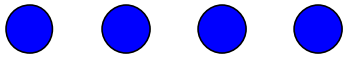
Repairhints

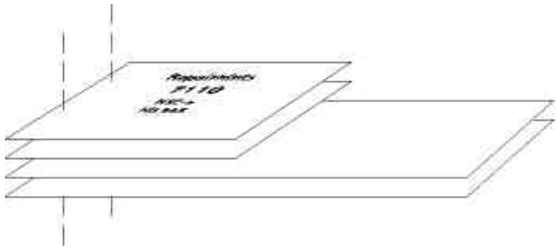
7110

NSE-5

HD 945



GENERAL



-How to use this document

Put the QUICK REPAIR layouts behind these manuals.
Now you are able to follow these specifications with graphical layouts and it is easier for you to find the components and measuring points.

-Component characteristics:

Some components contain important data.
Several described steps are only practicable if you are able to reflash/ realign the phone and/or rewrite IMEI/SIMlock in certain cases. Please pay attention to separate notes.

-Underfills, broken balls, µBGA

It is not possible to change underfilled components. The trial will damage PCB surely. All replaceable µBGA-components must be renewed after removing.
Check soldering points, remove oxidated solderings (broken balls) carefully by enclosing few new solder before placing new components.
µBGA must be soldered only with NMP approved µBGA-rework machines (e.g. Zevac/OK International).
Use only recommended Fluxtype and an appropriate amount of it.
Clean very careful the PCB after every rework and take great pains over the keyboard area. Don´t make any loose wiring connections anywhere.
If it is necessary to change any item located under the metal shields, remove the shield first, don´t cut partially or bend it.

1. INTRODUCTION

IMPORTANT:

This document is intended for use by authorized NOKIA service centers only.

The purpose of this document is to provide some further service information for NOKIA 7110 phones.
It contains a lot of collected tips and hints to find failures and repair solutions easily.
It will also give support to the inexperienced technicians.
Saving process time and improving the repair quality is the aim of using this document.
We have build it up based on fault symptoms (listed in "Contents") followed by detailed description for further analysis.
It is to be used additionally to the service manual and other service information like Service Bulletins, for that reason it doesn't contain any circuit descriptions or schematics.

All measurements are made using following equipment:

Nokia repair SW	: WinTesla Version 6.43
DLL version	: NSE5 version 271.03.00 / 19.07.2000
Nokia Module Jig	: MJS-8
Digital multimeter	: Fluke 73
Oscilloscope	: Hitachi V-1565; Fluke PM 3380A/B
Spectrum Analyzer	: Advantest R3361C with an analogue probe
RF-Generator /	: Rohde & Schwarz CMD 53
GSM Tester	

While every endeavour has been made to ensure the accuracy of this document, some errors may exist. If any errors are found by the reader, NOKIA should be notified in writing, using following procedure:

Please state:
Title of the Document + Issue Number/Date of publication.
Page(s) and/or Figure(s) in error.

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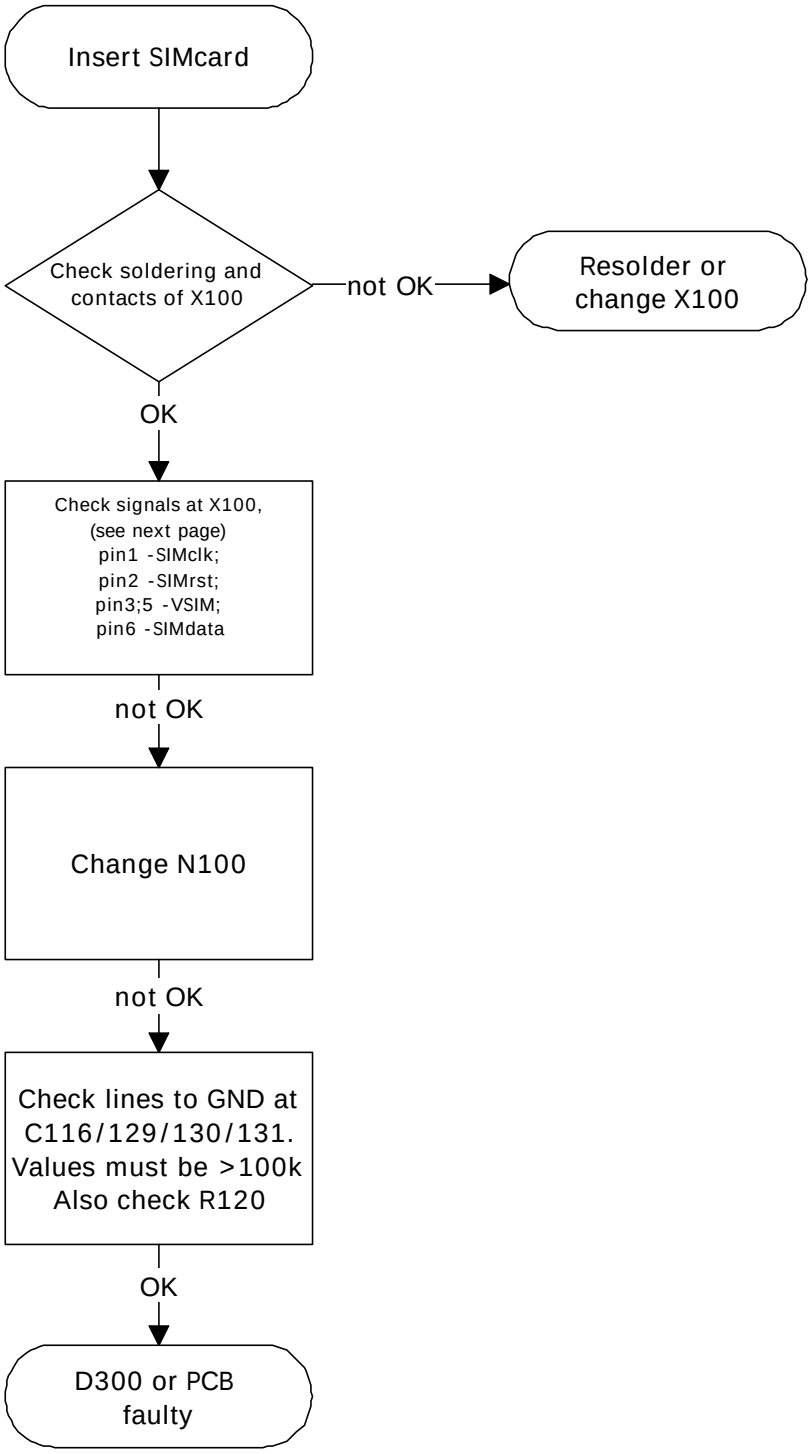
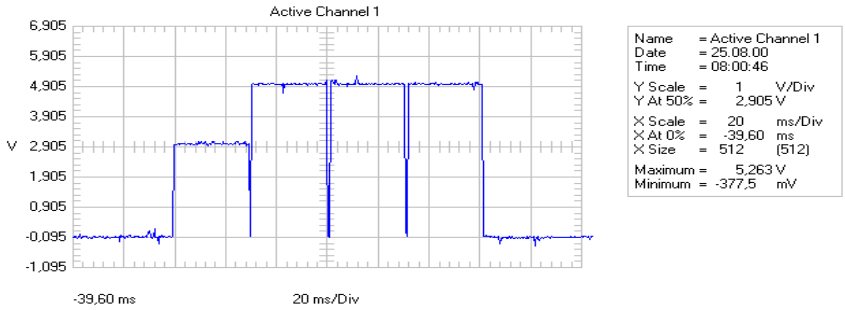
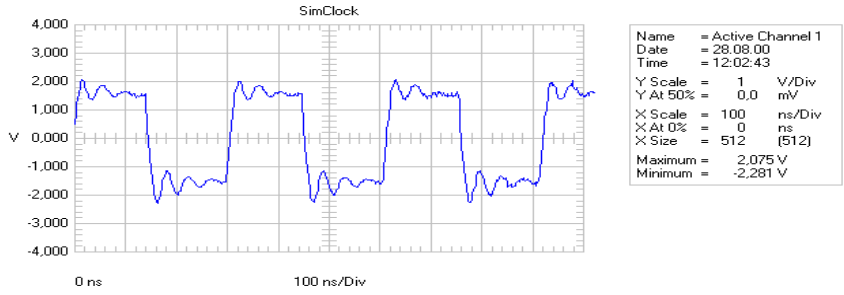
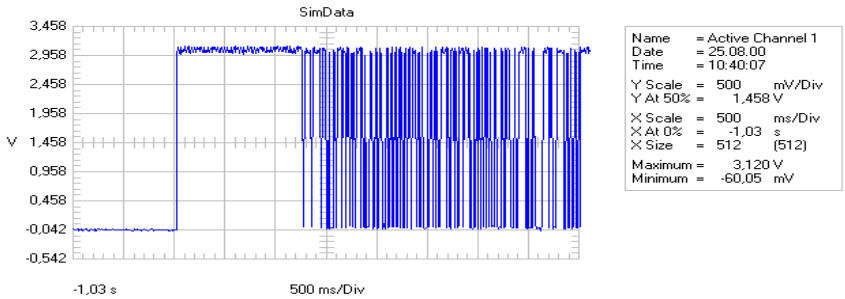
INSERT SIMCARD



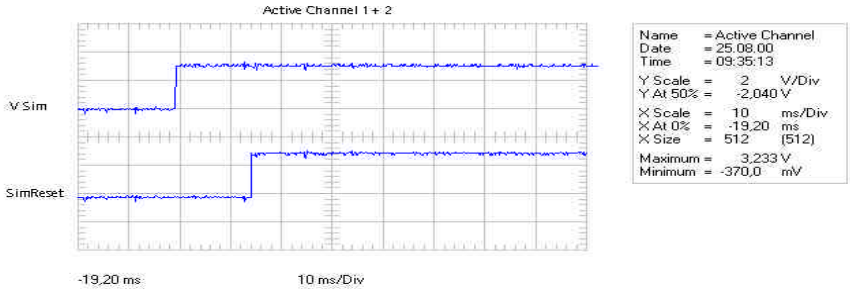


VSIM after switching on the phone without SIMcard. CCONT pulses up VSIM for four times, the first time the amplitude is 3 Volt, the next three times it is 5 Volt.
If the phone is switched on with SIMcard, VSIM stays on the level with which the SIMcard works, expected that SIMcard is not dirty or damaged.



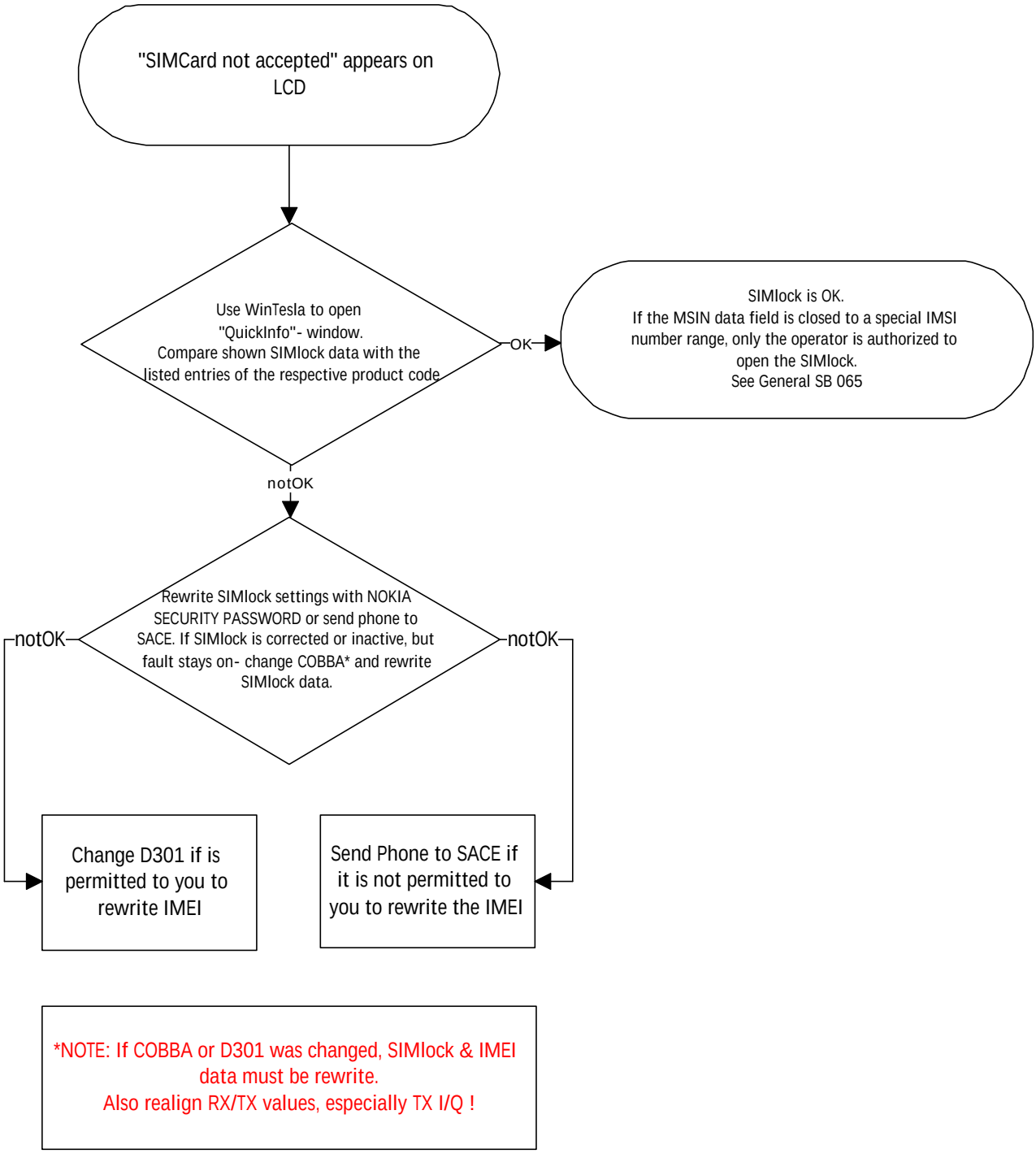


Note that SIMClock and SIMData are only present when SIMcard is active, for example when phone registers to network.



SIMReset is low-active, that means that the SIMcard will be reseted when SIMReset is 0 Volt. This is the case after switching on the phone (diagram above). While VSIM is already high, SIMReset keeps low for a few milliseconds – in this time the card will be reseted.

SIMCARD NOT ACCEPTED



X100 SIMcard Reader

- Check solderings of connector.
- Check if bend or soiled, change if necessary.

SIM lines shorts to GND

- Check resistance of SIM lines to GND at C116, C129, C130, C131,- value should be higher than 100kOhm.
- Check also R120.

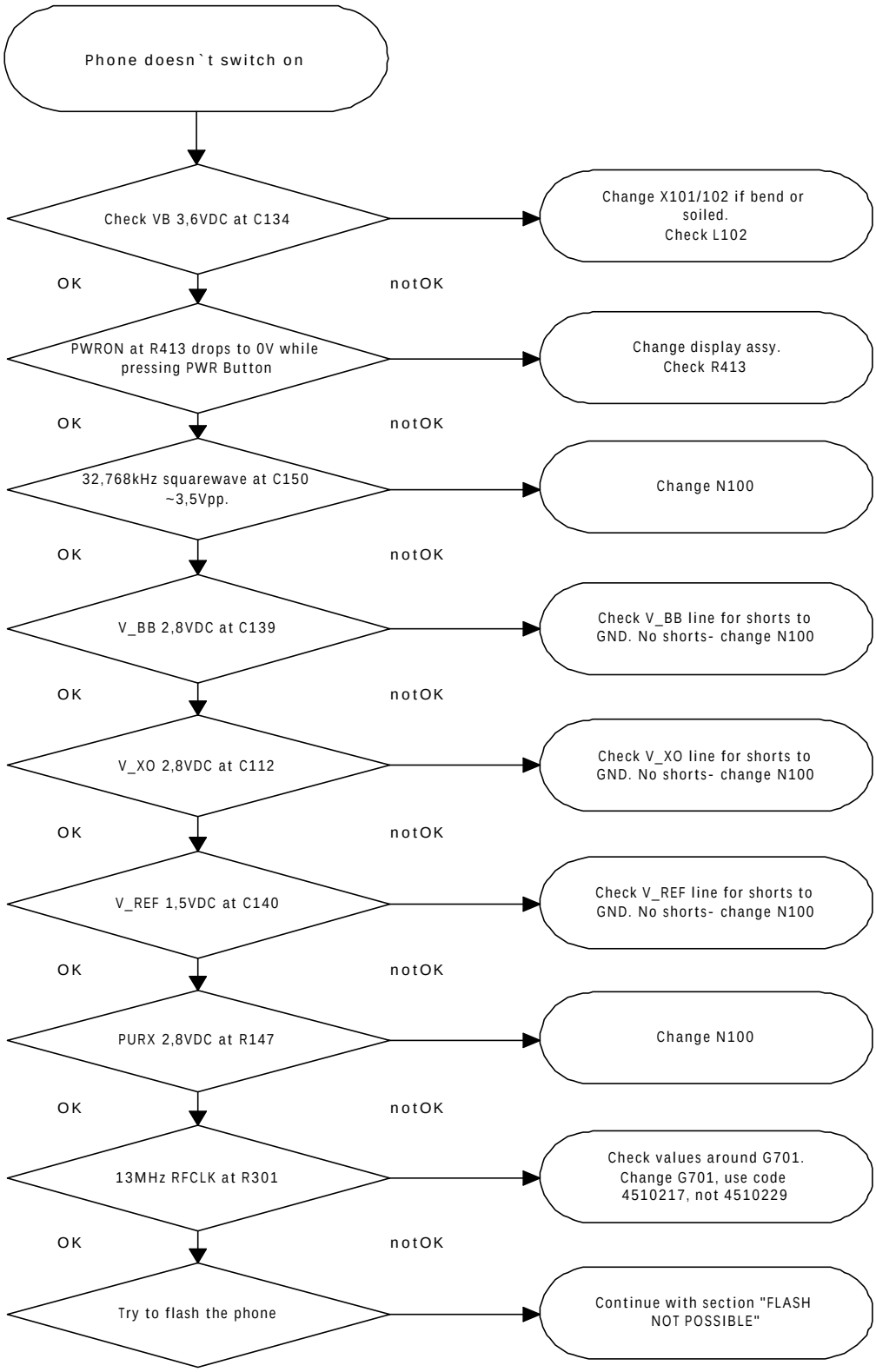
N100 CCONT faulty

- Check SIMClock, SIMData, SIMReset and VSIM.
- It´s also possible that broken solderings under CCONT N100 are the reason for this fault. Remove CCONT, tinplate oxidized pads carefully with only a little bit of flux and solder, replace CCONT with µBGA rework machine.

N200 COBBA faulty

- If “SIM card not accepted” appears on LCD, but SIMlock-settings are ok or no SIMlock is set, it is necessary to change COBBA N200.
  Note that you have to rewrite SIMlock-data and tune Rx/Tx-values of the phone after changing the COBBA,

PHONE DOESN`T SWITCH ON



Battery connector X101, X102

- Check solderings of X101, X102.
- Check if connectors are bend or soiled.

Power on/off switch faulty

- Check that PWRON at R413 decreases to 0V during pressing the powerswitch.
- Check display connector X400, change display assy if necessary.

B100 problems

- Check voltage at B100, both Pins 1,6VDC.
- Check 32,768kHz sinewave signal level at C104.(700mVpp).
- Check parts around B100 like R117, R118, R121, R135, C103, C104, C149.
- Check 32,768kHz squarewave at J318 (3,3Vpp).

G701 Reference oscillator faulty

- Check Vcc 2,8V at G701.
- Check Vcont (may vary between 1 and 3.5V).
- note that it is necessary to change G701 if frequency error is higher than 50Hz.

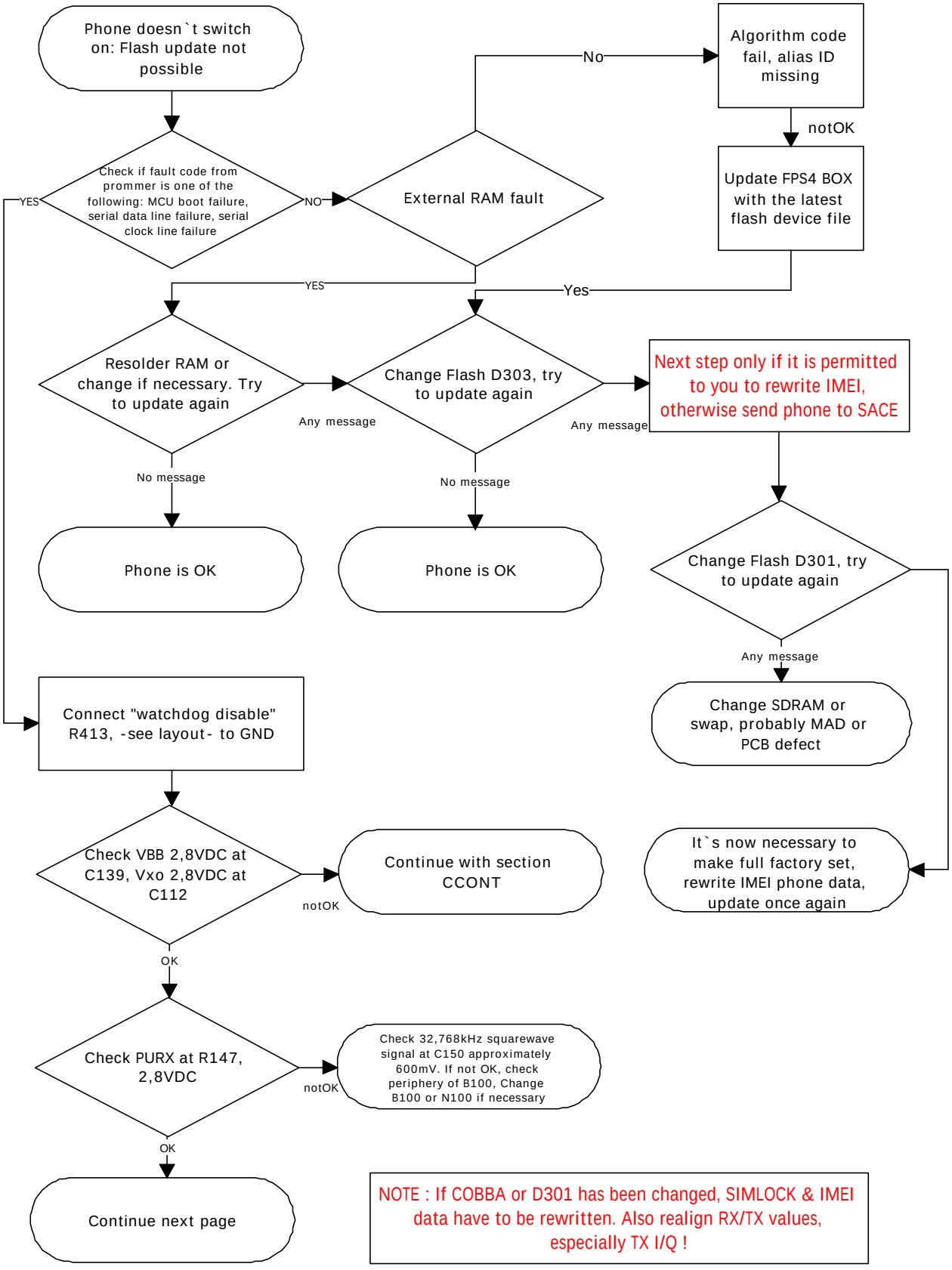
N100 CCONT faulty

- Check Vb 3,6Vat C134.
- Check that PWRON decreases to 0V at R413 when powerswitch is pressed.
- Check 32,768kHz squarewave at J318.
- Check 13MHz Clk-frequency at R301.
- Check Vbb 2,8V at C139.
- Check Vxo 2,8V at C112.
- Check Vref 1,5V at C140.
- Check PURX 2,8V at R147.
- Probably broken solderings under CCONT. Try to tinplate the oxidized pads careful with only a little bit of flux and solder.

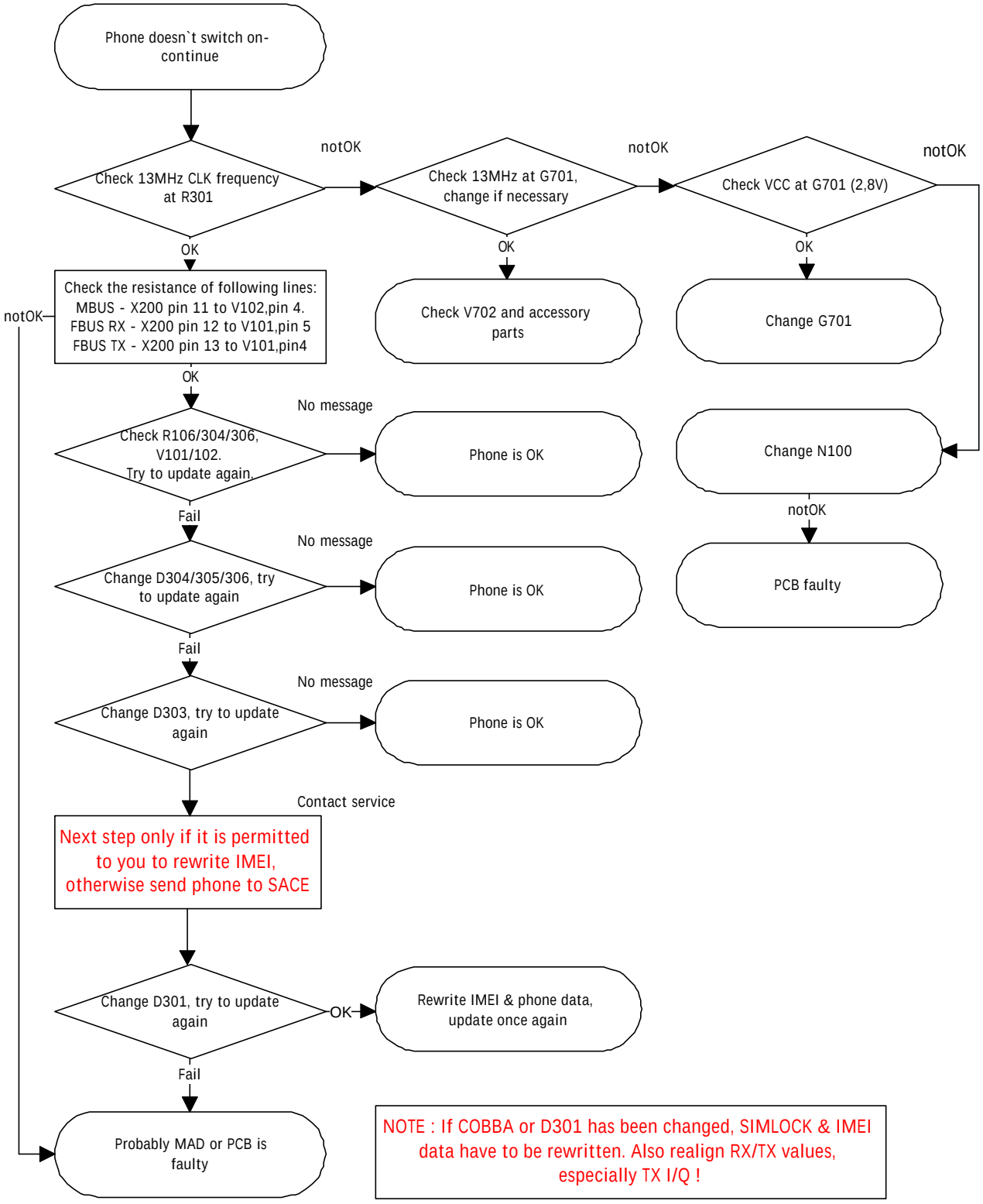
D300 MAD faulty

- Check 32,768kHz squarewave at J318.
- Check 13MHz Clk-frequency at R301.
- Check Vbb 2,8V at C139.
- Check PURX 2,8V at R147.
- MAD is probably faulty, swap the phone because MAD is not changeable.

FLASH UPDATE NOT POSSIBLE



FLASH UPDATE NOT POSSIBLE - CONTINUE –



CONTACT SERVICE PROBLEMS

Note: If the Phone displays " Contact Service ", Check with WinTesla which kind of selftest fails. Before open the phone, try to flash it in every case of selftest failure. In most of these cases, it would be possible to "repair" the phone or find out more about that failure.

Possible failures with message "Contact Service":

MCU ROM Checksum failed:
Try to flash the phone. If the failure persists, change D303.

RTC battery failed:
Change RTC battery and charge it, change N100 if failure persists.
(Charging RTC battery : Assemble phone and leave battery10 Minutes on it).

CCONT interface failed
Change CCONT (N100), (broken soldering).

DSP alive test failed:
Change COBBA. If failure persists, MAD should be the reason.
(Swap, because MAD is not changeable).

COBBA serial or parallel failed:
Change COBBA.

Warranty State failed:
Eeprom Data mismatch or phone is locked after swap process- send Phone to SACE.

If the Phone response any EEPROM mismatch (PPM Validity), Checksum failure or EEPROM failure, - (D301) is faulty.

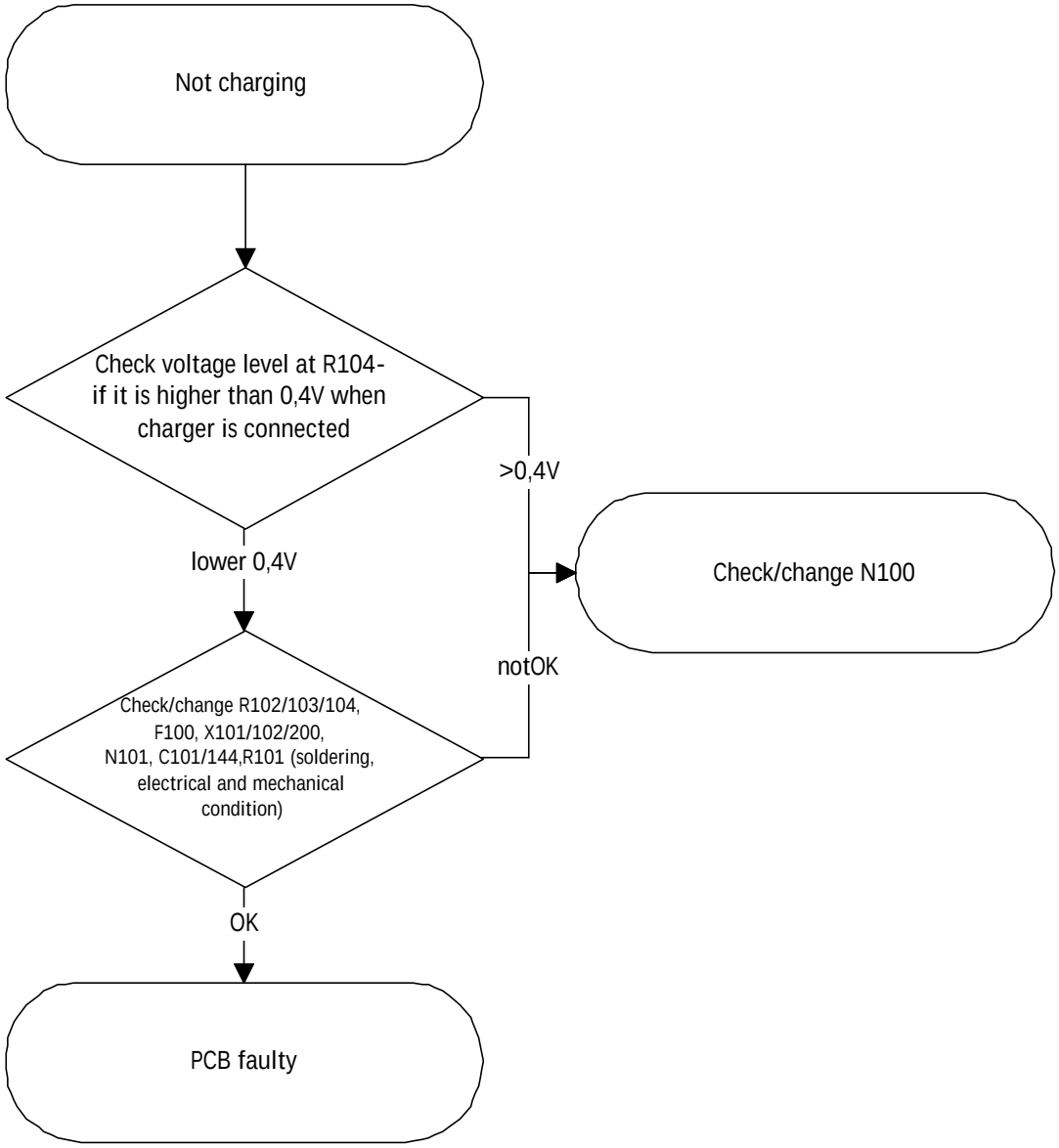
When your phone response a current consumption for empty Flash (~30mA) and doesn`t switch on after a succesful update with WinTesla, D301 is faulty.

Message : Factory default values cannot be set – D301 is faulty.

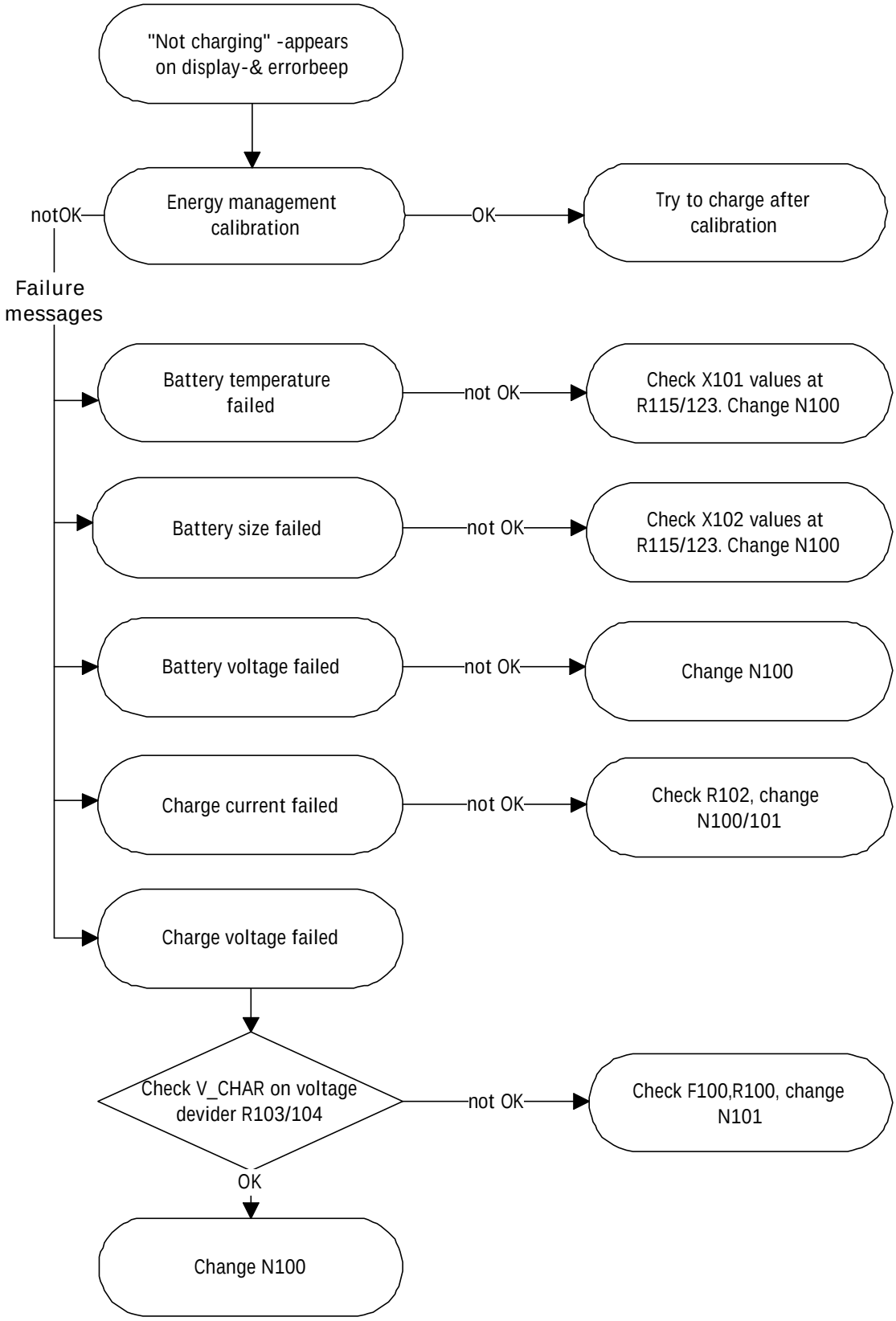
NOTE: If COBBA or D301 has been changed, SIMLOCK & IMEI data must be set. Also realign RX/TX values, especially TX I/Q. Never change D301 if you have no permission to rewrite IMEI. In case of this send phone to SACE.

NOT CHARGING (NOTHING HAPPENS IF CHARGER IS CONNECTED)

First of all : Always Check the mechanical condition of all connectors and connections



NOT CHARGING (APPEARS IN DISPLAY,- & ERRORBEEP)



X101, X102 Battery connector, X200 system connector

- Check soldering of connectors.
- Check mechanical appearance of connectors, change if necessary.

F101 faulty

- Check resistance of F101 (0 Ohm)

V_In line short circuit to GND

- Check resistance of V_In line to GND (~50 kOhm).
- if resistance is not ok Check R101 / C101 / C144 or change N101.

N100 faulty

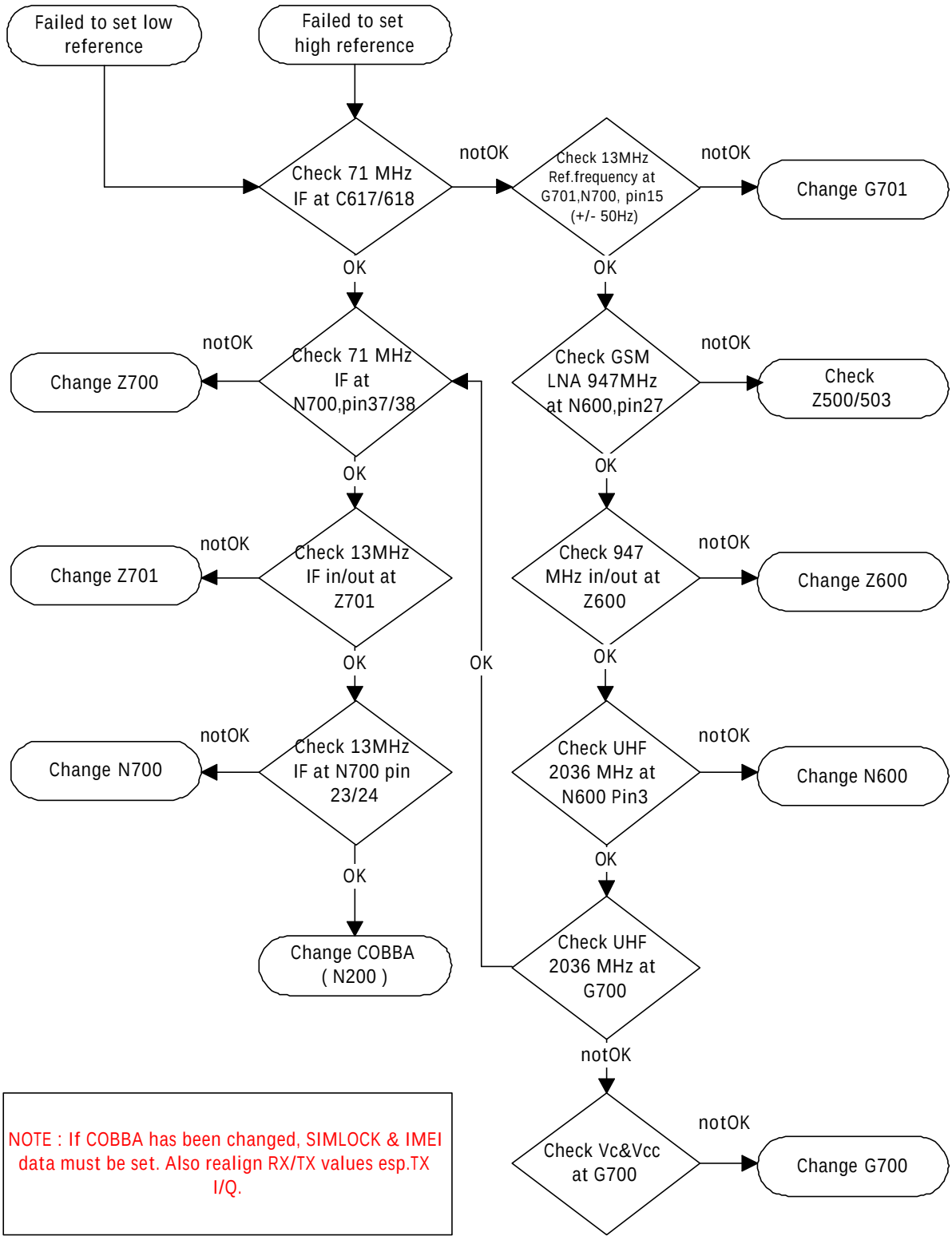
- Change CCONT / N100 if any A/D value is out of limits but DC voltage is ok.
- If DC voltages are not ok Check corresponding voltage dividers and battery connectors X101/102.
- Probably broken solderings under CCONT / N100. Remove CCONT, tinplate oxidized pads carefully with flux and solder, replace sparepart with µBGA rework machine.

Energy management calibration

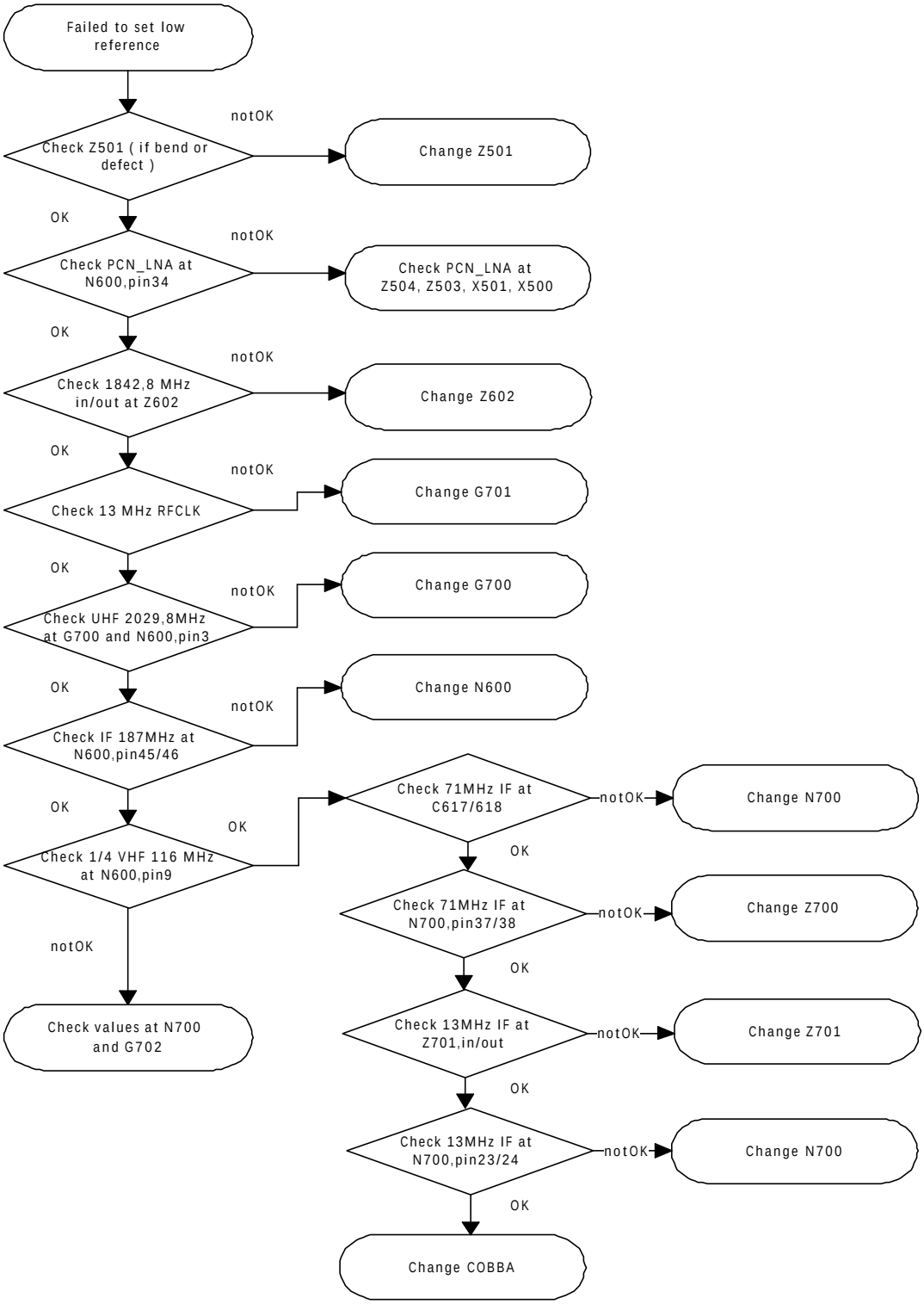
- Run calibration if charging stops too early.
- If message “not charging“ appears on LCD.
- If any part in the charging circuit has been replaced.

NO SERVICE GSM 900 - First Check spectrum if it is only a RX failure , see spectrum charts.
REF: GSM 900: Ch60 (947 MHz) / GSM 1800: Ch700 (1842,8 MHz).

WINTESLA TUNING RX CALIBRATIONS



NO SERVICE GSM 1800 First Check spectrum if it is only a RX failure. See spectrum charts.
REF: GSM 900: Ch60 (947 MHz) / GSM 1800: Ch700 (1842,8 MHz).
WINTESLA TUNING RX CALIBRATIONS



POOR / NO SERVICE -GSM 900 / GSM 1800

RSSI Measurement Failure messages.

REFERENCE IS : CH60-947 MHZ FOR GSM 900 AND CH700-1842,8 MHZ FOR GSM 1800.

IF THERE IS ONE OF THE FOLLOWING FAILURE MESSAGES, CHECK ALSO TX–SPECTRUM.
IF IT IS ONLY RF FAULT – OR USE CCONT CHAPTER AND SEE SPECTRUM SAMPLES.

CAN´T SET HIGH REFERENCE / CAN´T SET LOW REFERENCE AT GSM 900

Check 71 MHz IF at C617 / C618 --- If not ok – Check 13 MHz Ref. Freq. at G701.
Check 71 MHz IF at N700 / Pin 37,38 --- If not ok – change Z700.
Check 13 MHz IF at Z701 in & out (5dB attenuation over) --- If not ok – change Z701.
Check 13 MHz at N700 / Pin 23,24 --- If not ok – change N700.
Check GSM_LNA 947 MHz at N600 / Pin 27 --- If not ok check / change Z500 / Z503.
Check GSM_LNA 947 MHz at Z600 in & out --- If not ok – change Z600.
Check UHF Oscillator Freq. 2036 MHz at N600 / Pin 3 --- If not ok – change N600.
Check UHF Oscillator Freq. 2036 MHz at G700 (and VC/VCC) --- If not ok – change G700.
Change N200 (COBBA).

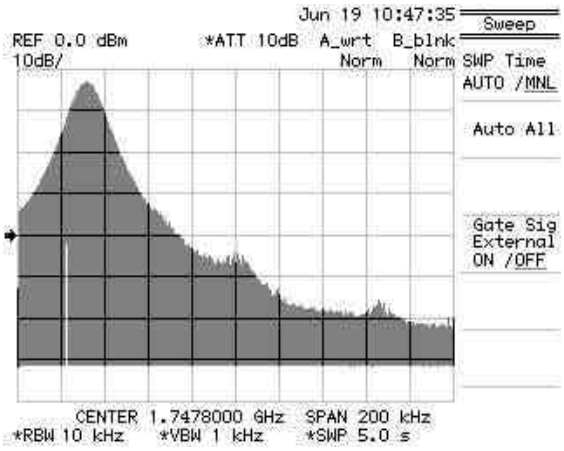
NOTE: IF COBBA HAS BEEN CHANGED, IT IS NECESSARY TO REWRITE IMEI AND SIMLOCK DATA .
ALSO RX / TX - AND TX I/Q - VALUES MUST BE REALIGNED.

CAN`T SET LOW REFERENCE AT GSM 1800

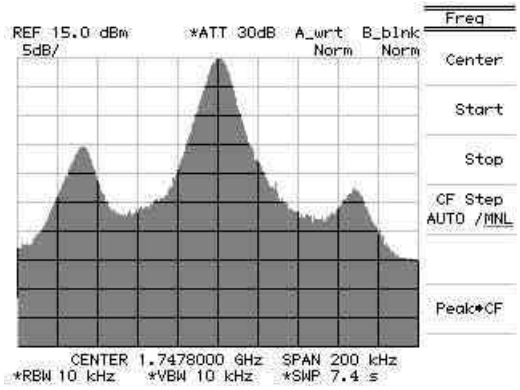
Check if Z501 is bend --- change if necessary.
Check PCN_LNA 1842,8 MHz at N600 / Pin 34-If not ok -ckeck Signal at Z504/503 and X501/500.
Check PCN_LNA 1842,8 MHz at Z602 in & out --- If not ok change Z602.
Check UHF Oscillator Freq. 2029,8 MHz at N600 / Pin 3 --- If not ok – change G700.
Check 187 MHz IF at N600 / Pin 45,46 --- If not ok – change N600.
Check 116 MHz (1/4 VHF) at N600 / Pin 9 --- If not ok – check Values at N700 and G702.
Check 71 MHz IF at C617 / C618 --- If not ok – check 13 MHz Ref. Freq. at G701.
Check 71 MHz IF at N700 / Pin 37,38 --- If not ok – change Z700.
Check 13 MHz IF at Z701 in & out (5dB attenuation) --- If not ok – change Z701.
Check 13 MHz at N700 / Pin 23,24 --- If not ok – change N700.
Check GSM_LNA 947 MHz at N600 / Pin 27 --- If not ok check / change Z500 / Z503.
Check GSM_LNA 947 MHz at Z600 in & out --- If not ok – change Z600.
Check UHF Oscillator Freq. 2036 MHz at N600 / Pin 3 --- If not ok – change N600.
Check UHF Oscillator Freq. 2036 MHz at G700 (and VC/VCC) --- If not ok – change G700.
Change N200 (COBBA).

NOTE: IF COBBA HAS BEEN CHANGED, IT IS NECESSARY TO REWRITE IMEI AND SIMLOCK DATA
ALSO RX / TX - AND TX I/Q - VALUES MUST BE REALIGNED.

Faulty spectrum – COBBA faulty, COBBA and CCONT broken soldering.



1)



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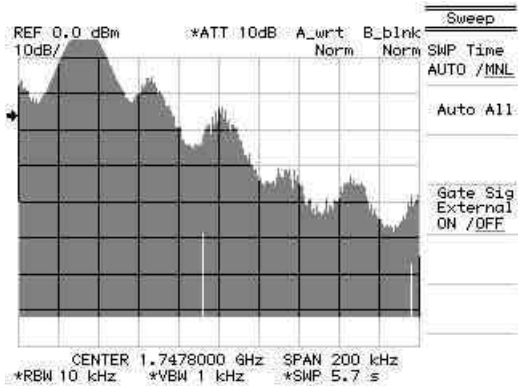
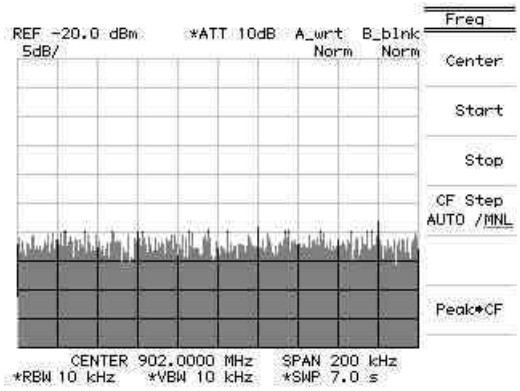


2)



4)

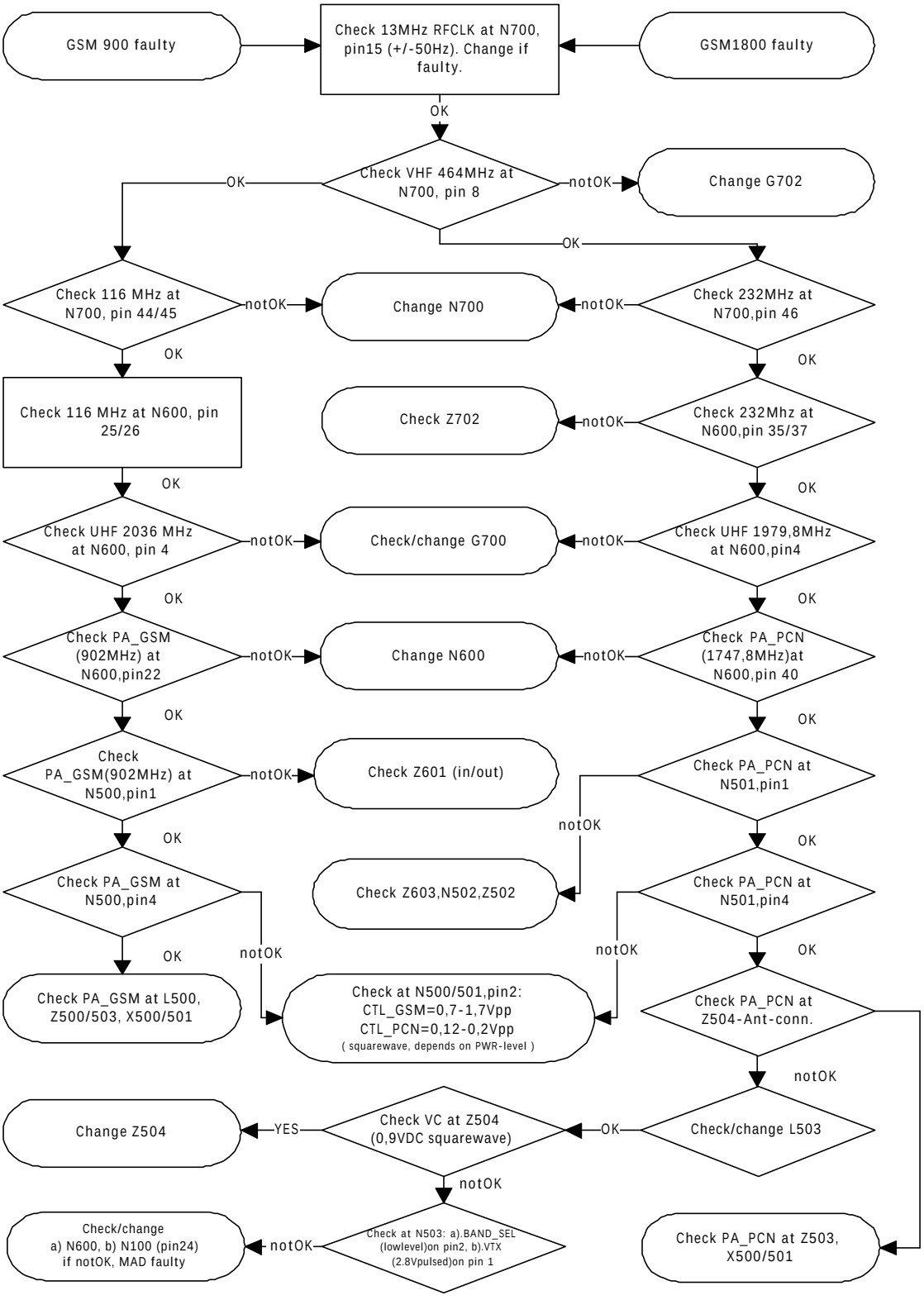
Pic1) Normal Spectrum

Pic2) Spectrum with broken soldering under CCONT
(No PCN_low reference settings in RSSI alignment).
Spectrum turnes to pic1 if N100 is pushed carefully with some nonmetaled item. This fault can also be measured at N700 pin 15.(13MHz RFCLK).

Pic3) Spectrum with faulty COBBA, RSSI-alignment is not possible.

Pic4) Spectrum with broken soldering under COBBA, RSSI- alignment is not possible. Spectrum turnes To pic 1 if N200 is pushed carefully with some nonmetallic item.

TX FAILURE


GSM 900 faulty
Check 13MHz RFCLK at N700, pin15 (+/-50Hz). Change if faulty.
GSM1800 faulty
OK
Check VHF 464MHz at N700, pin 8
OK
notOK
Change G702
OK
Check 116 MHz at N700, pin 44/45
notOK
Change N700
notOK
Check 232MHz at N700,pin 46
OK
OK
Check 116 MHz at N600, pin 25/26
Check Z702
notOK
Check 232Mhz at N600,pin 35/37
OK
OK
Check UHF 2036 MHz at N600, pin 4
notOK
Check/change G700
notOK
Check UHF 1979,8MHz at N600,pin4
OK
OK
Check PA_GSM (902MHz) at N600,pin22
notOK
Change N600
notOK
Check PA_PCN (1747,8MHz)at N600,pin 40
OK
OK
Check PA_GSM(902MHz) at N500,pin1
notOK
Check Z601 (in/out)
Check PA_PCN at N501,pin1
notOK
OK
Check PA_GSM at N500,pin4
Check Z603,N502,Z502
Check PA_PCN at N501,pin4
OK
notOK
notOK
OK
Check PA_GSM at L500, Z500/503, X500/501
Check at N500/501,pin2:
CTL_GSM=0,7-1,7Vpp
CTL_PCN=0,12-0,2Vpp
(squarewave, depends on PWR-level)
Check PA_PCN at Z504-Ant-conn.
notOK
Change Z504
YES
Check VC at Z504 (0,9VDC squarewave)
OK
Check/change L503
notOK
Check/change
a) N600, b) N100 (pin24)
if notOK, MAD faulty
notOK
Check at N503: a).BAND_SEL (lowlevel)on pin2, b).VTX (2.8Vpulsed)on pin 1
Check PA_PCN at Z503, X500/501

2. TX - POWER FAULTS

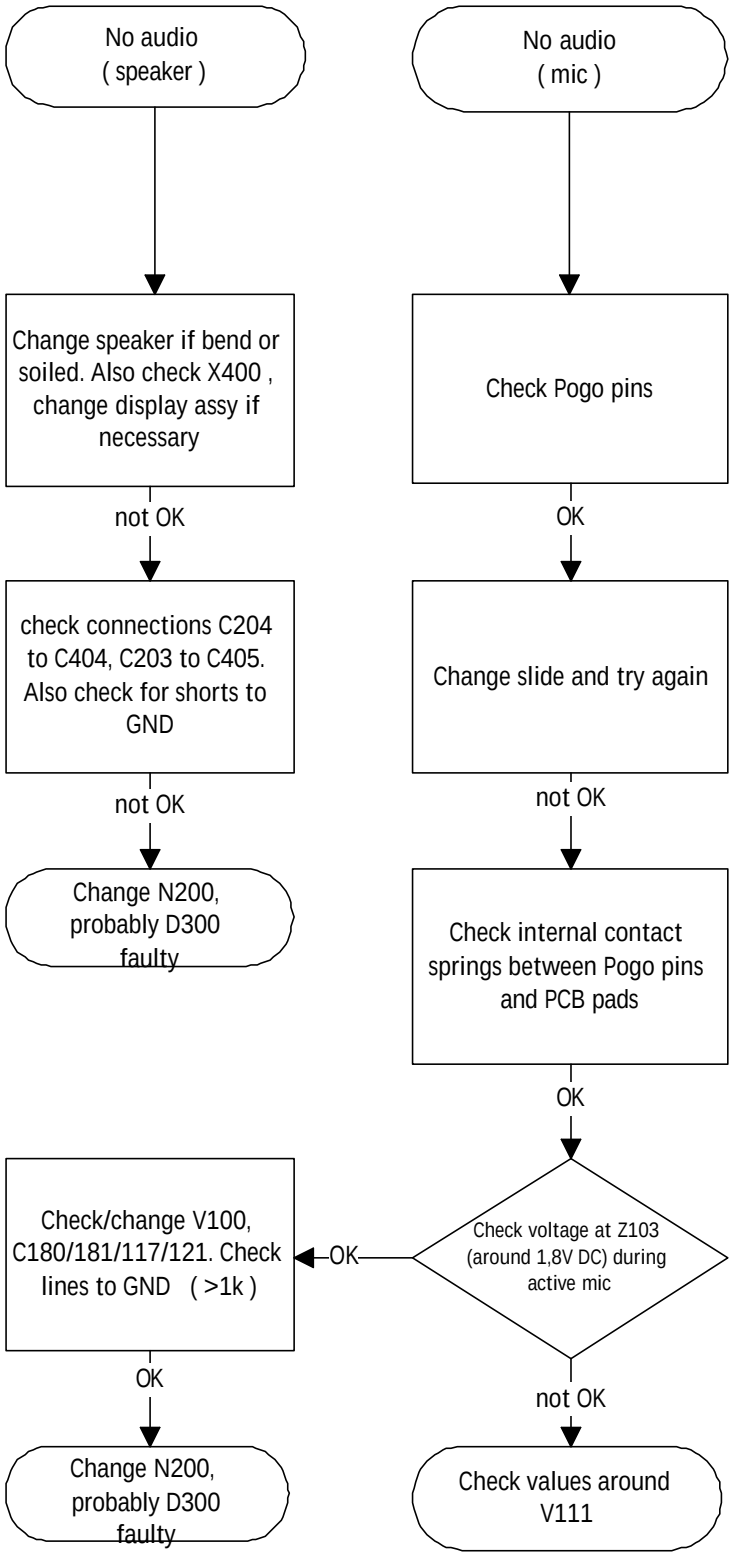
3. TX FAULT AT GSM 900 REFERENCE IS : CH 60 / 902 MHZ

Check 13 MHz Reference Freq. output at G701 (and VC / AFC Pins) --- If not ok – change G701.
Check 13 MHz Reference Freq. at N700 / Pin 15 --- If not ok – change N700.
Check VHF Oscillator Freq. 464 MHz at N700 / Pin 8 --- If not ok,
check values at G 702 (VC / VCC) --- change Oscillator if necessary.
Check 116 MHz at N700 / Pin 44,45 --- If not ok – change N700.
Check 116 MHz at N600 / Pin 25,26.
Check UHF Oscillator Freq. 2036 MHz at N600 / Pin 4 --- If not ok – change G700.
Check PA_GSM 902 MHz at N600 / Pin 22 --- If not ok – change N600.
Check PA_GSM 902 MHz at N500 / Pin 1 --- If not ok – check / change Z601 in & out (if possible).
Check PA_GSM 902 MHz at N500 / Pin 4 --- If not ok,
check CTL_GSM at N500 / Pin 2 => 0,7 – 1,7 Vpp squarewave / depends on Powerlevel.
If this happens --- change N500.
Check PA_GSM 902 MHz at L500 in & out (or if bend) --- If not ok – change L500.
Check PA_GSM 902 MHz at Z503 (input) --- If not ok – change Z500 after lifting case.
Check PA_GSM 902 MHz at X500 / X501.

4. TX FAULT AT GSM 1800 REFERENCE IS : CH 700 / 1747,8 MHZ

Check 13 MHz Reference Freq. output at G701 (and VC / AFC Pins) --- If not ok – change G701.
Check 13 MHz Reference Freq. at N700 / Pin 15 --- If not ok – change N700.
Check 464 MHz at N700 / Pin 8 --- If not ok – change G702.
Check 232 MHz at N700 / Pin 46 --- If not ok – change N700.
Check 232 MHz at N600 / Pin 35,37 --- If not ok – check outputs at Z 702 / change if necessary.
Check UHF Oscillator Freq. 1979,8 MHz at N600 / Pin 4 --- If not ok,
check values at G 700 (VC / VCC) --- change Oscillator if necessary.
Check PA_PCN 1747,8 MHz at N600 / Pin 40 --- If not ok – change N600.
Check PA_PCN 1747,8 MHz at Z603 in (at L 613) & out --- If not ok – change Z603.
Check PA_PCN 1747,8 MHz at N502 in (Pin 1) & out (Pin 4) --- If not ok – change N502.
Check PA_PCN 1747,8 MHz at Z502 in (C 515) & out (R513) --- If not ok – change Z502.
Check PA_PCN 1747,8 MHz at N501 / Pin 4 --- If not ok,
check CTL_PCN at N500 / Pin 2 => 0,12 – 0,2 Vpp squarewave / depends on Powerlevel
If this happens --- change N501.
Check PA_PCN 1747,8 MHz at L503 in & out (or if bend) --- If not ok change L503.
Check PA_PCN 1747,8 MHz at Z504 output (Pin Ant / Throughhole connection).
If output at Z504 not ok – change Z504.
Check VC (0,9 Vpp squarewave) for Z504 (at C 507).
Check VTX (2,8 V pulsed) at N503 / Pin 1 --- If not ok – change N100.
Check BAND_SEL (low Level) at N503 / Pin 2 --- If not ok – change N600.
If BAND_SEL and / or VTX not ok after changing N100 / N600 => probably MAD faulty
Check PA_PCN 1747,8 MHz at Z 503 / X501 / X500.

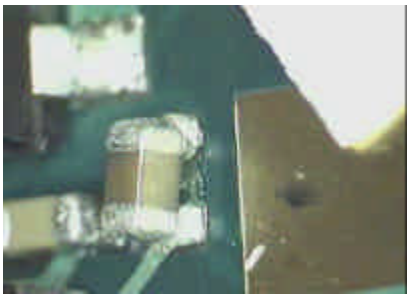
INTERNAL AUDIO FAILURE



EXTERNAL AUDIO PROBLEMS

1) External mic problems (Xmic)

Check C158 (if broken or bend)



In this case : Use a new RTC battery, the length of spring-connectors are the reason for bending the capacitor.

Check X200 . This item must be clean. Also check the soldering of the MBUS- connectors.

Check Z100, V106 input and output.

Change COBBA, note : Rewriting of IMEI and SIMlock data is necessary after changing the COBBA!

If Error persists. Probably MAD or PCB is defect.

2) External ear problems (Xear)

Check X200 – contacts and soldering.

Check Z102.

Check R114, V107 input and output.

Check Vbb at R112 = 2,8V DC.

Change COBBA , note : Rewriting of IMEI and SIMlock data is necessary after changing COBBA!

If error persists, probably MAD or PCB is defect.

MICROPHONE DOES NOT WORK

-Also see SB 018 –

Note : First of all check the mechanical condition of the phone and slide for mechanical damage or stuck. (PogoPins).

Probable reasons:

- **Shorts between contact tracks and slideflex.**
  These shorts often occur at the end of the slide-cover (friction-dust).
  If this happens, clean the flex with dustfree cloth, especially in the bottom corner.

- **The Pogo pins in microphone housing get stuck. If this happens, change A-Cover.**

- **Check the internal contact springs from Pogo-pins and their connector pads on the PCB.**

- **Check impedance (~ 1,8k) , change slide cover if necessary.**

- **Check solderings of Z103/104, C106/107/132.**

- **Check signals (given over MPA-1 =audio test probe) at V100 in & out.**

- **Check V_COBBA at V111 (2,8VDC).**

- **Check voltage (during call) at C117/121 (1,4VDC) , at E100 (0,3V), E101 (1,8V).**

- **Change COBBA if all of the above works.**

  Rewriting of IMEI and SIMlock data is necessary after changing the COBBA!

- **If the error persists, MAD or PCB should be the reason.**

SPEAKER DOES NOT WORK

1) Digital noise (TDMA) in speaker

Change slide – cover.

Change speaker.

2) No audio from speaker

Change speaker if necessary.

Check flex on display assy (bend or dirty).

Change display assy if necessary.

Check connections in EAR_P line - C204 to C404.

Check connections in EAR_N line - C203 to C405.

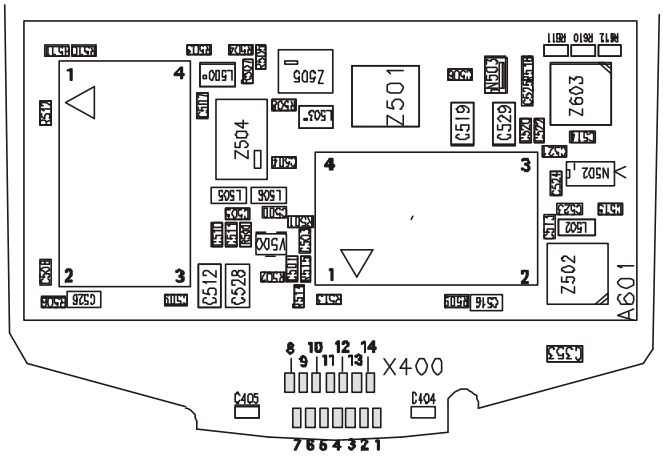
Both lines = 1,4V during call.

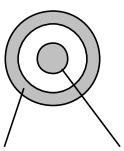
If one of the above fails – PCB faulty.

Check resistance between speaker lines and GND (>1 MOhm).

Probably MAD (D300) or PCB faulty.

1) Temp (1,5V)
2) LCD enabled (2,8V)
3) Ear P(1,3-1,9V)
4) LCD (2,8V)
5) GEN SIO
6) Ear N (1,3-1,9V)
7) PWR_ON
8) Light
9) VB
10) GND
11) GND
12) VBB (2,8V)
13) GEN SIO
14) LCD RSTX (2,8V without Display)





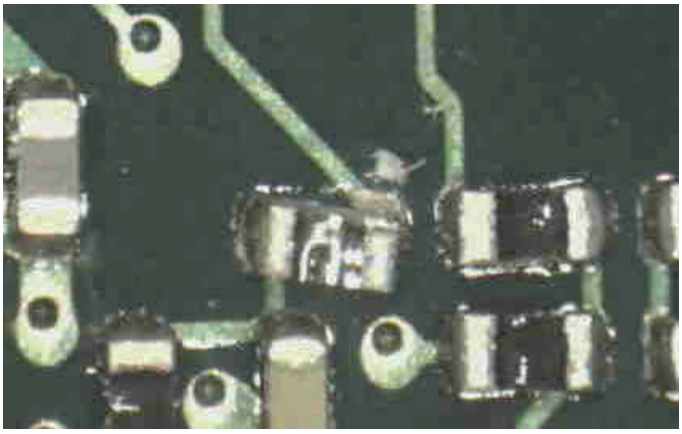
DISPLAY ASSY : EAR_N EAR_P

Rollerkey problems

Note : First of all check the mechanical funktionality.

Check the ESD & connector springs.

If scrollfunction failed, check R411 on PCB (broken or bend).
Cut the RTC battery holder or change the B-cover.
For more details **see SB 012**

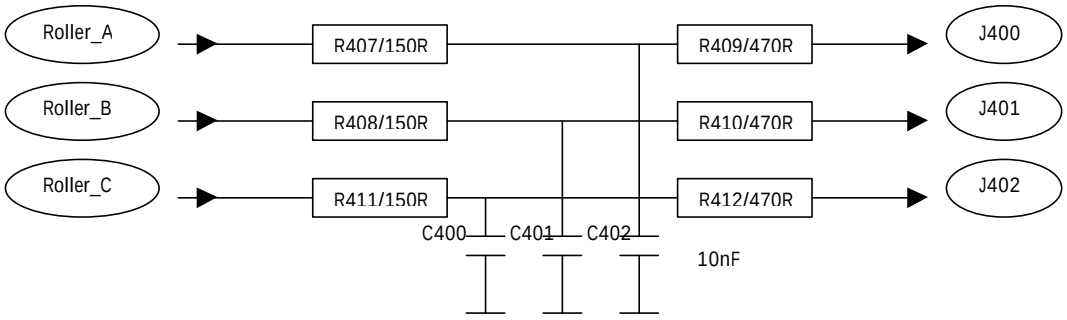


Check connections between R409 and J400, R410 and J401, R412 and J402.

If one of these connections failed, swap PCB.

Check resistance of R407-R412.

If all resistors and connections are OK, probably MAD or PCB should be the reason.



Product-Codes NSE - 5

22-Aug-00

Product-Code	SIM-Lock Data	Operator
0501580		APAC - Basic
0501829		APAC - Basic
0502999		APAC - K
0503018		APAC - J
0503019		APAC - J
0503073		APAC - K
0503200		Euro - F
0503201		Euro - E
0503202	**No SIM-Lock**	Euro - D
0503203	**MCC & MNC 00101**	Euro - C
0503204	**MSIN 0000000001**	Euro - B
0503205		Euro - G
0503276		Euro - D / Omnitel Pronto Italia
0503277		Euro - D / Telecom Italia Mobile
0503278		Euro - D / WIND
0503281		Euro - G / Amena
0503442		APAC - Basic
0503443		APAC - Basic
0503444		Euro - H
0503445		Euro - I
0503446		Euro - D ALS
0503510		Euro - A
0504406		Euro - H / KPN Orange
0504590		Euro - D / BLU S.p.A.
0504782		Euro - D / Vodafone Airtouch
0504819		APAC - C / Korea / China
0504848		Euro - D / TELSIM TEWAP
0504849		Euro - D / Turkcel / TUWAP

Product-Code	SIM-Lock Data	Operator
0503279	MCC & MNC 21407 MSIN ??????????	MoviStar Euro - G
0503280	MCC & MNC 21401 MSIN ??????????	Airtel WAP Conecta Euro - G
0503282 **NOT PRODUCED ANYMORE**	MCC & MNC 26001 MSIN ??????????	Polcomtel SA-Plus GSM Euro - I
0503976 **NOT PRODUCED ANYMORE**	MCC & MNC 20801 MSIN ??????????	France Telecom / Itineris Euro - D
0503978	MCC & MNC 23433 MSIN ??????????	Orange UK Euro - O
0504302	MCC & MNC 21601 MSIN ??????????	Pannon Euro - C
0504303	MCC & MNC 21630 MSIN ??????????	Westel Euro - C
0504304	MCC & MNC 23203 MSIN ??????????	MaxMobil Euro - D
0504305	MCC & MNC 20408 MSIN ??????????	KPN Telecom Euro - H
0504330	MCC & MNC 23201 MSIN ??????????	Mobilkom Euro - D
0504363	MCC & MNC 26003 MSIN ??????????	PTK Centertel Euro - I
0504364	MCC & MNC 26806 MSIN ??????????	TMN Euro - G
0504381	MCC & MNC 26801 MSIN ??????????	Telecel Euro - G
0504405	MCC & MNC 23205 MSIN ??????????	Austria Connect-One Euro - D
0504407	MCC & MNC 26002 MSIN ??????????	PTC ERA gs Euro - I
0504480	MCC & MNC 23207 MSIN ??????????	Tele.ring Euro - D
0504614	MCC & MNC 20801 MSIN ??????????	France Telecom,Itineris Euro - D
0504618	MCC & MNC 26803 MSIN ??????????	Optimus Telecomunicacoes S.A. Euro - G
0504749	MCC & MNC 23430 MSIN ??????????	One 2 One Euro - D
0504770	MCC & MNC 26001 MSIN ??????????	POLCOMTEL wapcol Euro - I
0504874	MCC & MNC 21630 MSIN ??????????	Westel (WESWA) Euro - C
0505004	MCC & MNC 20420 MSIN ??????????	Dutchtone Postpaid Euro - H
0505058	MCC & MNC 26803 MSIN ??????????	Centertel Euro - I
0505173	MCC & MNC 26003 MSIN ??????????	Optimus Telecomunicacoes S.A. Euro - G

CHANGE HISTORY

Originator	Status	Version	Date	Comment
Bernhard Kleine-Frauns	Draft	0.1	16.08.2000	First draft version for the repair group
Bernhard Kleine-Frauns	Draft	0.3	21.08.2000	Insert comments from repair team, add "General Instructions"
Bernhard Kleine-Frauns	Draft	0.5	23.08.2000	Insert comments from repair team, add "Faulty spectrum chart"
Bernhard Kleine-Frauns	Draft	0.7	24.08.2000	"Contact Service-problems",description of TX power fault and SIMcard faults added.
Bernhard Kleine-Frauns	Draft	0.9	28.08.2000	Audio fault descriptions added
Bernhard Kleine-Frauns	Approved	1.0	31.08.2000	SIMlock updated.