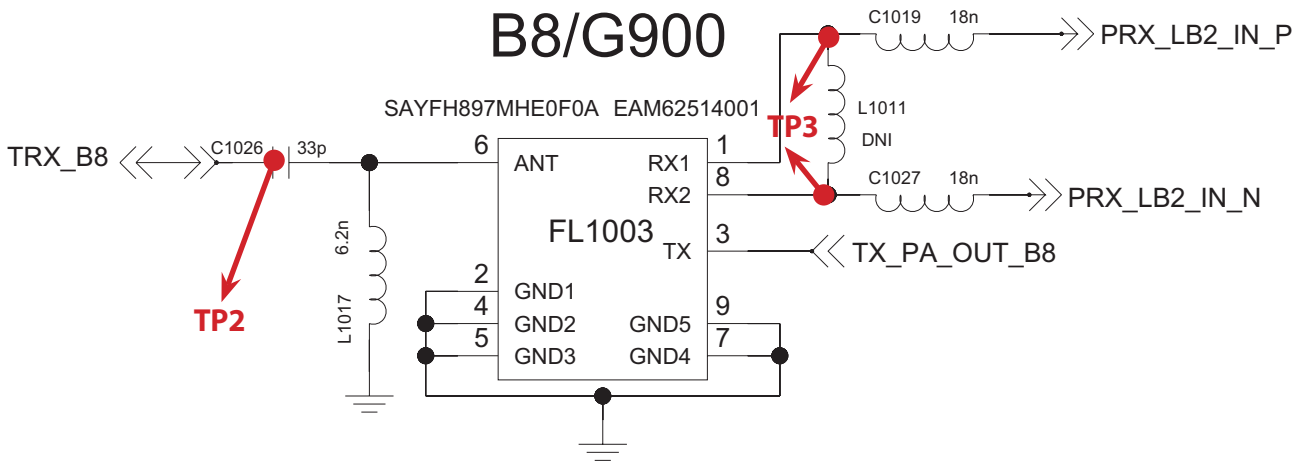


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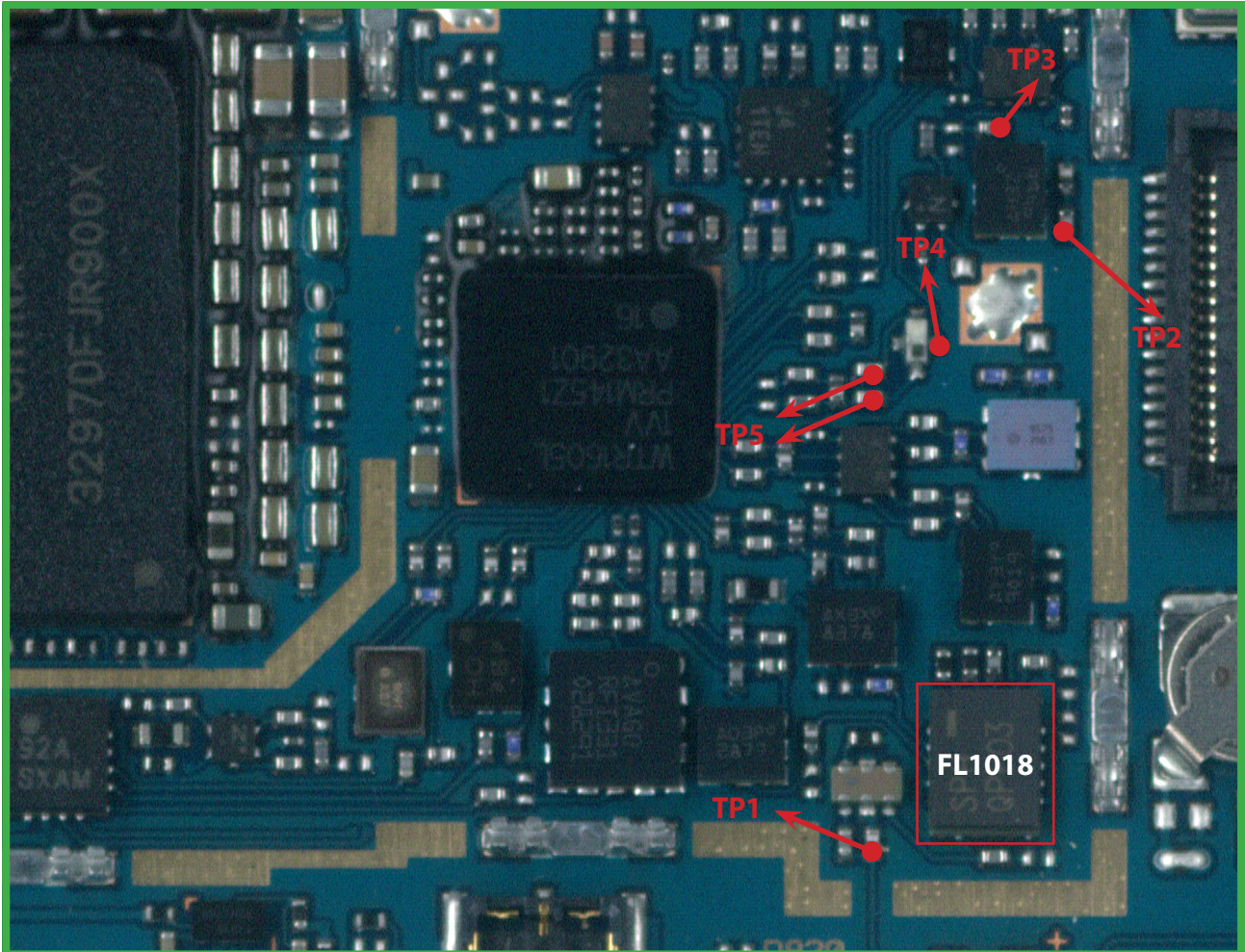
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

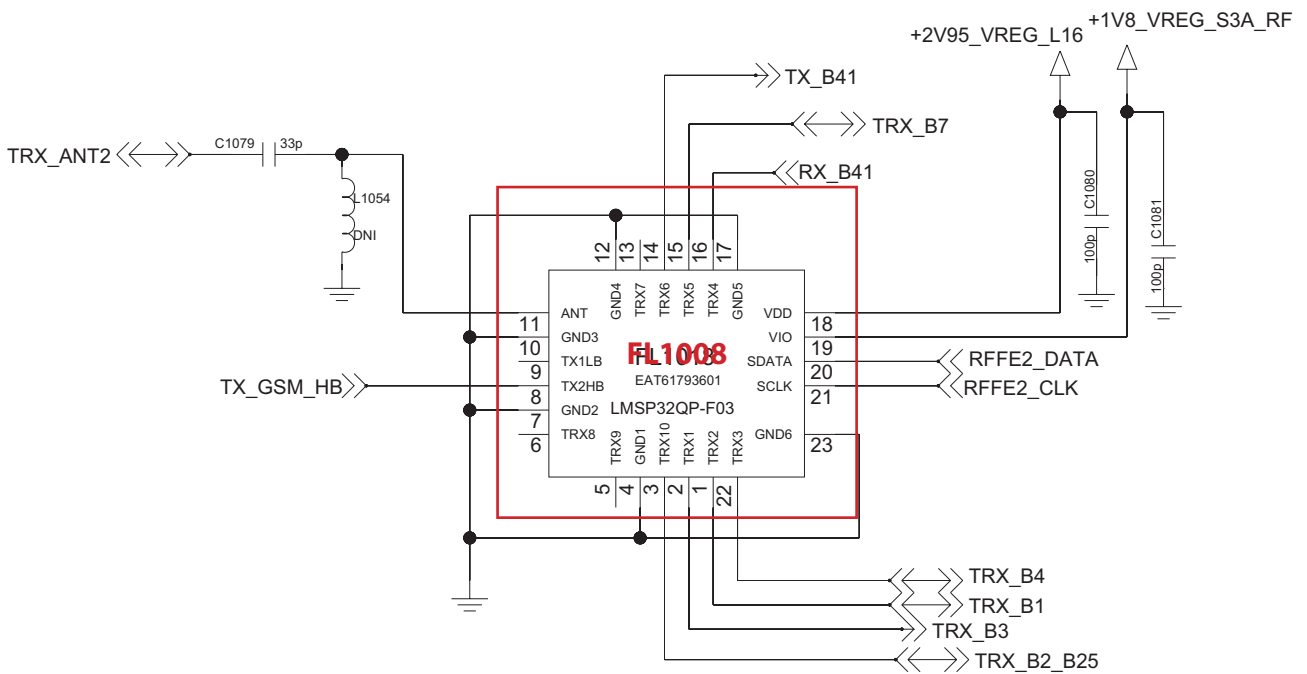
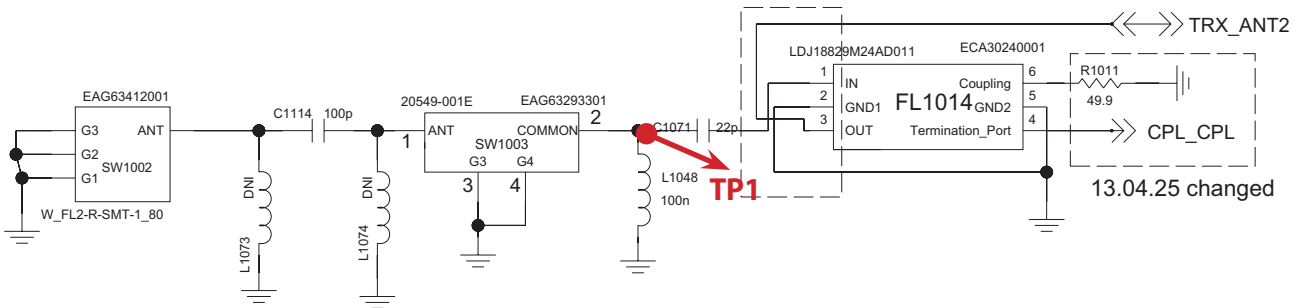


3.5.4.6 LTE B7

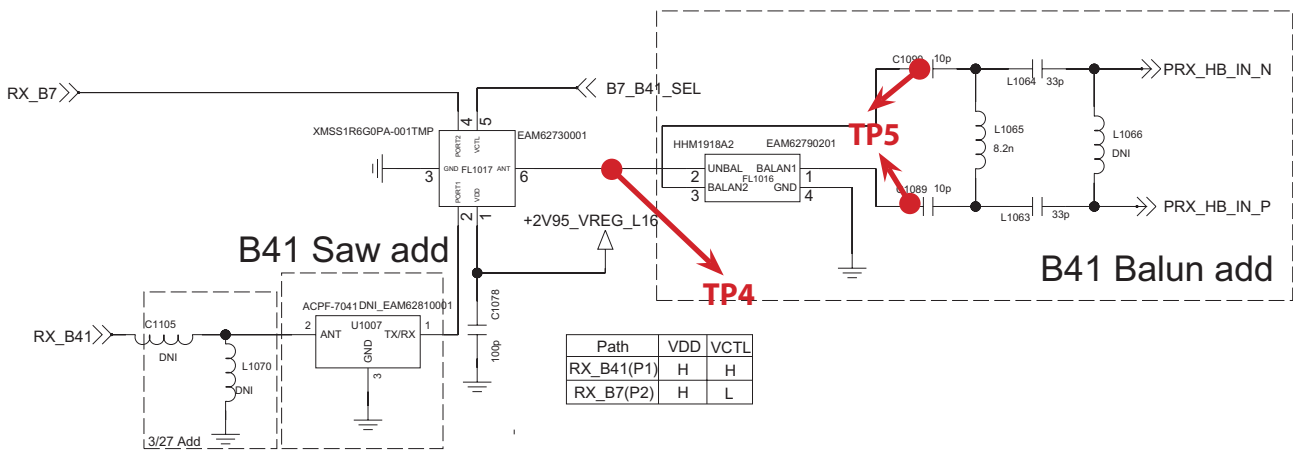
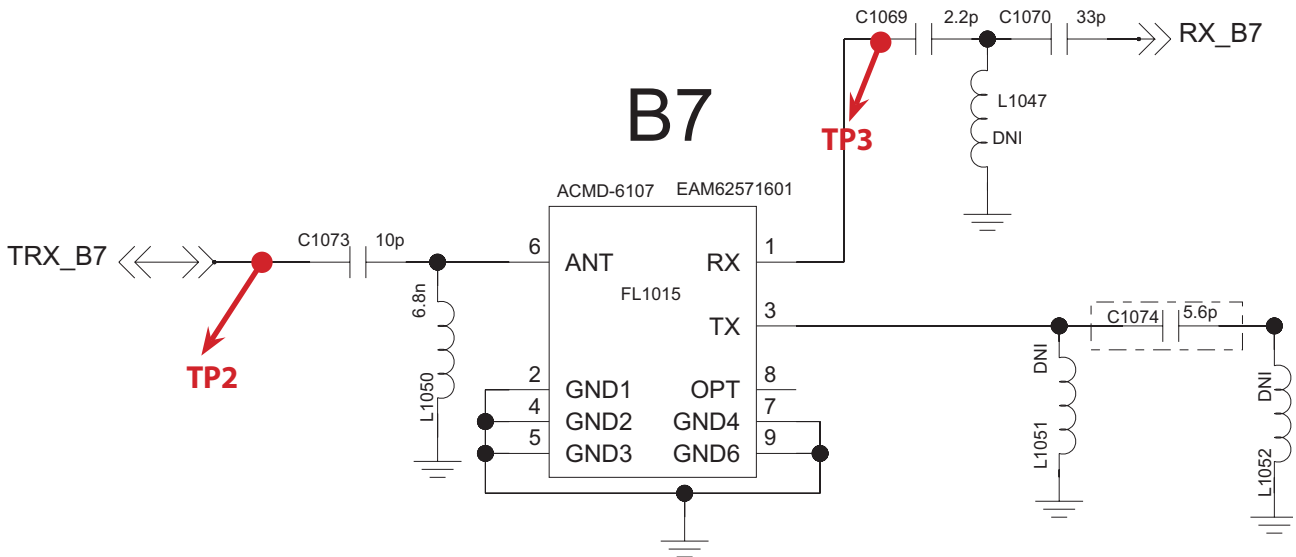


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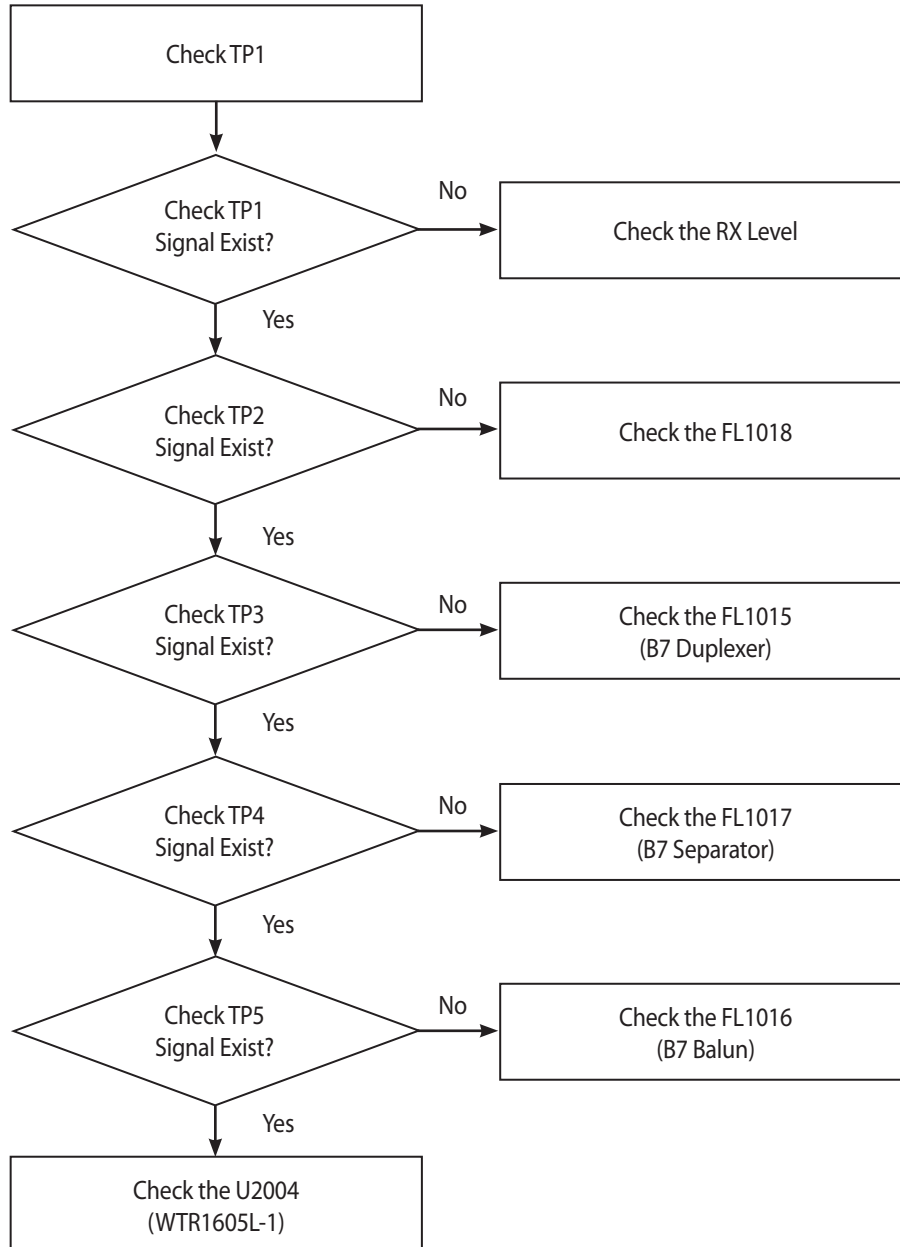
3. TROUBLE SHOOTING



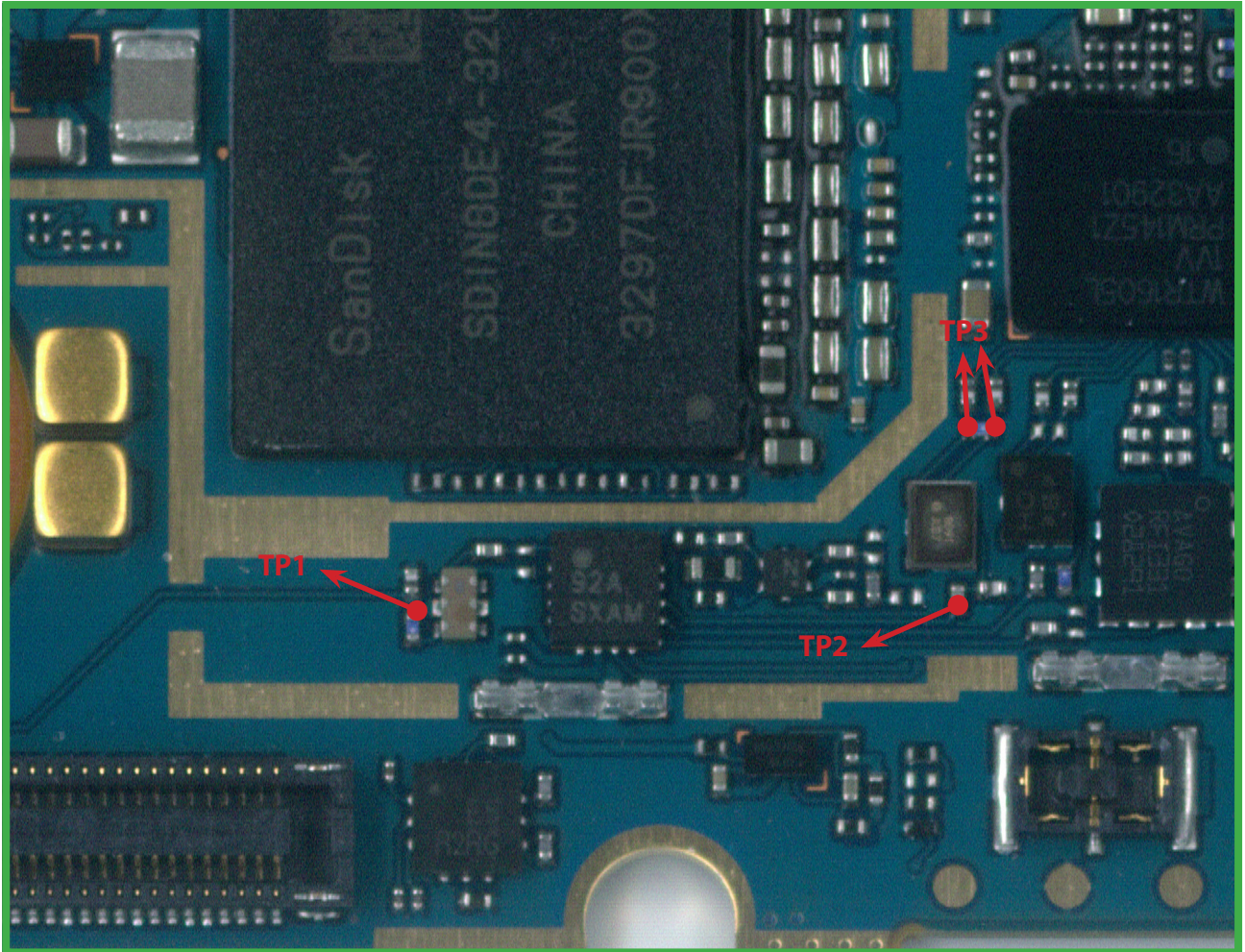
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

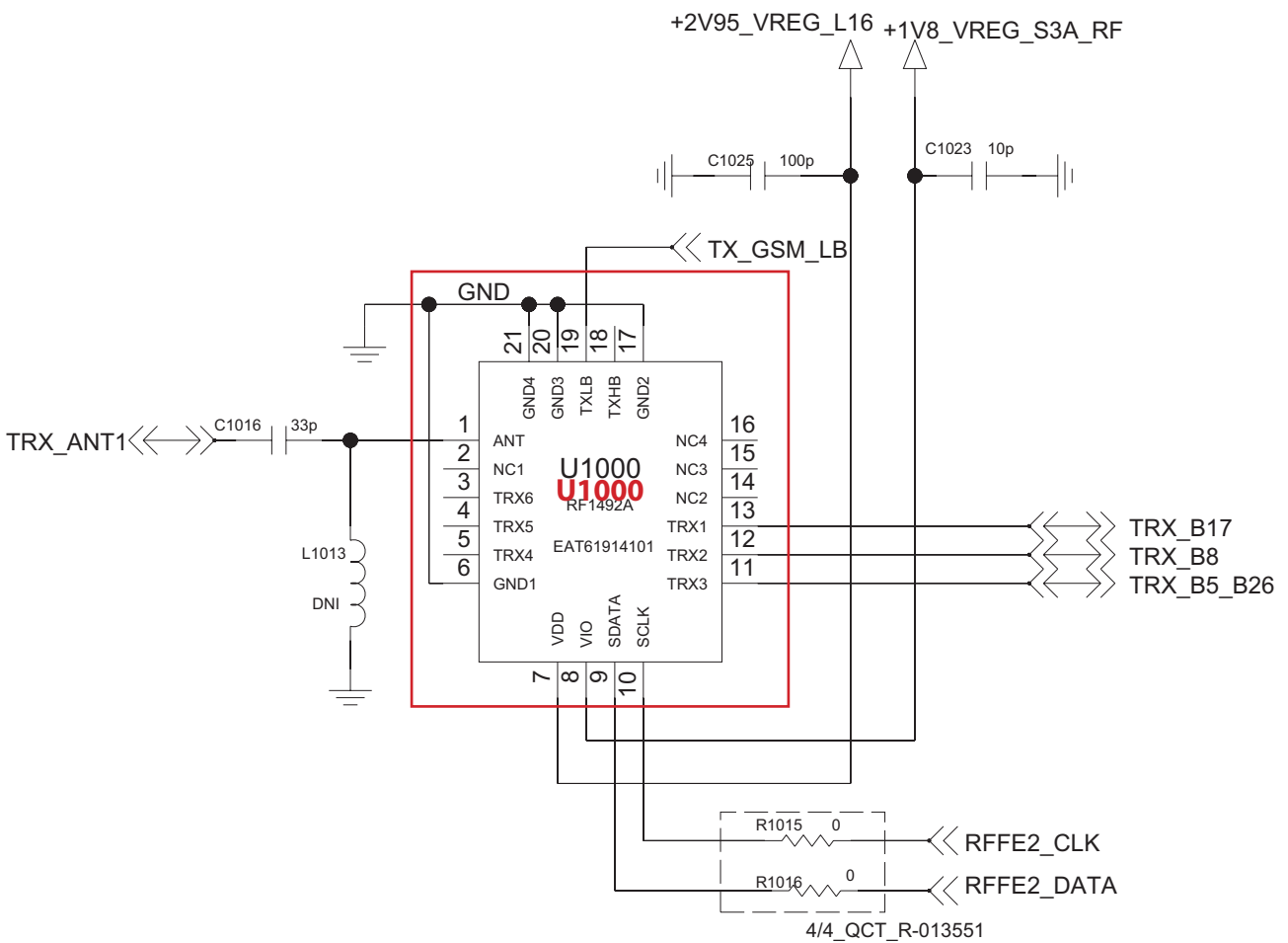
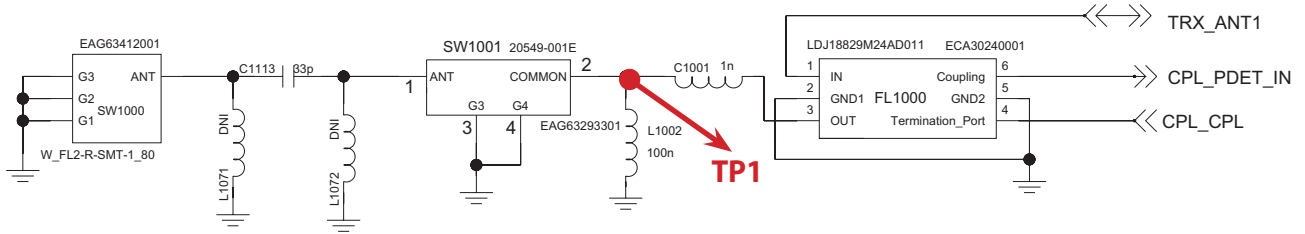


3.5.4.7 LTE B20

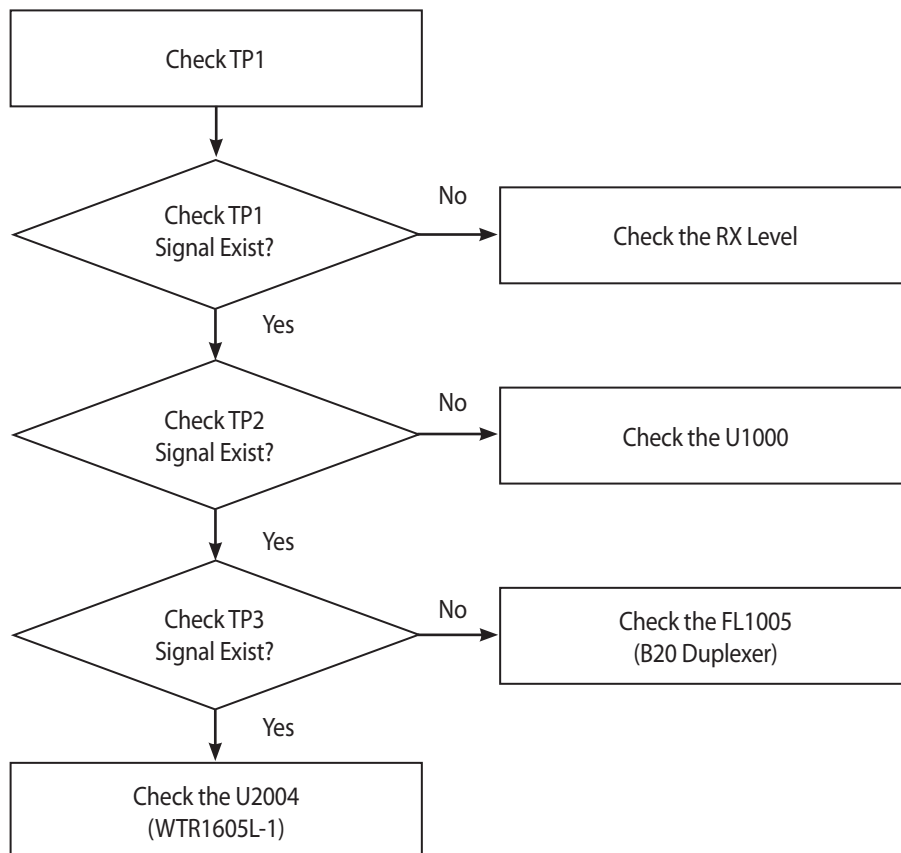
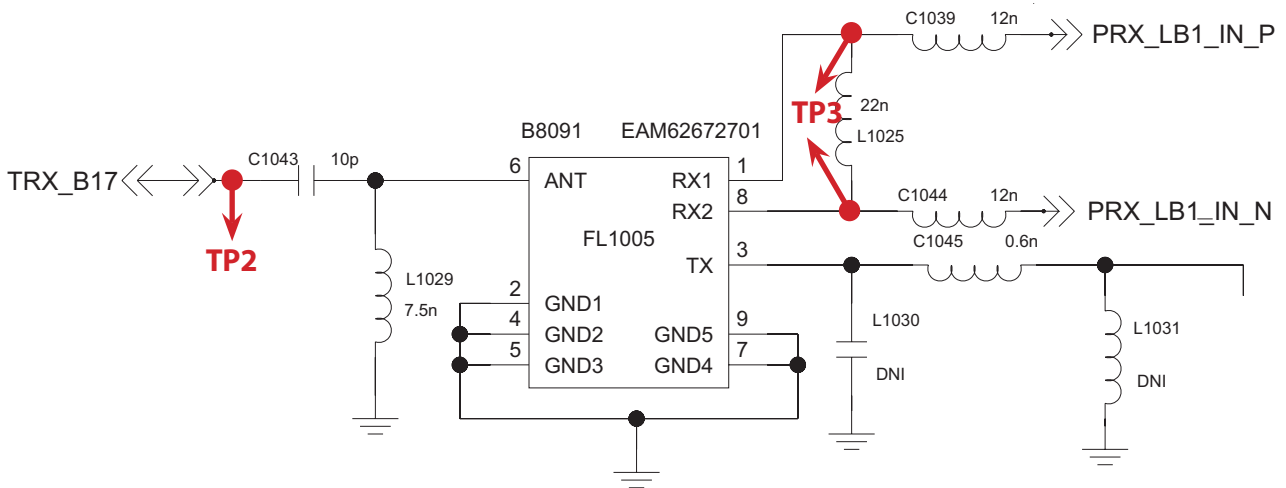


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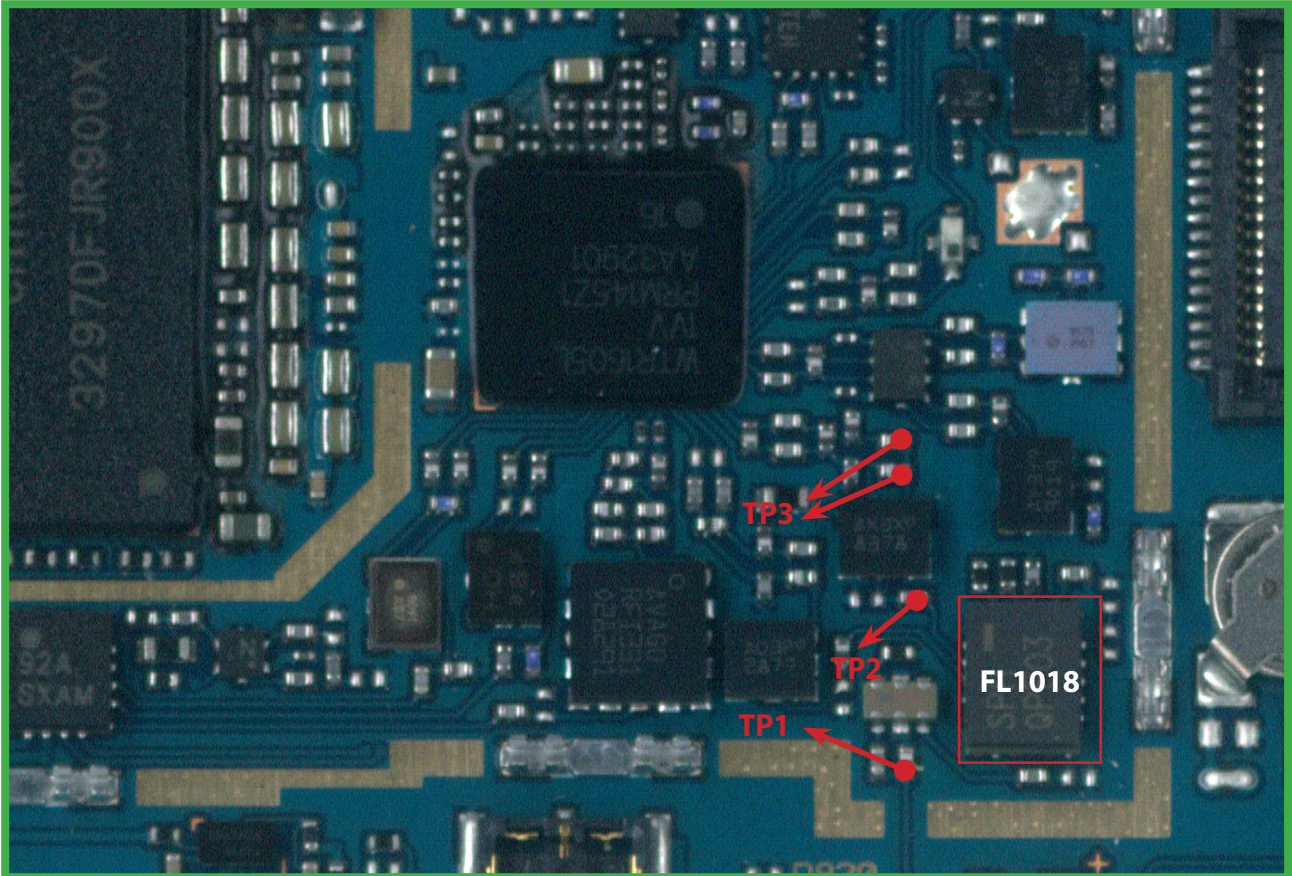
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

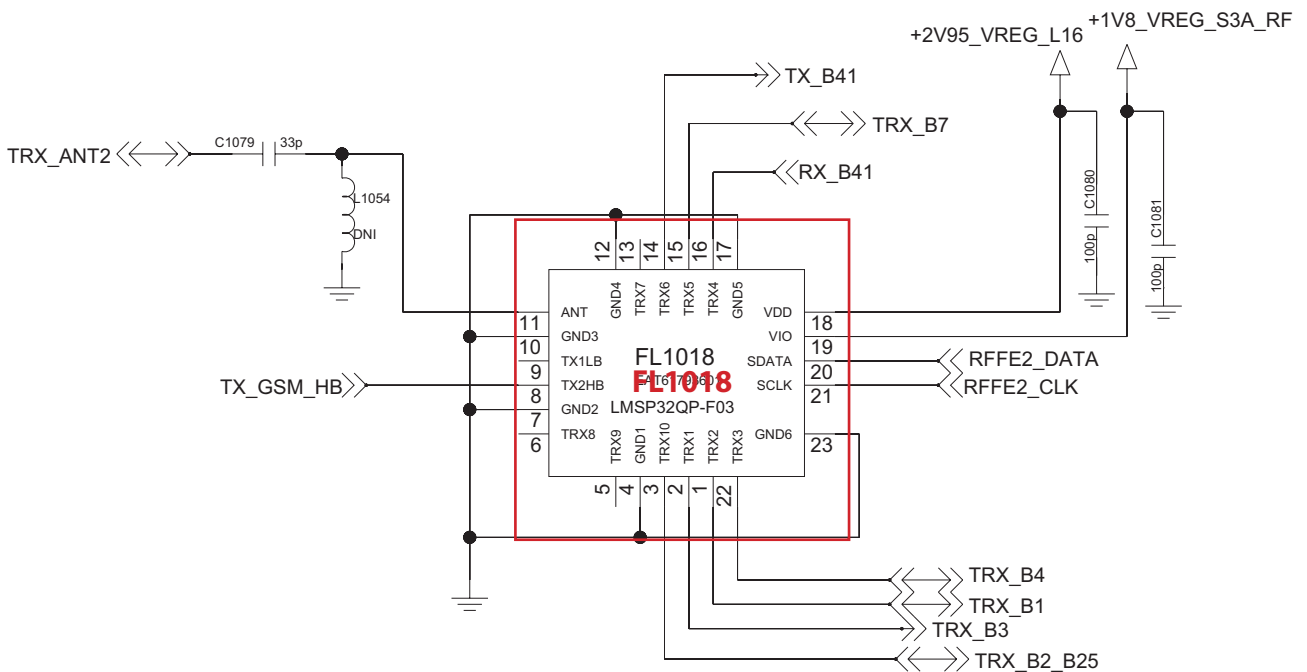
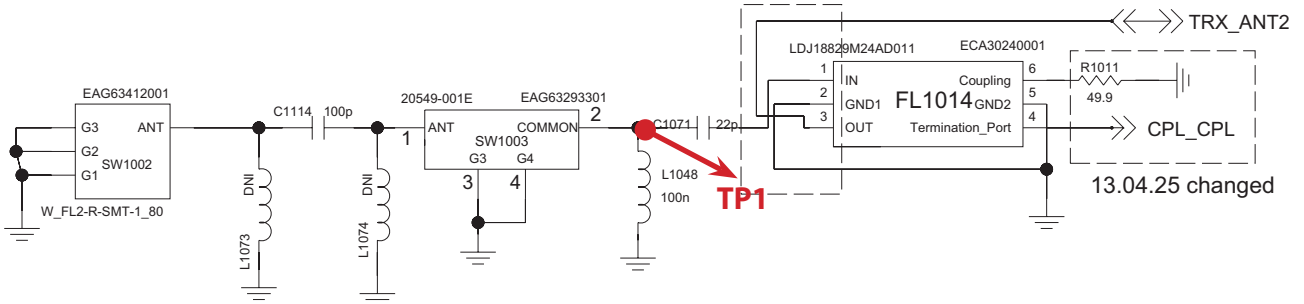


3.5.4.8 LTE B3/ DCS1800

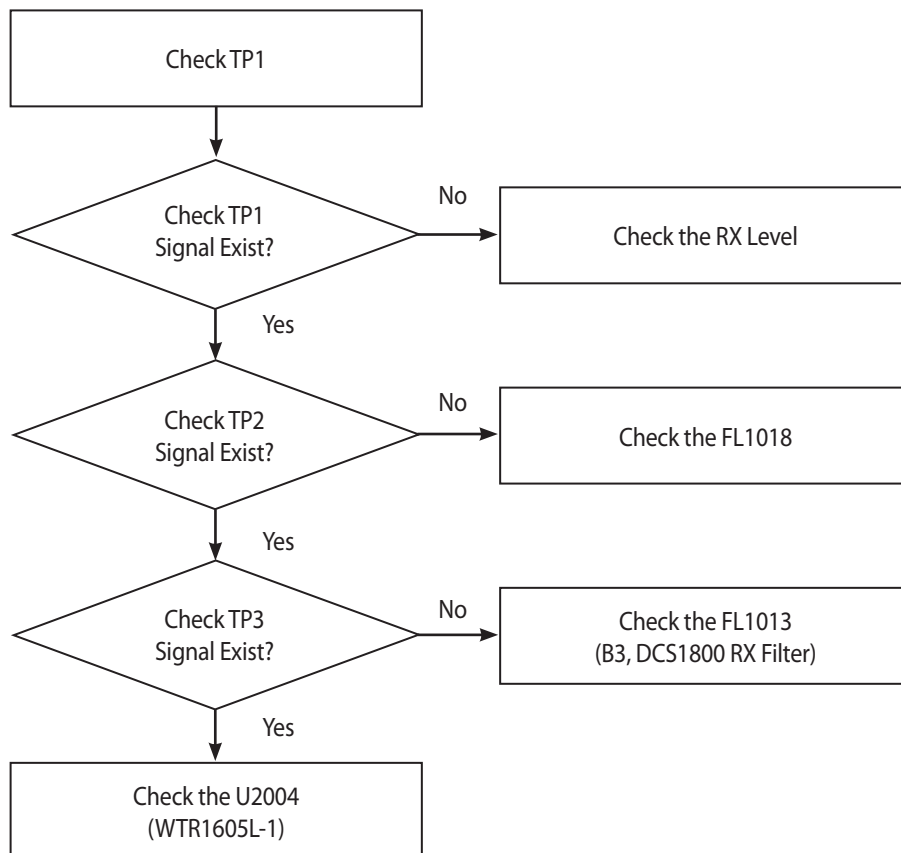
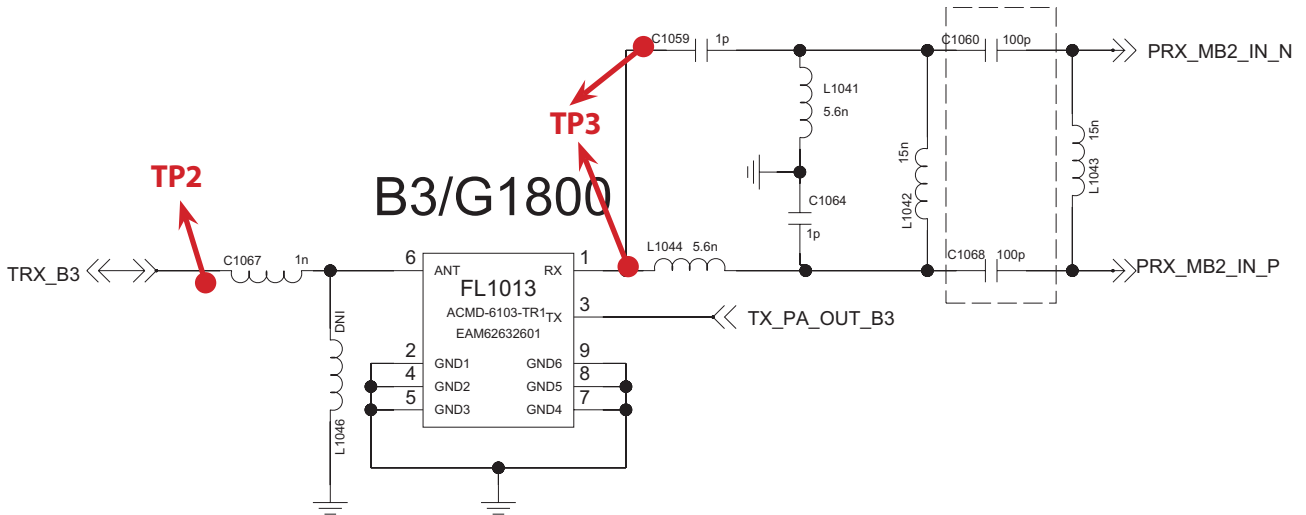


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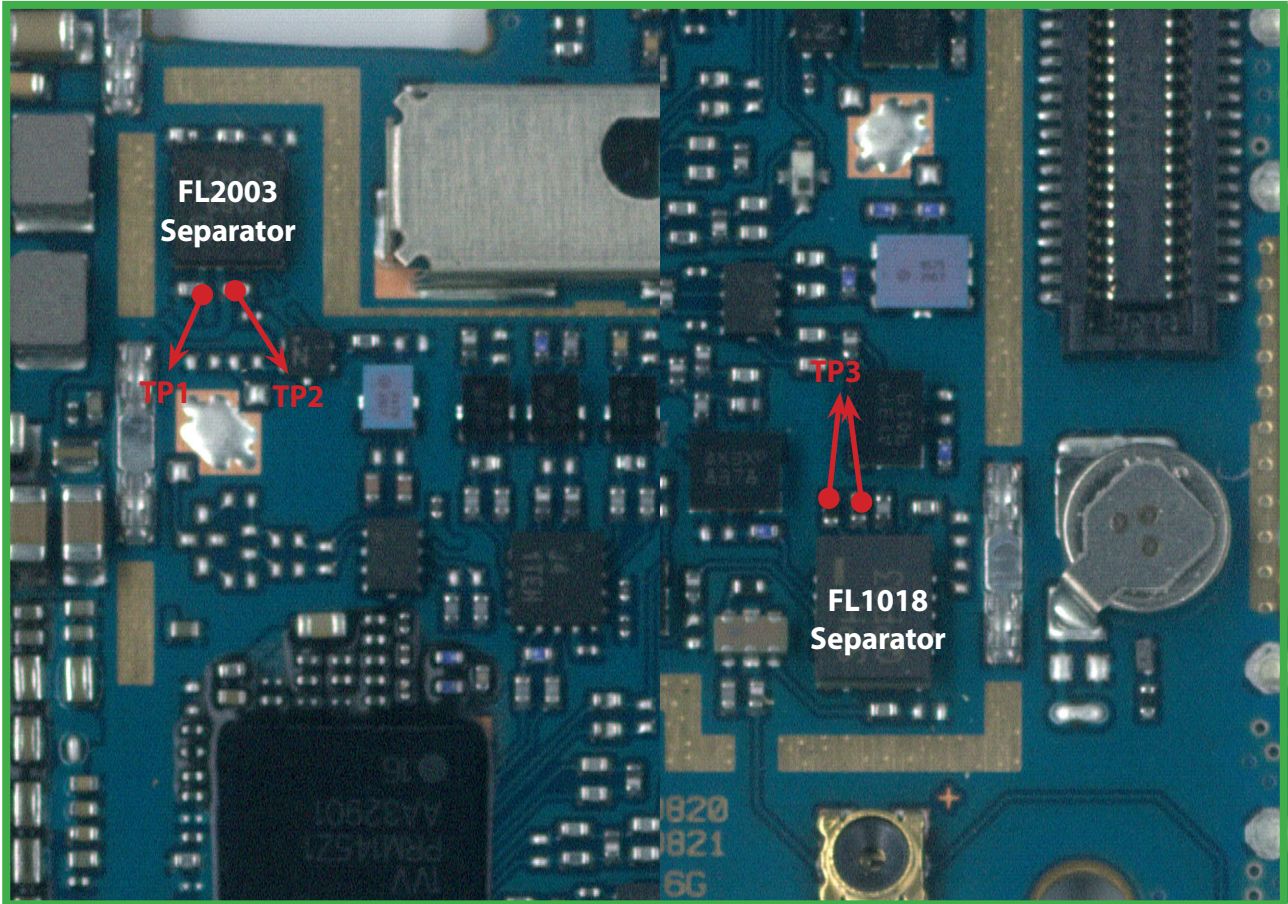
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

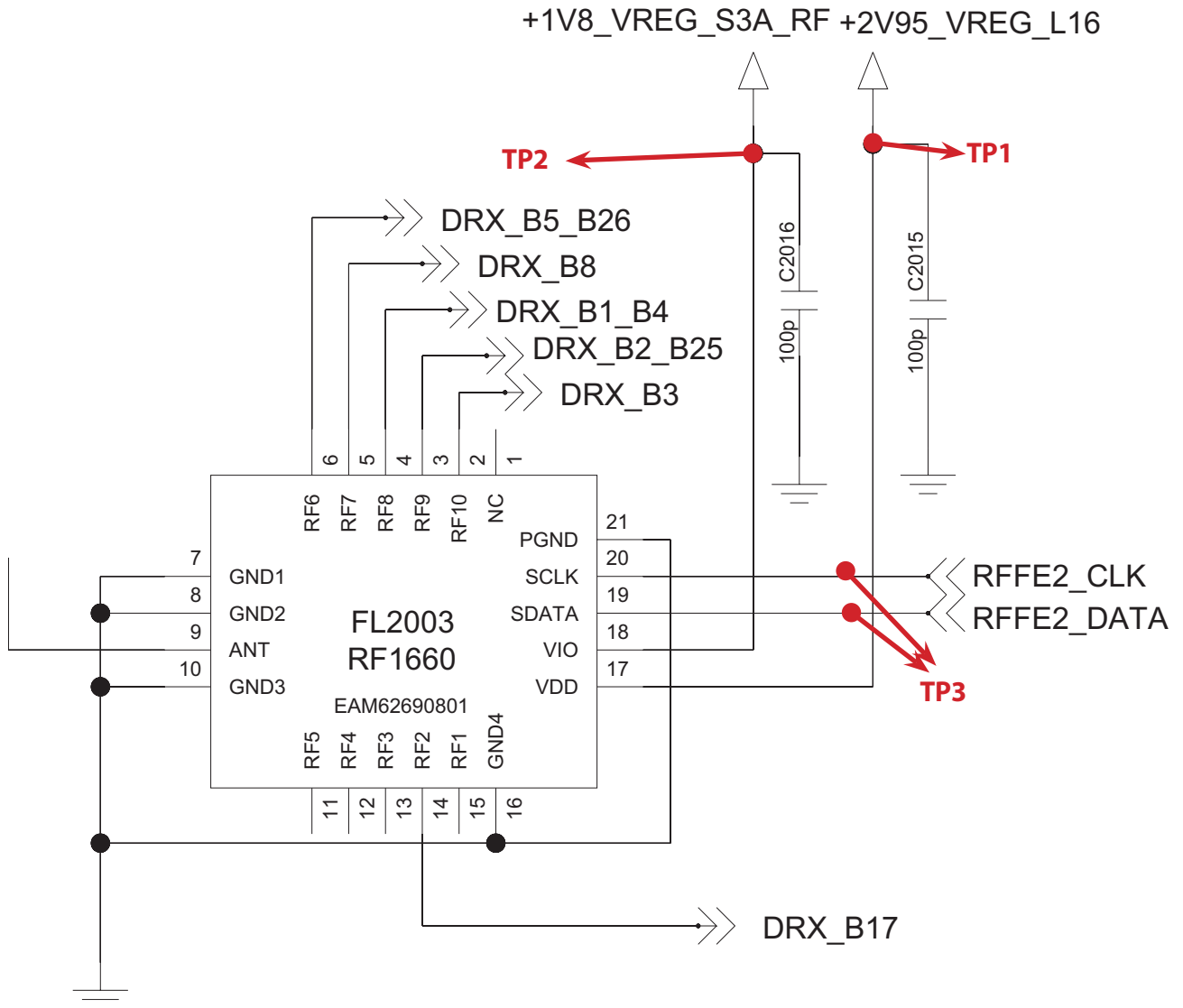


3.5.5 Checking DRx Front-end Separator

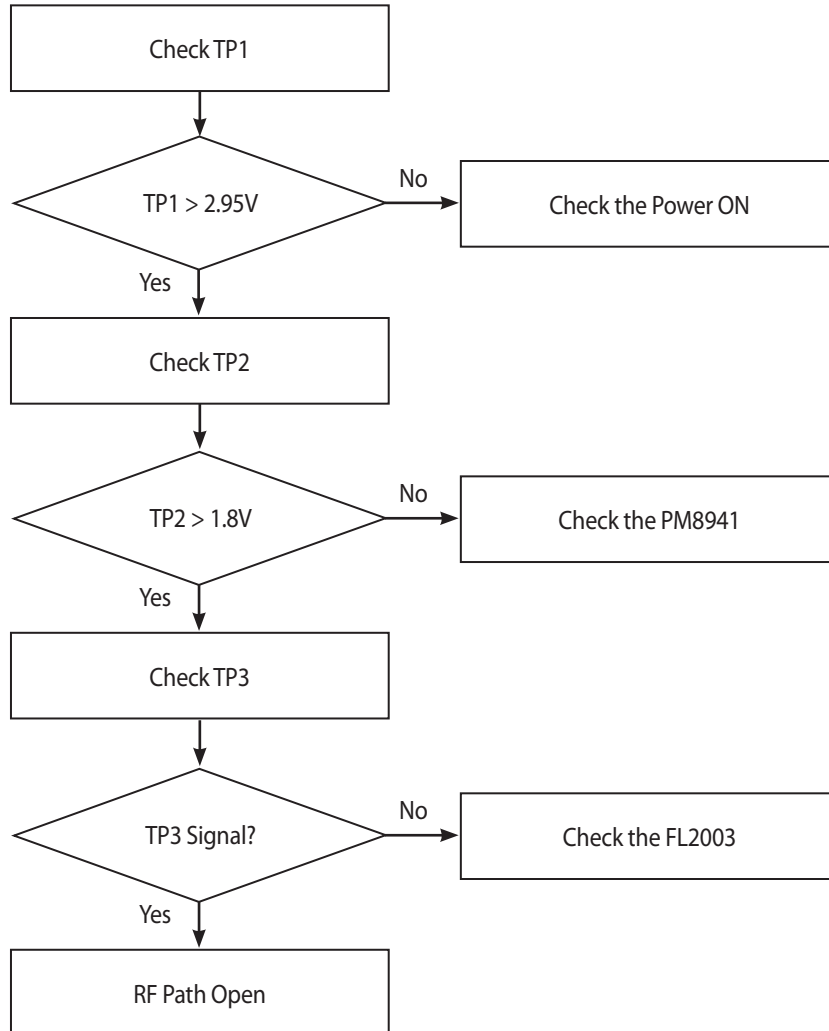


BOT

3. TROUBLE SHOOTING

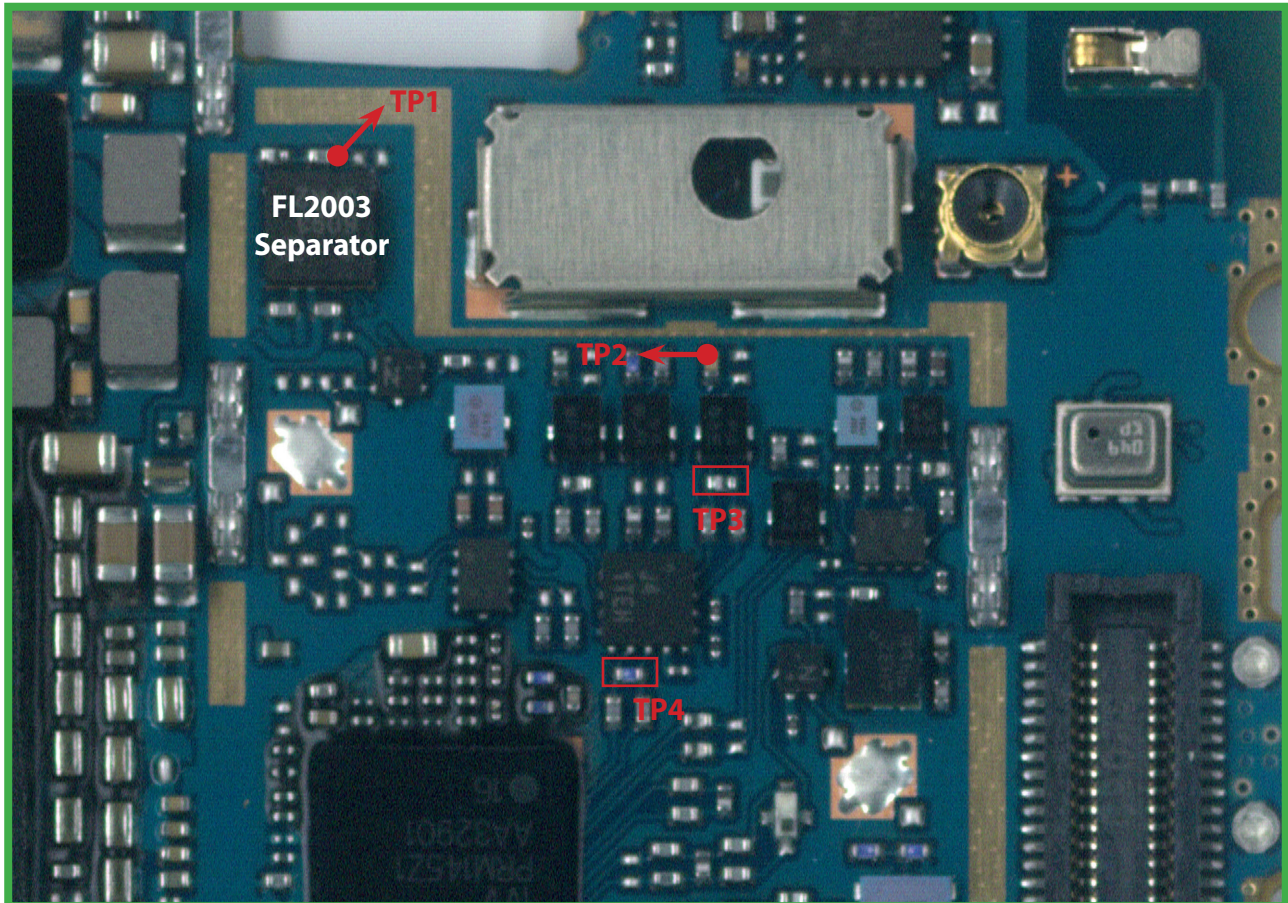


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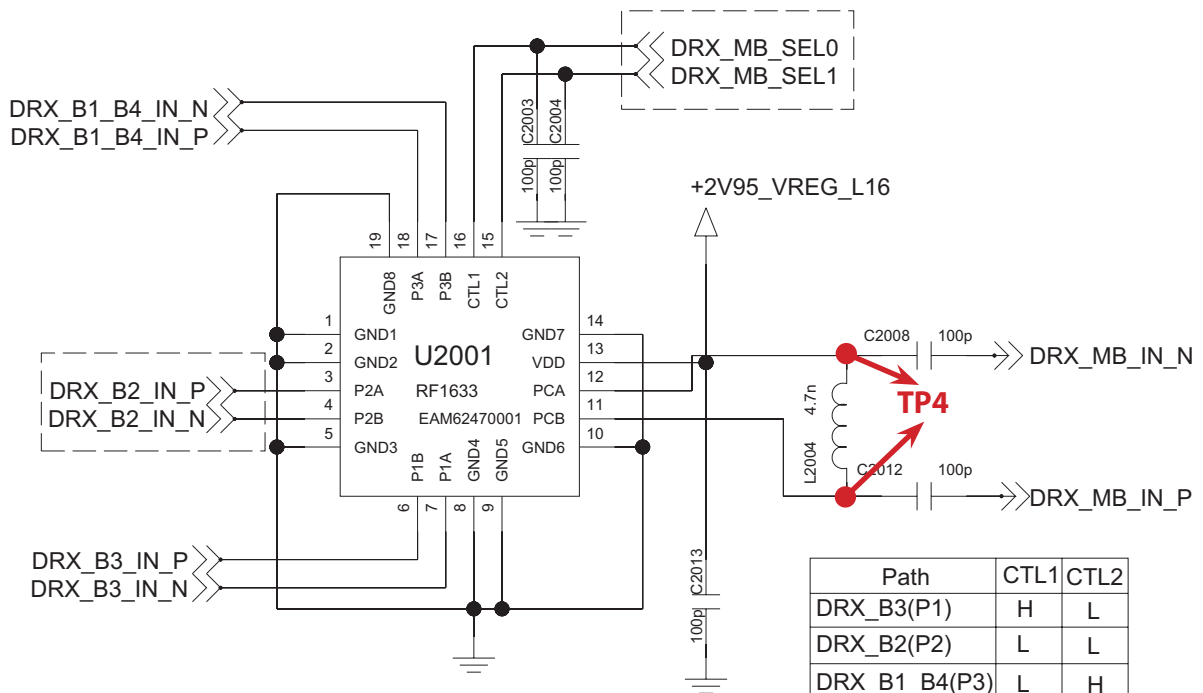
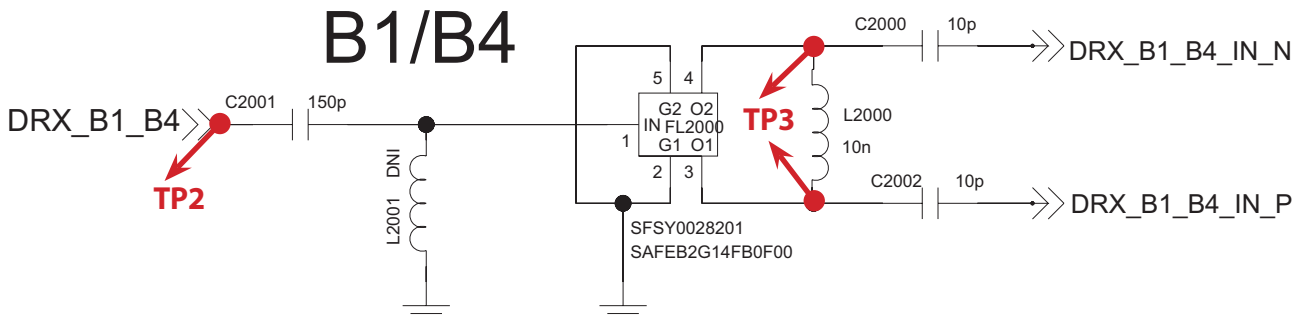
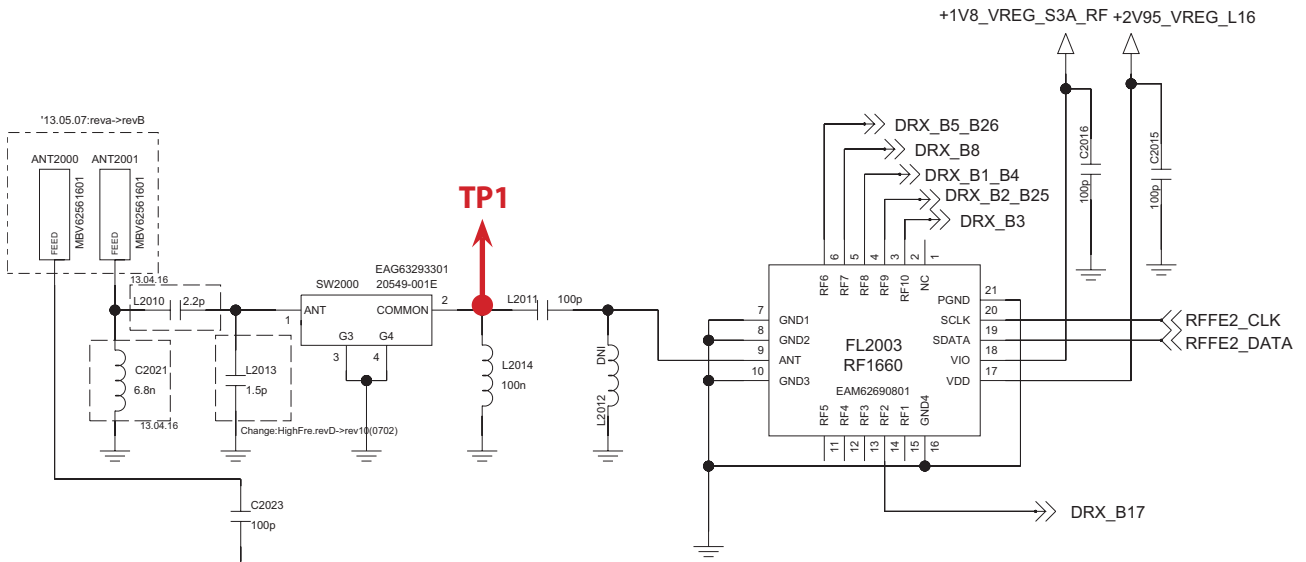
3.5.6 Checking RF DRx Level

3.5.6.1 WCDMA B1, B4/ LTE B1

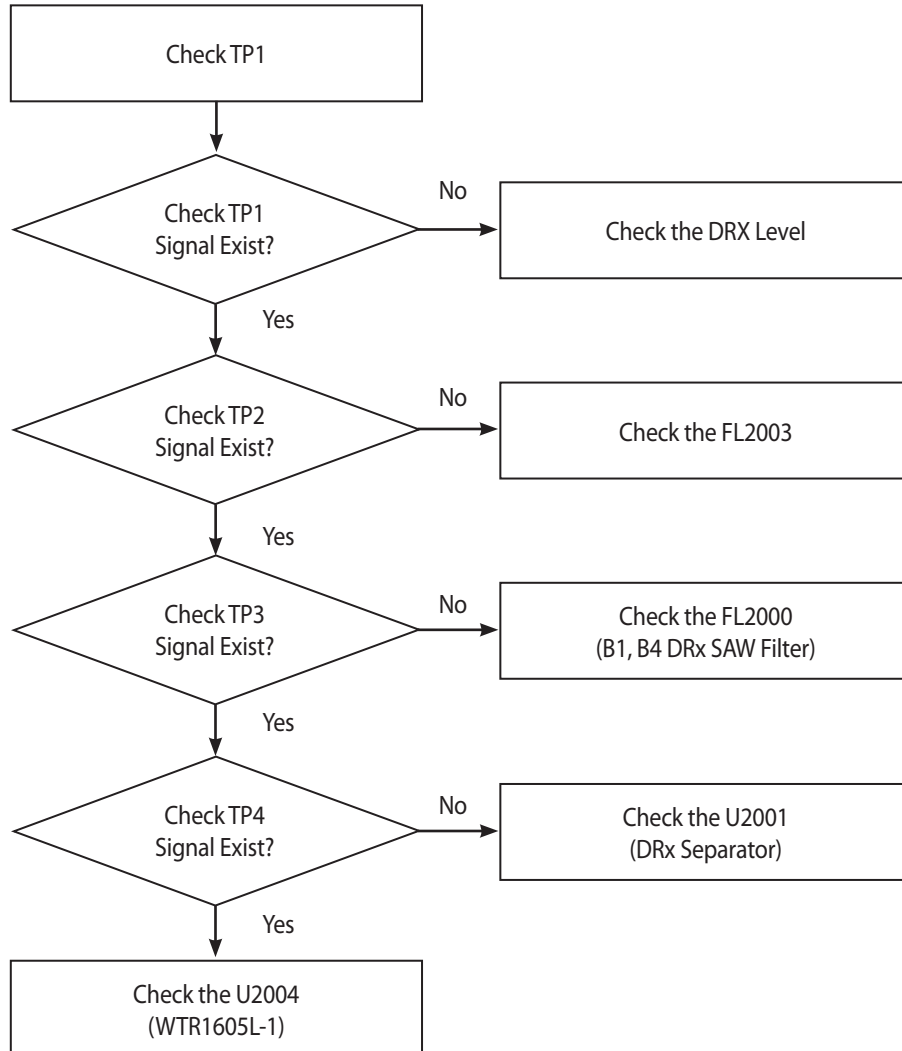


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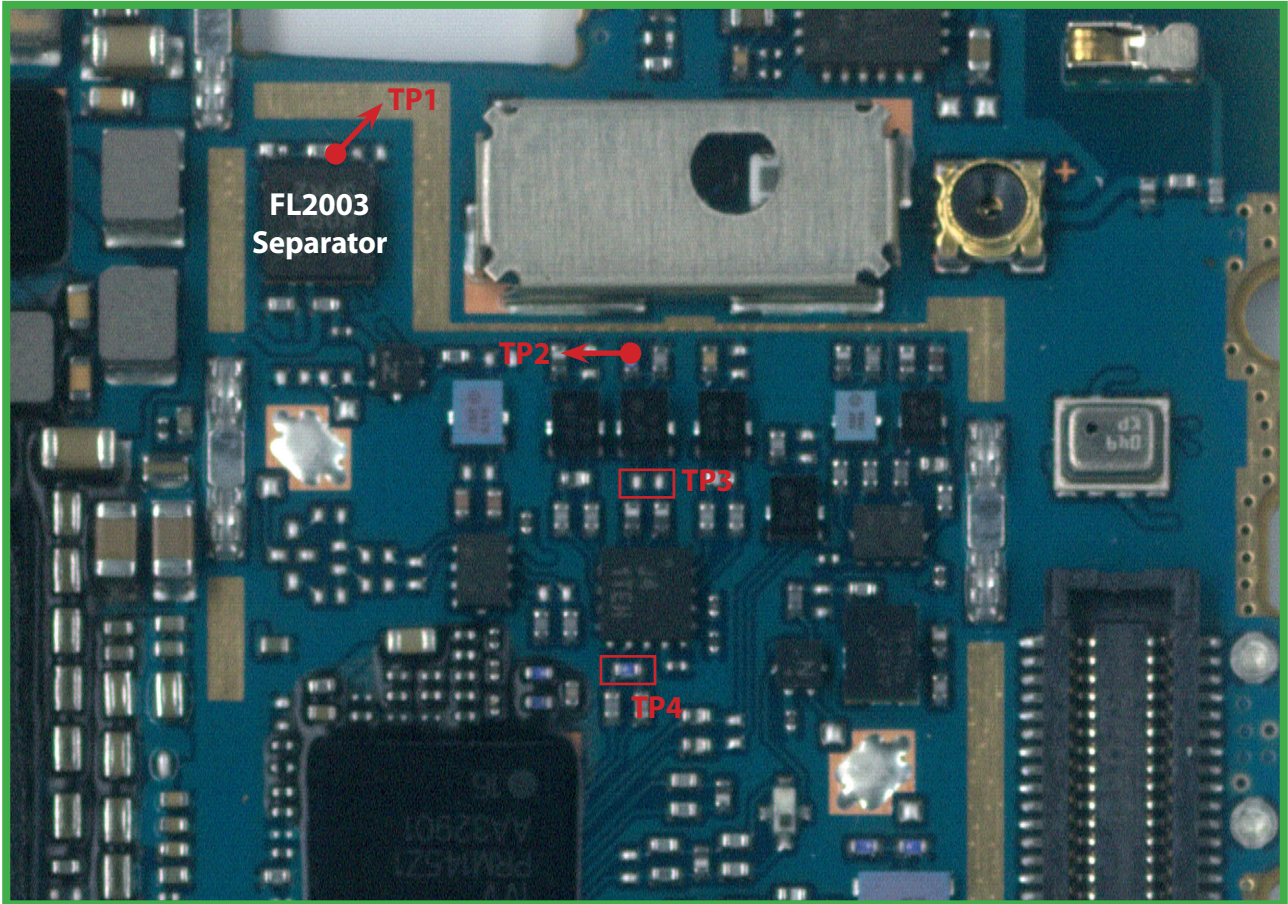
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

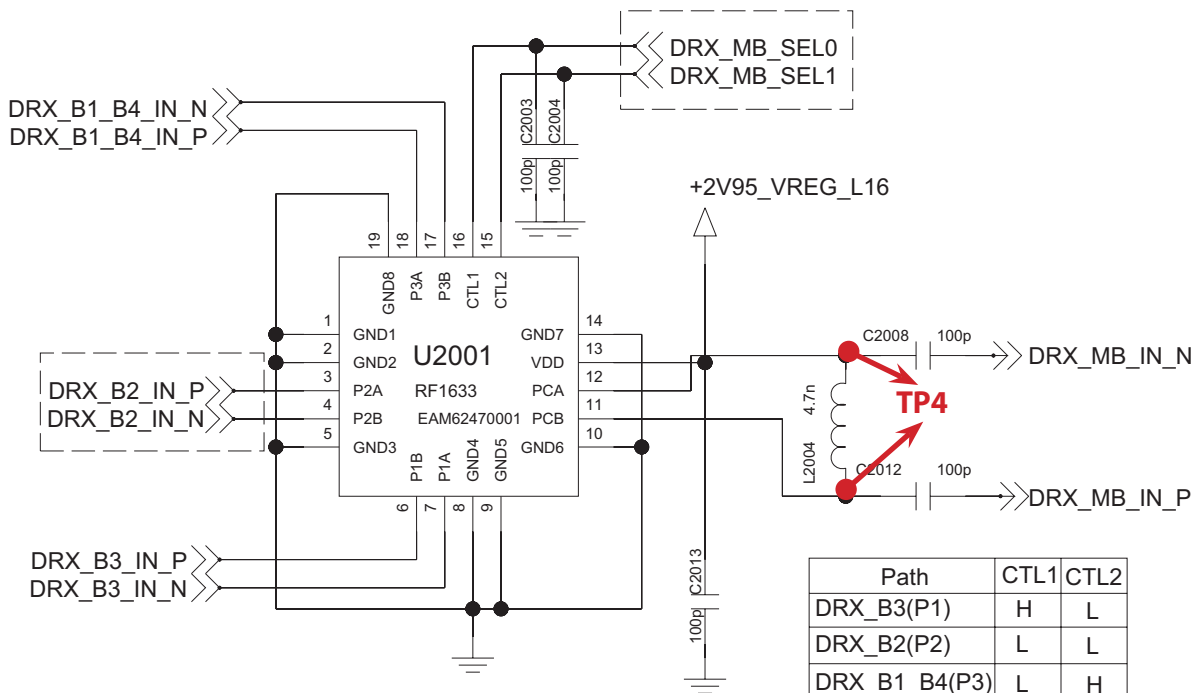
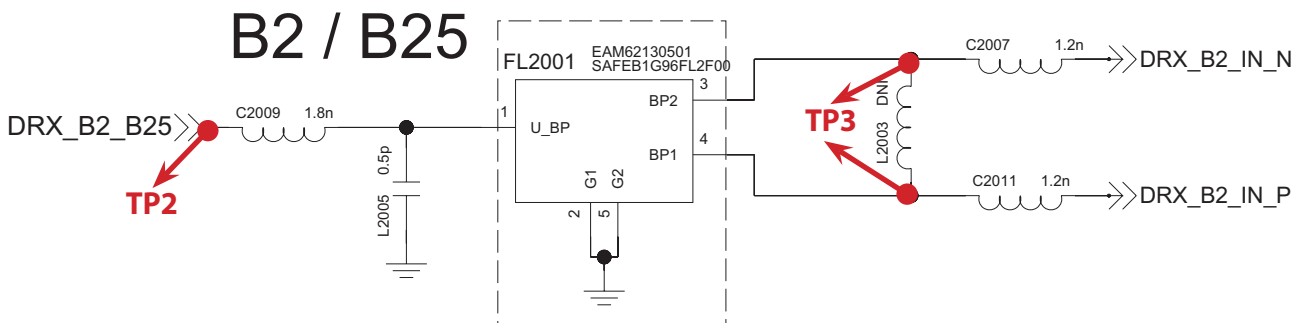
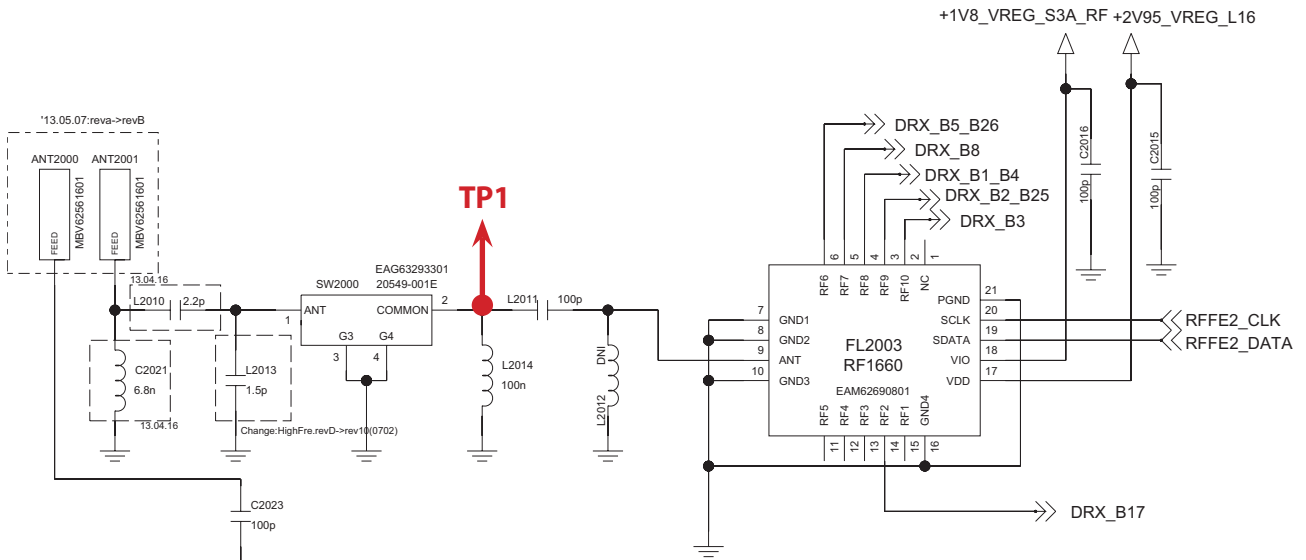


3.5.6.2 WCDMA B2

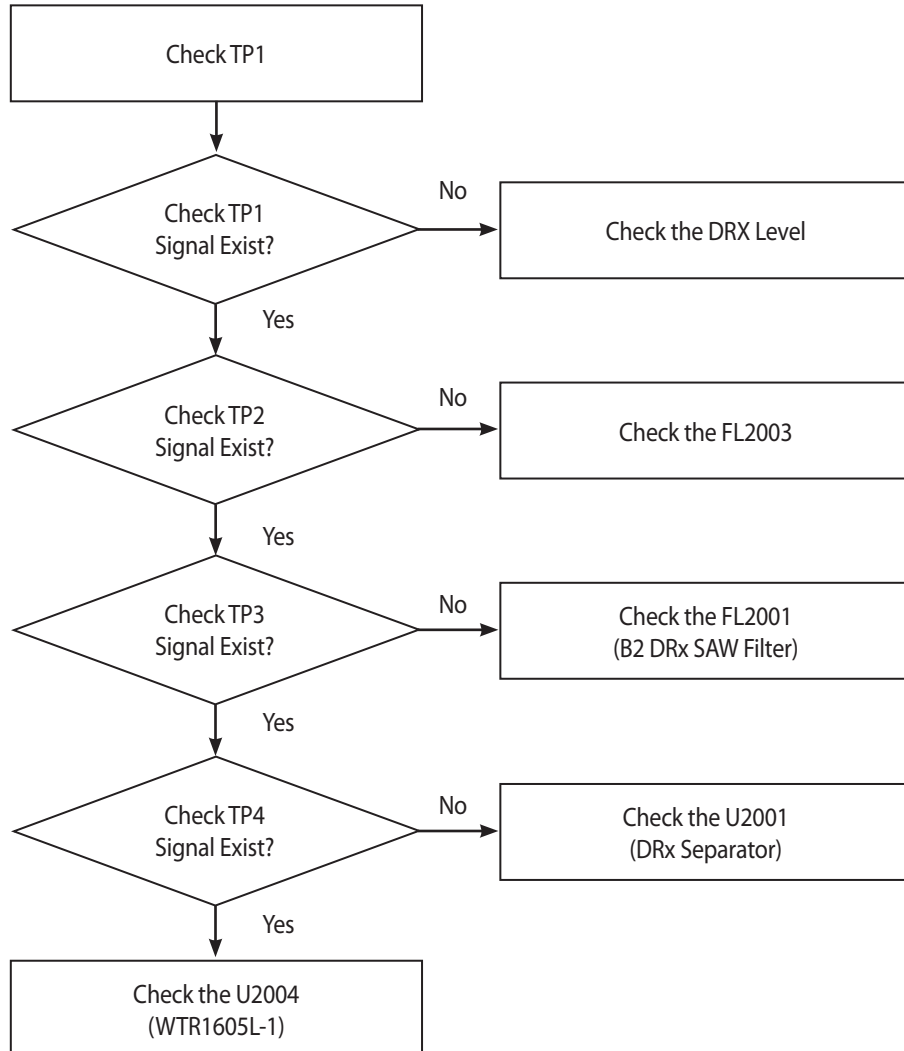


BOT

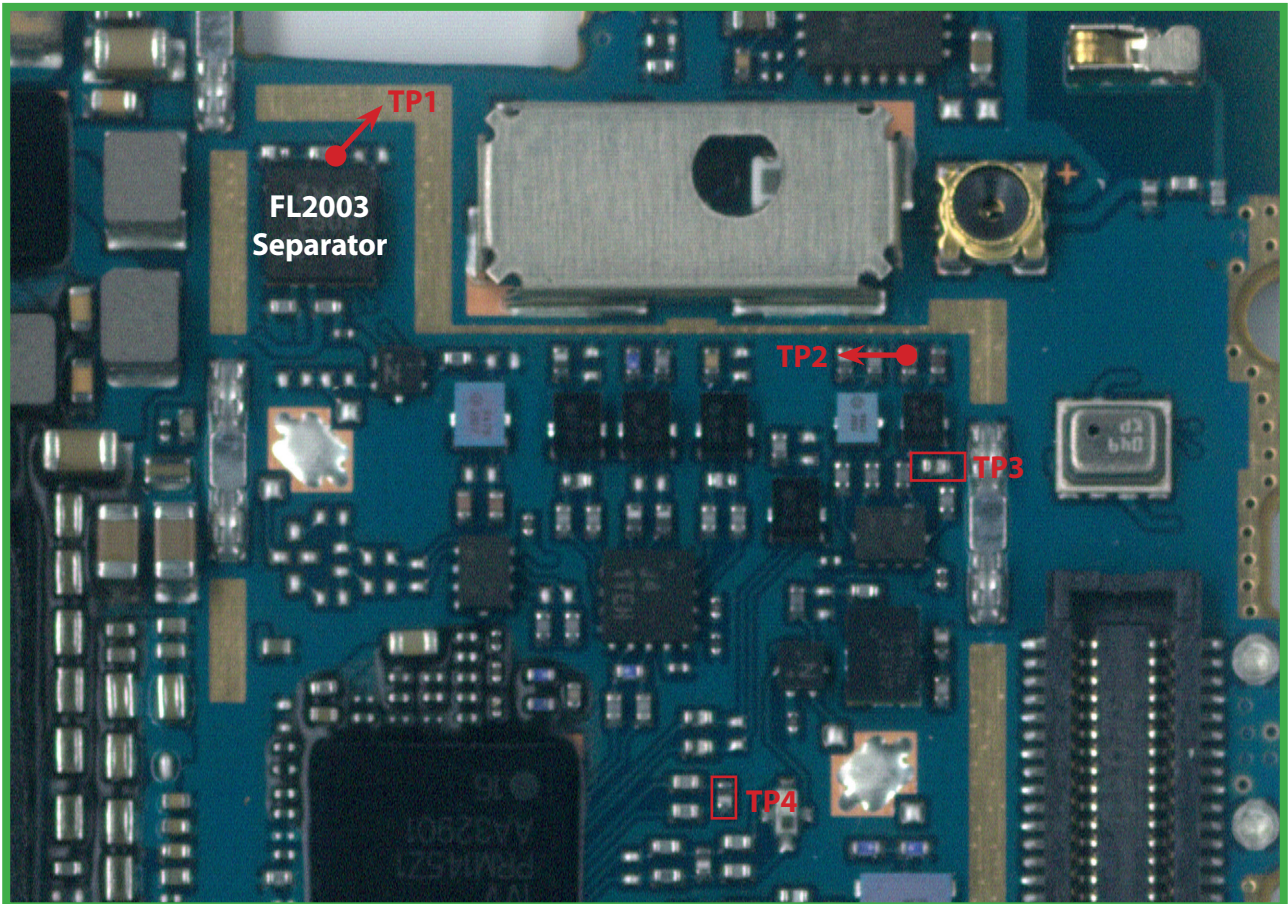
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

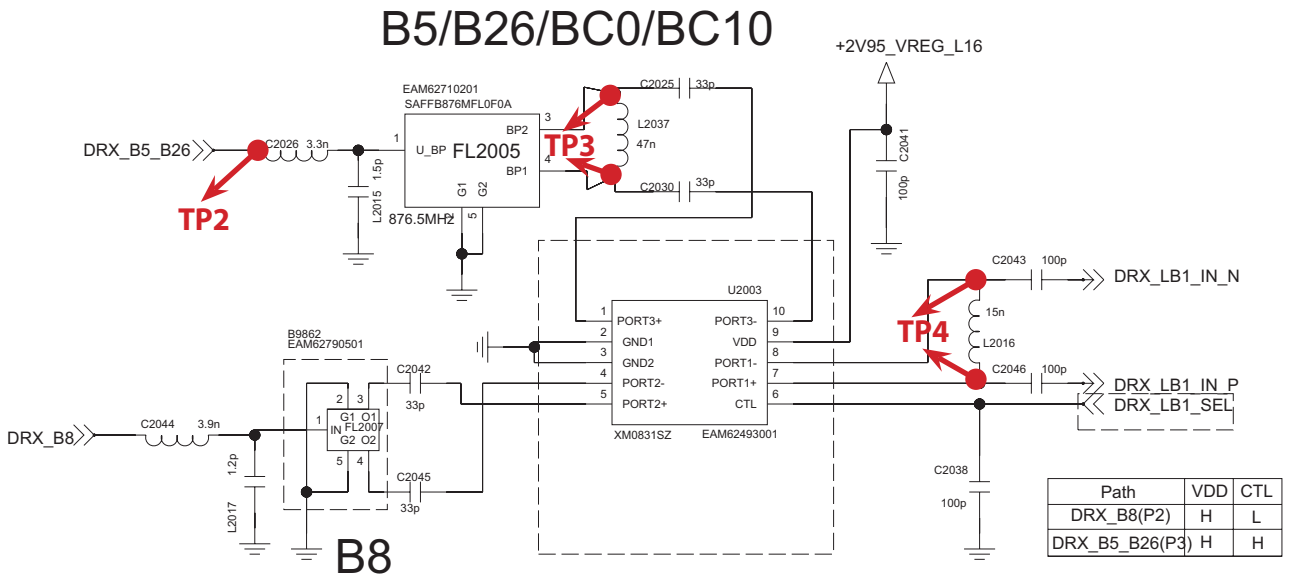
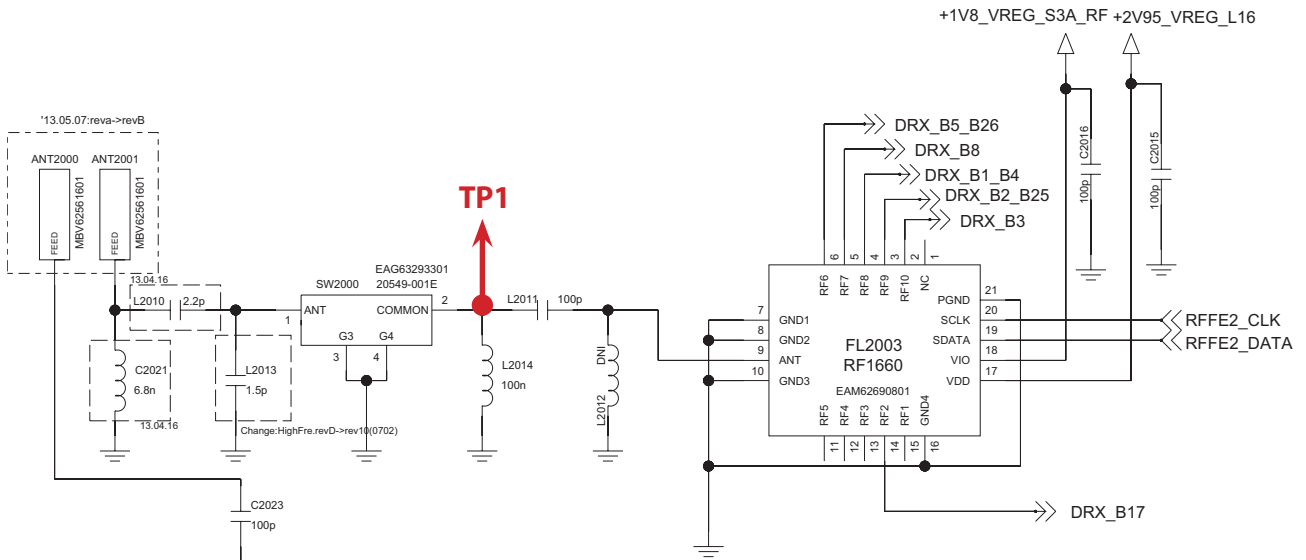


3.5.6.3 WCDMA B5/ LTE B5

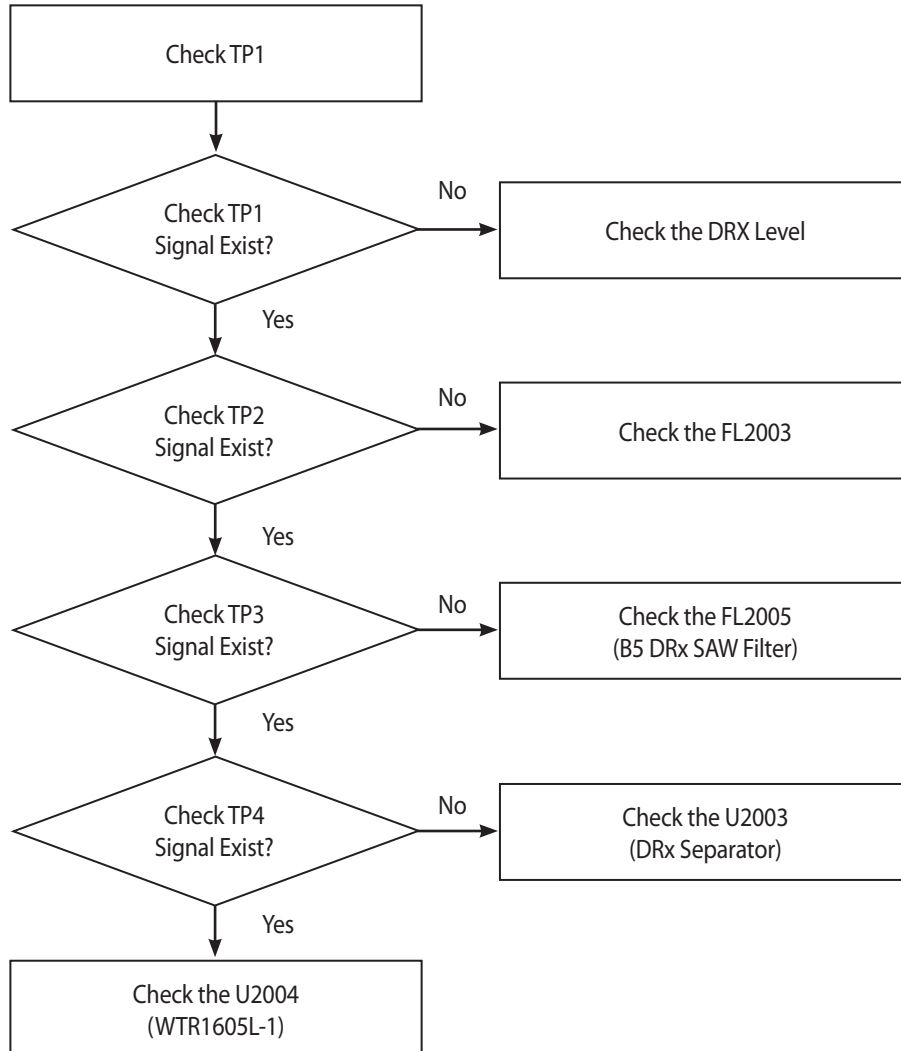


BOT

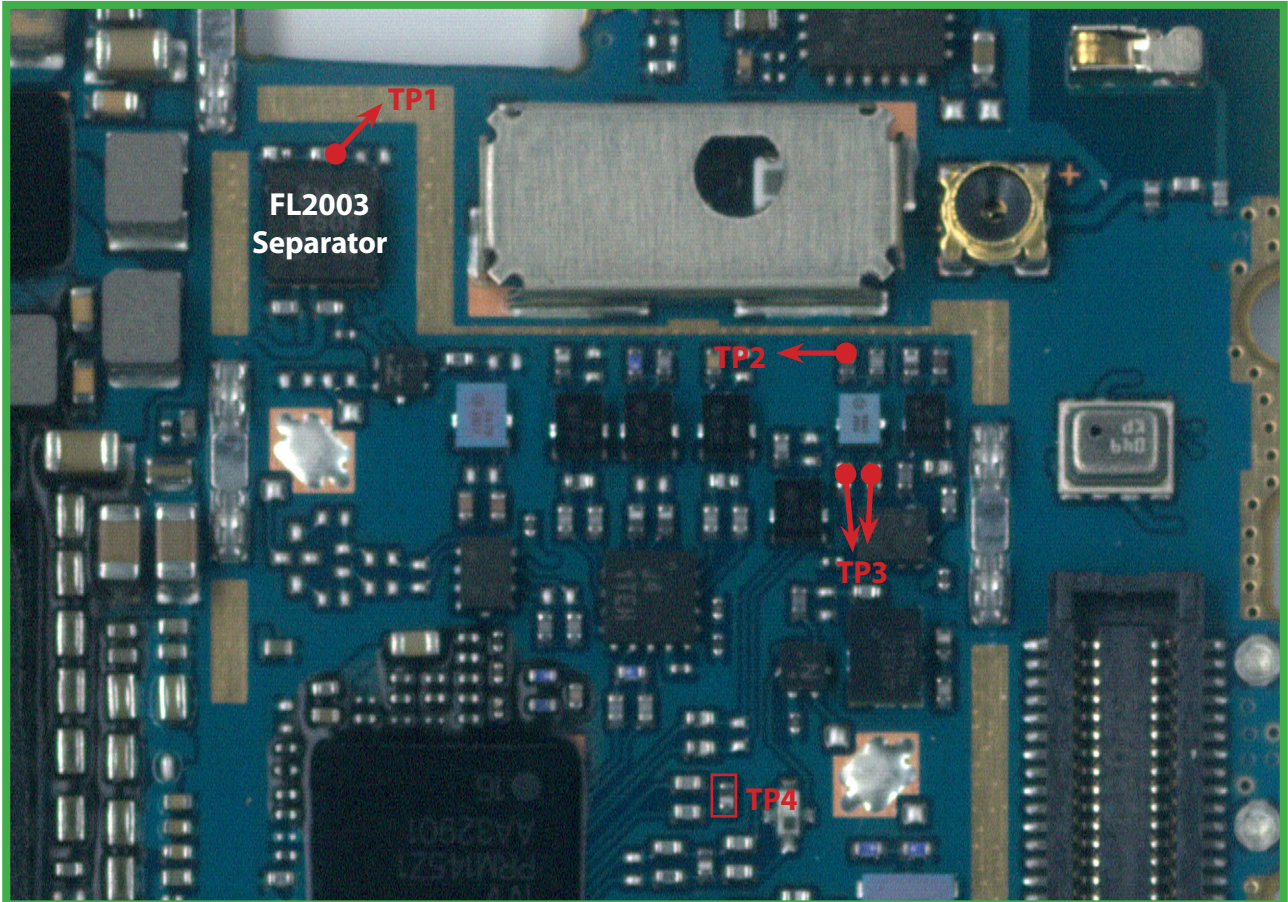
3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

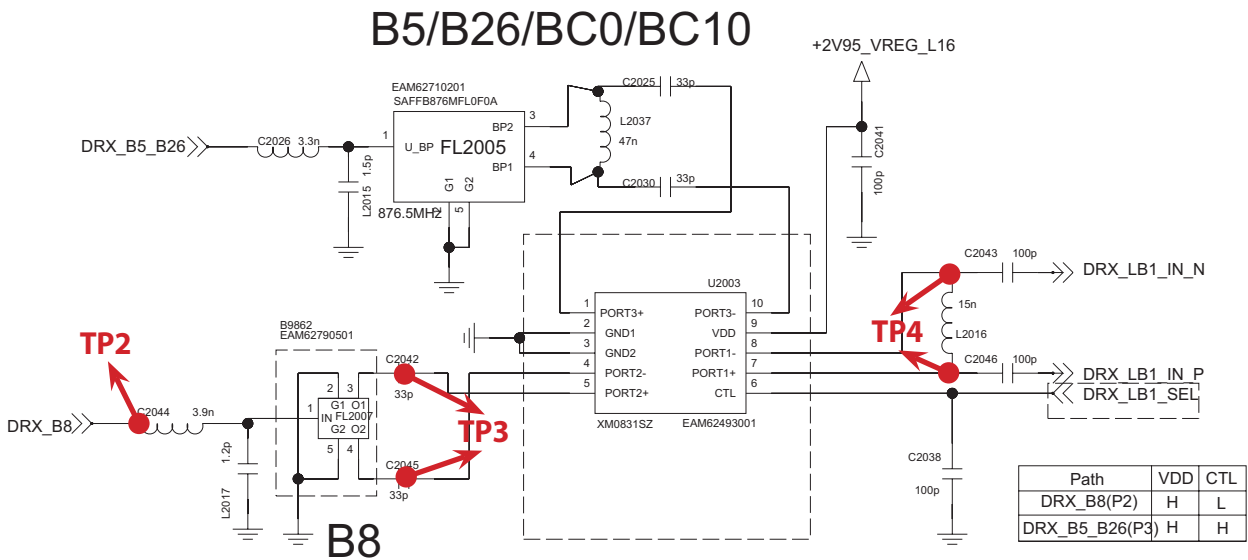
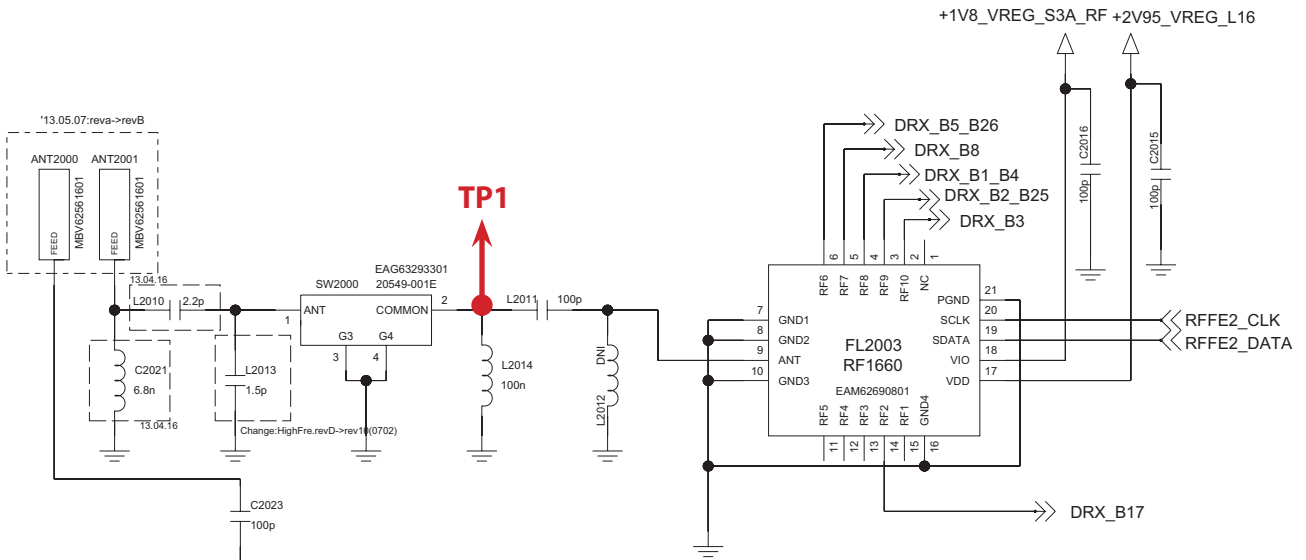


3.5.6.4 WCDMA B8

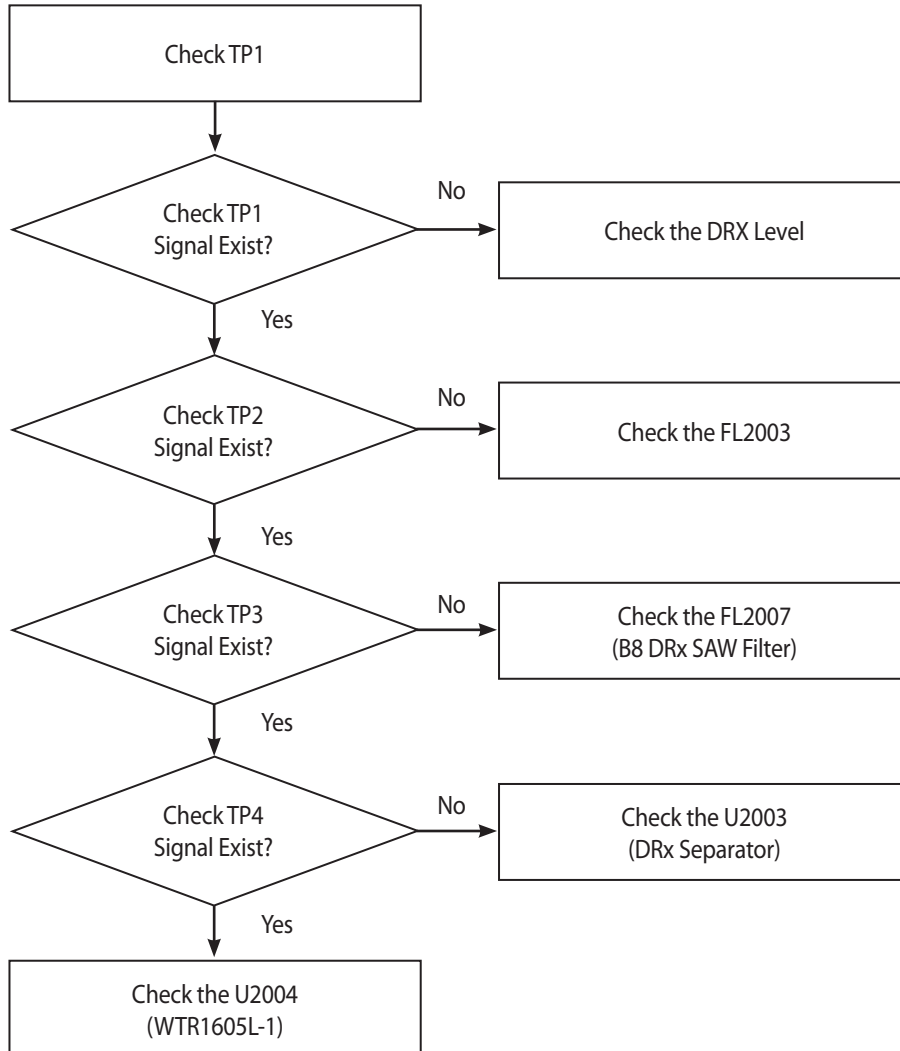


BOT

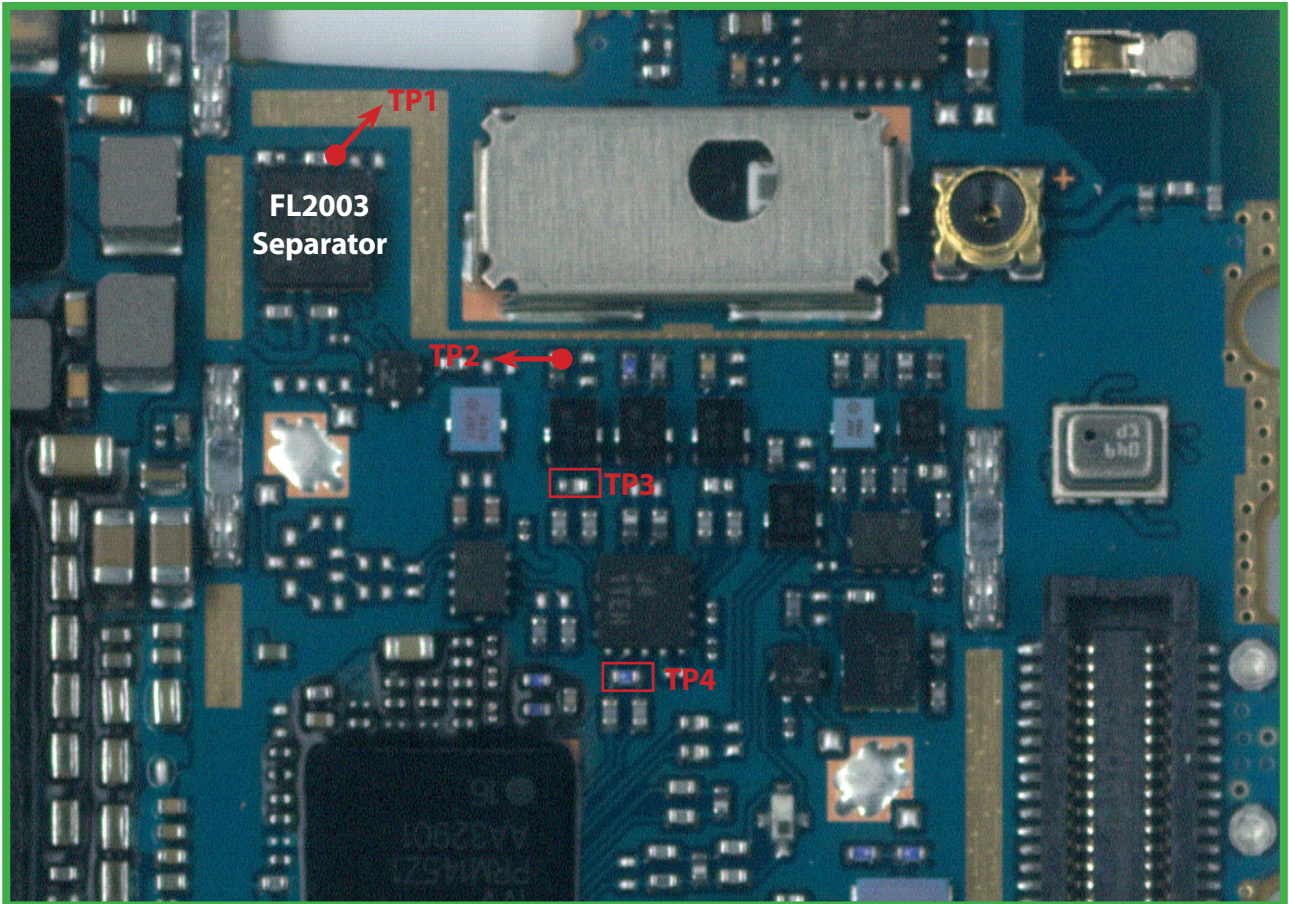
3. TROUBLE SHOOTING



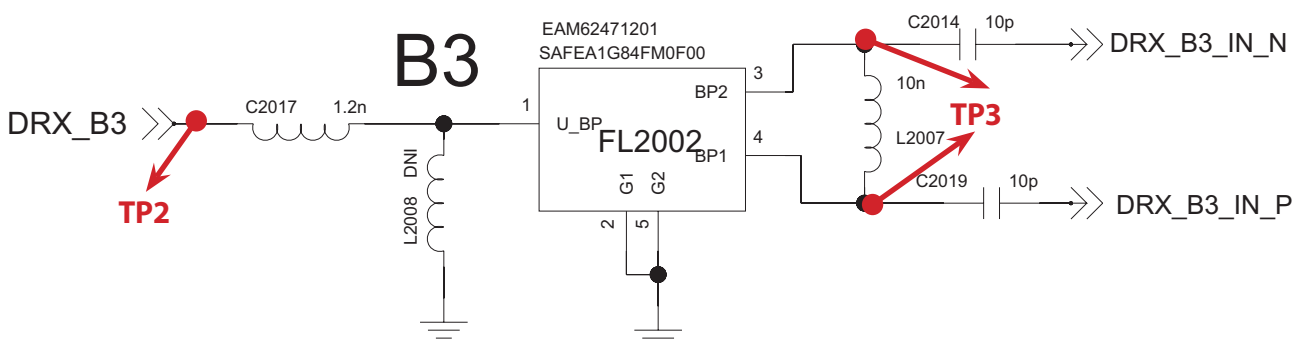
3. TROUBLE SHOOTING



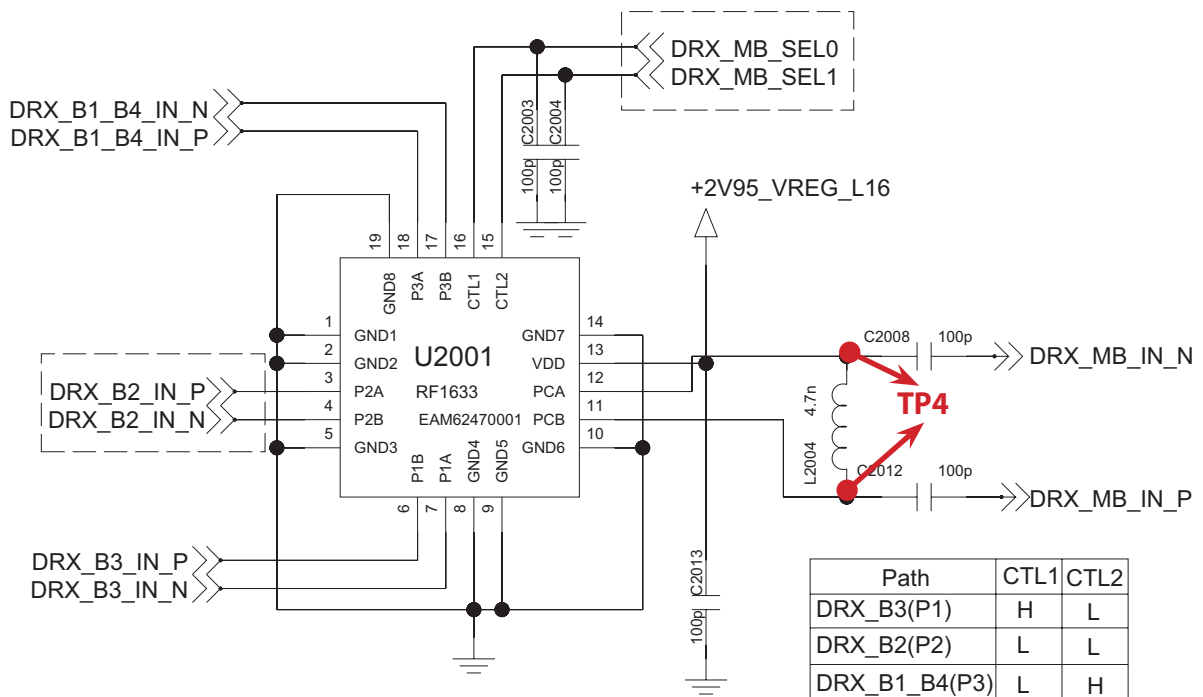
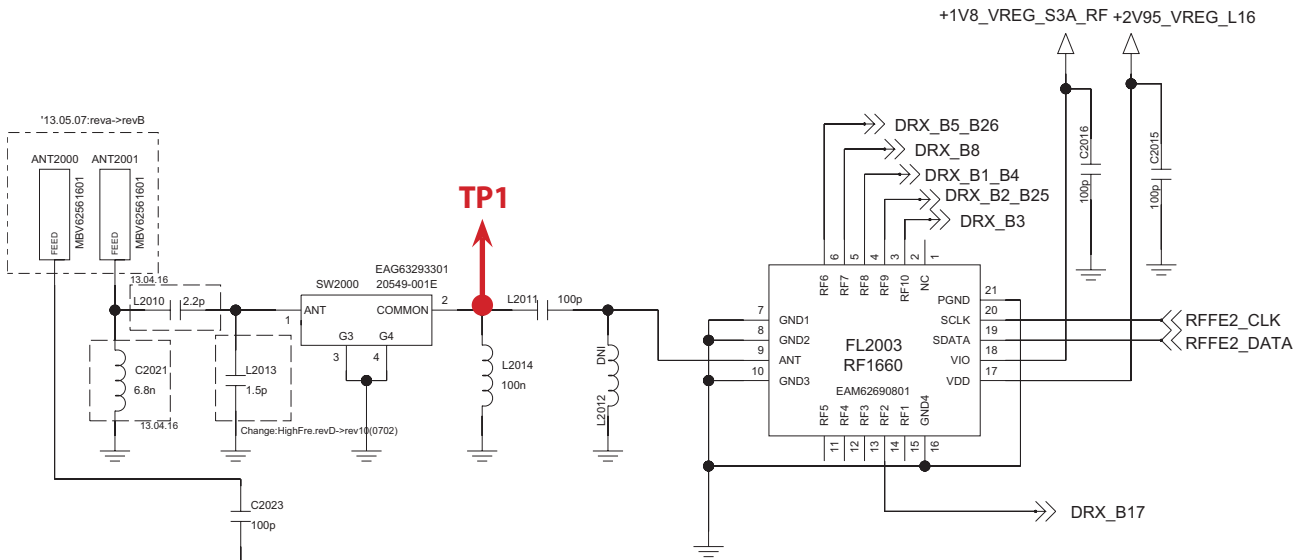
3.5.6.5 LTE B3



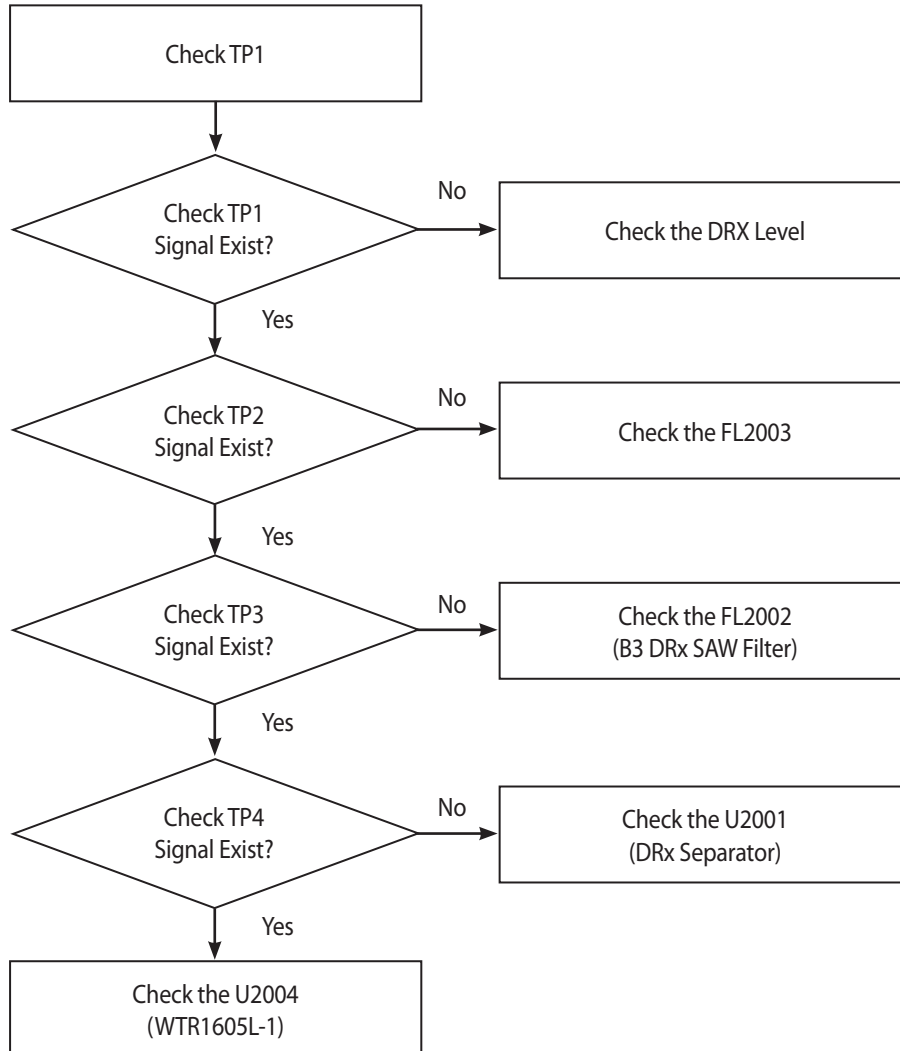
BOT



3. TROUBLE SHOOTING

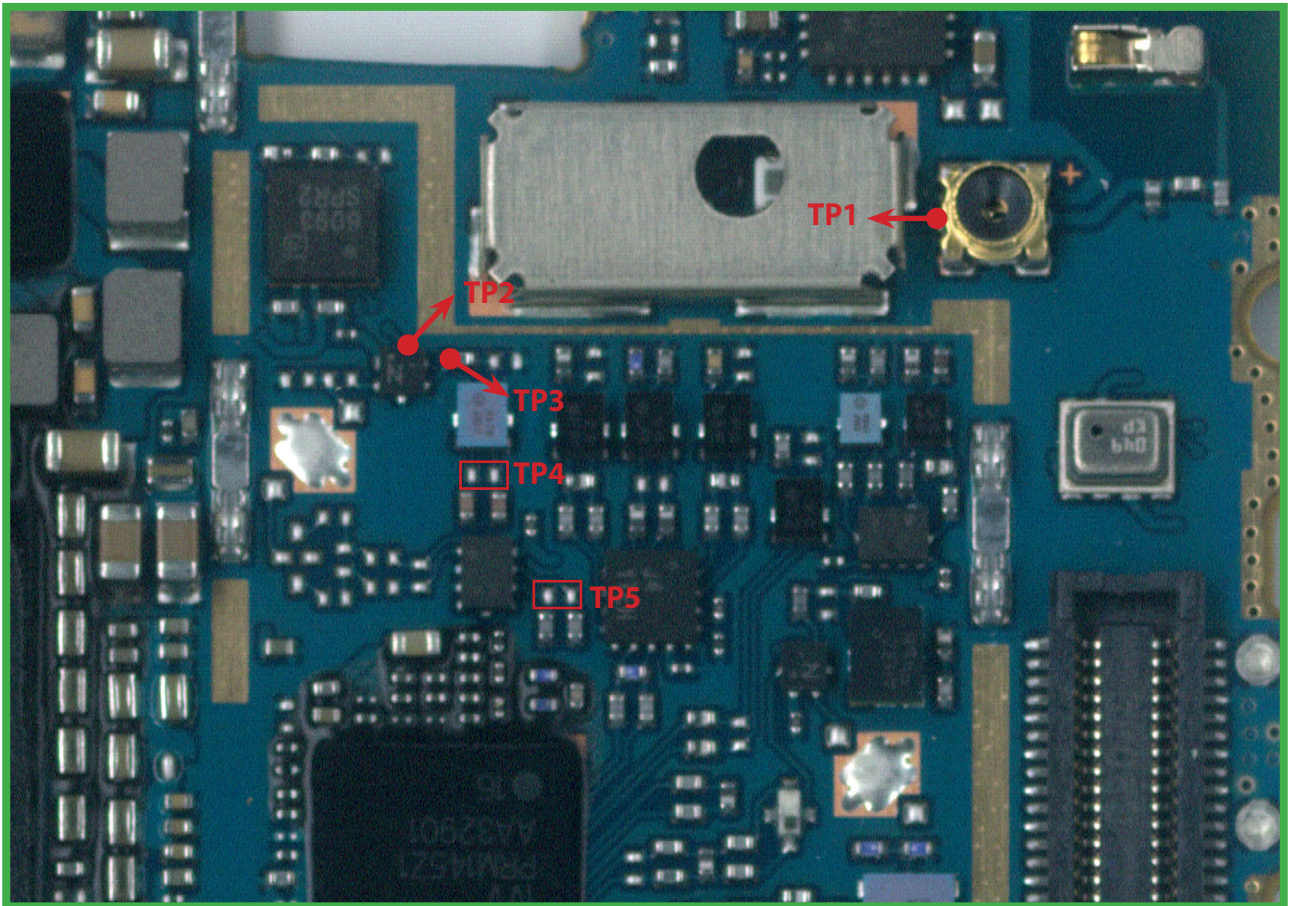


3. TROUBLE SHOOTING

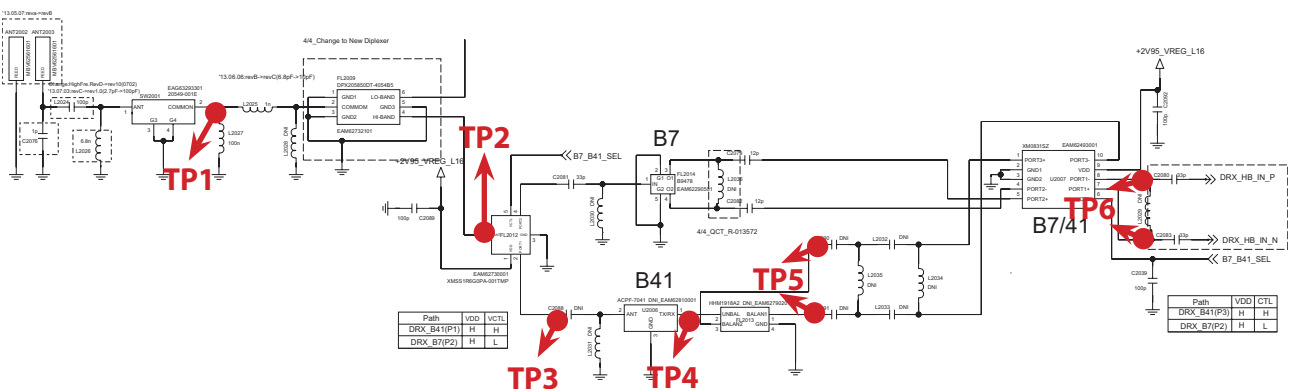


3. TROUBLE SHOOTING

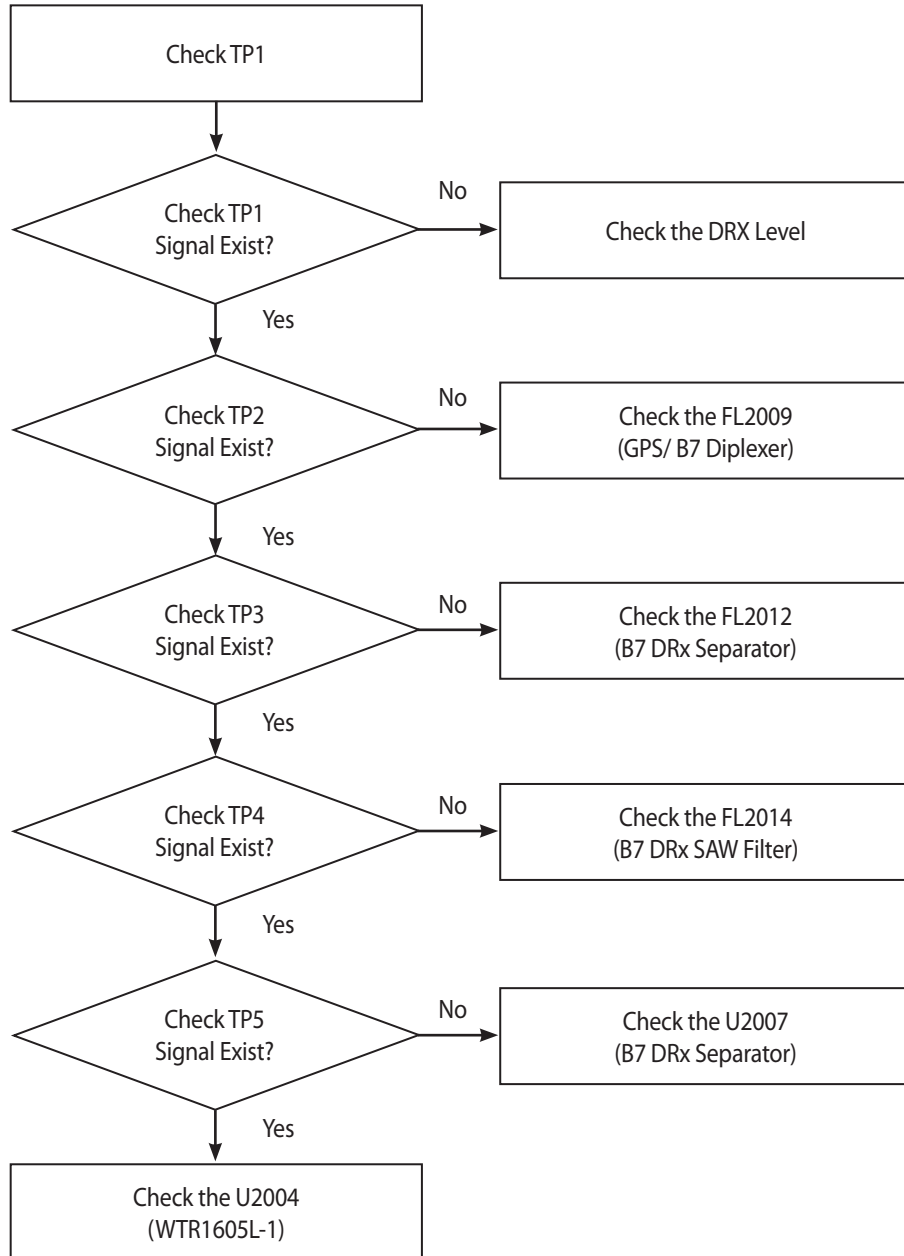
3.5.6.6 LTE B7



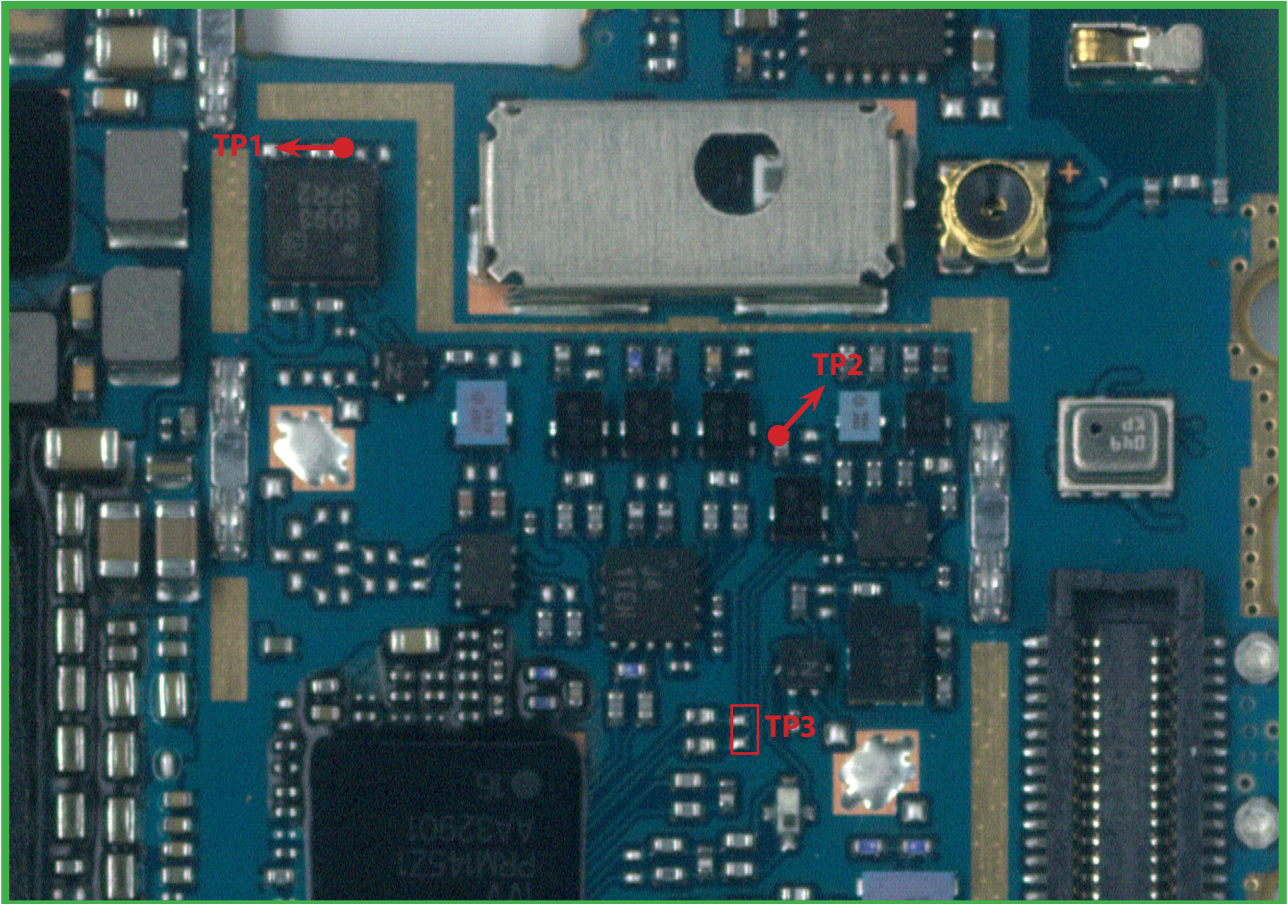
BOT



3. TROUBLE SHOOTING

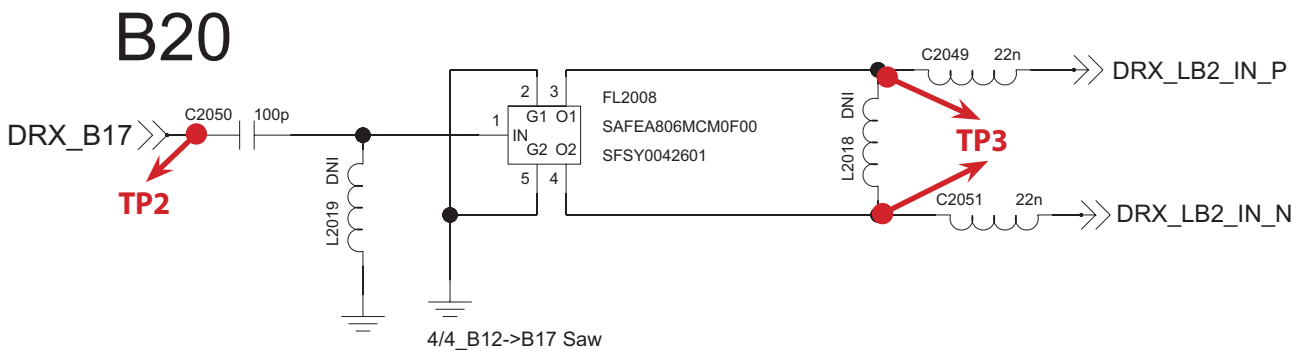
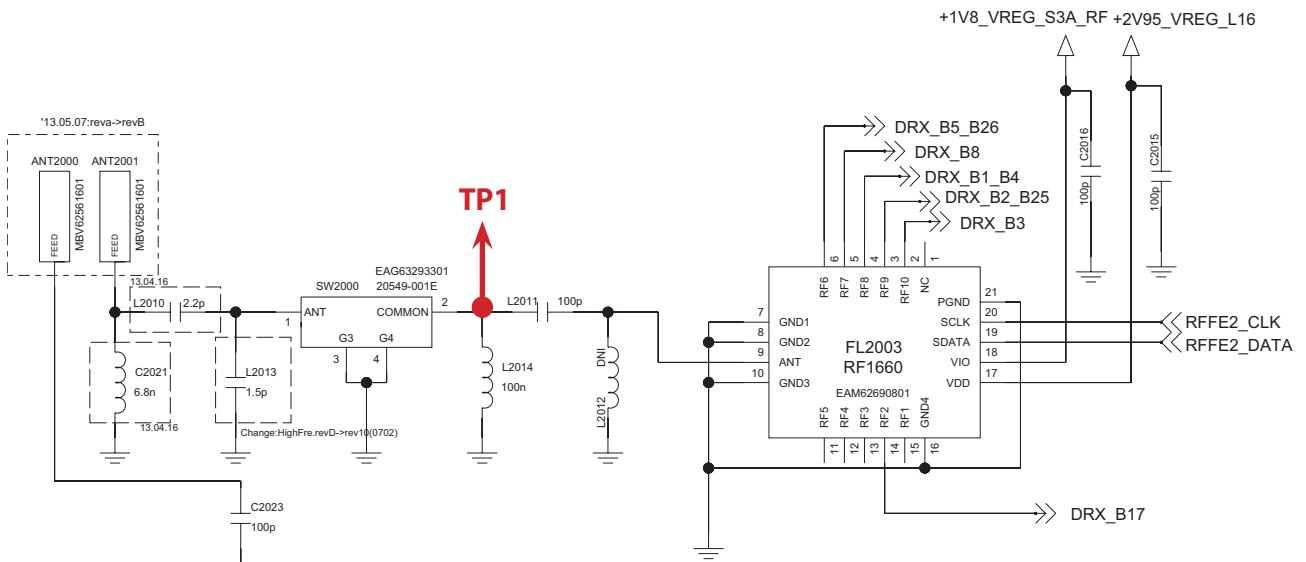


3.5.6.7 LTE B20

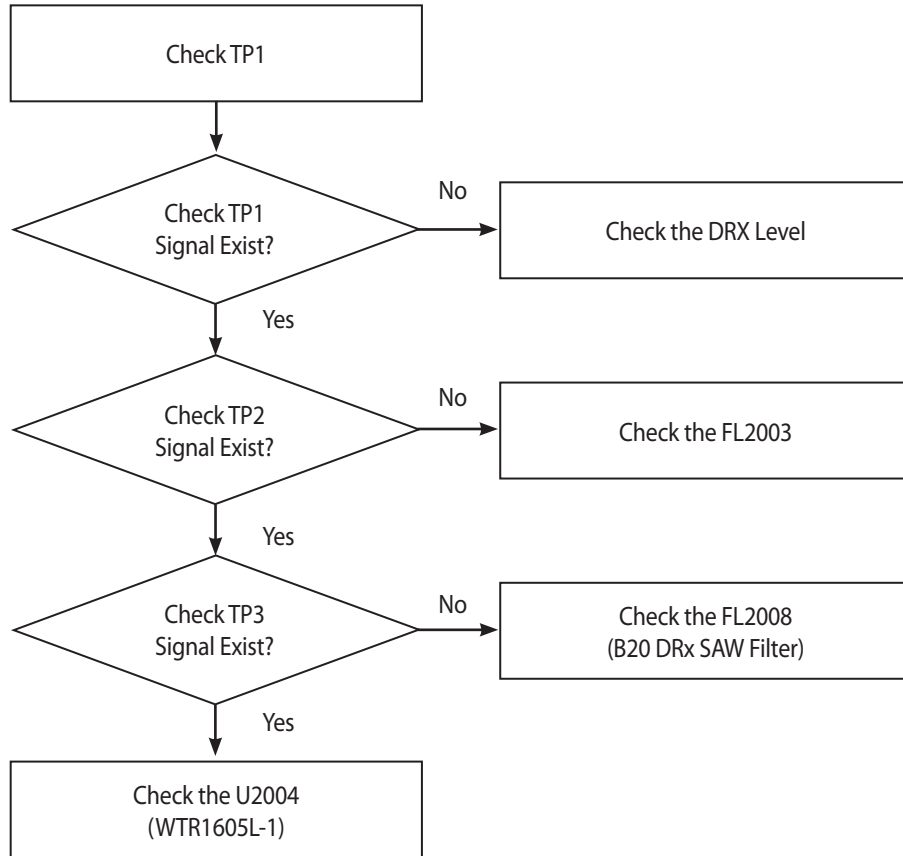


BOT

3. TROUBLE SHOOTING

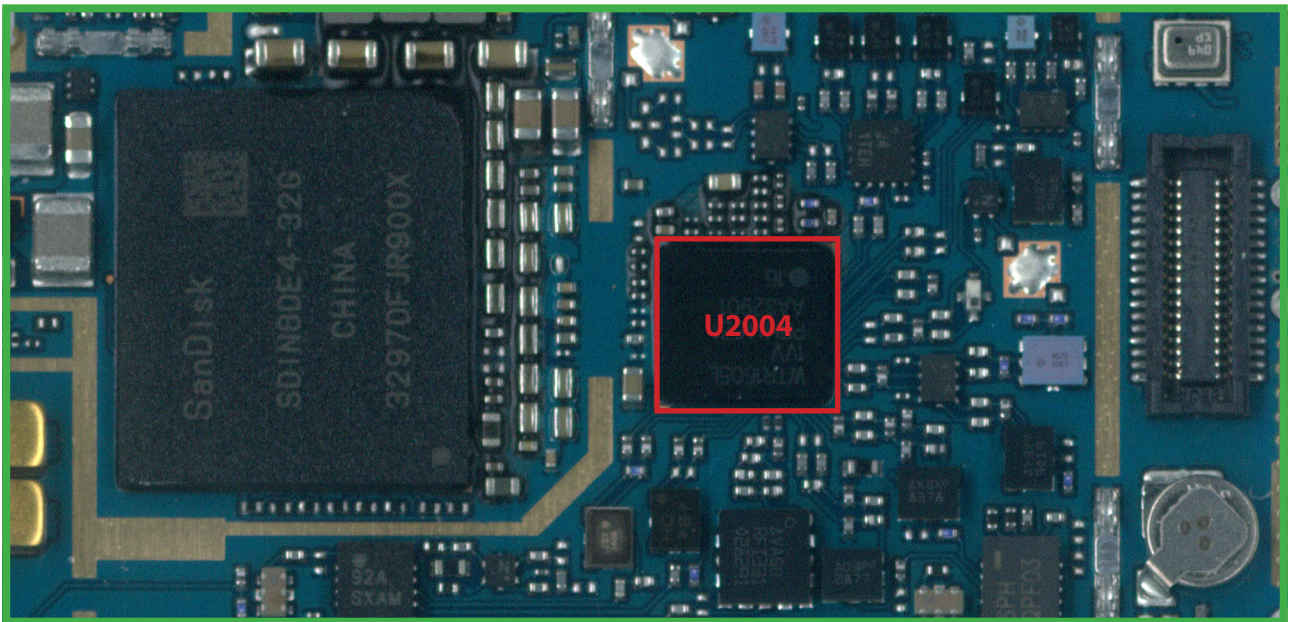


3. TROUBLE SHOOTING



3.6 GPS Trouble shooting

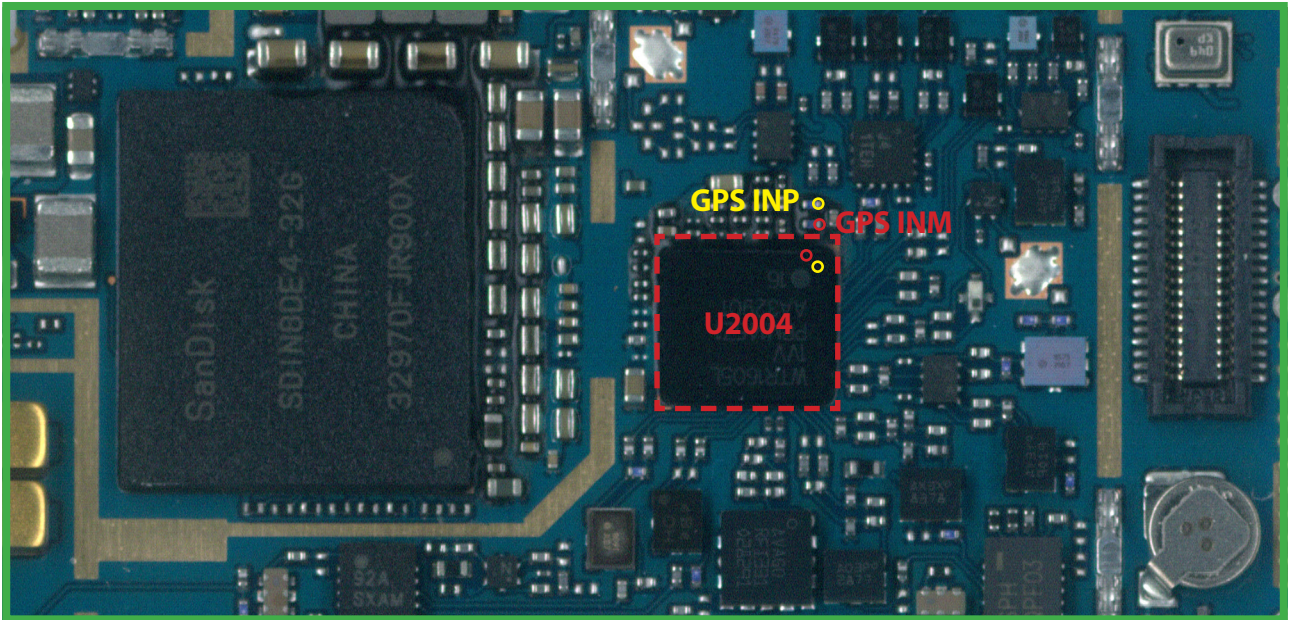
3.6.1 GPS IC Component



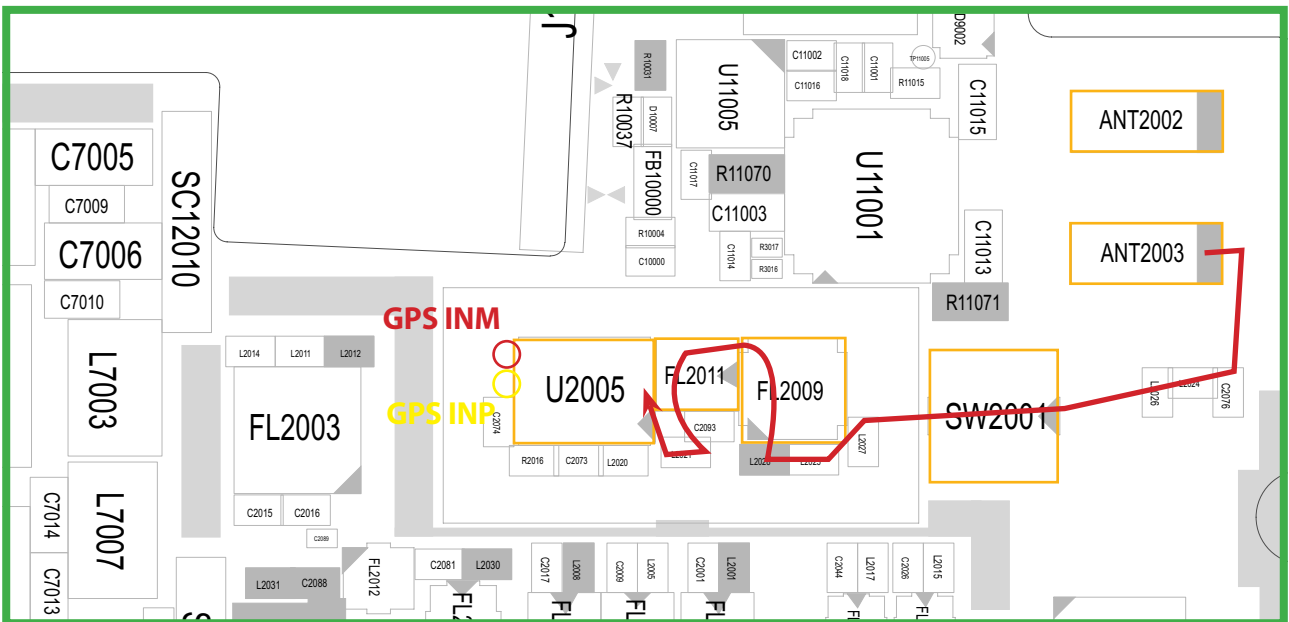
BOT

Reference No.	Description	Reference No.	Description
FL2011	SAW Filter	U2005	GPS LNA
FL2009	GPS & B7/41 Diplexer	SW2001	RF SWITCH
ANT2003	GPS ANT (Signal)	U2004	WTR1605L
ANT2002	GPS ANT (GND)		

3.6.2 GPS SIGNAL PATH

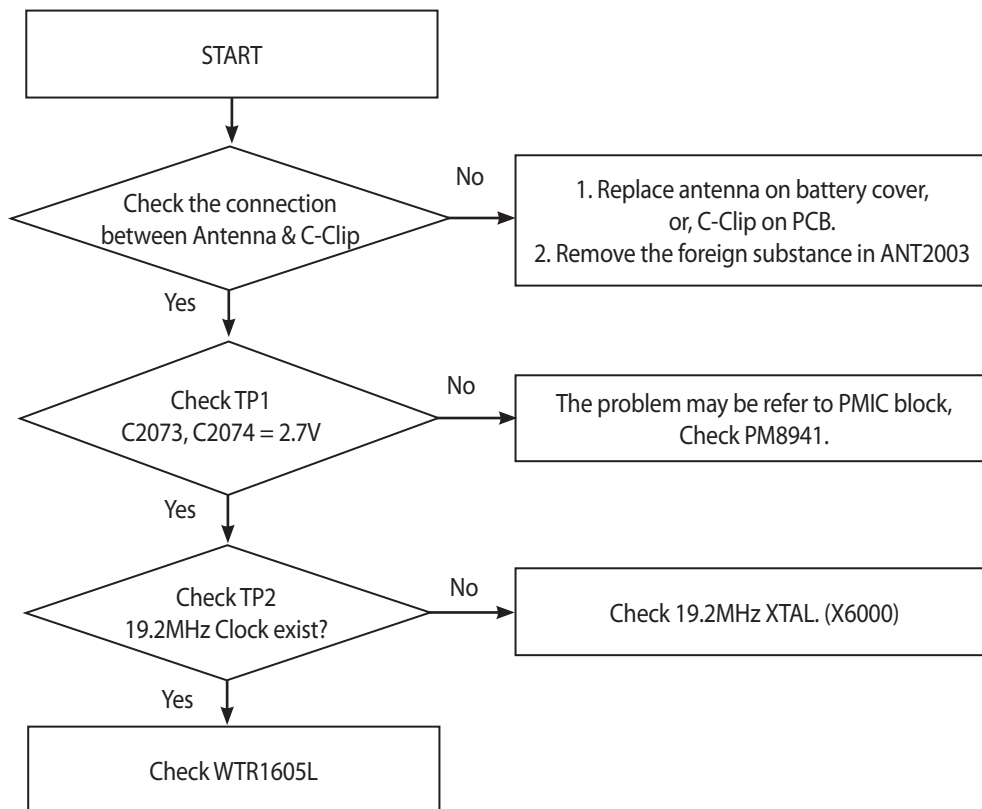


BOT

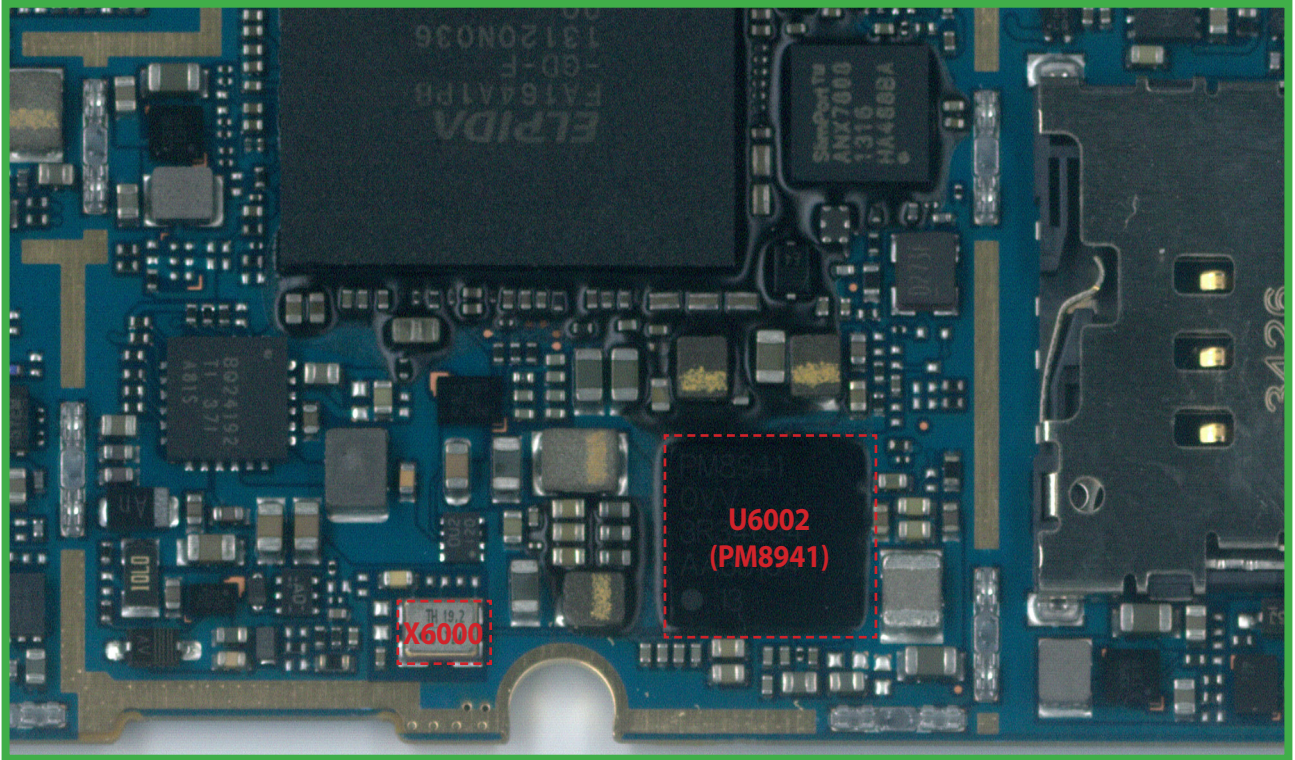


BOT

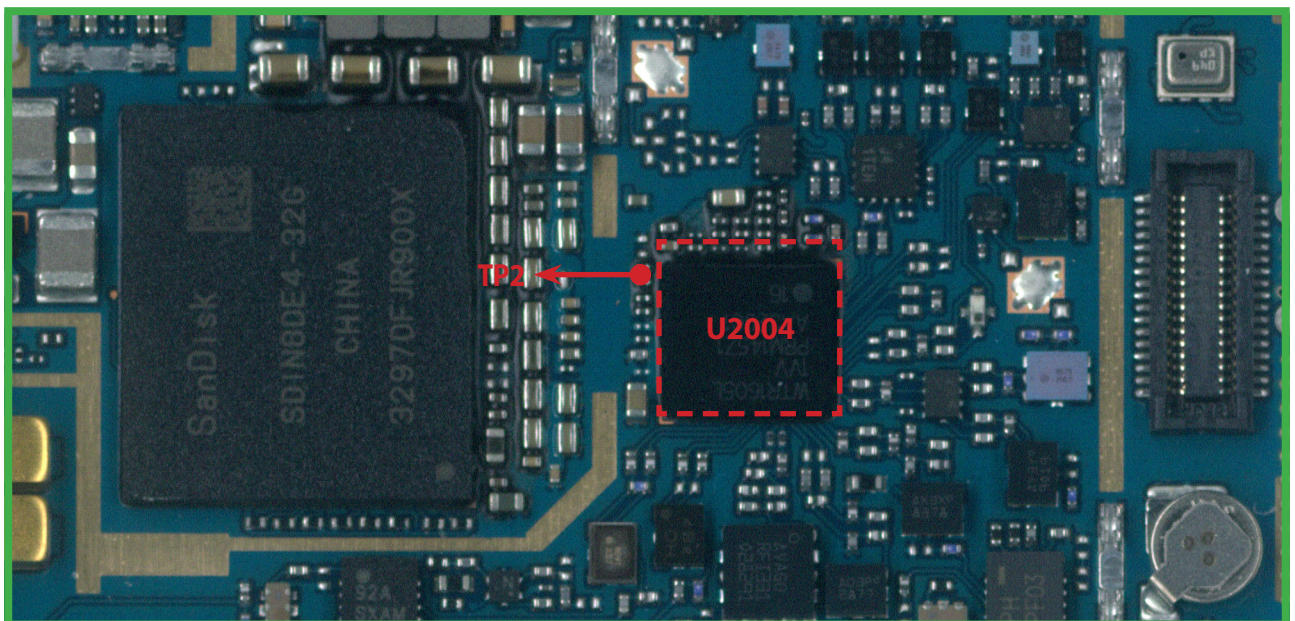
3.6.3 Checking GPS



3. TROUBLE SHOOTING

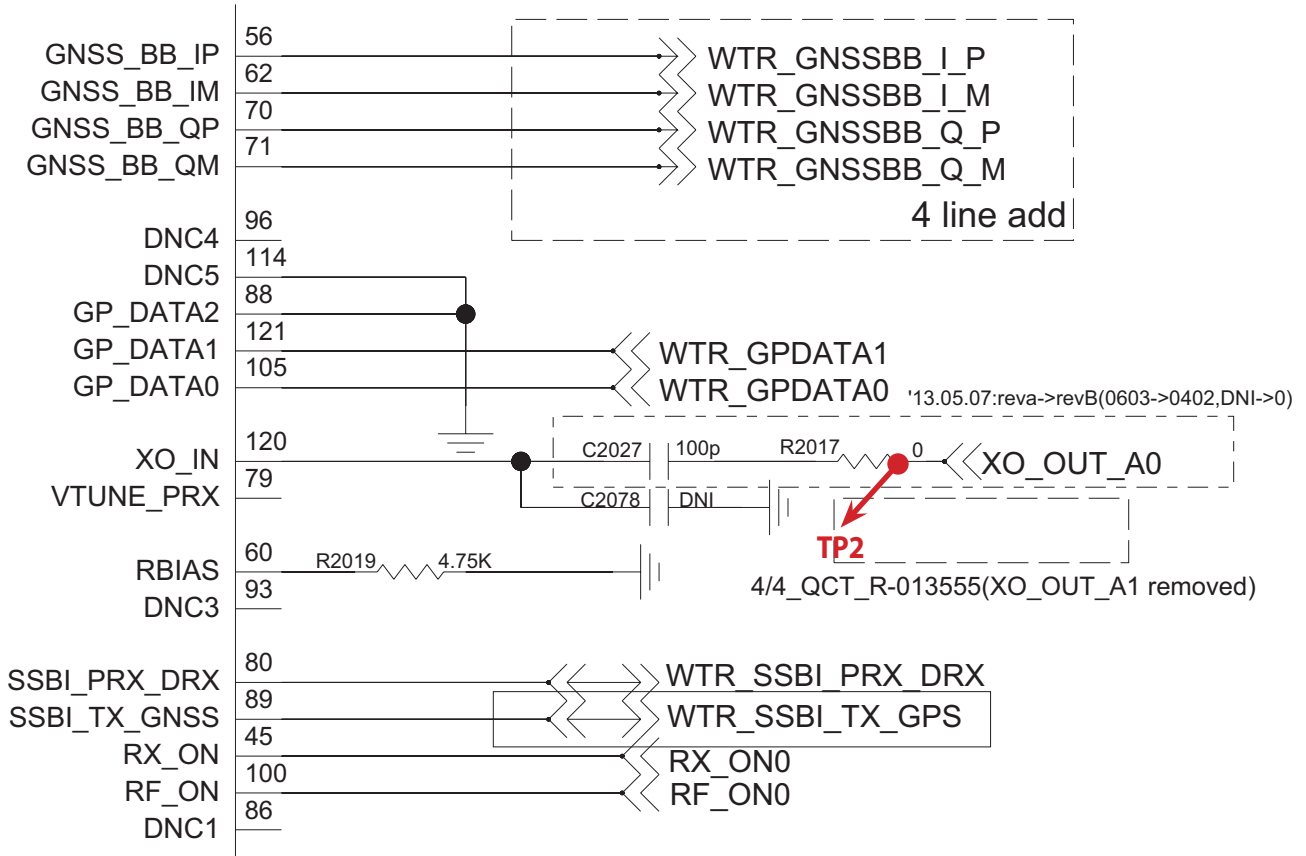


TOP



BOT

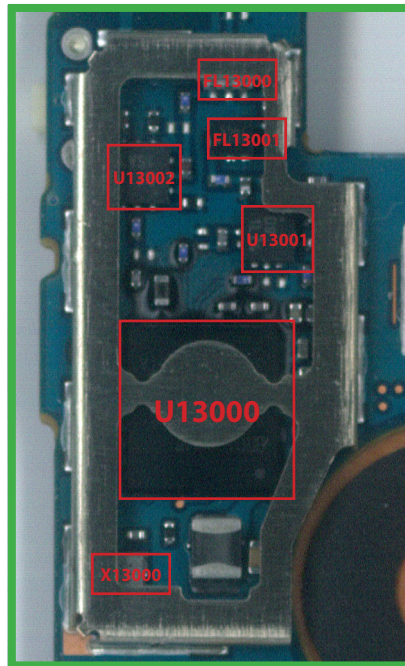
3. TROUBLE SHOOTING



Schematic of WTR1605L

3.7 WIFI/BT Trouble shooting

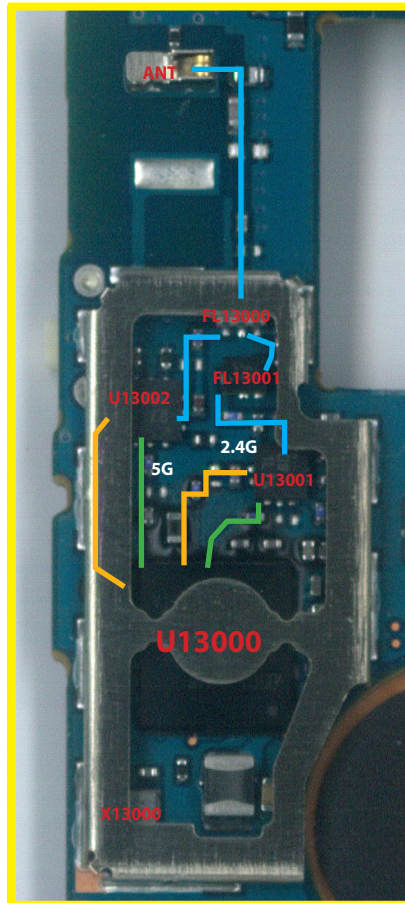
3.7.1 WIFI/BT IC Component



BOT

Reference No.	Description	Reference No.	Description
FL13000	Diplexer	U13001	2.4G SP3T+LNA
FL13001	SAW	U13002	5G SP2T+LNA
U13000	WIFI/BT Chip	X13000	Crystal

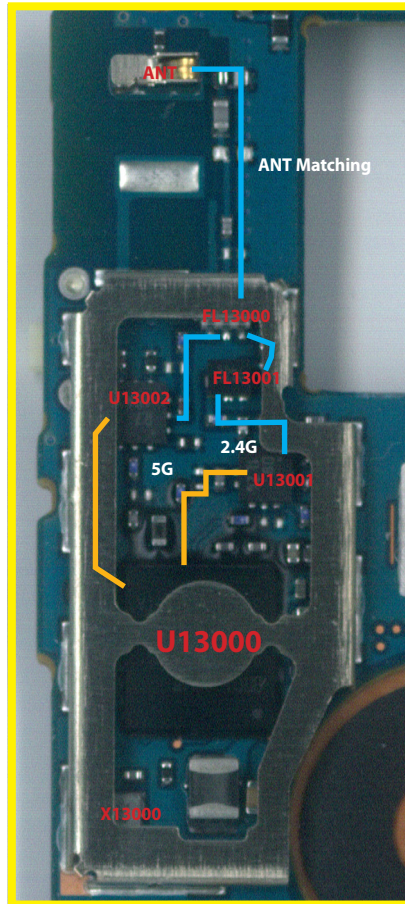
3.7.2 WIFI/BT Signal Path_Tx / Rx



— Tx Path
— Rx Path

BOT

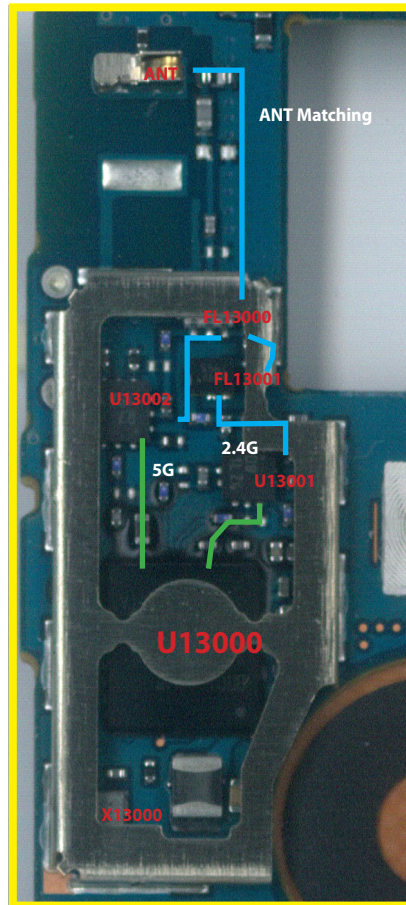
3.7.3 WIFI/BT Signal Path_Tx



— Tx Path

BOT

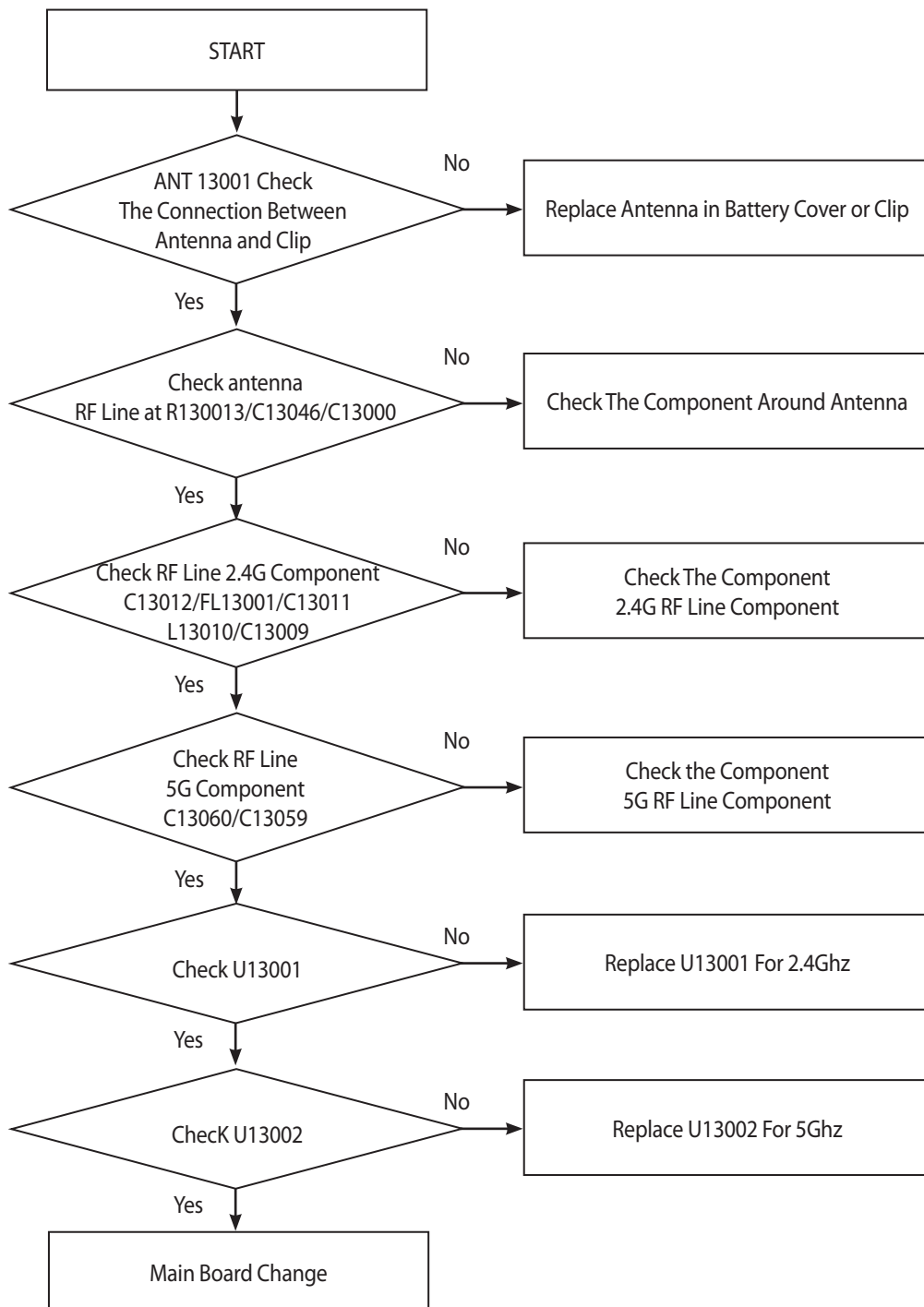
3.7.4 WIFI/BT Signal Path_Rx



— Rx Path

BOT

Checking WIFI_BT

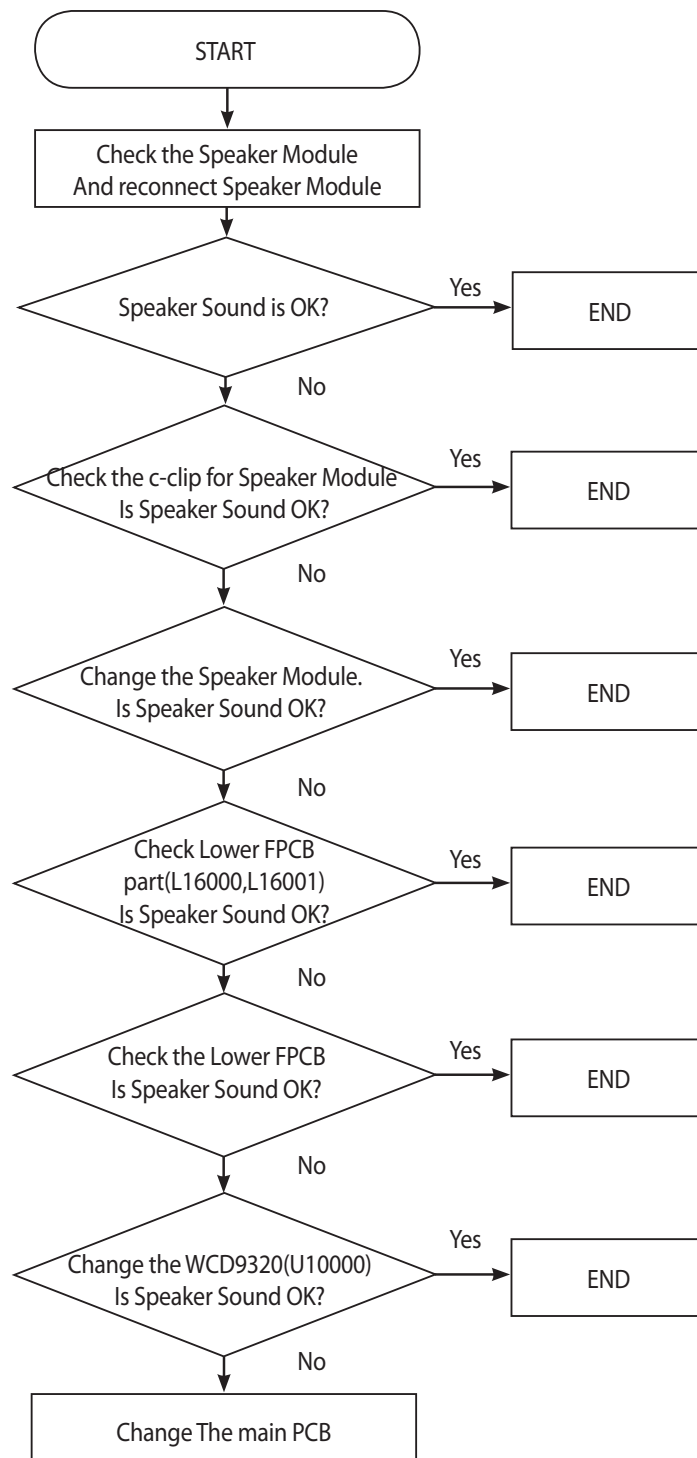


3.8 Audio troubleshooting

3.8.1 Speaker troubleshooting

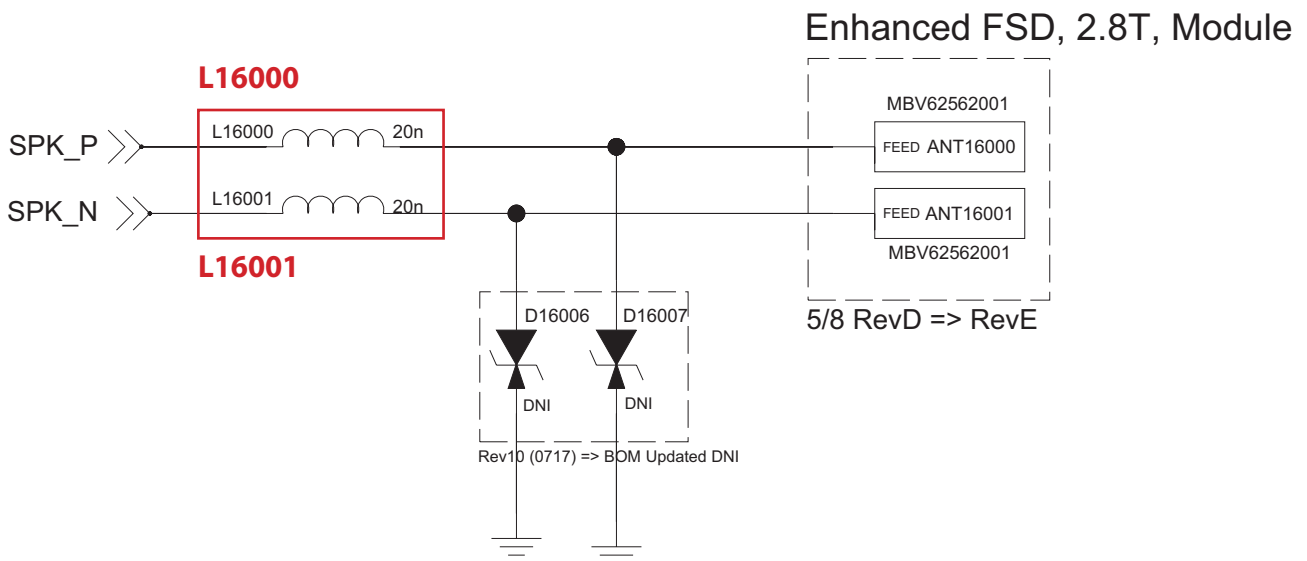
It's trouble shooting guide for no sound case.

Speaker control signals are generate by MSM8974(U3000), WCD9320(U10000).

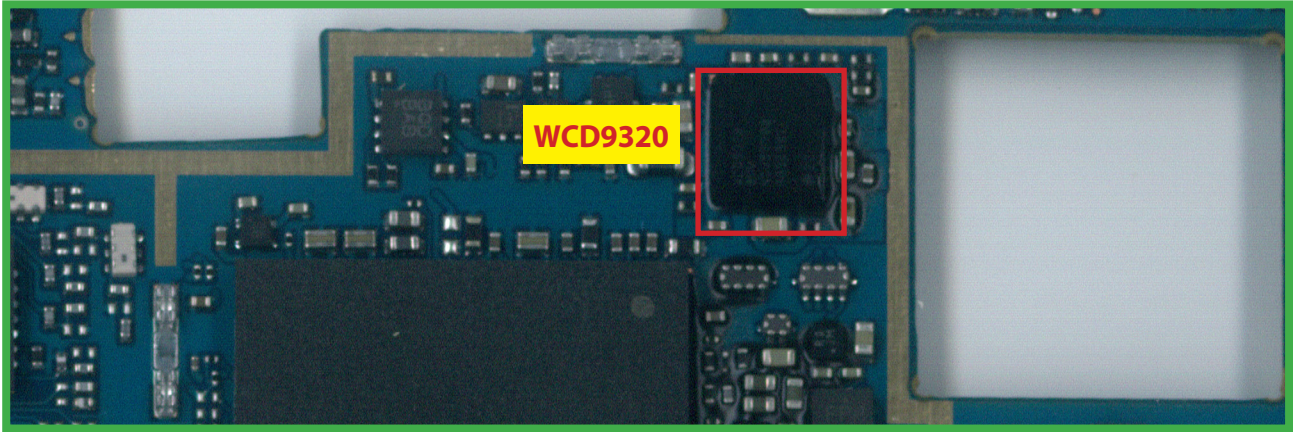




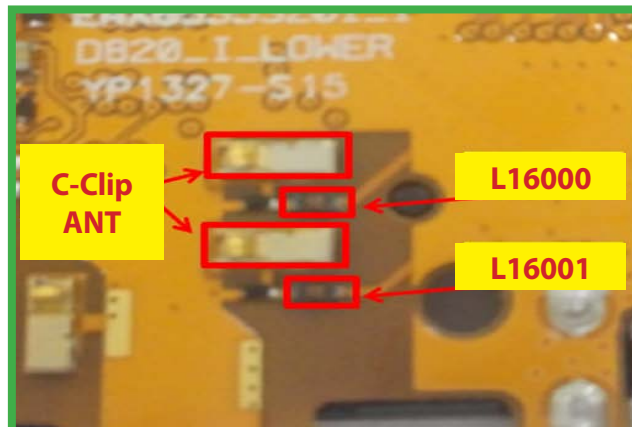
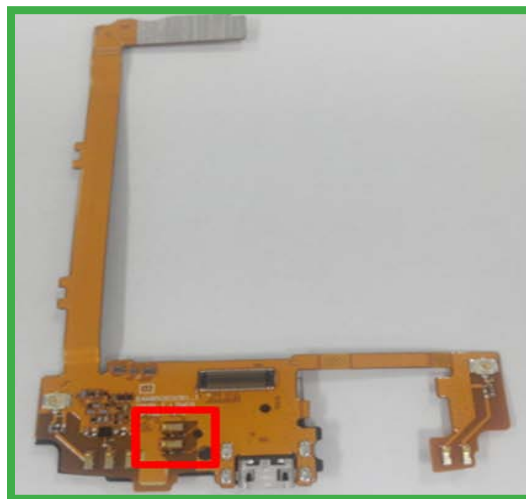
SPEAKER



3. TROUBLE SHOOTING



TOP

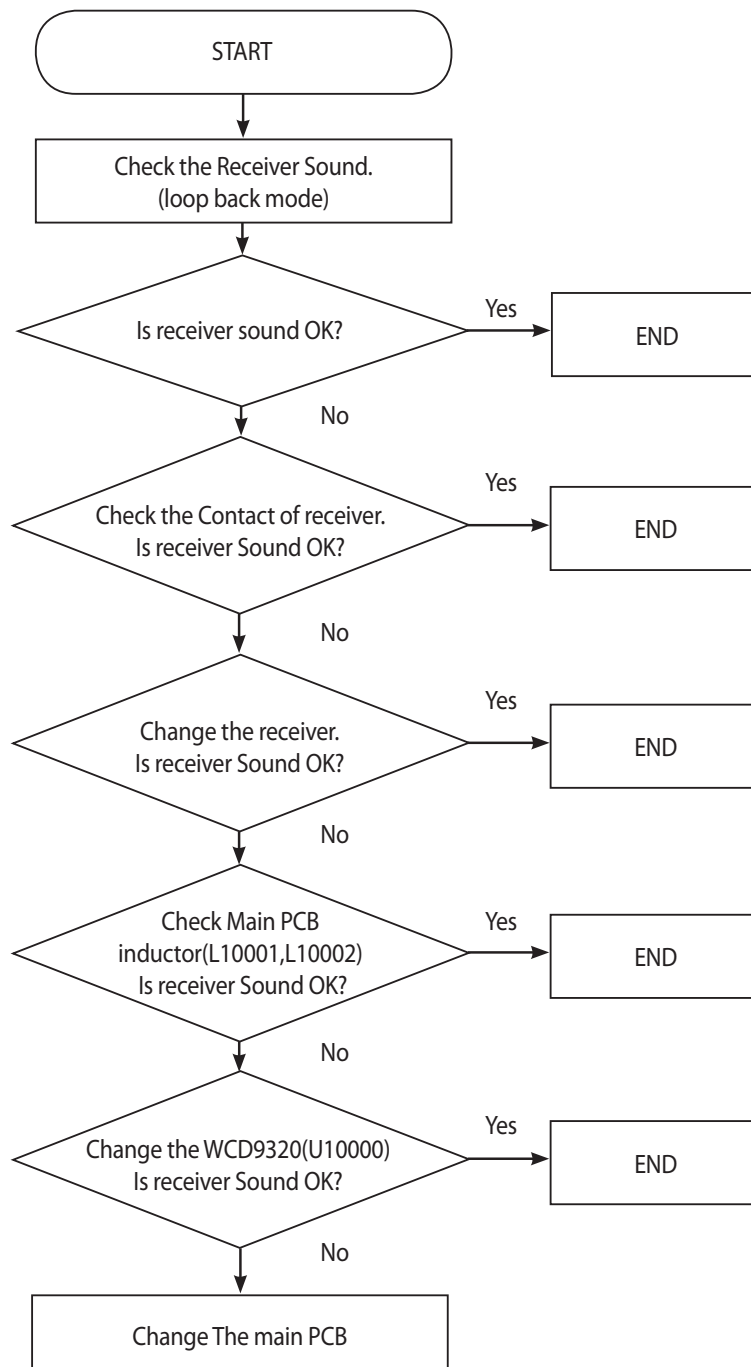


3.8.2 Receiver troubleshooting

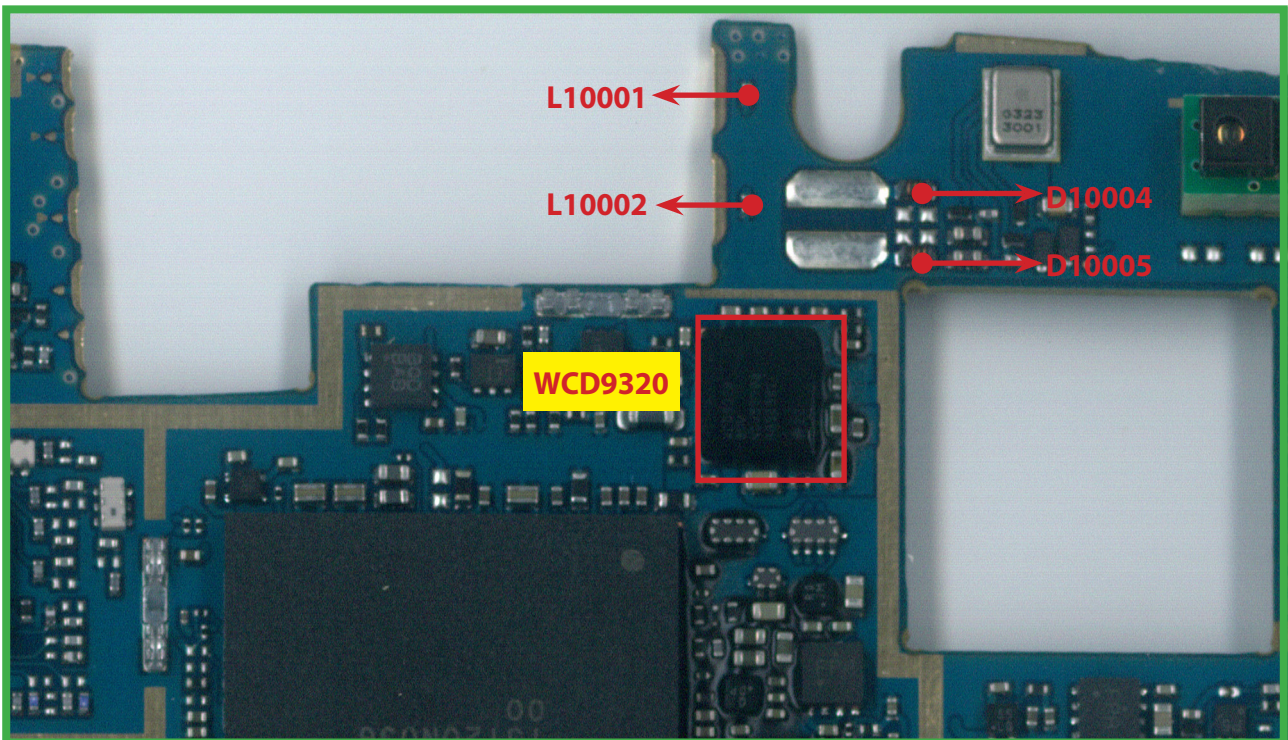
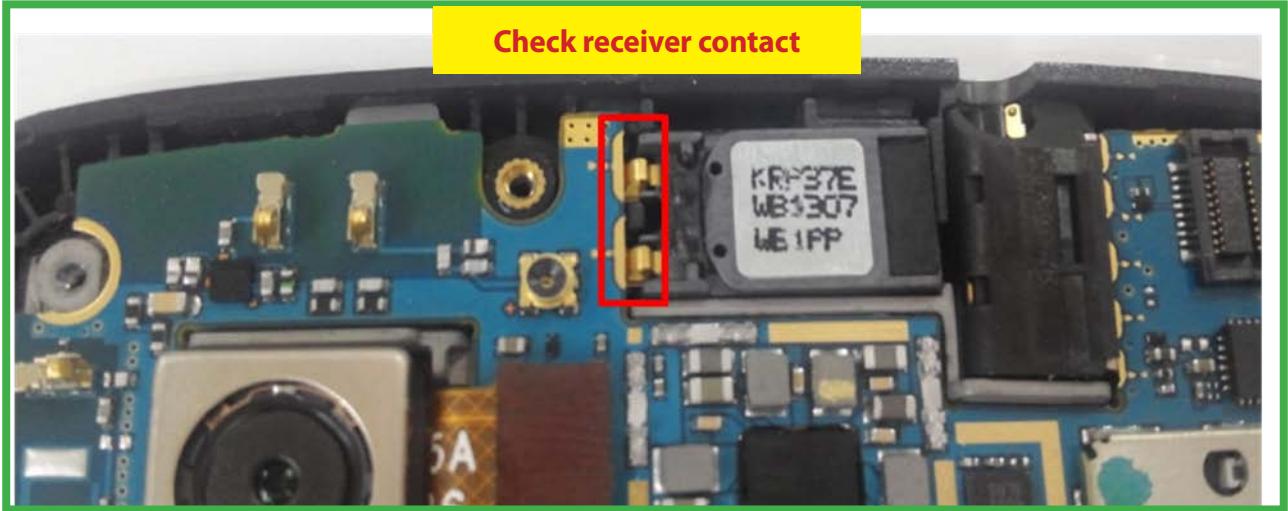
Receiver control signals are generate by MSM8974(U3000), WCD9320(U10000)

Voice Receiving path as below :

MSM8974 -> WCD9320 -> EAROP / EARON -> Receiver

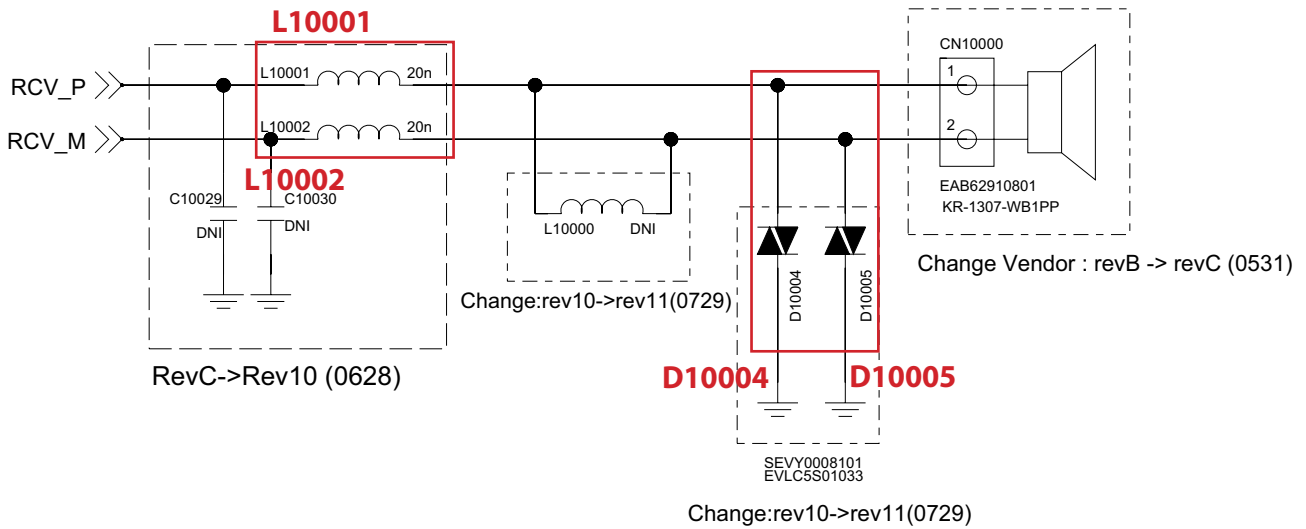


3. TROUBLE SHOOTING



TOP

RECEIVER



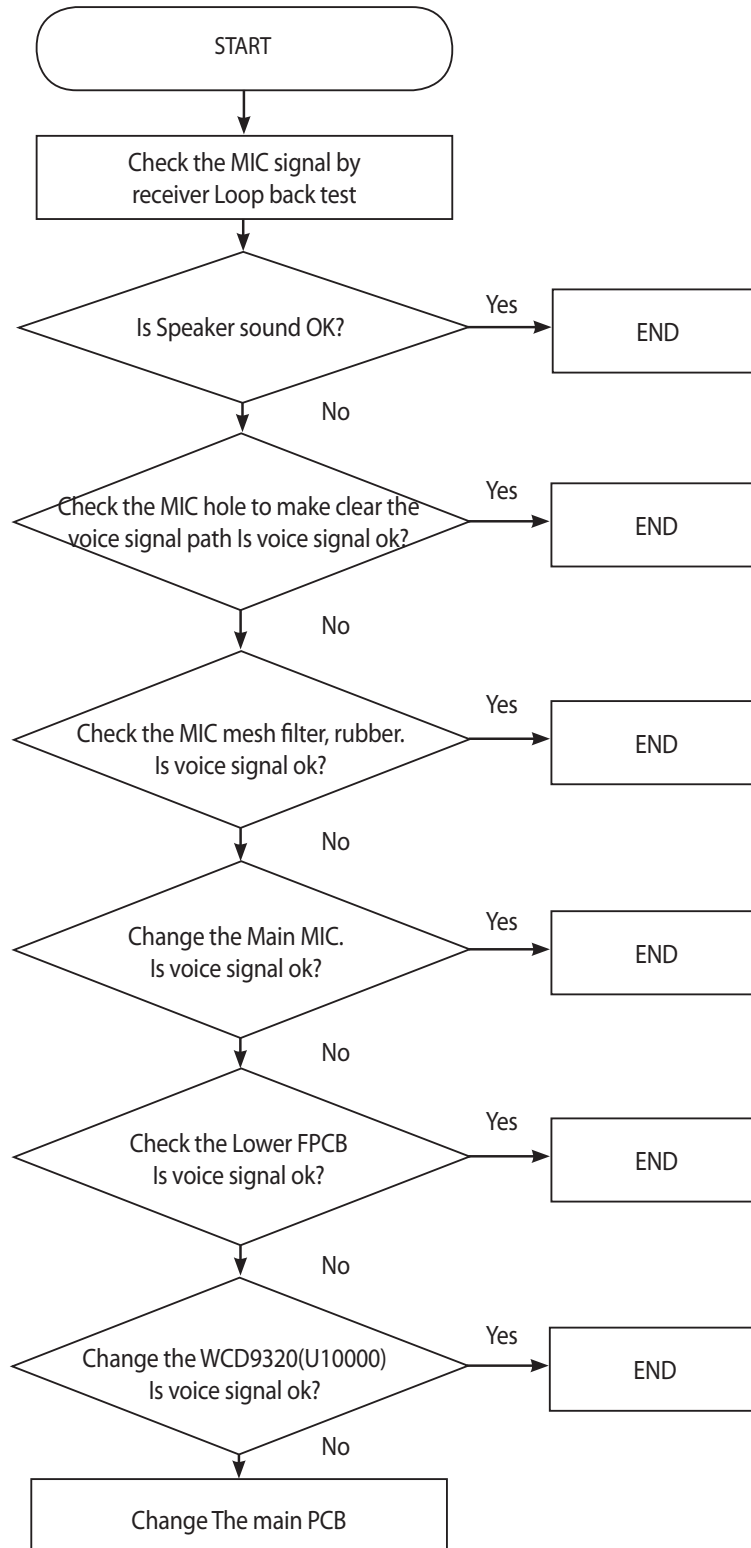
In case of No Receiver sound, not only Receiver fault but MIC fault.

You must check the voice recording test first. After voice recording, if you could hear the recorded sound, It is nor MIC fault And receiver path or parts is something wrong.

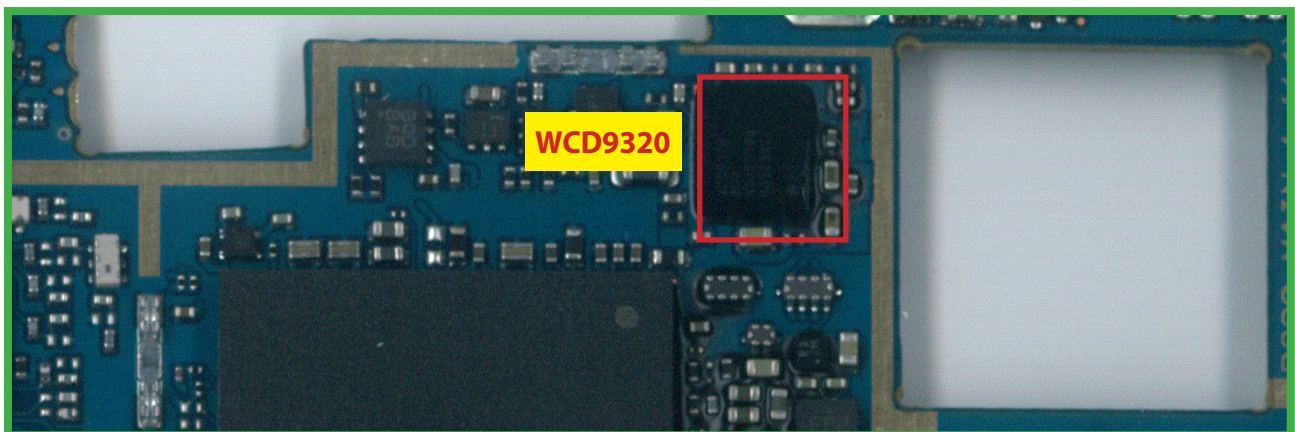
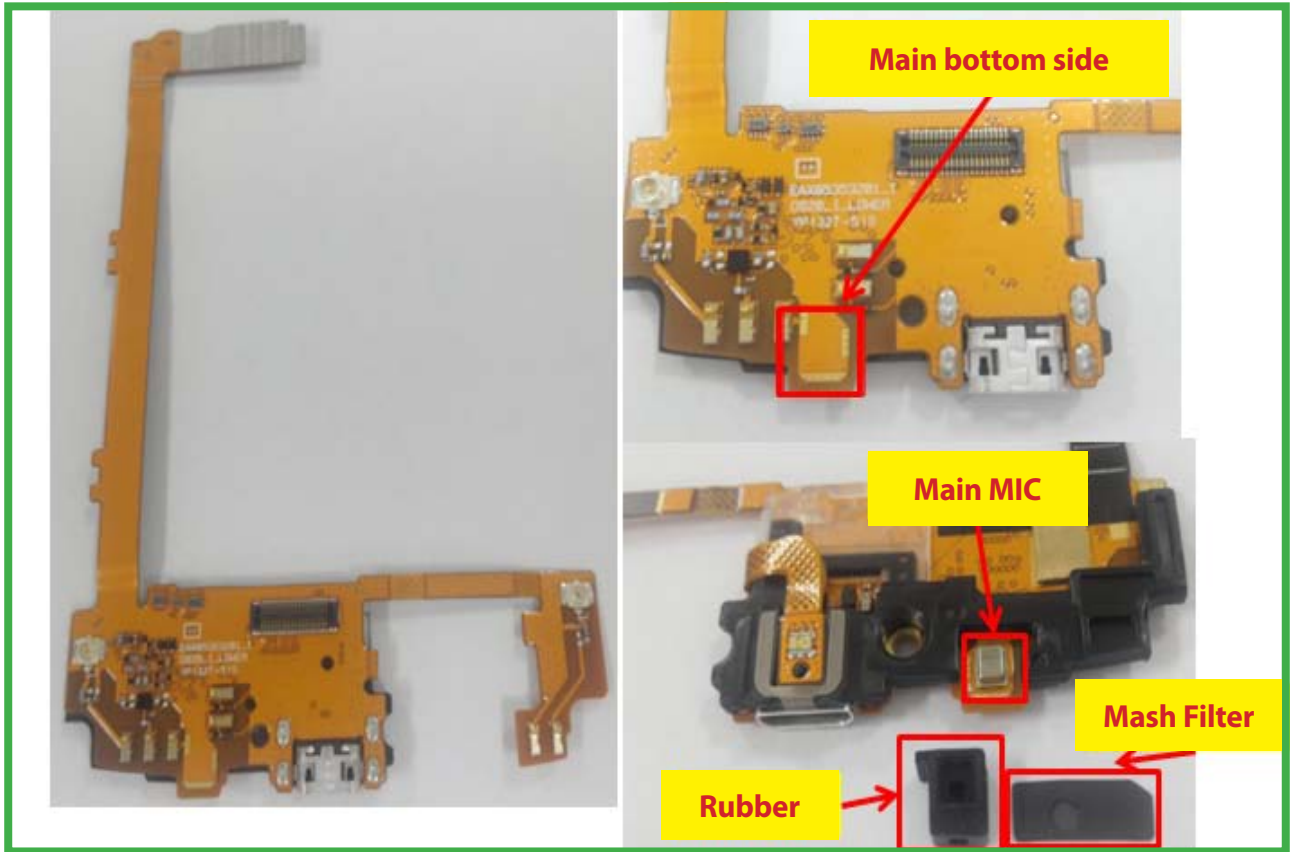
3.8.3 Main MIC troubleshooting

A Main MIC is located on Lower FPCB.

It operates in case of voice call (handset), voice recording, camcorder recording

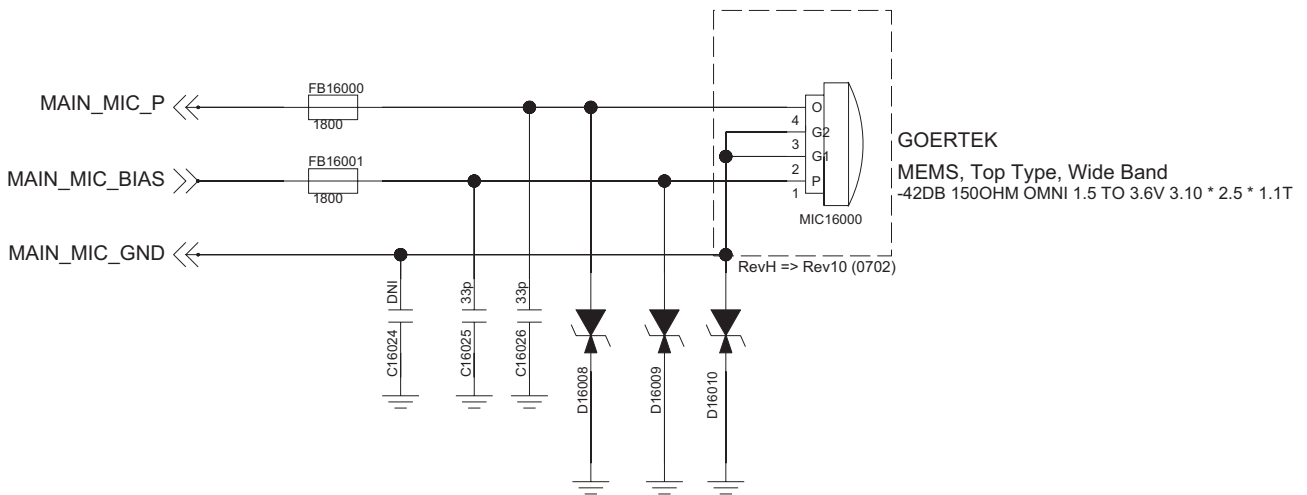


3. TROUBLE SHOOTING



TOP

Main MIC

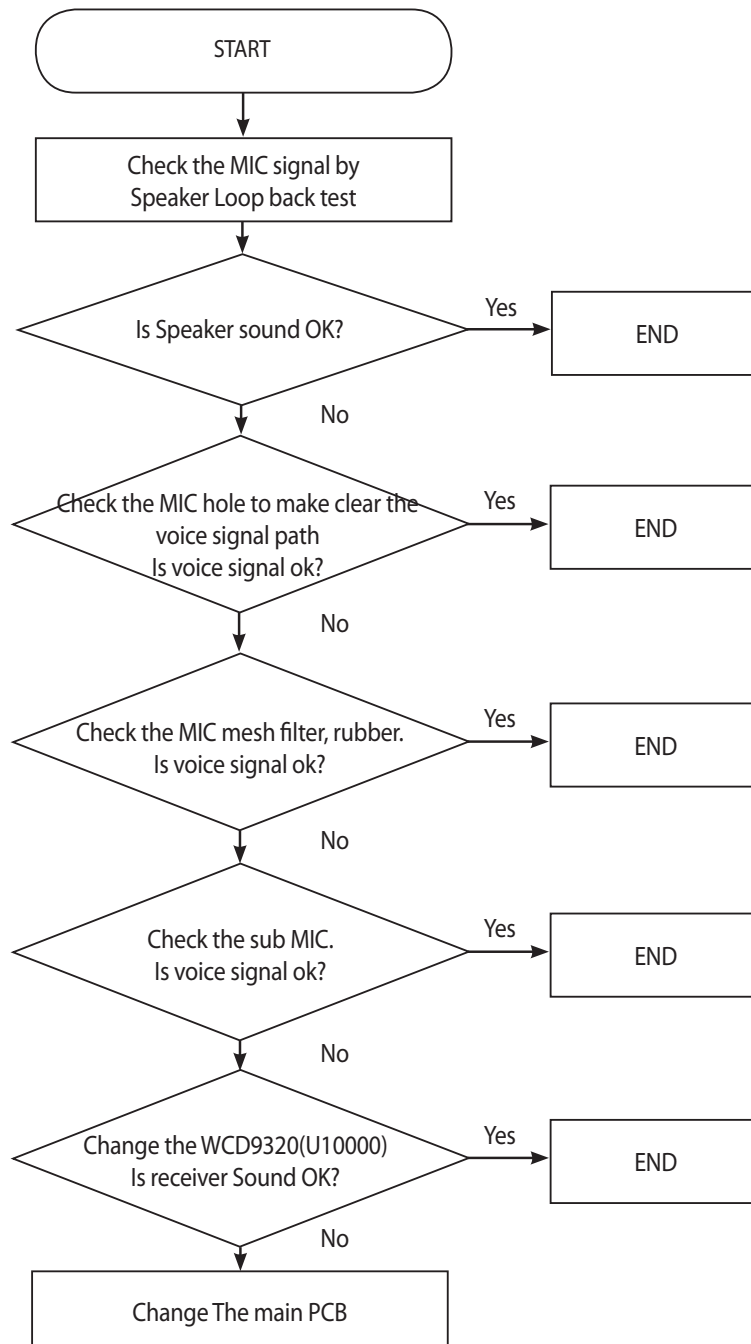


Main MIC

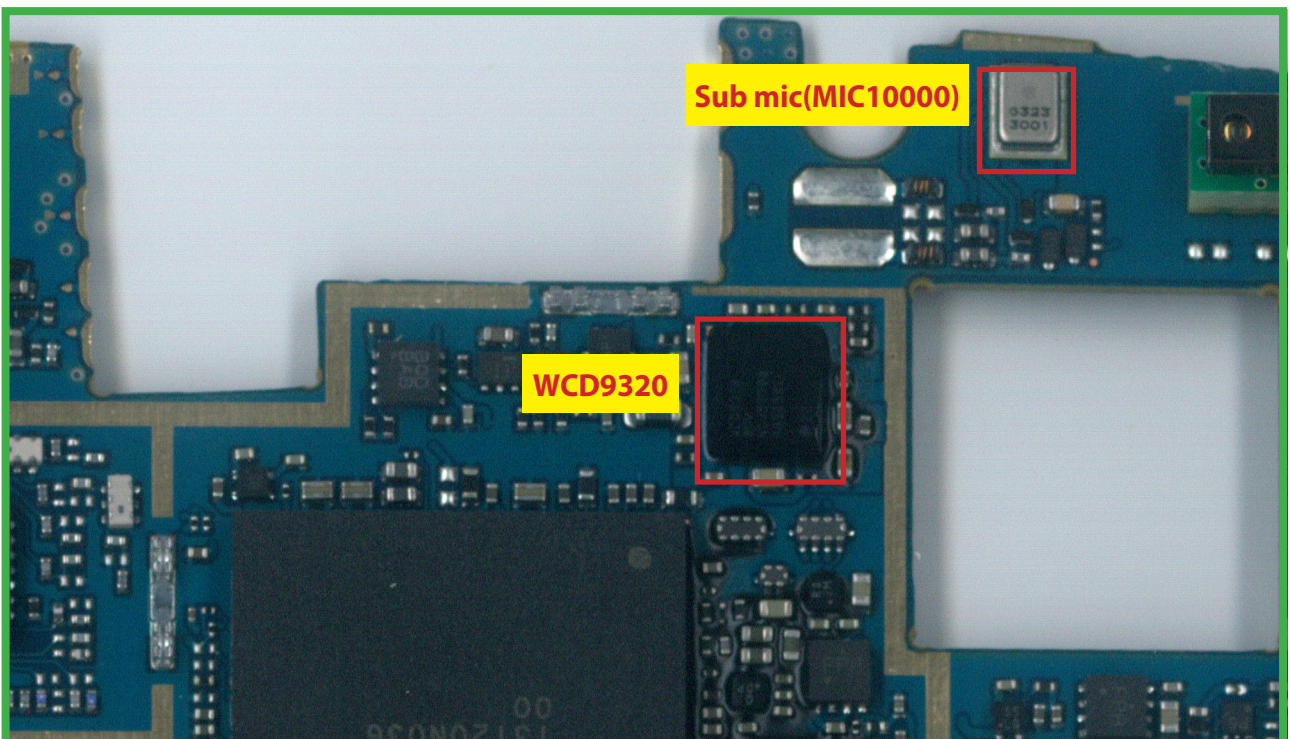
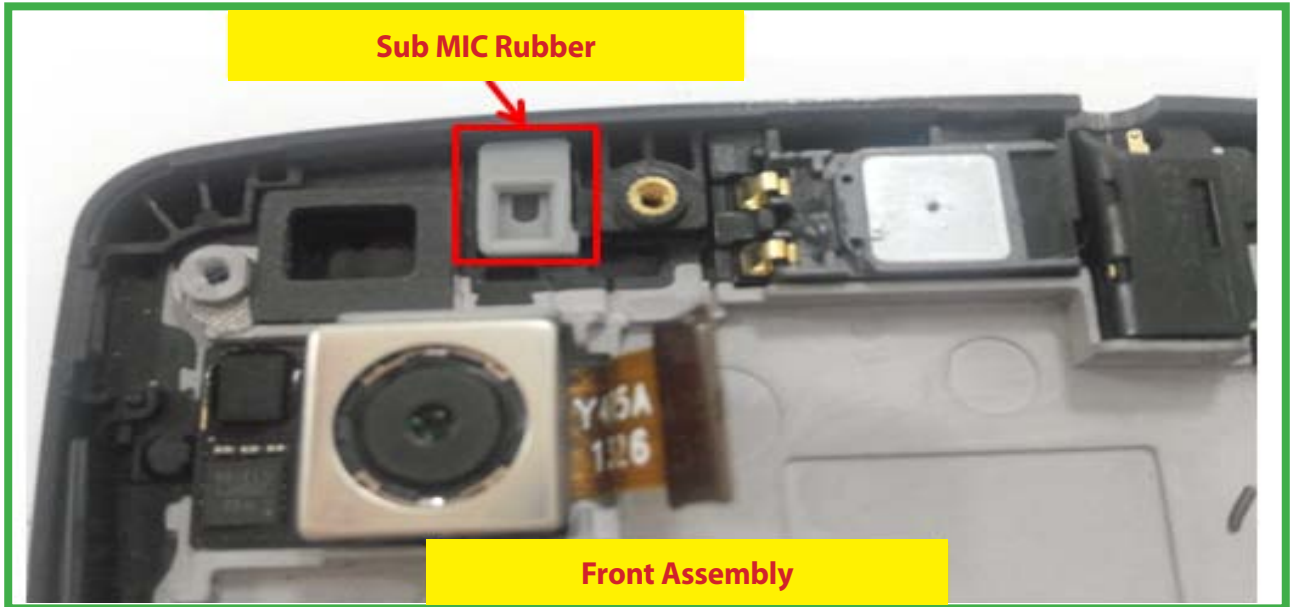
3.8.4 SUB MIC troubleshooting

A sub MIC is located on Main PCB.

It operates in case of voice call (Speaker phone).

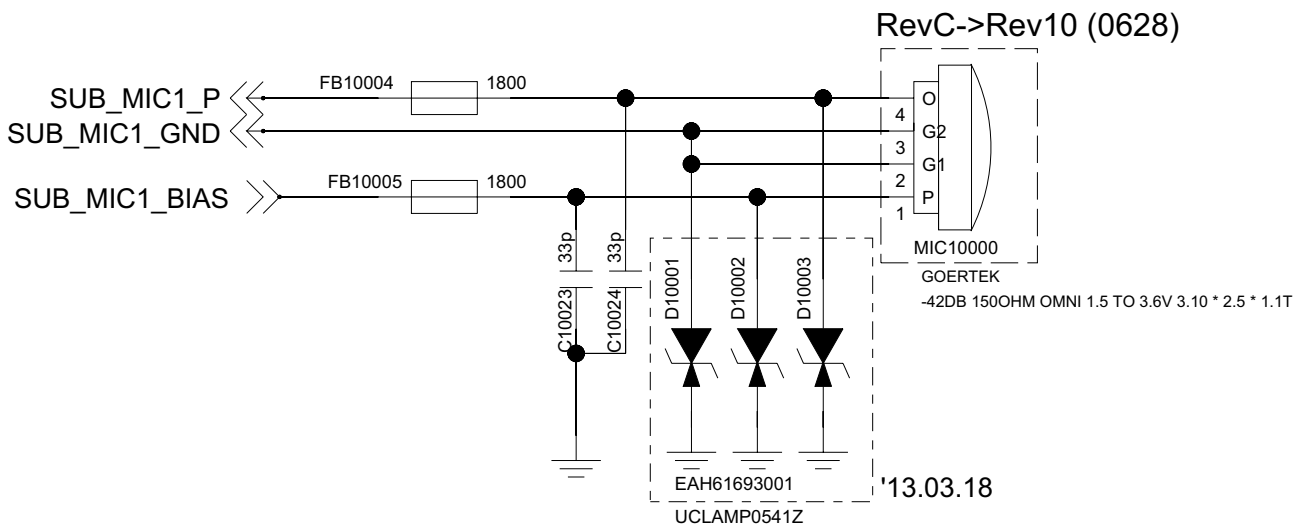


3. TROUBLE SHOOTING



TOP

Sub_MIC1

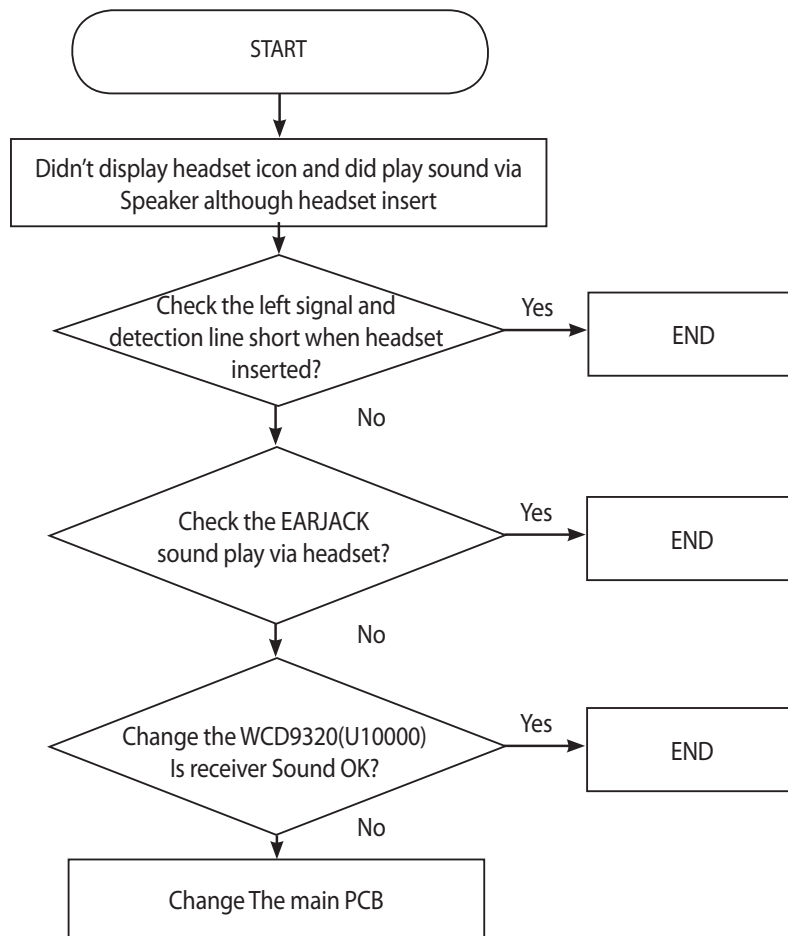


Sub mic(MIC10000)

3.8.5 Ear-MIC troubleshooting

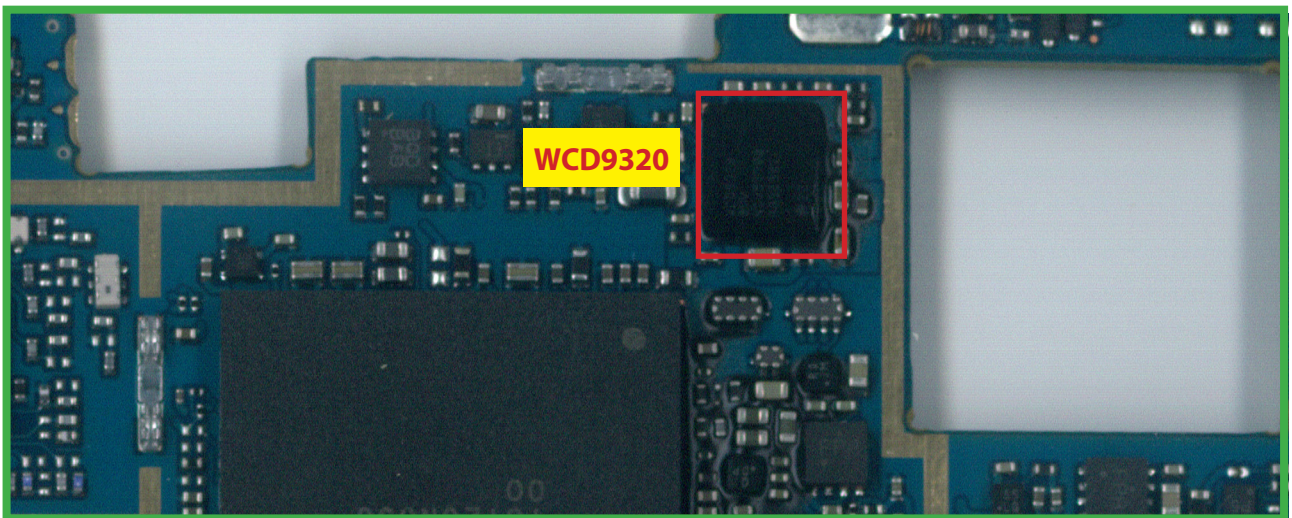
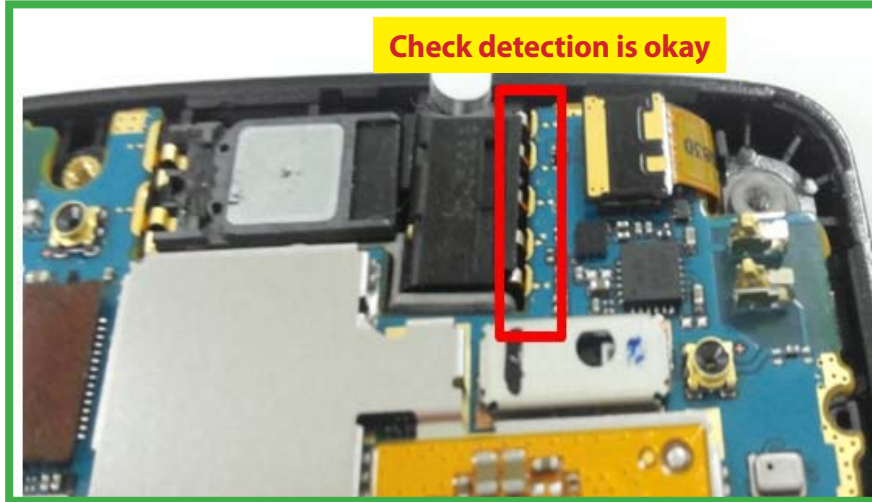
Ear MIC control signals are generate by MSM8974(U3000), WCD9320(U10000), FSA8008UMX(U7001).

Case A. Unable detection of headset insert.



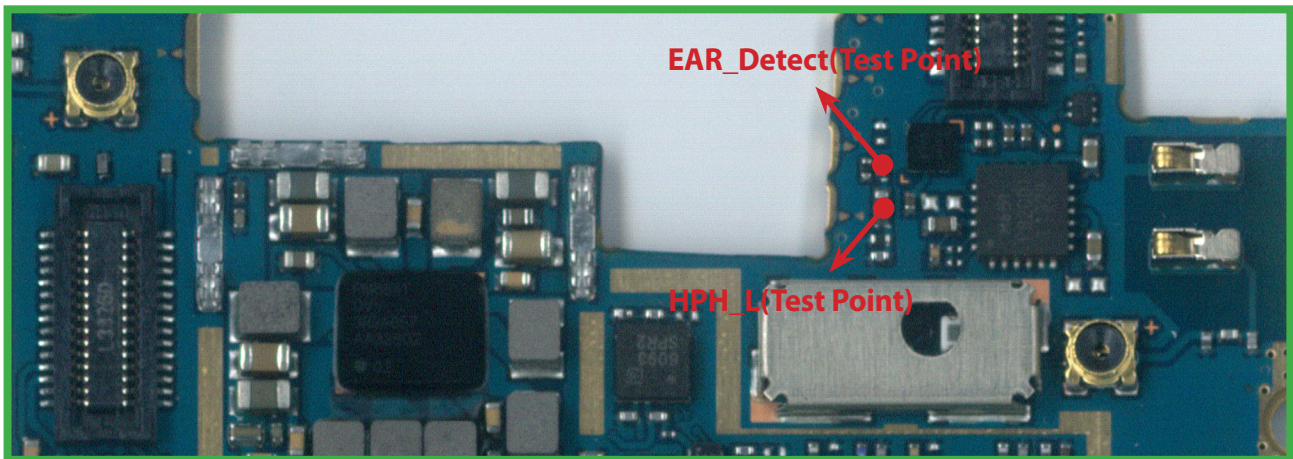
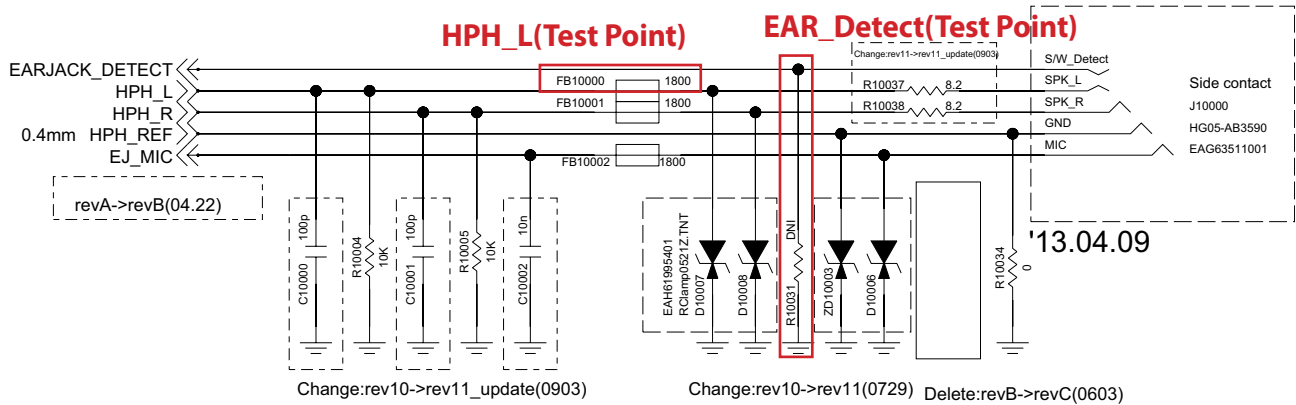
Check the left signal(HPH_L) and detection line(EARJACK_DETECT) are shorted when headset inserted.
See PCB Contact terminal also.

3. TROUBLE SHOOTING



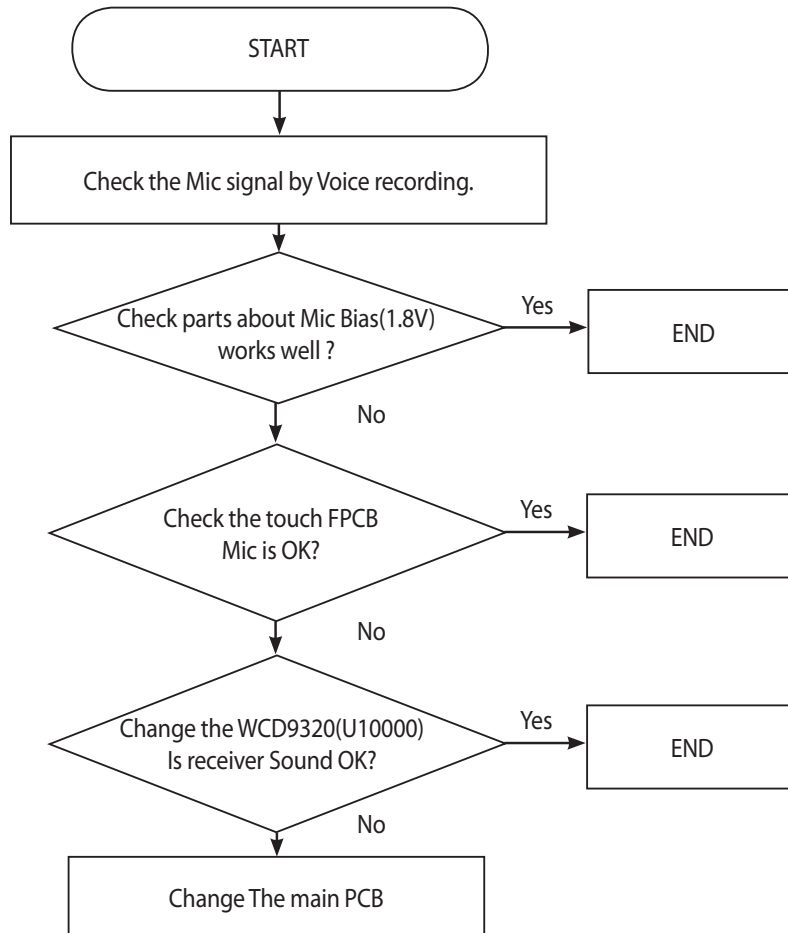
TOP

3.5pi Ear Jack Connector

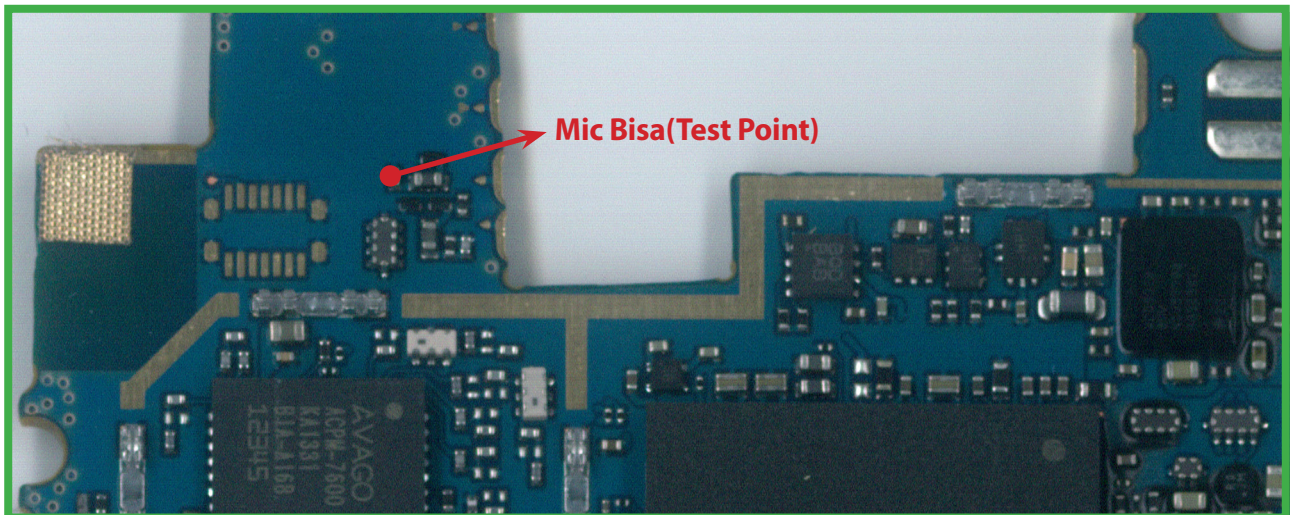
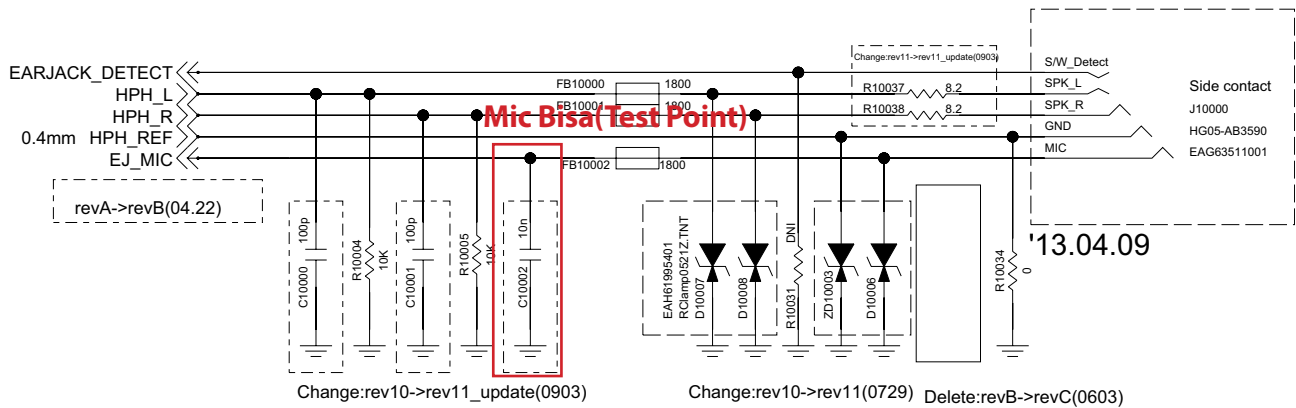


BOT

Case B. No Sound from Ear-mic



3.5pi Ear Jack Connector

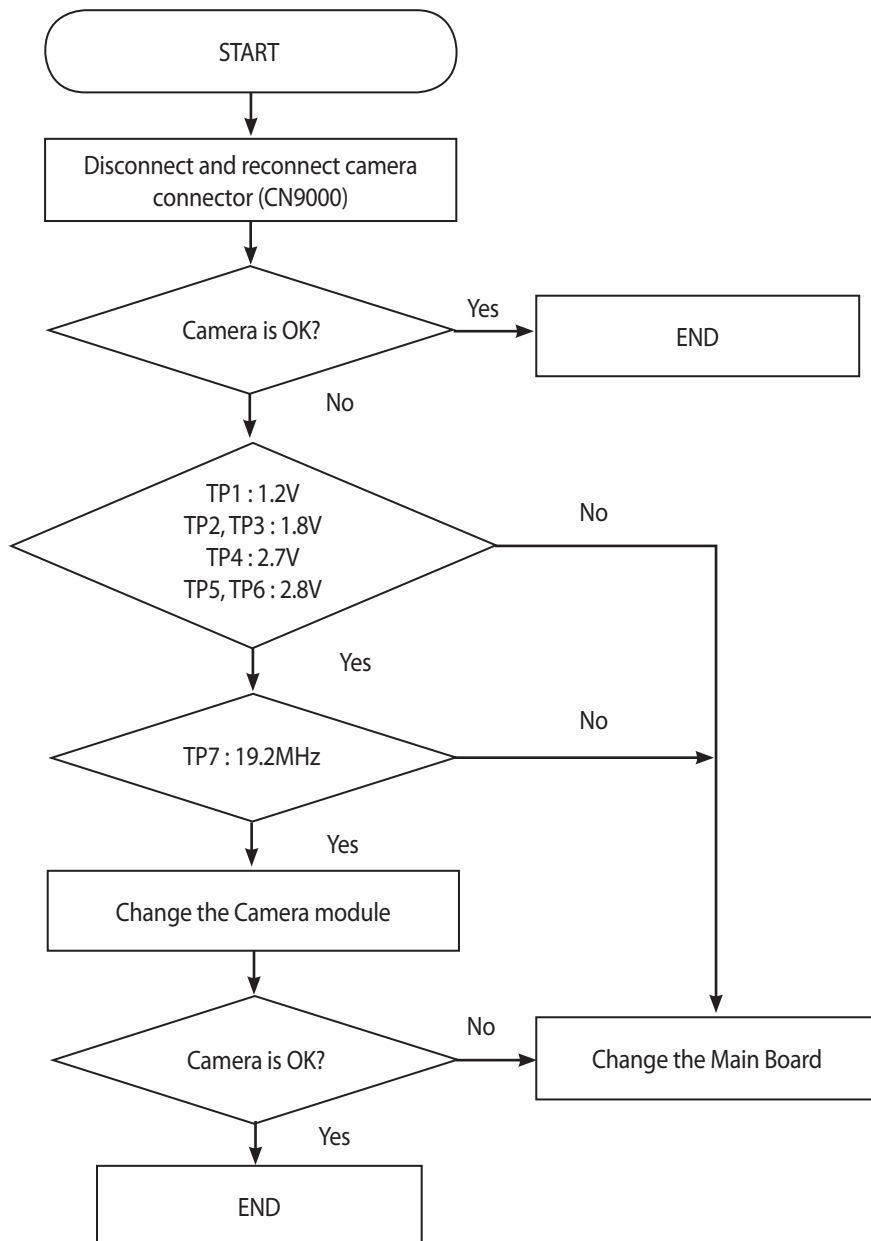


TOP

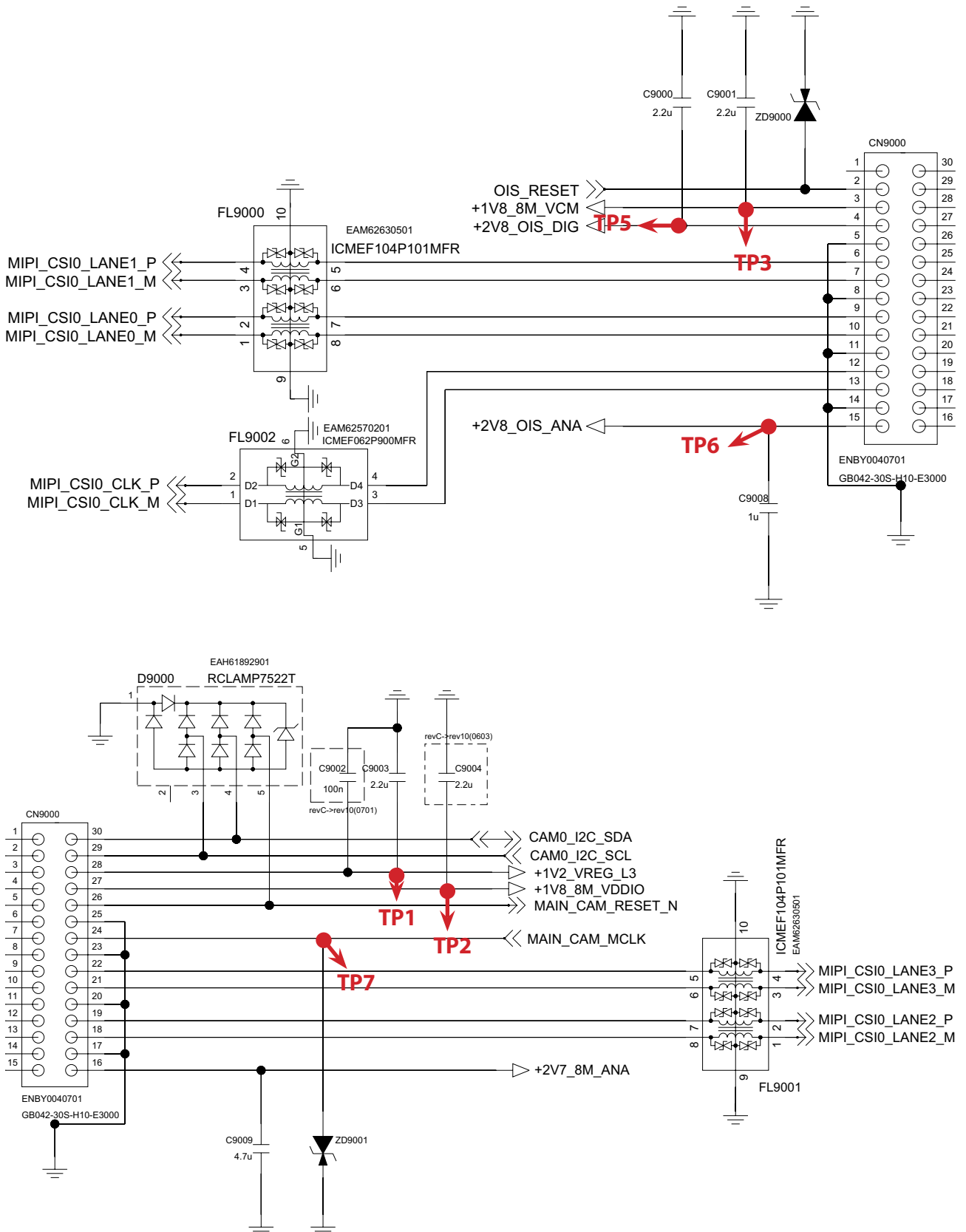
3.9 Camera

3.9.1 8M OIS Camera Trouble Shooting

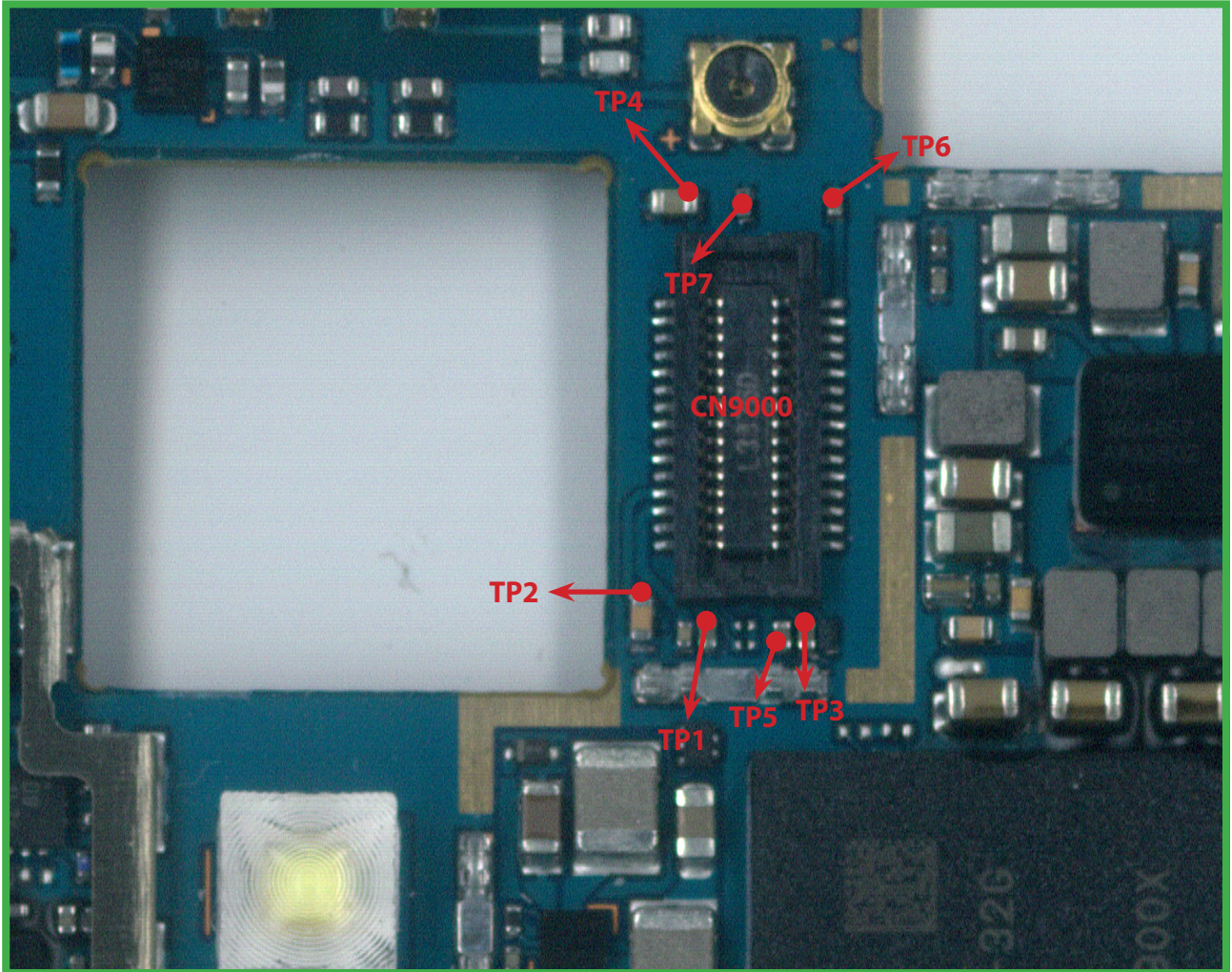
8M OIS camera control signals are generated by MSM8974



3. TROUBLE SHOOTING



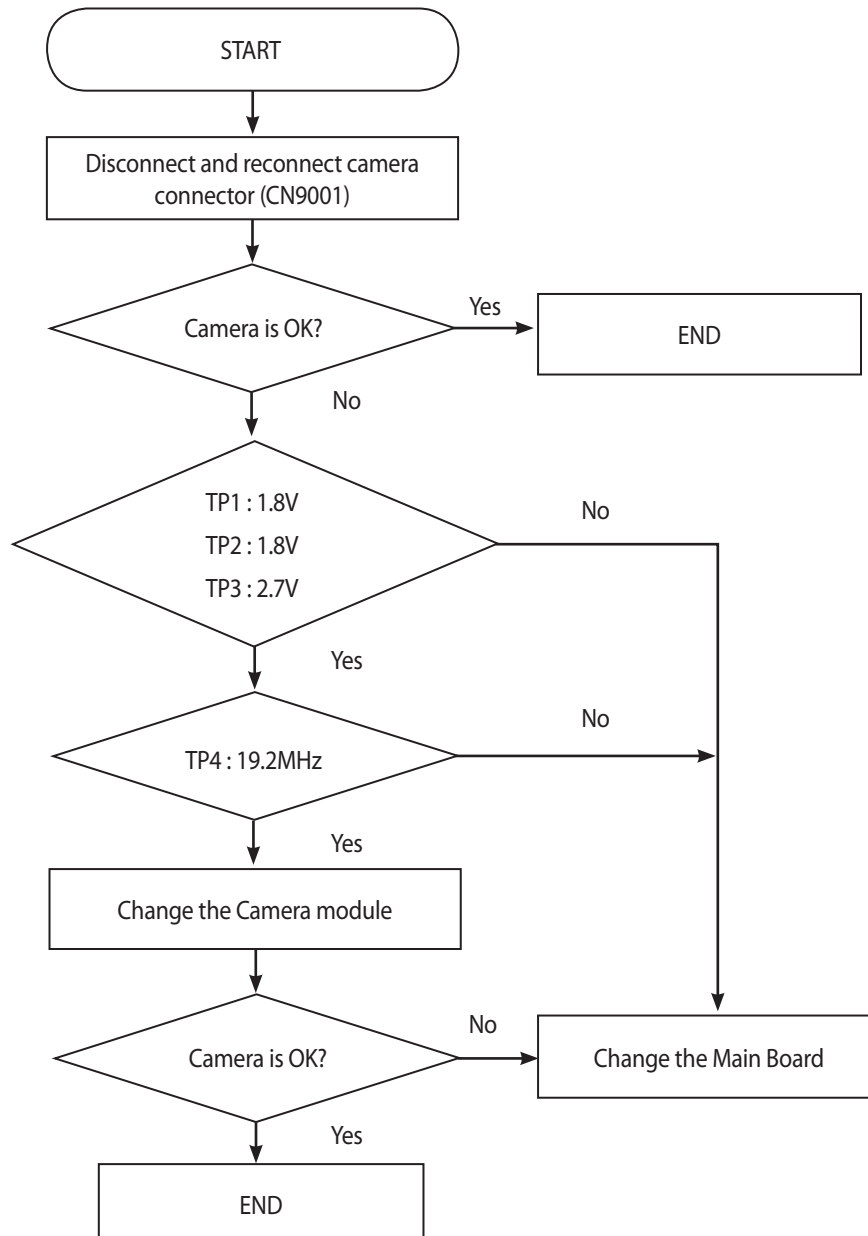
3. TROUBLE SHOOTING



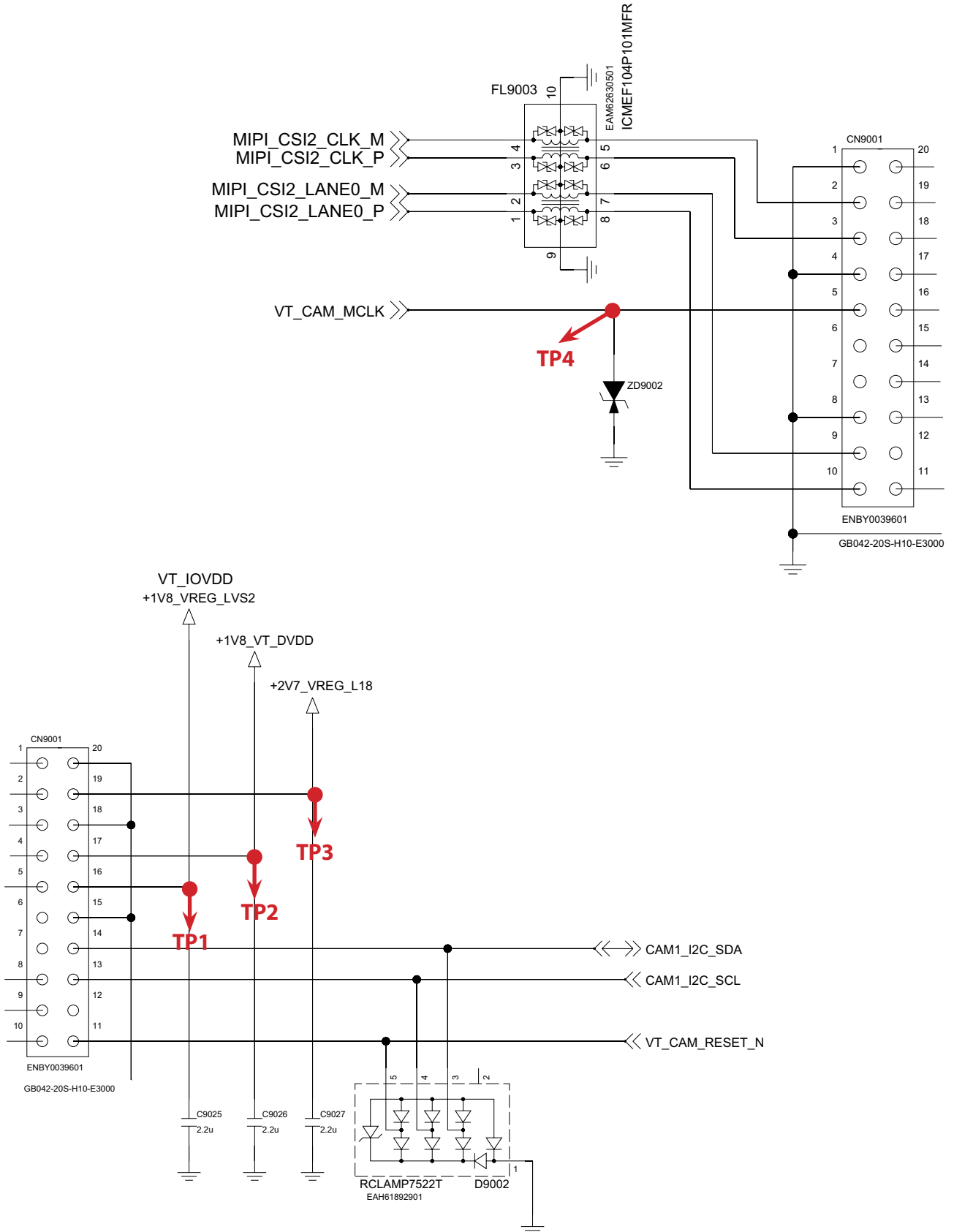
BOT

3.9.2 1.26M Front Camera Trouble Shooting

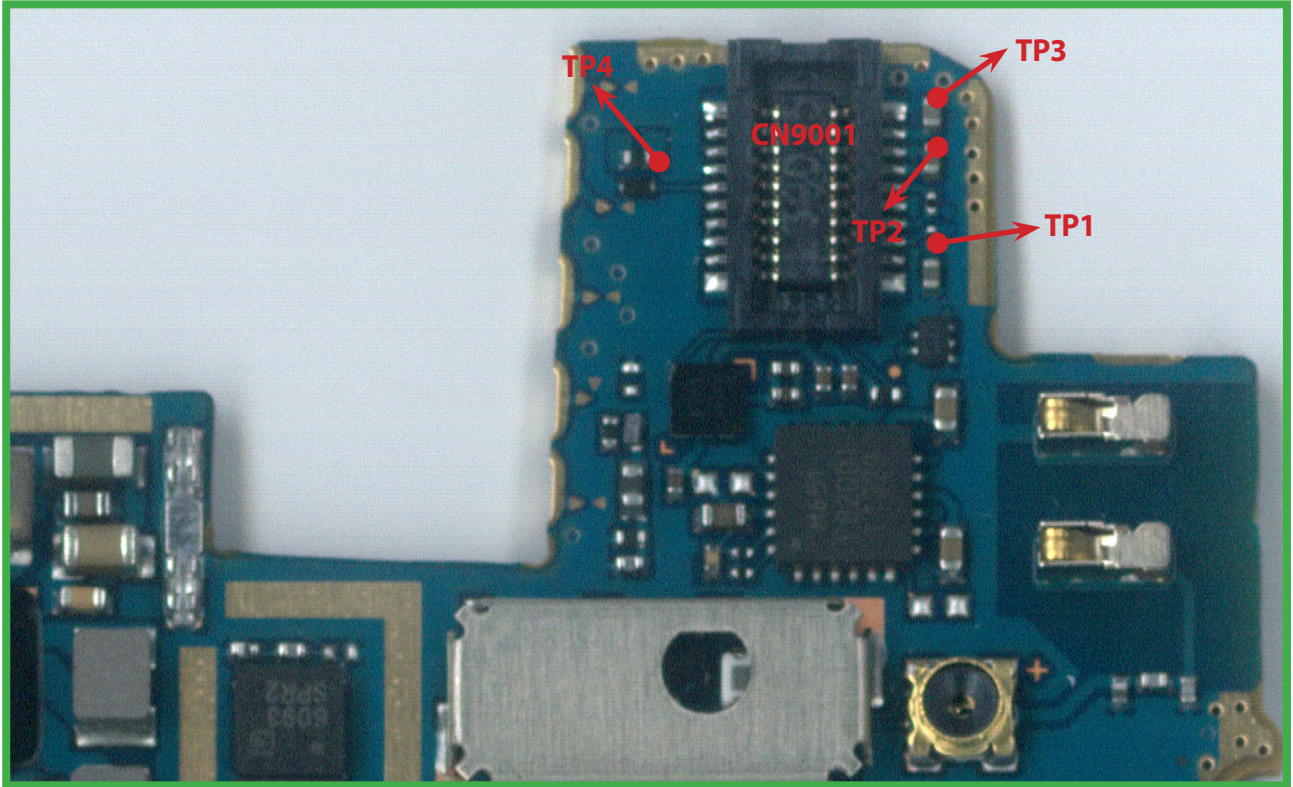
1.26M Front camera control signals are generated by MSM8974



3. TROUBLE SHOOTING



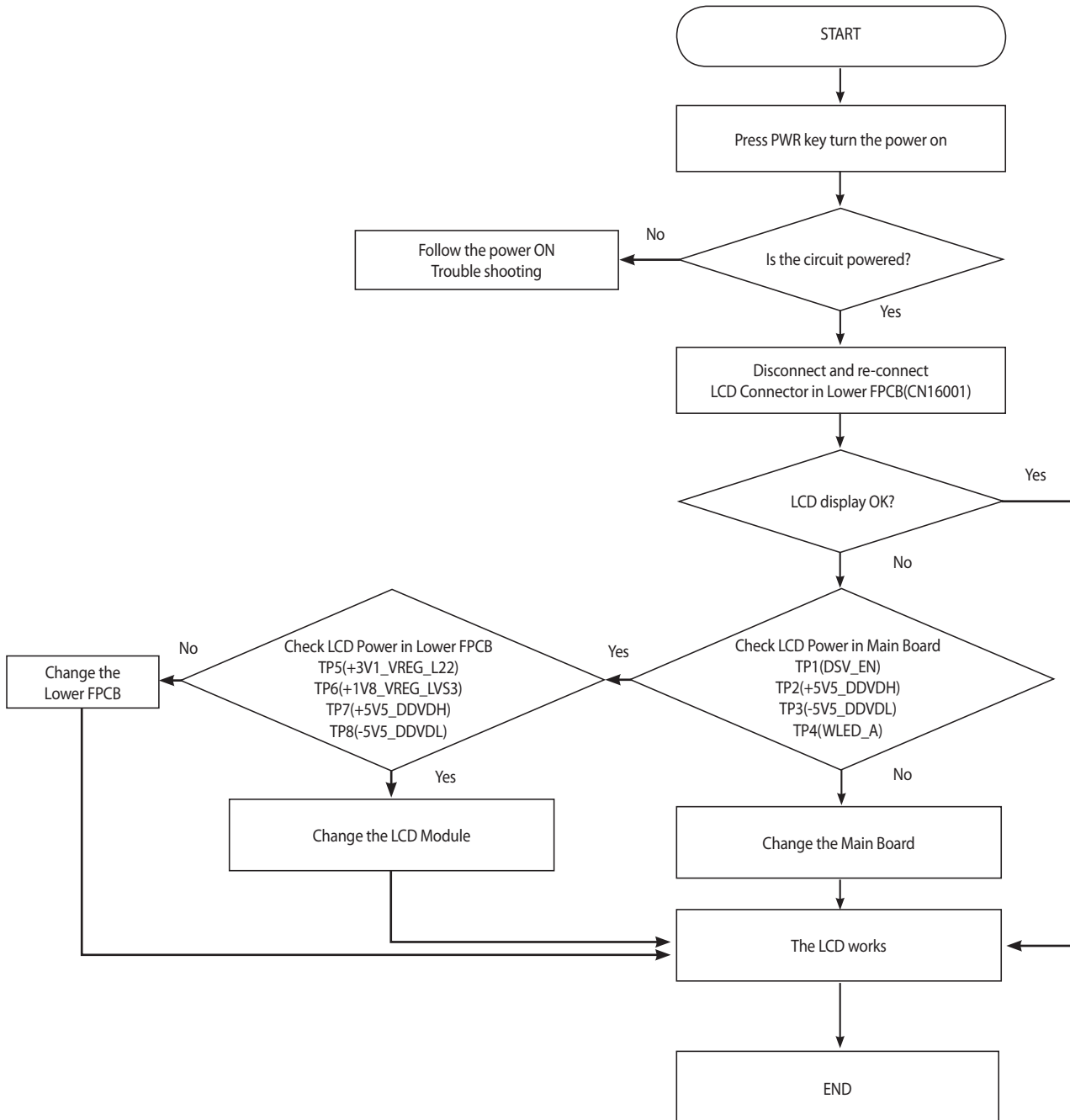
3. TROUBLE SHOOTING



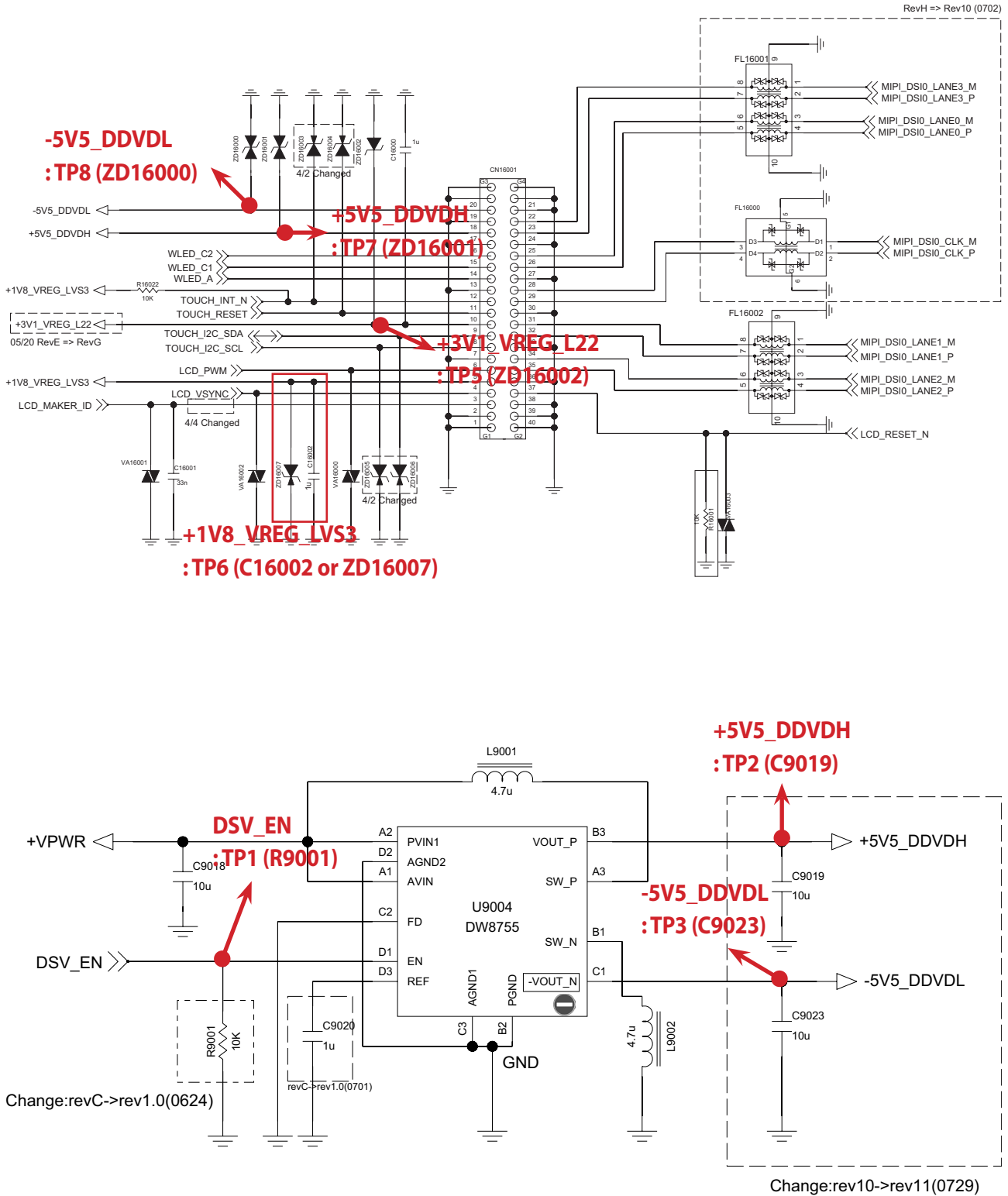
BOT

3.10 Main LCD trouble

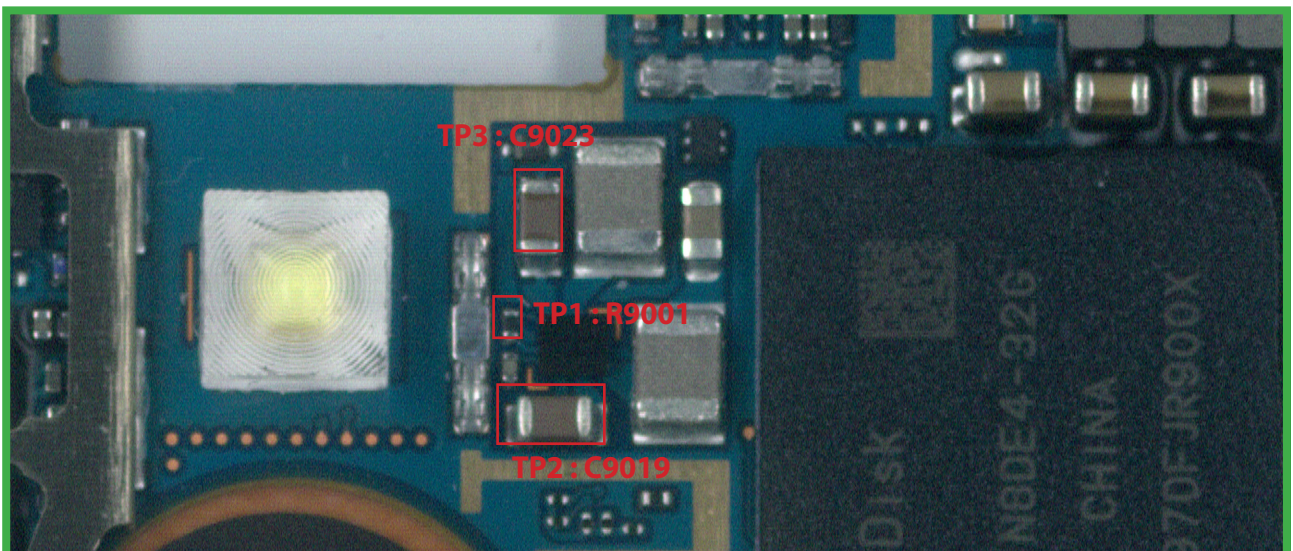
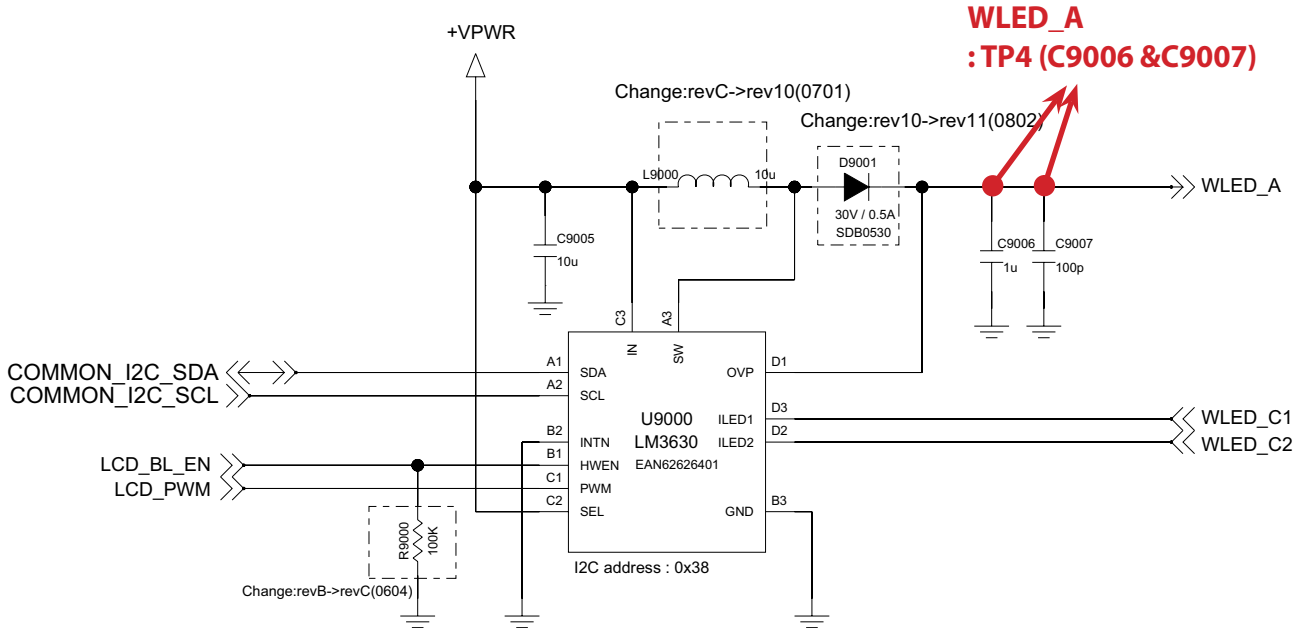
Main LCD control signals are generated by MSM897



3. TROUBLE SHOOTING

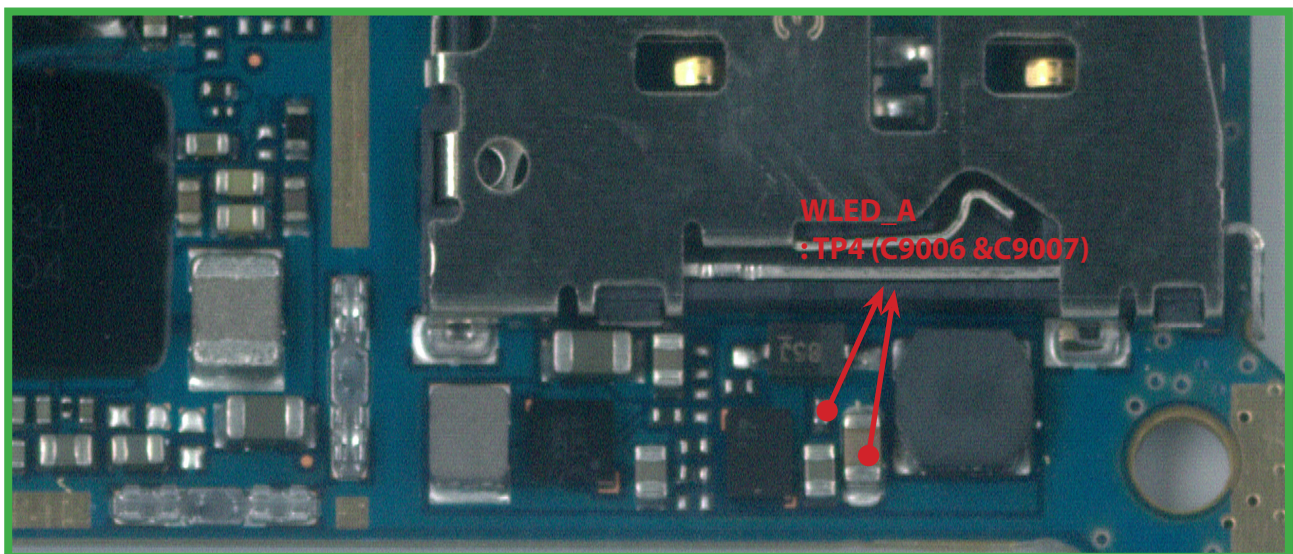
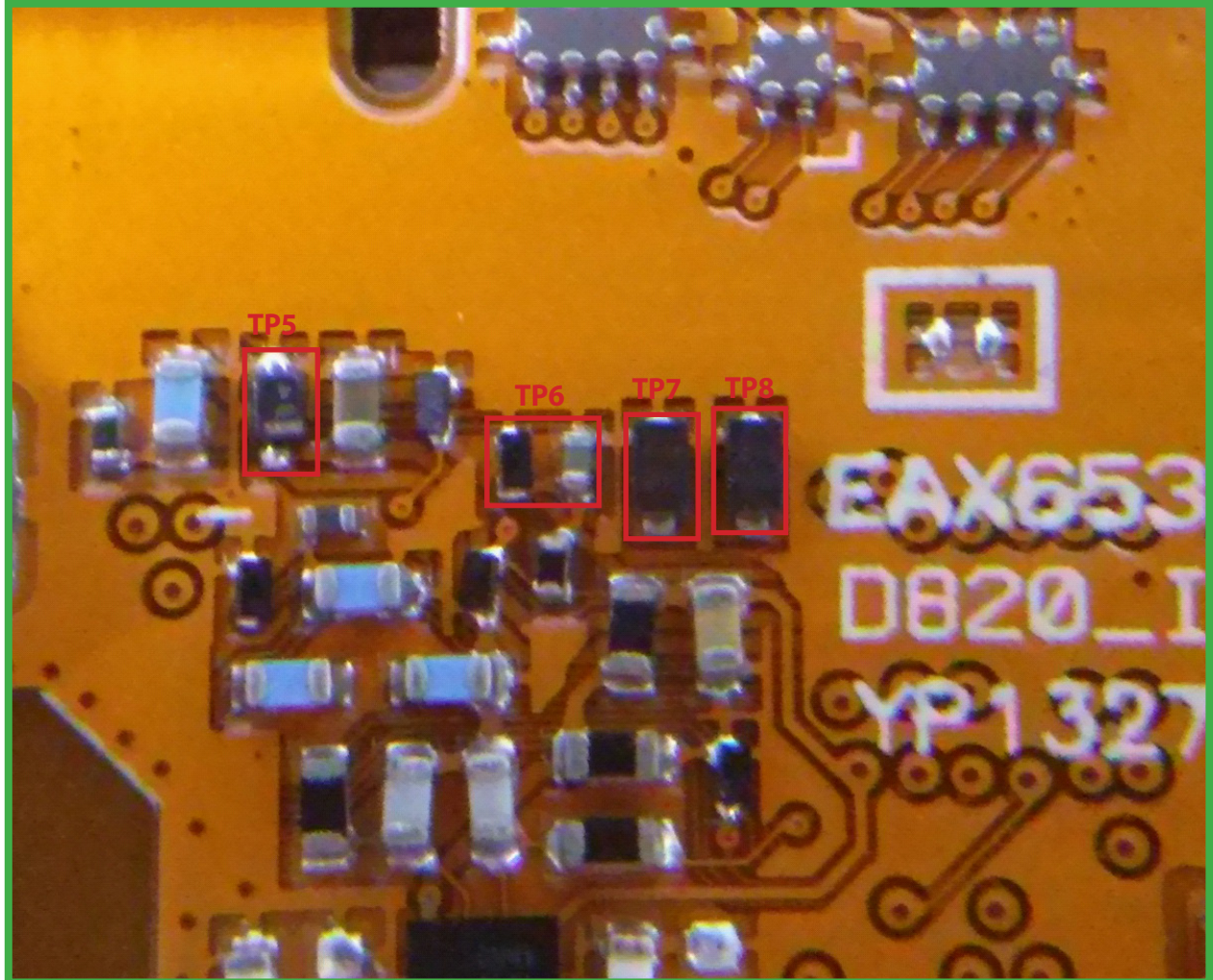


3. TROUBLE SHOOTING



BOT

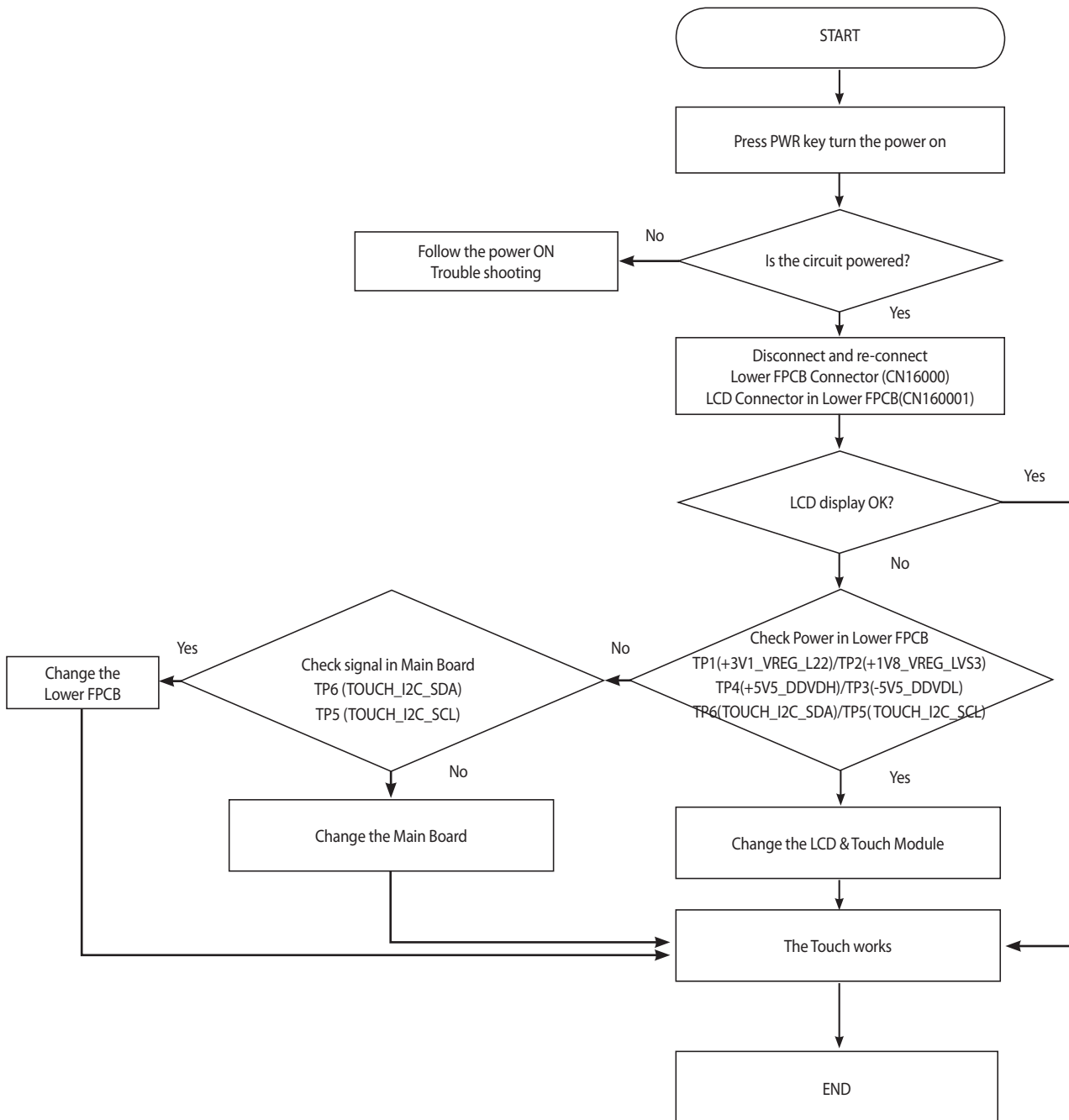
3. TROUBLE SHOOTING



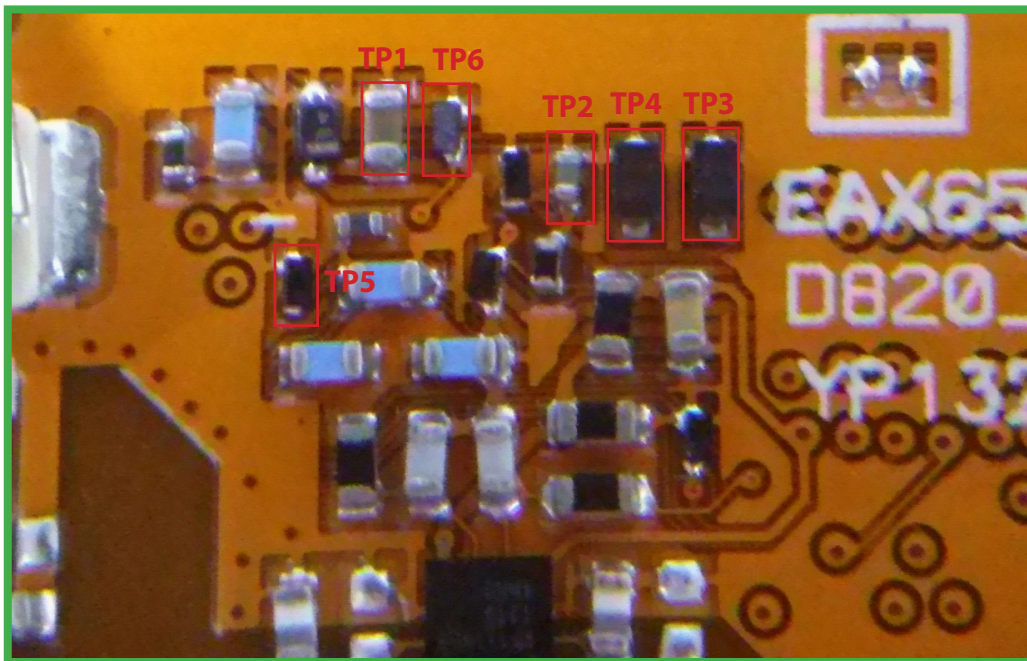
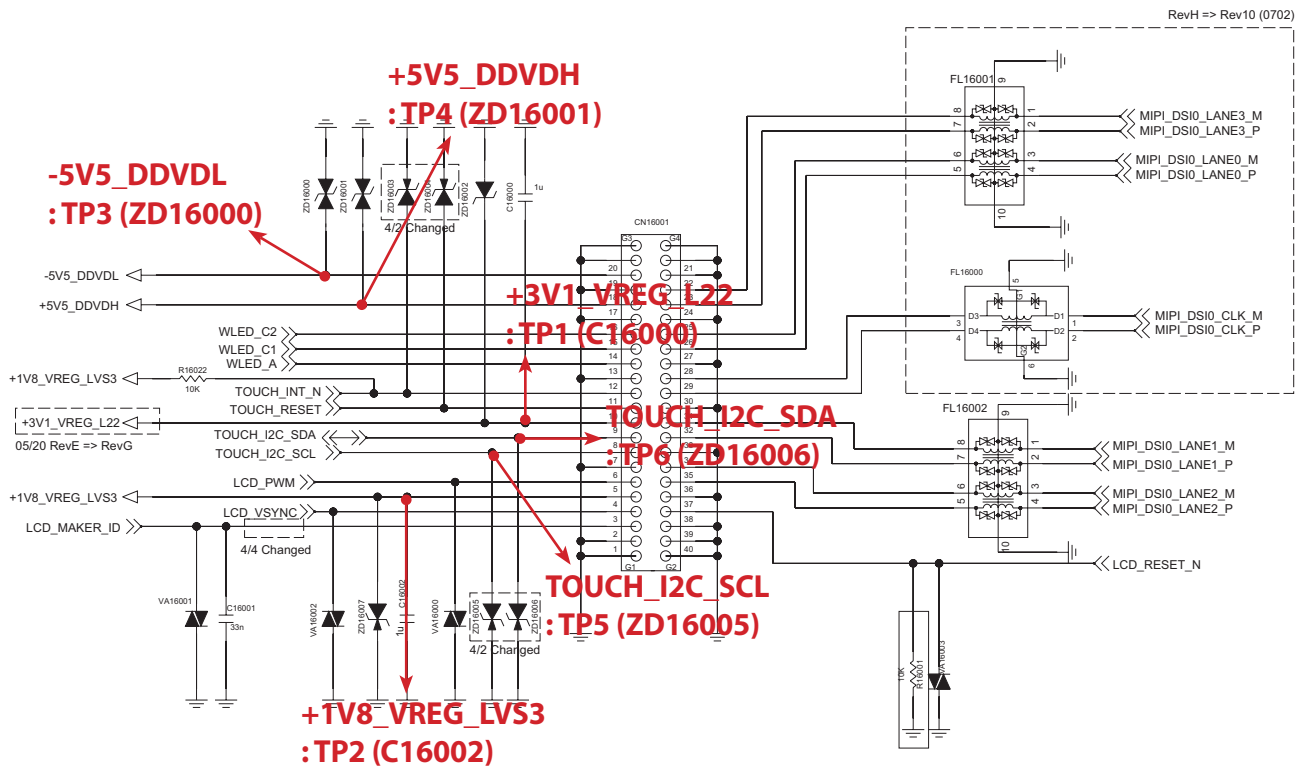
TOP

3.11 Touch Trouble Shooting

Touch control signals are generated by MSM8974

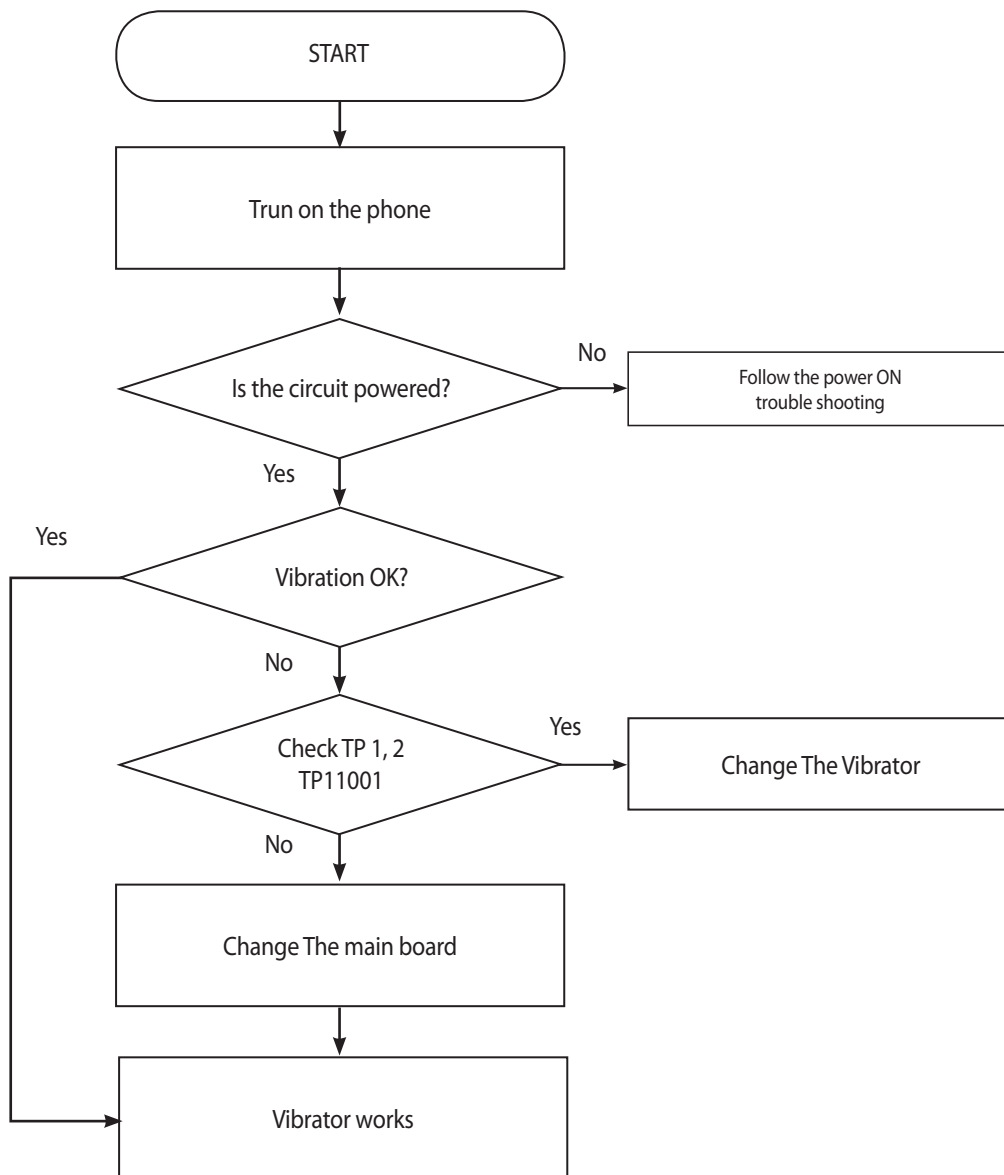


3. TROUBLE SHOOTING



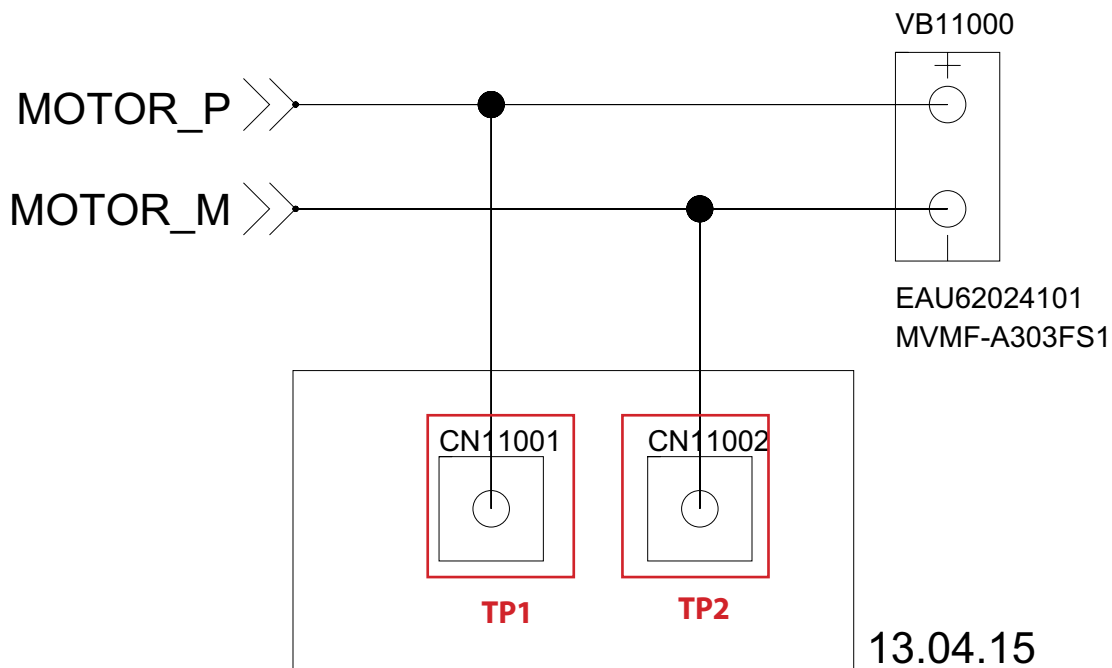
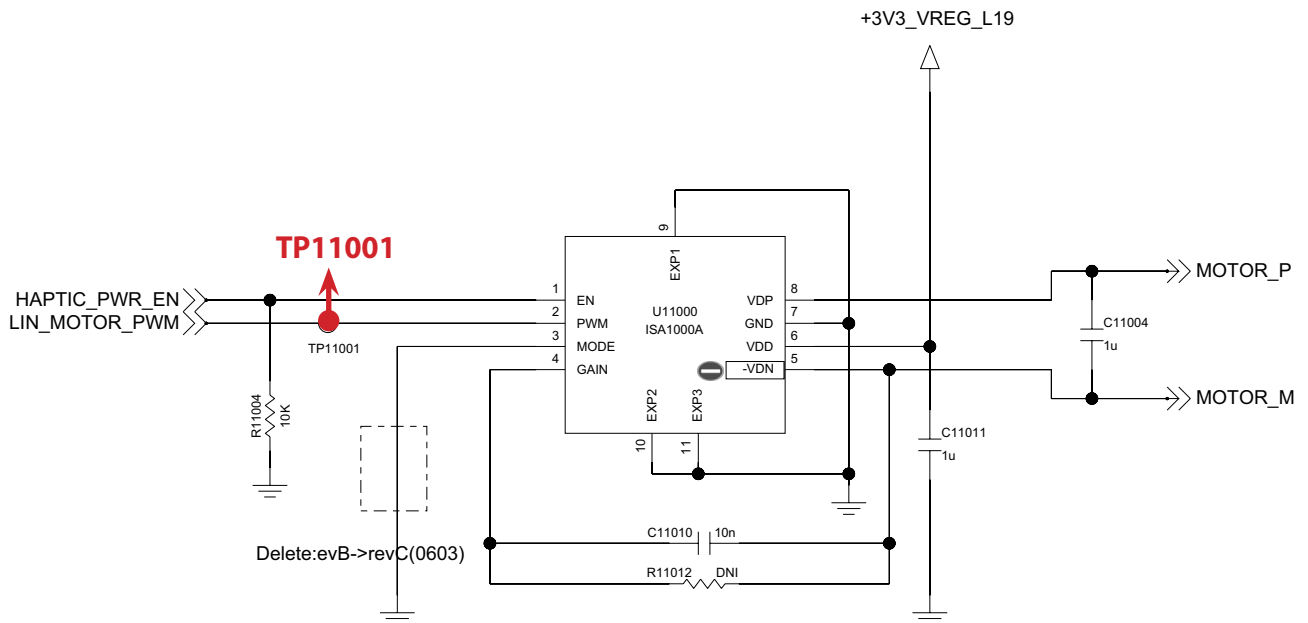
3.12 Vibrator Troubleshooting

Check out the setting menu on the phone. If not, check Test points shown on the pictures.



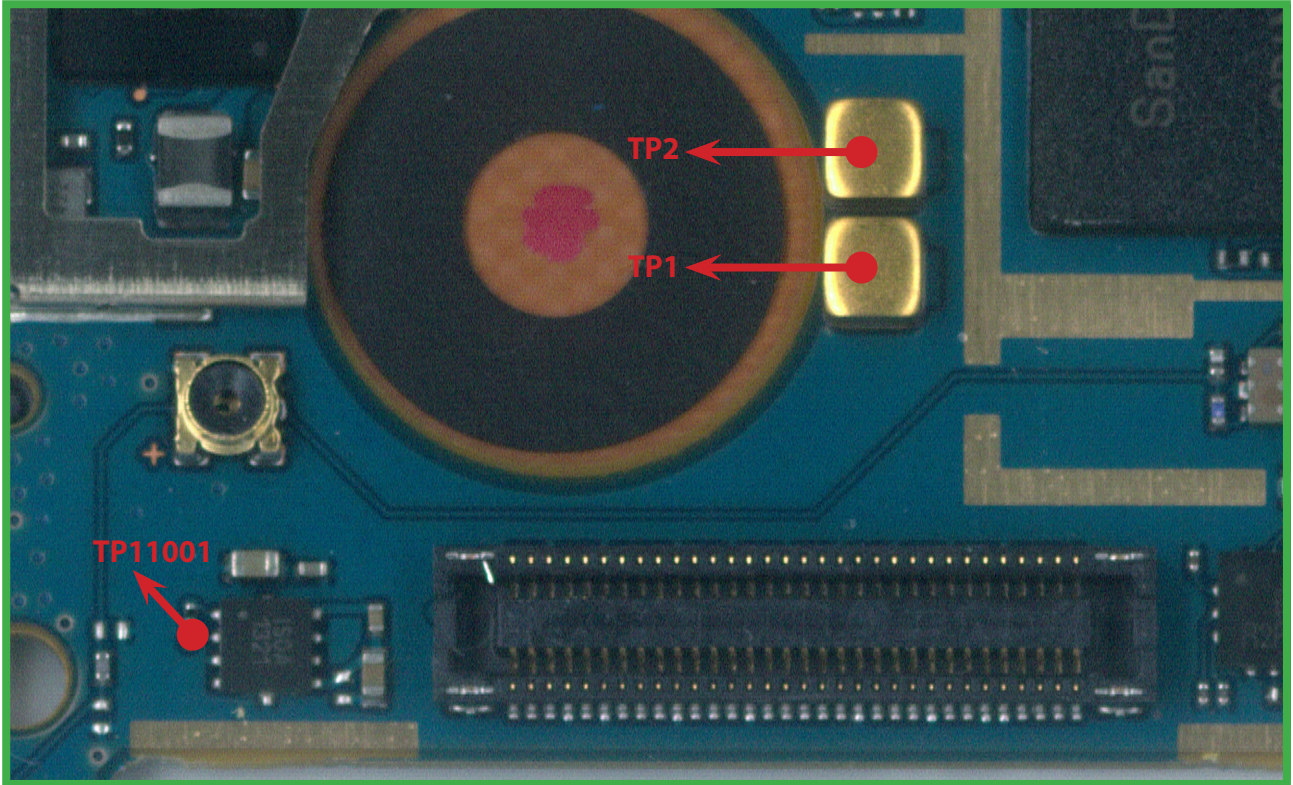
3. TROUBLE SHOOTING

< Motor Drover IC – ISA1000A (Main PCB) >



CN11001, CN11002 are Motor Dummy plates.
should be Placed on the Motor PAD!!

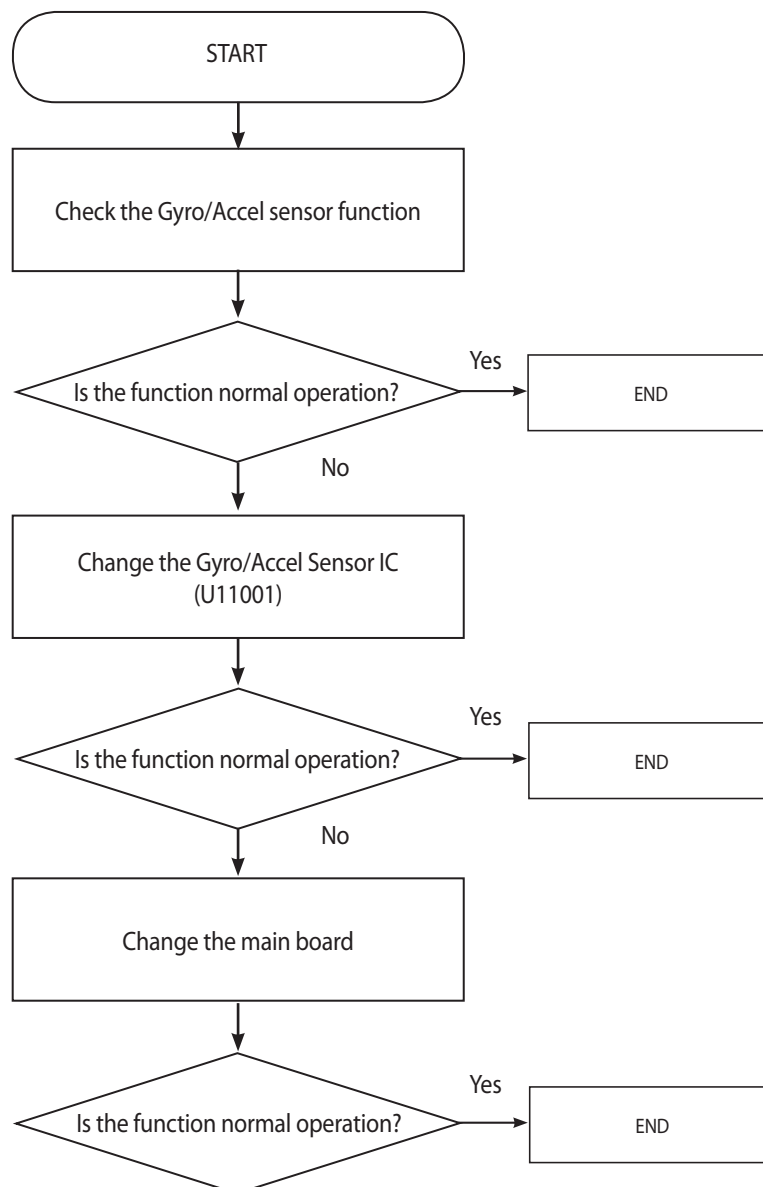
Mainboard bottom



3.13 Gyro/Accel Sensor Troubleshooting

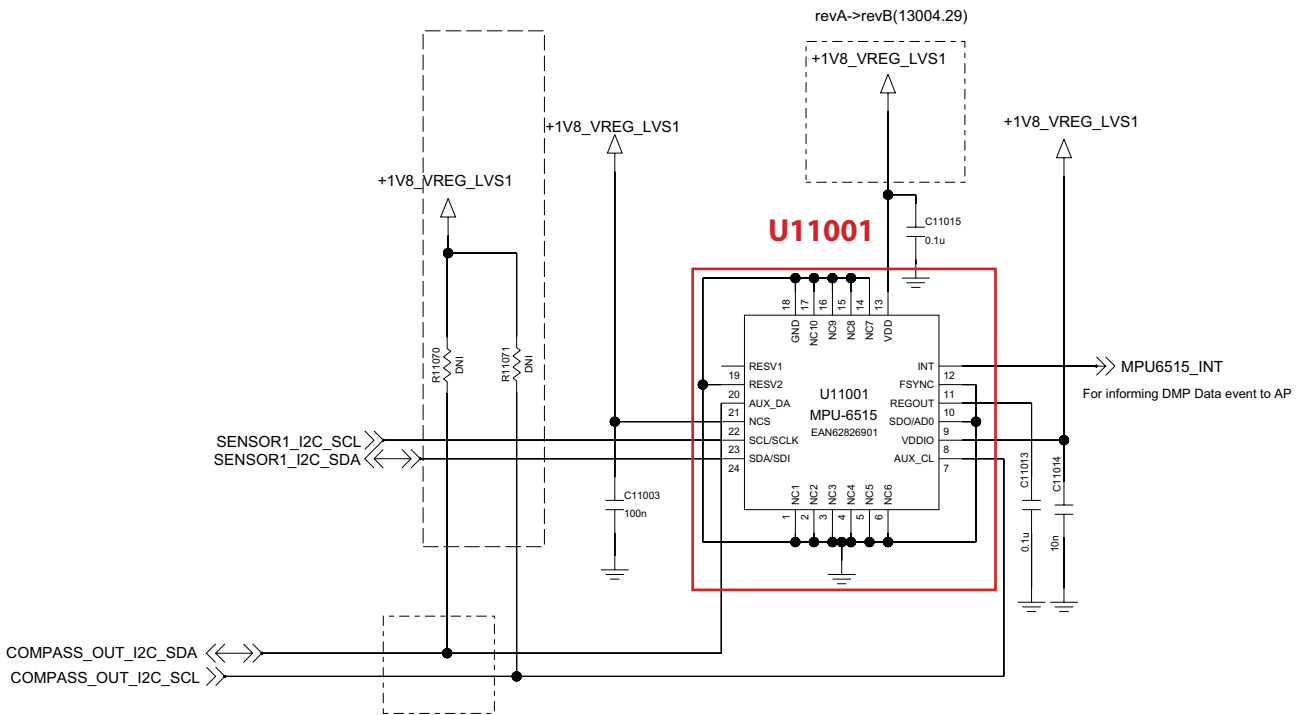
When the Gyro/Accel sensor does not work, the reason is chip problem. If the Gyro sensor IC is damaged, it will do not work even though power is supplied and MSM8974 controls normally. Therefore if the Gyro sensor is damaged, change the Gyro/Accel sensor IC or main board.

Gyro and Accel functions are combined to one chip (MPU6515)

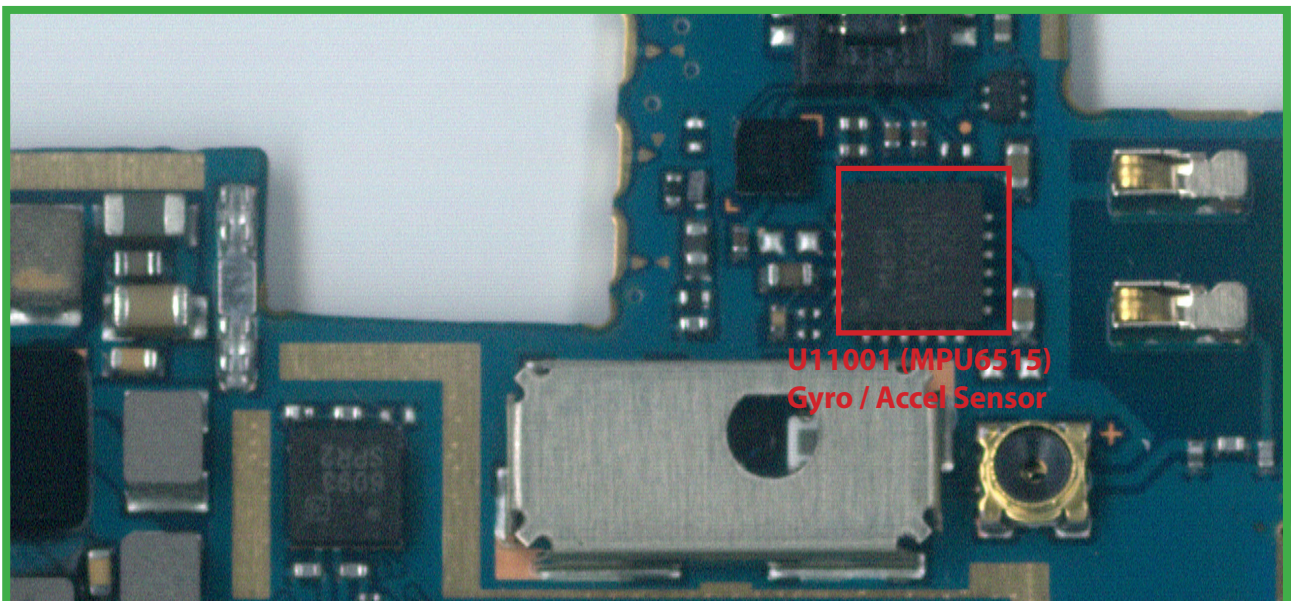


3. TROUBLE SHOOTING

< Gyro/Accel Sensor Circuit >



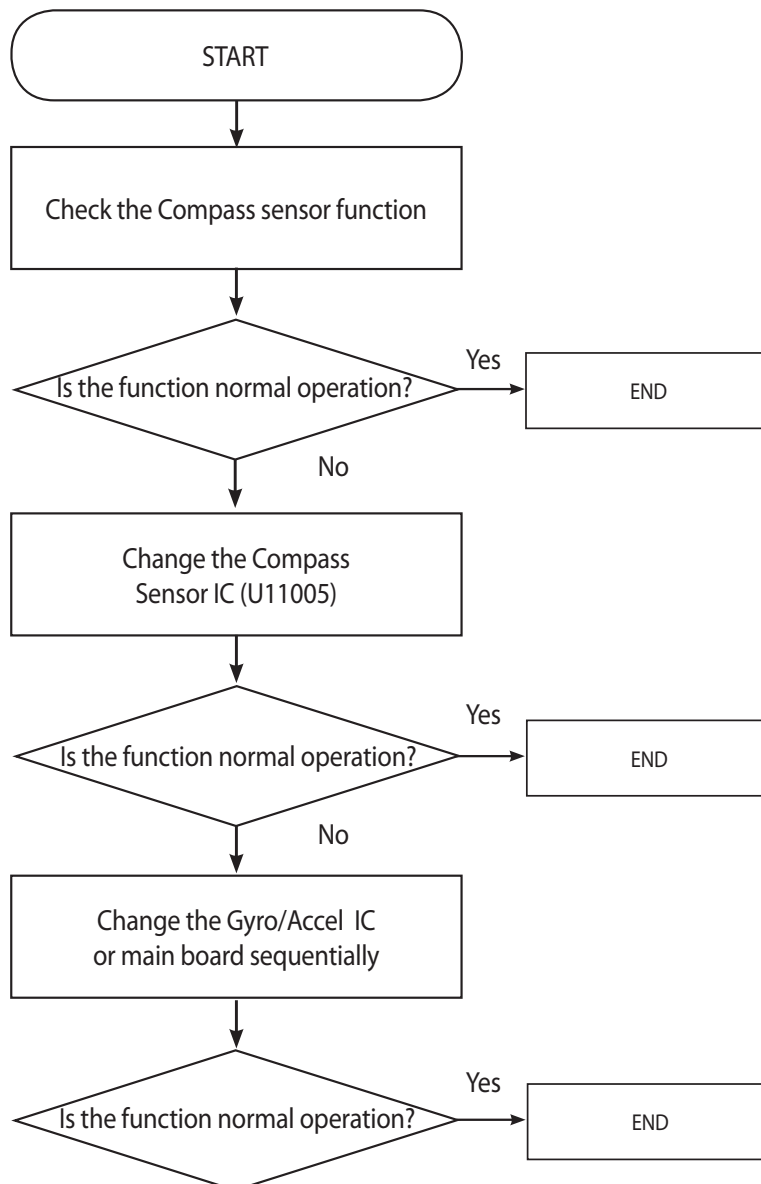
< Main board_Bottom >



3.14 Compass sensor troubleshooting

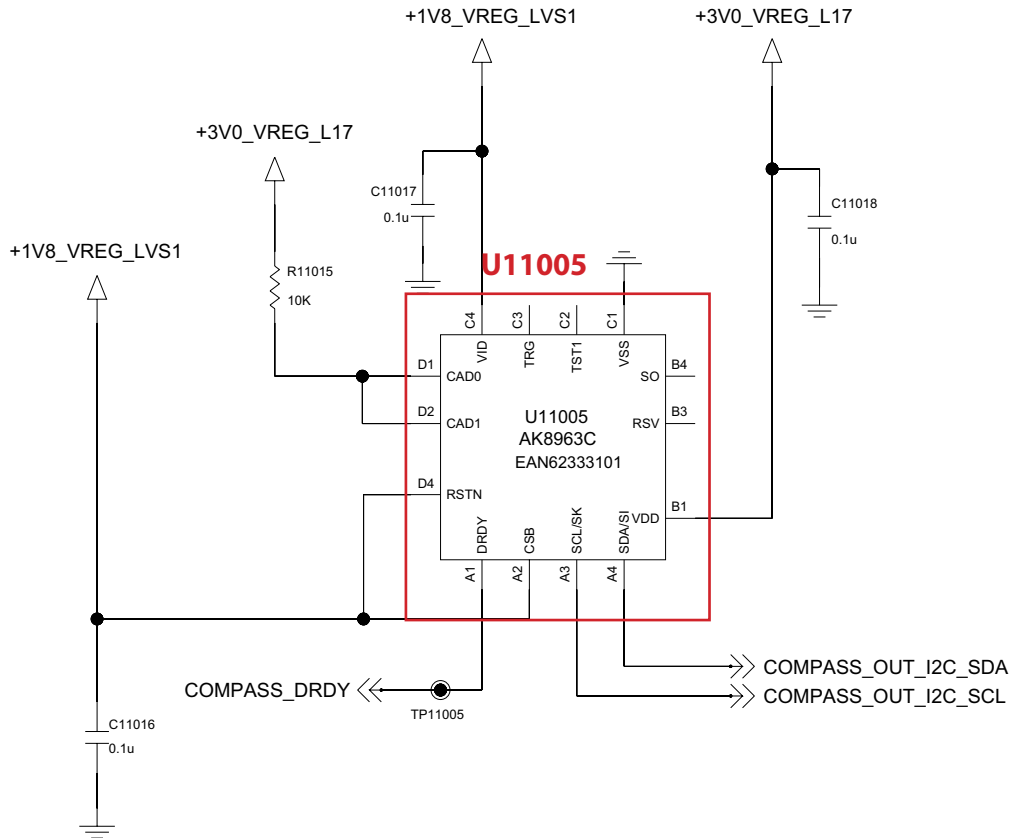
When the Compass sensor does not work, the reason is chip problem. If the Compass sensor IC is damaged, it will do not work even though power is supplied and MSM8974 controls normally. Also, Compass is connected to Gyro/Accel sensor directly. Therefore if the Compass sensor does not work, change the Compass sensor IC, and Gyro/Accel sensor or main board sequentially.

(Changing Sequence : Compass -> Gyro/Accel -> Main board)

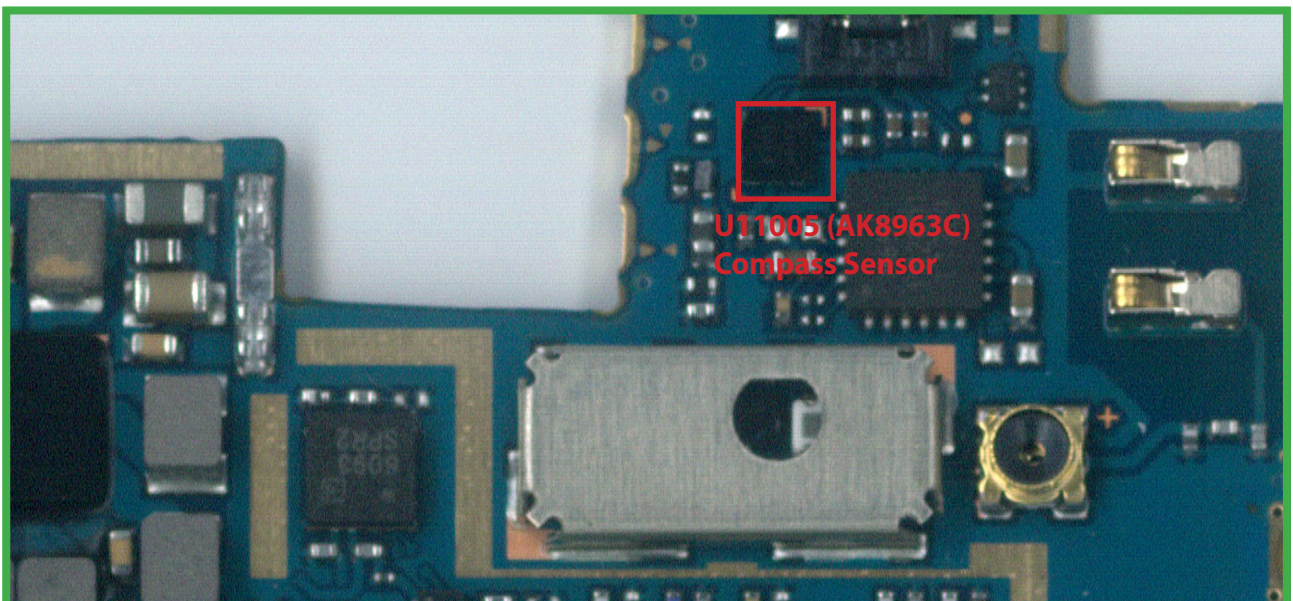


3. TROUBLE SHOOTING

< Compass Sensor >



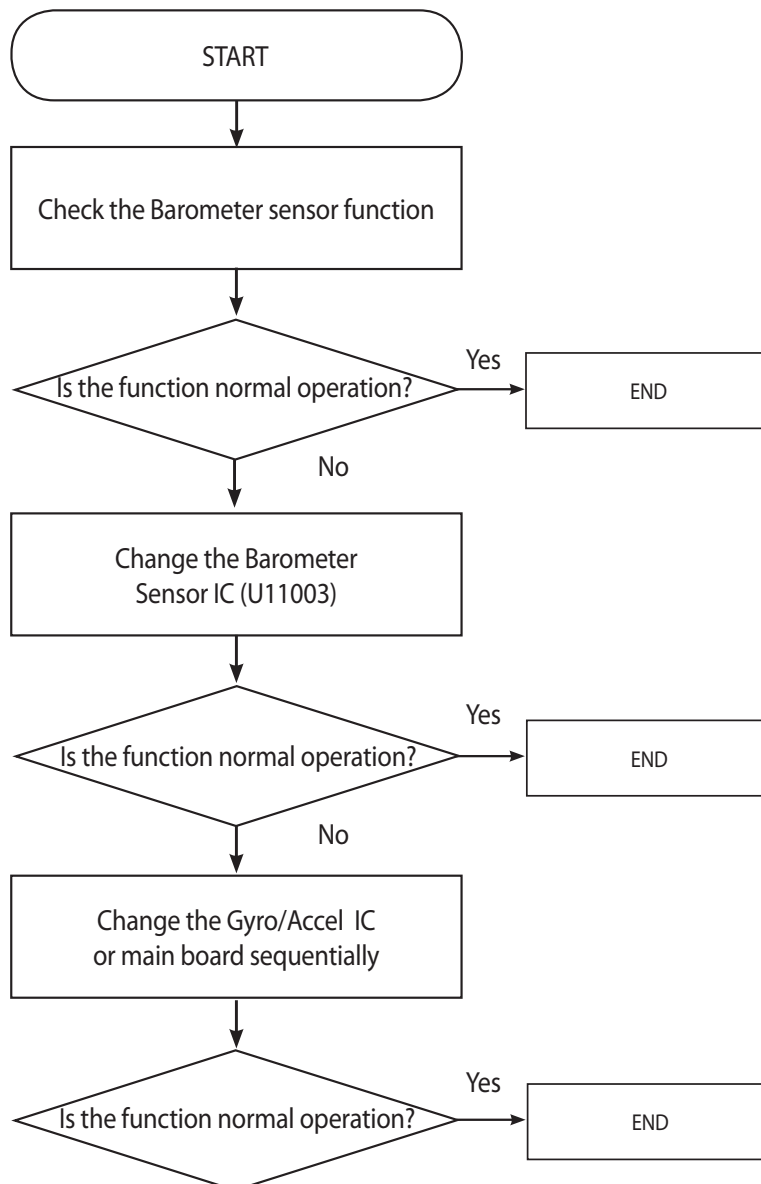
< Main board_Bottom >



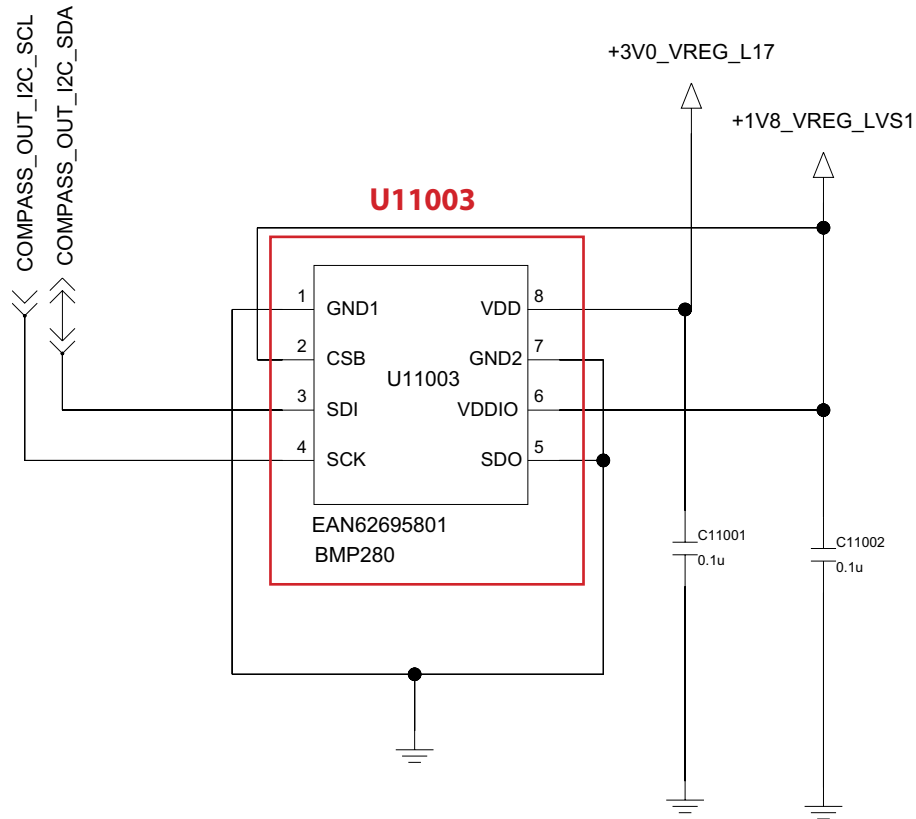
3.15 Barometer sensor troubleshooting (Pressure Sensor)

When the Barometer sensor does not work, the reason is chip problem. If the Barometer sensor IC is damaged, it will do not work even though power is supplied and MSM8974 controls normally. Also, Barometer is connected to Gyro/Accel sensor directly. Therefore if the Barometer sensor does not work, change the Barometer sensor IC, Gyro/Accel sensor or main board sequentially.

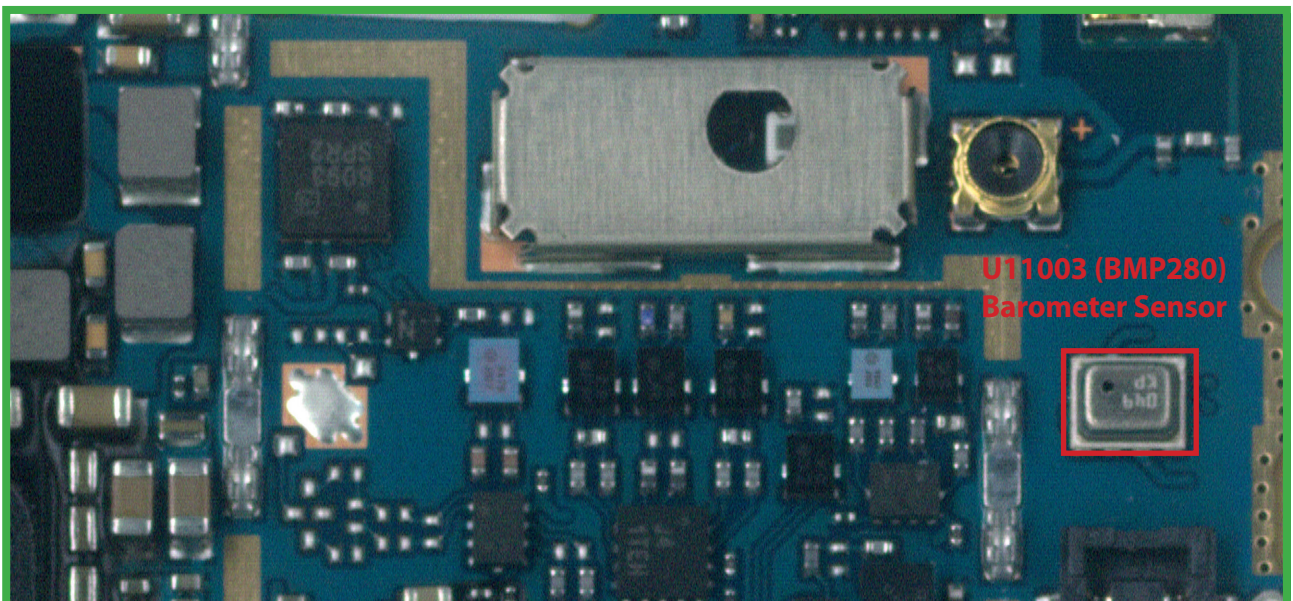
(Changing Sequence : Barometer -> Gyro/Accel -> Main board)



< Barometer Sensor >



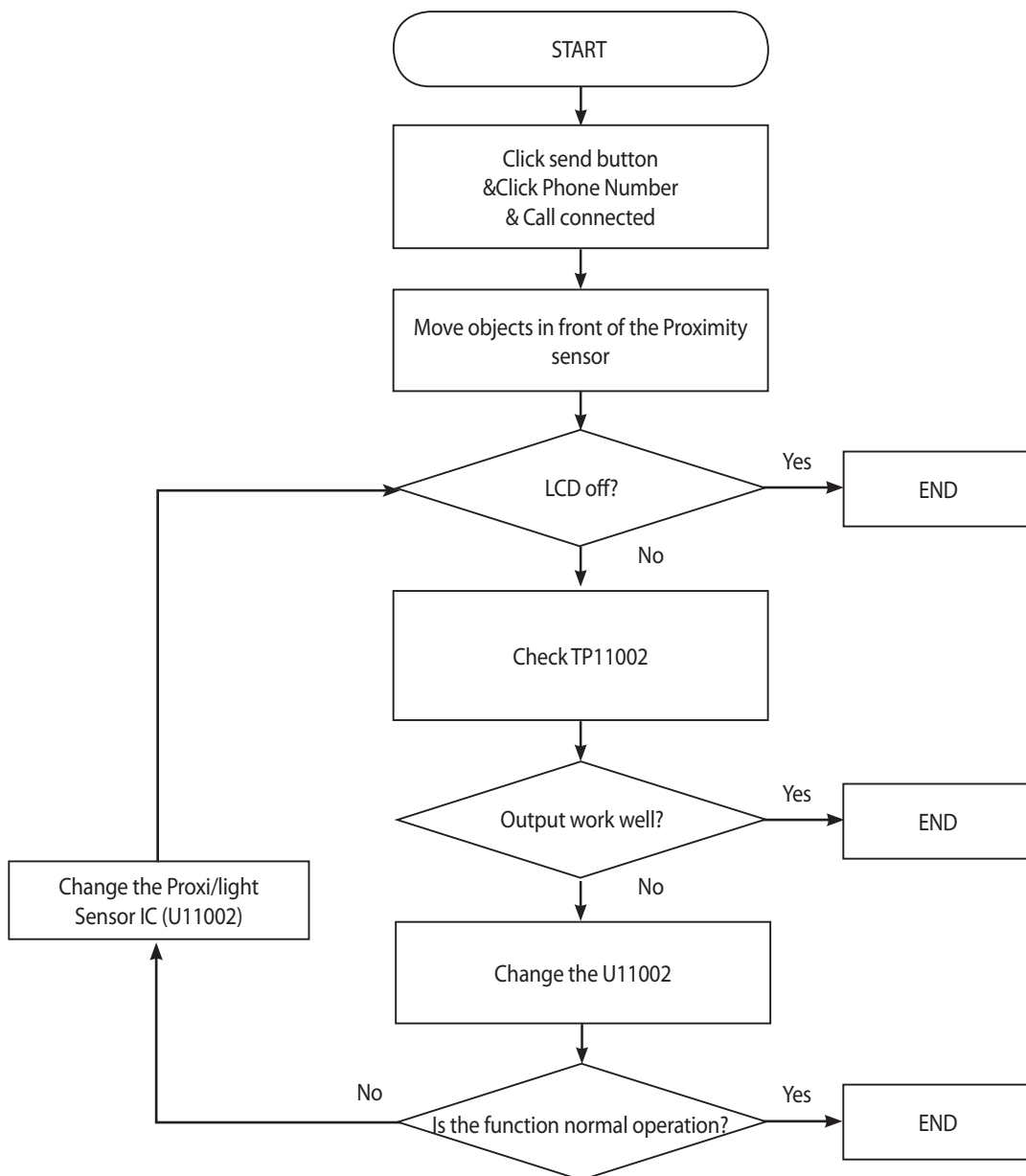
< Main board_Bottom >



3.16 Proximity Sensor on/off troubleshooting

Proximity Sensor is worked as below:

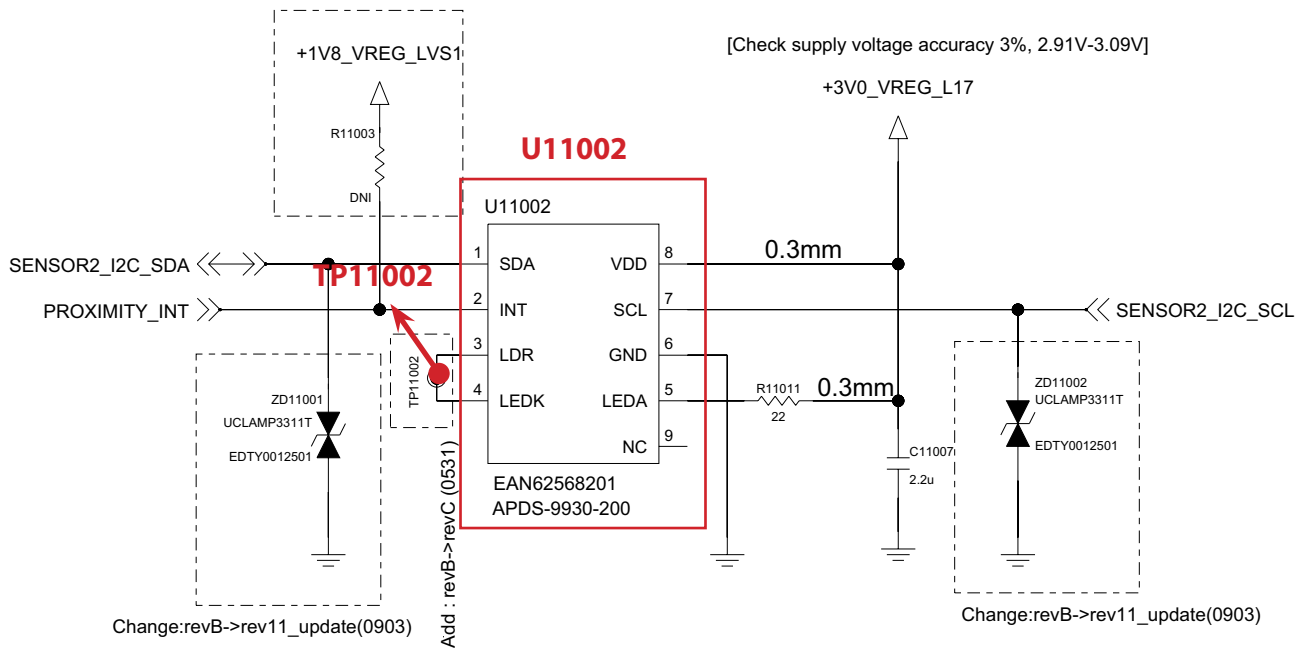
Call Button click -> Phone number click -> Call connected -> Move objects in front of the sensor-> Control automatically the screen's on/off operation



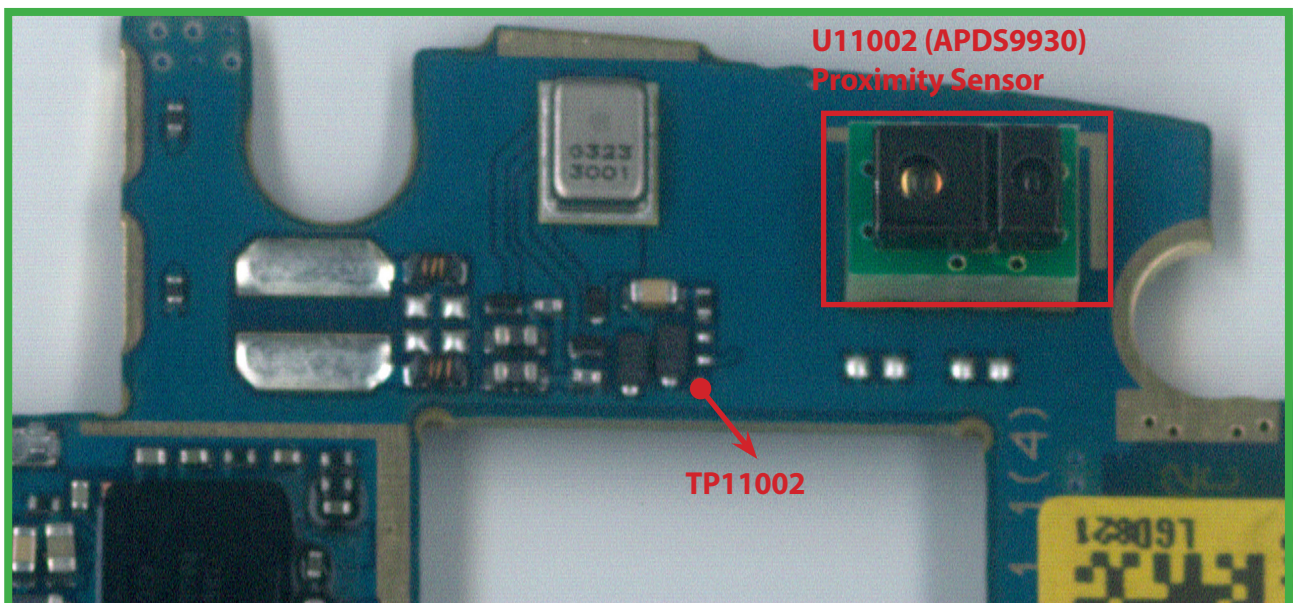
3. TROUBLE SHOOTING

< Proximity/Light Sensor >

Add : revB->revC (0531)



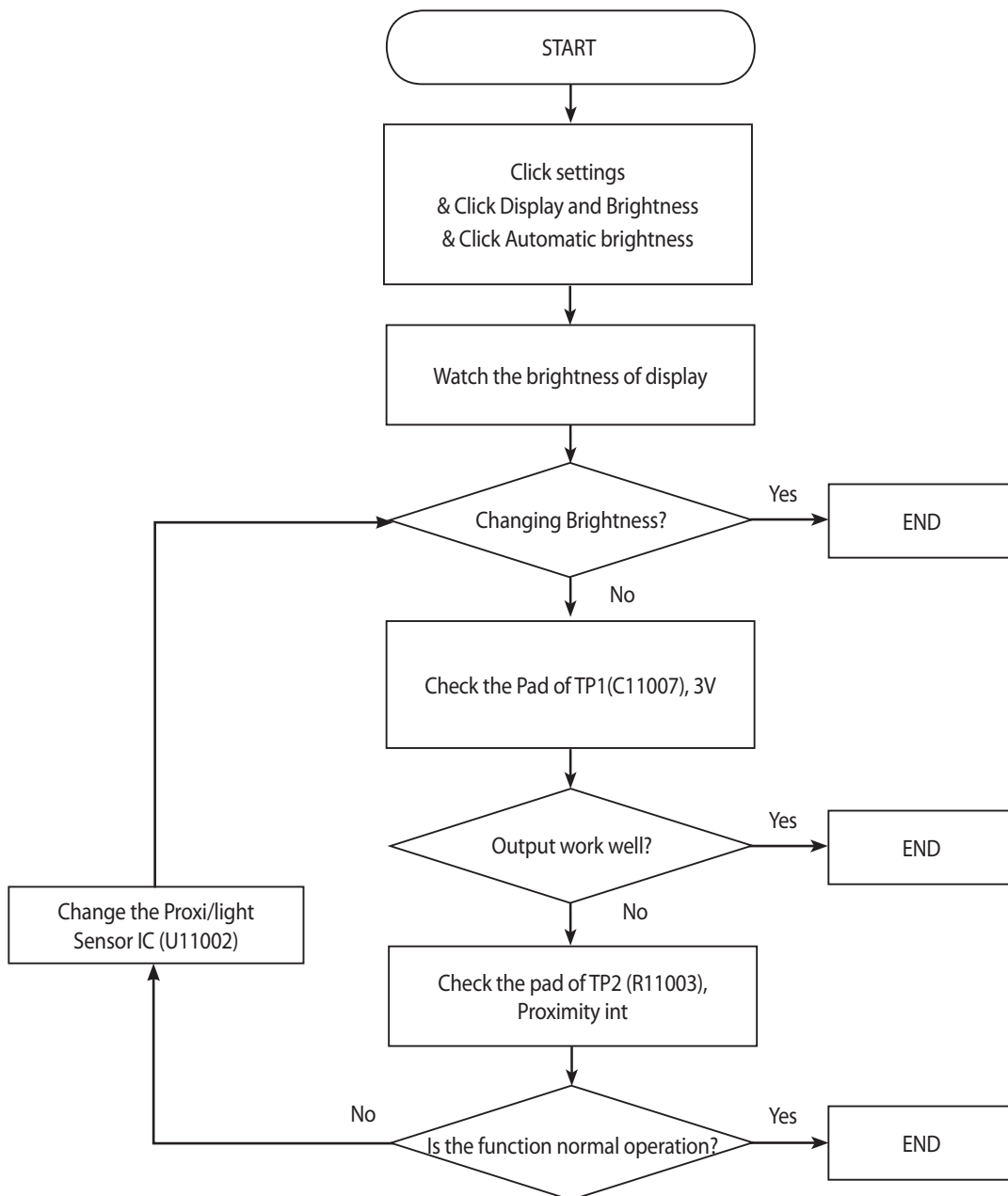
< Main PCB_Top >



3.17 Light Sensor on/off trouble

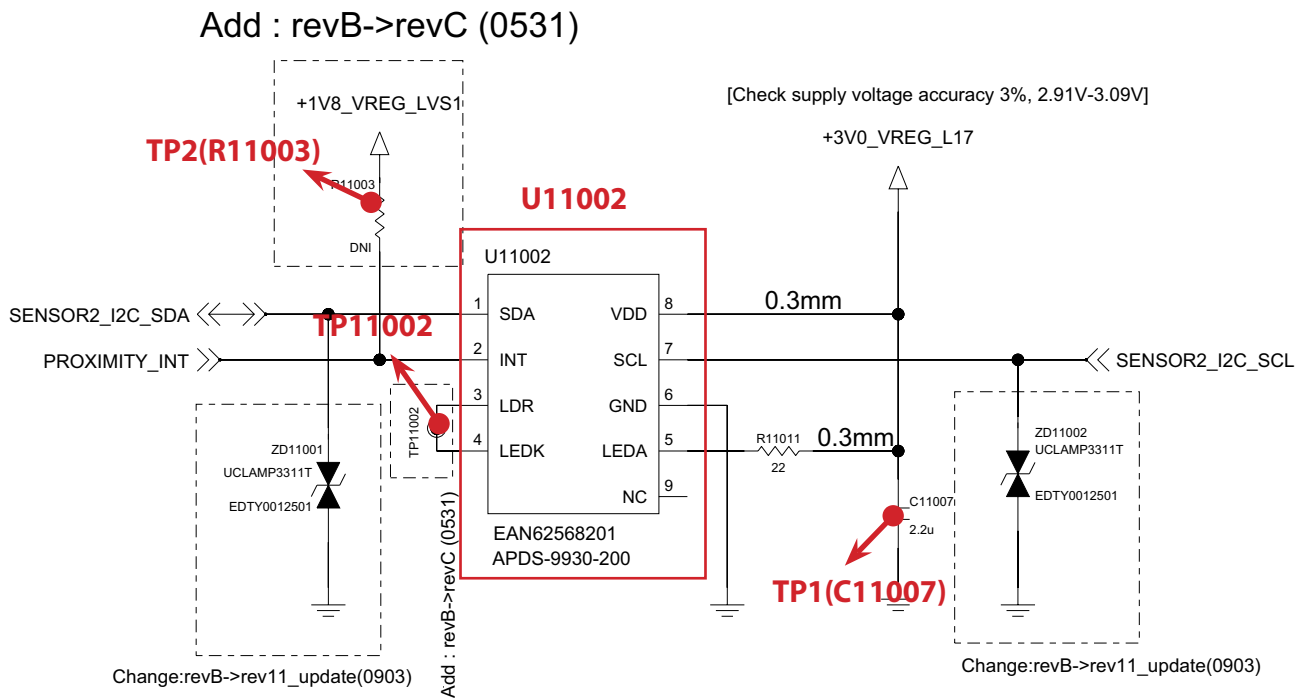
Light Sensor is worked as below:

Menu Key click -> Settings click -> Display click -> Brightness click -> Automatic brightness click

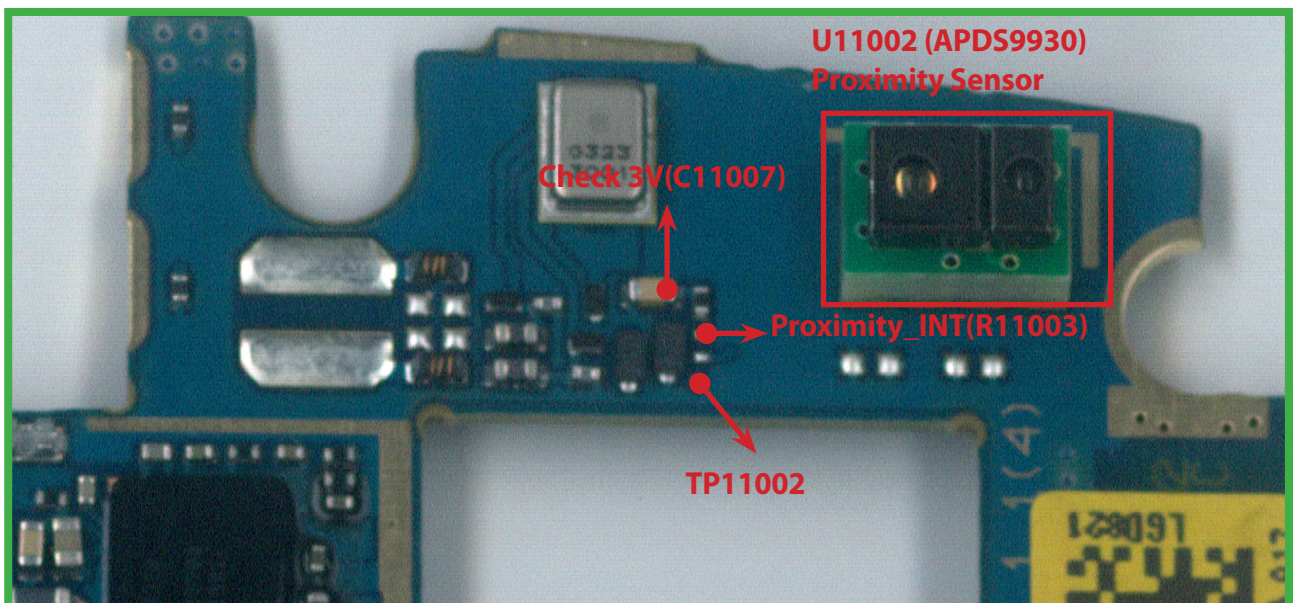


3. TROUBLE SHOOTING

< Proximity/Light Sensor >

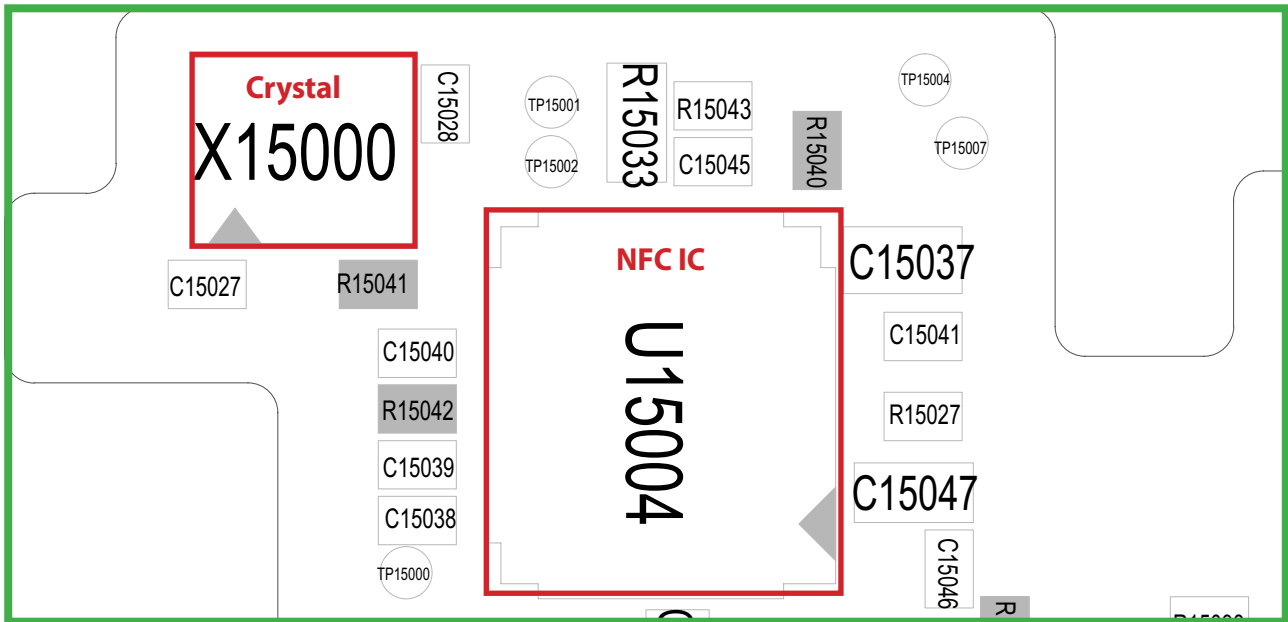


< Main PCB_Top >



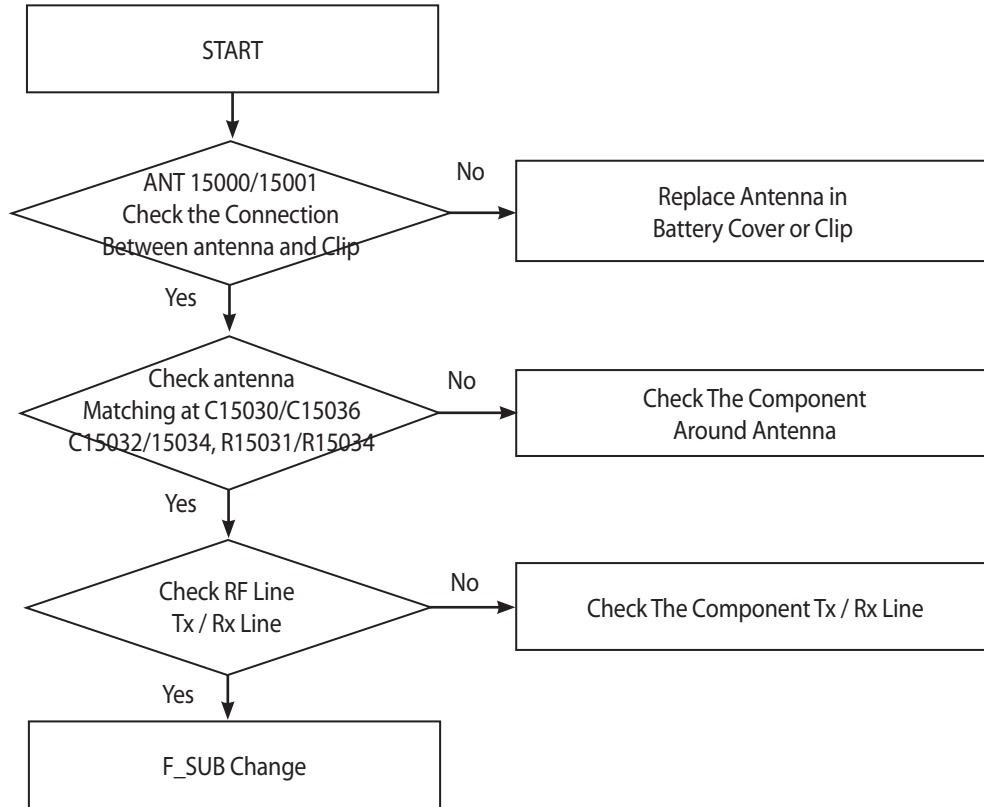
3.18 NFC

3.18.1 NFC components



Reference No.	Description	Reference No.	Description
U15004	BCM20793M, NFC IC	X15000	Crystal

3. TROUBLE SHOOTING



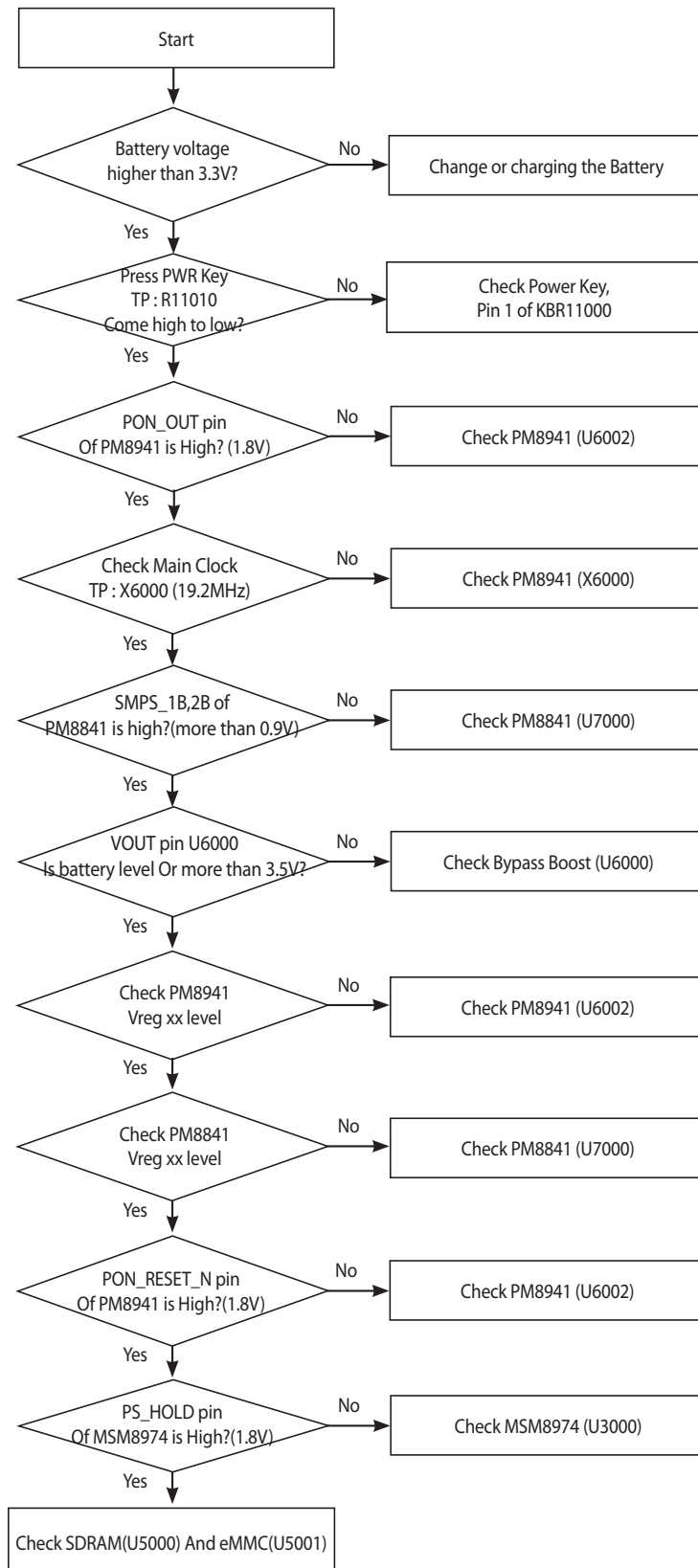
3.19 Power ON Troubleshooting

The main power source of D821/D821 is provided by 2 chips which are PM8941 and PM8841. Since MSM8974 only powers up normally when MSM8974 is properly powered therefore, PM8941 is the actual one to take look at.

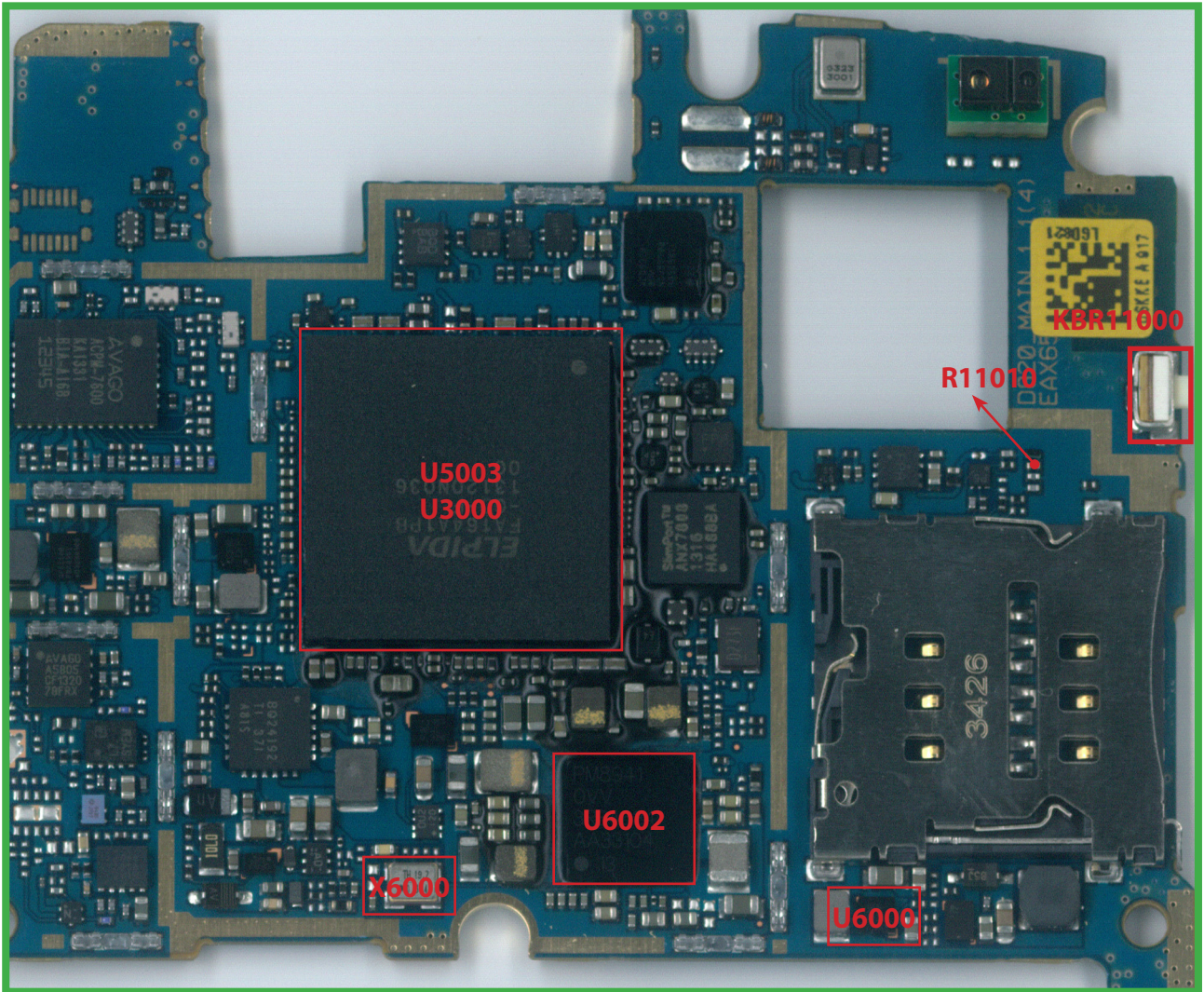
Power ON sequence of D821/D821 is below.

1. PM8941 receives a poweron trigger (e.g. KPD_PWR_N press).
2. PM8941 poweron sequence begins (PBS sequence runs). The following take place:
 - BMS OCV measurement occurs.
 - EXT_REG_EN1 is asserted (VPH_PWR) to enable external supplies.
 - PON_OUT is asserted (1.8 V) to enable PM8841.
 - A timer starts to allow PM8841 to complete his sequence.
3. PM8841 receives poweron trigger (PON_1 and PS_HOLD are asserted).
4. PM8841 poweron sequence begins (PBS sequence runs). The following take place:
 - S1 is turned ON (memory supply).
 - S2 is turned ON (core supply).
5. PM8841 PBS sequence completes. Since PM8841 PS_HOLD is already high, the PM8841 sequence completes. PM8841 is on.
6. PBS sequence on PM8941 continues.
 - The timer on PM8841 expires.
 - The rest of the power sequence (regulators, clocks) are enabled in several steps.
7. The PM8941 PBS sequence completes. PM8941 PON module deasserts PON_RESET_N and sets PS_HOLD timer.
8. Once PON_RESET_N is deasserted, MSM comes out of reset. and PBL will assert PS_HOLD. PM8941 is on.
9. After FLCB, secondary poweron sequence takes place.

3.19.1 Power ON Troubleshooting (MSM8974)

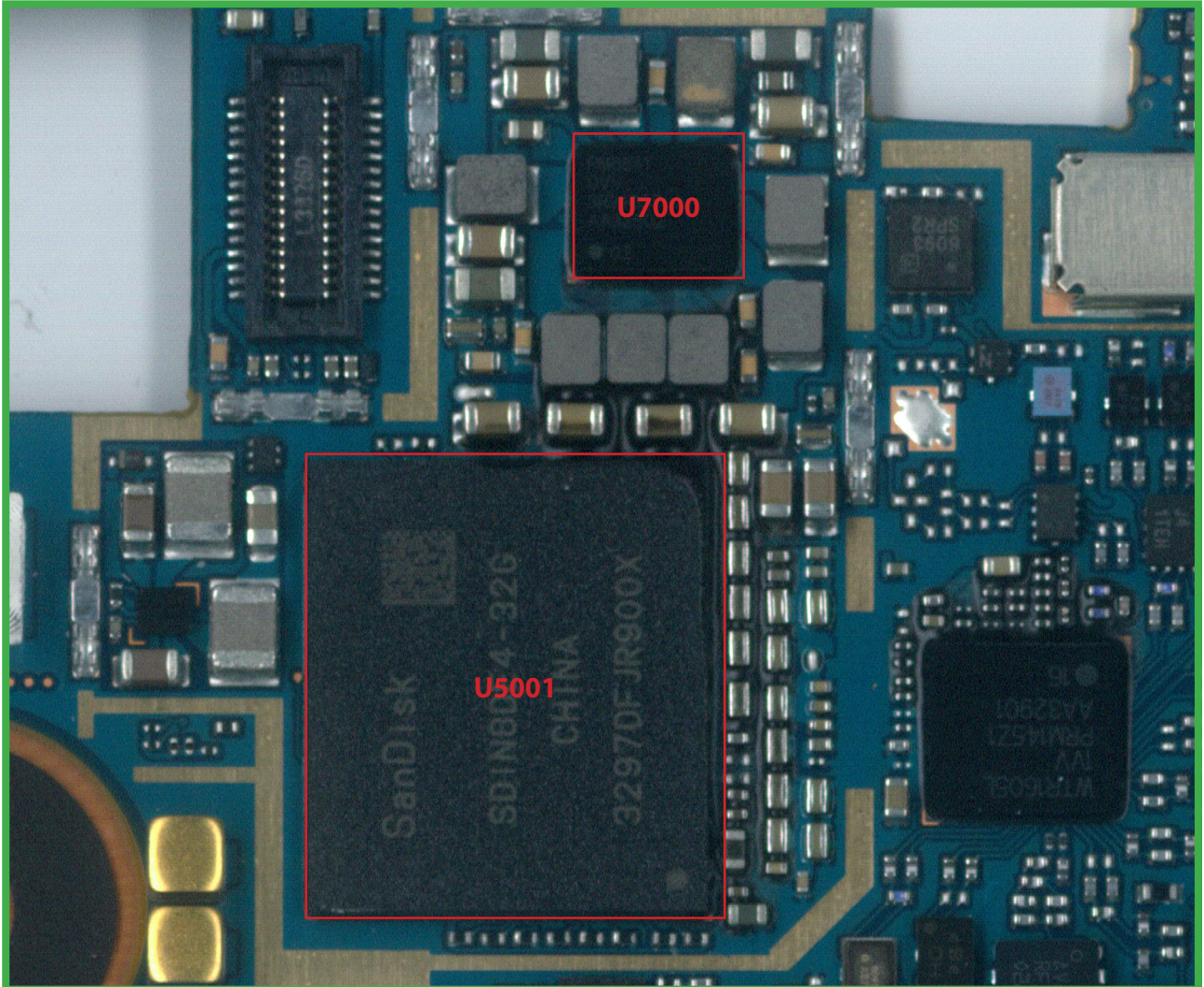


3. TROUBLE SHOOTING



TOP

3. TROUBLE SHOOTING



BOT

3.20 Wireless Charging Troubleshooting

When the WLC does not work, the problem comes from WLC antenna, SUB Board or WLC chip itself.

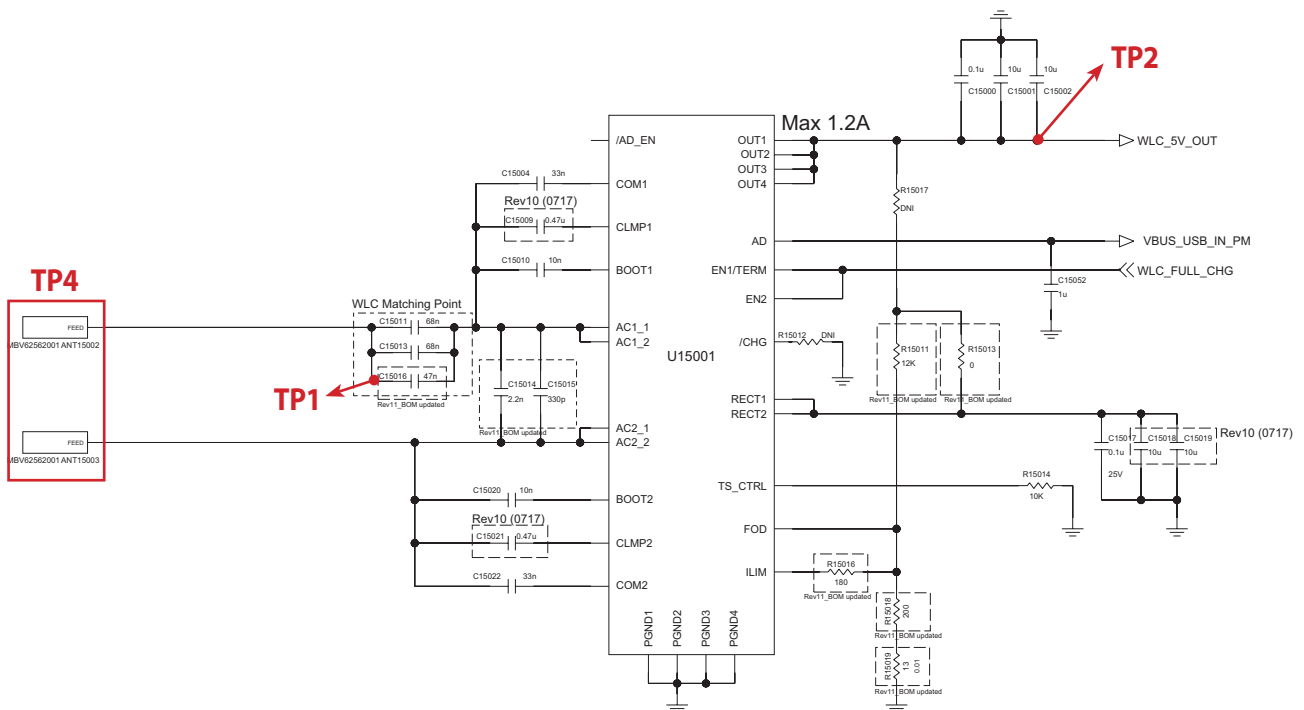
Wireless charging system is not controlled by the main core.

TP1 : Input power from secondary coil : AC 19V(at 100kHz~200kHz)

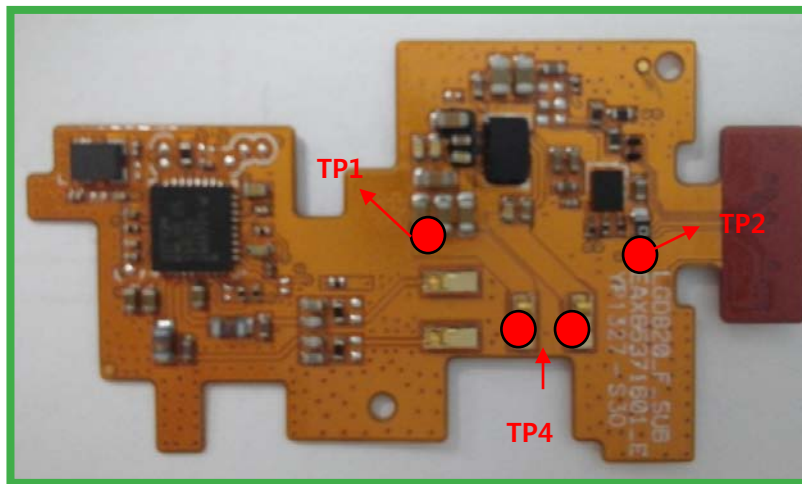
TP2 : Output power from WLC chip : within 4.8V ~ 5V

TP3 : Antenna itself has about 5.9uH self-inductance and 600mohm self-resistance (w/ RLC Meter)

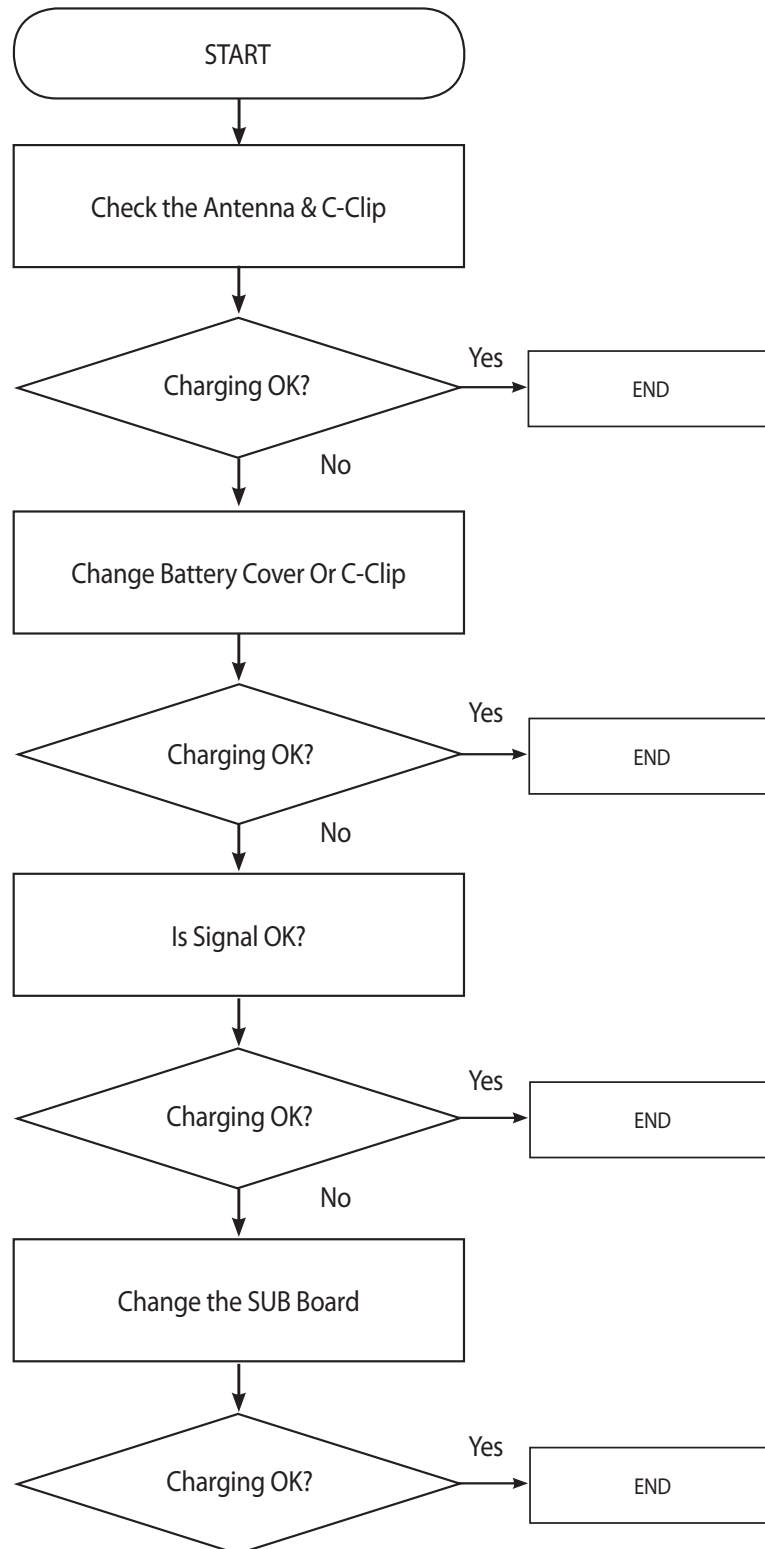
TP4 : C-clip is cracked or separated from board



3. TROUBLE SHOOTING



3. TROUBLE SHOOTING

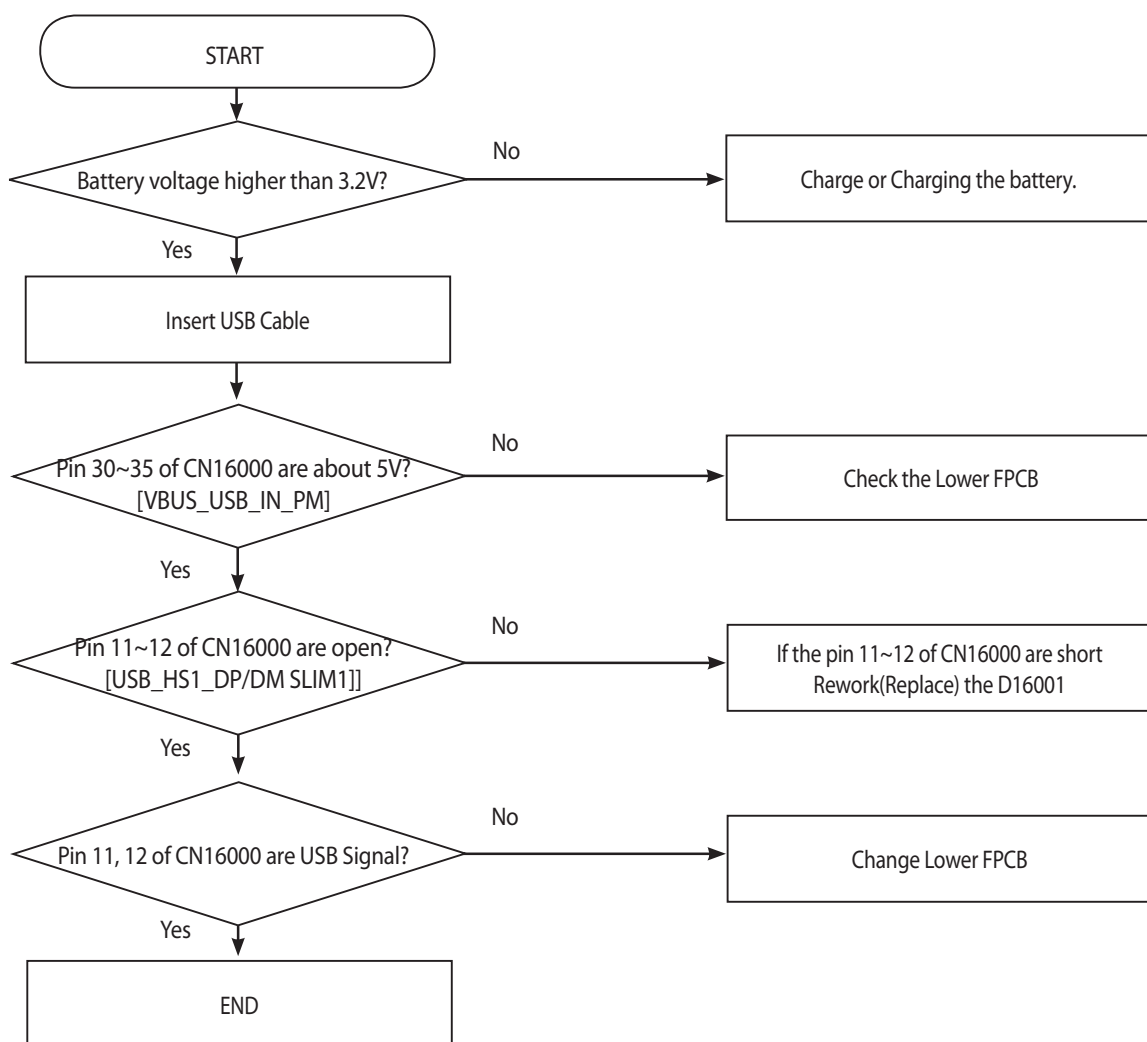


3.21 USB Trouble shooting

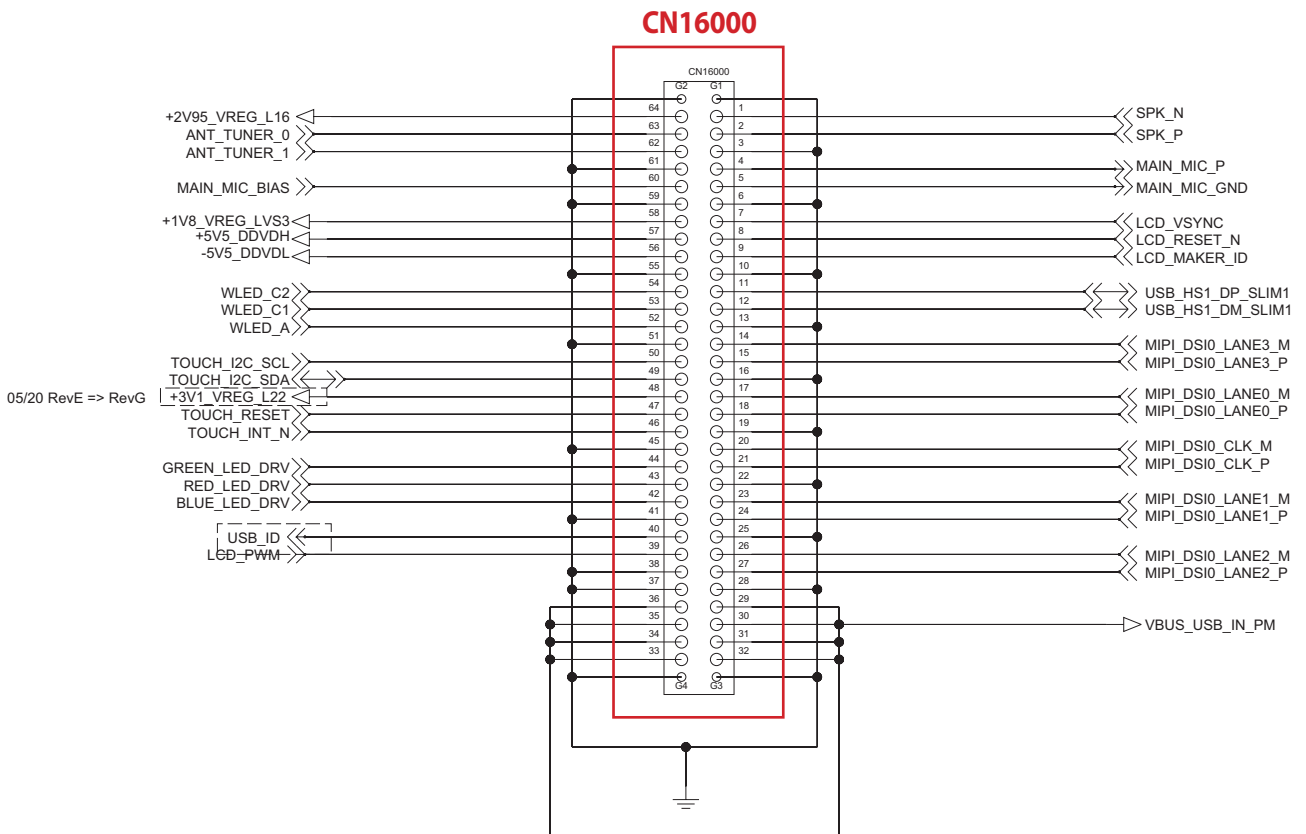
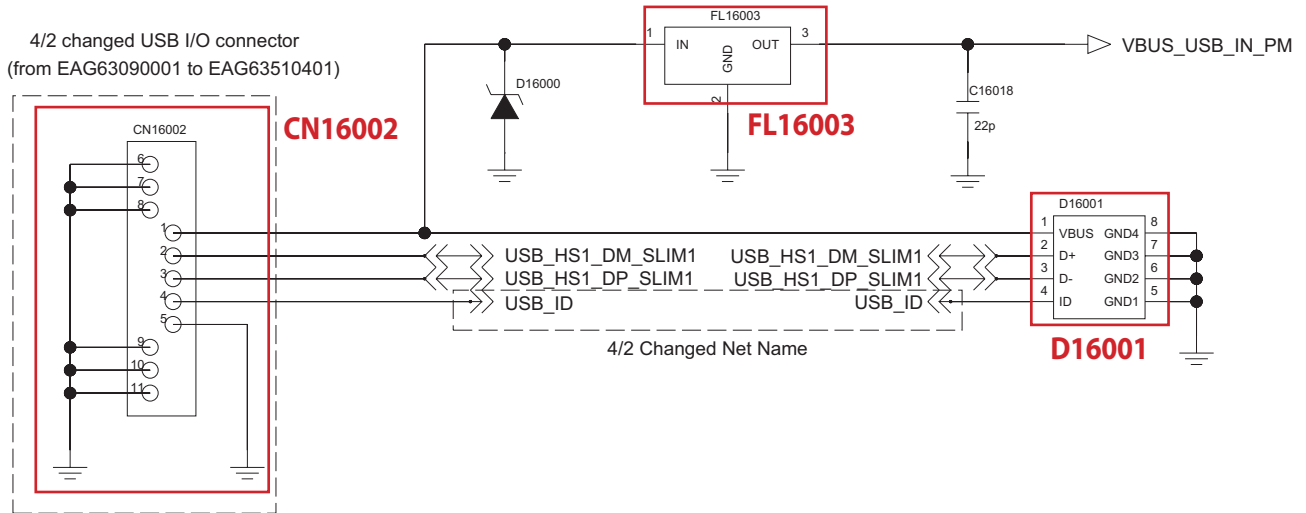
The sequence of D821 USB is,

USB connected to D821 -> VBUS_USB_IN(FL16003) goes to 5V -> USB_DATA is triggered -> USB work

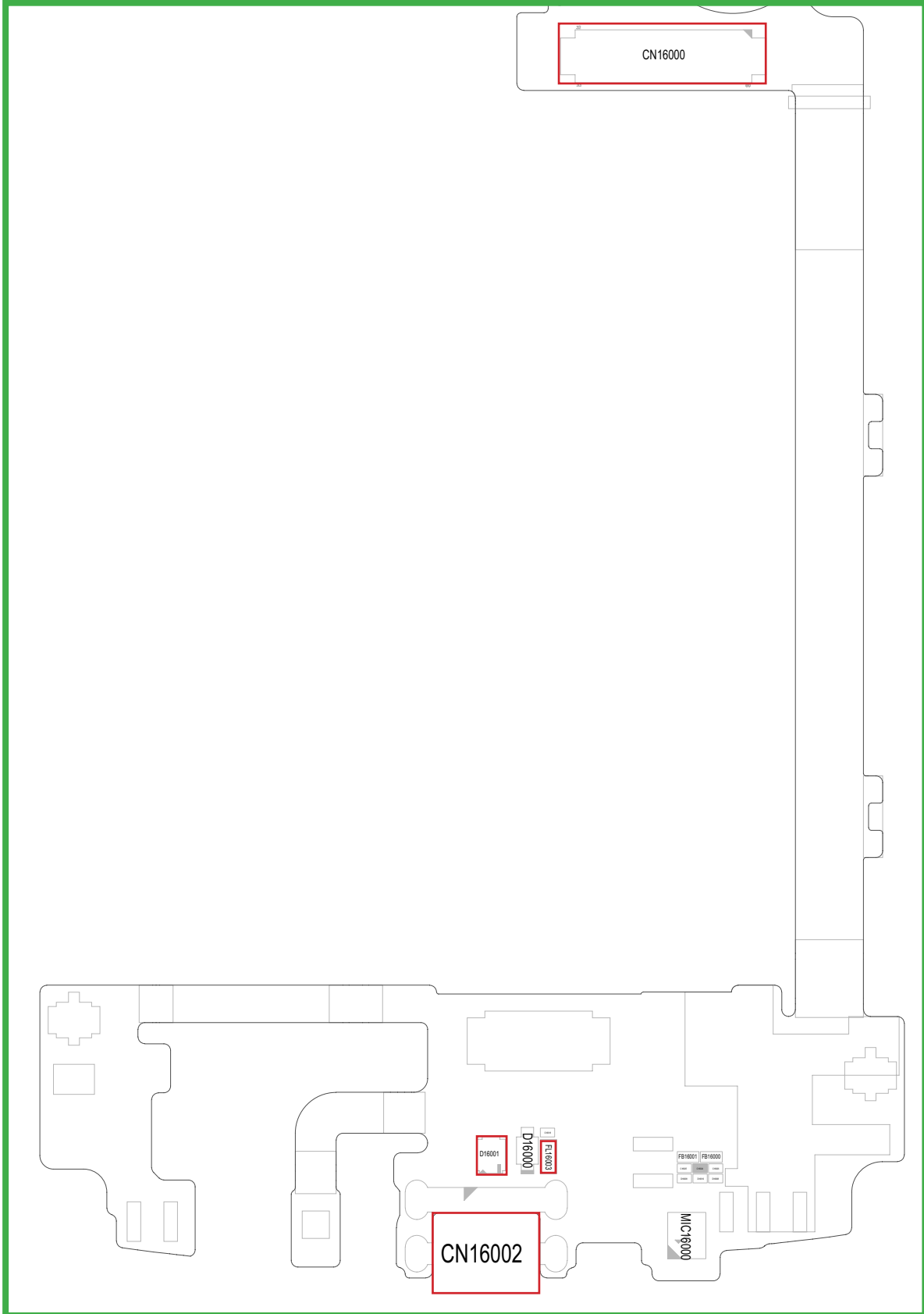
USB Trouble shooting is shown below.



3. TROUBLE SHOOTING

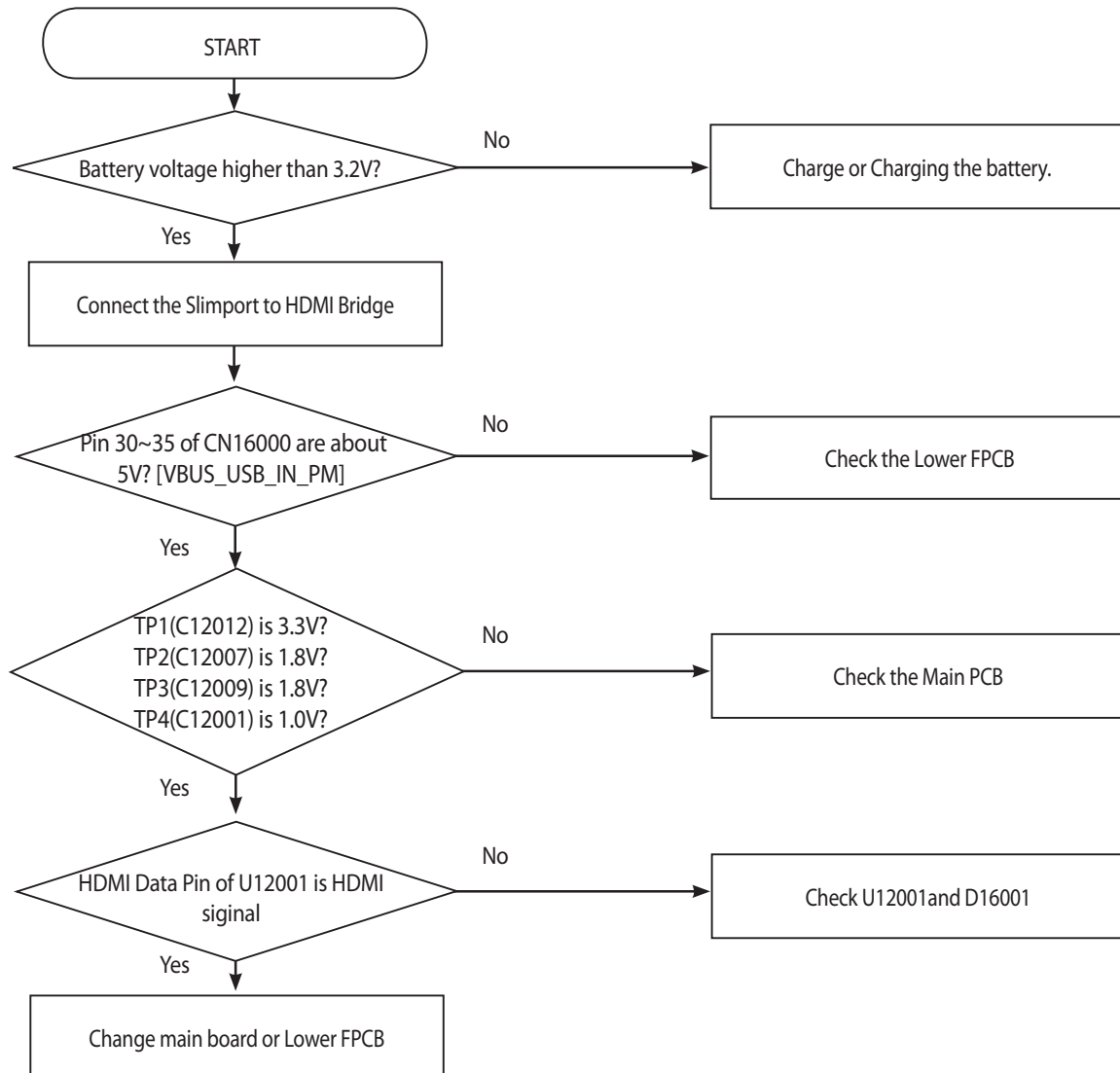


3. TROUBLE SHOOTING

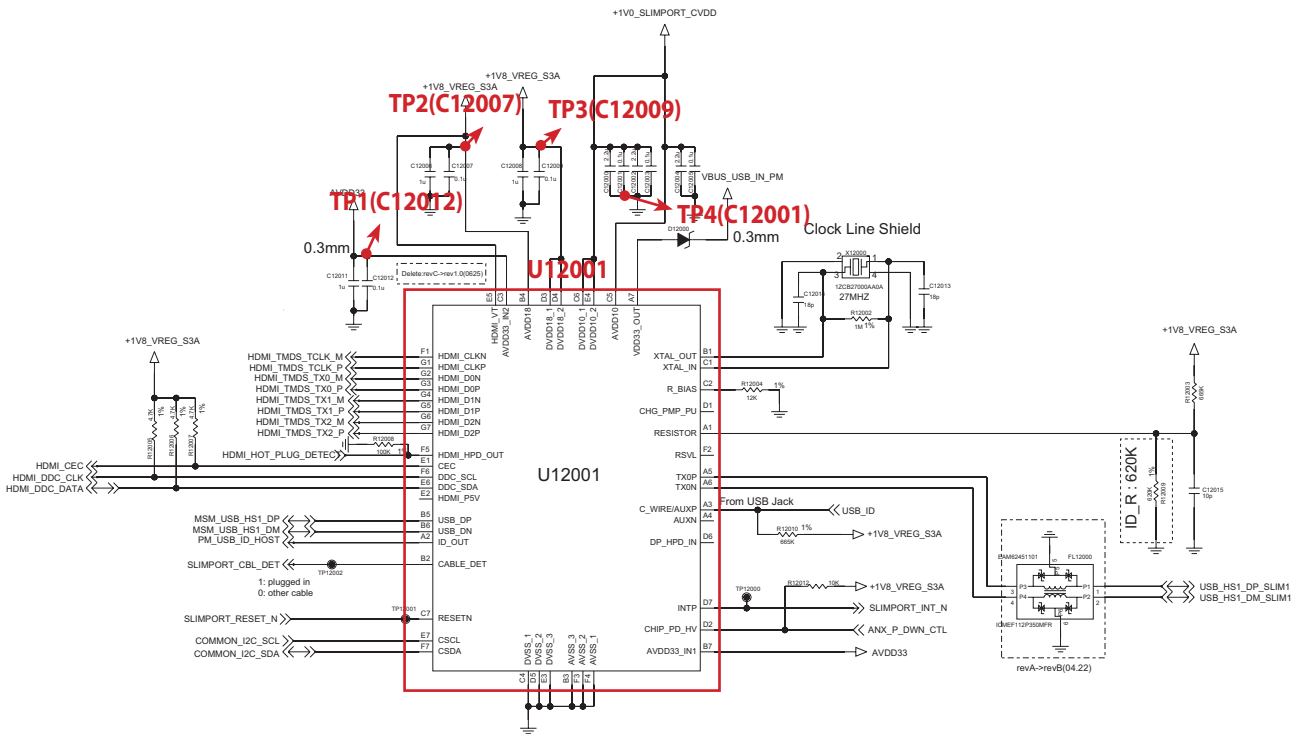


3.22 HDMI Troubleshooting

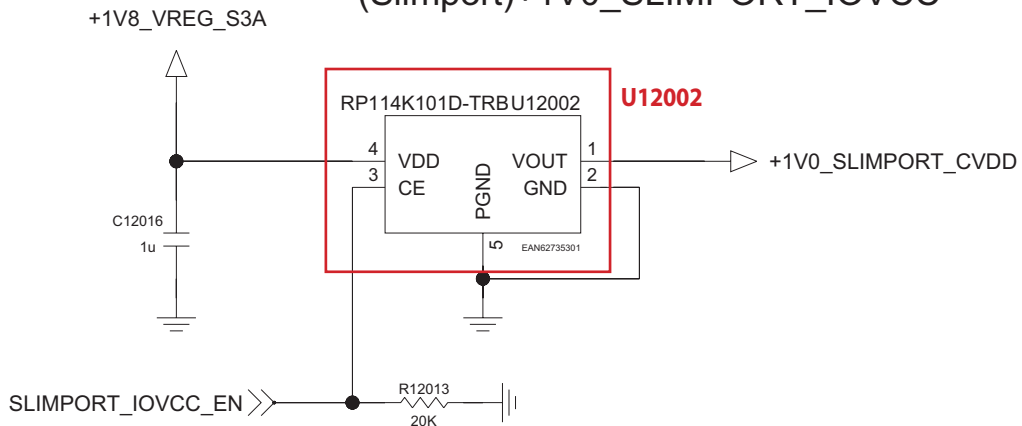
Check out the setting menu on the phone and then set the proper resolution for the outer display as shown below.



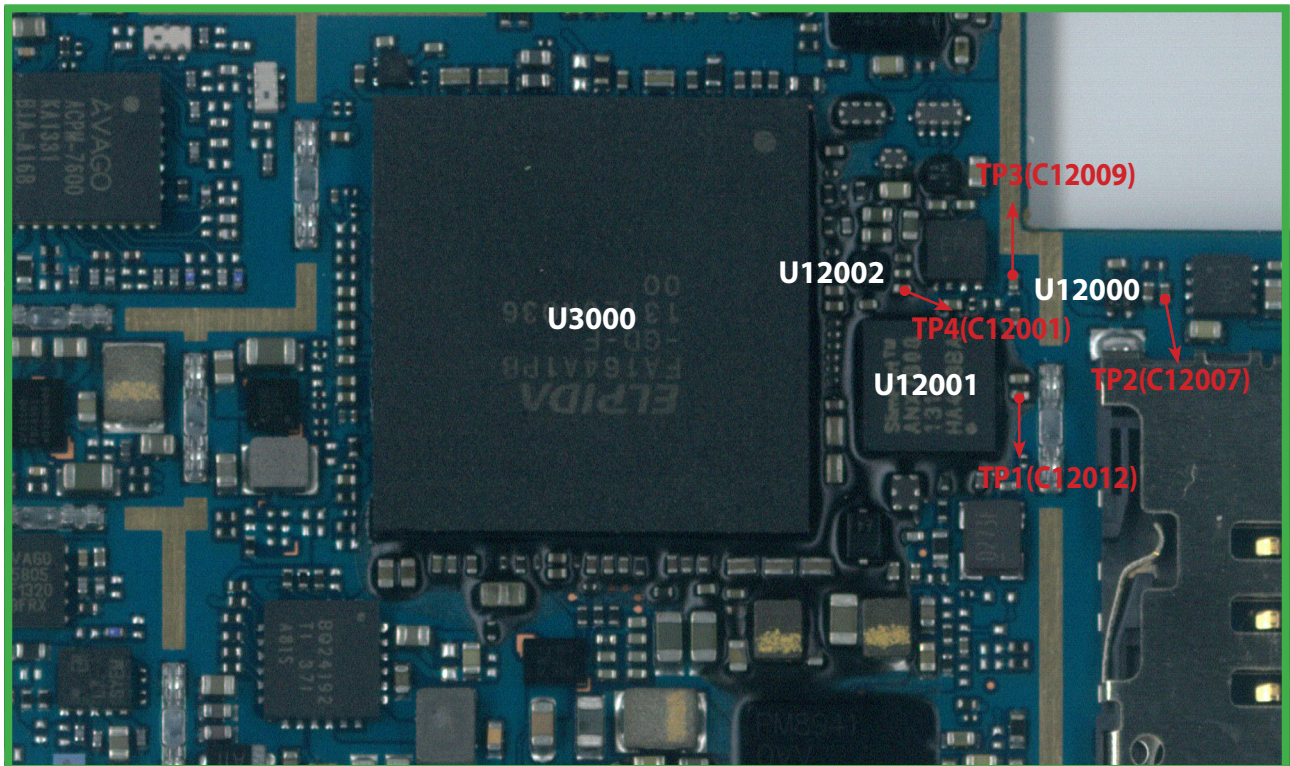
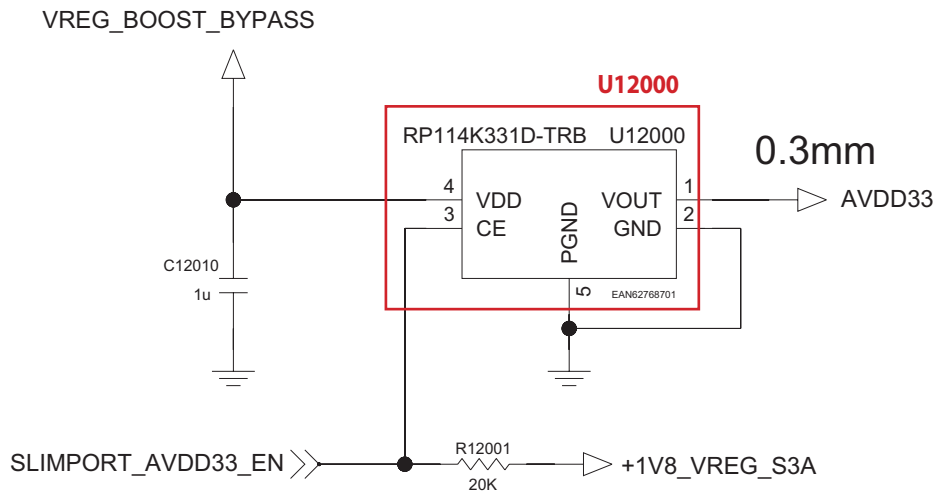
SLIMPORT



(Slimport)+1V0_SLIMPORT_IOVCC

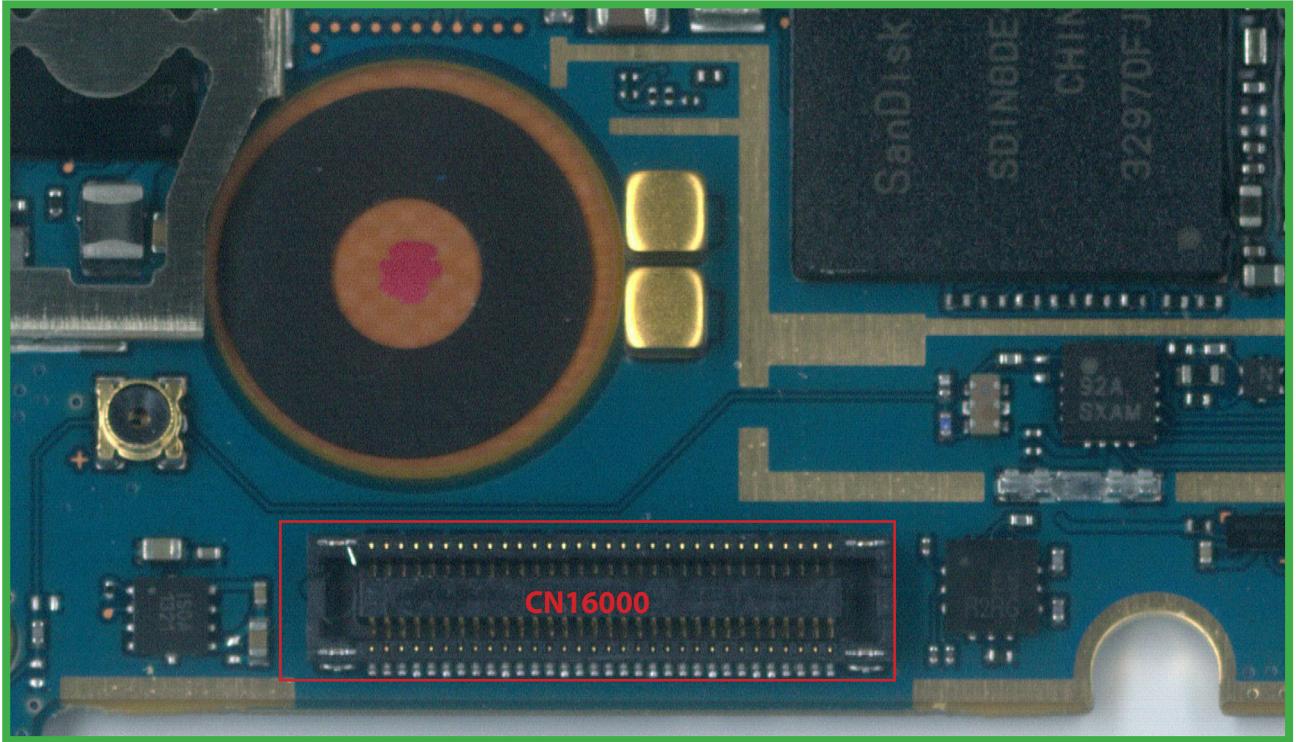


3. TROUBLE SHOOTING



TOP

3. TROUBLE SHOOTING

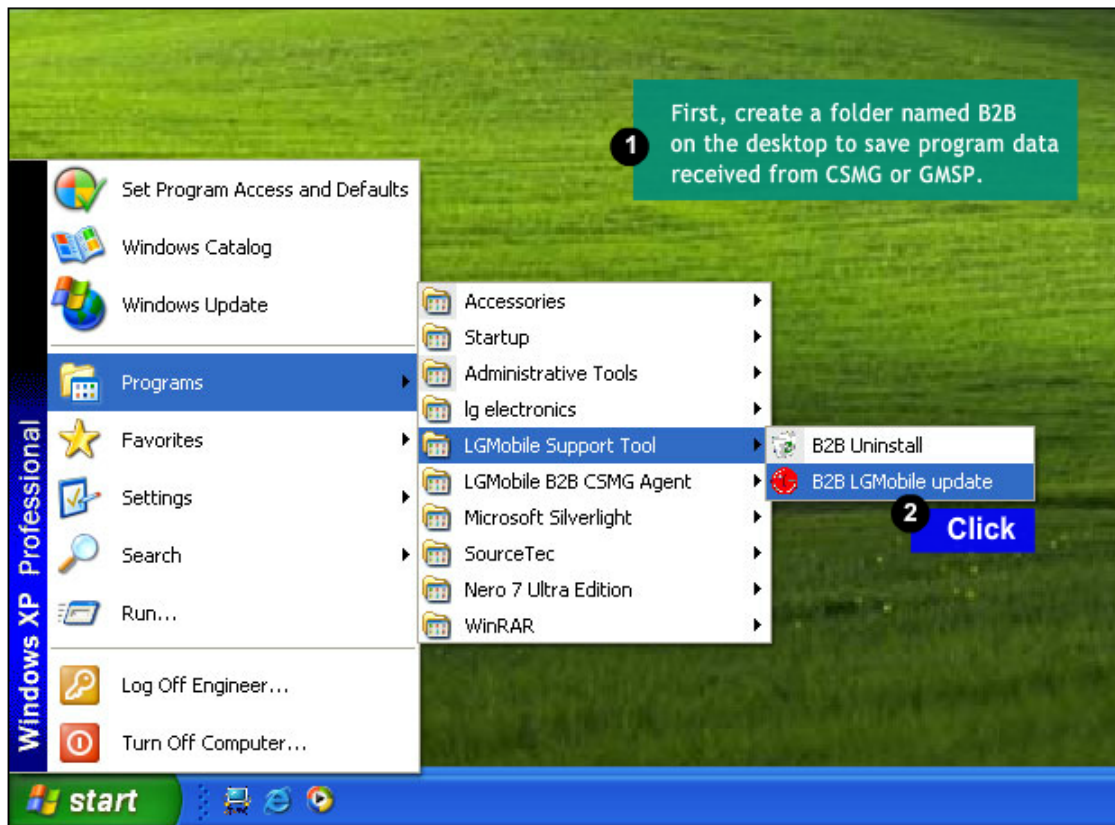


BOT

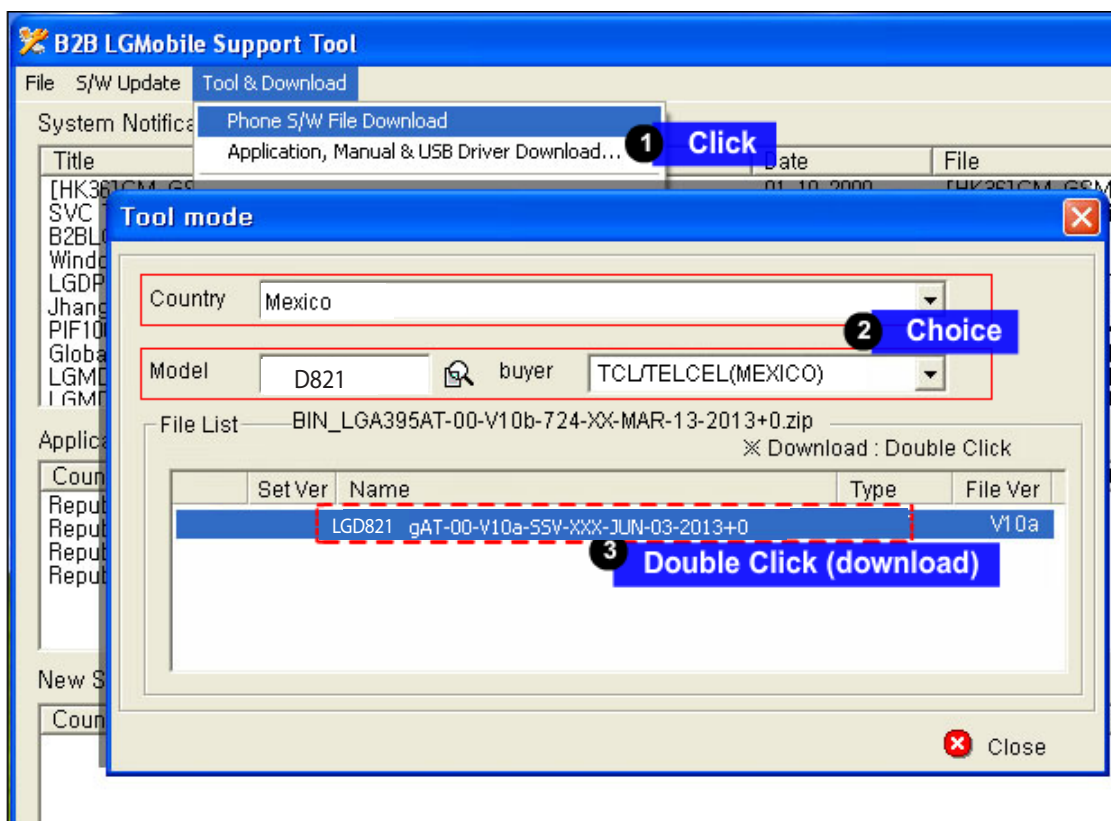
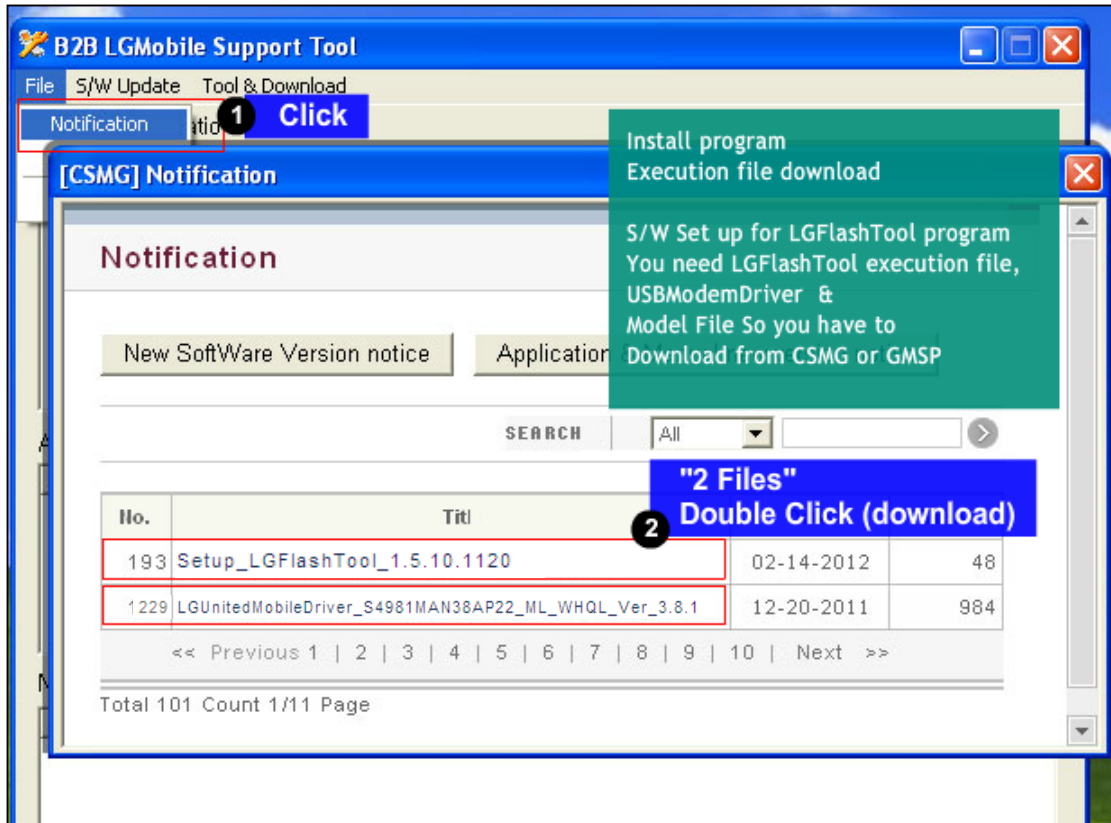
4. DOWNLOAD

This document is draft version, so the contents will be updated after registering the final one.

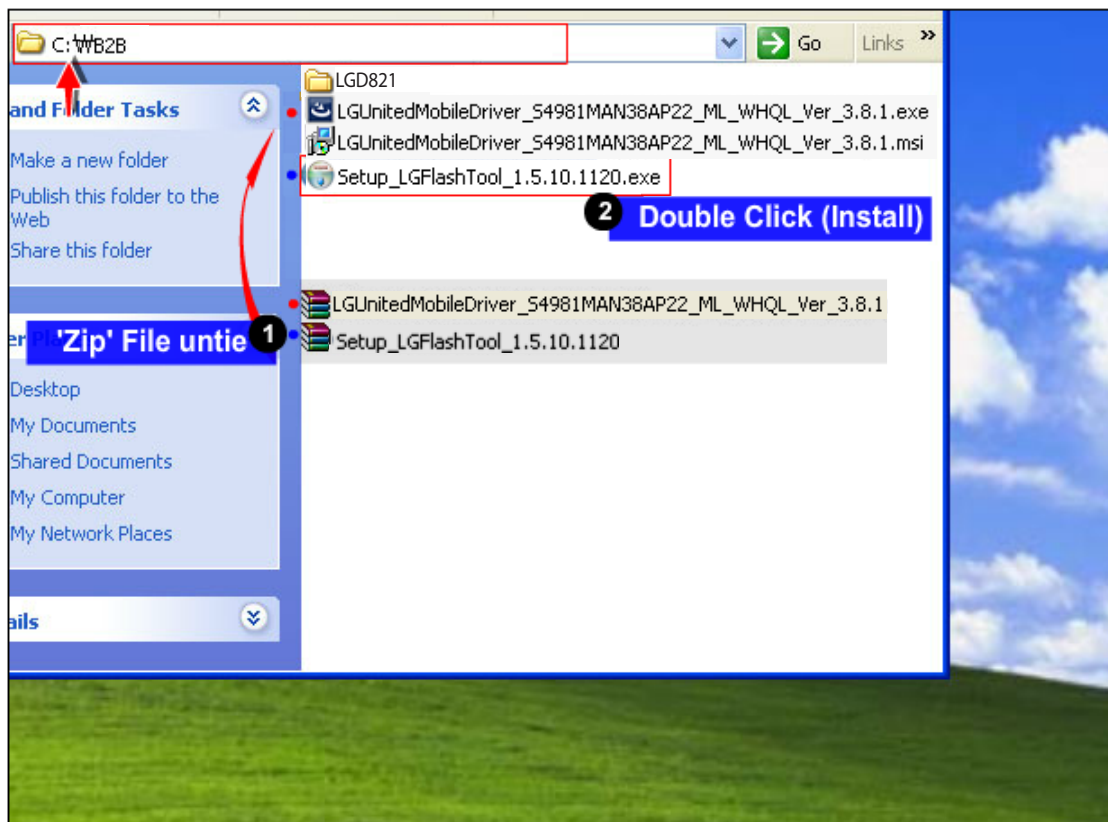
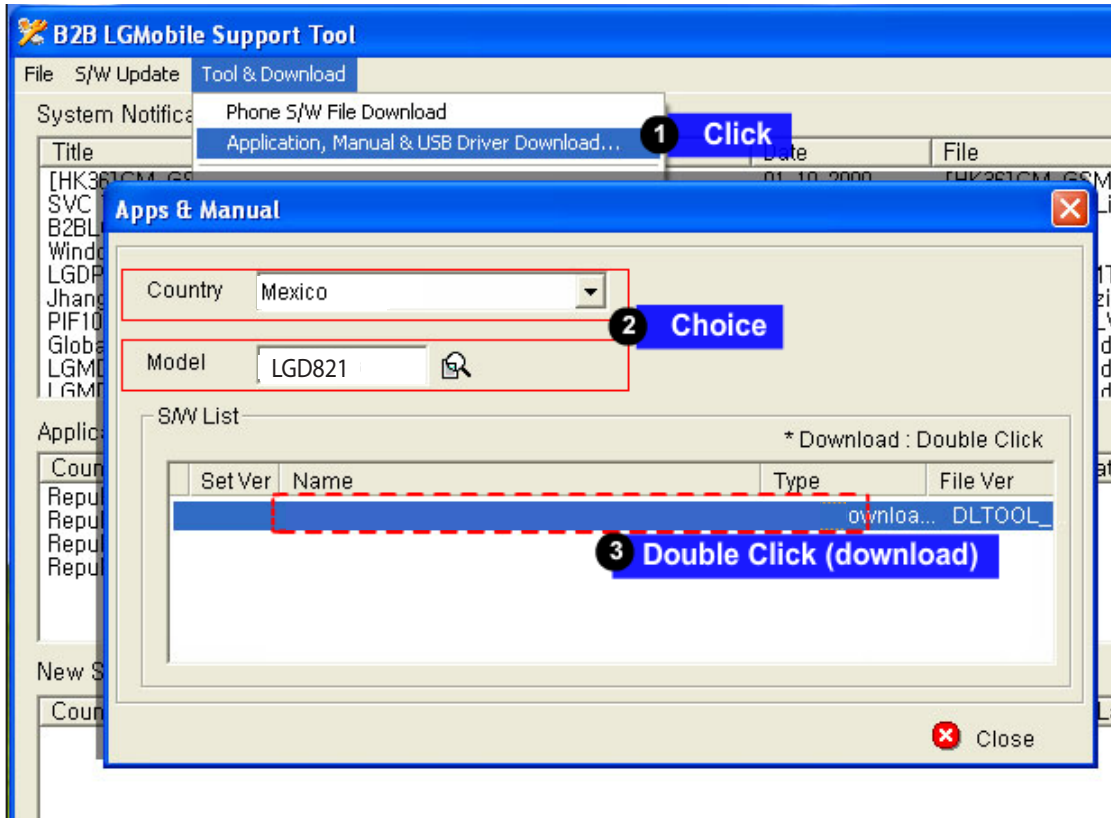
TOOL INFORMATION			
TOOL VERSION	DLL NAME	USB DRIVER	
Please Check the Version to "B2B"			
H/W			
	Name	Part No.	SW
D/L Cable			



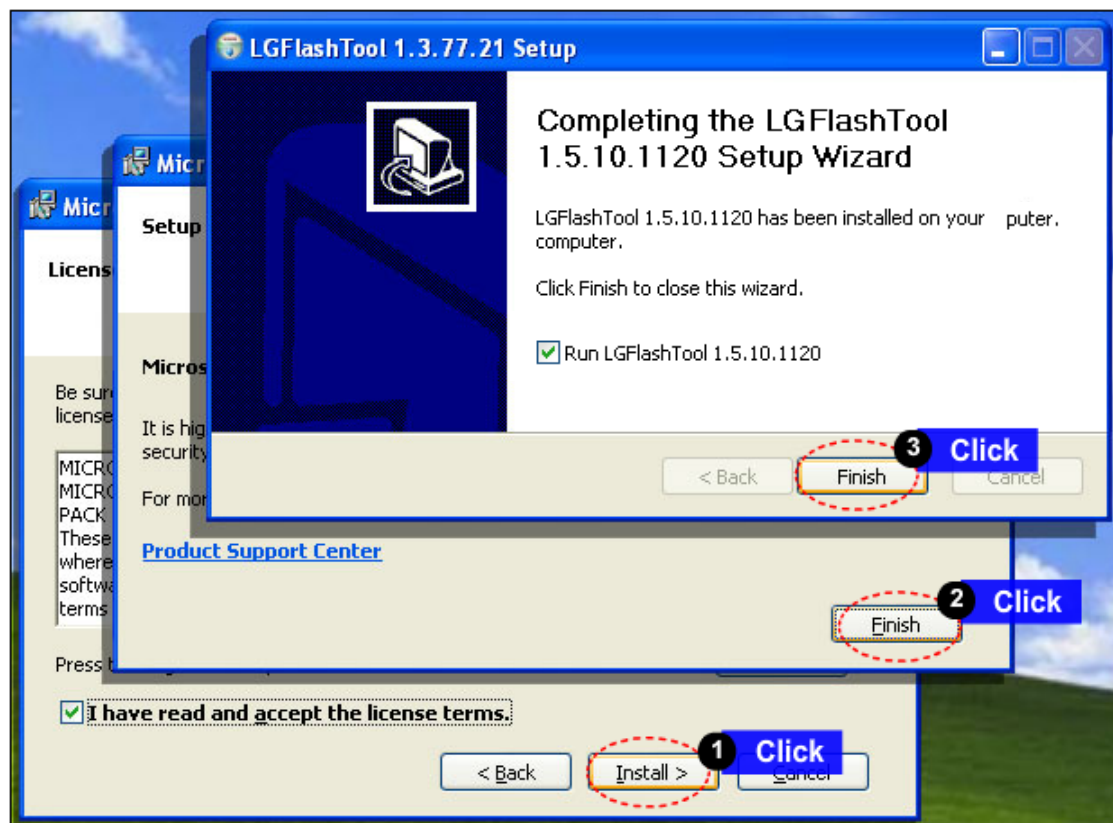
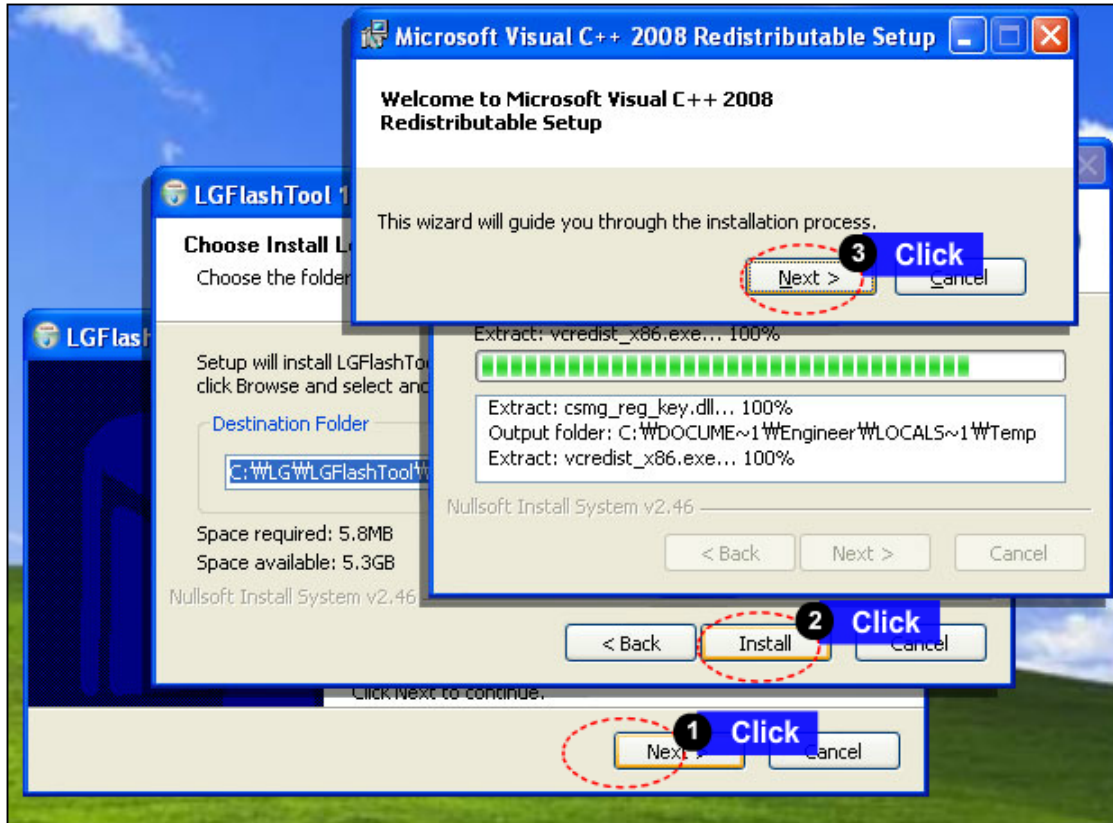
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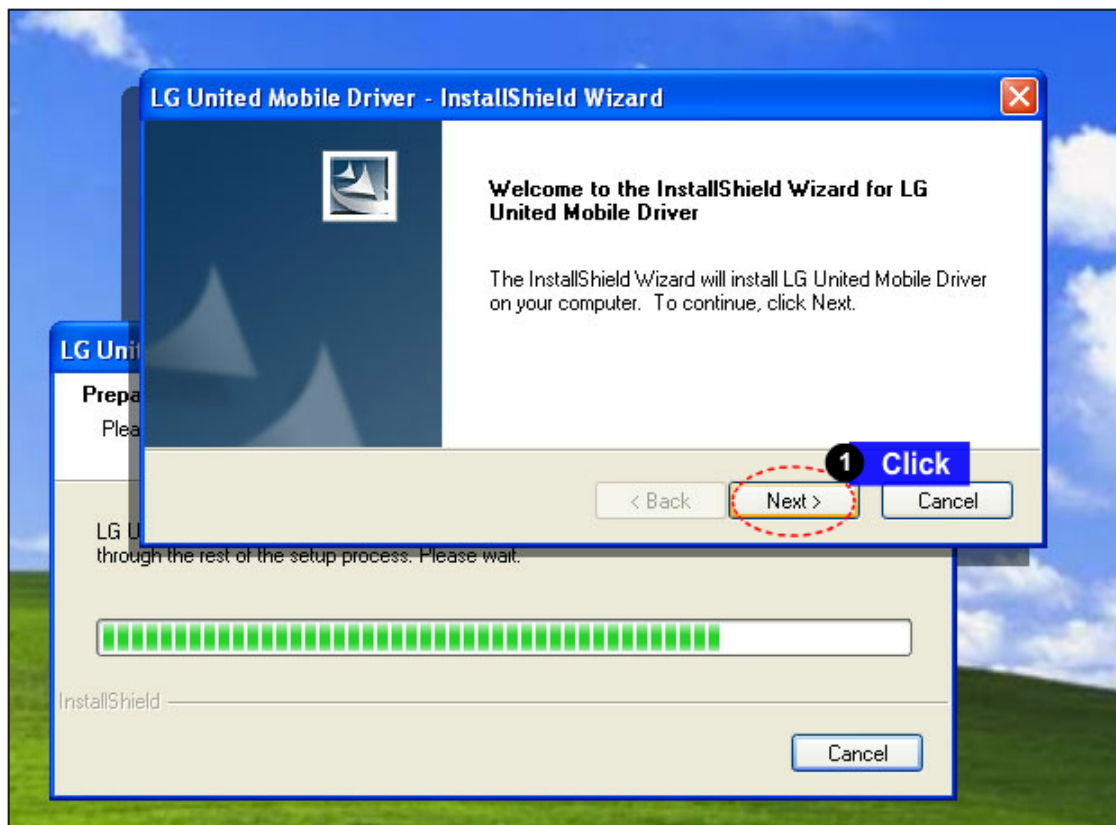
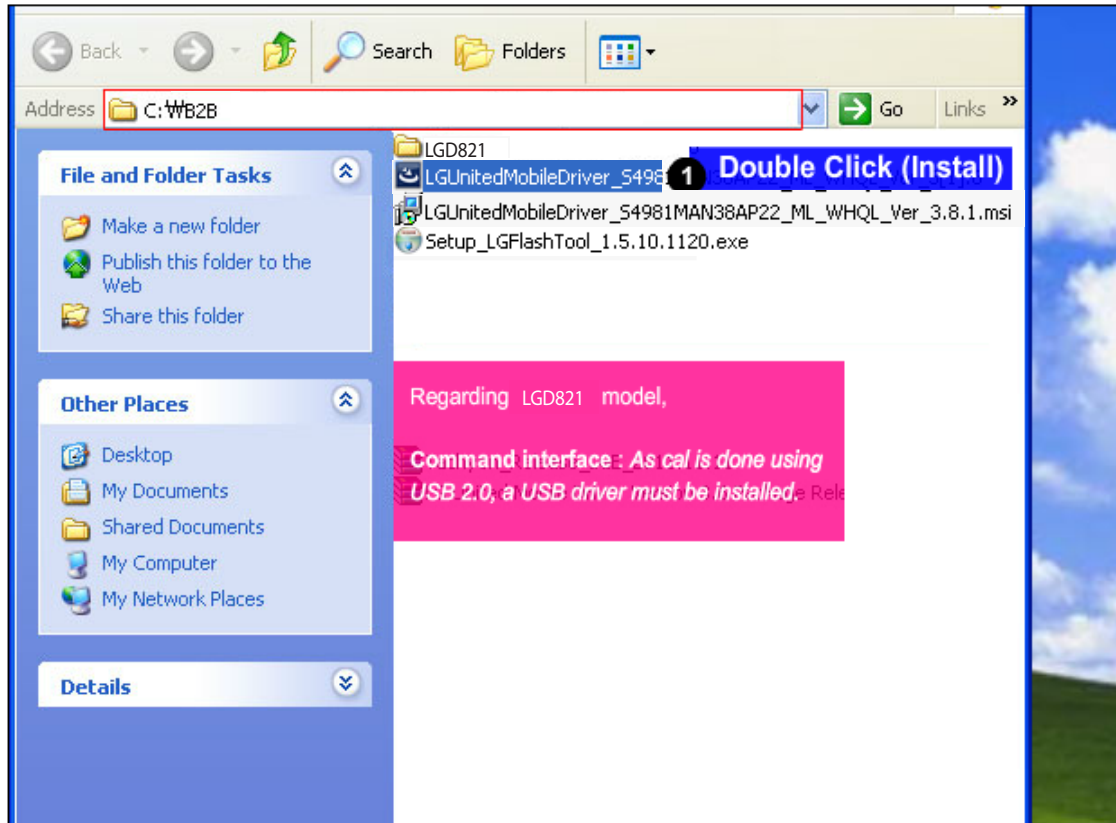


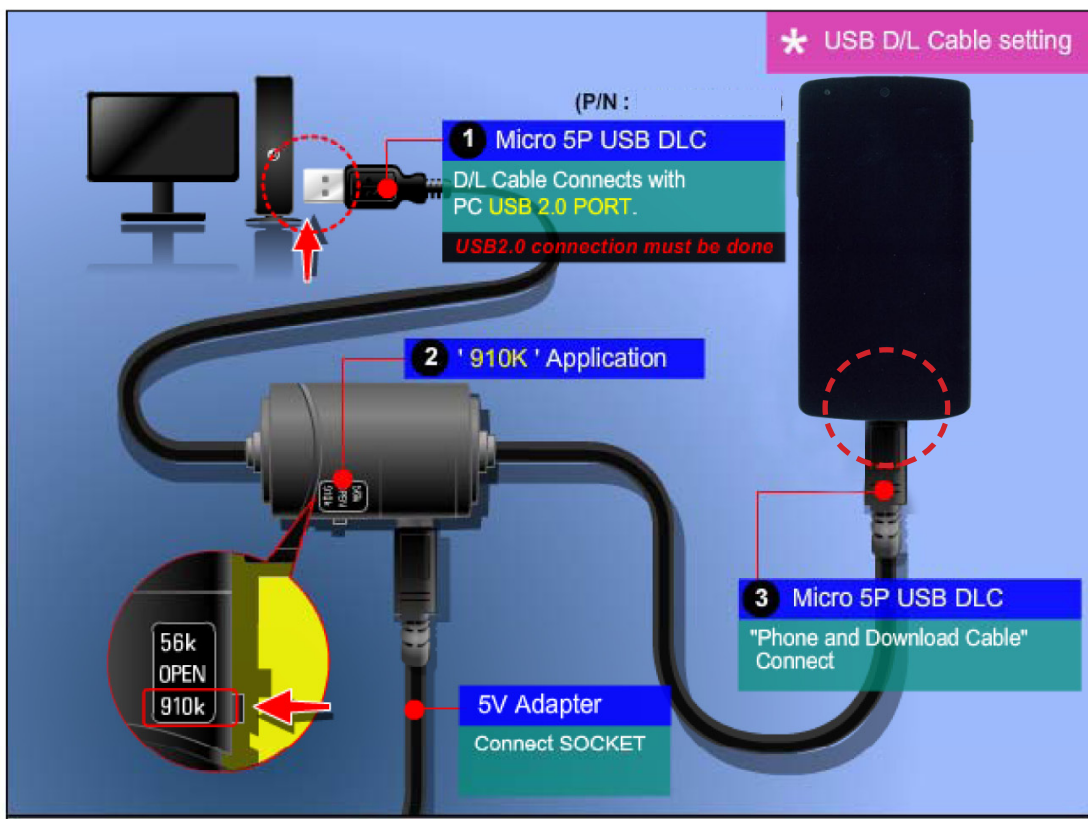
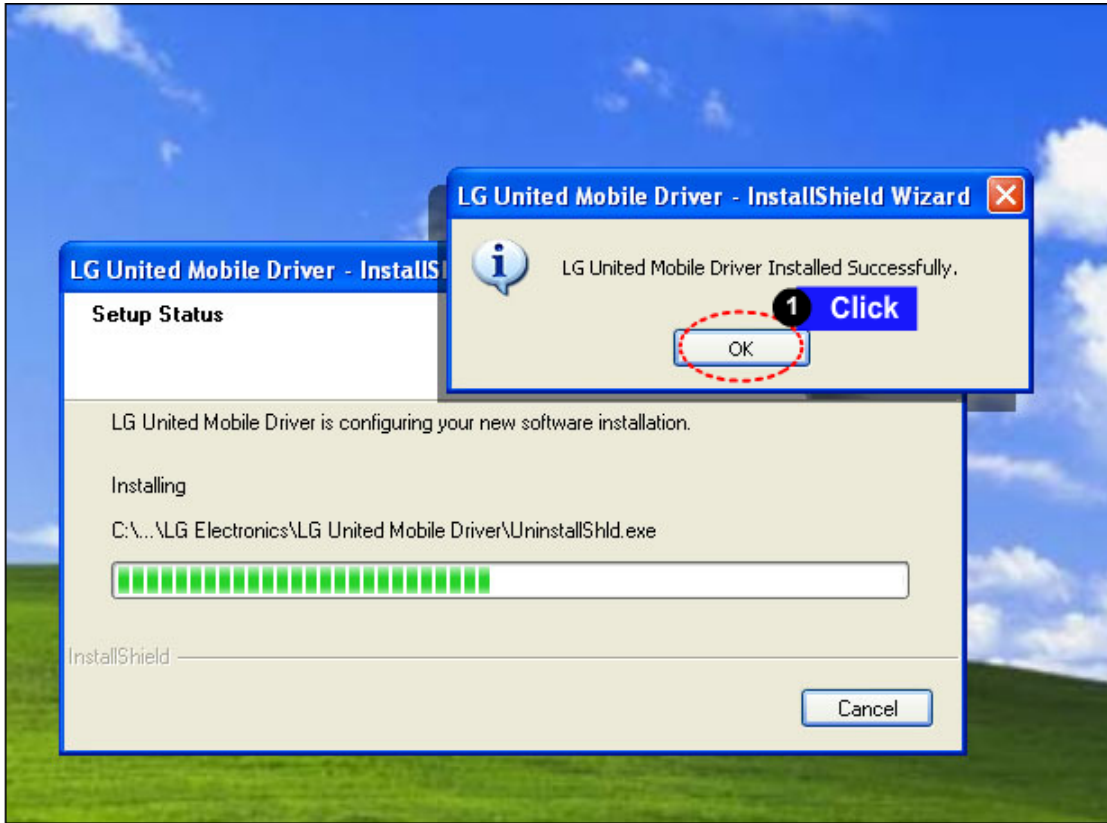
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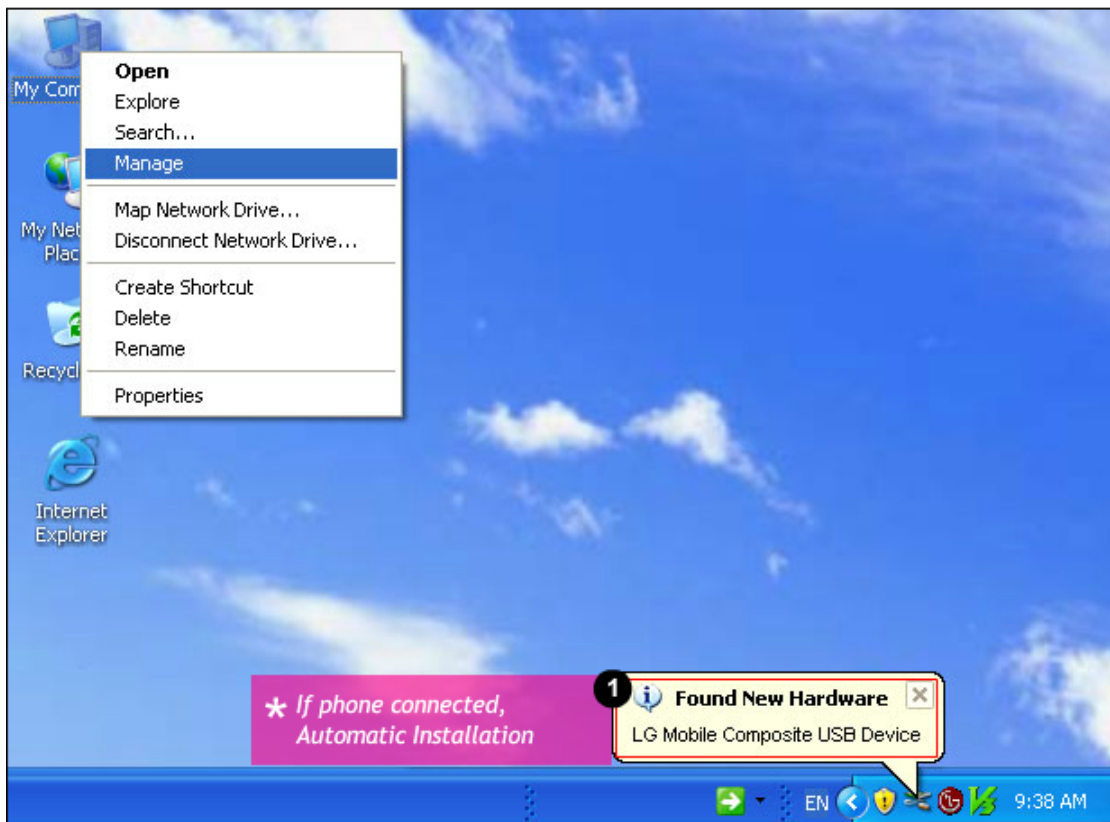
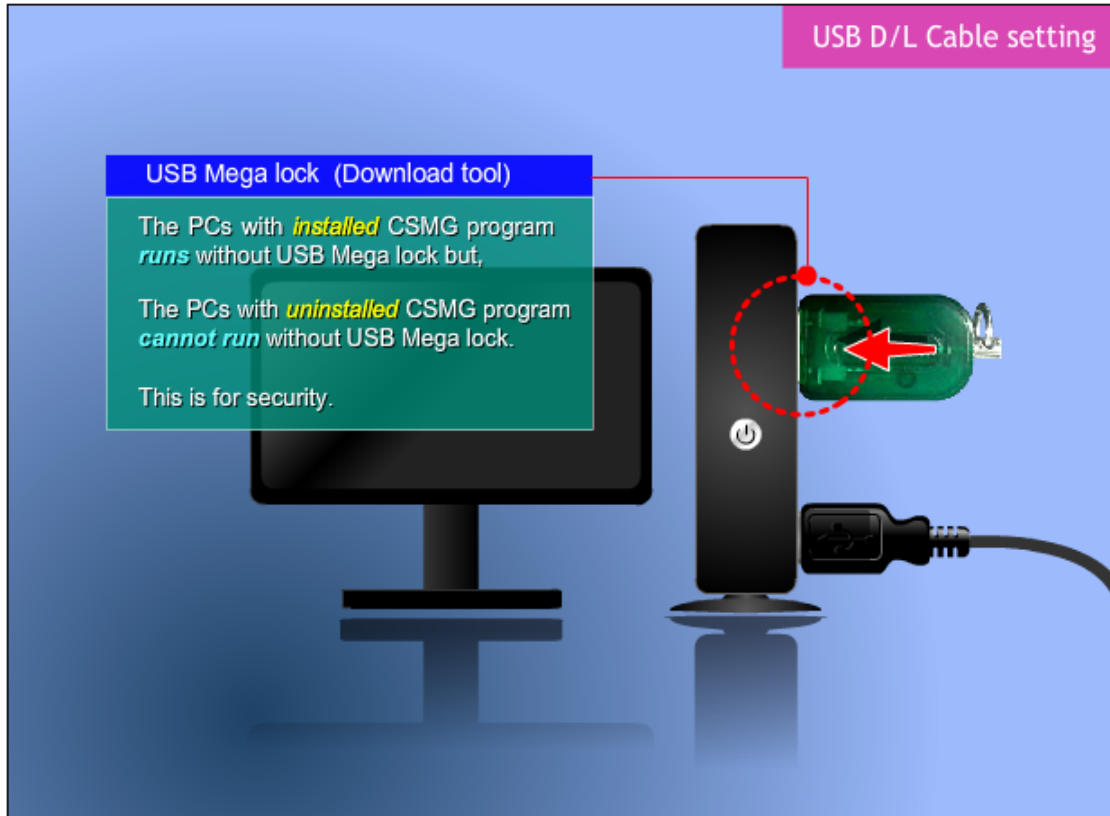


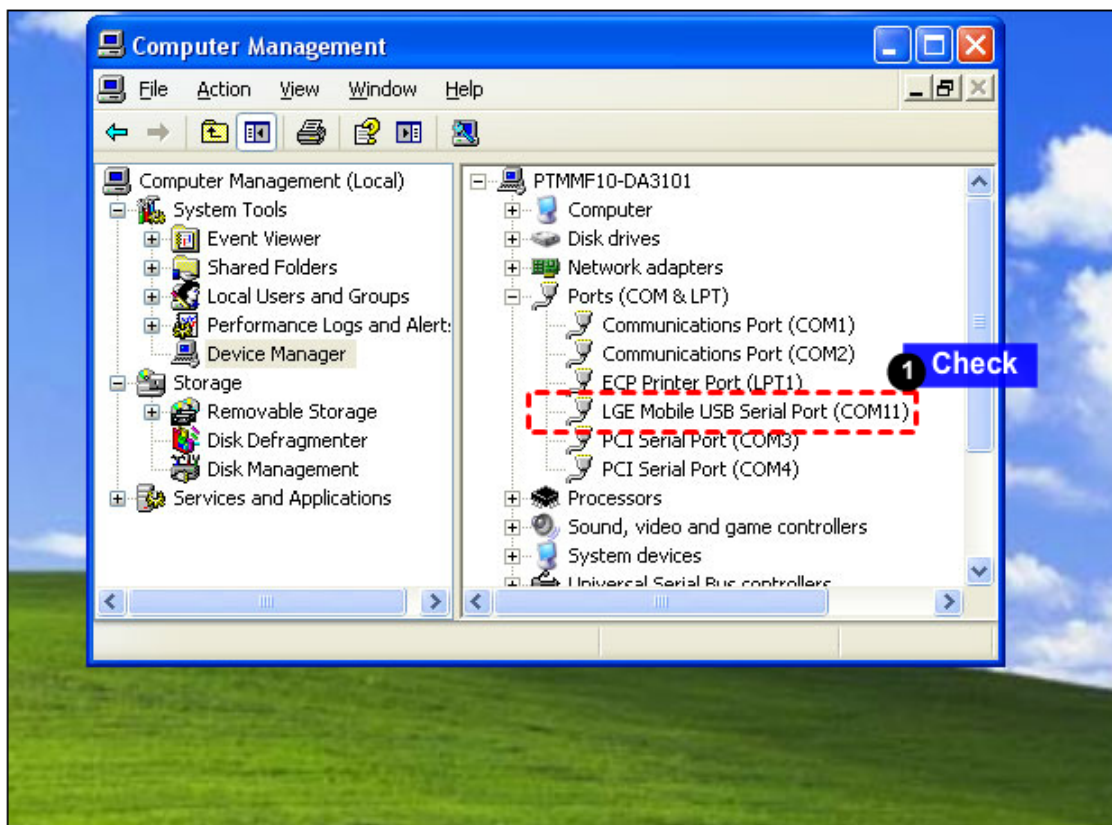
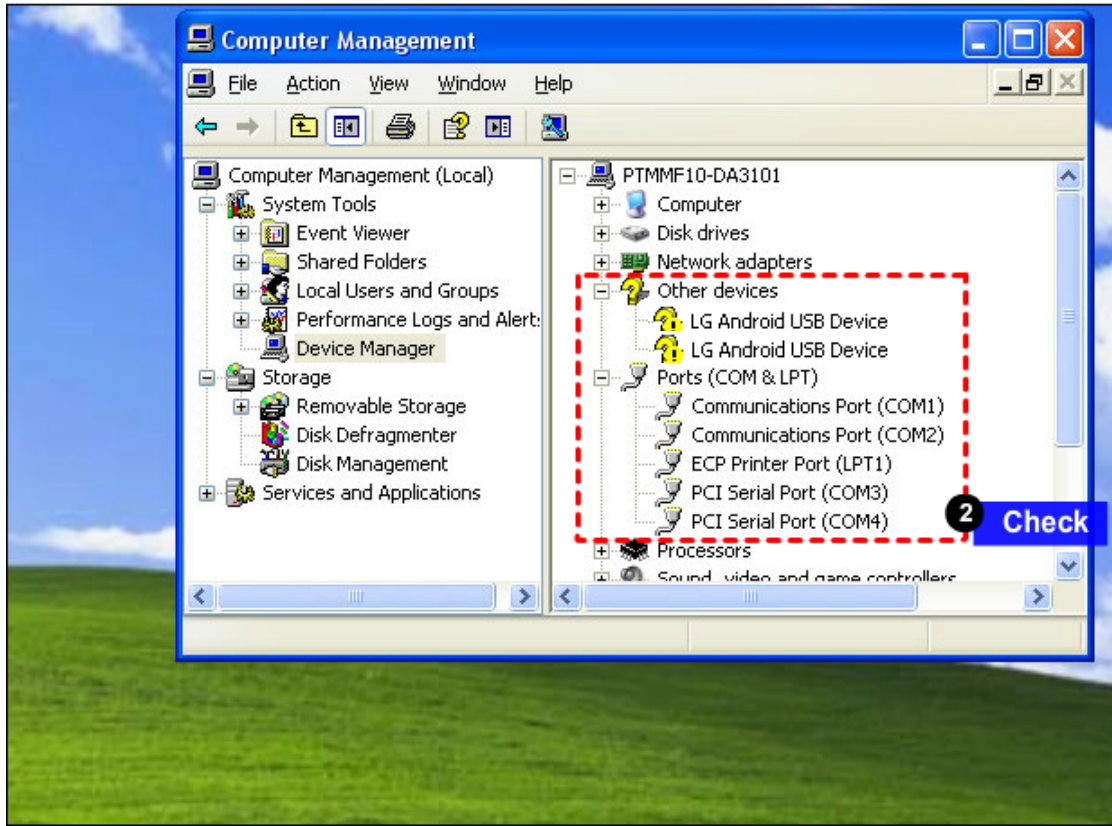
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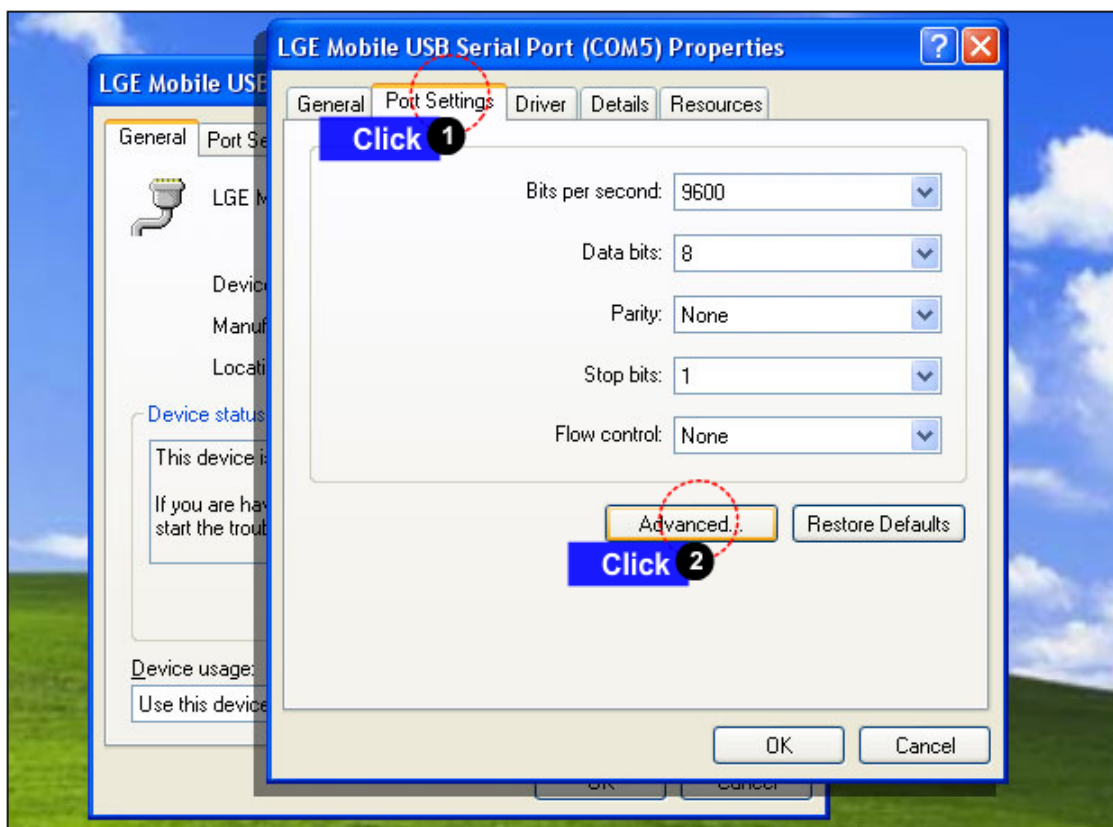
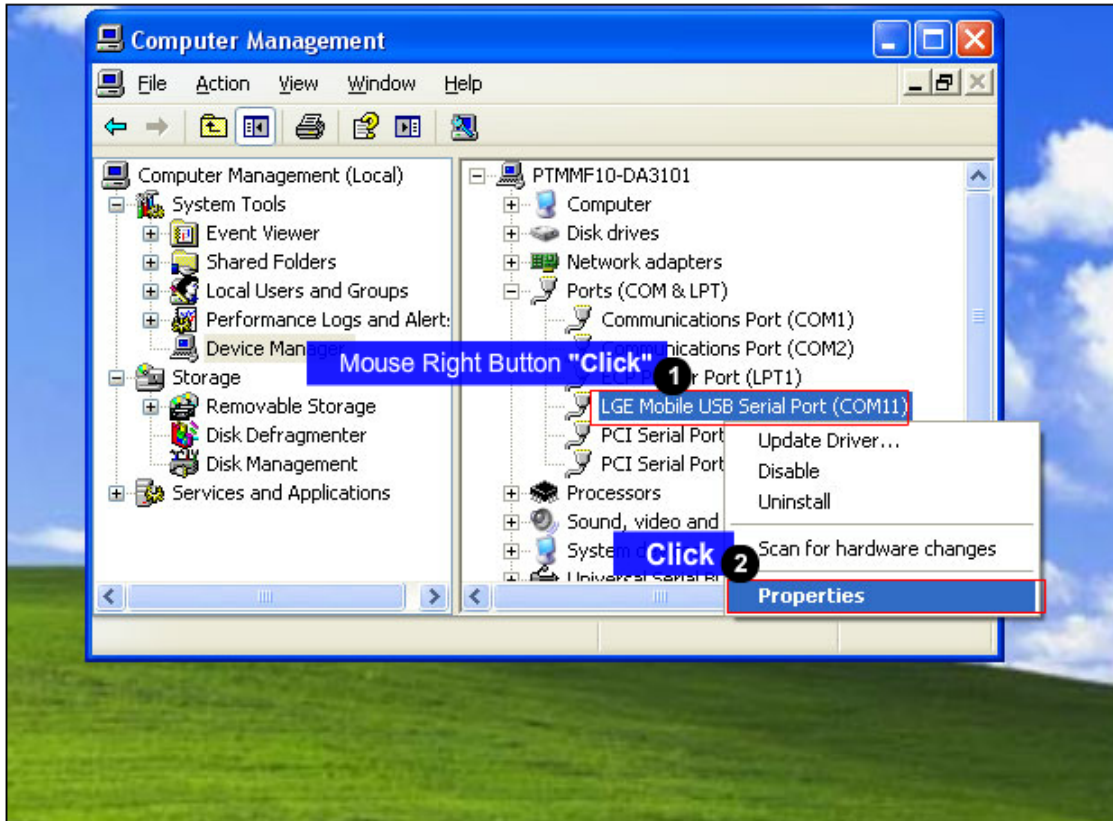




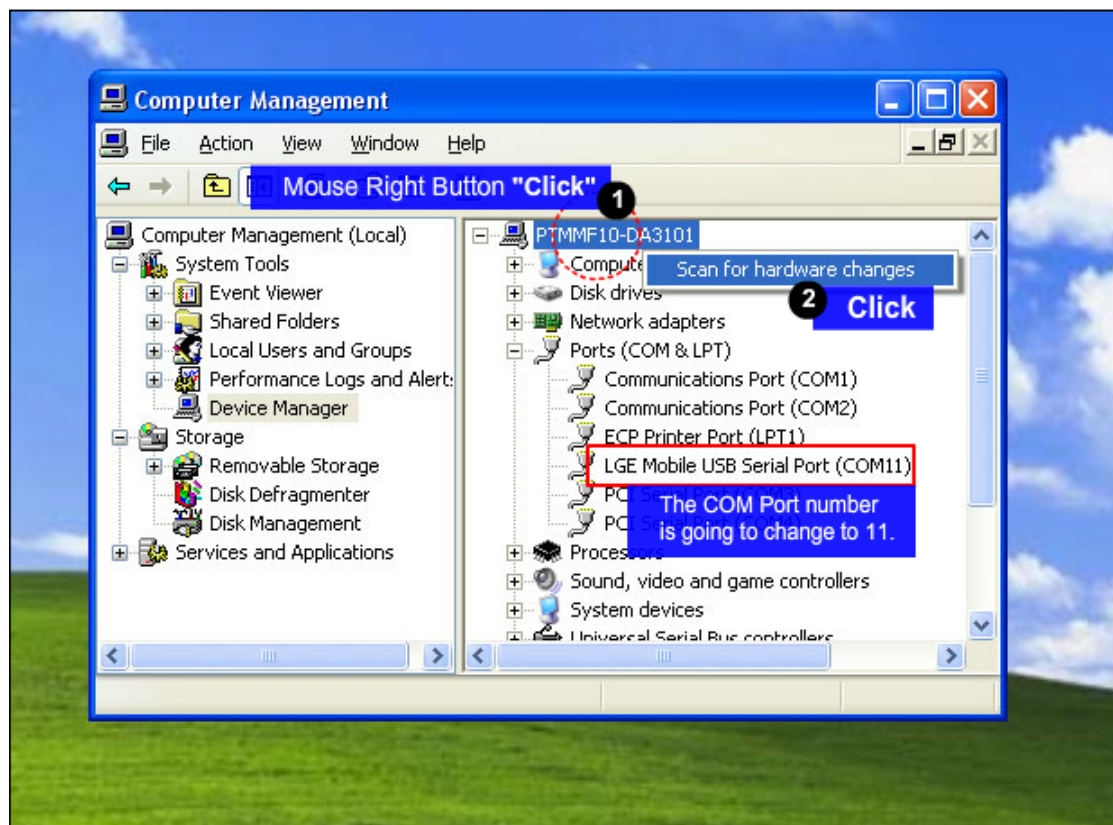
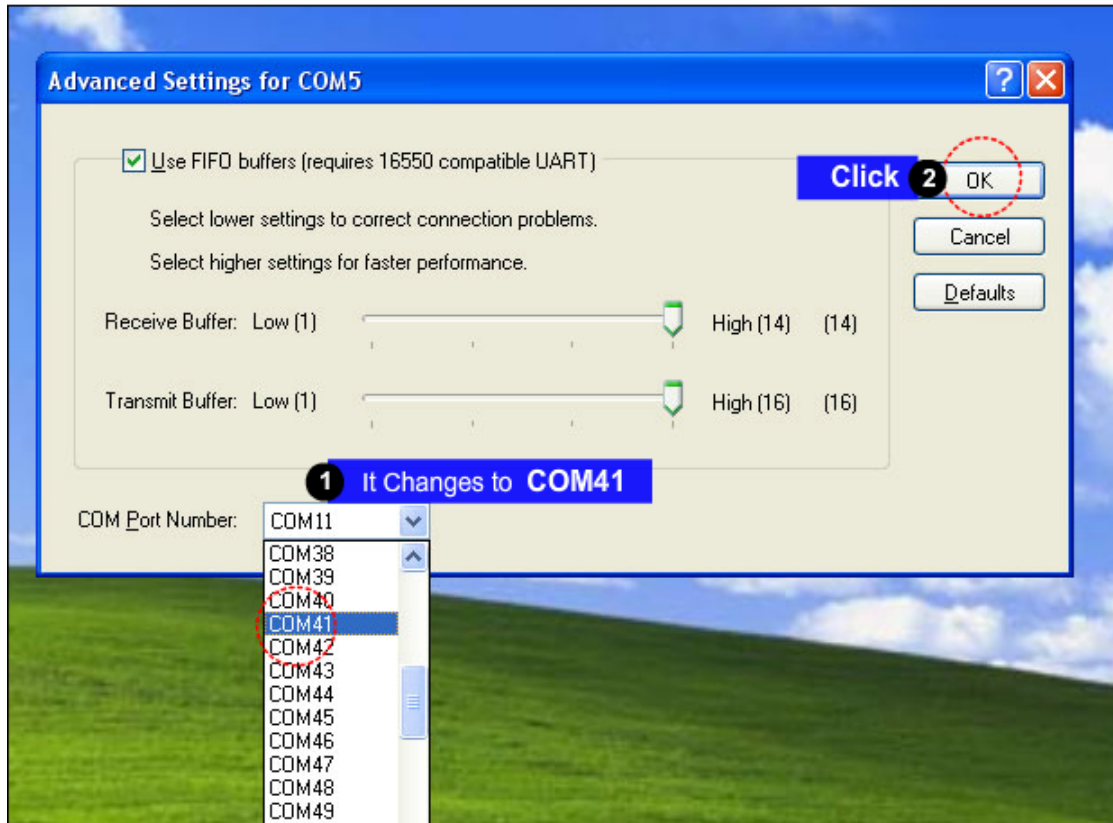


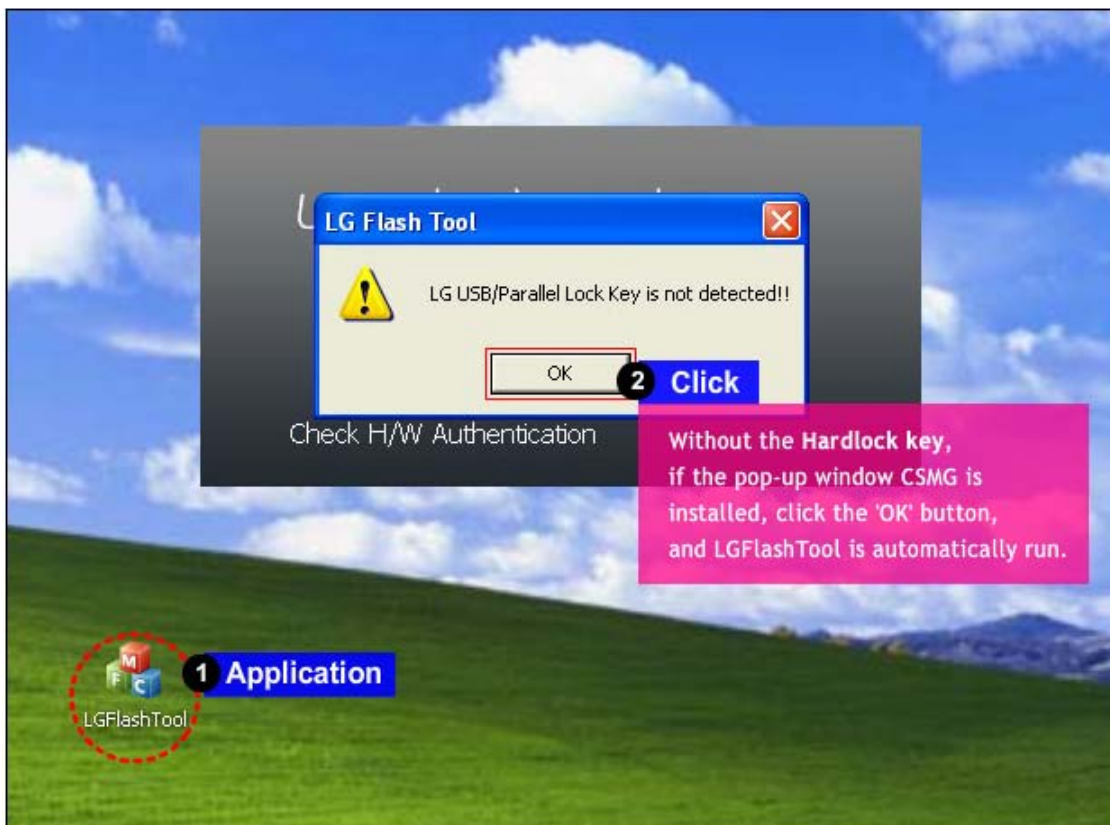
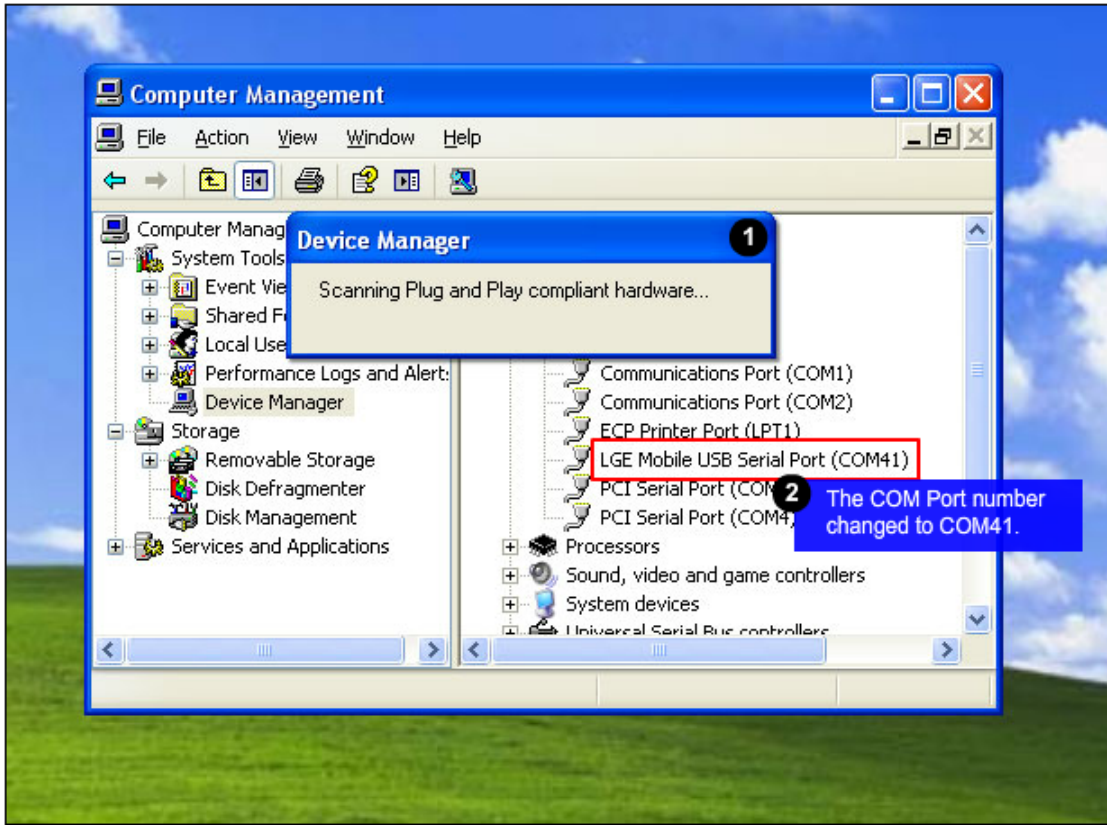


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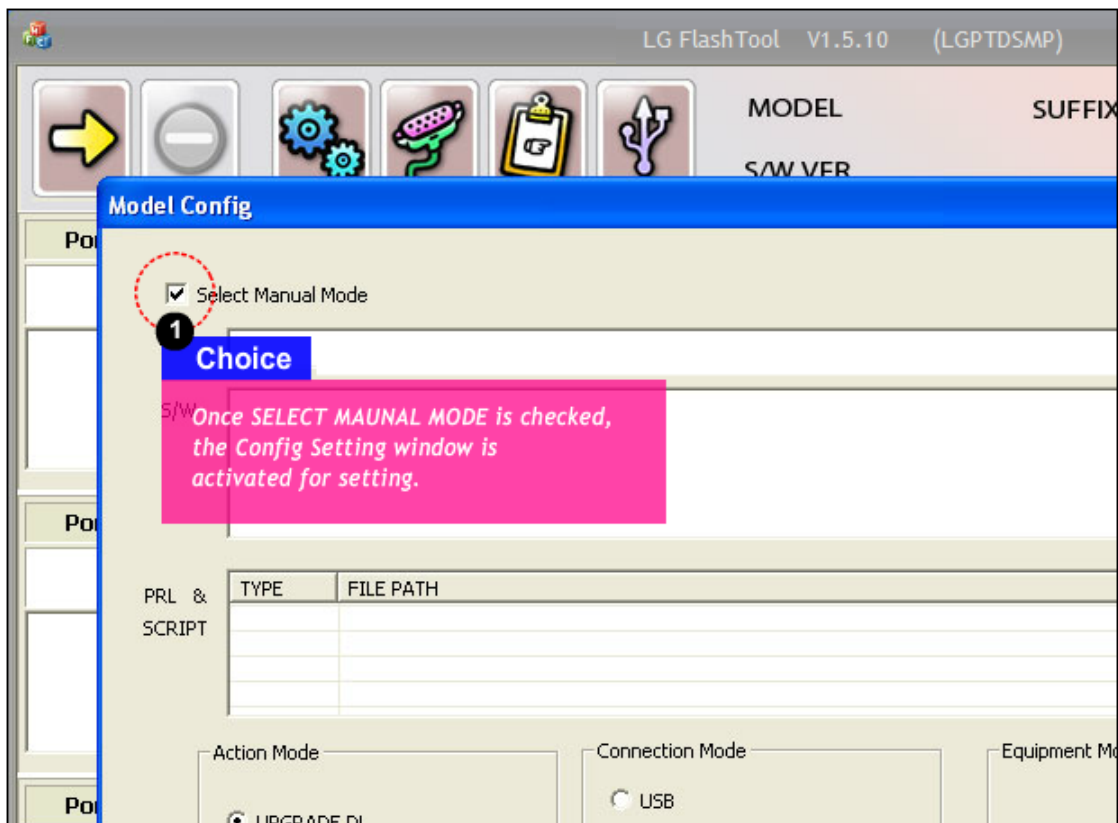
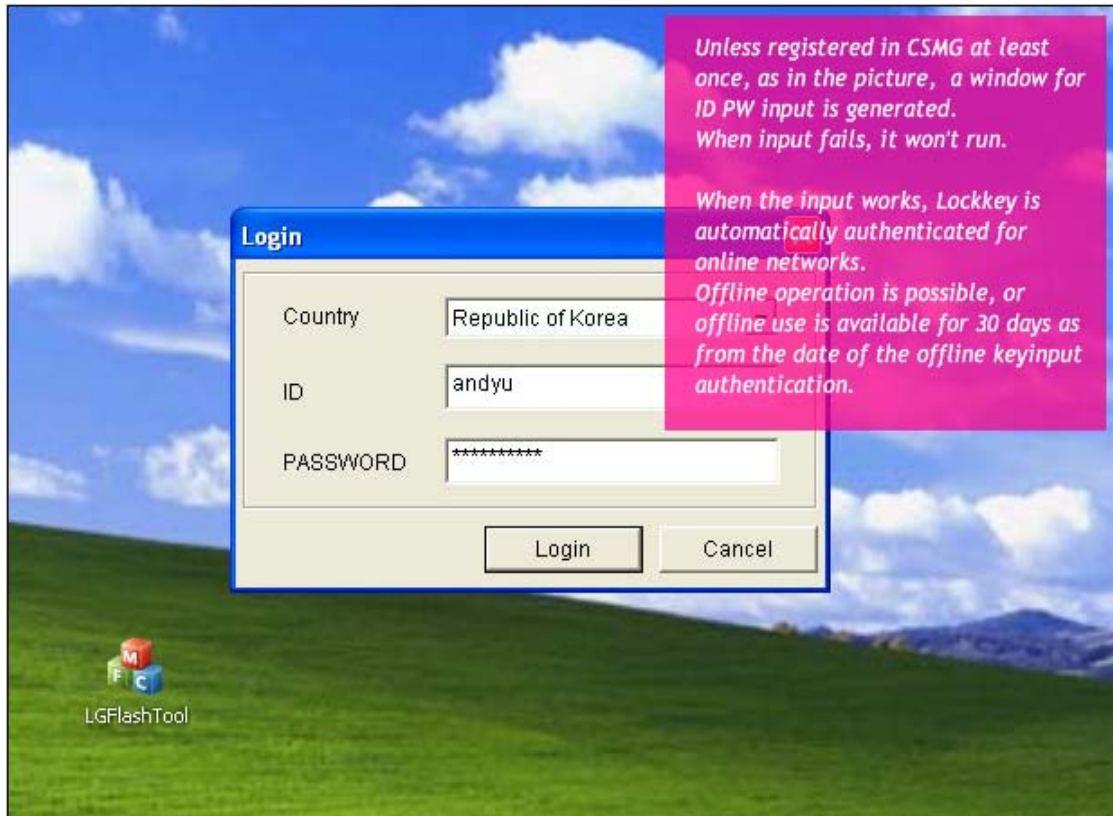


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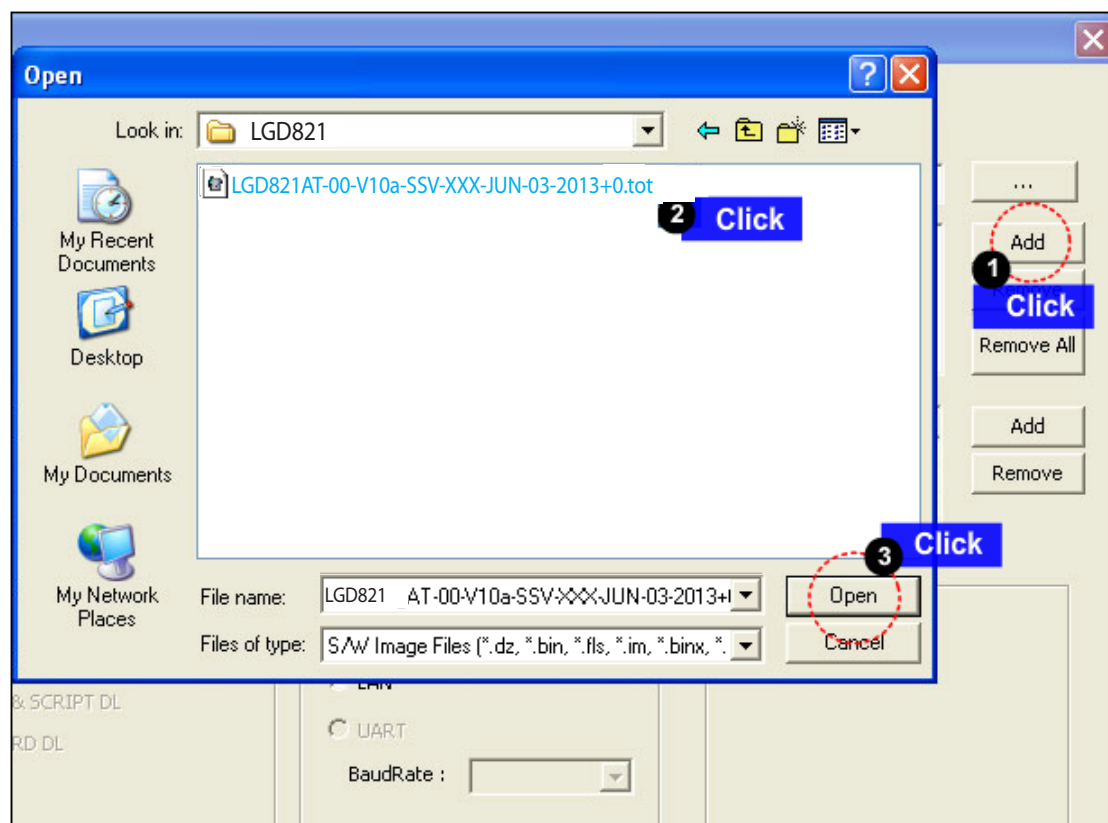
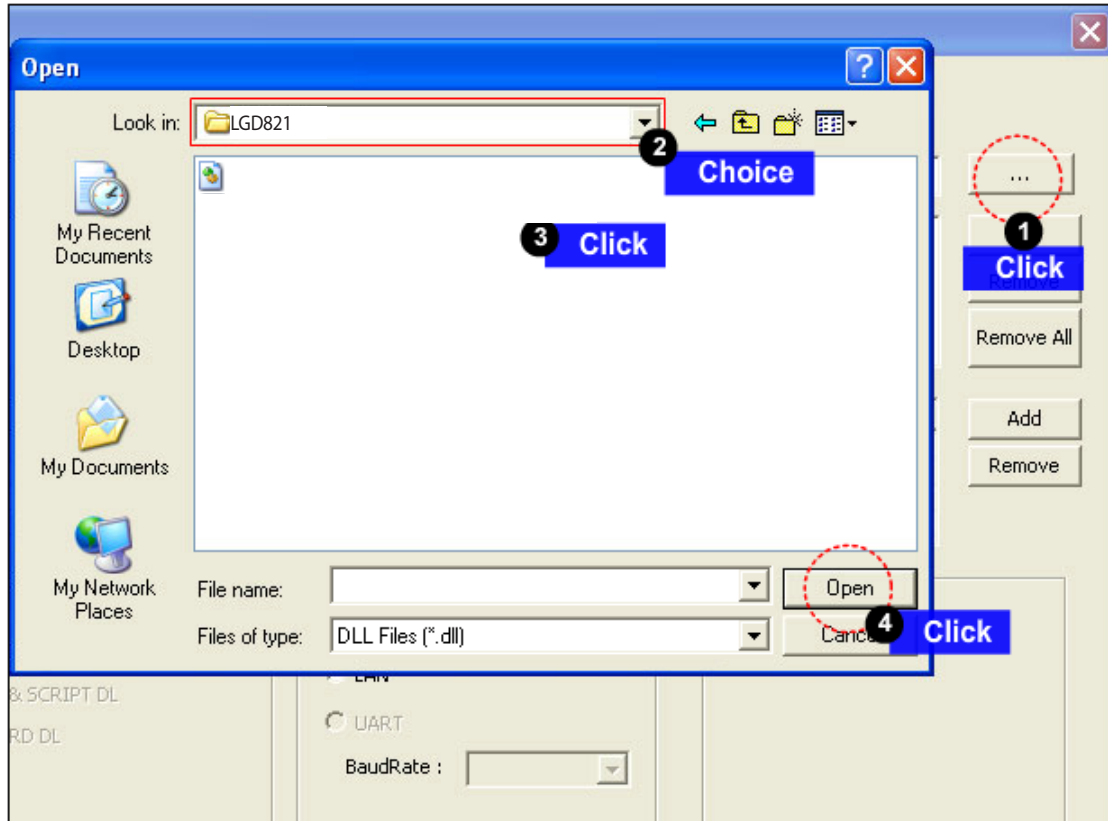




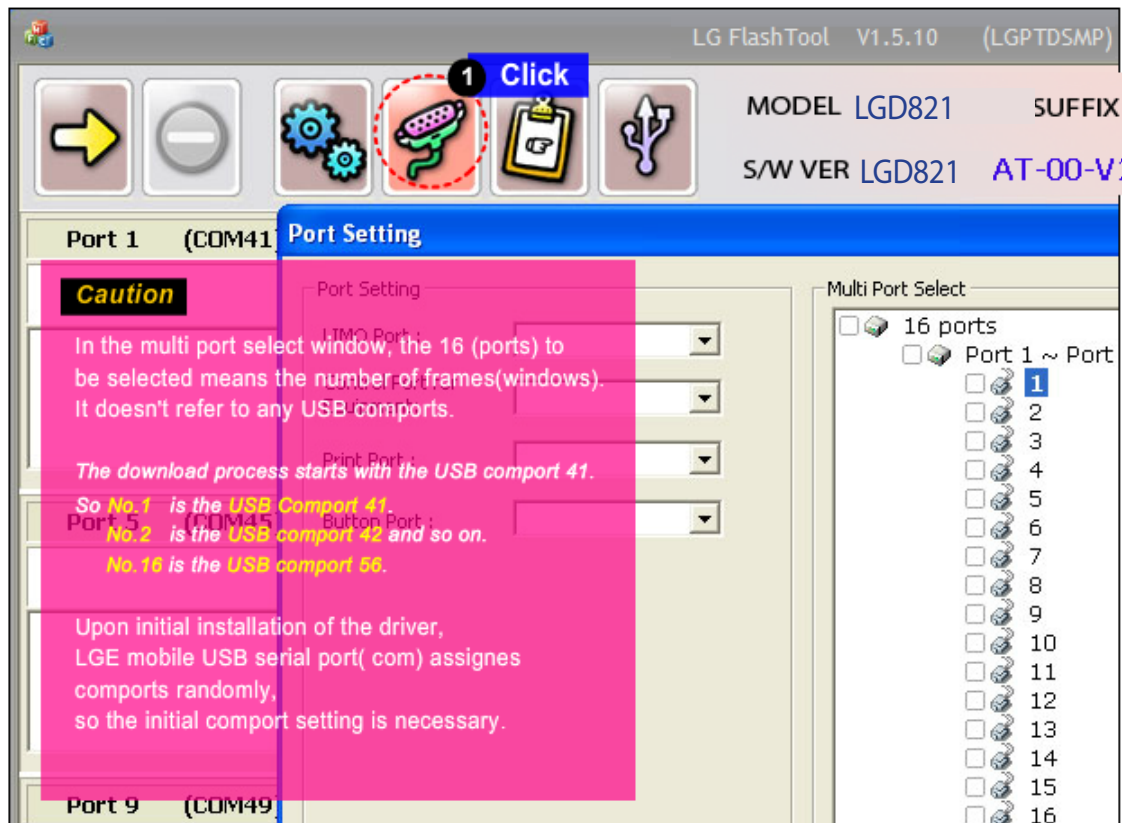
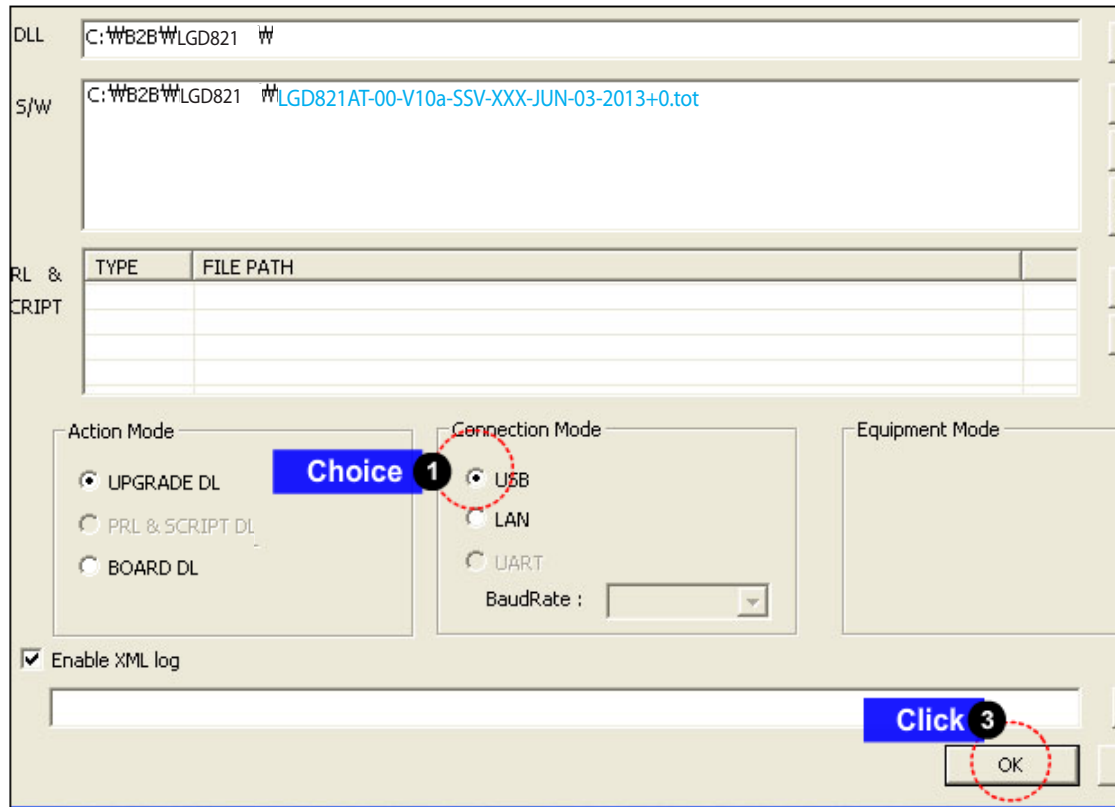
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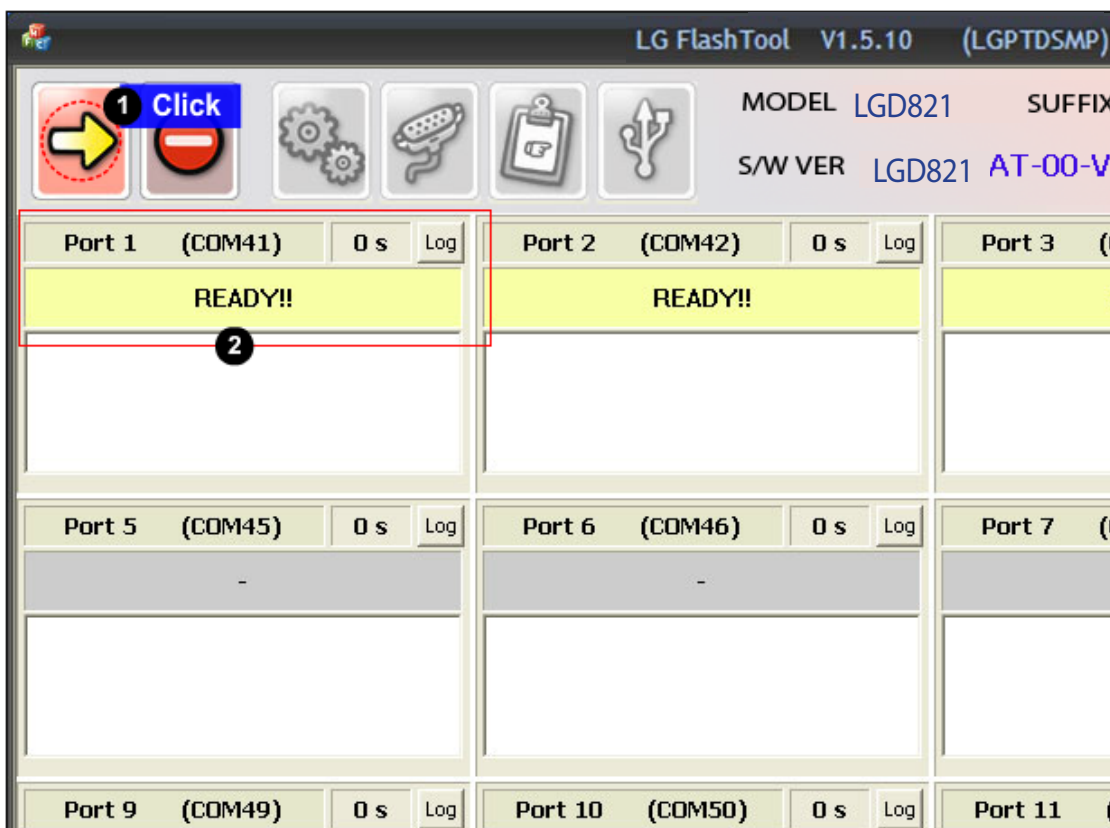
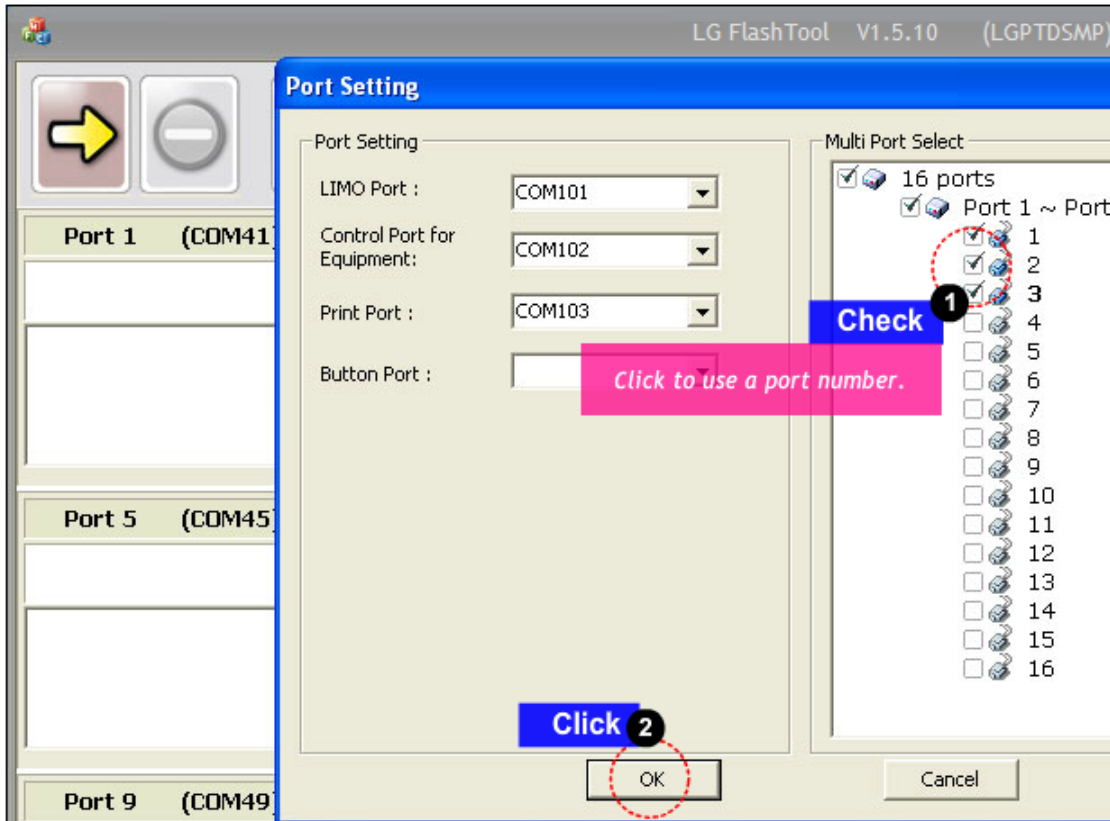
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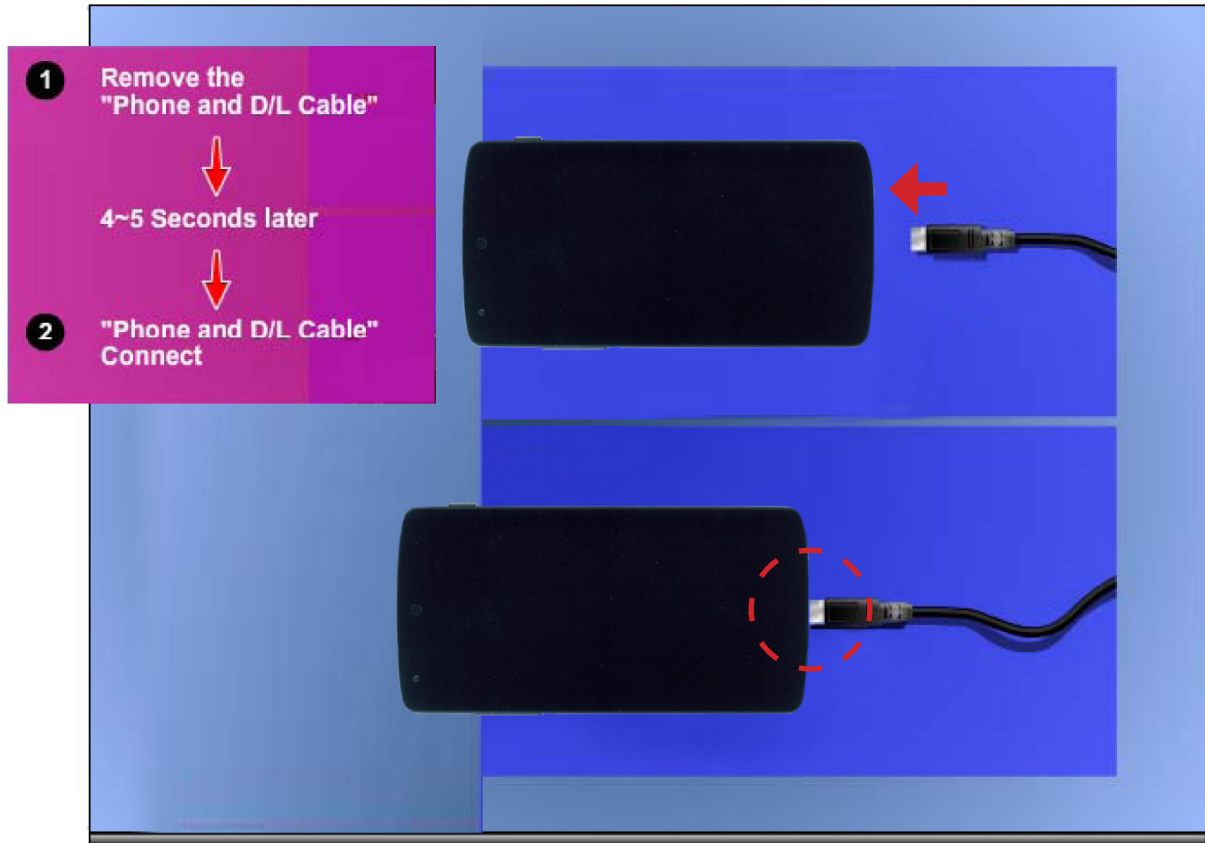
4. DOWNLOAD



4. DOWNLOAD



4. DOWNLOAD



LG FlashTool V1.5.10 (LGPTDSMP)

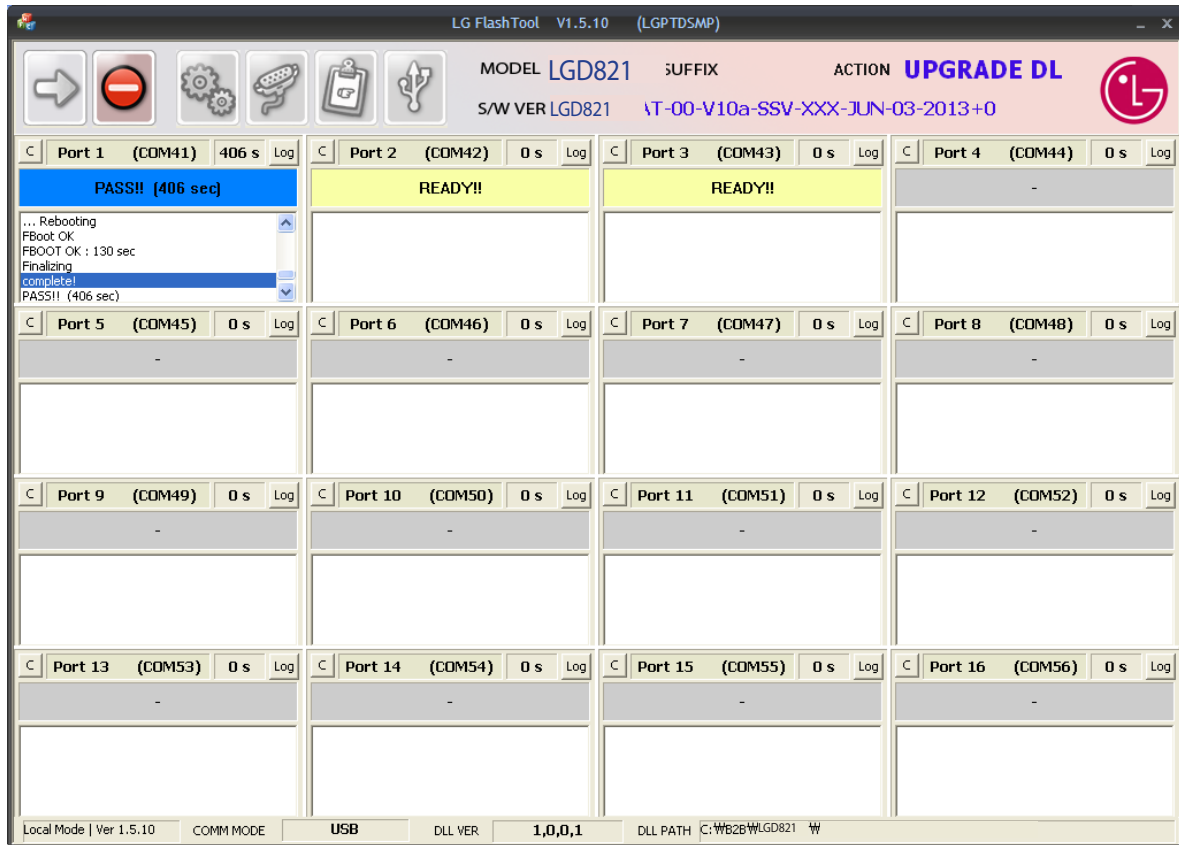
MODEL LGD821 SUFFIX ACTION **UPGRADE DL**

S/W VER LGD821 AT-00-V10a-SSV-XXX-JUN-03-2013+0

Port	COM	Time	Status
Port 1	(COM41)	406 s	PASS!! (406 sec)
Port 2	(COM42)	0 s	READY!!
Port 3	(COM43)	0 s	READY!!
Port 4	(COM44)	0 s	-
Port 5	(COM45)	0 s	-
Port 6	(COM46)	0 s	-
Port 7	(COM47)	0 s	-
Port 8	(COM48)	0 s	-
Port 9	(COM49)	0 s	-
Port 10	(COM50)	0 s	-
Port 11	(COM51)	0 s	-
Port 12	(COM52)	0 s	-
Port 13	(COM53)	0 s	-
Port 14	(COM54)	0 s	-
Port 15	(COM55)	0 s	-
Port 16	(COM56)	0 s	-

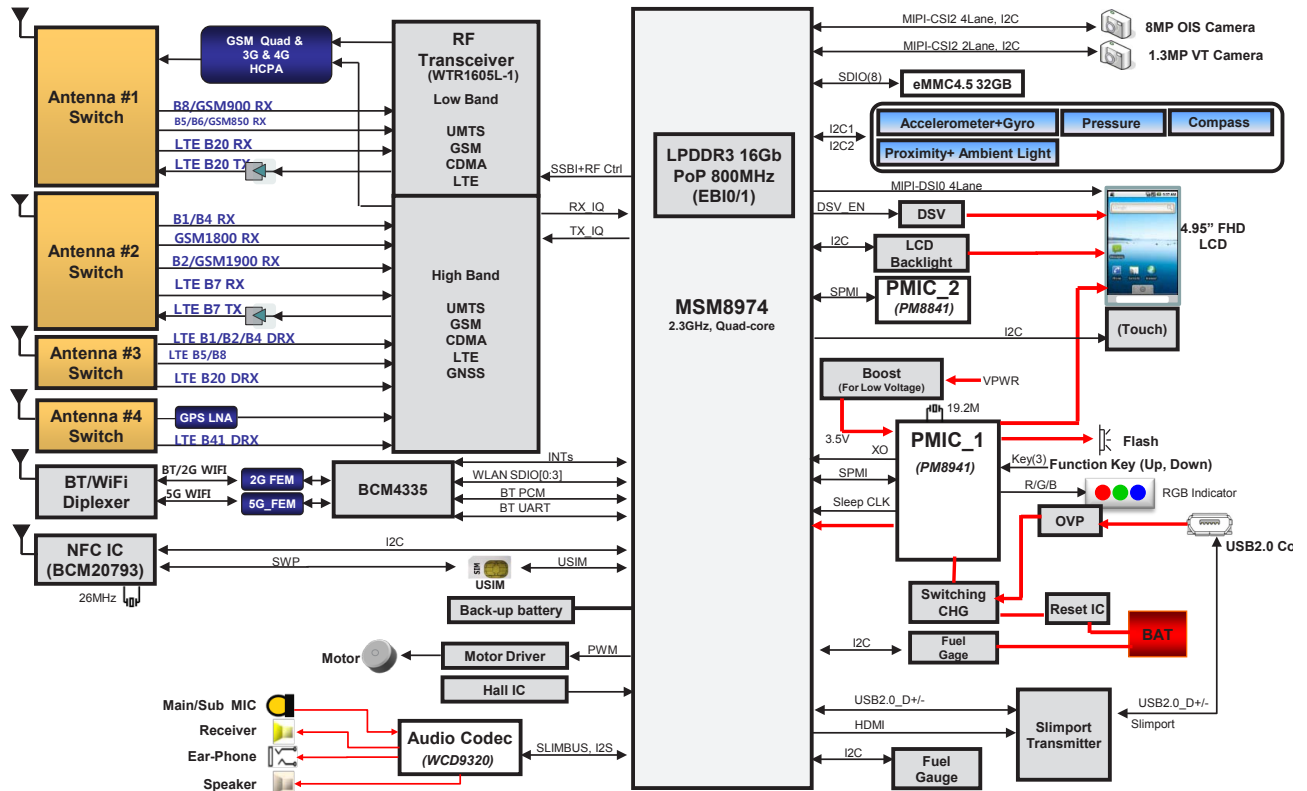
Local Mode | Ver 1.5.10 COMM MODE USB DLL VER 1,0,0,1 DLL PATH C:\WB2B\WLG0821

4. DOWNLOAD



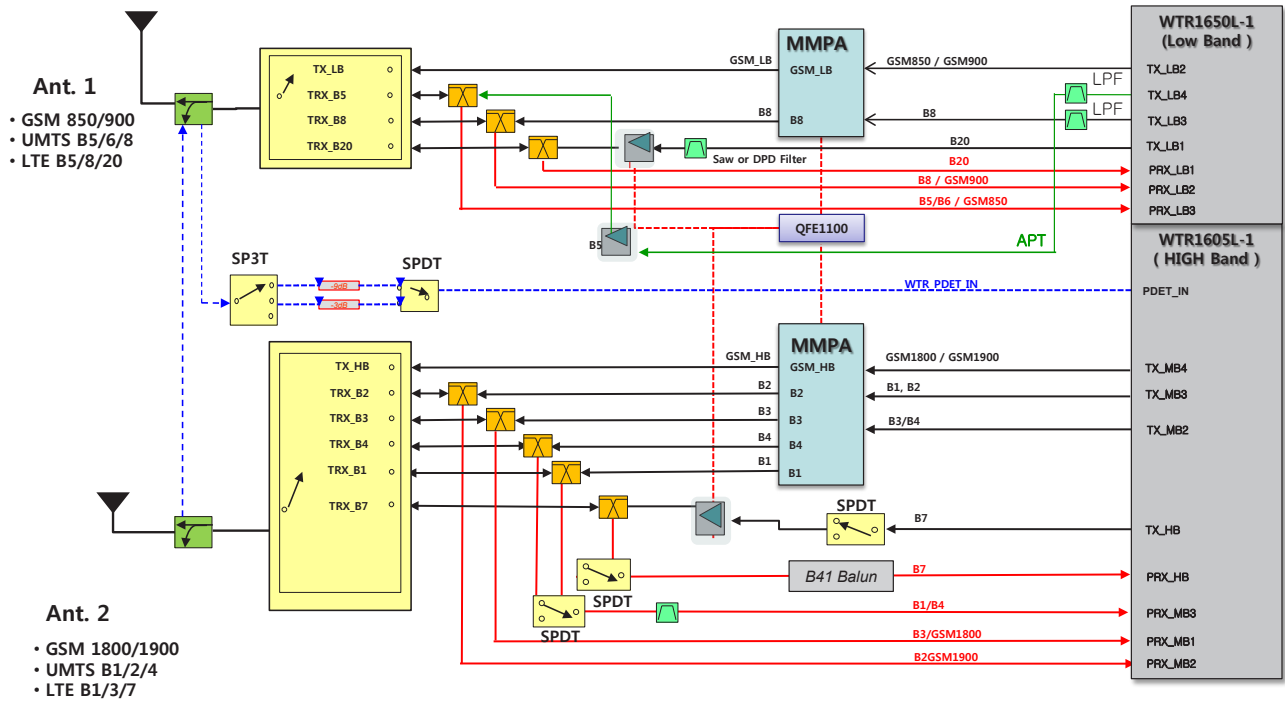
5. BLOCK DIAGRAM

[D821] Total Block Diagram



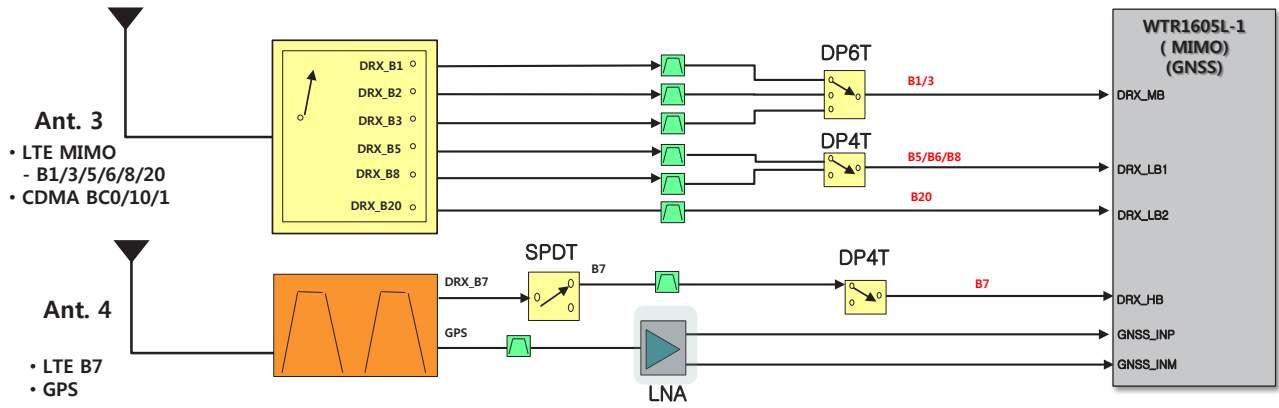
5. BLOCK DIAGRAM

[D821] RF CDMA/Global/LTE



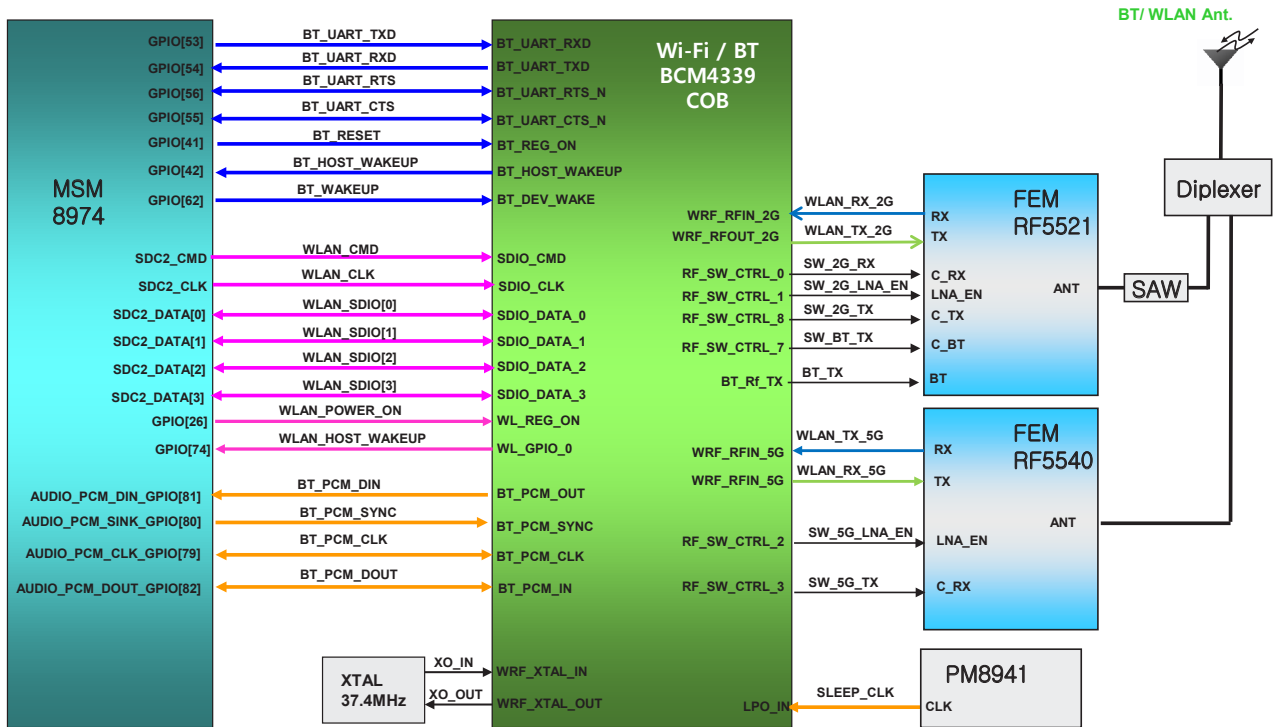
5. BLOCK DIAGRAM

[D821] RF LTE MIMO/CDMA DRX

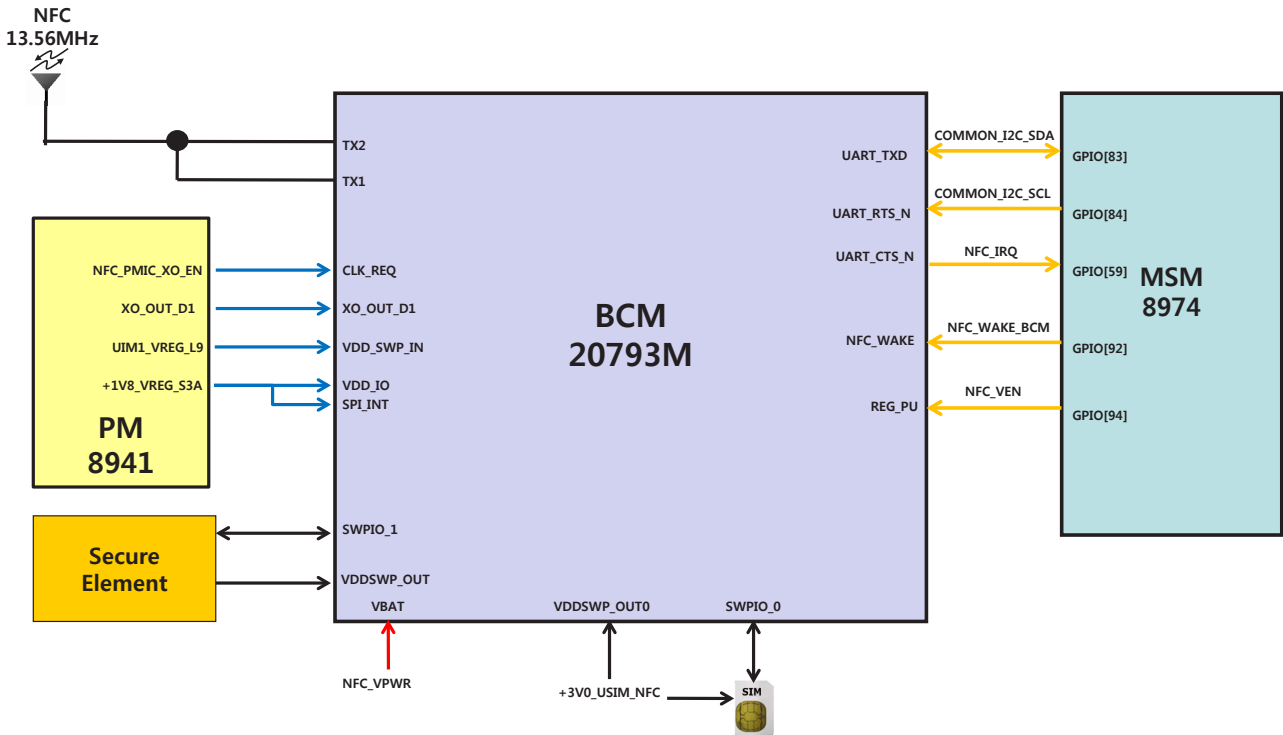


5. BLOCK DIAGRAM

[D821] WiFi/BT I/F

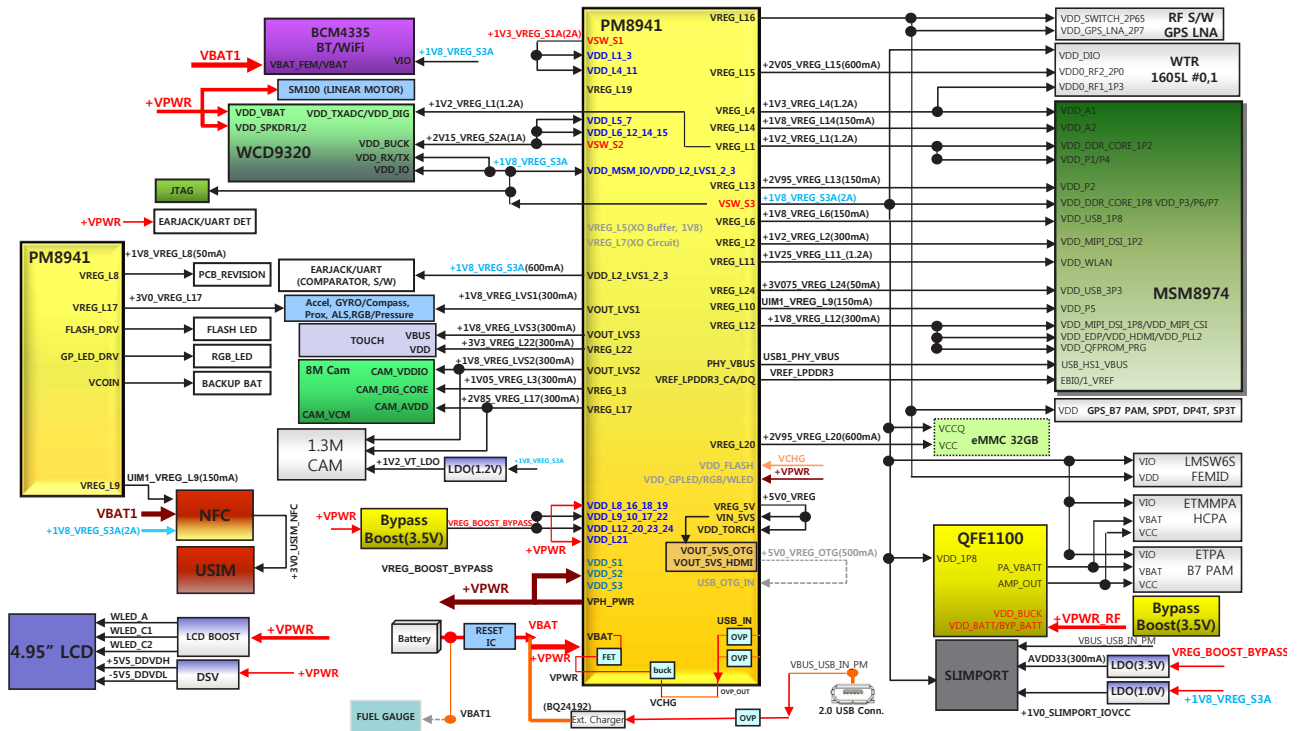


[D821] NFC I/F

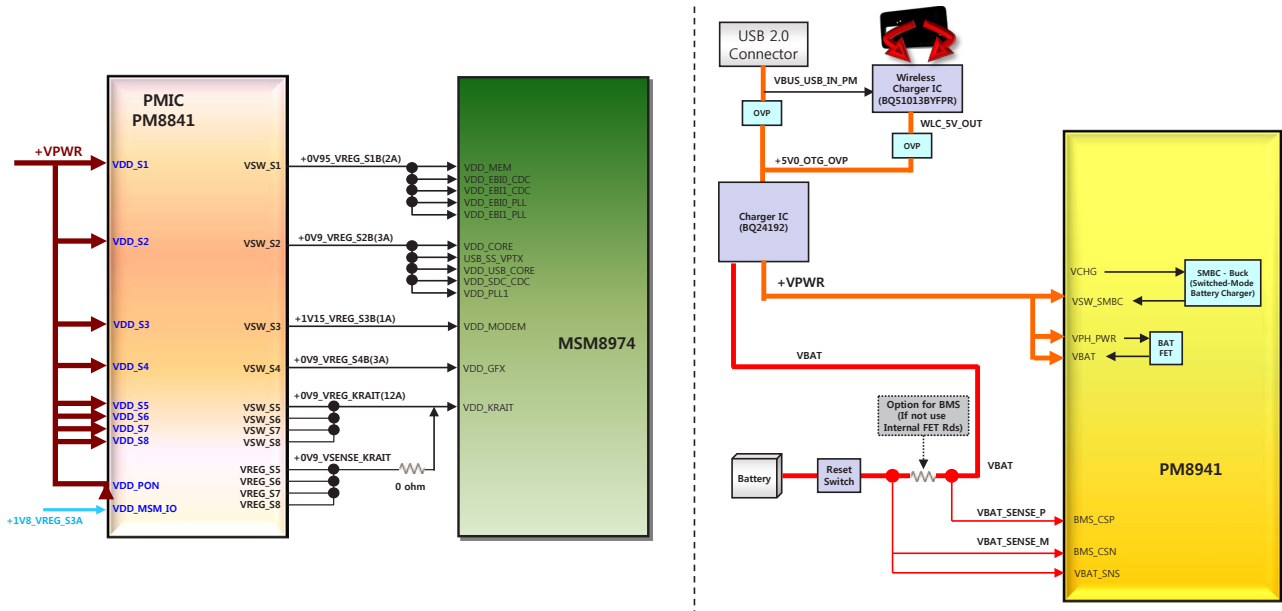


5. BLOCK DIAGRAM

[D821] PM8941 Output Power Management

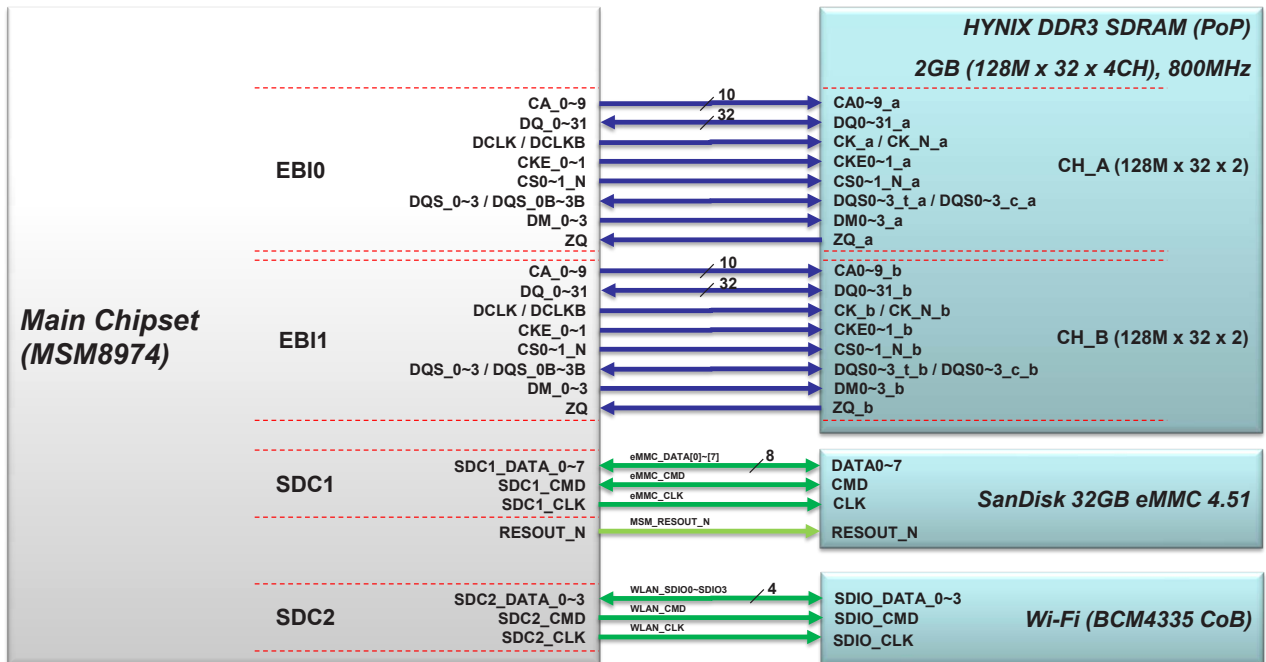


[D821] PM8841 SMPS / PM8941 Input Power Management



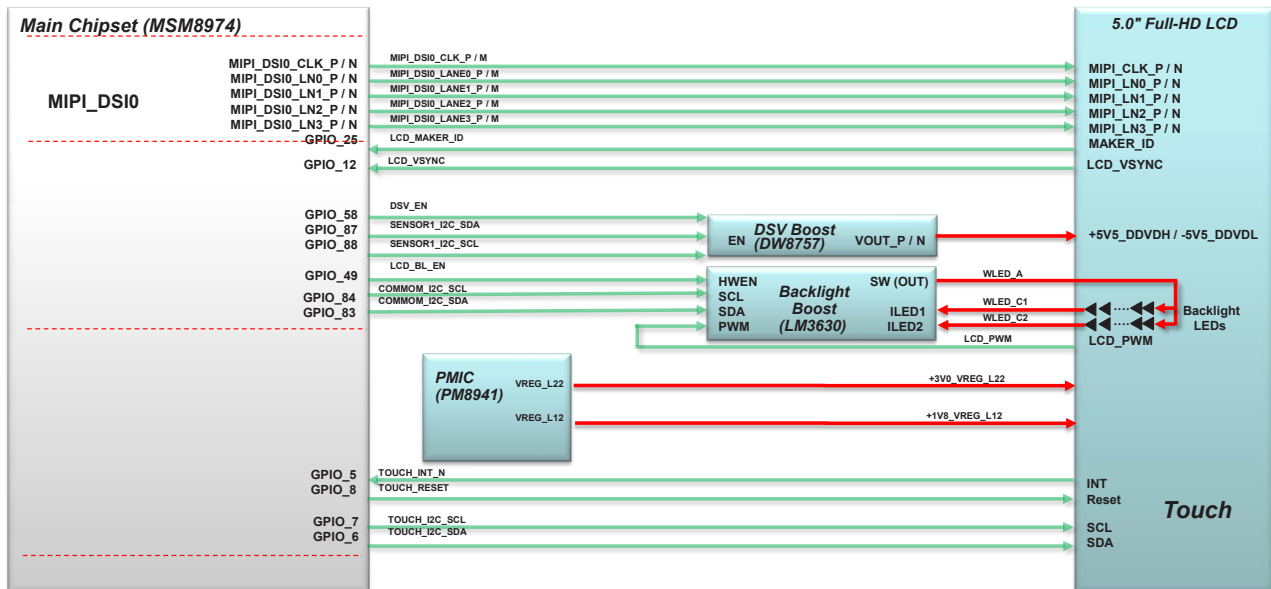
5. BLOCK DIAGRAM

[D821] Memory I/F

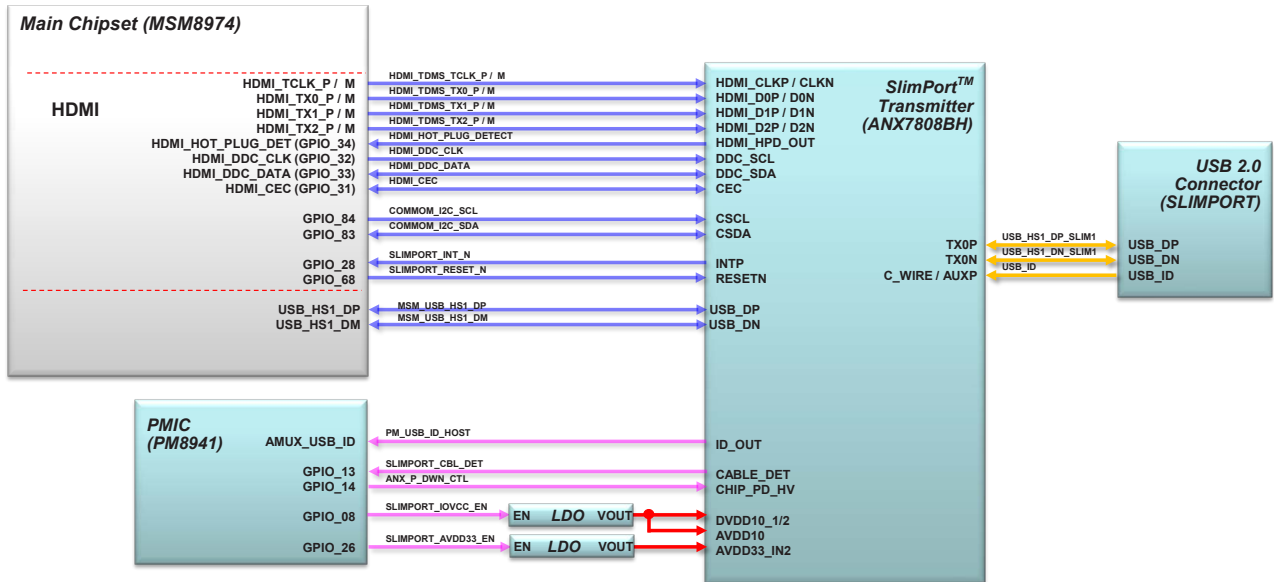


5. BLOCK DIAGRAM

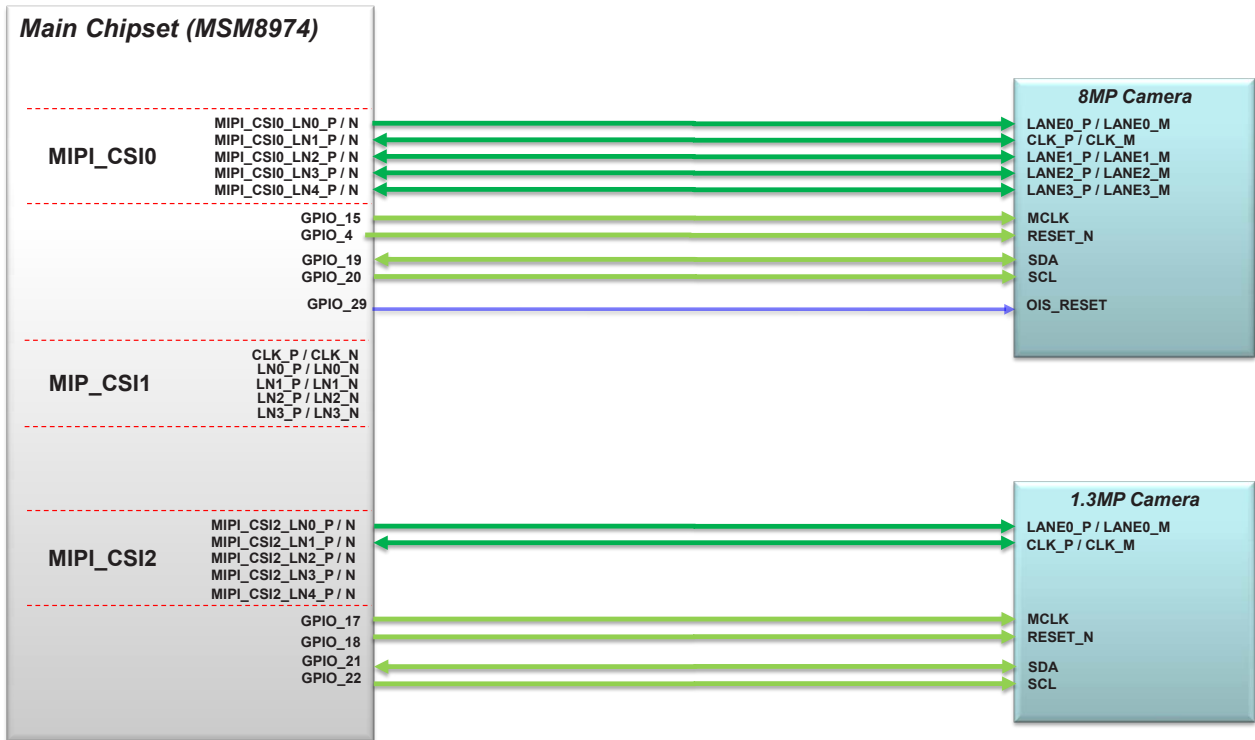
[D821] Main & Display/Touch I/F



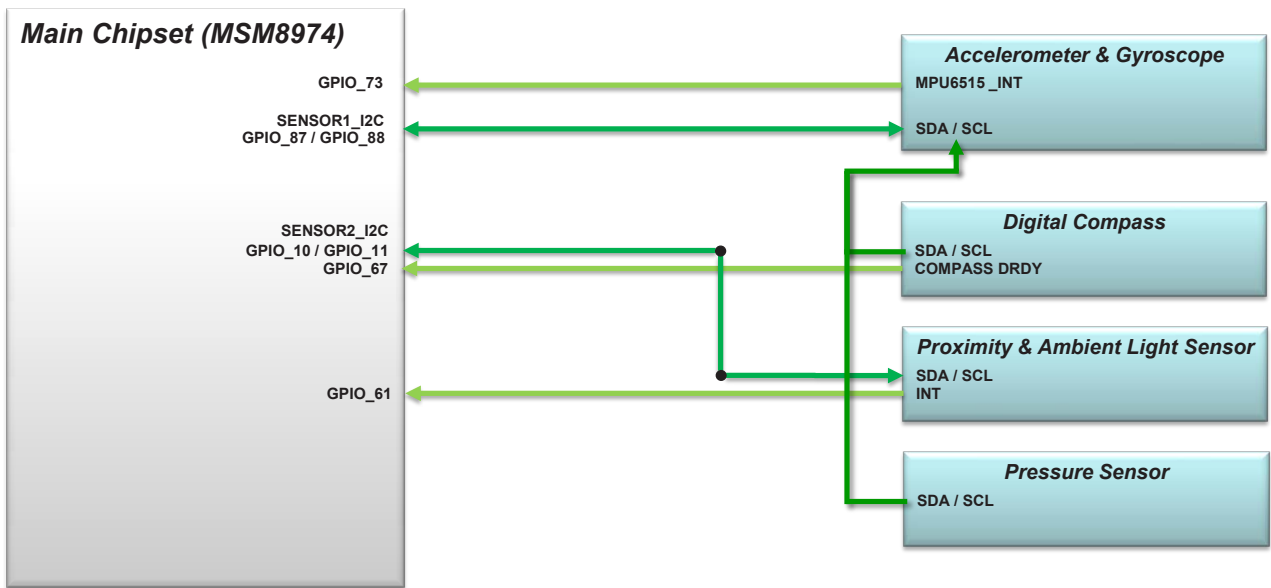
[D821] Main & Slimport I/F



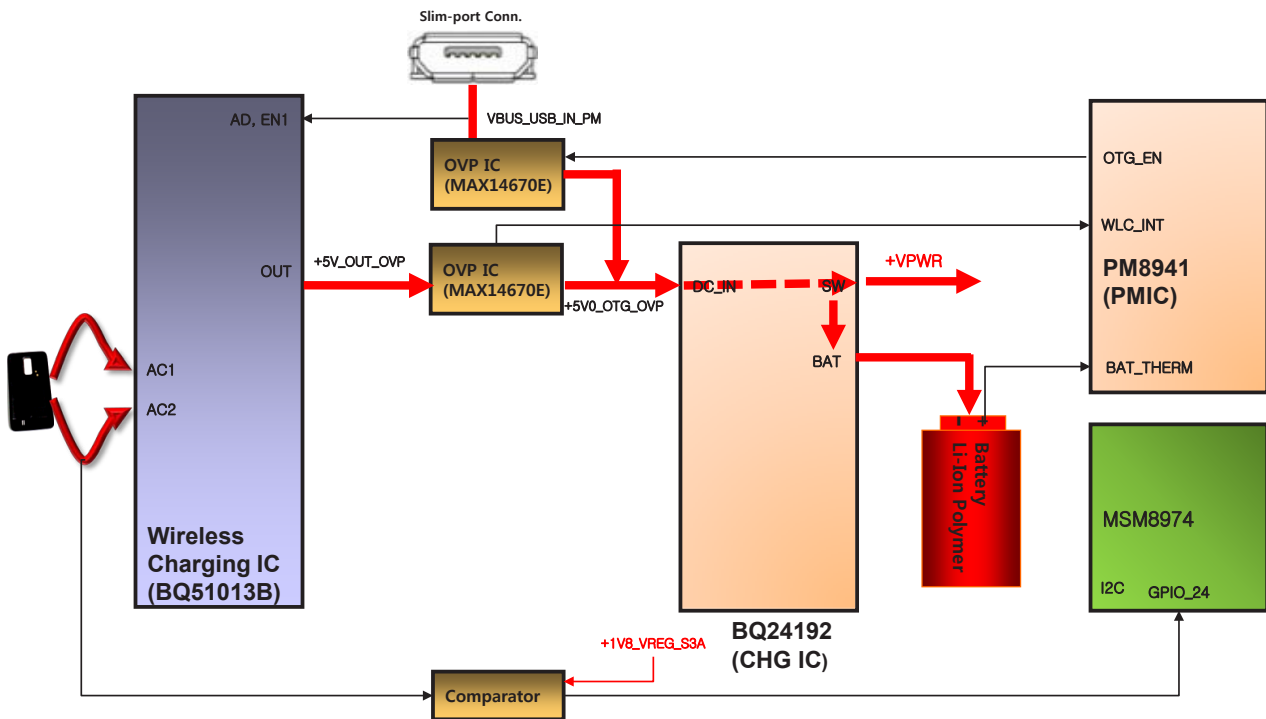
[D821] Camera I/F



[D821] Sensor I/F

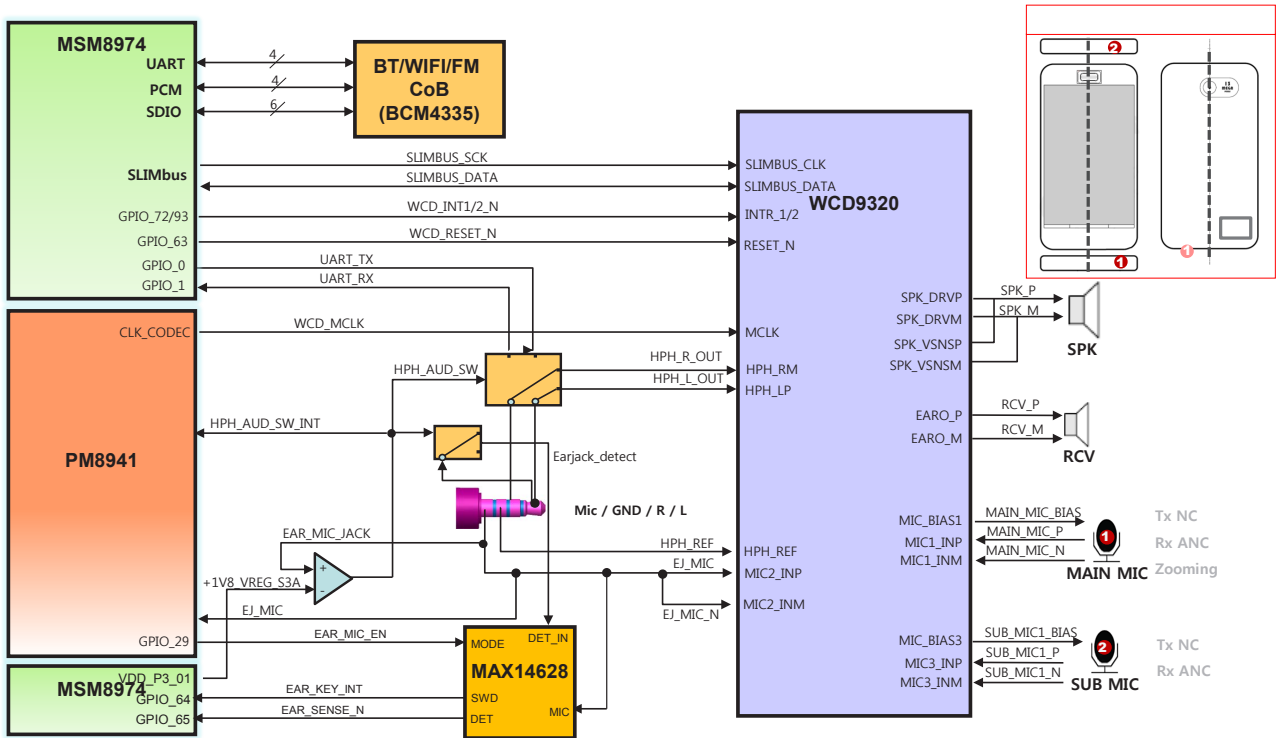


[D821] CHARGING/WIRELESS CHARGING



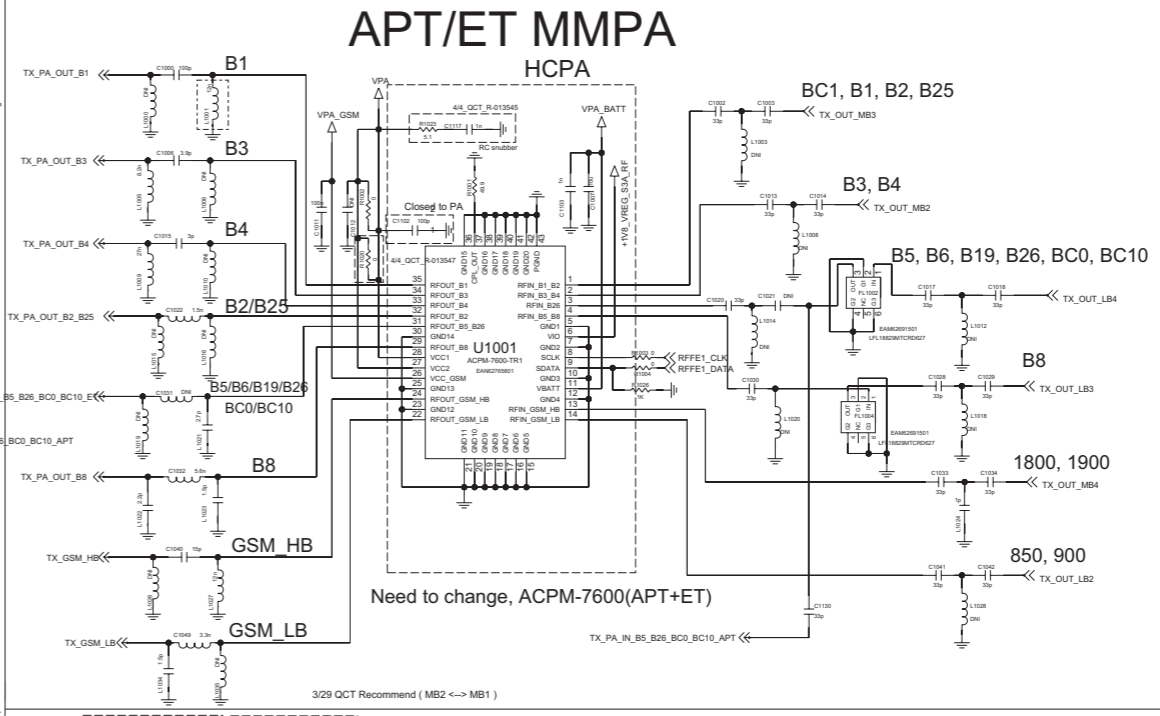
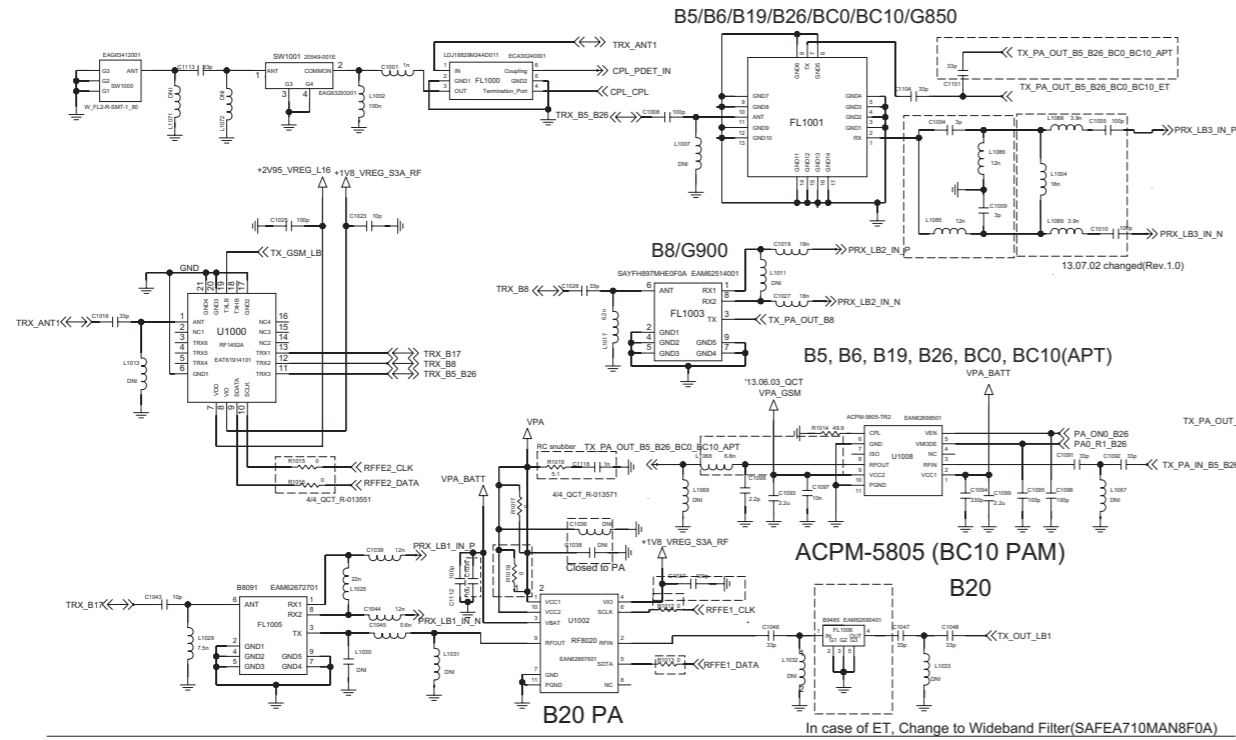
5. BLOCK DIAGRAM

[D821] Audio

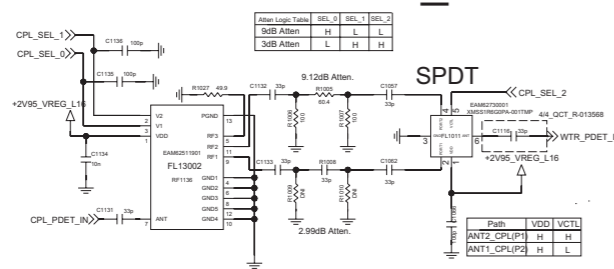


6. CIRCUIT DIAGRAM

ANT#1 B5(G850)/B8(G900)/B20



COUPLER_PDET



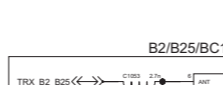
COUPLER LOW/HIGH °D

Path	VDD	VCTL
9.12dB(P1)	H	L
2.9dB(P2)	L	L
Term(P3)	L	H

RF PAM Part Name

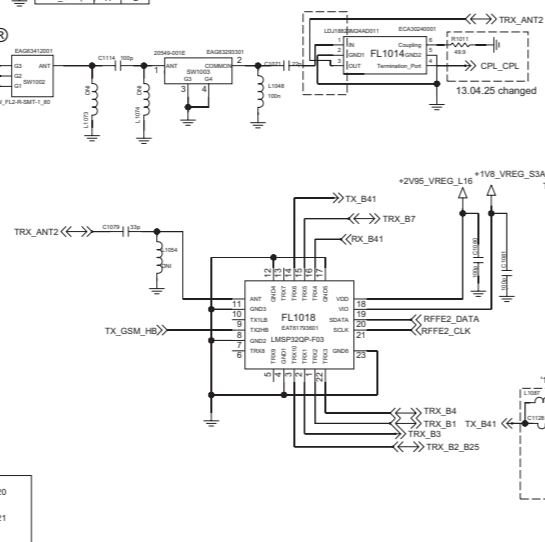
RF PAM Part Name	MMPA	B7	B17/B20	B41
APT/ET	ACPM-7600	RF9107/RF9100		ACPM-8361
ET				

Balun location should be closed to DPX



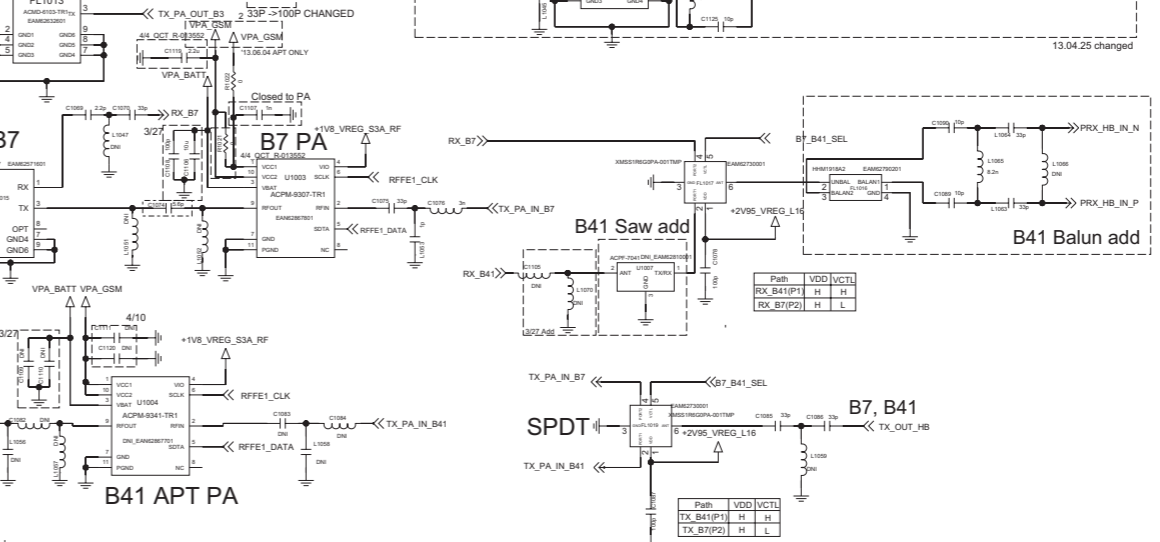
ANT#2

B1/B4 B3(G1800)
B2(G1900)
B7

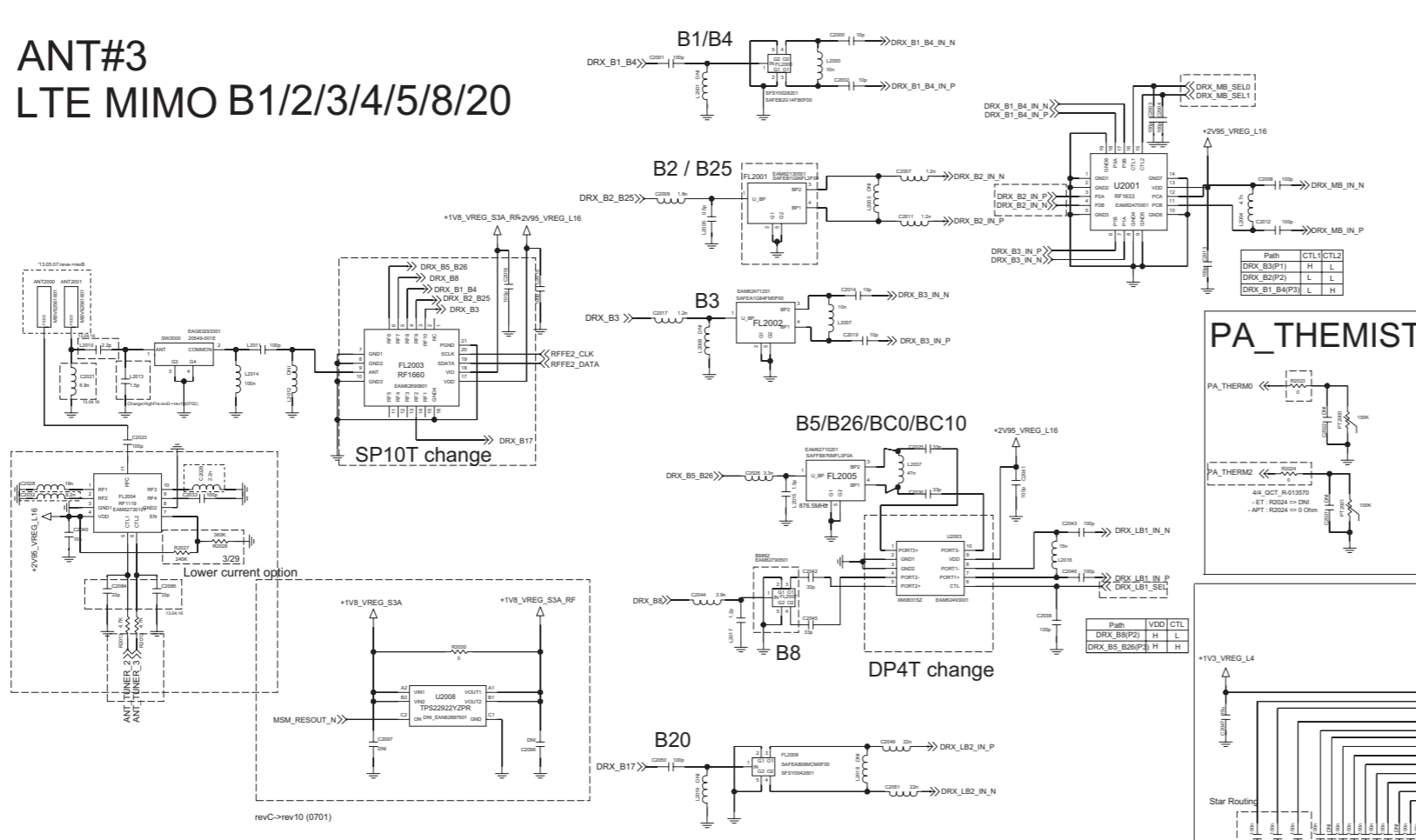


COUPLER LOW/HIGH °D

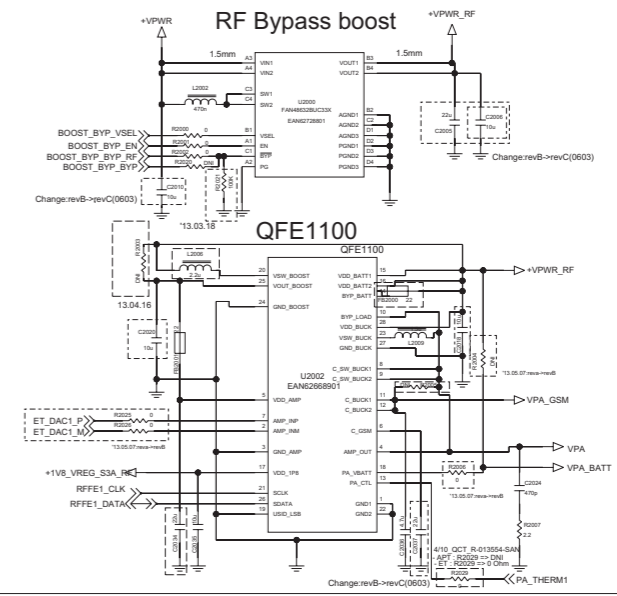
Path	VDD	VCTL
TX_B4(P1)	H	H
TX_B4(P2)	H	L
TX_B7(P2)	H	L



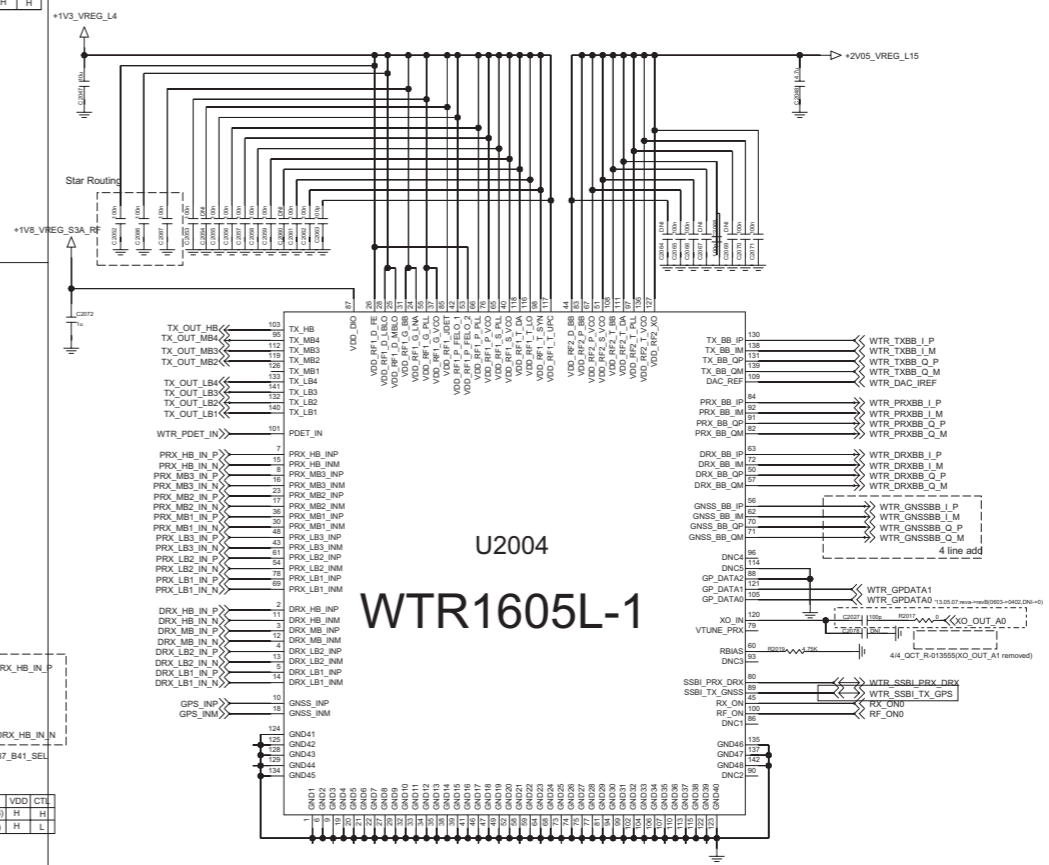
ANT#3
LTE MIMO B1/2/3/4/5/8/20



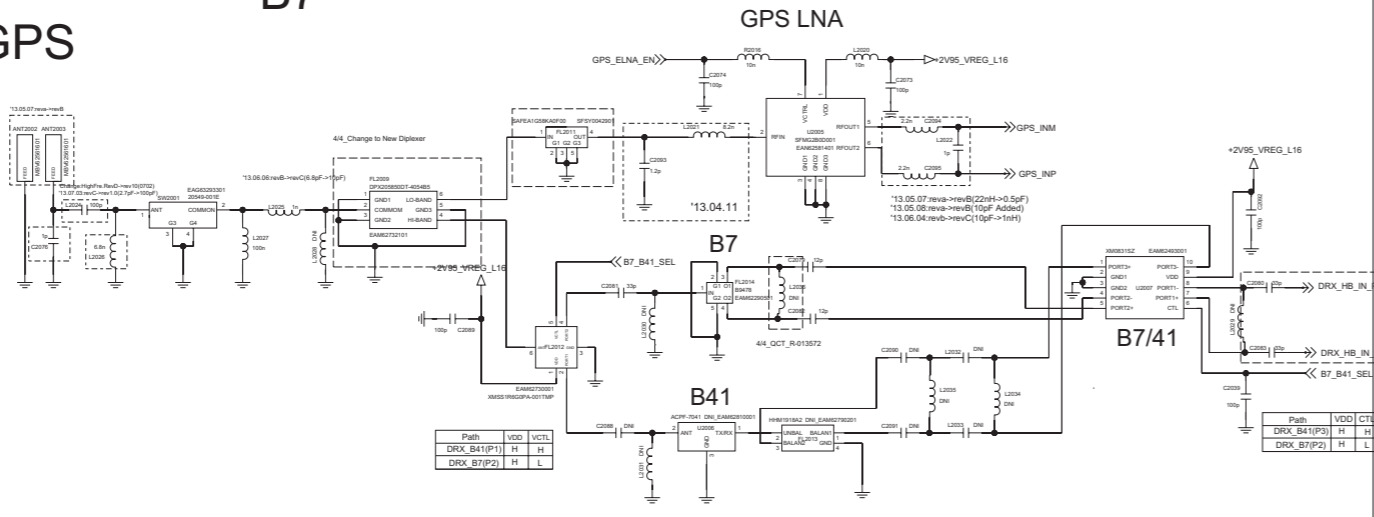
BOOST & DC-DC



TRANCEIVER

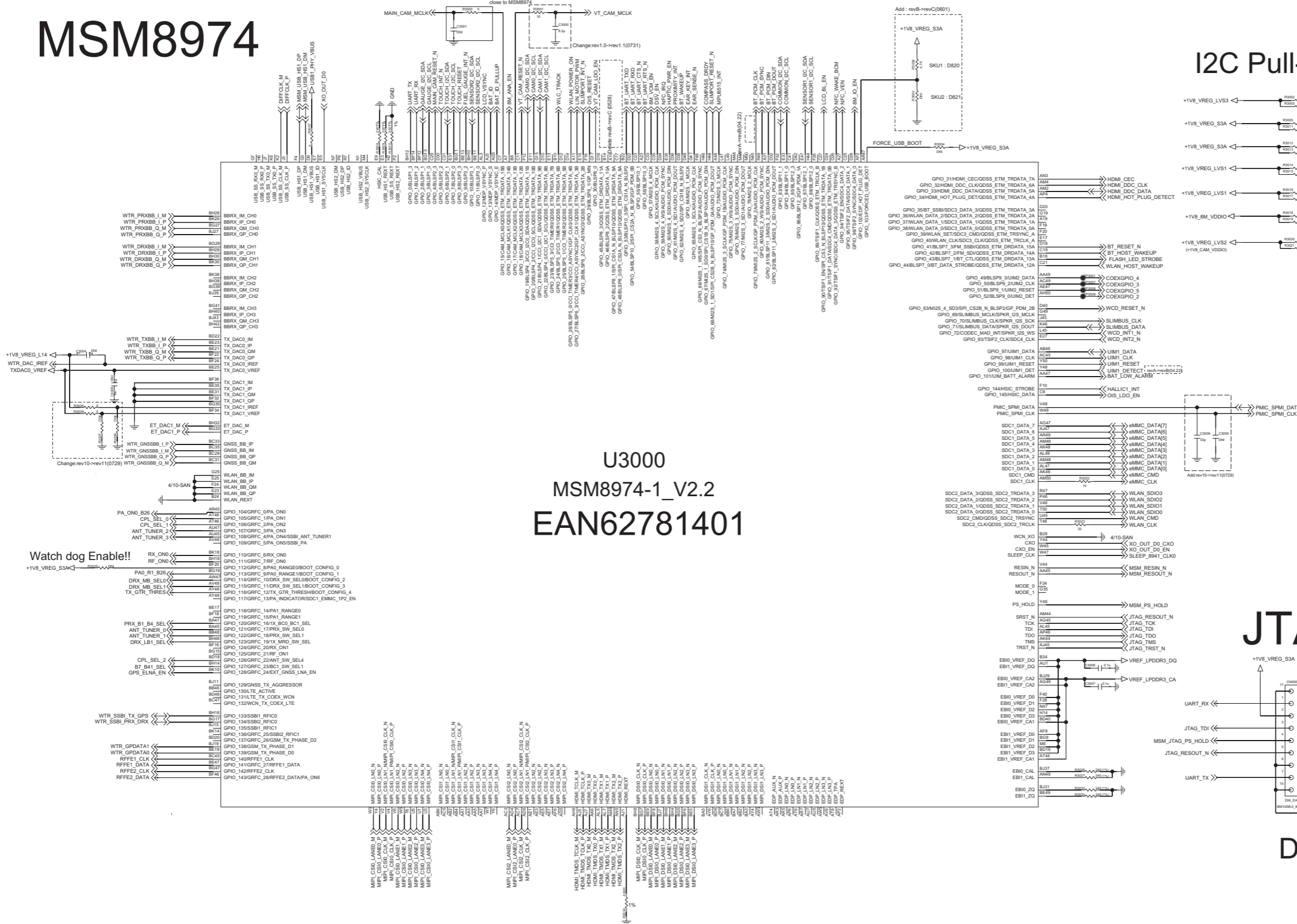


ANT#4
LTE MIMO B7
GPS

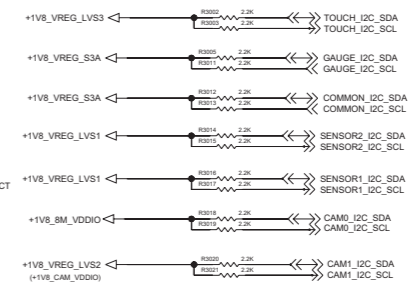


MSM8974

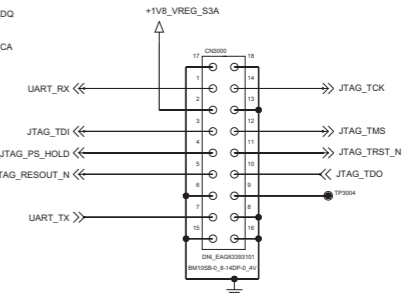
Final Camera MCLK!!



I2C Pull-Up

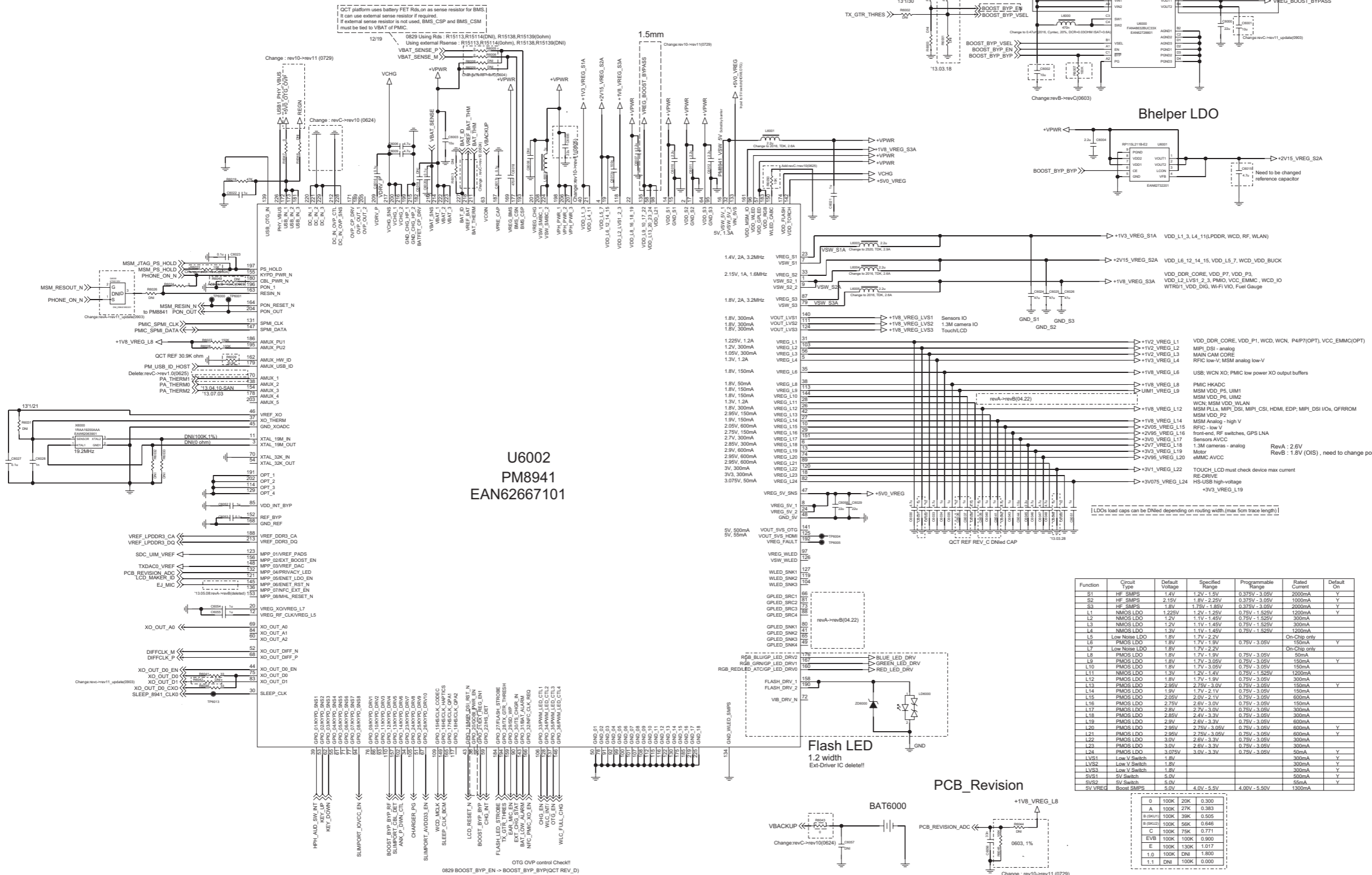


JTAG

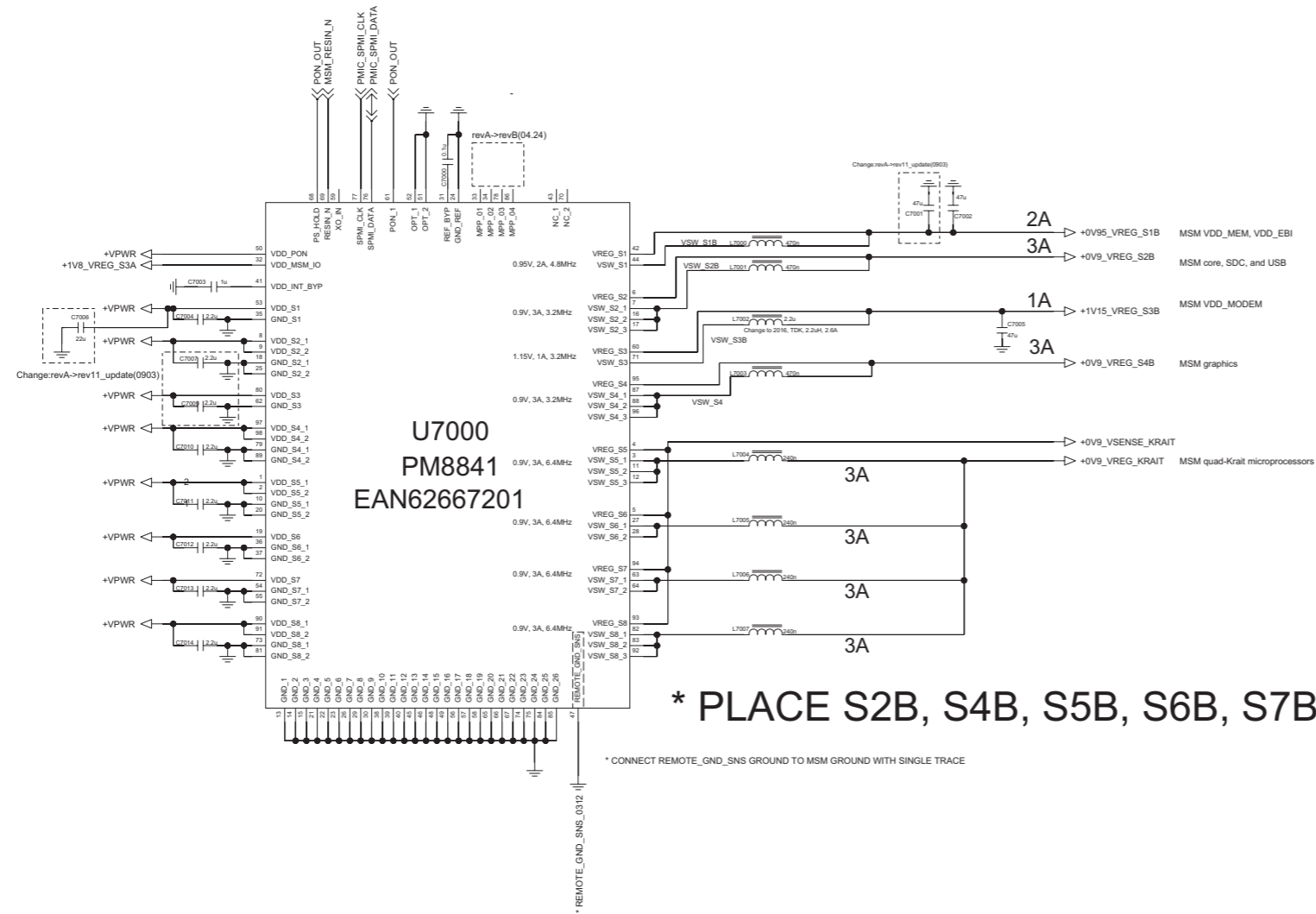


DNI

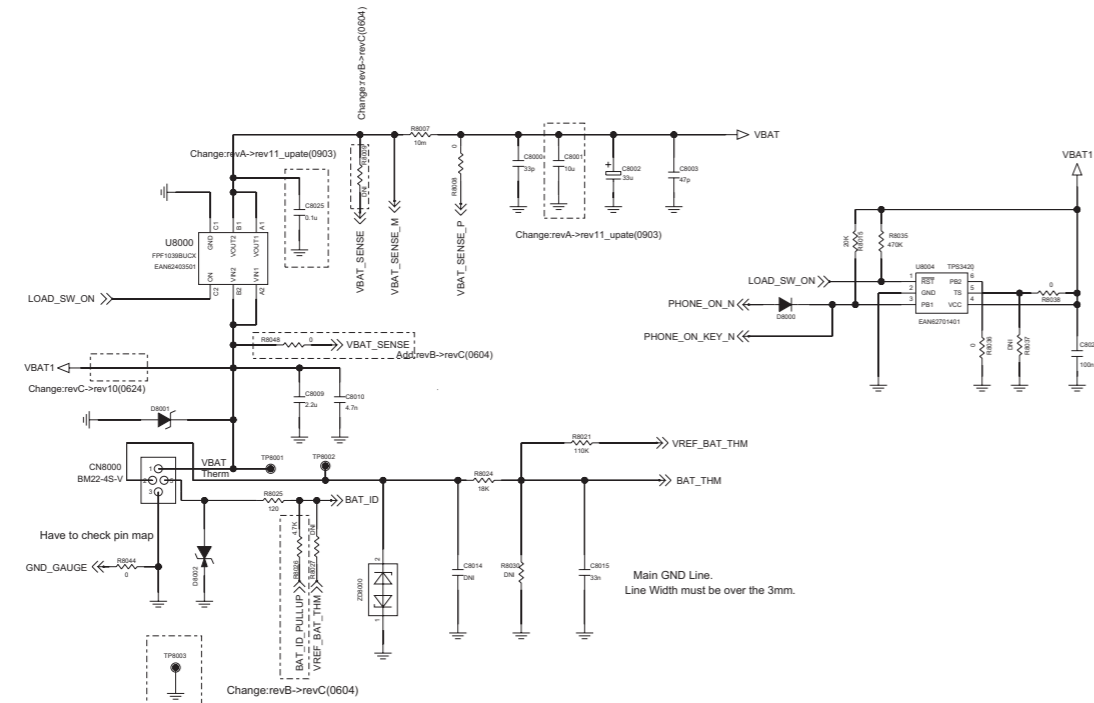
PM8941



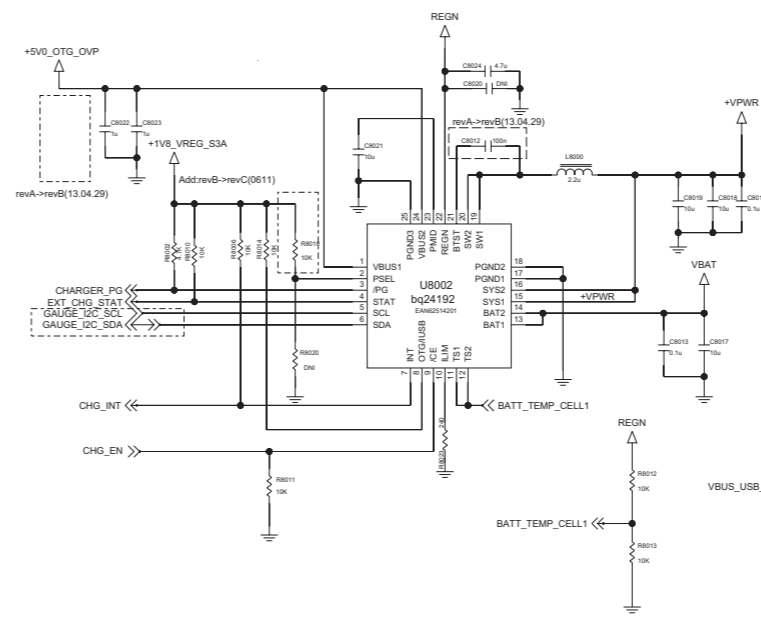
PM8841



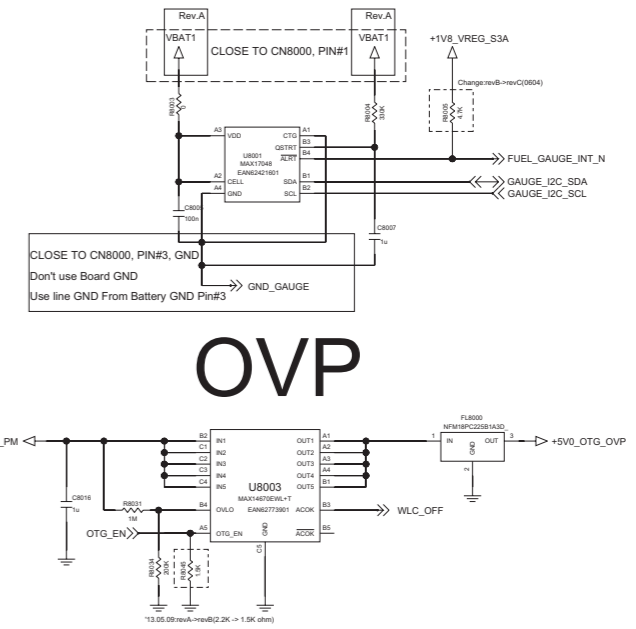
Battery Connector



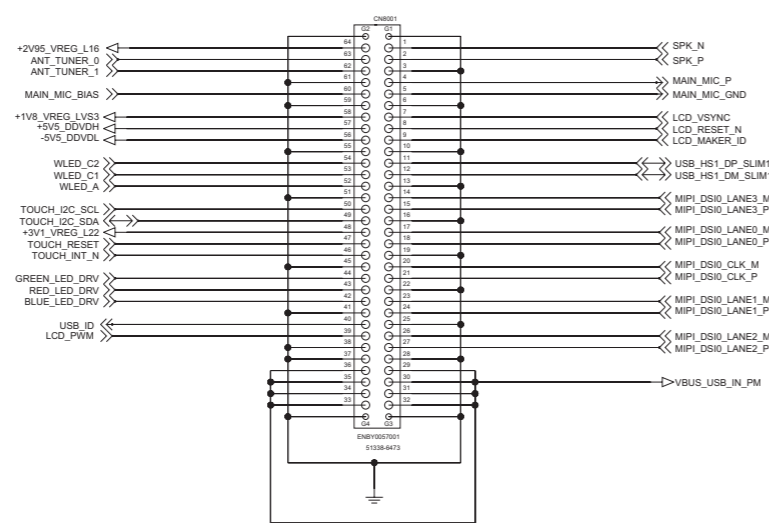
Reset IC External Charger IC



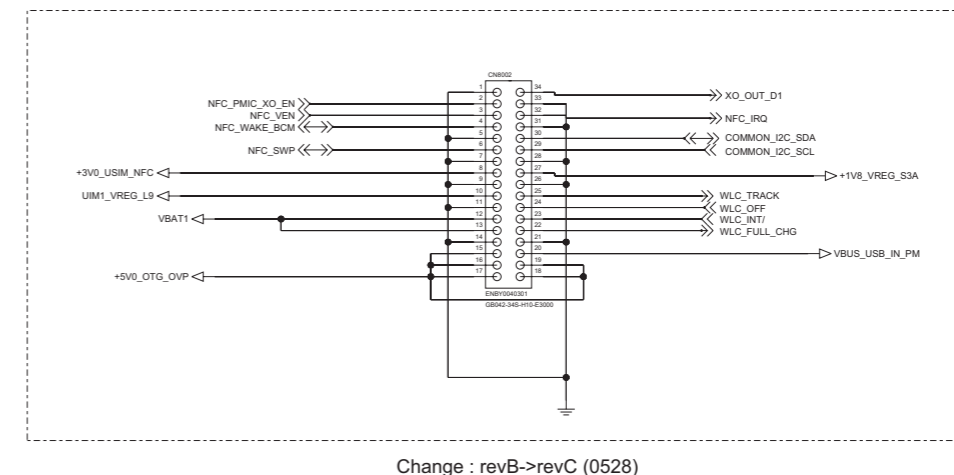
Fuel Gauge



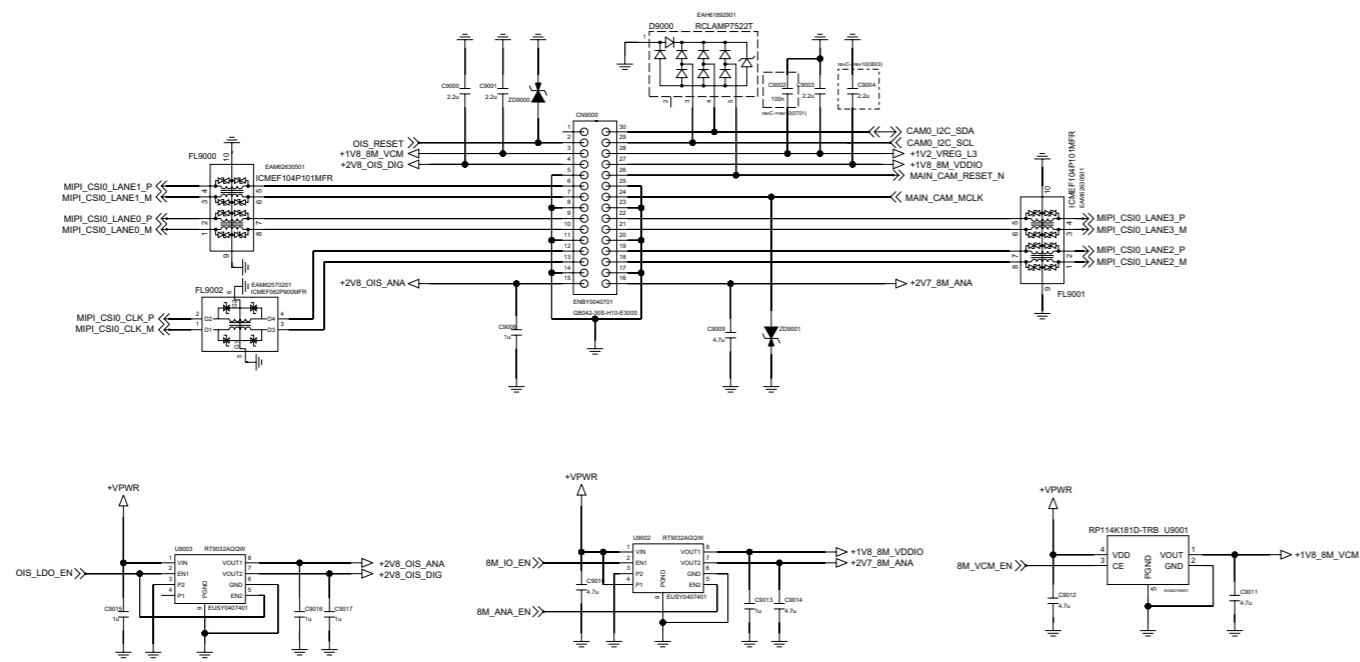
Main to Lower FPCB 64 Pin Conn. 1.5T, Socket



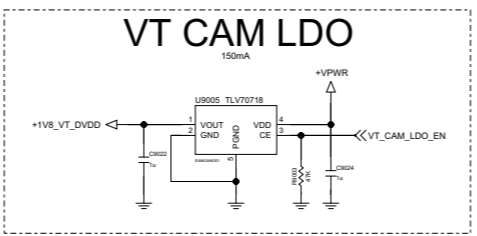
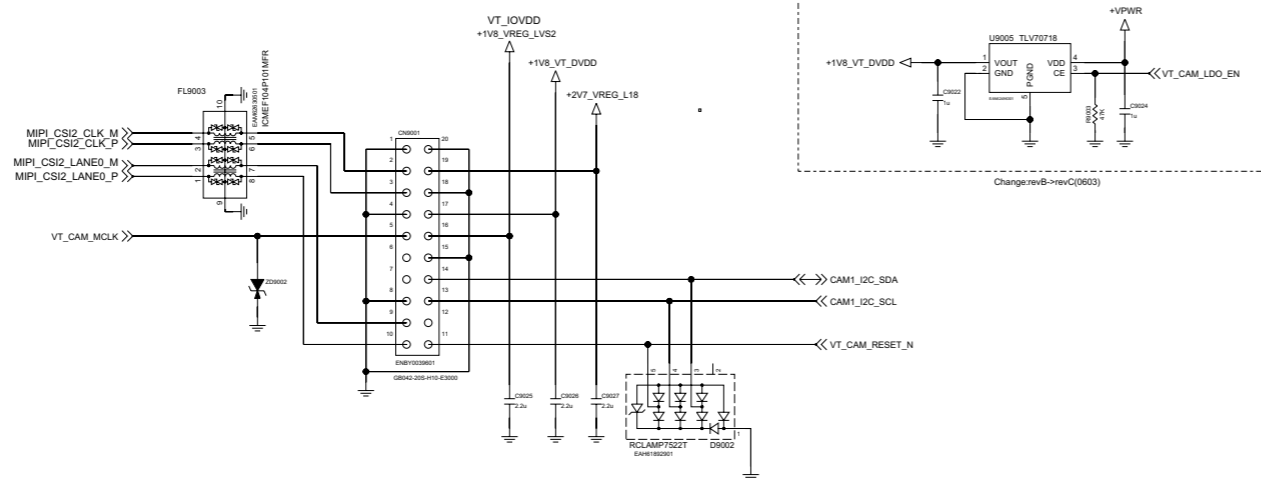
Main to Sub 34 Pin Conn. 1.0T



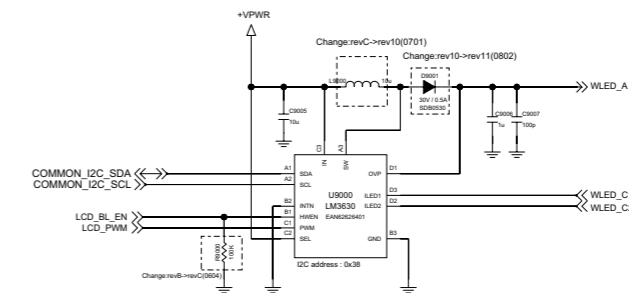
8M_OIS_CAMERA



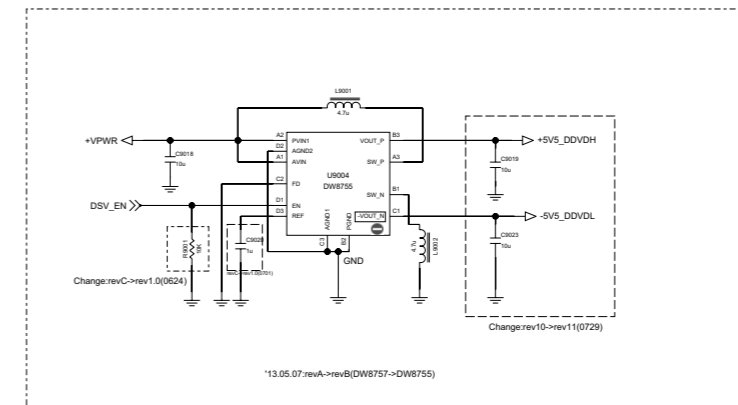
1.3M VT CAM



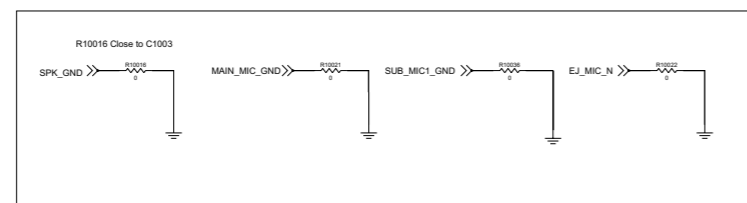
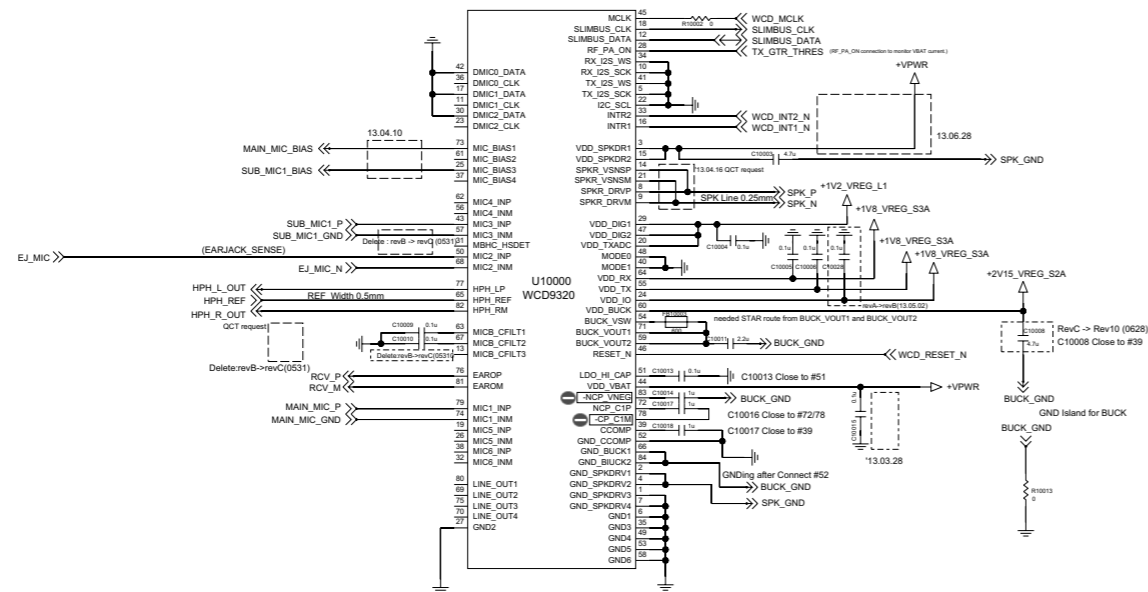
LCD Backlight LED Boost



DSV (DW8757 => DW8755)

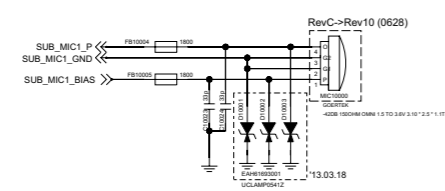


WCD9320(CODEC)

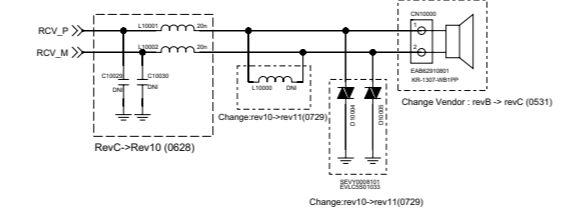


Close to WCD9320

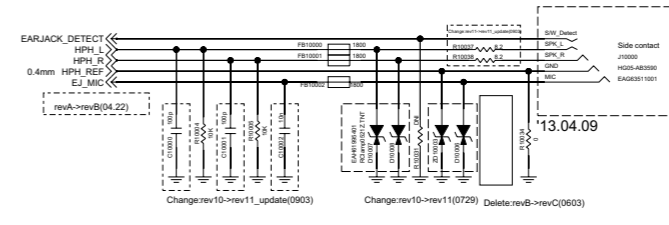
Sub_MIC1



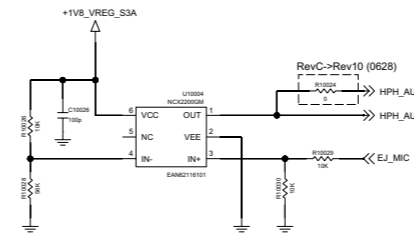
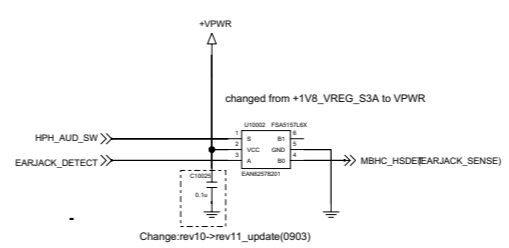
RECEIVER



3.5pi Ear Jack Connector

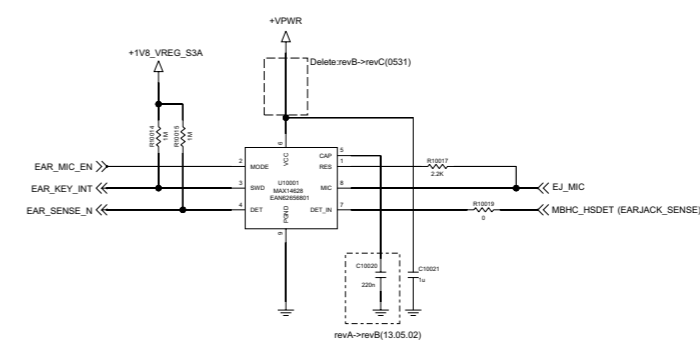


Debug port using 3.5pi EARJACK

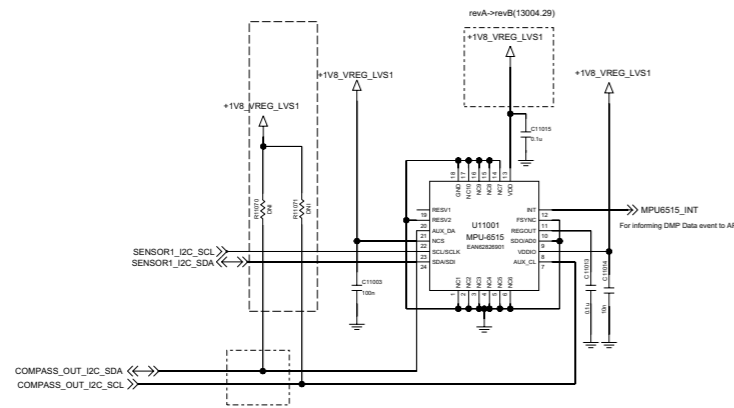


Earjack voltage select : PM8941

EJ DETECT

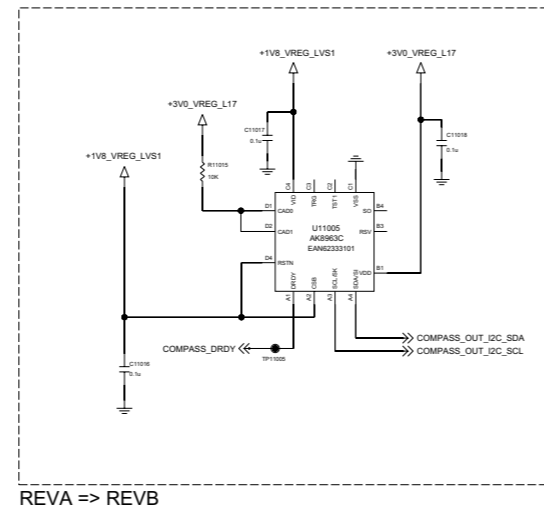


Accelerometer + Gyroscope SENSOR Module



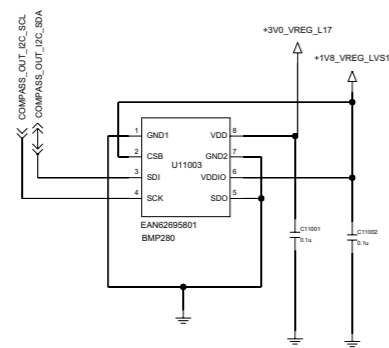
I2C	Devices
Sensor1	Accel + Gyroscope, Compass, Pressure
Sensor2	Proximity+ALS

Compass Sensor

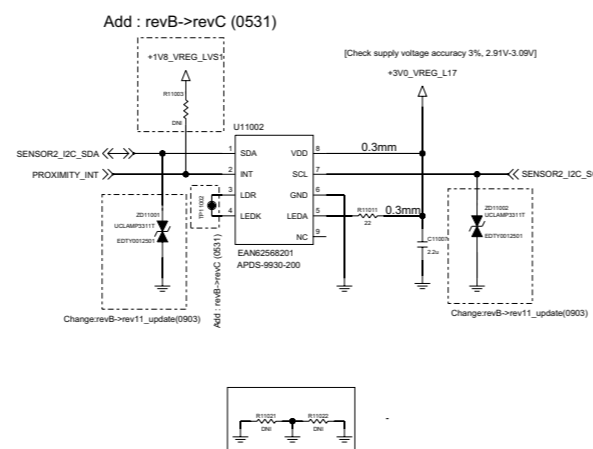


REVA => REV B

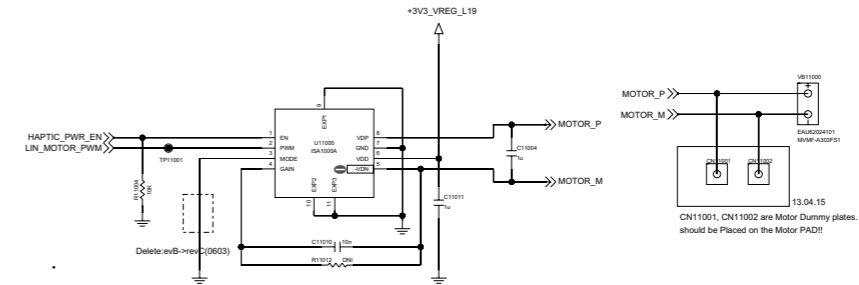
Pressure Sensor



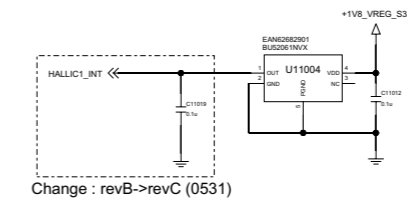
Proximity & Ambient



QCOIN MOTOR



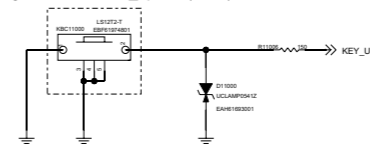
HALL IC



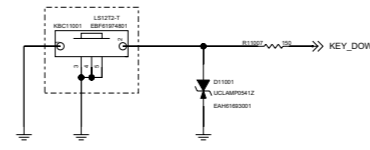
Change : revB->revC (0531)

Volume Key

Change : revA->rev11_update(0903)

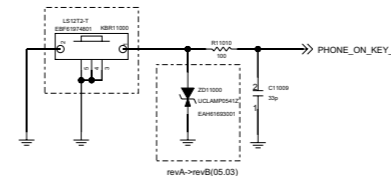


Change : revA->rev11_update(0903)

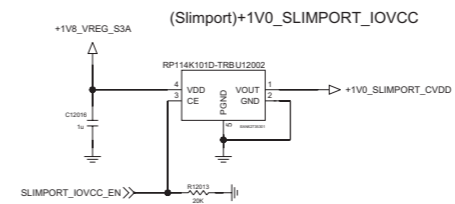
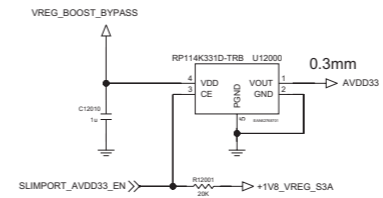
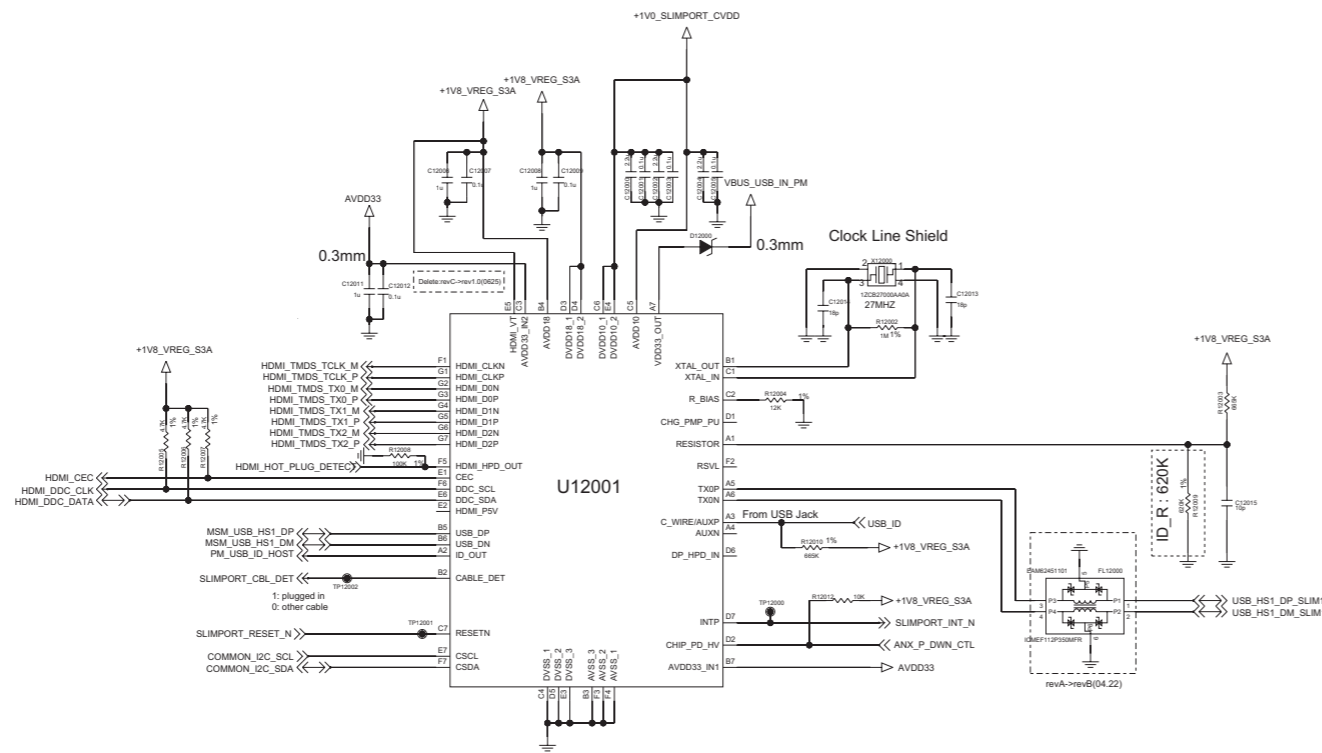


Power Key

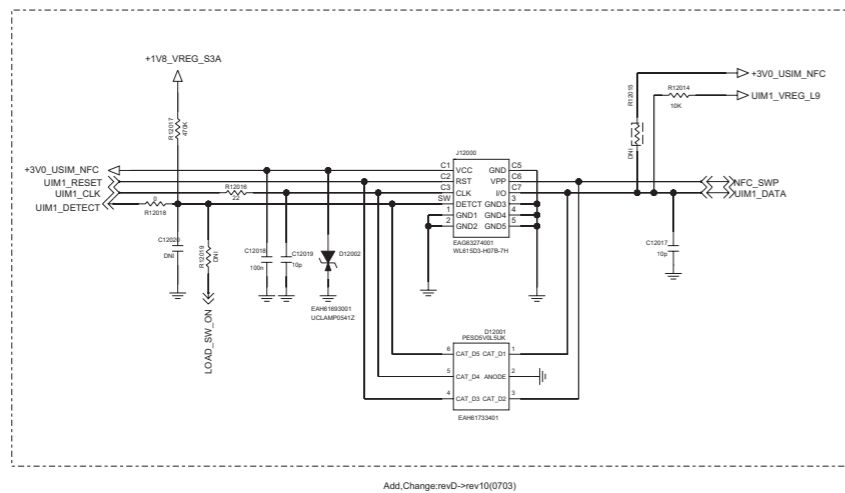
Change : revA->rev11_update(0903)



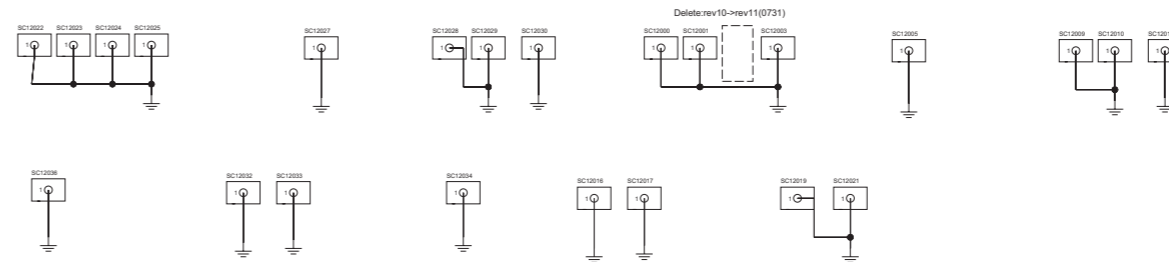
SLIMPORT



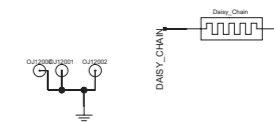
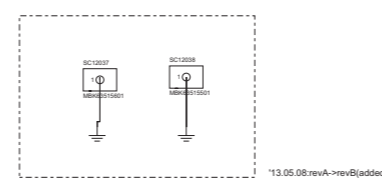
Micro_SIM Socket



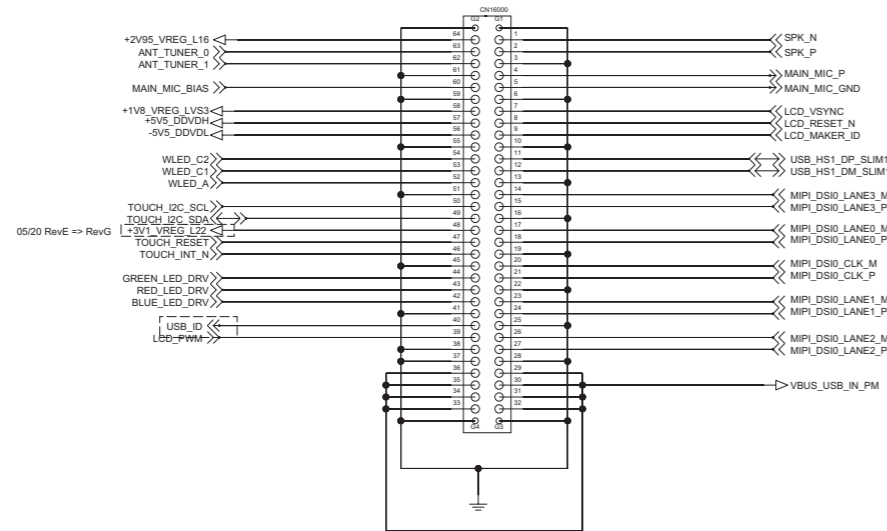
SMT Boss / Screw / Shield can frame



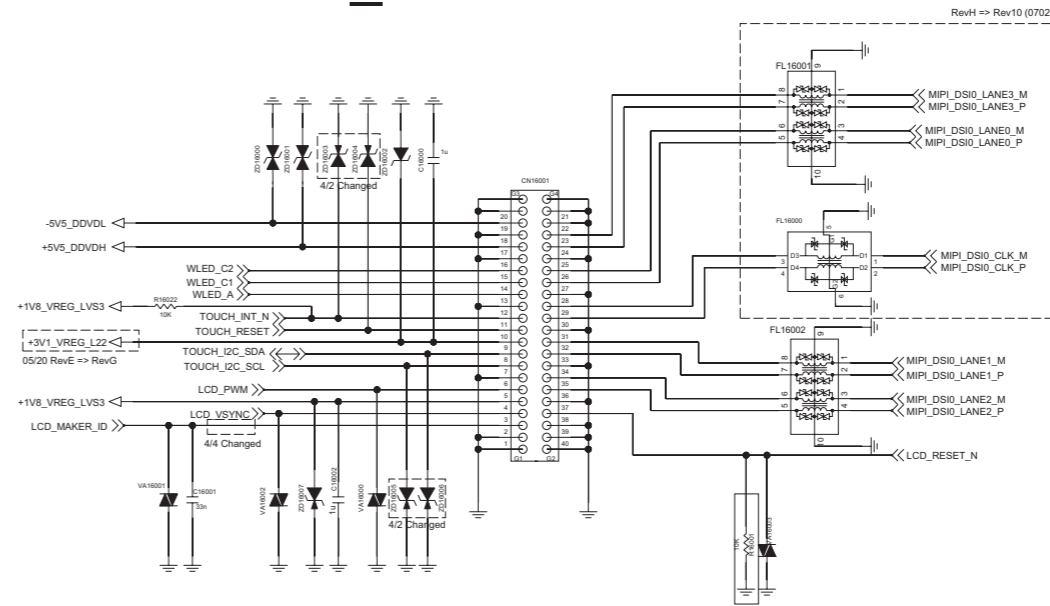
Shield can PAD



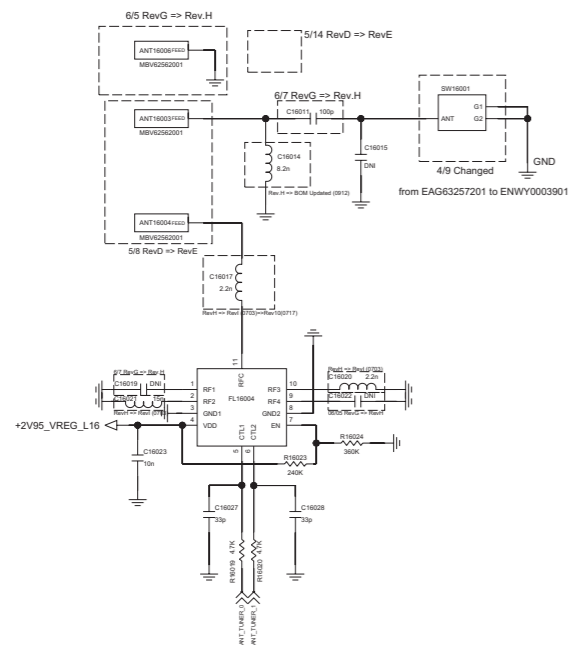
Lower FPCB to Main 64 Pin Conn 1.5T. Header



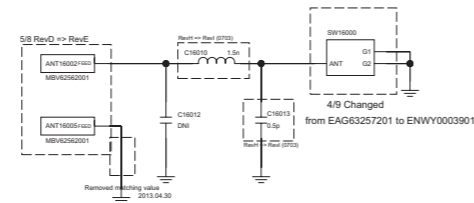
LCD_Touch Connector



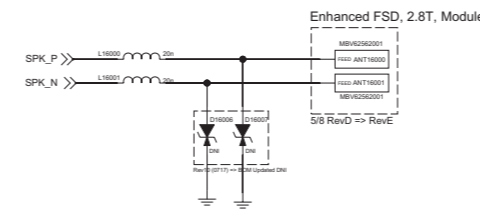
ANT#1 LOW BAND



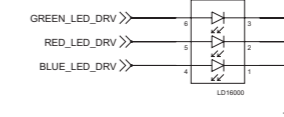
ANT#2 HIGH BAND



SPEAKER

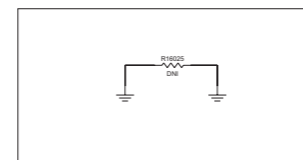


Indicator LED (R/G/B)

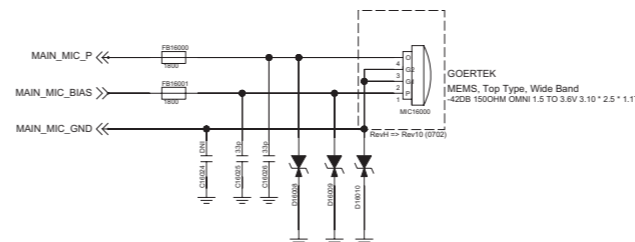


Dummy Resistor

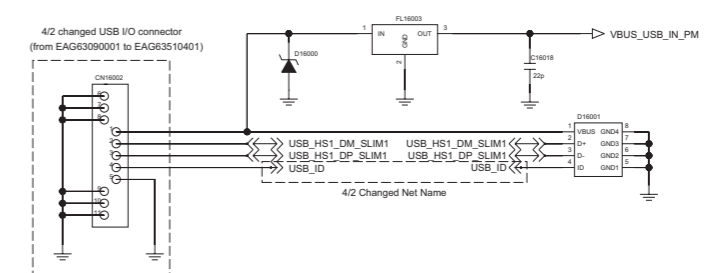
SKU1 : DNI
SKU2 : Install



Main MIC

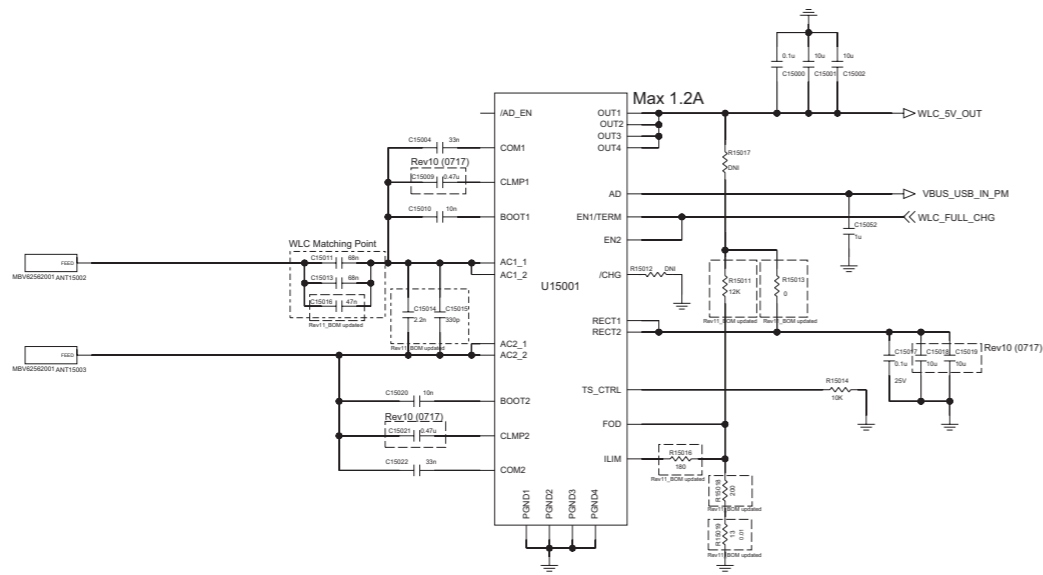


USB2.0 & OTG

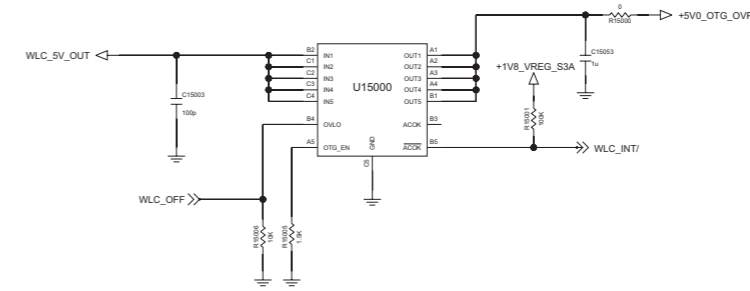


Wireless Charging

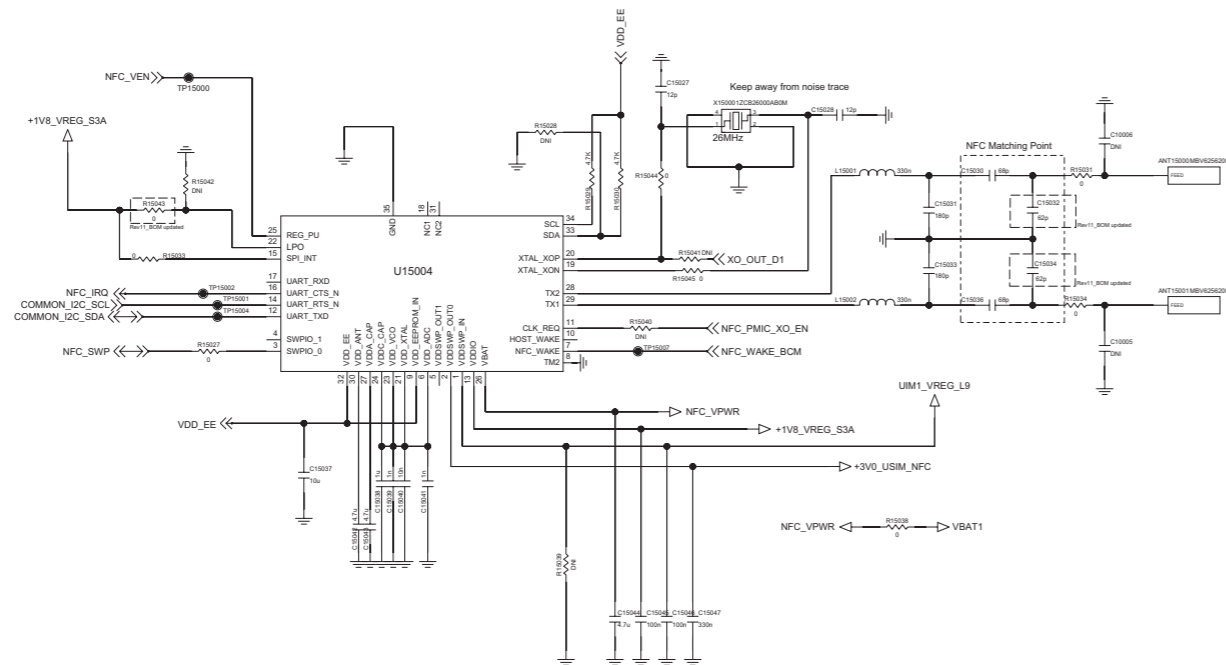
Wireless charging Interface



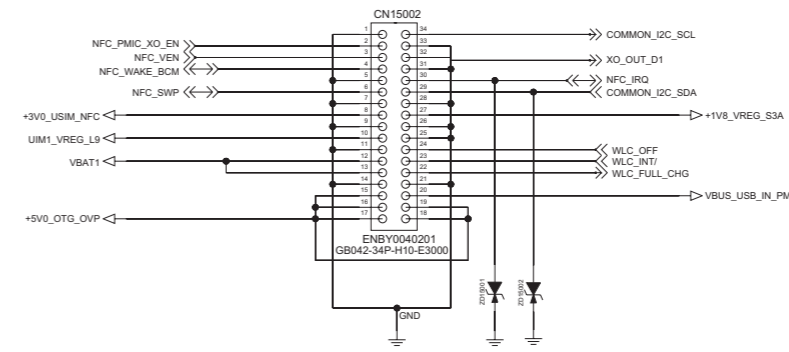
Wireless Charging - OVP



NFC -> Broadcom



Sub to Main -> 34Pin




7. BGA PIN MAP

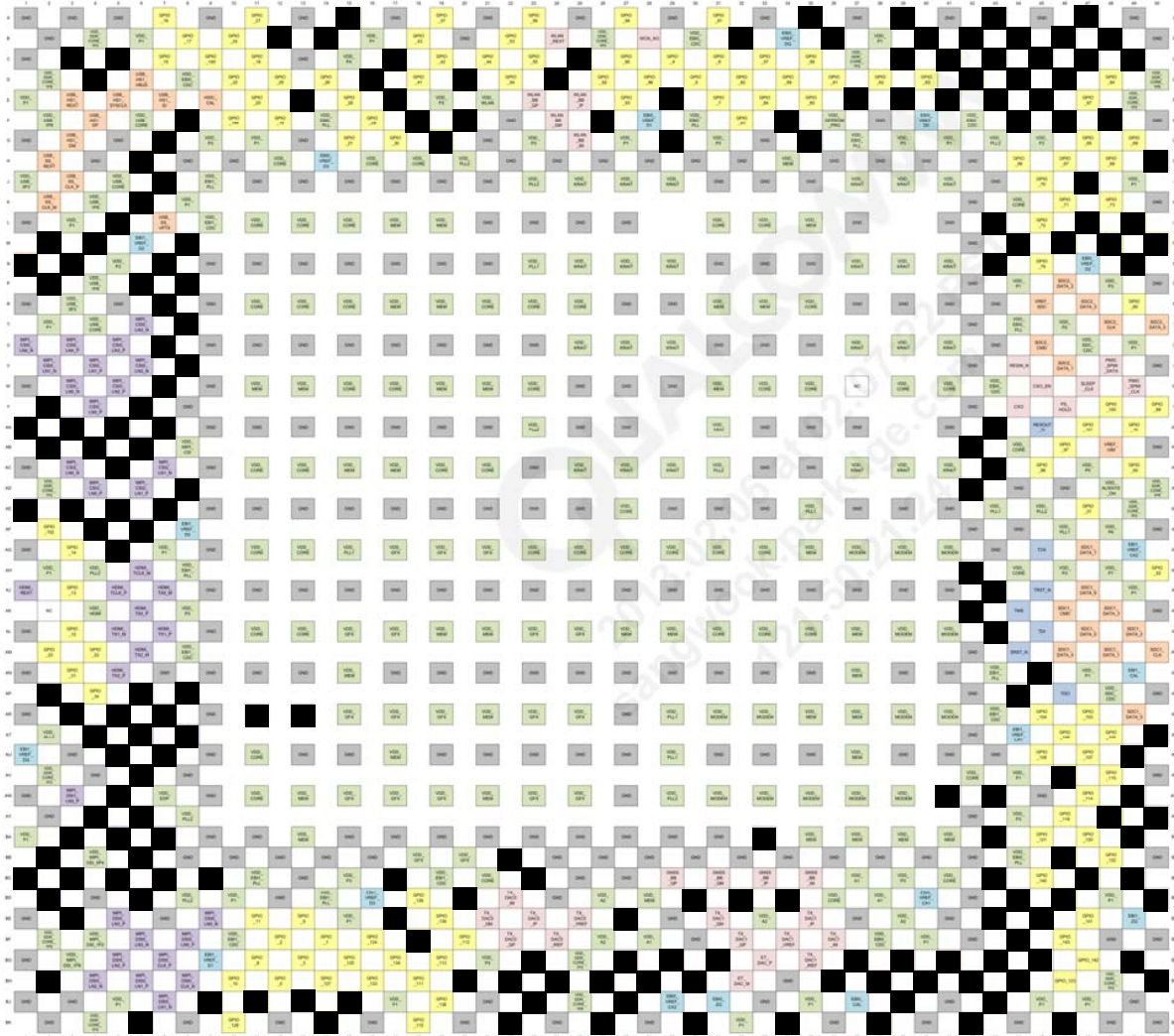
U2004 – WTR1605L(top view)

1		2		3		4		5		6		7		8		9
GND		DRX_HB_INP		DRX_MB_INP		DRX_LB2_INP		DRX_LB1_INP		GND		PRX_HB_INP		PRX_MB3_INP		GND
	10		11		12		13		14		15		16		17	
	GNSS_INP		DRX_HB_INM		DRX_MB_INM		DRX_LB2_INM		DRX_LB1_INM		PRX_HB_INM		PRX_MB3_INM		PRX_MB2_INM	
18		19		20		21		22		23		24		25		26
GNSS_INM		GND		GND		GND		GND		GND		VDD_RF1_G_LNA		VDD_RF1_D_MBLO		VDD_RF1_D_FE
	27		28		29		30		31		32		33		34	
	VDD_RF1_G_BB		GND		GND		GND		GND		GND		GND		GND	
	35		36		37		38		39		40		41		42	
	VDD_RF1_G_VCO		GND		GND		GND		GND		VDD_RF1_S_VCO		GND		VDD_RF1_P_FELO	
	43		44		45		46		47		48		49		50	
	PRX_MB1_INM		VDD_RF2_D_BB		RX_ON		GND		GND		PRX_LB3_INM		GND		DRX_BB_OP	
	51		52		53		54		55		56		57		58	
	VDD_RF2_S_VCO		GND		VDD_RF1_P_FELO		PRX_LB2_INM		VDD_RF1_G_PLL		GNSS_BB_IP		DRX_BB_OM		GND	
	59		60		61		62		63		64		65		66	
	GND		RBIAS		PRX_LB2_INP		GNSS_BB_IP		DRX_BB_IP		GND		VDD_RF1_S_PLL		VDD_RF1_P_PLL	
	67		68		69		70		71		72		73		74	
	VDD_RF1_P_VCO		GND		PRX_LB1_INM		GNSS_BB_IP		DRX_BB_IP		GND		GND		GND	
	75		76		77		78		79		80		81		82	
	VDD_RF1_P_VCO		GND		PRX_LB1_INP		GNSS_BB_IP		DRX_BB_IP		GND		GND		PRX_BB_IP	
	83		84		85		86		87		88		89		90	
	VDD_RF1_P_VCO		PRX_BB_IP		VDD_RF1_P_DET		GND		VDD_DIO		GP_DATA2		SSBI_TX_GNSS		PRX_BB_IP	
	91		92		93		94		95		96		97		98	
	PRX_BB_IP		PRX_BB_IP		GND		GND		TX_MB4		GP_DATA2		VDD_RF2_T_PLL		VDD_RF1_T_SYN	
	99		100		101		102		103		104		105		106	
	GND		RF_ON		PDET_IN		GND		TX_HB		GND		GP_DATA0		GND	
	107		108		109		110		111		112		113		114	
	GND		VDD_RF2_T_BB		DAC_REF		GND		VDD_RF2_T_DA		TX_MB3		GND		GND	
	115		116		117		118		119		120		121		122	
	GND		VDD_RF1_T_LO		VDD_RF1_T_UPC		VDD_RF1_T_DA		TX_MB2		XO_IN		GP_DATA1		GND	
	123		124		125		126		127		128		129		130	
	GND		GND		GND		TX_MB1		VDD_RF2_XO		GND		GND		TX_BB_IP	
	131		132		133		134		135		136		137		138	
	TX_BB_IP		TX_LB2		TX_LB4		GND		GND		VDD_RF2_T_VCO		GND		TX_BB_IP	
	139		140		141		142		143		144		145		146	
	TX_BB_IP		TX_LB1		TX_LB3		GND		GND		GND		GND		GND	

Rx RF	Rx BB	Tx RF	Tx BB	Support	DNC	Power	Ground
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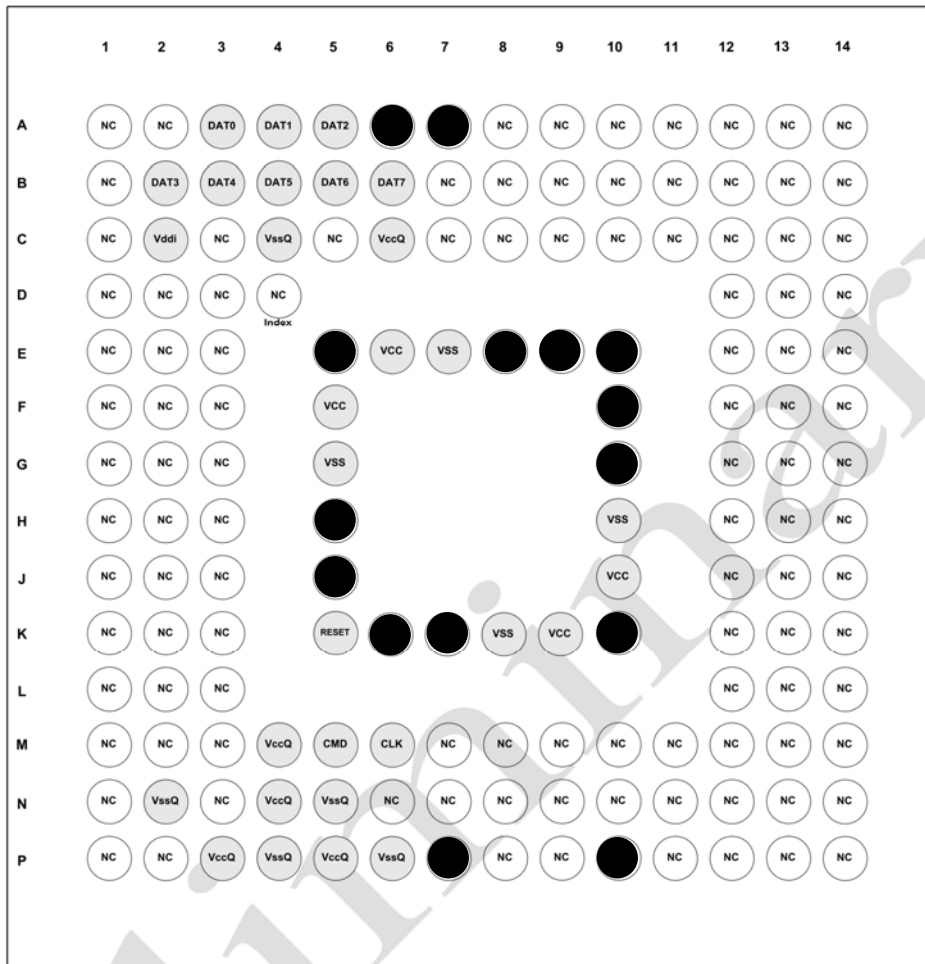
 Not Used

U3000 – MSM8974



Not Used

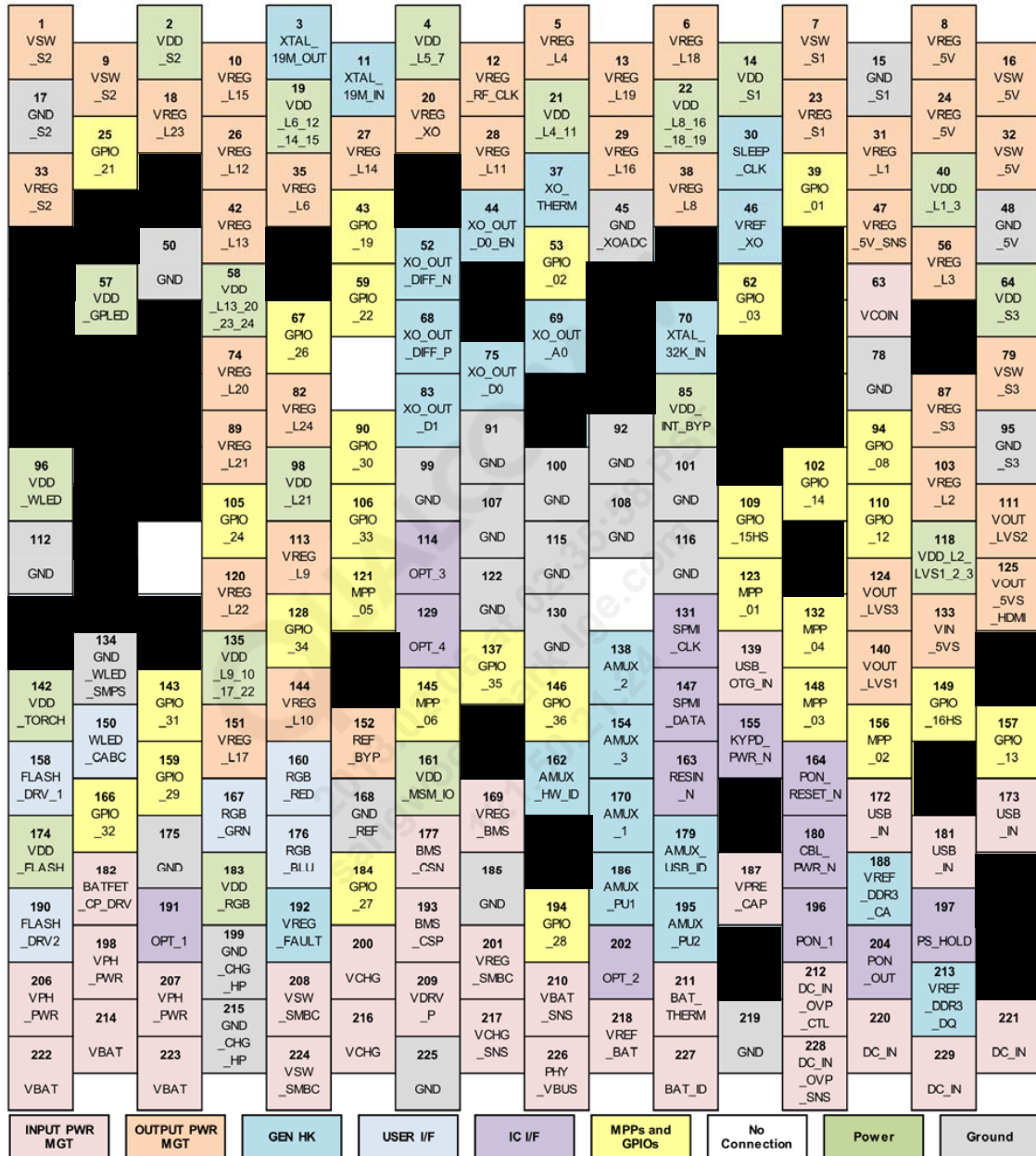
U5001 – eMMC memory



● Not Used

7. BGA PIN MAP

U6002 – PM8974(Top view)




Not Used

7. BGA PIN MAP

U7000 – PM8841(Top view)

1 VDD _S5	2 VDD _S5	3 VSW _S5	4 VREG _S5	5 VREG _S6	6 VREG _S2	7 VSW _S2	8 VDD _S2	9 VDD _S2
10 GND _S5	11 VSW _S5	12 VSW _S5	13 GND	14 GND	15 GND	16 VSW _S2	17 VSW _S2	18 GND _S2
19 VDD _S6	20 GND _S5	21 GND	22 GND	23 GND	24 GND _REF		25 GND _S2	26 GND
27 VSW _S6	28 VSW _S6	29 GND	30 GND	31 REF _BYP	32 VDD _MSM_IO			35 GND S1
36 GND _S6	37 GND _S6	38 GND	39 GND	40 GND	41 VDD _INT_BYP	42 VREG _S1		44 VSW _S1
45 GND	46 GND	47 REMOTE _GND_SNS	48 GND	49 GND	50 VDD _PON	51 OPT_2	52 OPT_1	53 VDD _S1
54 GND _S7	55 GND _S7	56 GND	57 GND	58 GND		60 VREG _S3	61 PON_1	62 GND _S3
63 VSW _S7	64 VSW _S7	65 GND	66 GND	67 GND	68 PS _HOLD	69 RESIN _N		71 VSW _S3
72 VDD _S7	73 GND _S8	74 GND	75 GND	76 SPMI _DATA	77 SPMI _CLK		79 GND _S4	80 VDD _S3
81 GND _S8	82 VSW _S8	83 VSW _S8	84 GND	85 GND		87 VSW _S4	88 VSW _S4	89 GND _S4
90 VDD _S8	91 VDD _S8	92 VSW _S8	93 VREG _S8	94 VREG _S7	95 VREG _S4	96 VSW _S4	97 VDD _S4	98 VDD _S4
OUTPUT PWR MGT	IC I/F	MPPs and GPIOs	No Connection	Power	Ground			

 Not Used

7. BGA PIN MAP

U10000 – WCD9320(top view)

1 GND _SPKDRV	2 GND _SPKDRV	3 VDD _SPKDR1	4 GND _SPKDRV	5 TX_ I2S_SCK	6 GND					
	7 GND _SPKDRV		8 SPKR_ DRVP		9 SPKR_ DRVM		10 RX_ I2S_SCK		11 DMIC1 _CLK	12 SLIMBUS _DATA
			14 SPKR_ VSNSP		15 VDD _SPKDR2		16 INTR1		17 DMIC1 _DATA	18 SLIMBUS _CLK
				20 VDD TXADC		21 SPKR_ VSNSM		22 I2C_SCL		24 VDD _IO
25 MIC_ BIAS3					27 GND		28 RF_PA _ON		29 VDD _DIG1	30 DMIC2 _DATA
						33 INTR2		34 RX_ I2S_WS	35 GND	36 DMIC0 _CLK
					39 CCOMP		40 MODE1		41 TX_ I2S_WS	42 DMIC0 _DATA
									47 VDD _DIG2	48 MODE0
	43 MIC3_ INP		44 VDD _VBAT		45 MCLK		46 RESET_N			
49 GND		50 MIC2_ INP		51 LDO_ HI_CAP		52 GND _CCOMP		53 GND		54 BUCK _VSW
	55 VDD _TX				57 MIC3_ INM		58 GND		59 BUCK _VOUT2	60 VDD _BUCK
				63 MICB_ CFILT1		64 VDD _RX		65 HPH_REF		66 GND _BUCK
	67 MICB_ CFILT2		68 MIC2_ INM						71 BUCK _VOUT1	72 NCP_ C1P
73 MIC_ BIAS1		74 MIC1_ INM				76 EAROP		77 HPH_LP		78 NCP_ C1M
	79 MIC1_ INP				81 EAROM		82 HPH_RM		83 NCP_ VNEG	84 GND _BUCK


- Audio inputs
- Audio outputs
- Digital IOs
- Support - analog
- Support - digital
- Power
- Ground

Not Used

7. BGA PIN MAP

U12001 – ANX7808(top view)


	1	2	3	4	5	6	7	
A	RESISTOR	ID_OUT	C-WIRE/ AUXP		TX0P	TX0N	VDD33_OUT	A
B	XTAL_OUT	CABLE_DET	AVSS	AVDD18	USB_DP	USB_DN	AVDD33_IN	B
C	XTAL_IN	R_BIAS	AVDD33_IN	DVSS	AVDD10	DVDD10	RESETN	C
D		CHIP_PD_HV	DVDD18	DVDD18	DVSS		INTP	D
E	CEC		DVSS	DVDD10	HDMI_VT	DDC_SDA	CSCL	E
F	HDMI_CLKN		AVSS	AVSS	HDMI_HPD_ OUT	DDC_SCL	CSDA	F
G	HDMI_CLKP	HDMI_D0N	HDMI_D0P	HDMI_D1N	HDMI_D1P	HDMI_D2N	HDMI_D2P	G
	1	2	3	4	5	6	7	

 Not Used

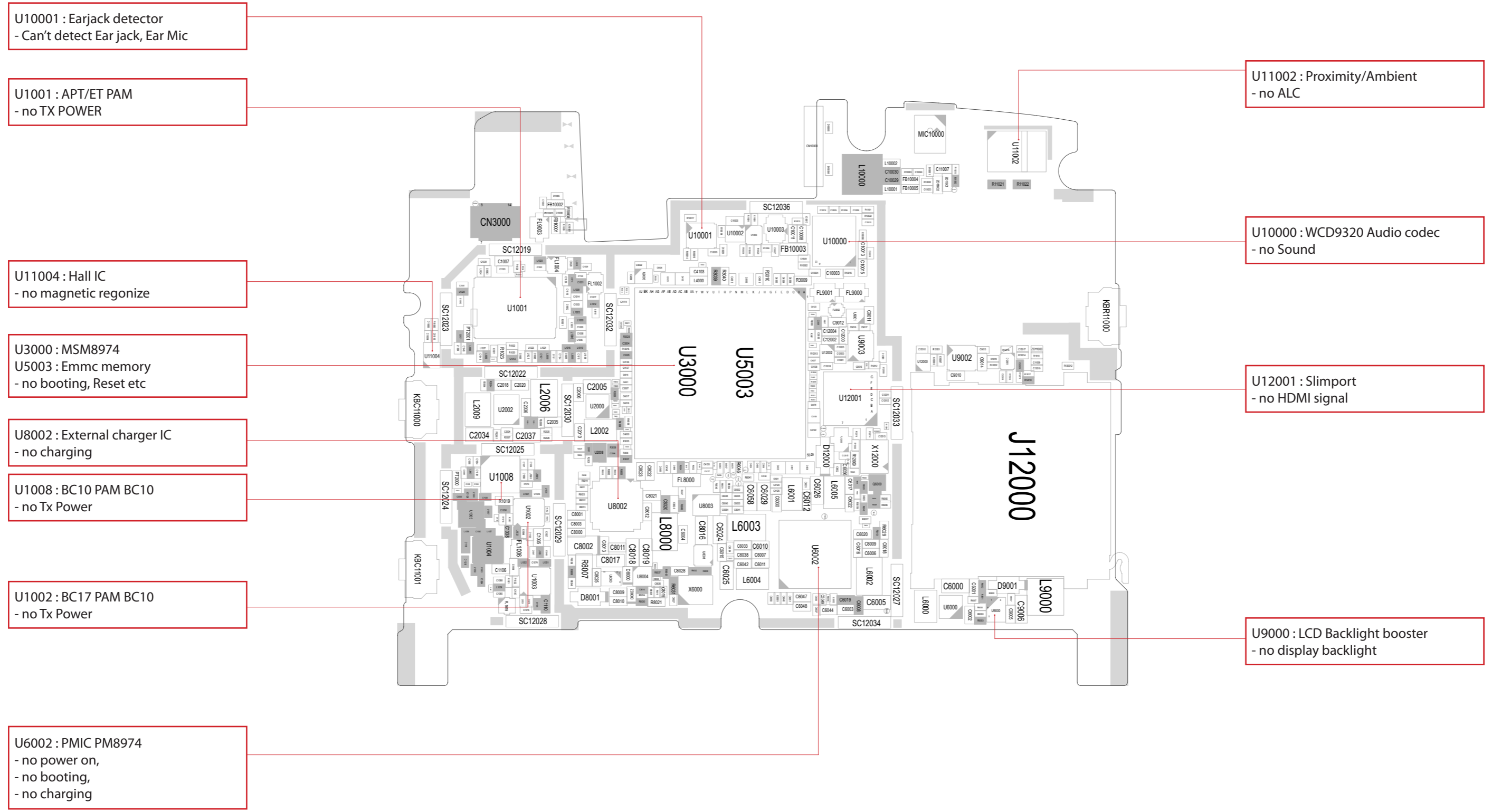
7. BGA PIN MAP

U13000 – BCM4330(top view)

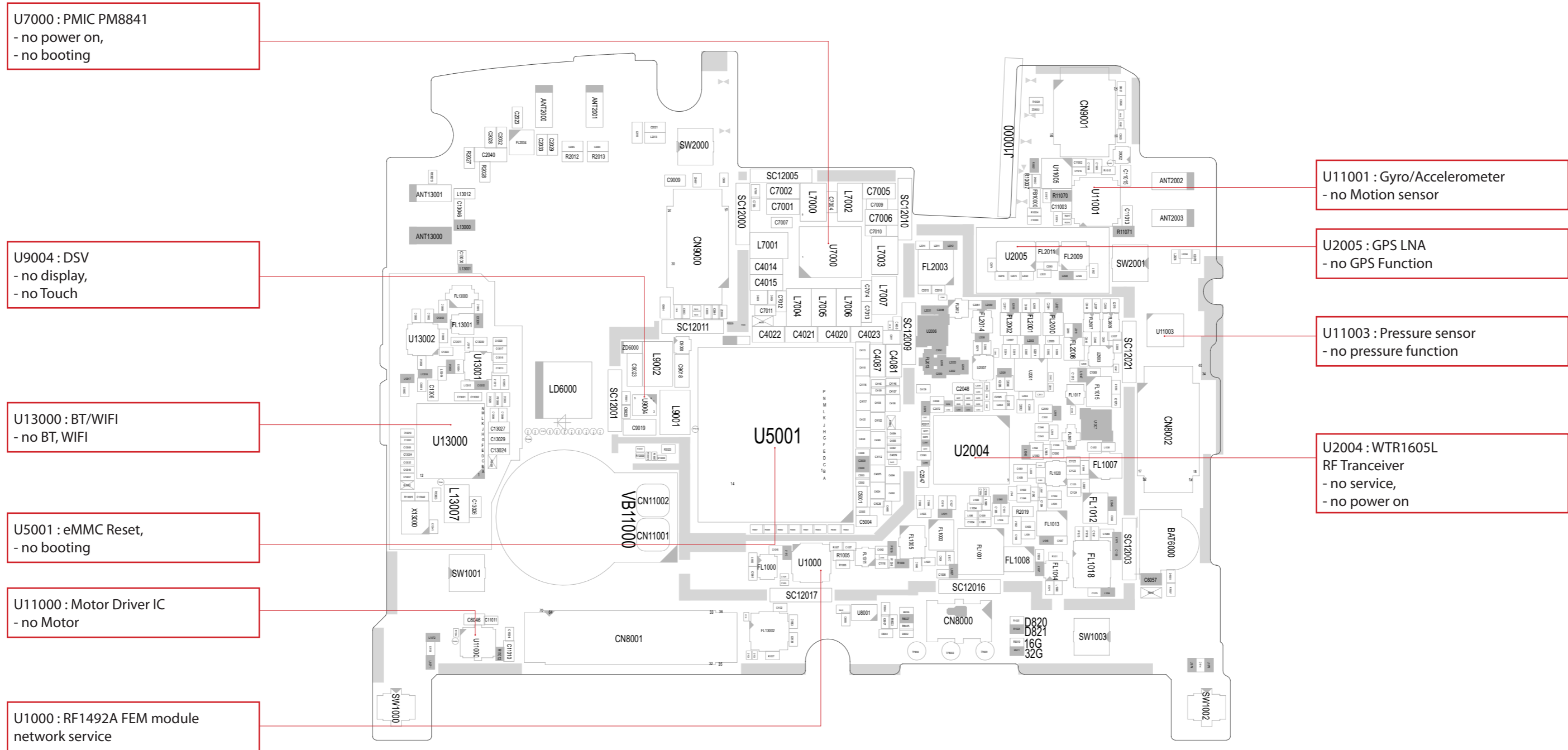
	1	2	3	4	5	6	7	8	9	10	11	12	
A		NO CONNECT				NO CONNECT					NO CONNECT		A
B	SR_PVSS	SR_VLX	WL_REG_ON	LPO_IN	GPIO_3	GPIO_0	HSIC_DATA	HSIC_STROBE		SDIO_DATA_0	SDIO_CLK	SDIO_CMD	B
C	SR_VDDBATPSV	SR_VDDBATASV	PMU_AVSS		GPIO_4		WL_VDDC	HSIC_AVDD12PLL	HSIC_DVDD12	SDIO_DATA_1	SDIO_DATA_3	WL_VDDC	C
D	LDO_VDD1P5	VOOUT_CLDO	BT_REG_ON		GPIO_5	GPIO_2	VSSC	HSIC_AGNDDPLL	VDDIO_S0	SDIO_DATA_2	VSSC		D
E	VOOUT_3P3	VOOUT_LNLD0	VSSC			BT_UART_CTS	VDDIO_RF	VSSC		RF_SW_CTRL_8	RF_SW_CTRL_3	RF_SW_CTRL_2	E
F	VOOUT_BTLD02P5	LDO_VDDBATSV	VDDIO			BT_UART_RTS	BT_UART_TXD				RF_SW_CTRL_1	RF_SW_CTRL_0	F
G	BT_PCM_IN	BT_PCM_CLK		WL_VDDC	WL_VDDC	BT_UART_RXD	RF_SW_CTRL_7	WL_VDDC		BBPLL_AV5	WRF_XTAL_GND1P2	BBPLL_AVDD1P2	G
H		BT_PCM_SYNC		BT_VDDIO	BT_VDDC		WRF_GPIO_OUT	WRF_WL_NLDOIN_VDD1P5		WRF_VCO_GND	WRF_XTAL_VDD1P5	WRF_XTAL_IN	H
J	FM_AUDIOVDD1P2	BT_HOST_WAKE	BT_PCM_OUT	BT_VDDC	VSSC			WRF_BUCK_GND1P5	WRF_MMD_GND1P2	WRF_PFD_GND1P2	WRF_CP_GND	WRF_XTAL_OUT	J
K		FM_AUDIOVSS	BT_DEV_WAKE	VSSC			WRF_AFE_GND1P2	WRF_LO_GND1P2_2	WRF_SYNTH_VBAT_VDD3P3	WRF_MMD_VDD1P2	WRF_PFD_VDD1P2	WRF_XTAL_VDD1P2	K
L		FM_PLLVDD1P2	FM_PLLVSS	BT_IFVDD1P2	BT_PLLVSS	BT_IFVSS	WRF_RX2G_GND1P2	WRF_TX_GND1P2	WRF_PADRV_VBAT_VDD3P3	WRF_PADRV_VBAT_GND3P3	WRF_LO_GND1P2_2	WRF_RX5G_GND1P2	L
M	FM_VCOVSS	FM_LNAVSS	BT_VCOVSS	BT_PLLVDD1P2	BT_PAVSS		WRF_LNA_2G_GND1P2	WRF_PA_VBAT_GND3P3_4	WRF_PA_VBAT_GND3P3_3	WRF_PA_VBAT_GND3P3_2	WRF_PA_VBAT_GND3P3_1	WRF_LNA_5G_GND1P2	M
N	FM_LNAVCOVDD1P2		BT_VCOVDD1P2	BT_LNAVDD1P2	BT_RF	BT_PAVDD2P5	WRF_RFIN_2G	WRF_RFOUT_2G	WRF_PA2G_VBAT_VDD3P3	WRF_PASG_VBAT_VDD3P3	WRF_RFOUT_5G	WRF_RFIN_5G	N
	1	2	3	4	5	6	7	8	9	10	11	12	

 Not Used

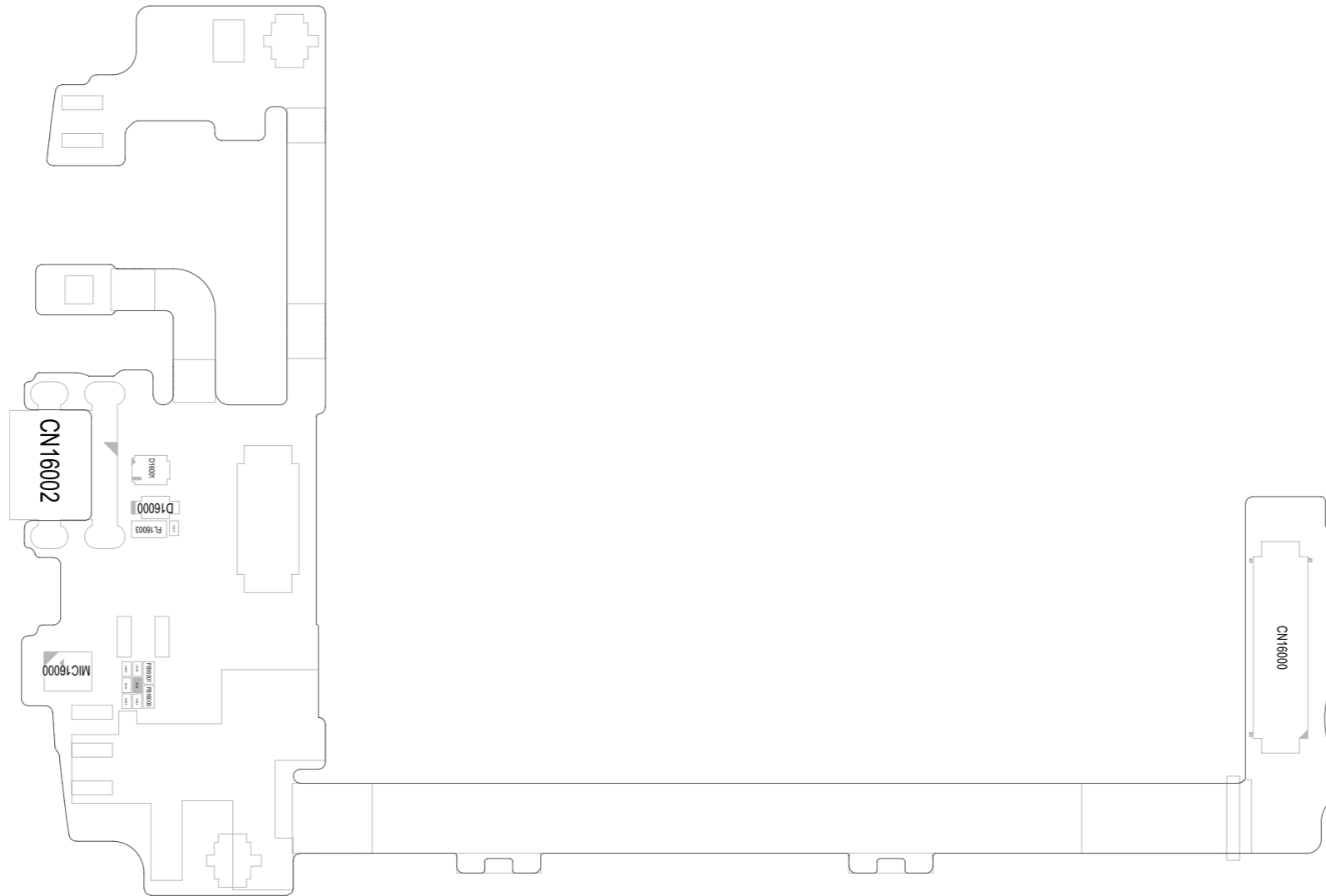
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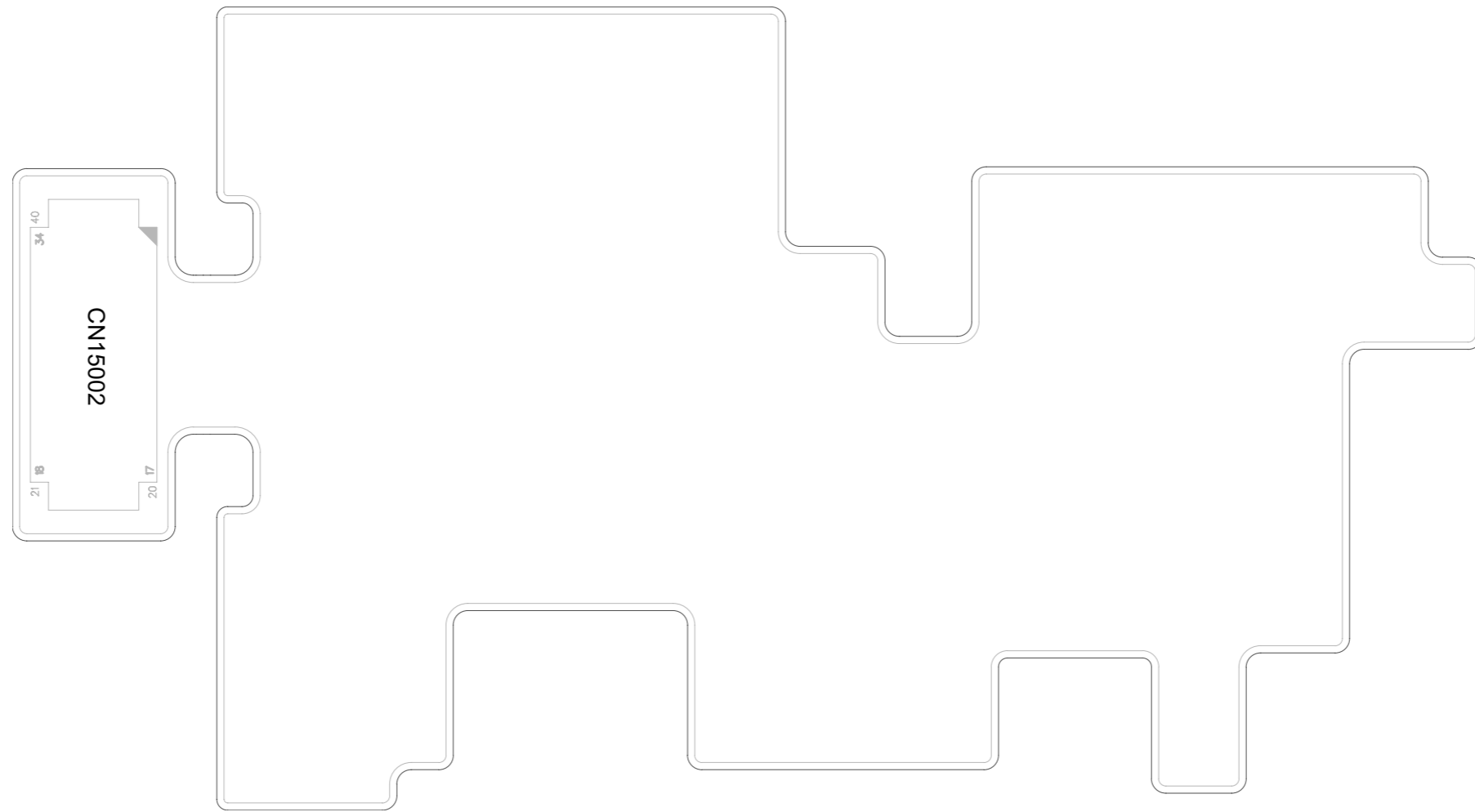
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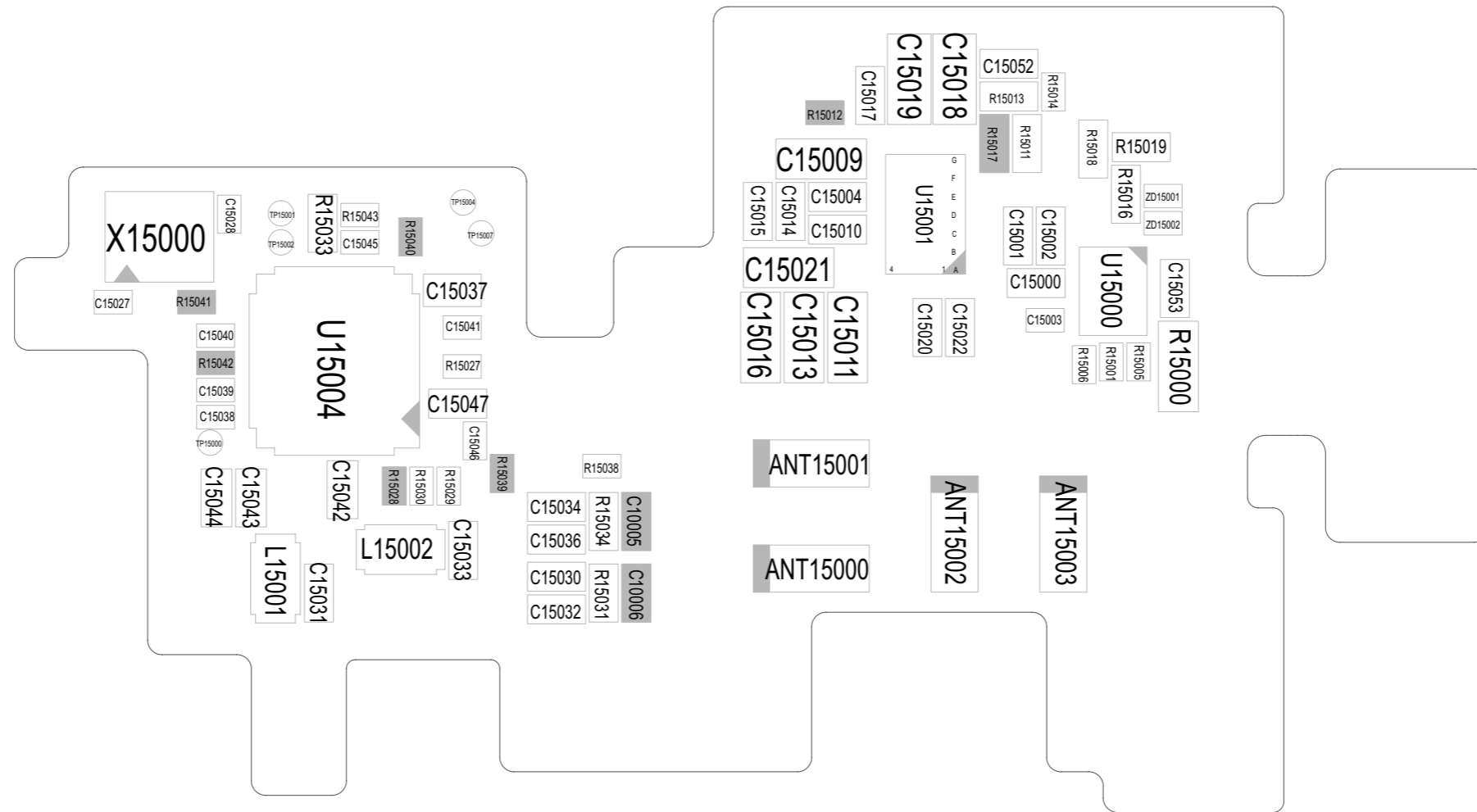
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LG-D821_F_LOWER_EAX65353201_1.0_TOP



LG-D821_1.0_TOP

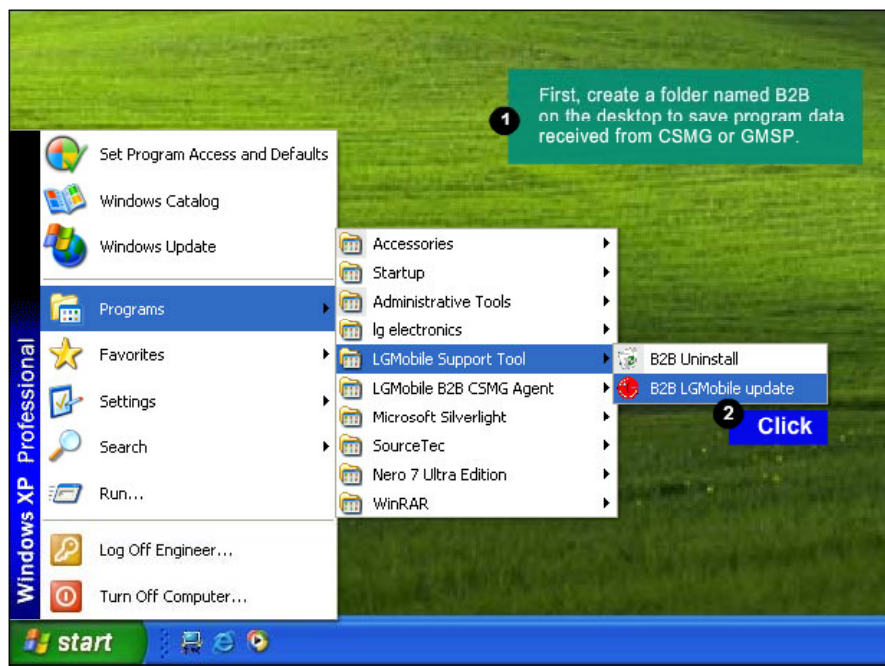


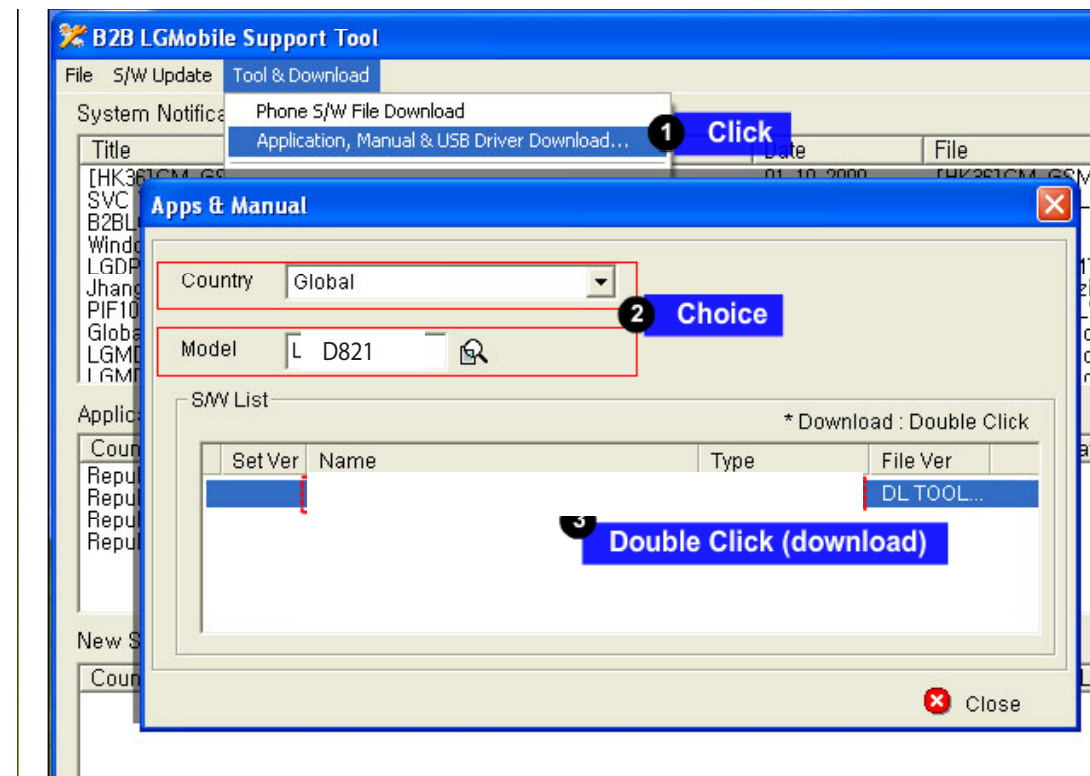
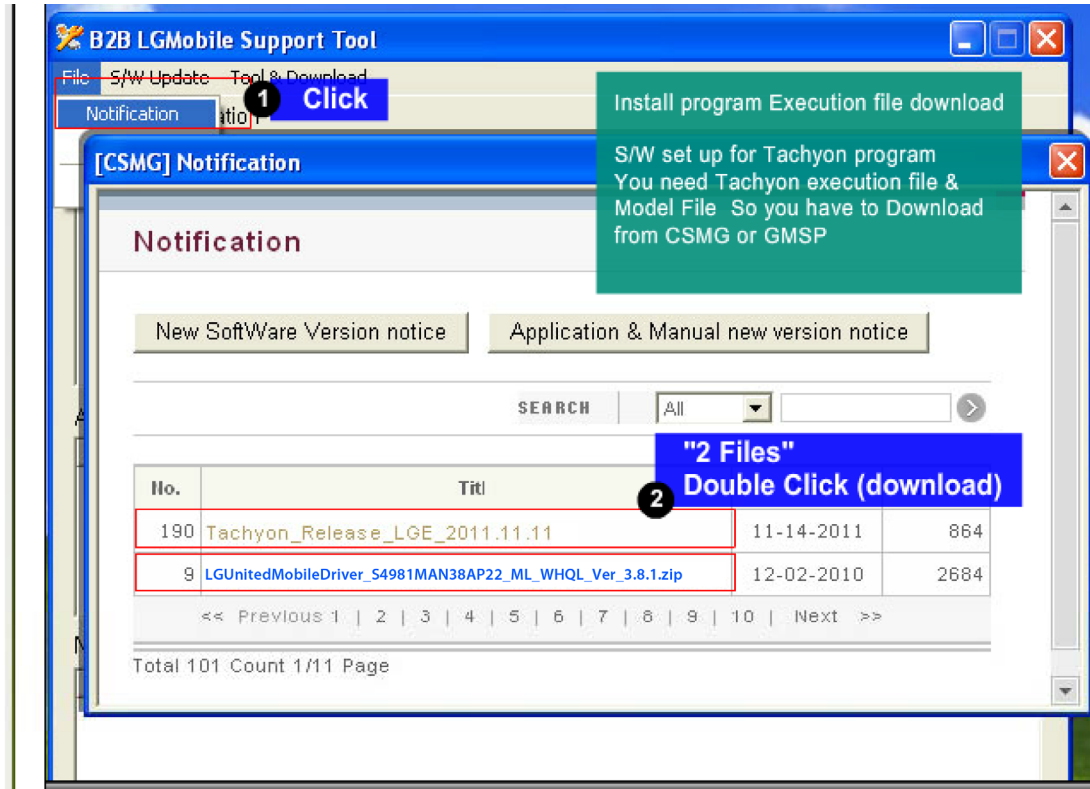
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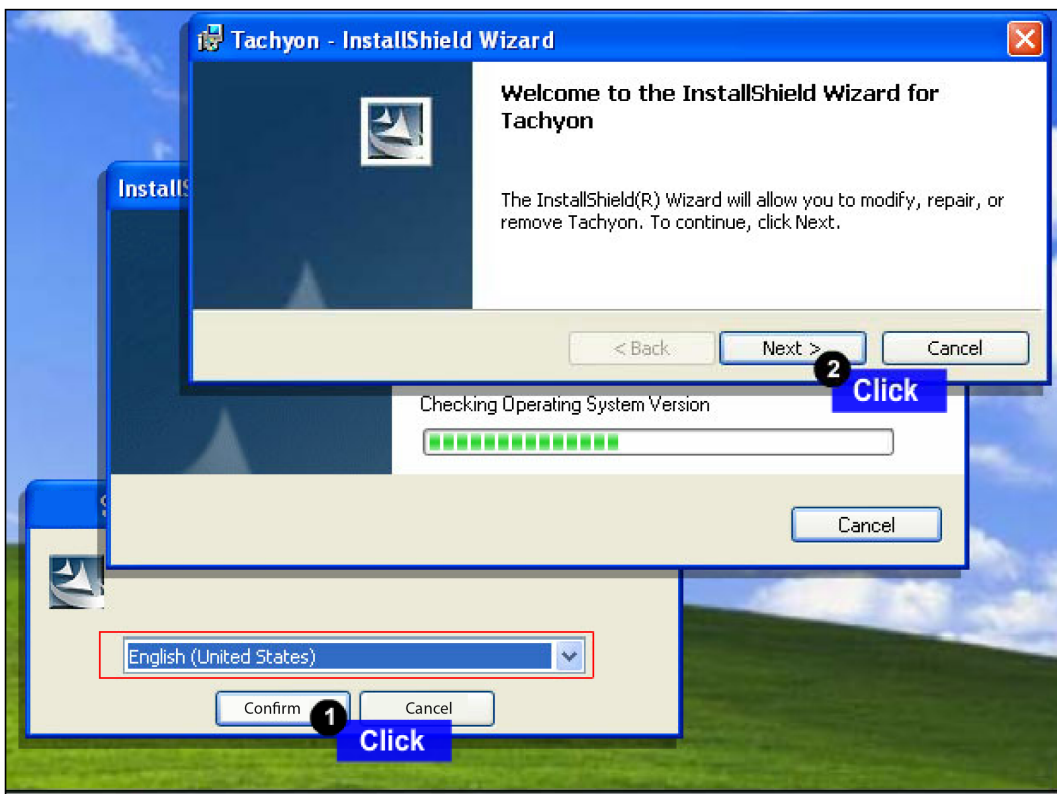
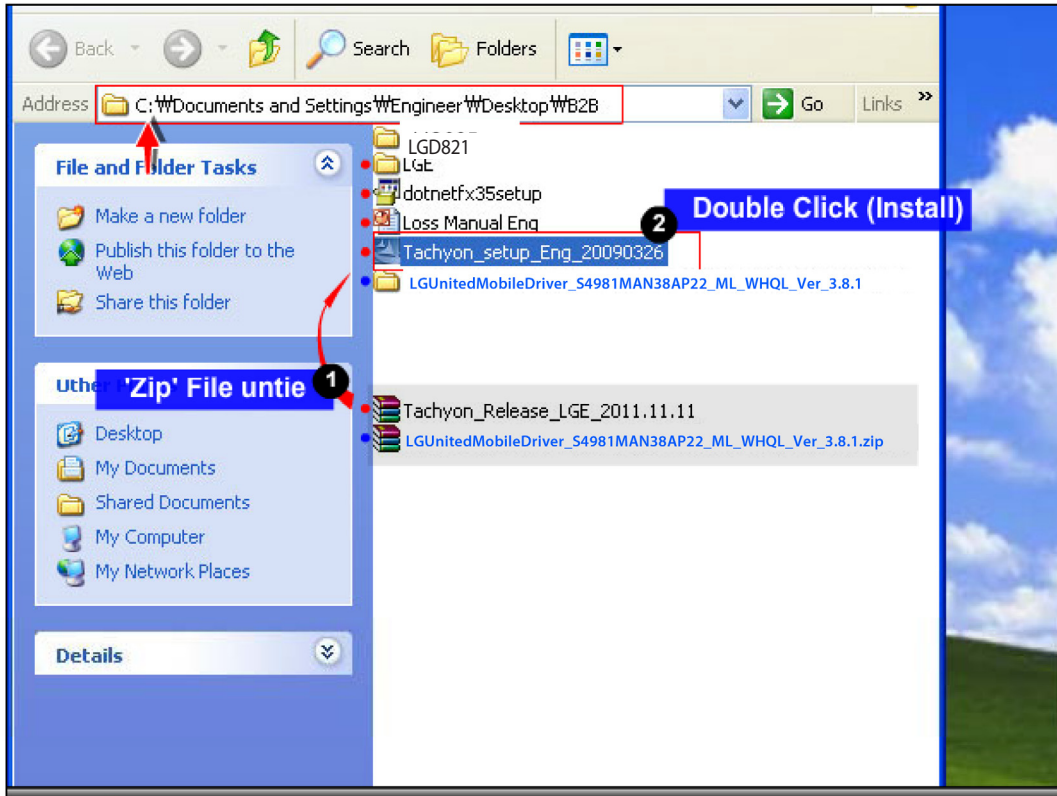
9. CALIBRATION

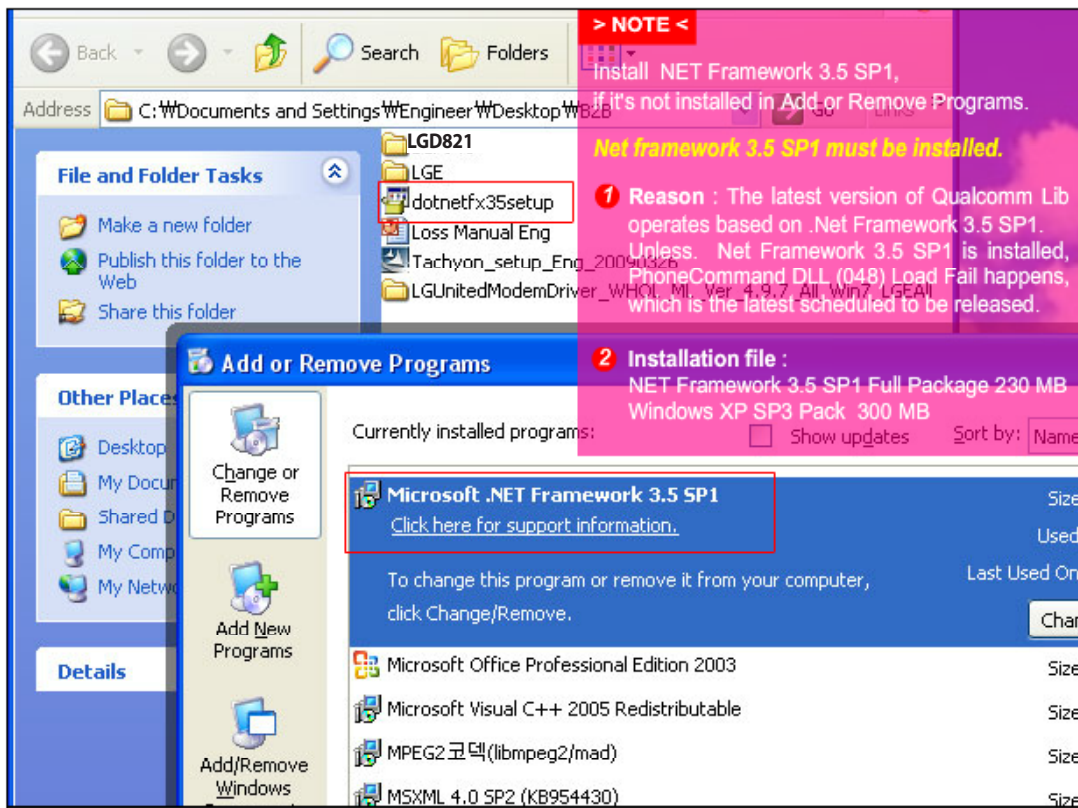
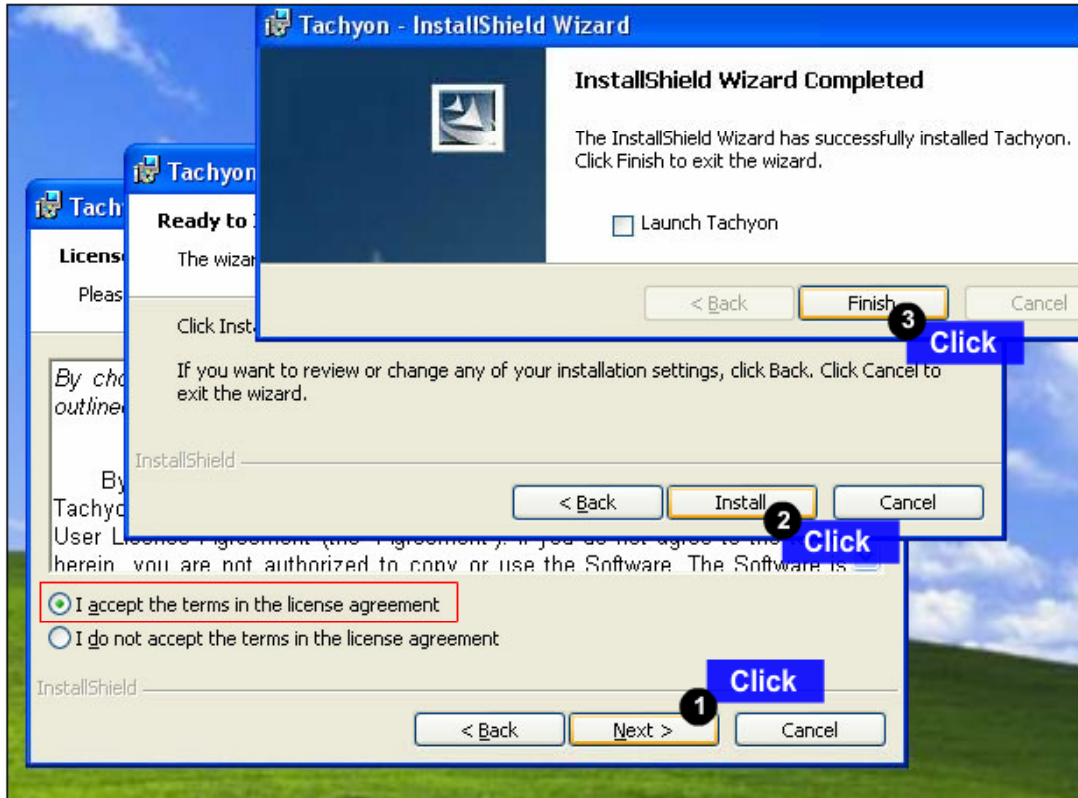
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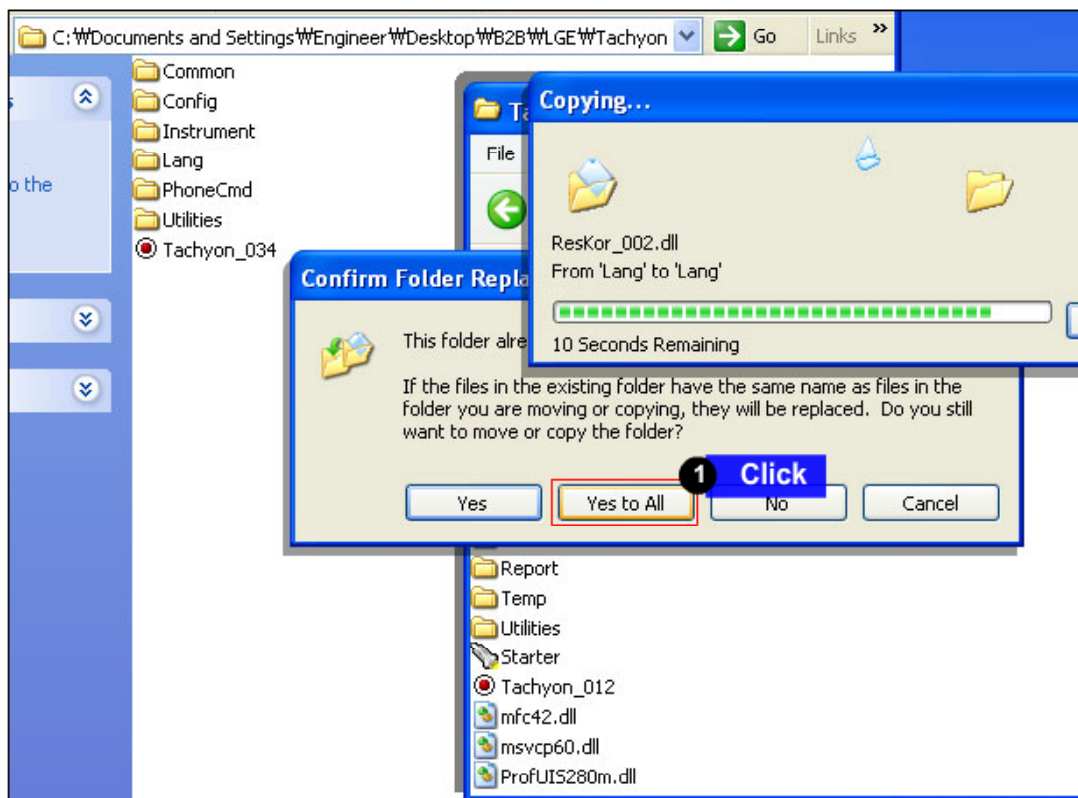
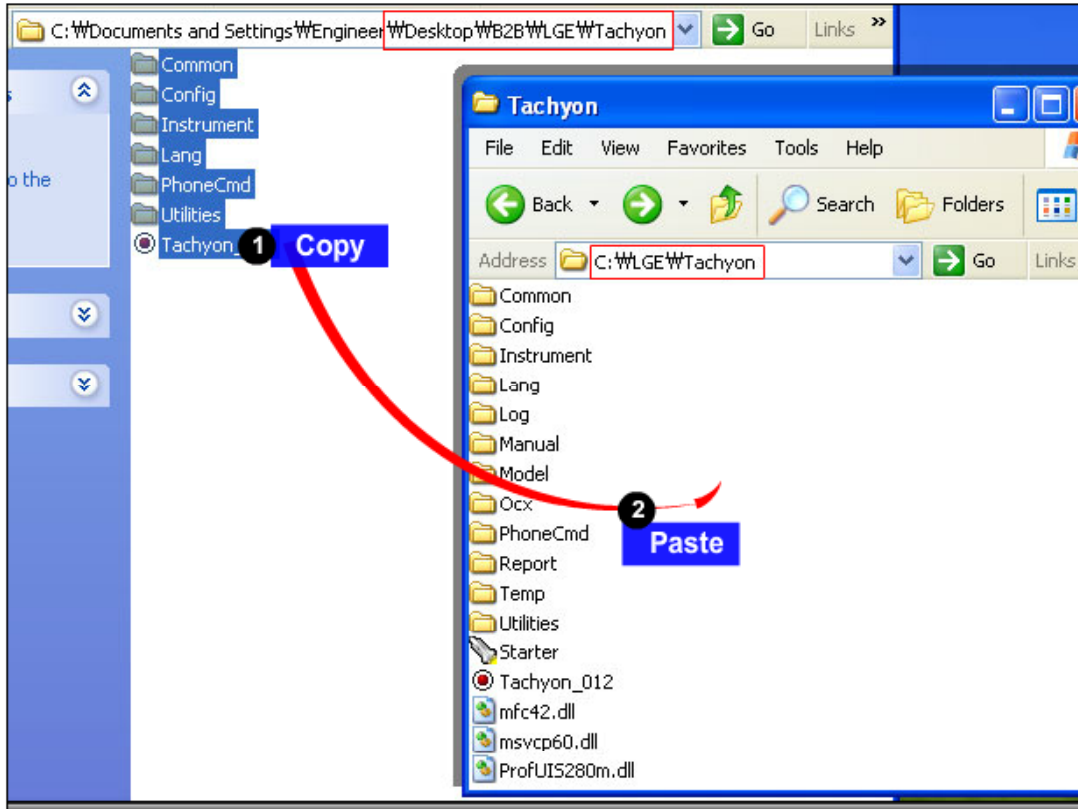
CAL INFORMATION		
S/W VERSION		
Please Check the Version to "B2B"		
H/W		
	Name	Part No.
PIF	PIF200(All Type)	BJAY0024021
USB Cable	USB Cable	RAD32247898
Power Cable	DC Power Cable	RAD32247878
I/O Cable		
RF Cable_Main		
Power Supply_PIF	Power Supply 5.3V	
Power Supply_Phone	Power Supply 5.0V	
RF Test Equipment	CMW500, RF800A	
NOTICE		
CMW500 RF Cable connection		



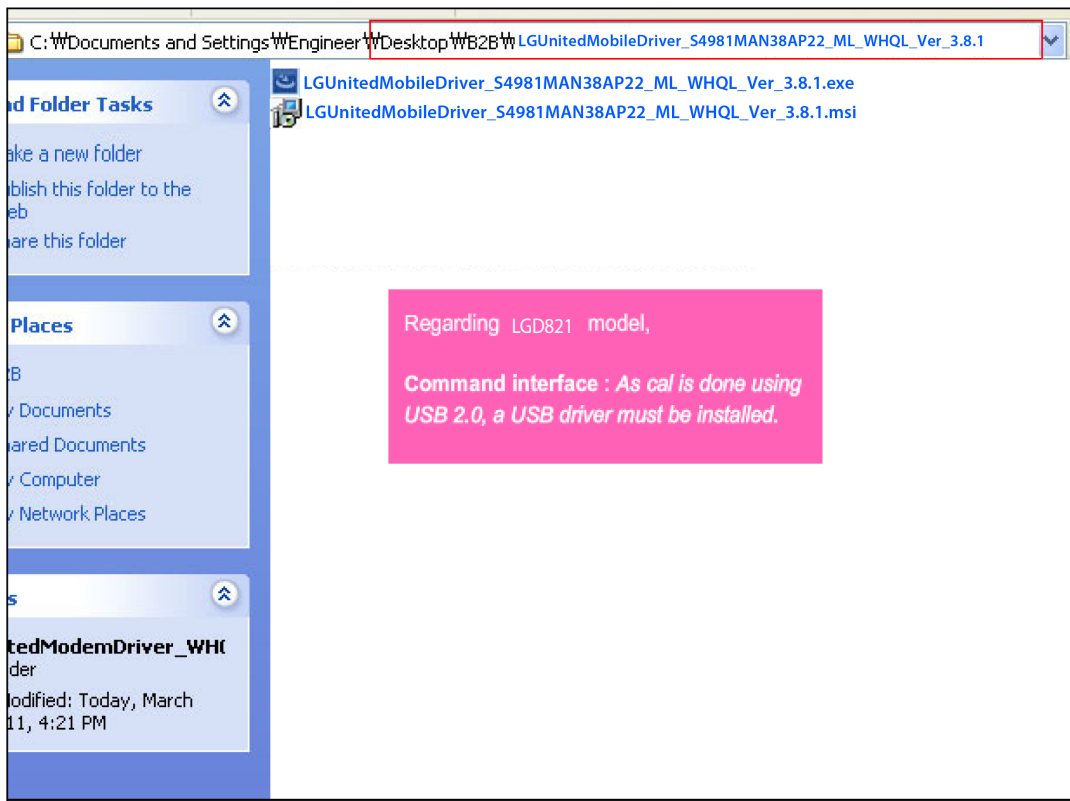
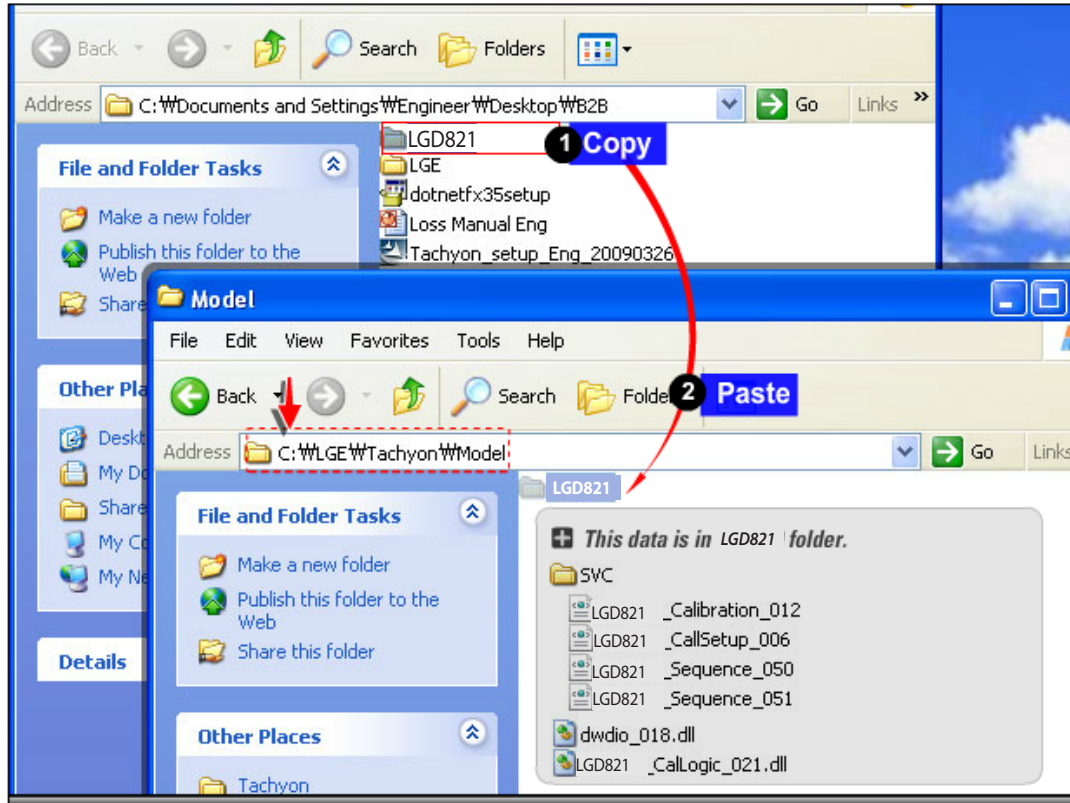




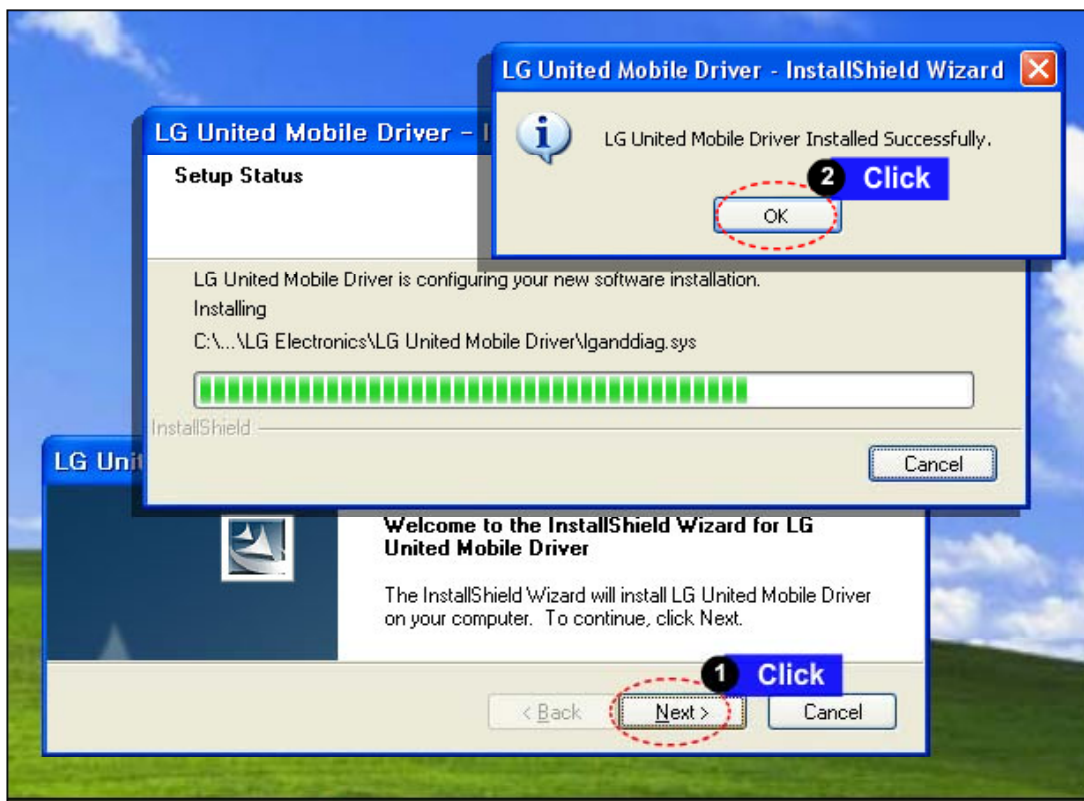
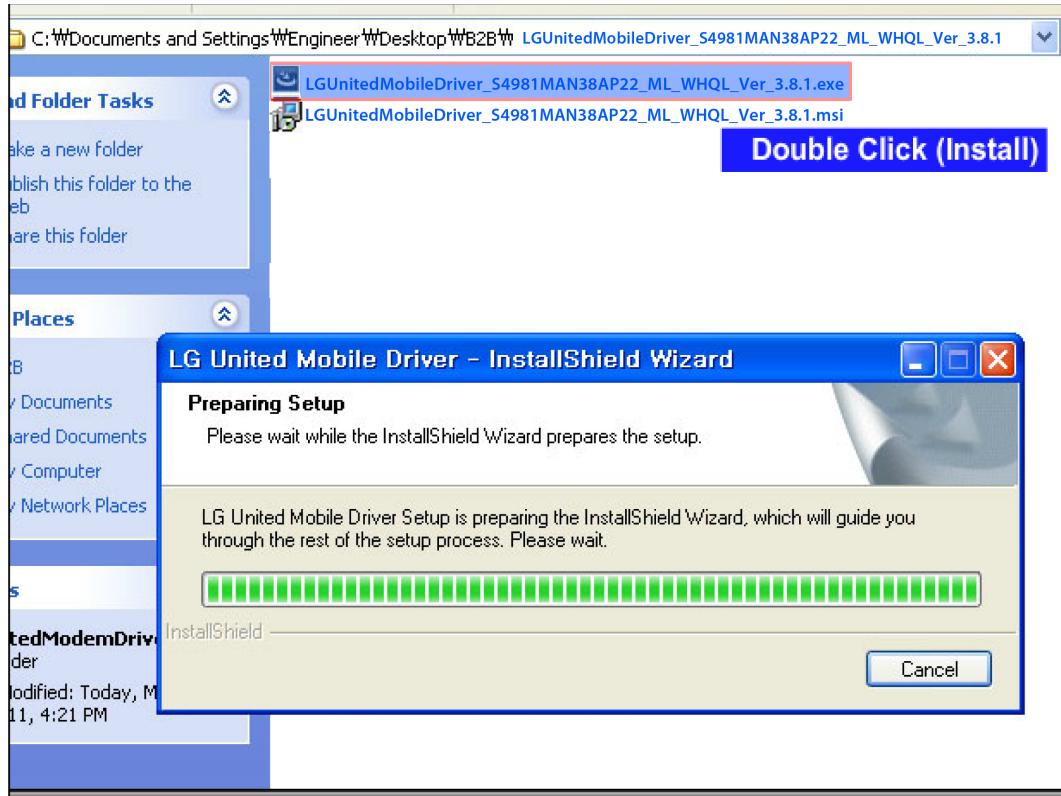




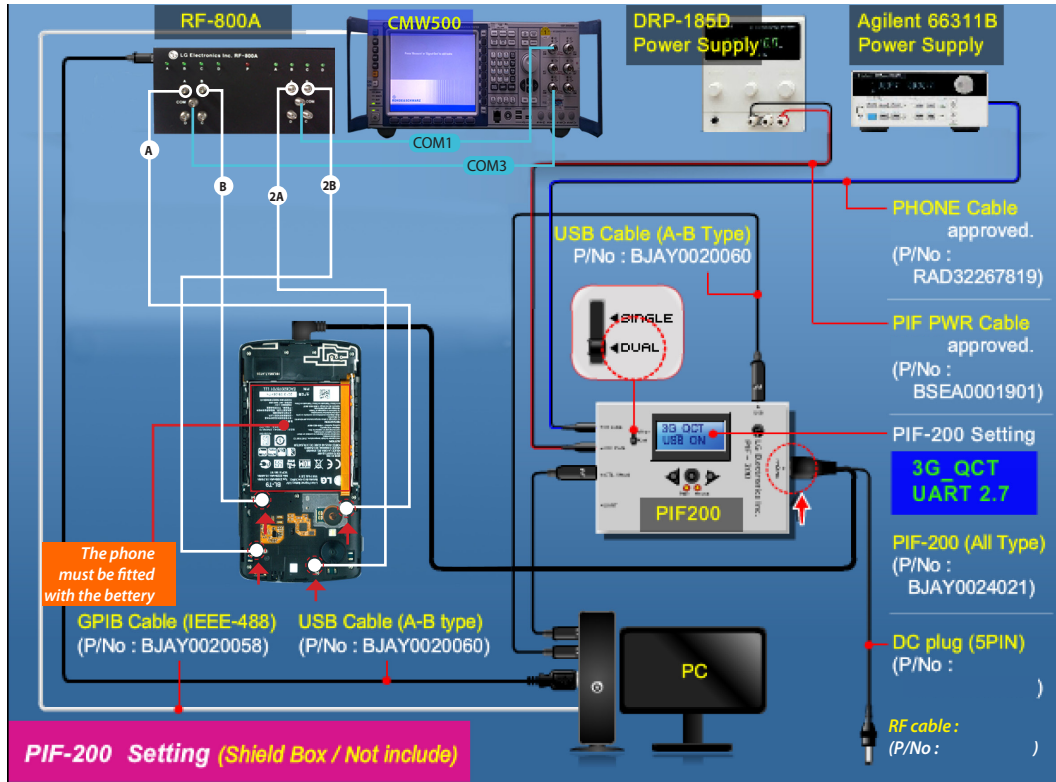
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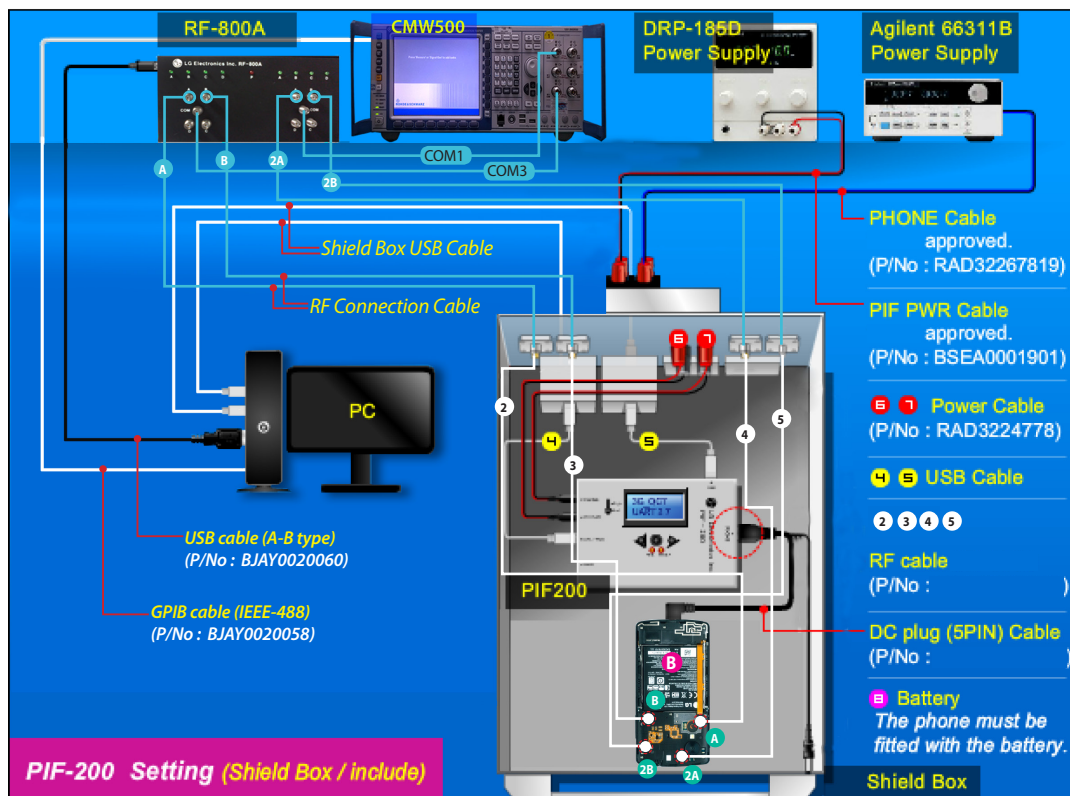
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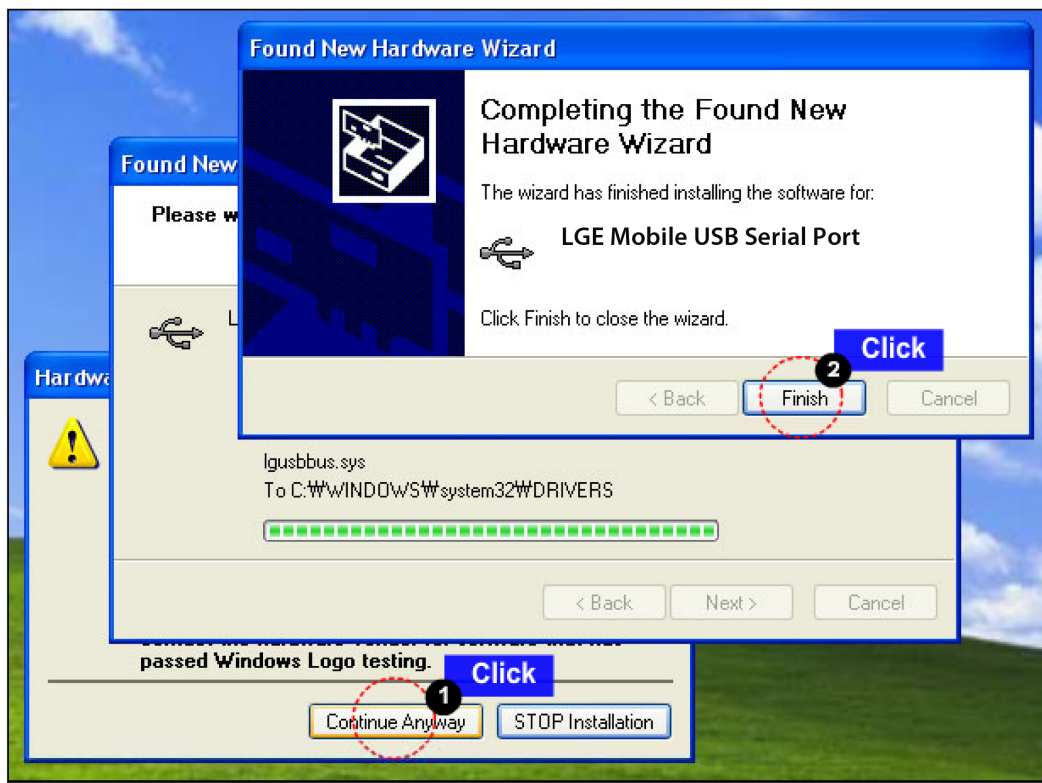
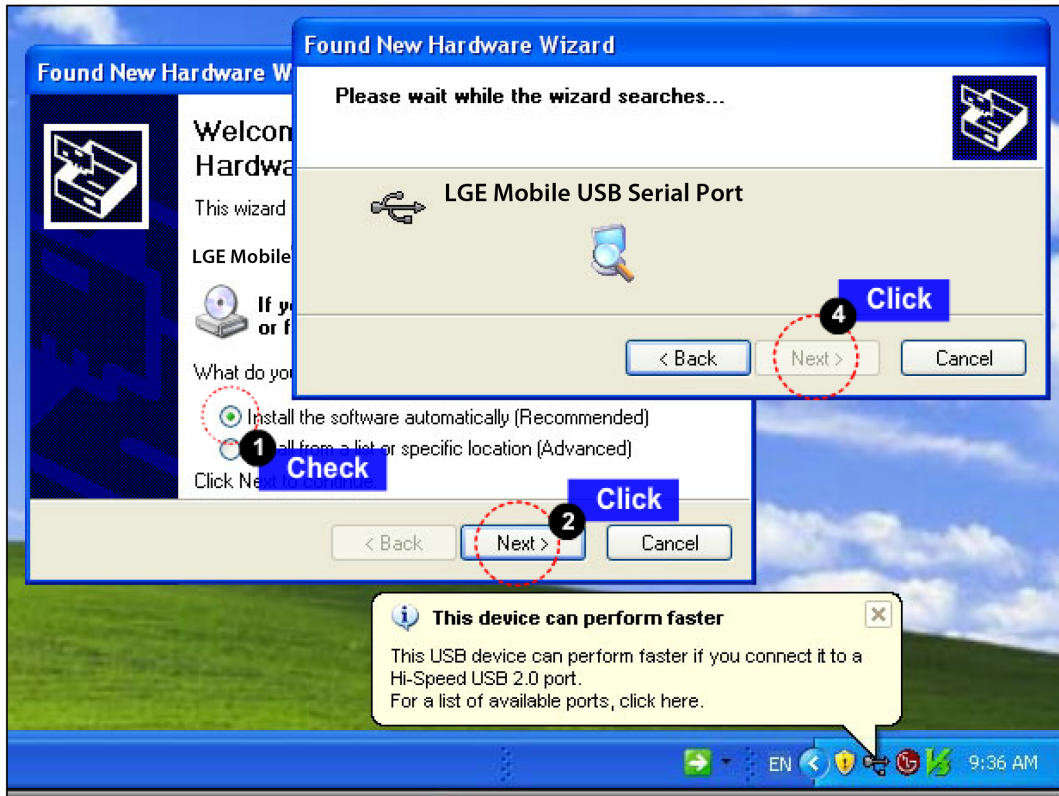


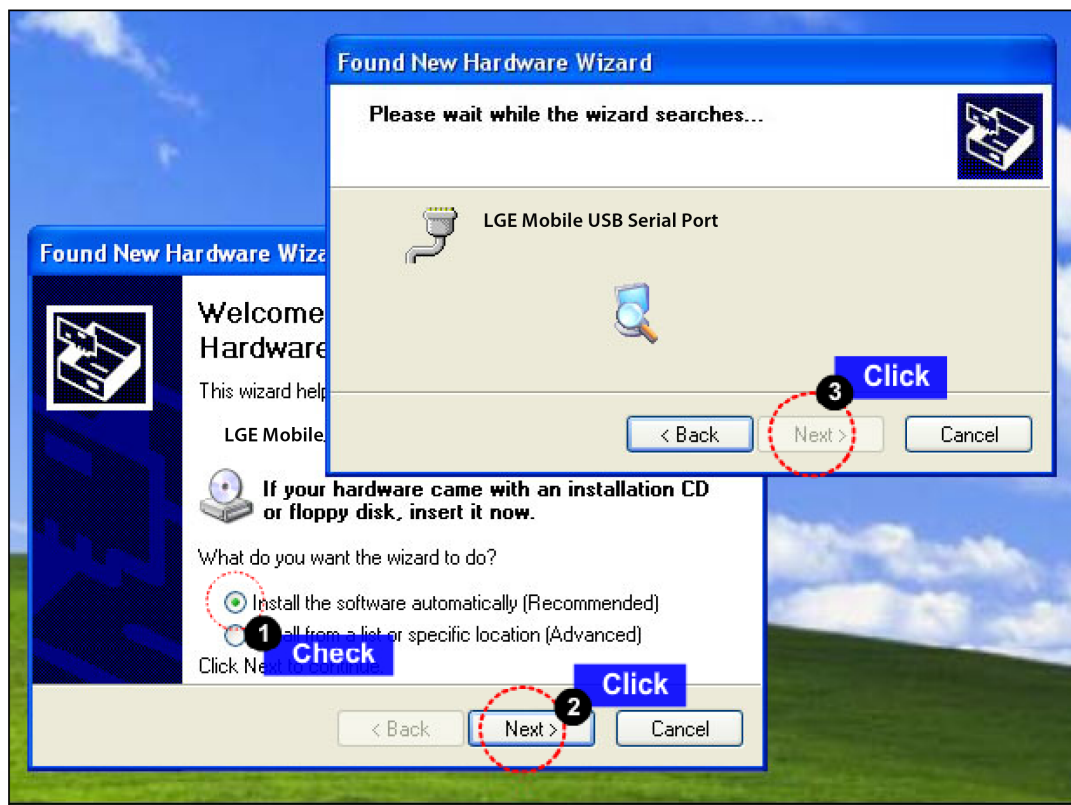
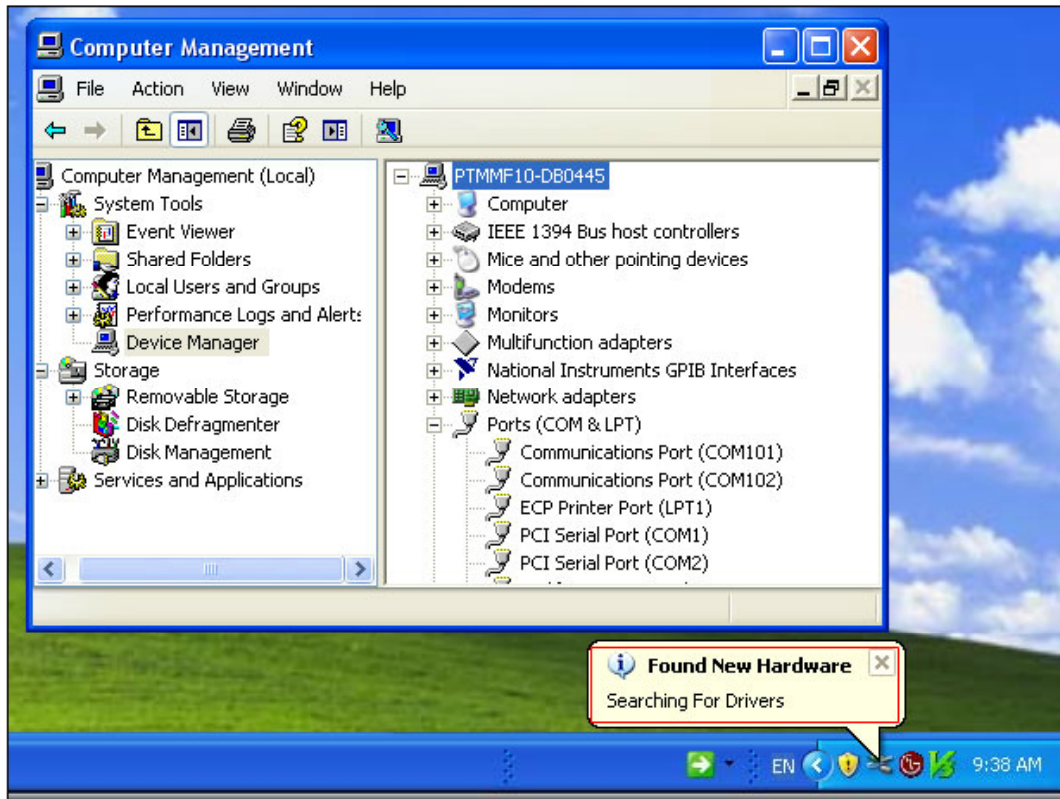
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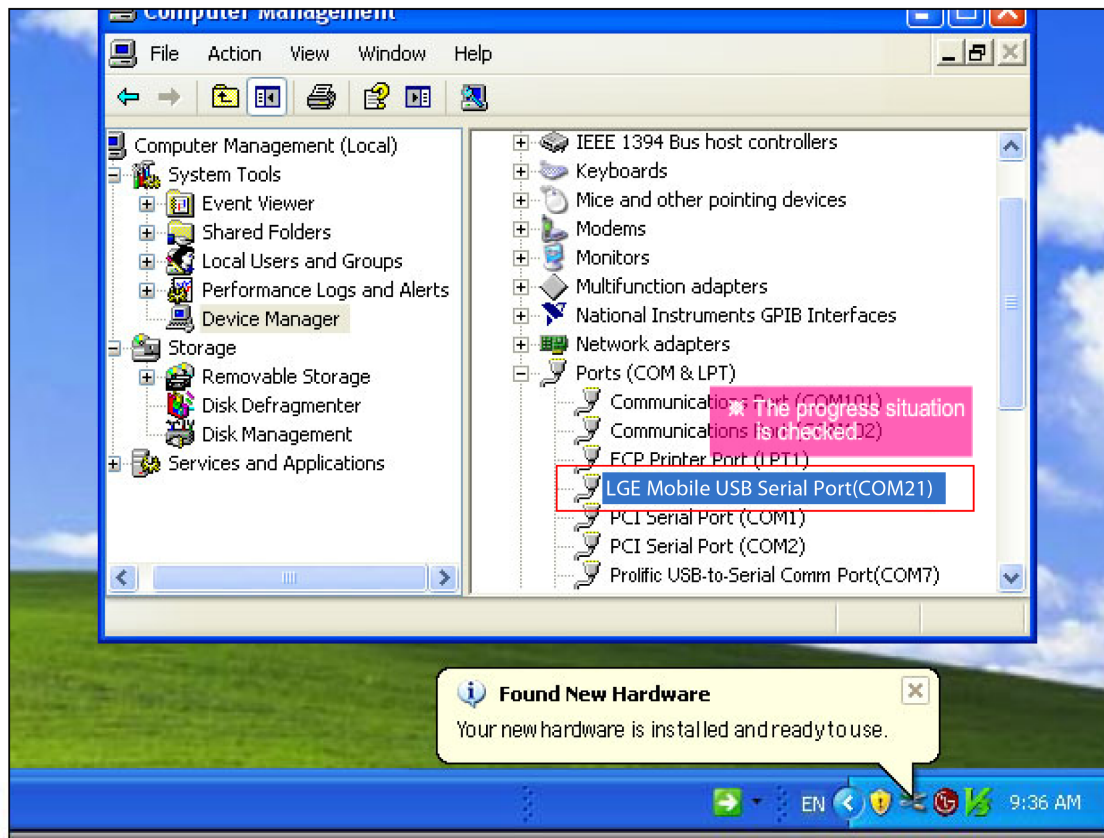
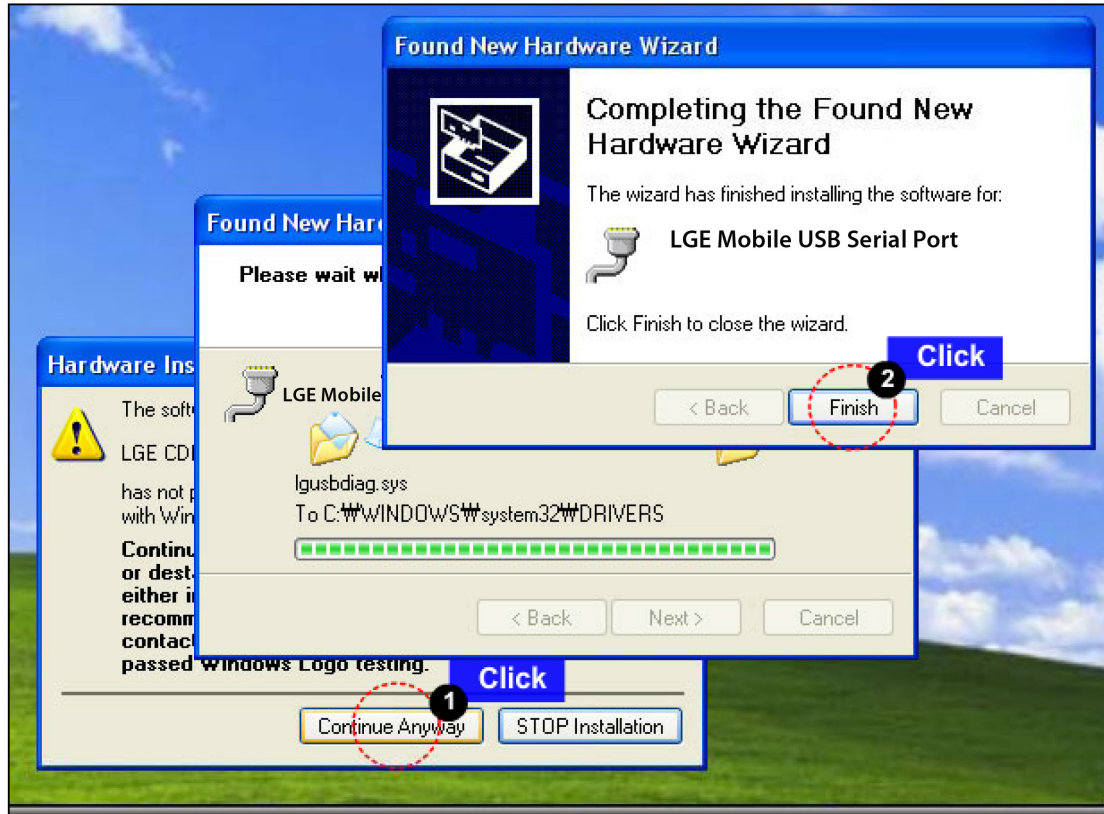


→ This is for example.
 You can check "C:\WLG\WTachyon\WModel\WD821\WSetting Guide" ←

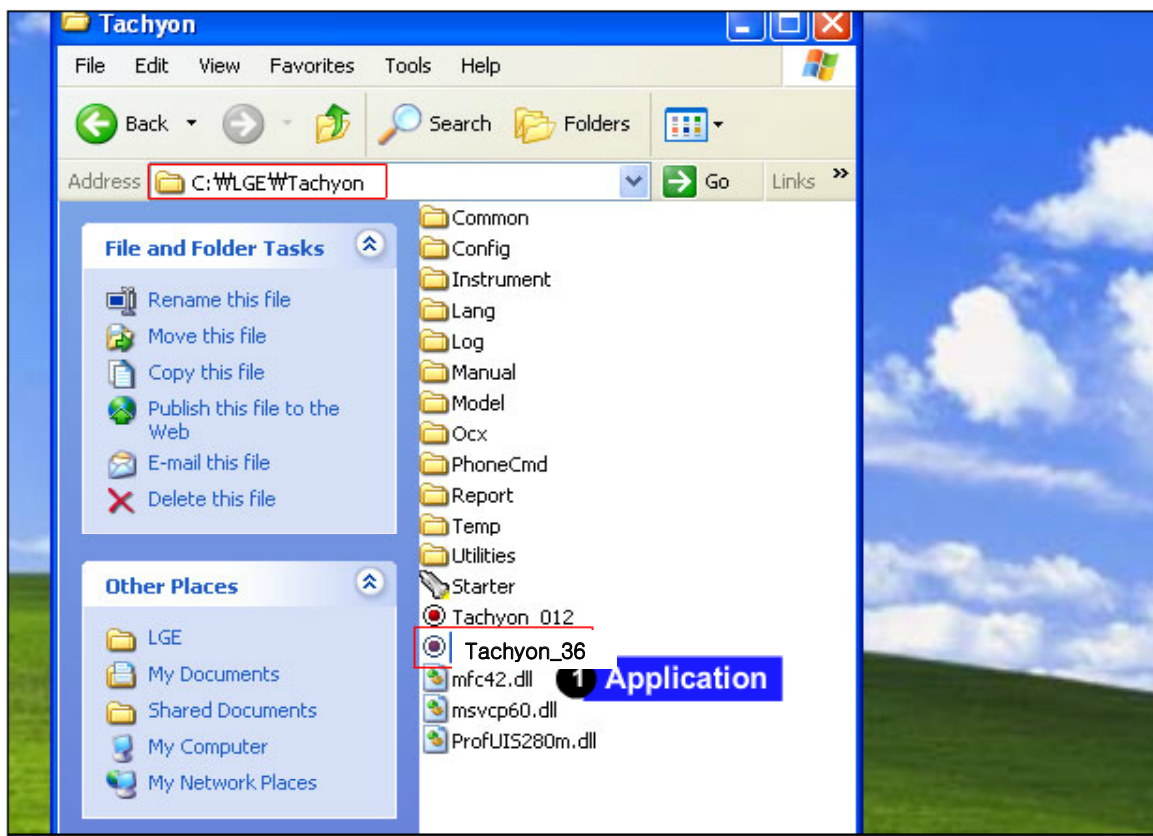
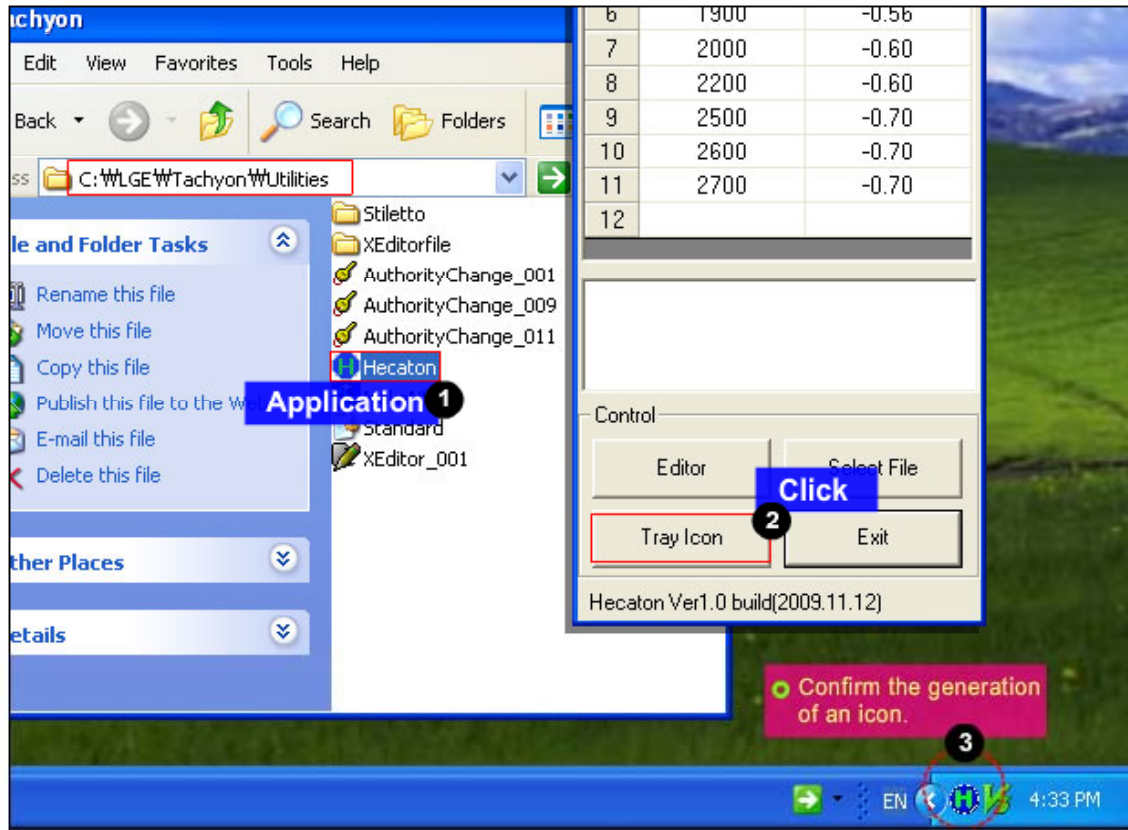




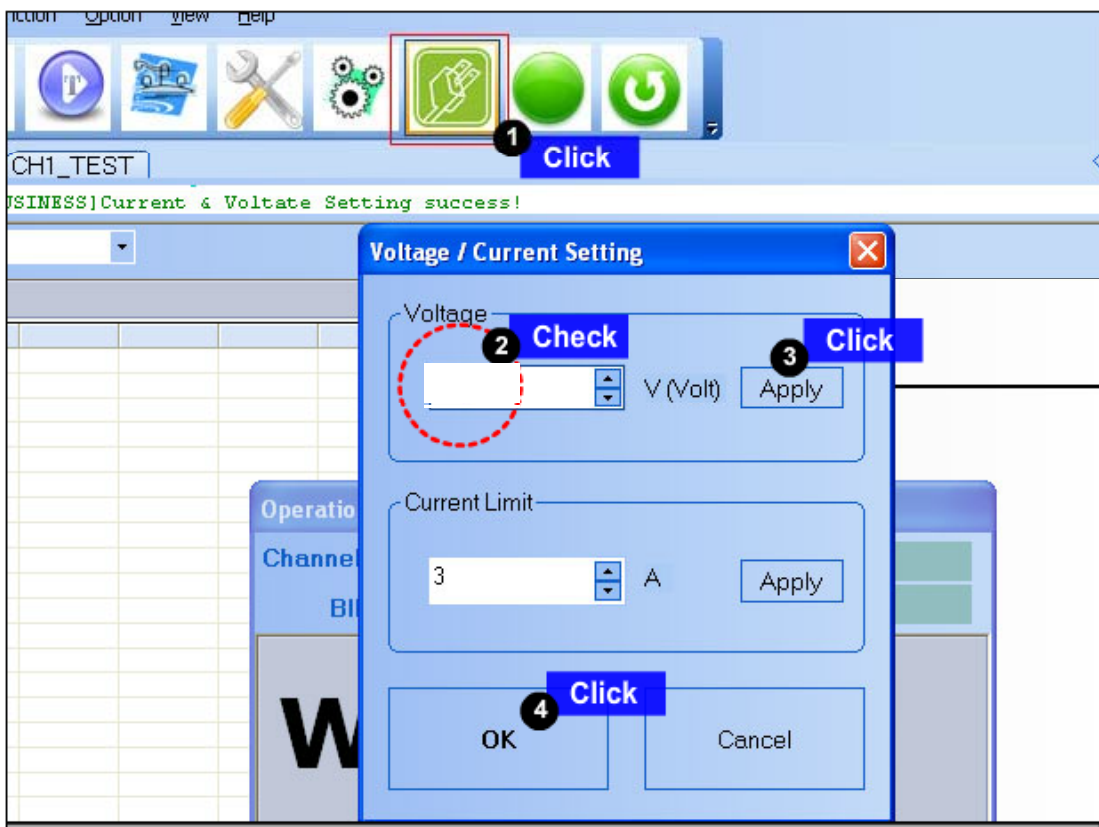
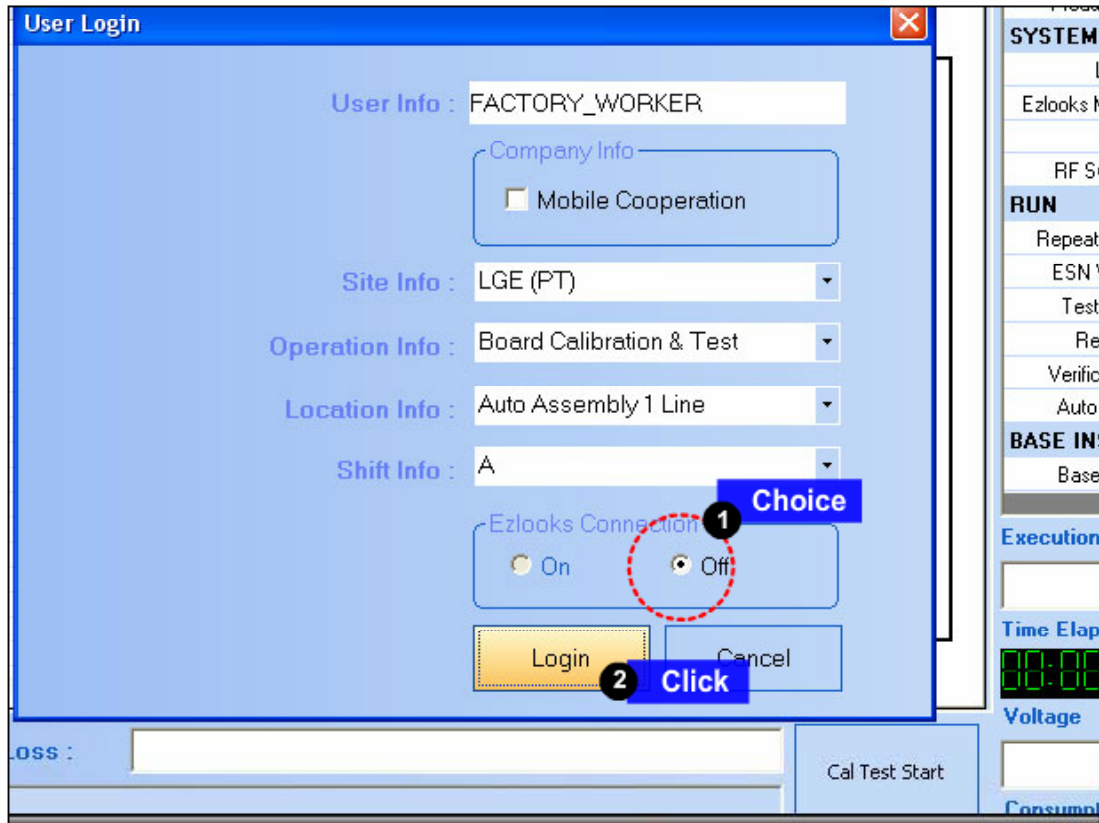


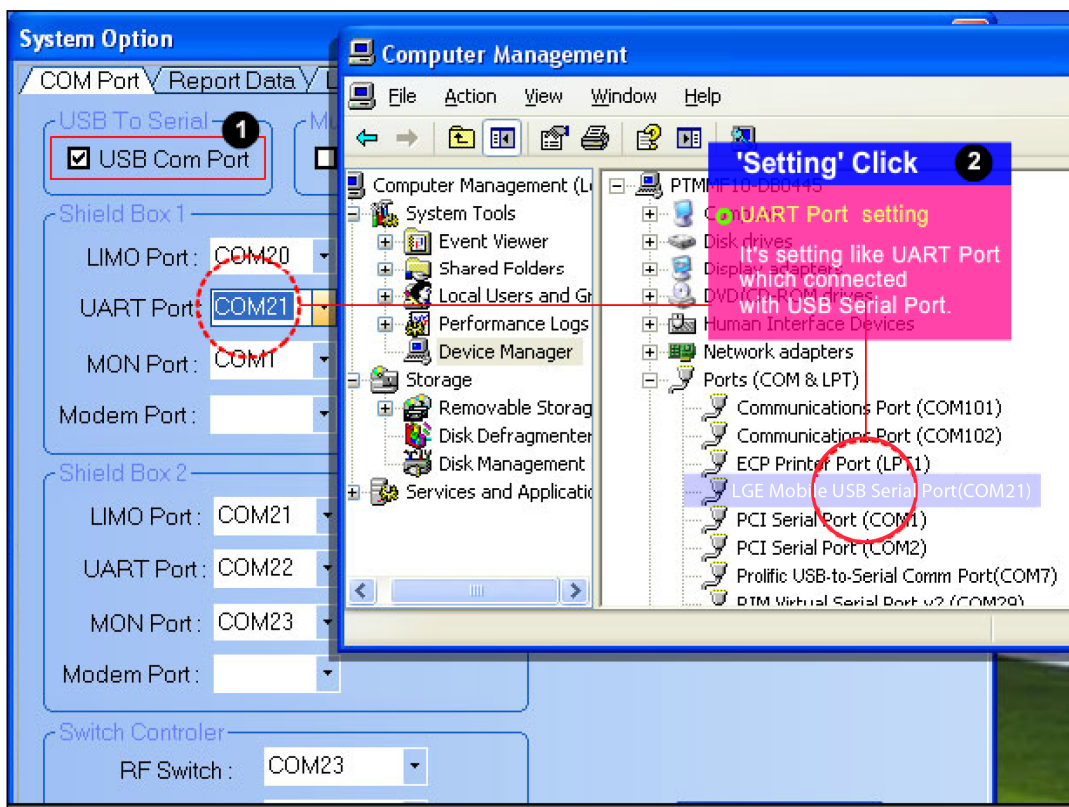
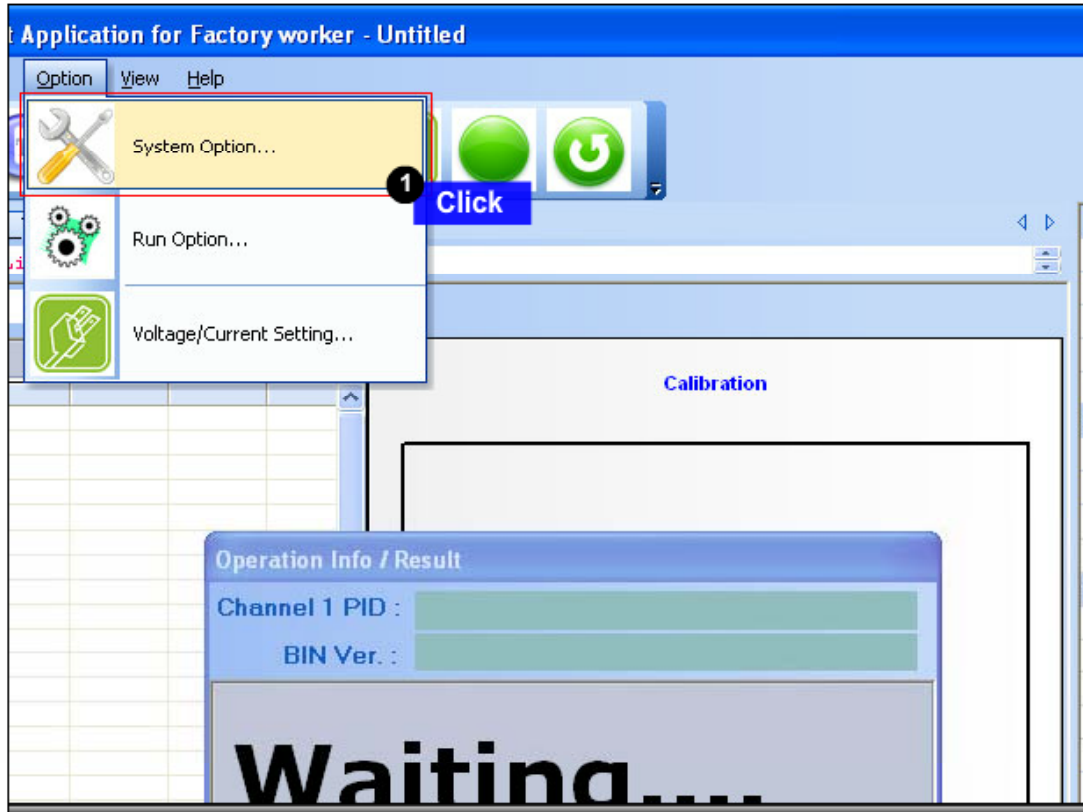


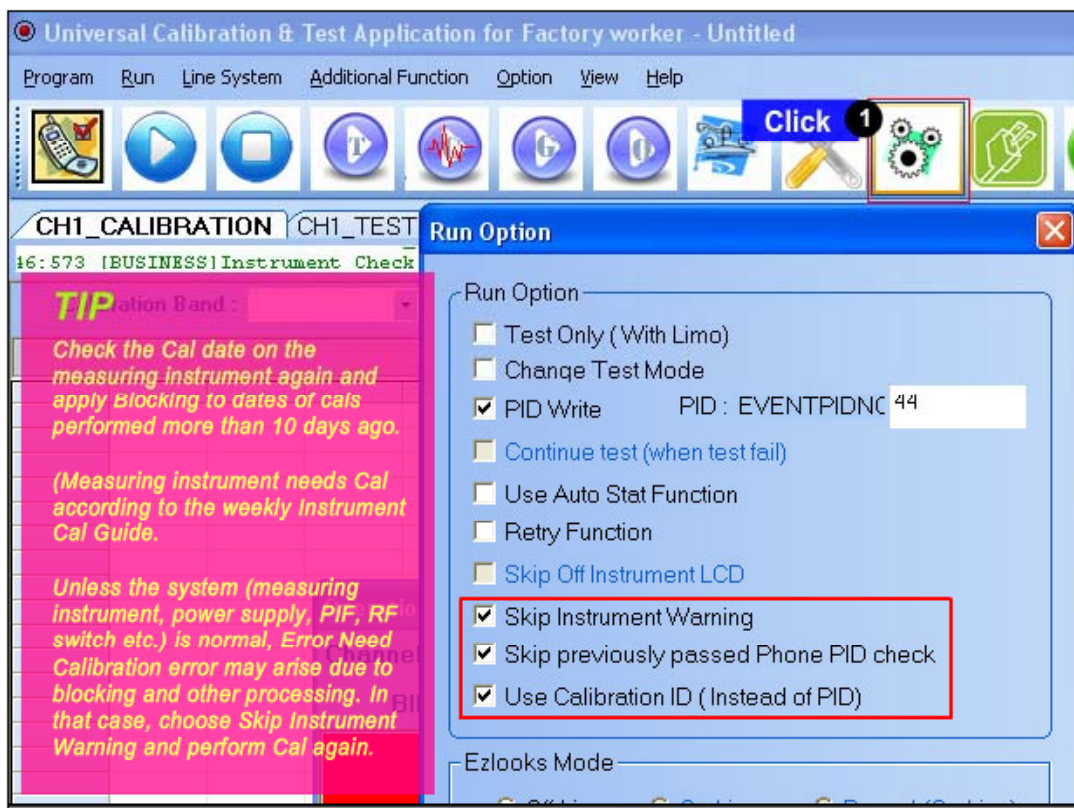
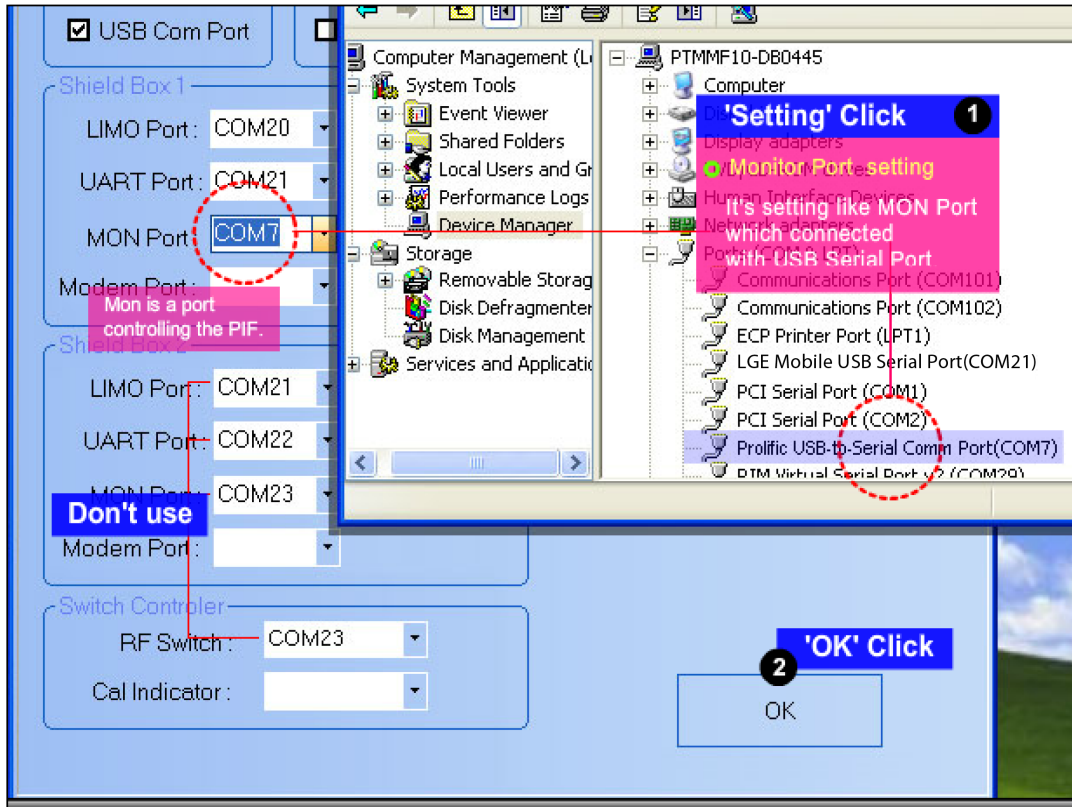
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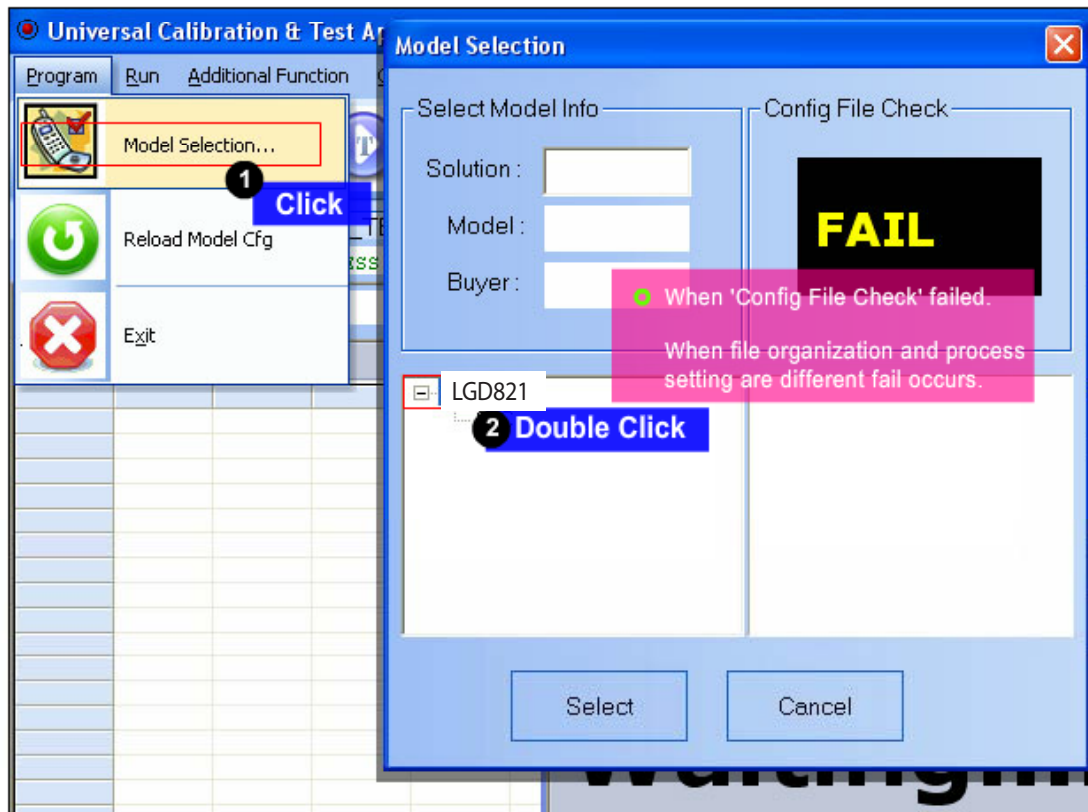
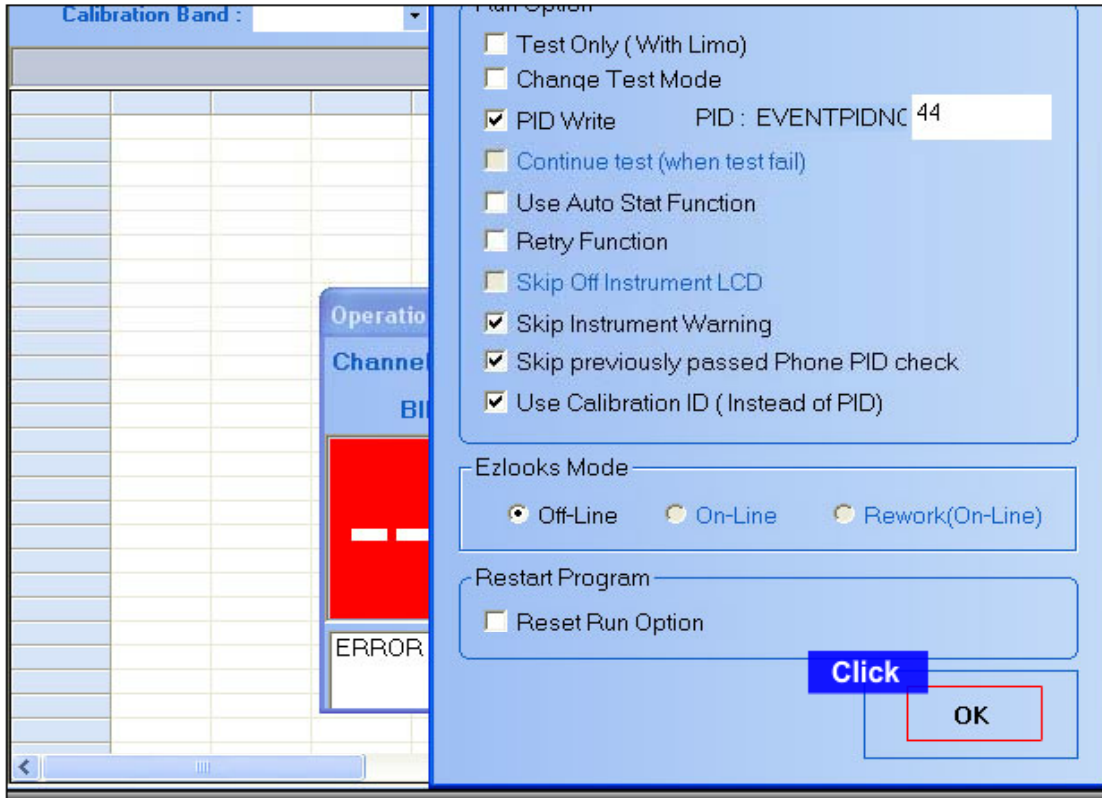
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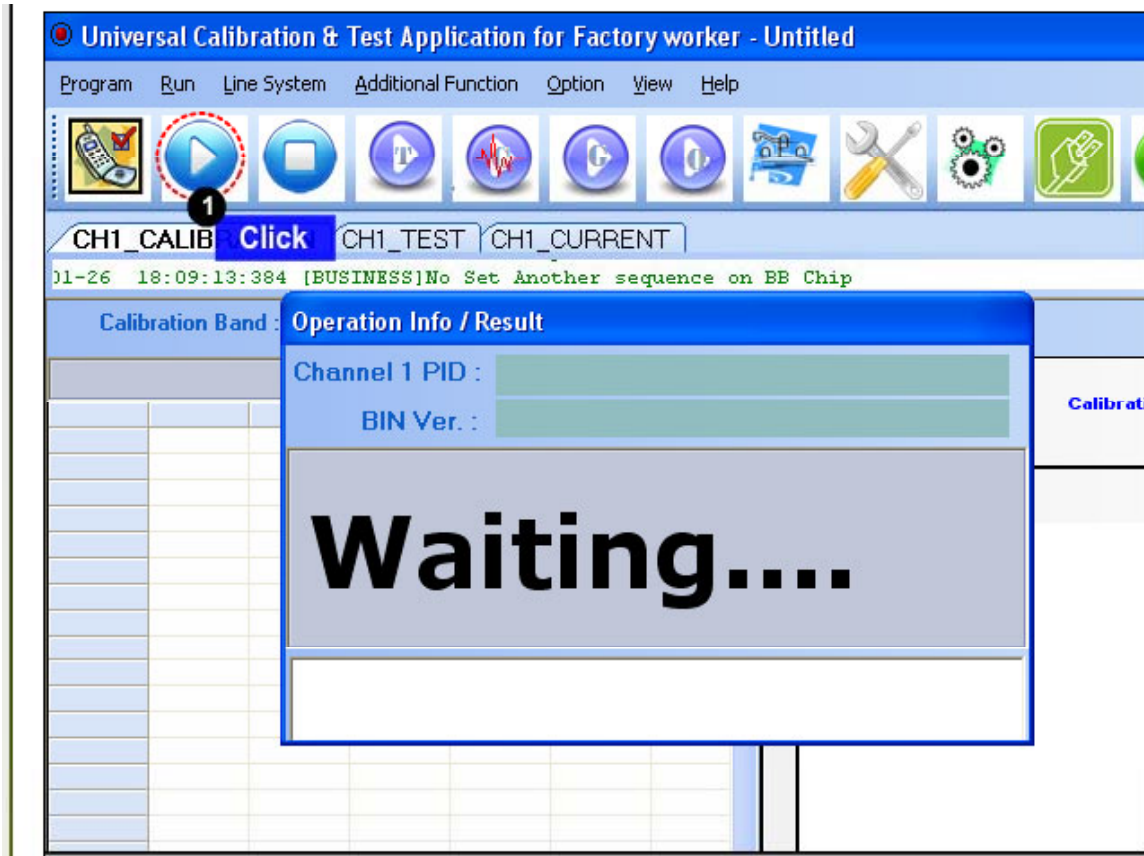
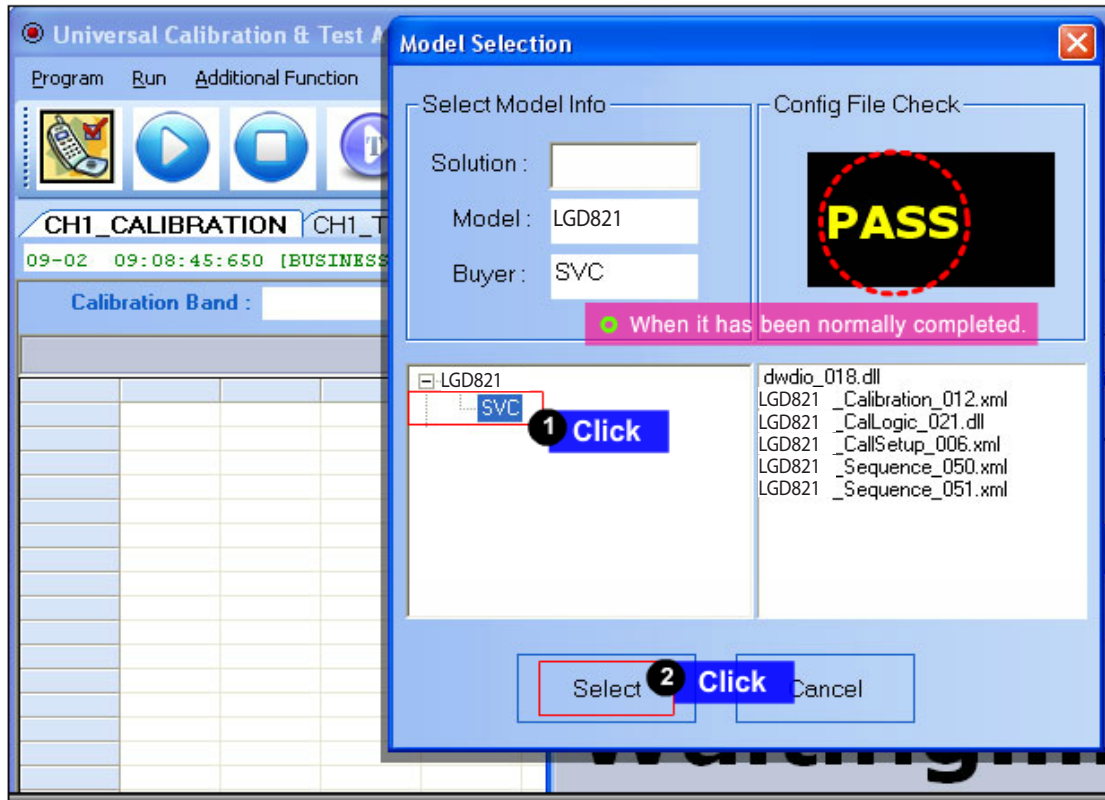


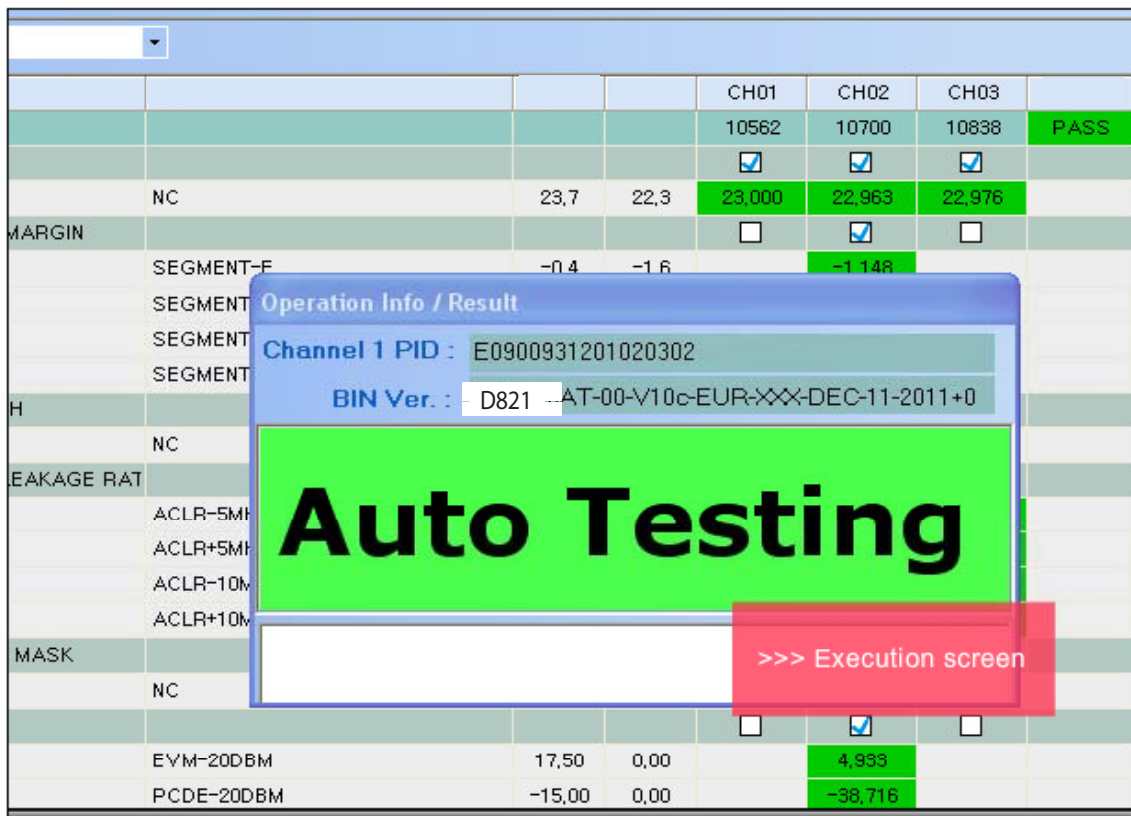
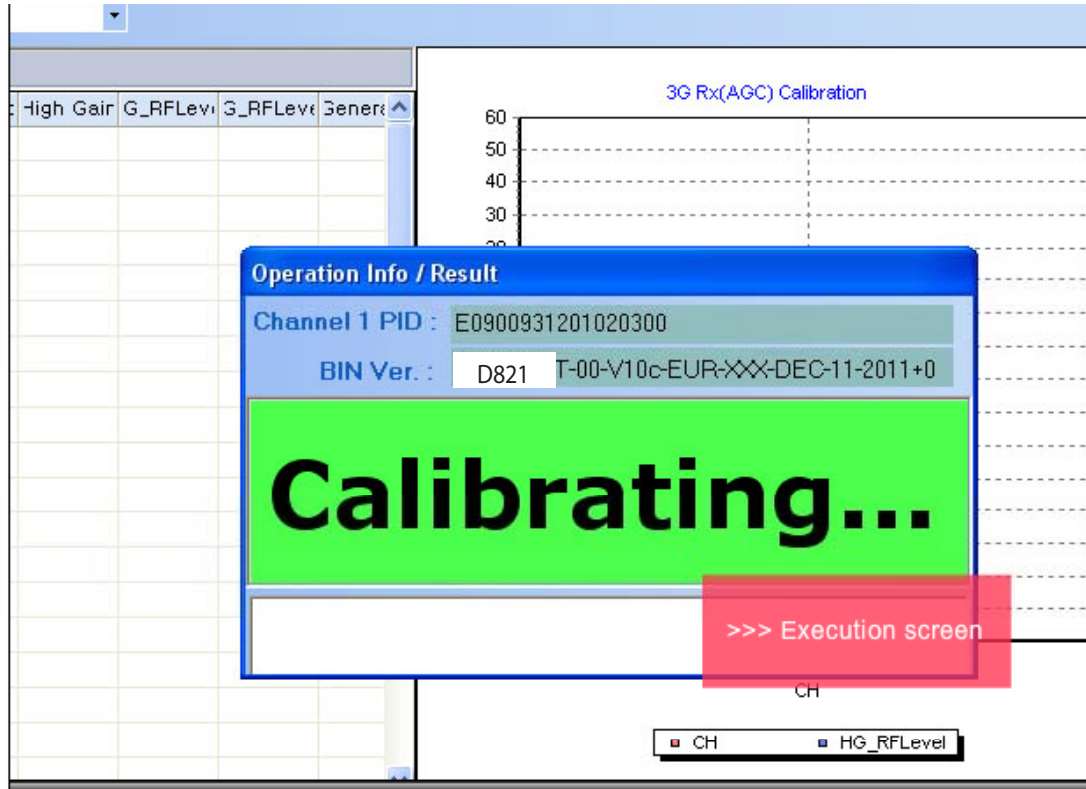




9. CALIBRATION







9. CALIBRATION

Condition	USL	LSL	CH01	CH02	CH03	P/F
			10562	10700	10838	PASS
			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
NC	23,7	22,3	23,065	22,983	23,013	
MARGIN			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
SEGMENT	<div style="border: 1px solid blue; padding: 5px;"> <p>Operation Info / Result</p> <p>Channel 1 PID : F0900931201020299</p> <p>BIN Ver. : D821 AT-00-V10c-EUR-XXX-DEC-11-2011+0</p> <div style="background-color: blue; color: white; text-align: center; padding: 10px; font-size: 2em; font-weight: bold;"> --- PASS --- </div> </div>					
NC						
LEAKAGE RAT						
ACLR-5M						
ACLR+5M						
ACLR-10M						
ACLR+10M						
IN MASK						
NC	0,5	-0,5				
						'PASS' The End
EVM-20DBM	17,50	0,00		4,720		
PCDE-20DBM	-15,00	0,00		-38,441		
System Loss : MySystem(MS) .gms · RF900 6C.grf						

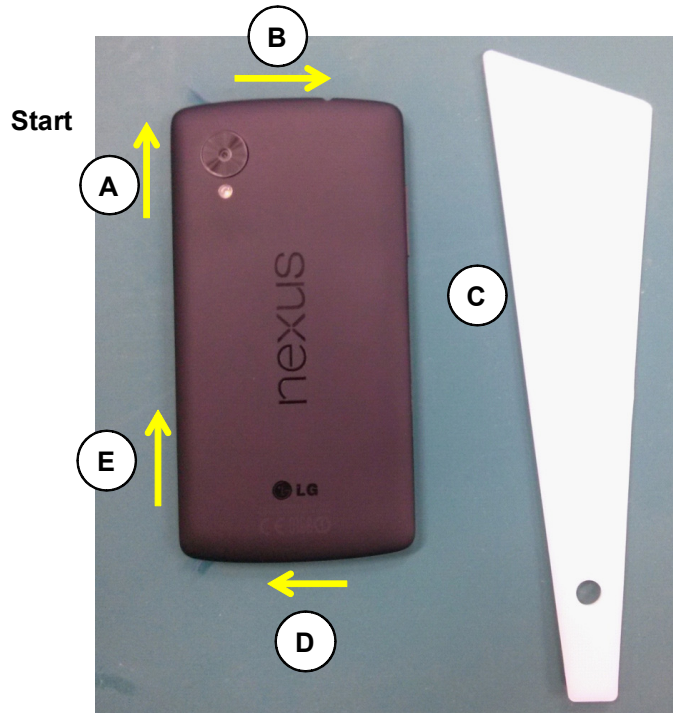
10. DISASSEMBLE GUIDE

1. Disassemble SIM tray

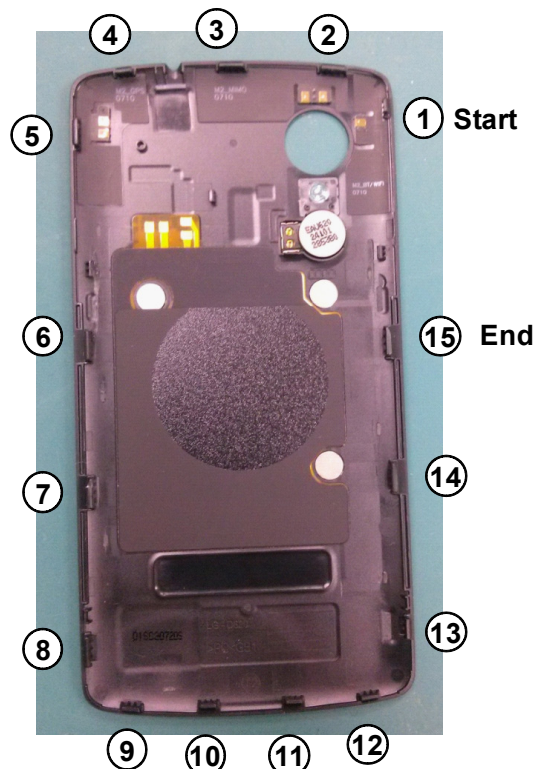


Remove SIM tray (by opener)

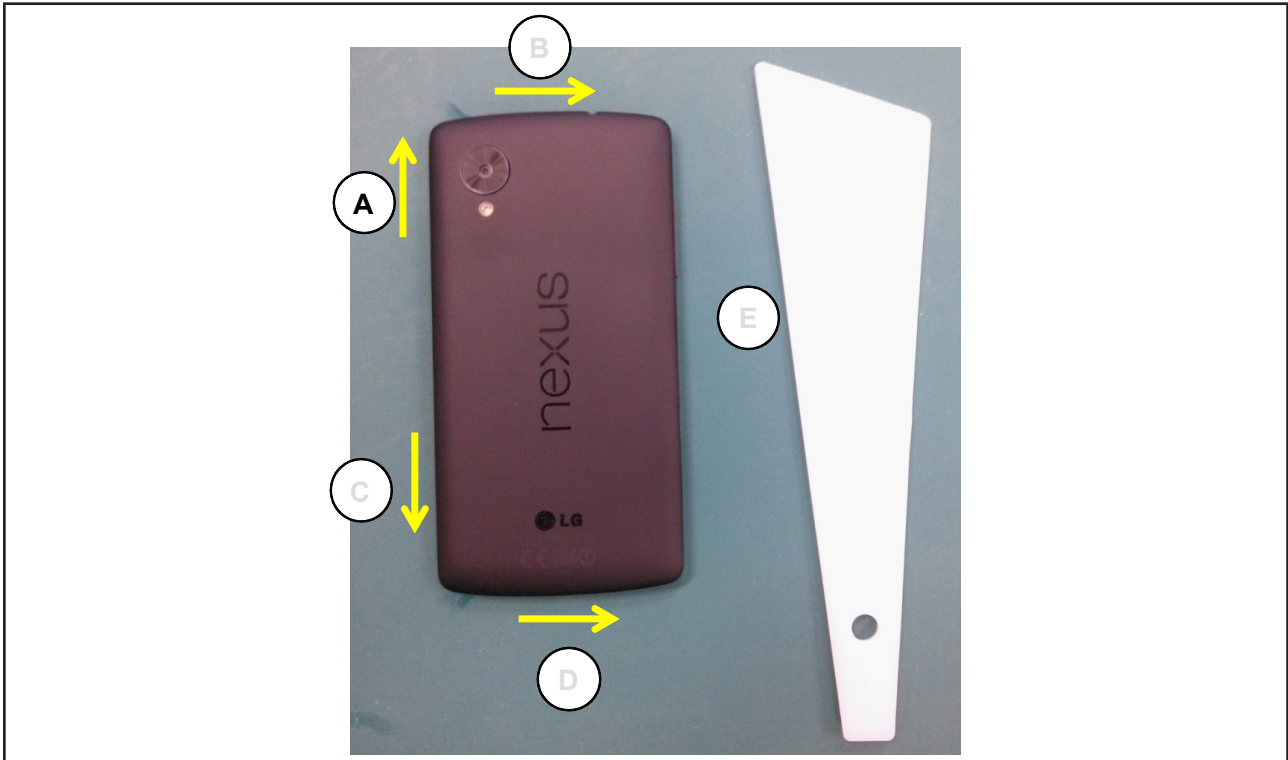
2. Disassemble Battery Cover



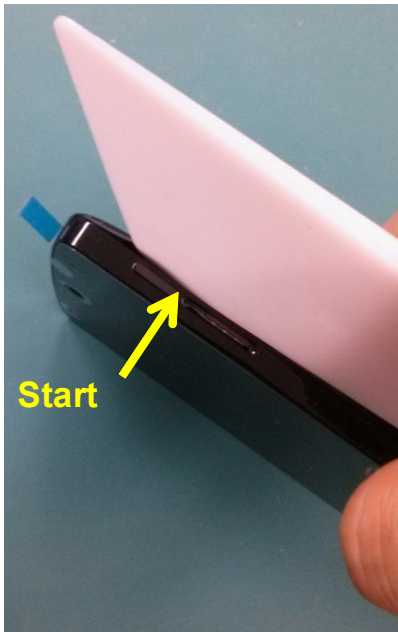
A -> B -> C -> D -> E (Hook 1 -> 2 -> 3 -> 4 -> 5 -> 6 -> 7 -> 8 -> 9 -> 10 -> 11 -> 12 -> 13 -> 14 -> 15)



10. DISASSEMBLE GUIDE

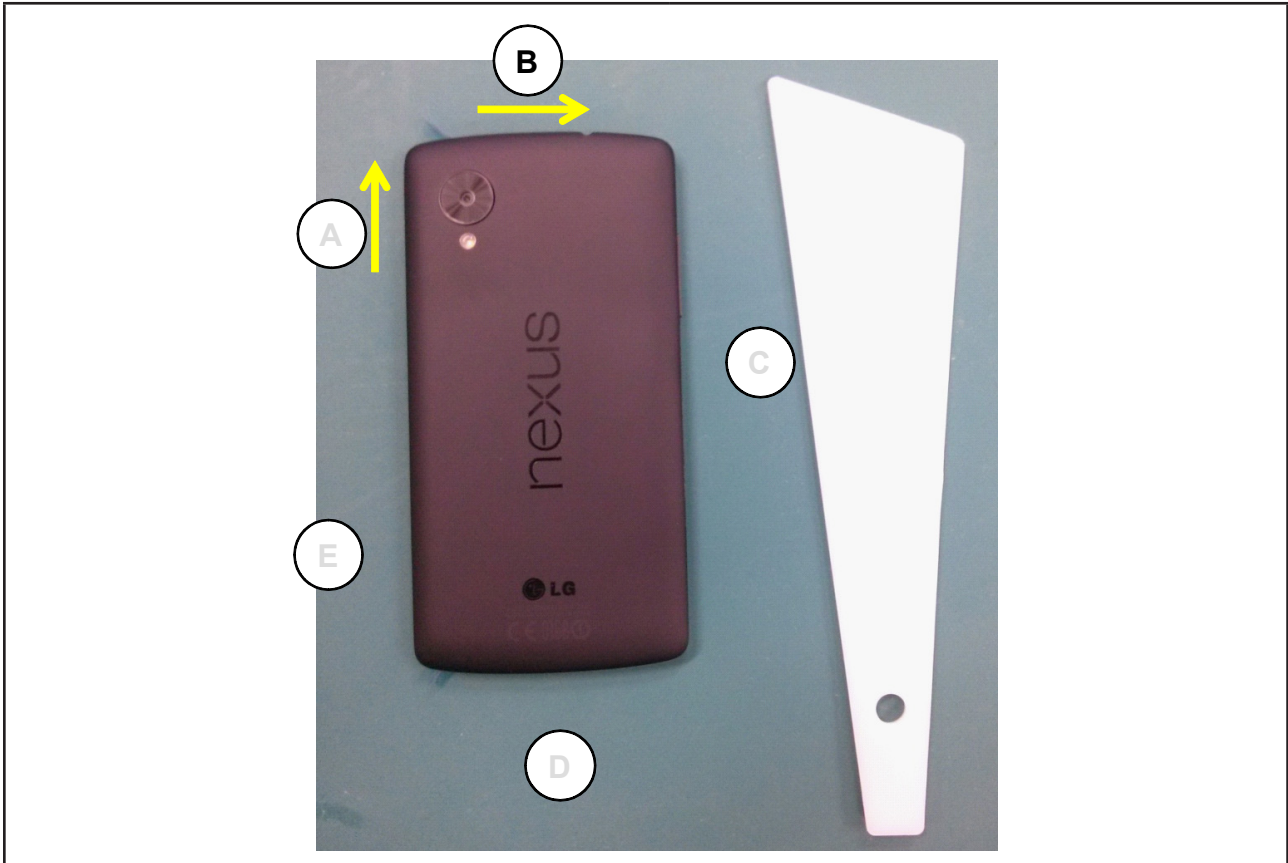


A->B->C->D->E



After remove SIM Tray, between power button and middle of SIM tray hole insert spatula and disassemble hook.

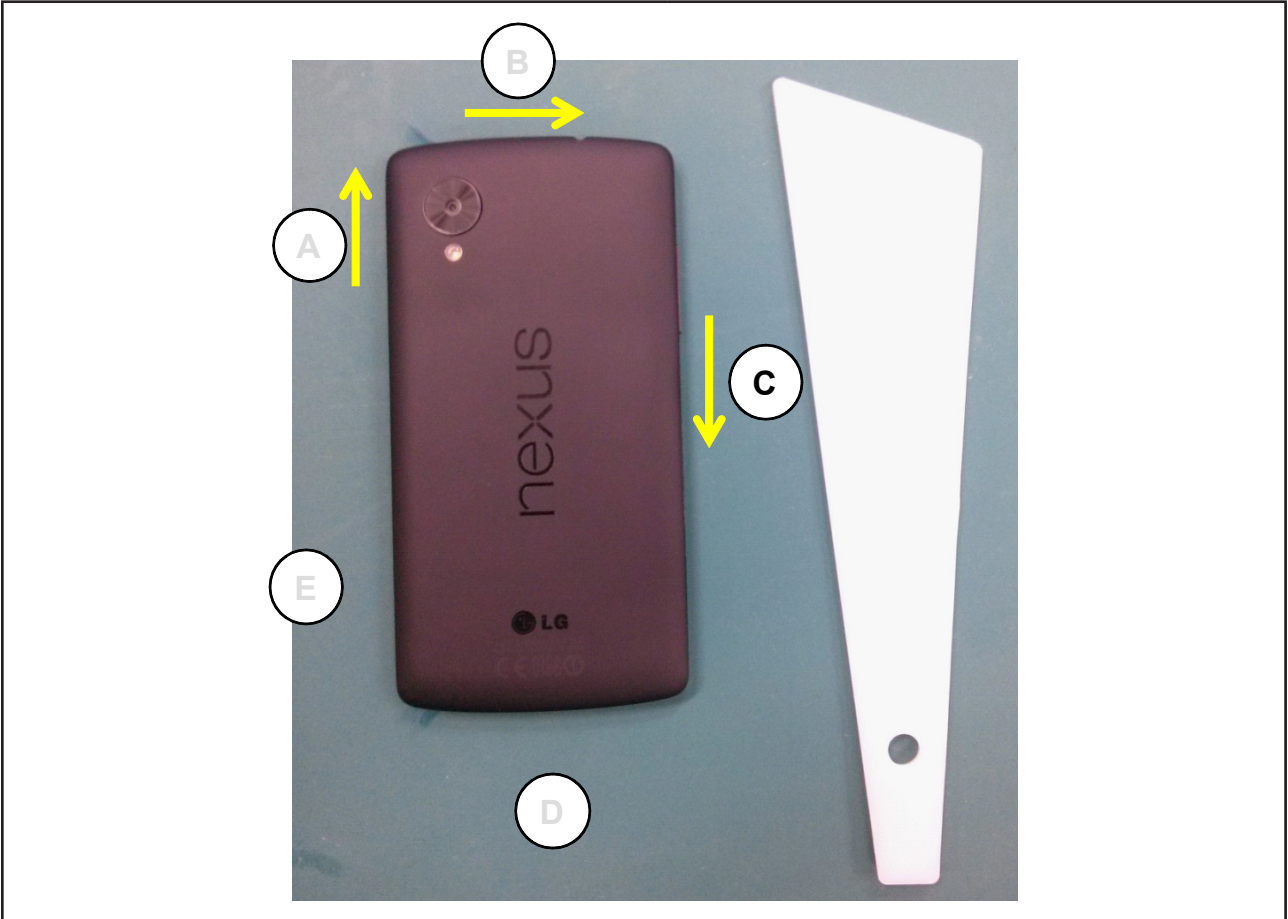
10. DISASSEMBLE GUIDE



A-> B-> C-> D-> E



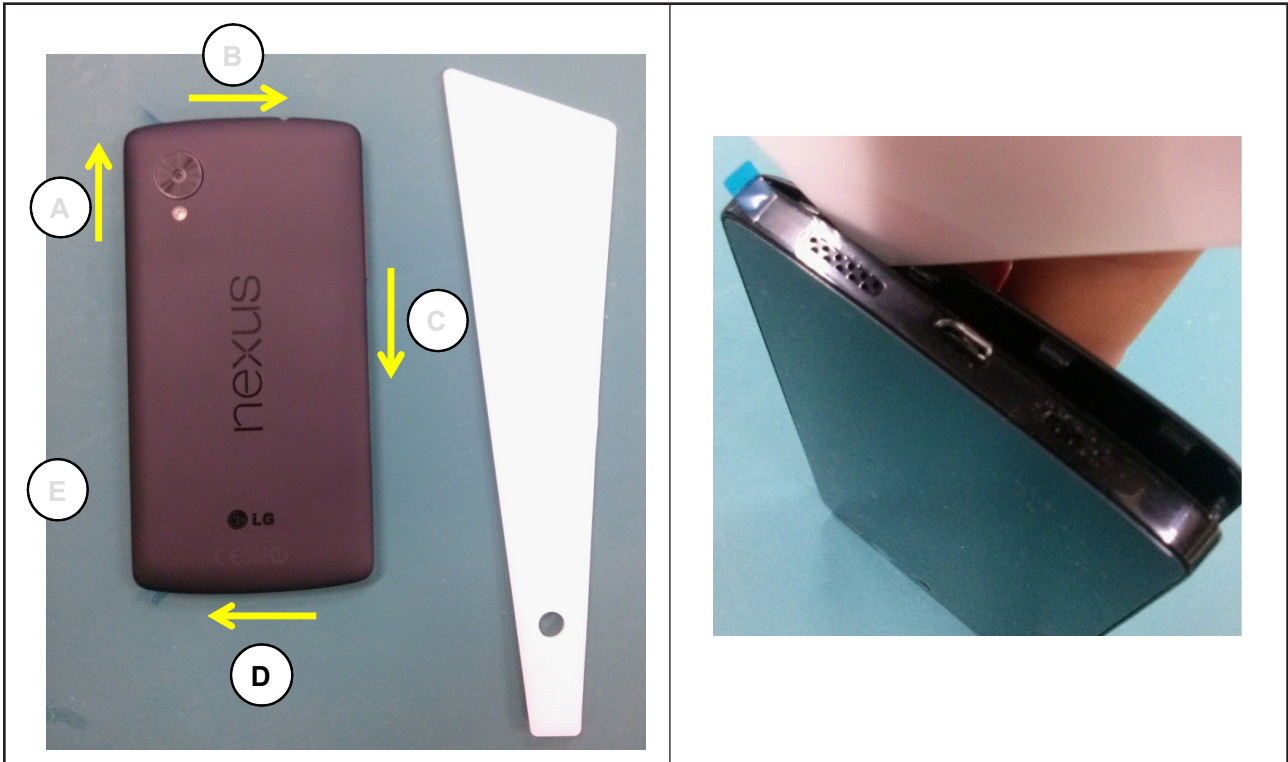
Disassemble top side hook



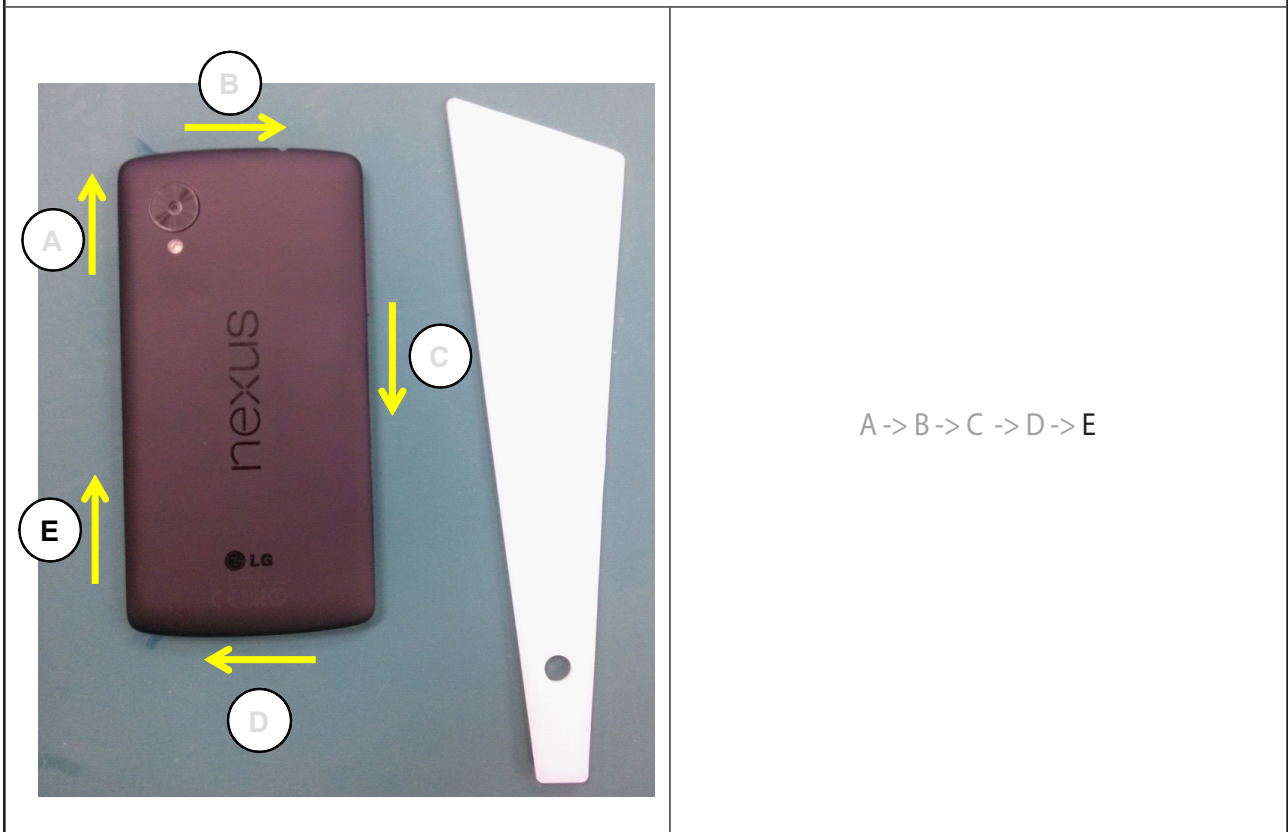
A->B->C->D->E



10. DISASSEMBLE GUIDE



A->B->C->D->E



A->B->C->D->E

3. Rear Cover Remove



Remove REAR COVER by pulling the side of REAR COVER, after unscrewing 6 points (Follow the order of the pictures)

4. PCB & Battery Remove



1. Remove FPCB CONNECTOR 4EA and COAXIAL CABLE CONNETTOR from PCB
2. Remover MAIN PCB
3. Remove BATTERY pushing tool on the top side of BATTERY

5. FPCB & ANT Remove



1. Unscrew 2 Points



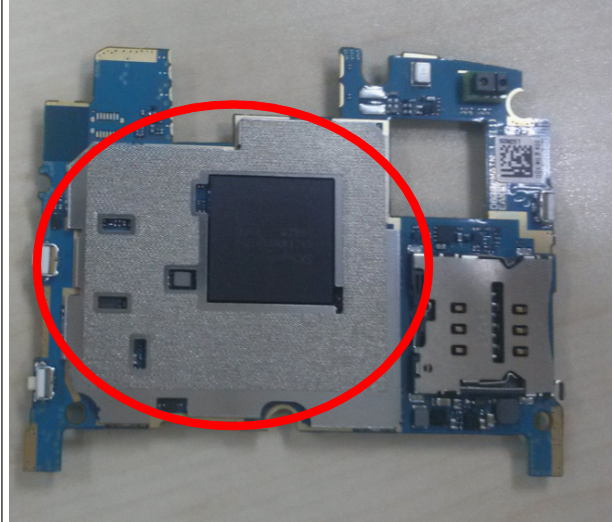
2. Remove MAIN ANNTENA



3. Remove FPCB 2EA



6. Main PCB Remove



Remove Can, Shield 2EA from MAIN PCB

11. EXPLODED VIEW & REPLACEMENT PART LIST

This document is draft version, so the contents will be updated after registering the final one.