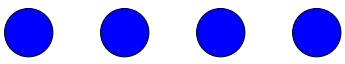
Repairhints

3210

NSE-8/9



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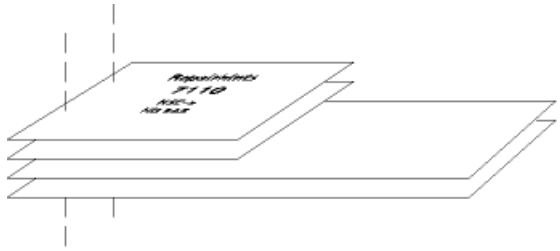
GENERAL



How to use this document

Put the QUICK REPAIR & COMPONENT FINDER layouts behind this manual.
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 data 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 the PCB surely.
All replaceable µBGA-components must be renewed after removing.
Check soldering points, remove oxidated solderings (broken balls) very careful.
µBGA´s **must** be soldered only with NMP approved µBGA-rework machines (e.g. Zevac/OK International).
Soldering CSP´s with Hot Air Fan is strictly forbidden! – refer to General Service Bulletin 106.
Use only recommended fluxtype and always an appropriate amount of it.

PCB handling

Use appropriate cleaning materials only, do not use scratching or rubbing tools. Clean PCB carefully after every rework and take great pains over the keyboard area. Do not make any loose wiring connections anywhere.
If it is necessary to change any item located under the metal shields, first remove the shield, do not cut partially or bend it.

Realign after repair

Characteristics of replacement parts are different.
To prevent additional faults after repair (e.g. low standby time, loosing network etc.) it is necessary to retune phone values after repair.

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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 3210 phones.
It contains a lot of collected tips and hints to find failures and repair solutions easily.
It also will give support to 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 does not contain any circuit descriptions or schematics.

All measurements are made with following equipment:

Nokia repair SW	: WinTesla Version 6.43
DLL version	: NSE8 version 311.02.00 / 13.03.2001
Nokia Module Jig	: MJS-13
Digital multimeter	: Fluke 73
Oscilloscope	: Fluke PM 3380 B
Spectrum Analyzer	: Advantest R 3131 with an analogue probe
RF-Generator /	: Rohde & Schwarz CMU 200
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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Change history **48**

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HW changes in NSE–8/9, 3210

MOST IMPORTANT CHANGES - SUMMARY:

Check L102 - version and soldering if phone switches off or does not switch on.
Page# 9 & 14

Clock/Time & ringtone problems - HW changes (SB 17).
Page# 8 & 16

Check R103 version if phone does not charge and check C-Cover version (Time dial removal – SB 24).
Page# 8 & 22

Charging problems with ACP-7 charger if battery is totally discharged (SB 42).
page# 6 & 22

Check if protective label is added / problems to switch on the phone (SB 11).
Page# 9 & 12

Check version of key dome sheet / keypad problems – high keypress force (SB 28 & SB 032).
Page# 7 & 32

Check version of G701 („A" version must be changed to „B" version) / poor or no service (SB 018).
Page# 6 & 16

Poweramplifier change and modul version GD7 (SB 030).
Page# 10

New version of 71MHz filter (ceramic package – SB 030).
Page# 10

New CCONT versions (Vs. H to I and to M)– these are not vice versa compatible (SB 030 & SB 040).
Page# 10

New COBBA versions (Vs. 3.1 to 4.1) – these are not vice versa compatible (SB 035).
Page# 10

COBBA underfilled (SB 037).
Page# 10

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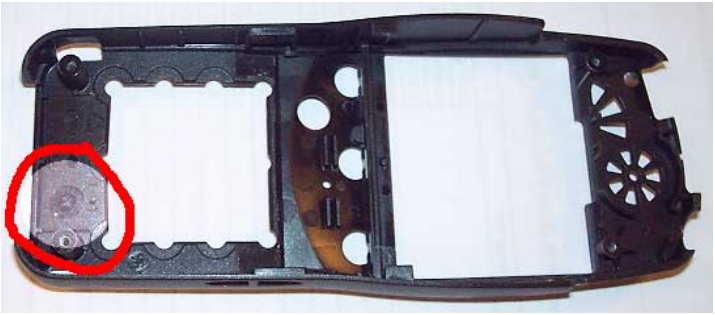
CHARGING PROBLEMS

Check if R103 is broken – if resistor was broken or missing: Change N101, too.
Check C-Cover version, cut the arrow of the time dial in cover or change C-Cover if necessary.
(Service Bulletin 024).



NOT CHARGING (with ACP-7 charger only)

If battery is totally discharged – R132 must be changed to 150k / 1% tolerance and R131 must be changed to 82k / 1% tolerance resistor.
For detailed information see Service Bulletin 042.

POOR OR NO SERVICE

13MHz oscillator (G701) must be changed from version "A" (NGK3092A) to new version "B" (NGK3092B). This version "A" VCTCXO is a component used for phones labeled "Made in Finland", but only within the IMEI range below mentioned.

First NSE-8 IMEI 448896/10/274359/9
Last NSE-8 IMEI 448896/10/422812/8

First NSE-9 IMEI 448898/10/098643/6
Last NSE-9 IMEI 448898/10/149081/8 **(Service Bulletin 018)**

TIME & RINGTONE PROBLEMS

In some cases the ringtone and/or the clock work too slow or too fast – in these cases C148 must be changed to 47p, J 50V and C153 to 18p, J 50V and check 32.768kHz sine- & squarewave signals of B100.
Change oscillator if necessary **(Service Bulletin 017).**

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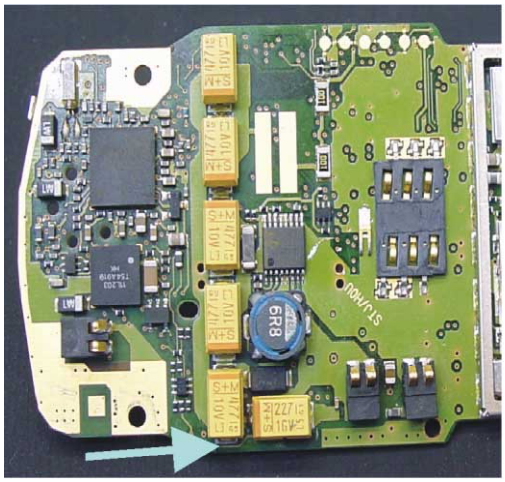
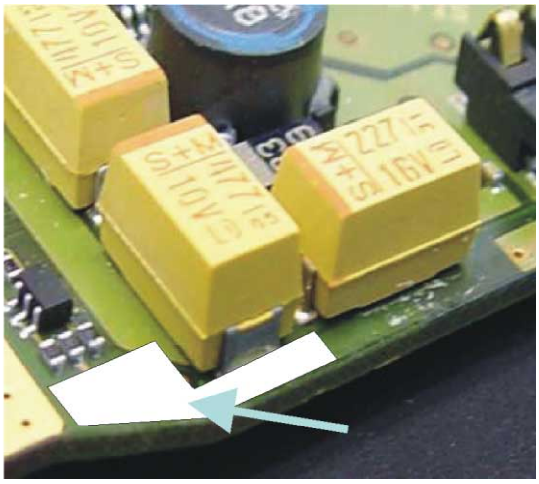
PHONE DOES NOT SWITCH ON

Check if track (R132 to L102), located at C110, is printed as upper layer and if this line is 0 Ohm. Also place an isolation label on this track (see pictures) to protect it for short cuts to D-Cover. This is necessary in IMEI number range below 448896/20/485419/5 and 448896/10/205064/9 **(Service Bulletin 011).**





L102 SOLDERING PROBLEMS

Check soldering of L102 – In some cases the soldering of the coil can be broken on both sides – change if necessary.
Note the different (approved) versions of L102.

The first (oldest version with soldering problem)

The new versions for better reliability below.

KEYPAD PROBLEMS

High key press force (eg. Navikey,2,5,8,0)
These problems occure due to process change at PCB vendor.
IMEI range: First 448903/10/729000/0
Last 449142/10/432508/8
The PCB´s can be identified by a double arrow symbol on the keypad of the PCB. In this case a new modified keydome sheet is available to solve this problem.
(Service Bulletin 028 & 032)

PCN PA BUFFER CHANGE

The PCN PA buffer amplifier (N502) is changed from NEC (µpc2771) to RFMD (RF2367) version –
changes apply to HW versions 5.xx. Also the attenuator between the buffer and the PA (R513, R514, R515) is changed from 2dB to 7dB to compensate the higher saturated power from the RFMD buffer (relative to the NEC buffer)

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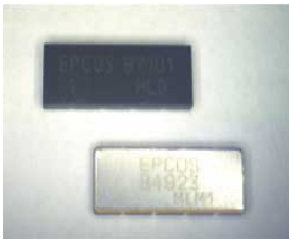
NEW PCB (GD_7), COMPONENT & VENDOR CHANGES

Z700 71MHz FILTER – NEW CERAMIC PACKAGE

If it is necessary to change this filter, please note: The old and the latest type are not compatible and cannot be changed one for the other!



Old

New

N500 / N501 PHILIPS POWERAMPLIFIER

These are used with GD_7xx PCB only and are not compatible with Hitachi amplifiers (different prints). In case of replacement of any poweramplifier type, it is necessary to tune the sidebands (CH1 and CH124 for GSM900 and CH512 and CH885 for GSM1800) in addition to the mid channels (CH60 and CH700) – **for tuning instructions see Service Bulletin 020.**

DIFFERENT CCONT N100 VERSIONS IMPLEMENTED

1st change is CCONT version 2H to version 2I – This new version can replace the old version, but not vice versa!
2nd change is CCONT version 2I to version 2M – New version can replace the old version, but not vice versa!
For detailed information see Service Bulletin 030 & 040

NEW COBBA N200 VERSION IMPLEMENTED

New version COBBA 4.1 can replace the old version COBBA 3.1, but not vice versa!
For detailed information see Service Bulletin 035

COBBA N200 UNDERFILLED

To prevent that symptoms of dropping calls or loosing service appear - resulting from broken solderings under µBGA – underfilling of COBBA is the solution for those cases. It has been used since IMEI 449143/10/716000/x
NOTE: IT IS NOT POSSIBLE TO REWORK OR REPLACE AN UNDERFILLED µBGA COMPONENT!
For detailed information see Service Bulletin 037

New GSM TX Filter (Z601)

The ceramic version of Z601 is changed to a new version – changes apply to HW versions 5.xx / 55.xx.
These versions can be changed against one for the other.

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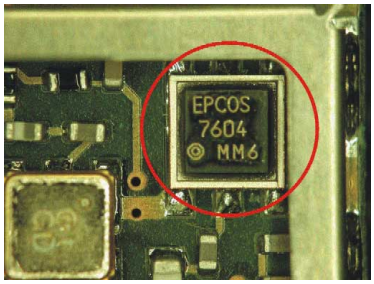
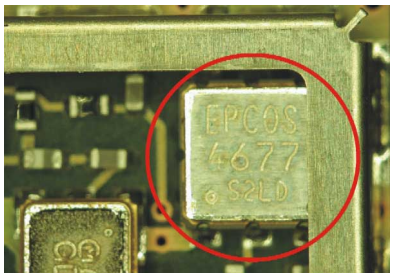
OLD



NEW



left side: old version / right side: new CSSP version

HW CHANGES SUMMARY FOR GD - BOARD

PCB-Vers.	HW changes.	Delete	Add	Remarks
GD7_18	54.06 => 54.10	71MHz Filter (4511109) R717 220Ω (1430734) R718 220Ω (1430734) R701 470Ω (1430744) R606 2.7kΩ (1430832) C749 1.5pF (2320516) C617 68pF (2320556) C618 68pF (2320556) L600 180nH (3643037) L601 180nH (3643037) L701 330nH (3645031)	71MHz Filter (4511161) R717 330Ω (1430740) R718 330Ω (1430740) R701 5.6kΩ (1430772) R606 5.6kΩ (1430772) C749 1.8pF (2320518) C617 82pF (2320558) C618 82pF (2320558) L600 220nH (3643079) L601 220nH (3643079) L701 390nH (3640077)	
GD7_21 GD7_18 to _21	55.10 => 55.45	R315 0Ω (1430690) C529 1pF (2320629)	C529 1pF (2320508) C170 100nF (2320805)	New Philips poweramplifier Atmel Flash IC partially in use
GD7_21	55.45 => 55.60	D300 MAD V5 (4370489) C145 100pF (2320560) C320 10nF (2320620) C149 1.5pF (2320915) N100 CCONT 2H (4370393) 71MHz Filter (4511109)	D300 MAD V9 (4370591) C149 1pF (2320915) N100 CCONT 2I (4370467) 71MHz Filter (4511161)	New 71MHz Filter New CCONT version 2I New MAD V9 (C07) MAD V5 HW-ID: 55.82 MAD V5 / GD7_18 HW-ID: 55.16 varistor R103 shifted
GD7_21	55.60 => 55.61	R319 680kΩ (1430826)		Change of interrupt level for CARDDETX in BB
GD7_21	55.61 => 55.75	N200 COBBA 3.1 (4370575)	N200 COBBA 4.1 (4370643)	New COBBA version 4.1
GD7_21	55.75 => 55.76	Z601 Filt 902MHz (4511015)	Z601 Filter 902MHz (4511155)	New TX-Filter
GD7_21	55.76 => 55.85	N100 CCONT2M (4370467)	N100 CCONT 2M (4370719)	New CCONT version 2M
GD7_21	55.85 => 55.91	D300 MAD V9 (4370591)	D300 MAD V16 (4370687) C308 27pF (2320546)	New MAD version 16 ROM 6
GD7_25				New board with selective OSP

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HW CHANGES SUMMARY FOR GF - BOARD

PCB-Version	HW-changes	Delete	Add	Remarks
GF7_17	3.00 => 3.02	N114 (4219941) C153 27pF (2320546)	V114 (4219941) C153 22pF (2320544)	Improvement of amplitude of 32kHz oscillator
GF7_17	3.02 => 3.05	C232 27pF (2320546) C233 27pF (2320546) C242 27pF (2320546) C243 27pF (2320546)		To get a better TDMA-noise uplink performance
GF7_17	3.05 => 3.06	C148 100pF (2320560) C153 22pF (2320544)	C148 47pF (2320552) C153 18pF (2320604)	To improve the start up of 32kHz oscillator
GF7_18	4.00 => 4.05	C232 27pF (2320546) C233 27pF (2320546) C242 27pF (2320546) C243 27pF (2320546)		To get a better TDMA-noise uplink performance
GF7_18	4.05 => 4.06	C148 100pF (2320560) C153 22pF (2320544)	C148 47pF (2320552) C153 18pF (2320604)	To improve the start up of 32kHz oscillator
GF7_18	4.06 => 4.10	71MHz Filter (4511109) R717 220Ω (1430734) R718 220Ω (1430734) R701 47Ω (1430744) R606 2.7kΩ (1430832) C749 1.5pF (2320516) C617 68pF (2320556) C618 68pF (2320556) L600 180nH (3643037) L601 180nH (3643037) L701 330nH (3645031)	71 MHz Filter (4511161) R717 330Ω (1430740) R718 330Ω (1430740) R701 5.6kΩ (1430772) R606 5.6kΩ (1430772) C749 1.8pF (2320518) C617 82pF (2320558) C618 82pF (2320558) L600 220nH (3643079) L601 220nH (3643079) L701 390nH (3640077)	
GF7_18	4.10 => 4. 15	D300 MAD V5 (4370489) C145 100pF (2320560) C320 10nF (2320620) C149 2.2pF (2320915) N100 CCONT 2IH (4370393)	D300 MAD V9 (4370591) C149 2.2 pF (2320915) N100 CCONT 2I (4370467)	New CCONT Version 2I New MAD V9 (C07)
GF7_18 => GF7_20	4.06 => 5.00	R104 10Ω (1430700) R619 22Ω (1430710) R605 1kΩ (1430754) R727 1.5kΩ (1430758) R135 330kΩ (1430816) C307 1nF (2312401) C613 27pF (2320546) C205 33nF (2320783) C122 10µF (2610003) D300 MAD V5 (4370489)	R619 18Ω (1430708) R727 1.8kΩ (1430760) C205 10nF (2320805) D300 MAD V9 (4370591) R630 22Ω (1430710) R320 100Ω (1430726) R620 270Ω (1430738) R621 270Ω (1430738) R335 330kΩ (1430816) R314 0Ω (1430690) R327 1kΩ (1430754) C122 1µF (2312401) C318 1µF (2312401) C245 1µF (2320481) C332 27pF (2320546) C650 27pF (2320546) C320 10nF (2320620)	New MAD Version 9 (C07)

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GF7_20	5.00 => 5.15	C145 100pF (2320560) C320 10nF (2320620) C149 2.2pF (2320915) N100 CCONT 2IH (4370393)	C149 2.2pF (2320915) N100 CCONT 2I (4370467)	New CCONT version 2I
GF7_20	5.15 => 5.16	R508 47Ω (1430718) R319 680KΩ (1430826)	R508 68Ω (1430722)	Improvements in RF/PCN (R508) Changed interrupt level for CARDDETX in BB (R319)
GF7_20	5.16 => 5.30	N200 COBBA 3.1 (4370575)	N200 COBBA 4.1 (4370643)	New COBBA Version 4.1
GF7_20	5.30 => 5.31	Z601 Filter 902MHz (4511015)	Z601 Filter 902MHz (4511155)	New TX-Filter
GF7_20	5.31 => 5.86	N100 CCONT 2M (4370467)	N100 CCONT 2M (4370719)	New CCONT version 2M
GF7_20	5.89 => 5.90	L103 60R/100MHz (3203717)	L103 470R/100MHz (3203737)	L103 changed, which improves 600 KHz modulation spectrum
GF7_20	5.87 => 5.94	R514 10Ω (1430700) R513 470Ω (1430744) R515 470Ω (1430744) N502 RF Ampl. (4340263)	R514 47Ω (1430718) N502 RF Ampl. (4340263)	New PCN PA buffer RFMD=> damp adaption: (R513,R514,R515)
GF7_22				New board with selective OSP

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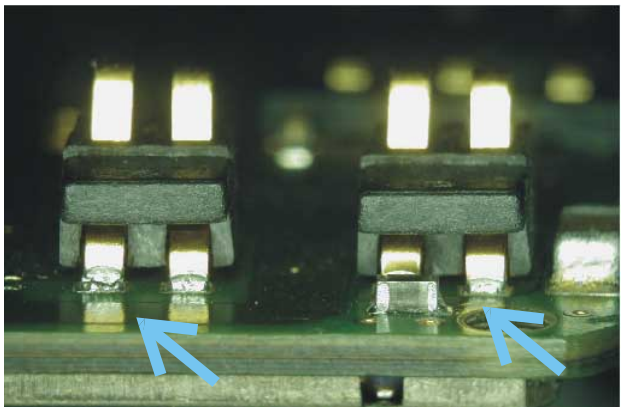
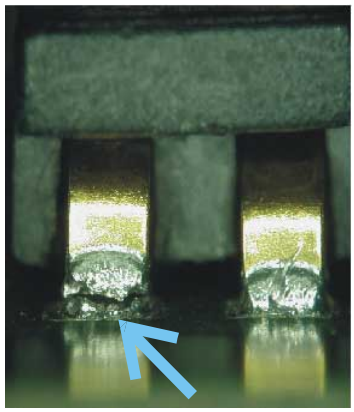
PHONE DOES NOT SWITCH ON

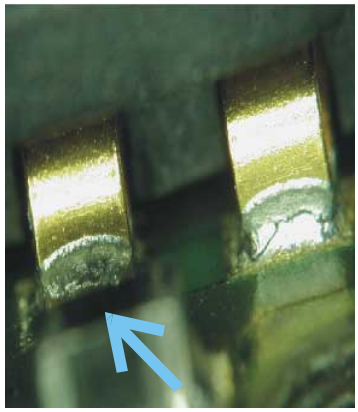
At first always check mechanical appearance of battery connectors X101/X102 if bent or dirty etc. – defect connectors could cause additional faults like "not charging" or the phone switches off intermittently.

Does not switch on with battery (nor with service battery)

Check if phone works properly in service jig.
Check if BTEMP AD value is in range of 300.
Check battery connectors X101 / X102 for broken solderings or bent spring contacts (see pictures below).
Check if phone works also after connecting LCD module in jig (short circuit in VBB line from LCD possible).







X504 related fault

Check if connector X504 has its correct position – especially after rework in its area.
If it is misplaced or bent, it could cause possible short circuits to D - Cover with throughholes.

POWER switch S416 faulty

Check mechanical condition of S416.
Check if PWRON at R413 drops to 0V during pressing power switch.
Change powerswitch S416 or continue with CCONT chapter on page#17.

L102 broken/poor soldered

Check soldering of L102.
Check resistance of L102 = 0Ω.
Resolder coil or change if necessary.
See the different versions of coil in HW changes chapter on page#9.

VB line faulty

Check battery voltage VB 2.7VDC at L102.
Check VB 2.8VDC at R132.
Check connection (0Ω) between R132/L102.
See HW changes chapter on page#9 for additional PCB protection.

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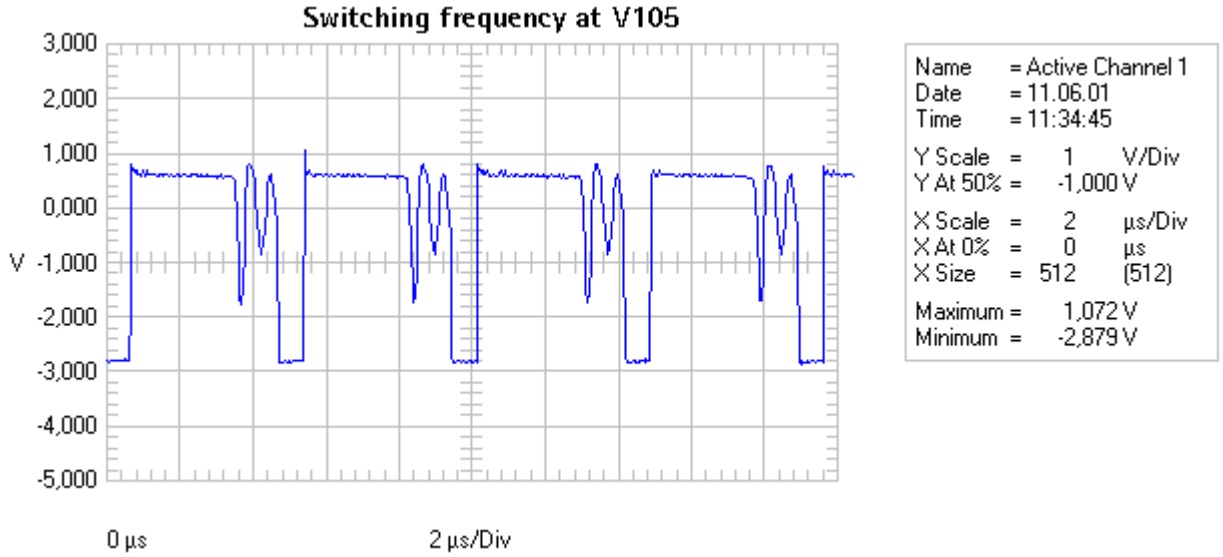
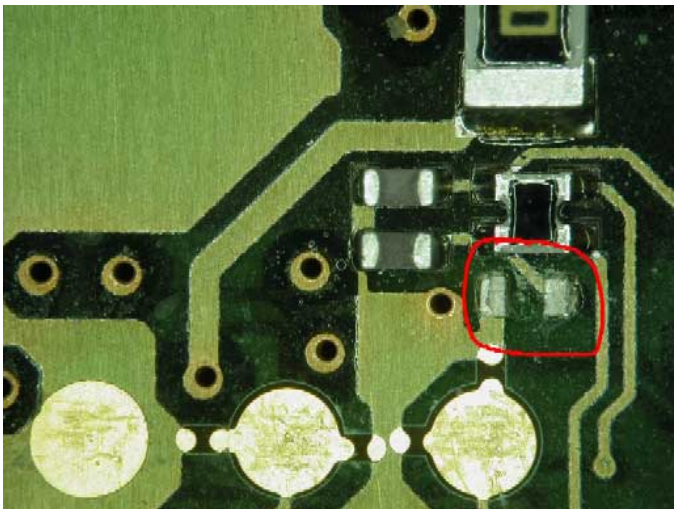
DC/DC Converter V105 faulty

Check the difference between V101 cathode 3.2VDC / anode 2.6VDC.
Check at V105 – pin 4, 5, 12, and 13: switching frequency 600kHz.
Check 1.2VDC at V105, pin 15.
Check at V105, pin3: 0V. If not, check the respective voltage dividers R131, R132, R134, R143, R144.
If all ok – change V105.



FLASH D301 / SRAM D302 related faults

Check if the current consumption is approximately 20mA.
Try to flash the phone – if this does not work go to chapter "FLASH update not possible" on page#30.
Check also near the service contacts on the PCB - If any component is missing (like on picture below) – flashing will not work!



Torn off components are the result of sliding the phone on the service battery – the contacts can be damaged, too.
NOTE: Always handle the phone in combination with the service battery with care to prevent those failures!

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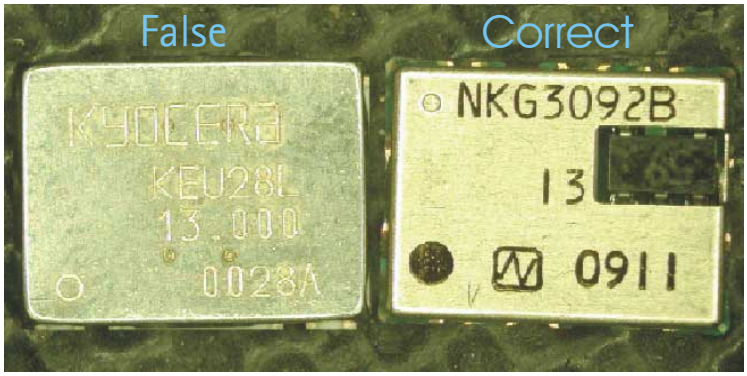
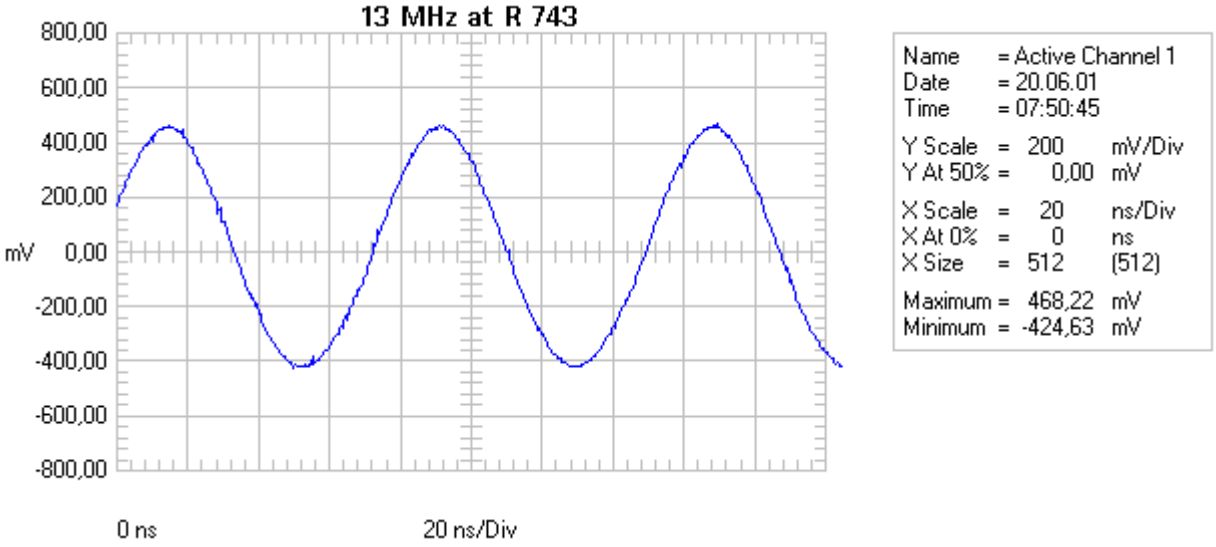
G701 faulty

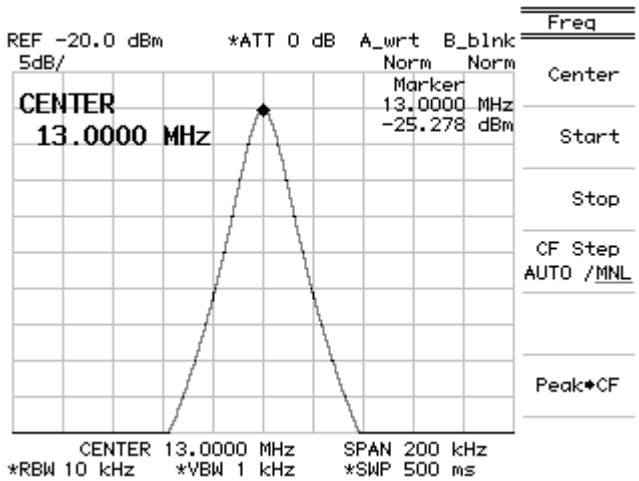
Check VCC 2.8VDC at C750 **(Phone must be set in local mode).**
Check control voltage (AFC) 0.1 – 2.3V at C715.
Check 13MHz reference frequency ±50 Hz (900mVpp) at R743.

NOTE:

If you have to change the oscillator, pay attention to use the correct one – also see HW changes chapter on page#8







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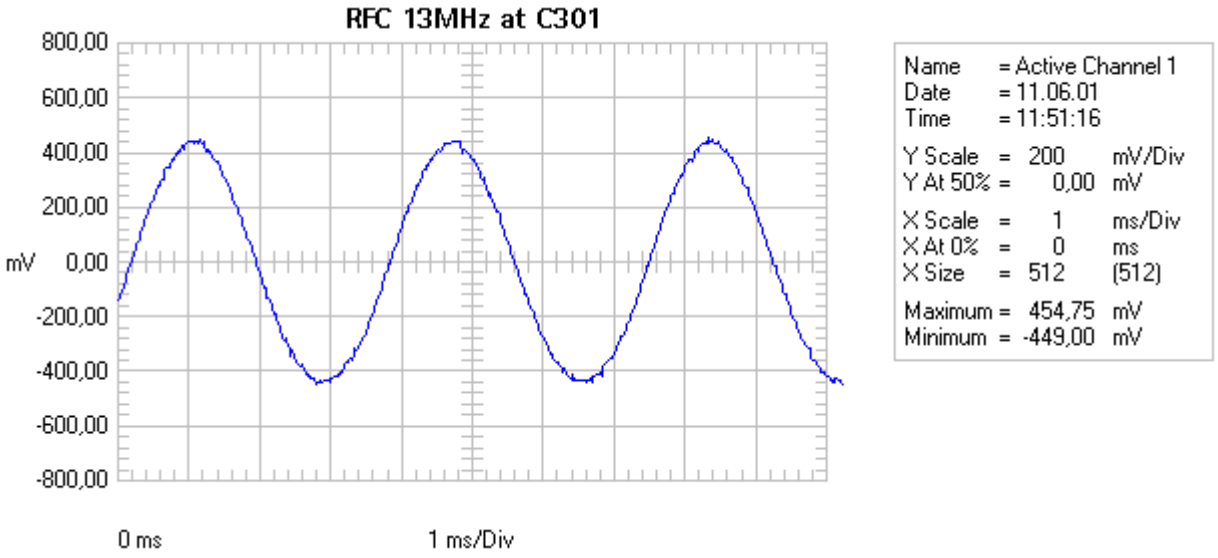
MAD D300 faulty

Check 32.768 kHz SLEEPCLK squarewave at C145 3Vpp.
Check 13MHz RFC at C301 900 mVpp.
Check VBB 2.8 VDC at C117.
Check SLEEPX 2.8 VDC at J340.
Check PURX 2.8 VDC at R303.



CCONT N100 faulty

Check at R413, if 3.2VDC drops to 0V during pressing powerswitch.
Check SLEEPCLK 32.768kHz squarewave at C145: 3Vpp.
Check VBB 2.8VDC at C117.
Check Vref 1.5VDC at C123.
Check PURX 2.8VDC at R303.
Check VXO 2.8 VDC at C102.

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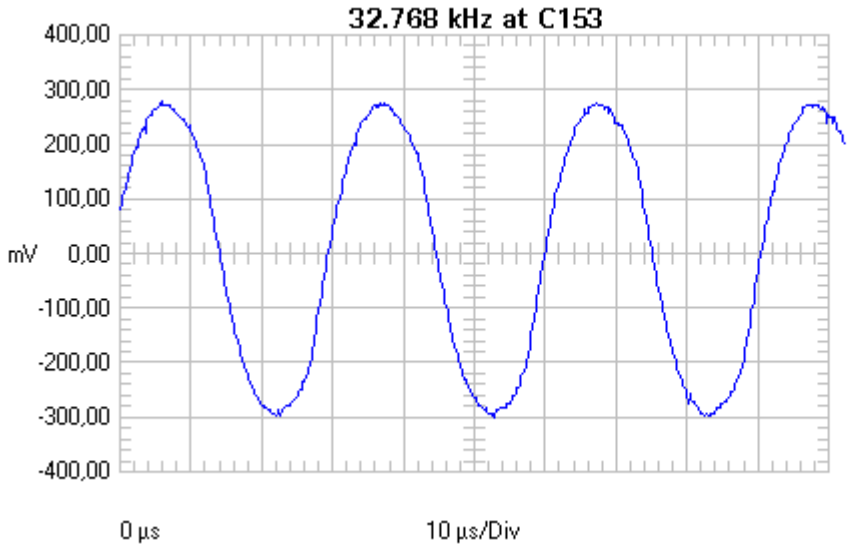
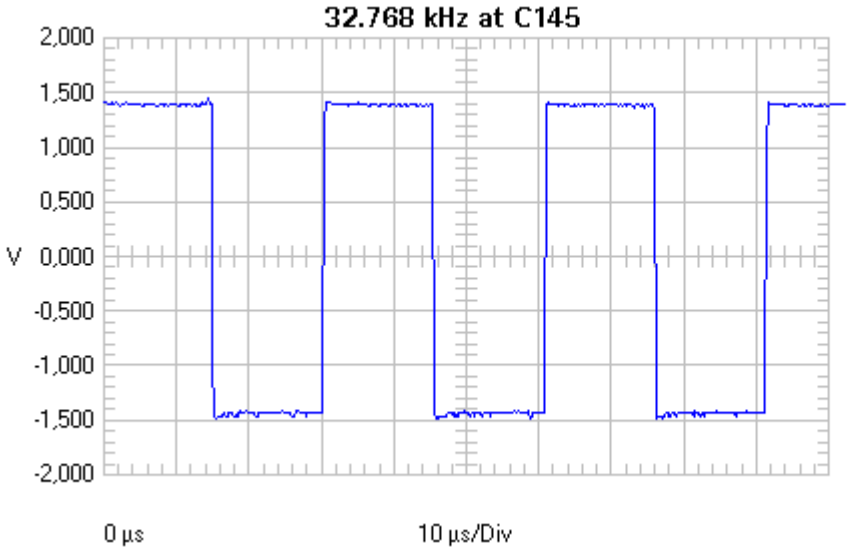
B100 faulty

Check 32.768kHz sinewave at C153 – 600mVpp.
Check Sleepclock area: C147, C148, C149, C153 and R121-R124.
Check 32.768kHz squarewave at C145 – 3Vpp.



Name	= Active Channel 1	
Date	= 28.05.01	
Time	= 14:46:47	
Y Scale	= 100	mV/Div
Y At 50%	= 0,00	mV
X Scale	= 10	µs/Div
X At 0%	= 0	µs
X Size	= 512	(512)
Maximum	= 279,31	mV
Minimum	= -299,50	mV



Name	= Active Channel 1	
Date	= 28.05.01	
Time	= 14:48:08	
Y Scale	= 500	mV/Div
Y At 50%	= 0,00	mV
X Scale	= 10	µs/Div
X At 0%	= 0	µs
X Size	= 512	(512)
Maximum	= 1,459	V
Minimum	= -1,478	V

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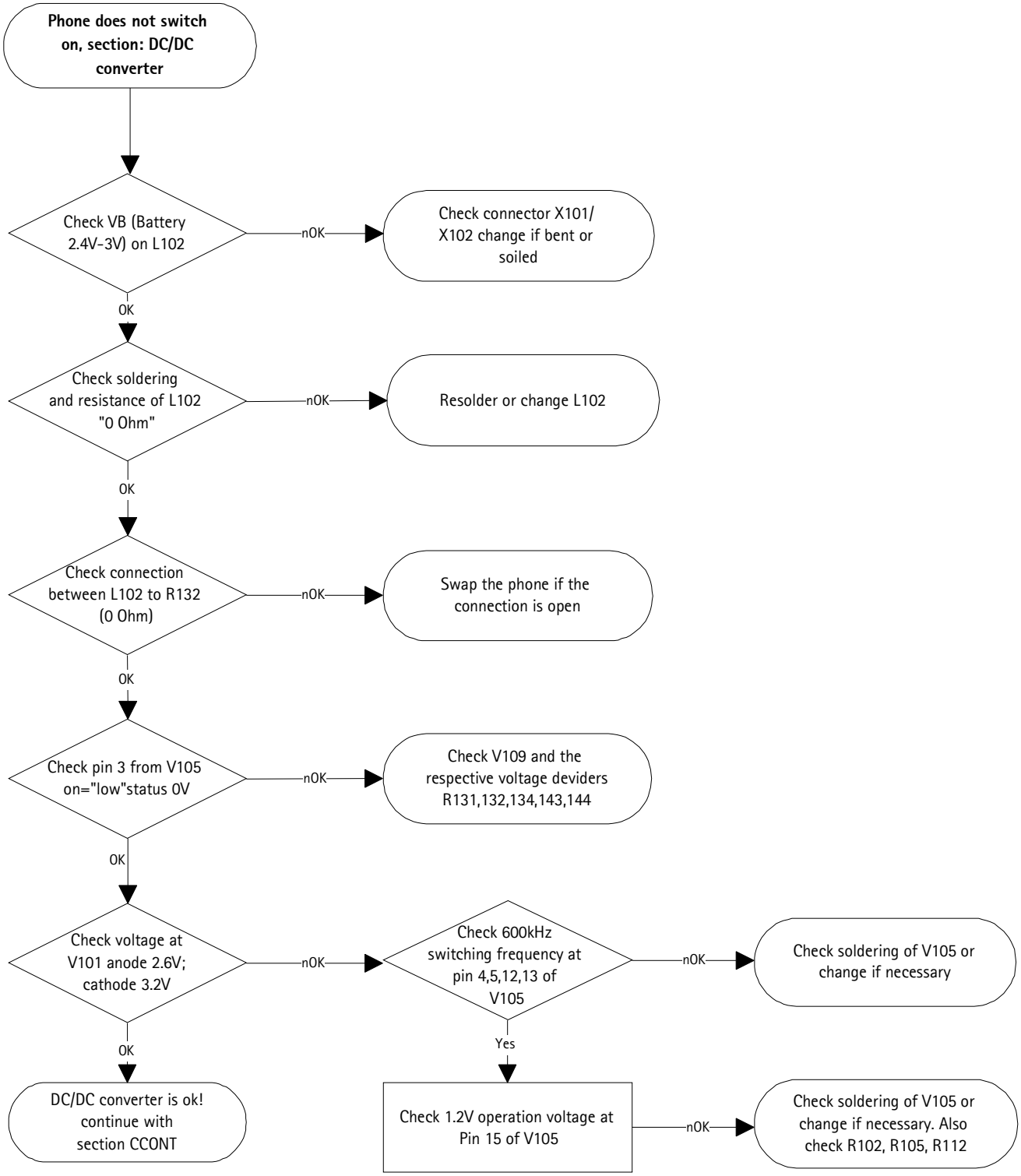
PHONE DOES NOT SWITCH ON: SECTION DC/DC CONVERTER



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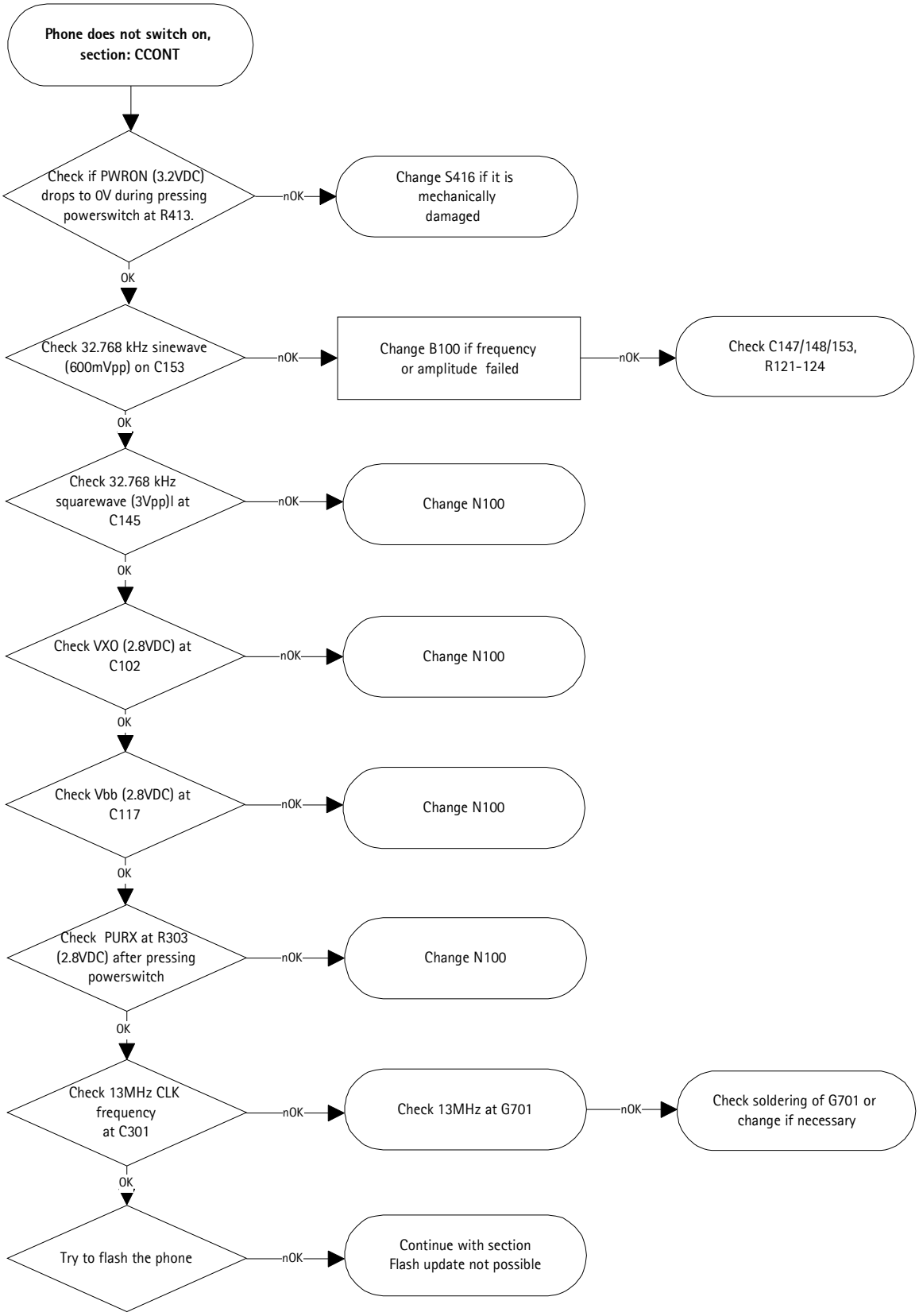
PHONE DOES NOT SWITCH ON: SECTION CCONT

(First disable Watchdog)



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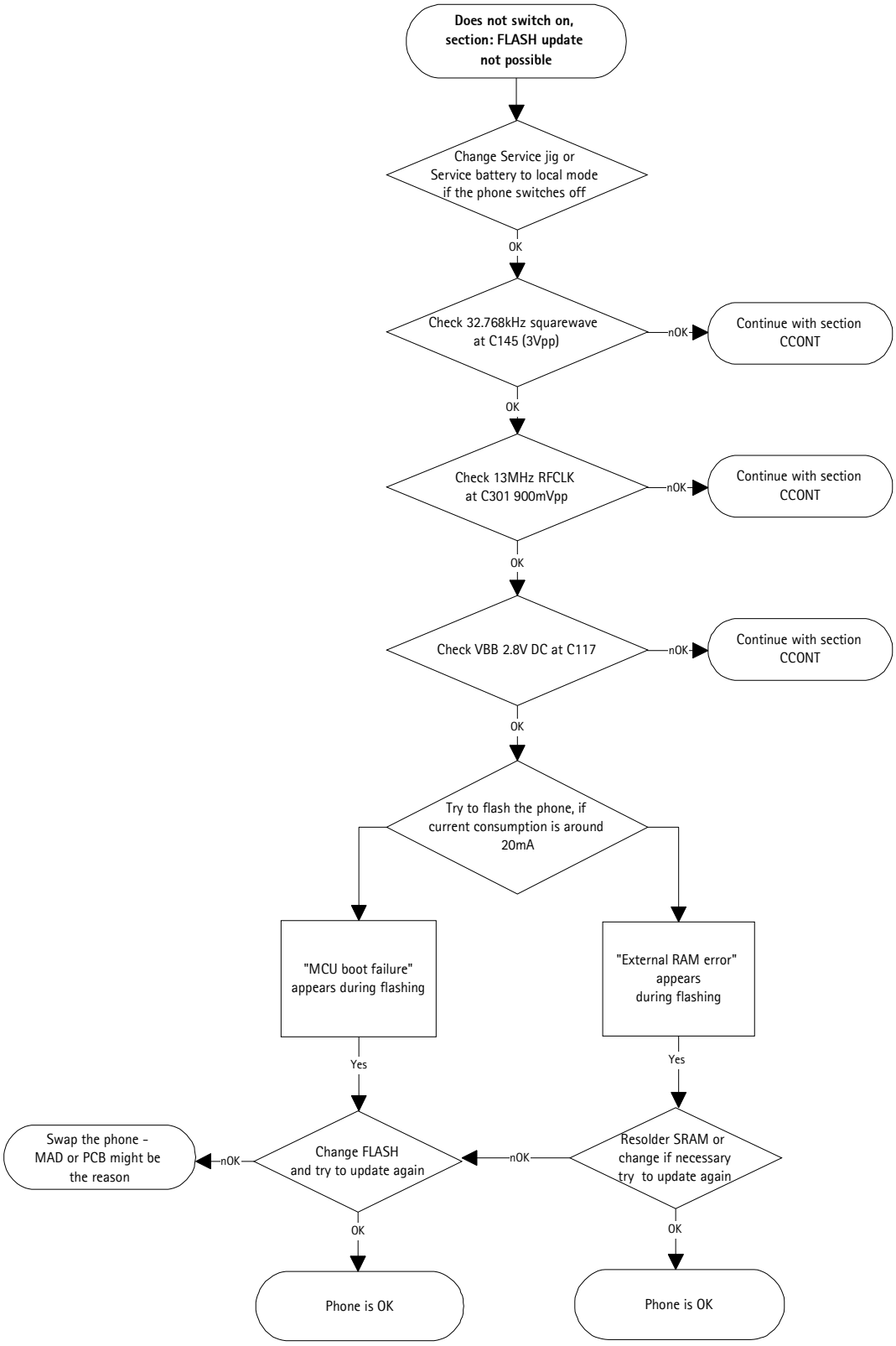
PHONE DOES NOT SWITCH ON / FLASH UPDATE NOT POSSIBLE



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NOT CHARGING FAILURES

If you are using WinTesla NSE-8/9 with DLL 2.41.03 or lower, the error message "current calibration fail" will appear in every charge tuning calibration test!
See additional information in Service Manual:
Chapter "Service Software Instructions", page# 21 (Energy Management Calibration)

X101/102 and X503 faulty

First of all check the mechanical condition of all connectors and clean connector-pads (X503) on PCB and/or change bent or damaged connectors if necessary –also see pictures on page # 14.
If any connector is poor soldered – additional faults will be the result!

F100 faulty

Check resistance of fuse F100 (0Ω).
Check resistance of V_CHARGE_IN line to GND – should be around 10KΩ.
If the line is in lower-Ohm range, check the PCB for possible liquid or mechanical damages.

R103 faulty or broken

If the phone does not charge when ACP-9 fast charger is connected:
Check mechanical condition of R103 (some versions of this resistor can be broken through mechanical stress)
If the component is broken or is completely missing – change R103 and additional PSCC N101.
(PSCC defect by using charger with broken or missing R103)
If a broken resistor is the reason for this fault, check also C-Cover and cut away the arrow in time dial (by using e.g. scalpel) or replace it if necessary – **see HW changes page# 8 for additional information.**

R125 to R127 connection faulty

Check with **WinTesla/local mode/Testing/ADC readings** if any AD value is out of limits – especially **BTEMP (317 ≅ 25°).**
Check connection between R125 (near CCONT) and R127 (near X101) = 0Ω and check the resistance of R127 = 47kΩ.
If R127 is broken or poor soldered, the battery indication bar on LCD will appear flashing when charger is connected to phone.

C100 broken

Display-message "Not charging"
Check mechanical condition of C100 (near PSCC) – change capacitor if broken (sometimes only hairline crack)
Check C-Cover (bent or damaged) if C100 is broken – change if necessary

Charging problems with ACP – 8/9 charger

(Sometimes charging stops after LCD light turned off)
Check if the problems do appear with these chargers only and if the phone works properly with ACP – 7 charger.
Check R117 (10kΩ) and R142 (10kΩ) in CHARG_CTRL line if these are poor soldered or in MΩ range – change if necessary.
Check V200 in CHARG_CTRL line for shorts to GND.
Check CHARG_CTRL line to GND.

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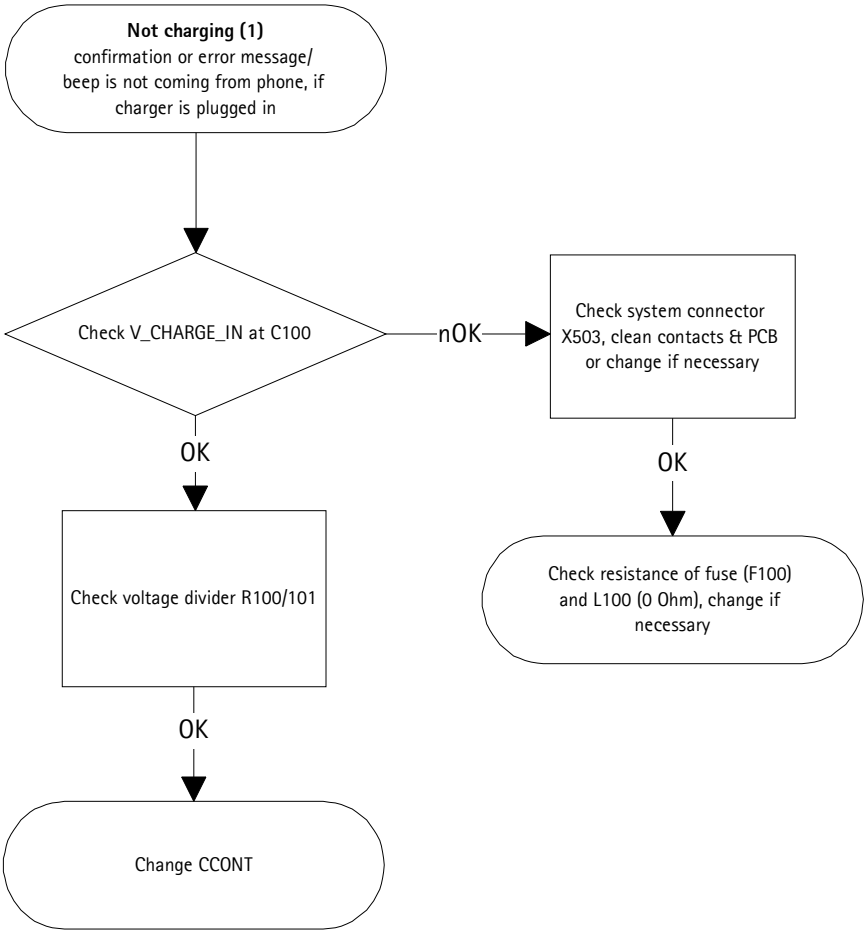
NOT CHARGING (1)



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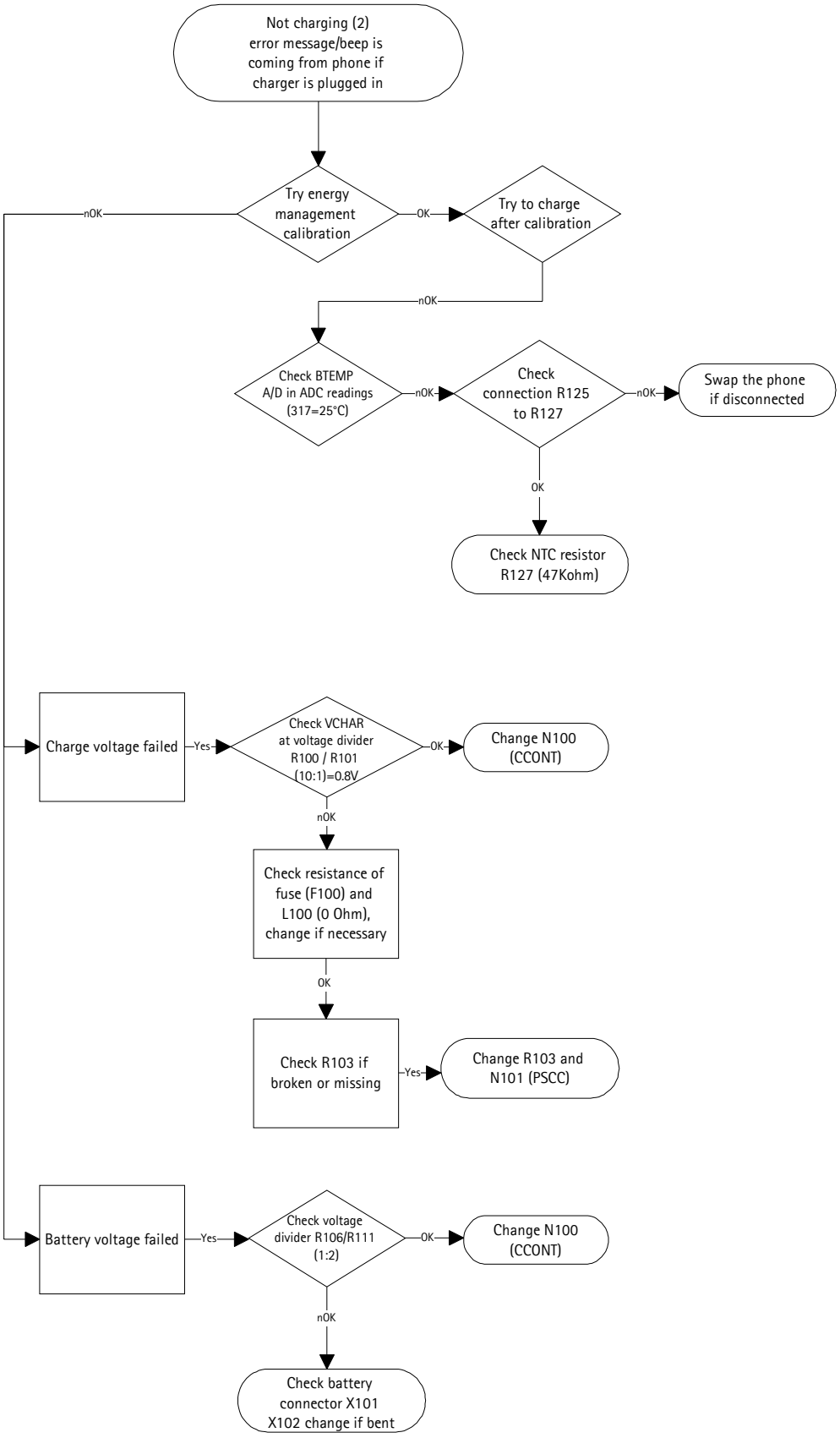
NOT CHARGING (2)



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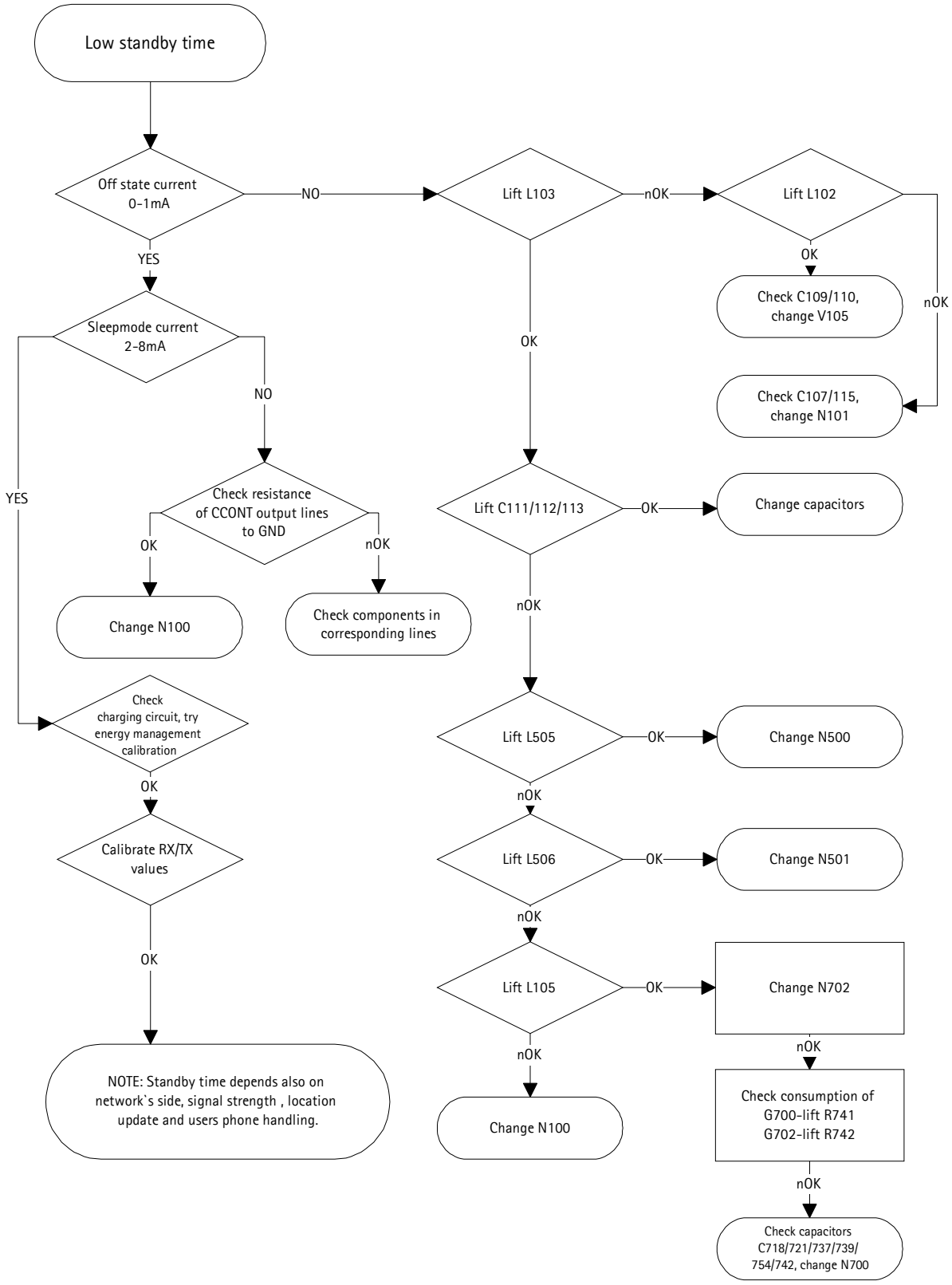
LOW STANDBY TIME



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C111, C112, C113, C115 faulty

Check the current consumption in different operation modes (refer to the table below).
Check if high current consumption resulting from VB, Vout or output voltages of CCONT.
Disconnect L105 (N702 supply) L505, L506 (PA´s supply) coil by coil and check consumption after every removing.
Check and desolder C111, C112, C113 and C115.
Try Energy Management Calibration if charging stops too early or battery is too hot after charging.
see chapter "NOT CHARGING FAULTS" for additional information.

Current consumption values

Function mode	Minimum current in mA	Maximum current in mA
Off state	0	1
Sleep mode	2	8
Call mode GSM 900	< 100*	< 370**
Call mode GSM 1800	< 100*	< 350**

CH60, Power level 19 CH700 Power level 15
Ch60, Power level 5 CH700 Power level 0
Measured with TDS-7

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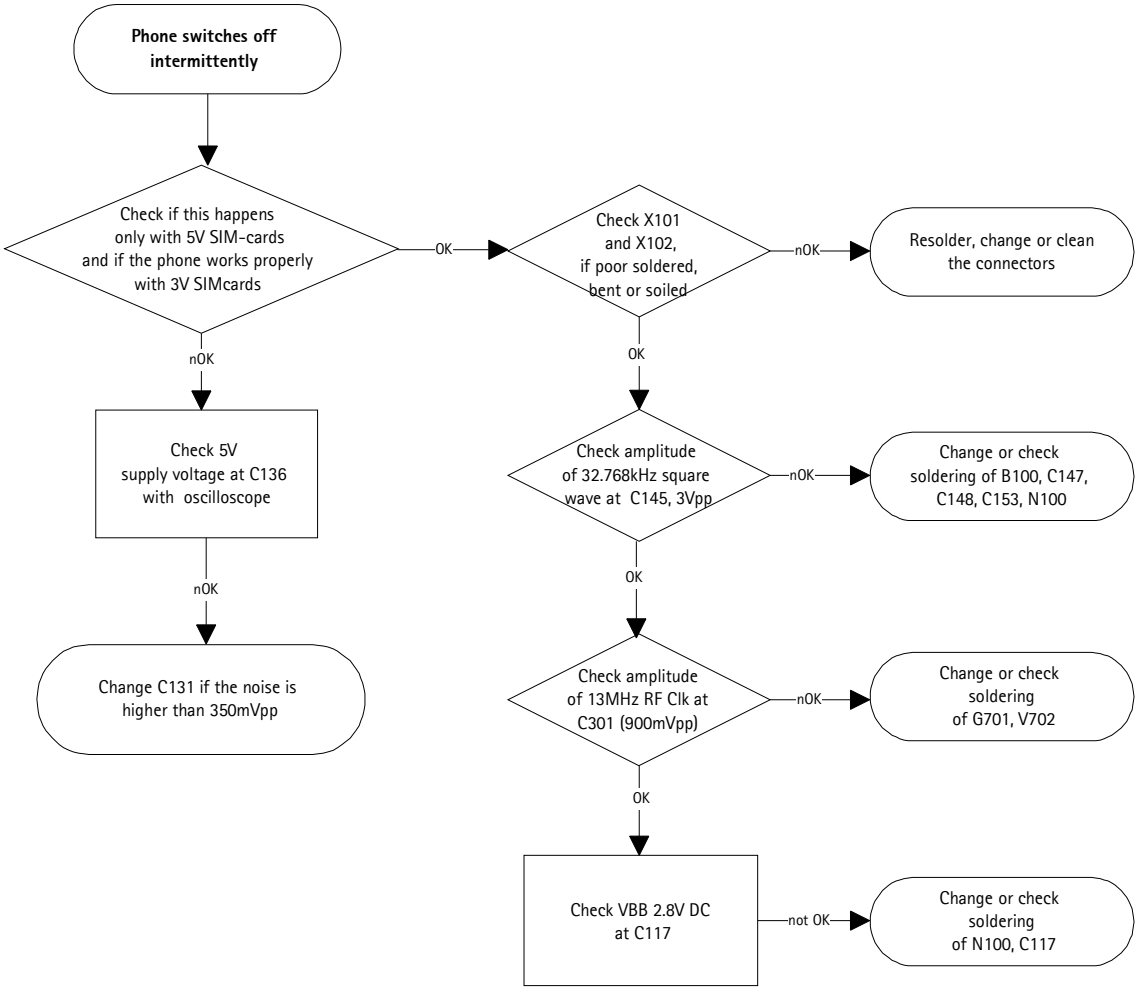
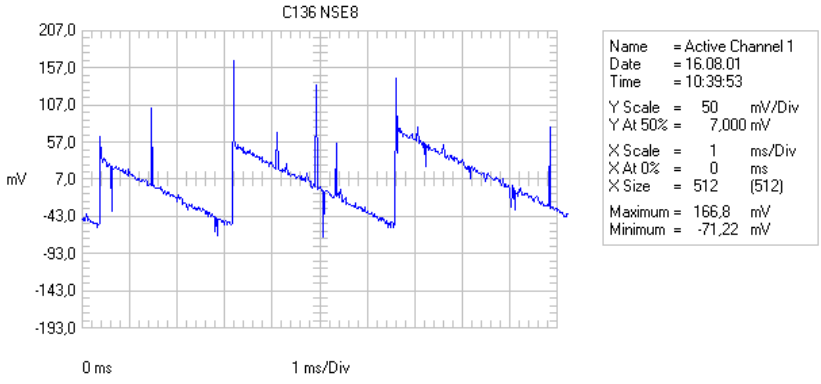
PHONE SWITCHES OFF



C136 10µF/10V

Check if the phone does not switch off with 3V SIM Cards.
Check if VSIM at C136 is approximately 4.8V-5.2V, with maximal 350mVpp noise overlap - see diagram below.
Diagram of normal noise at C136.



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CONTACT SERVICE FAILURES

D303 EEPROM faulty
Check using WinTesla if IMEI or product data are somehow corrupted.
Check 2.8VDC at pin 8 of EEPROM.
Do not use the option "Full factory set" with WinTesla. Otherwise the original IMEI will be changed to "65656565..."
Change EEPROM if it is permitted to you and rewrite all phone data (IMEI, product code...).
If you are not authorized to change EEPROM and the IMEI is missing, write a note with a short comment, and send it together with the phone to a higher level NOKIA Service Center.

COBBA serial fail
After changing COBBA N200 – take care that all components in the periphery of COBBA are not shifted from their position! Especially check R765, R766, R233 for the correct position.

CCONT interface failed
Remove Display and check selftest again. If failure persists, change CCONT and check for oxidized pads.

Flash update not possible

D301 FLASH / D302 SRAM - faulty or poor soldered
"Contact service " appears on LCD
Check with **WinTesla/Testing/Self tests** – which of the MCU self test fails

If "MCU ROM Checksum failed" appears or if the phone does not switch on:
Check current consumption. If continuously around 20mA, try to flash the phone.
If the fault remains after flashing:
Check soldering of SRAM D302
Change Flash D301 and try to flash the phone again.

If "MCU RAM Interface failed" or
if "MCU RAM Component failed" appears:
Check 32.768KHz Sleepclock squarewave at C145 (3Vpp).
Check 13MHz RFC at C301 (900mVpp).
Check VBB at C117 – 2.8VDC.
Resolder SRAM D302 and try to flash the phone.
If any error message appears during flashing ("External RAM error"), change SRAM D302 and retry.
If error message persists, change Flash D301 and flash again.
If the failure persists, probably MAD D300 or PCB faulty.

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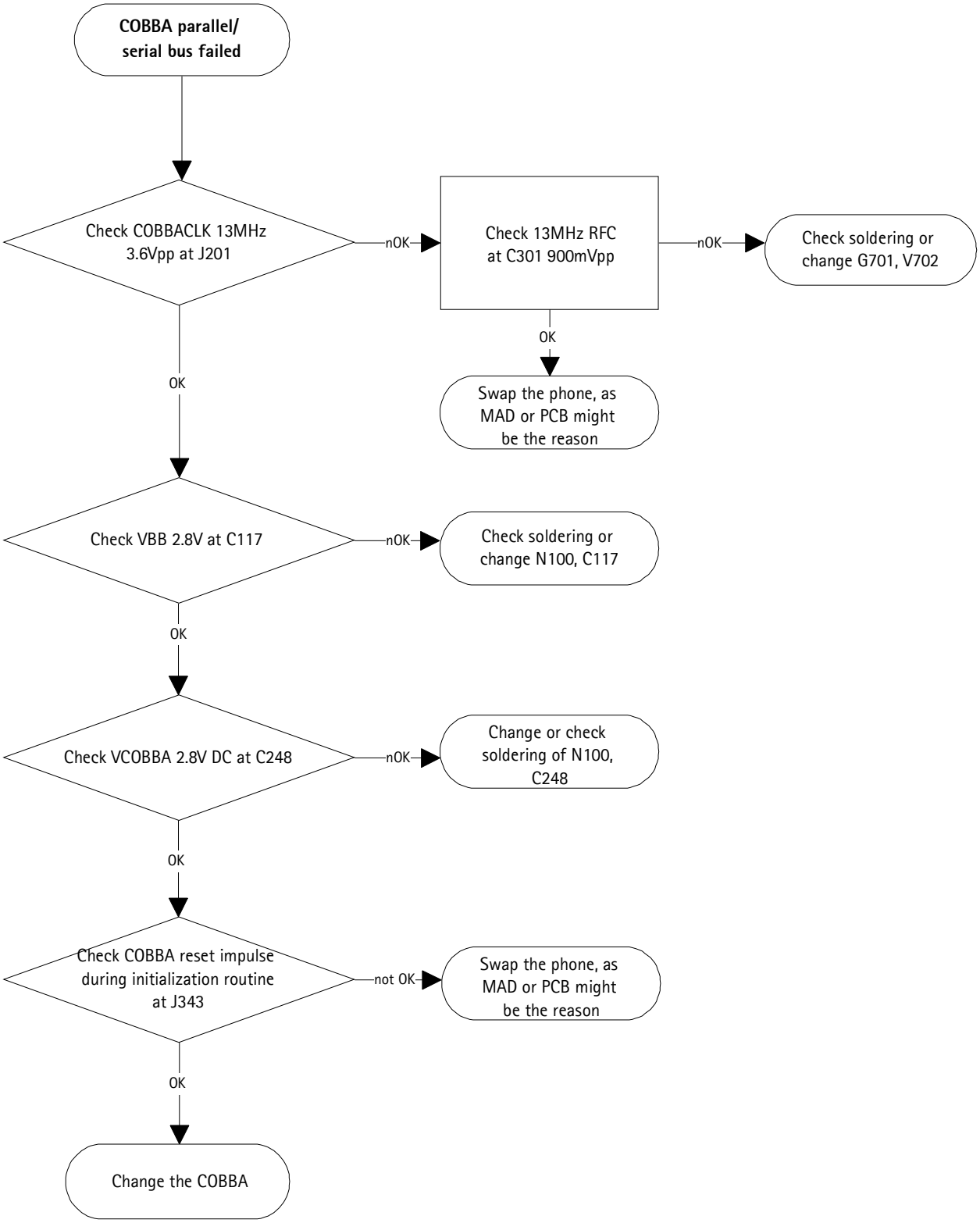
CONTACT SERVICE - COBBA PARALLEL / SERIAL BUS FAILED



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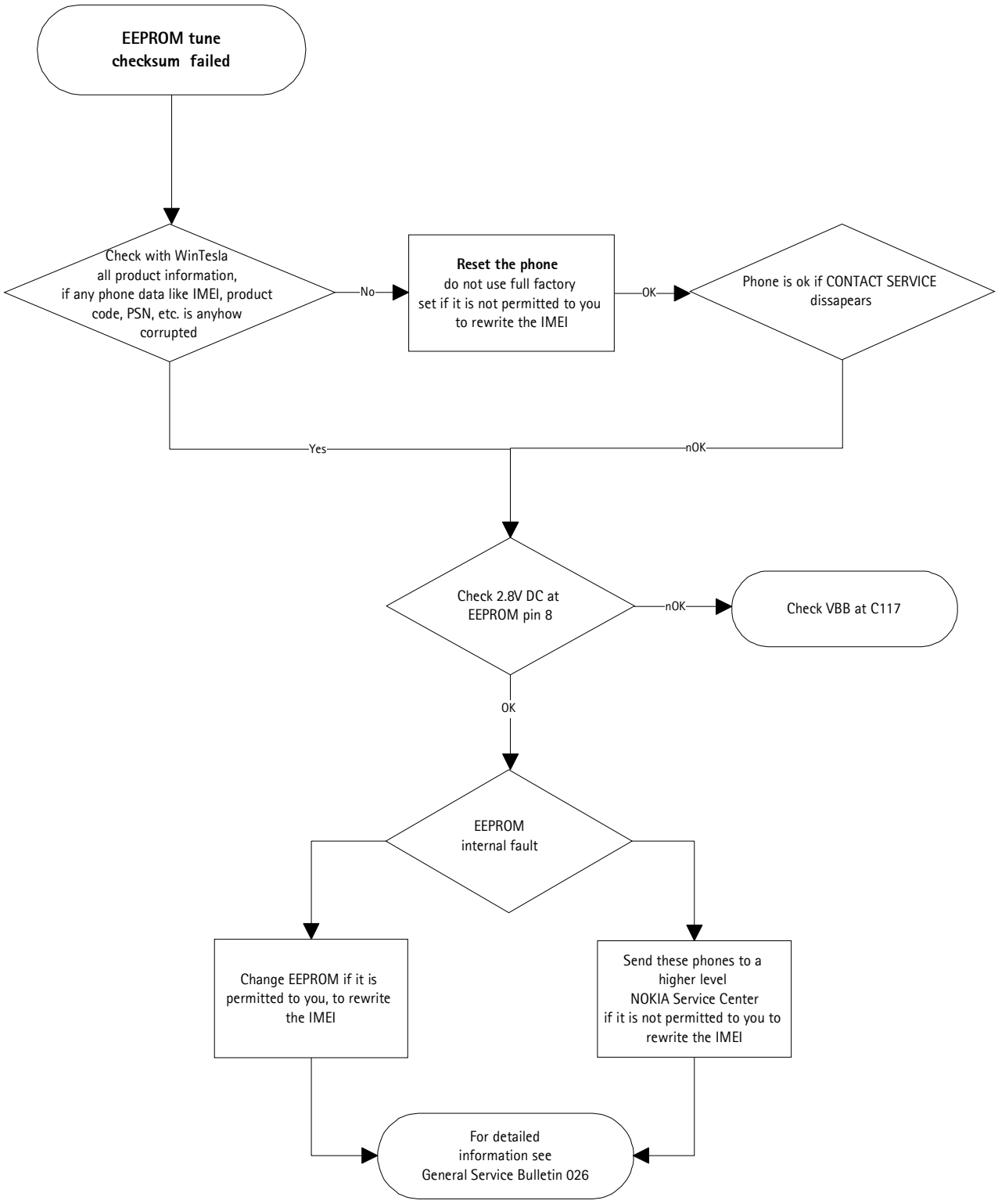
CONTACT SERVICE – EEPROM TUNE CHECKSUM FAILED



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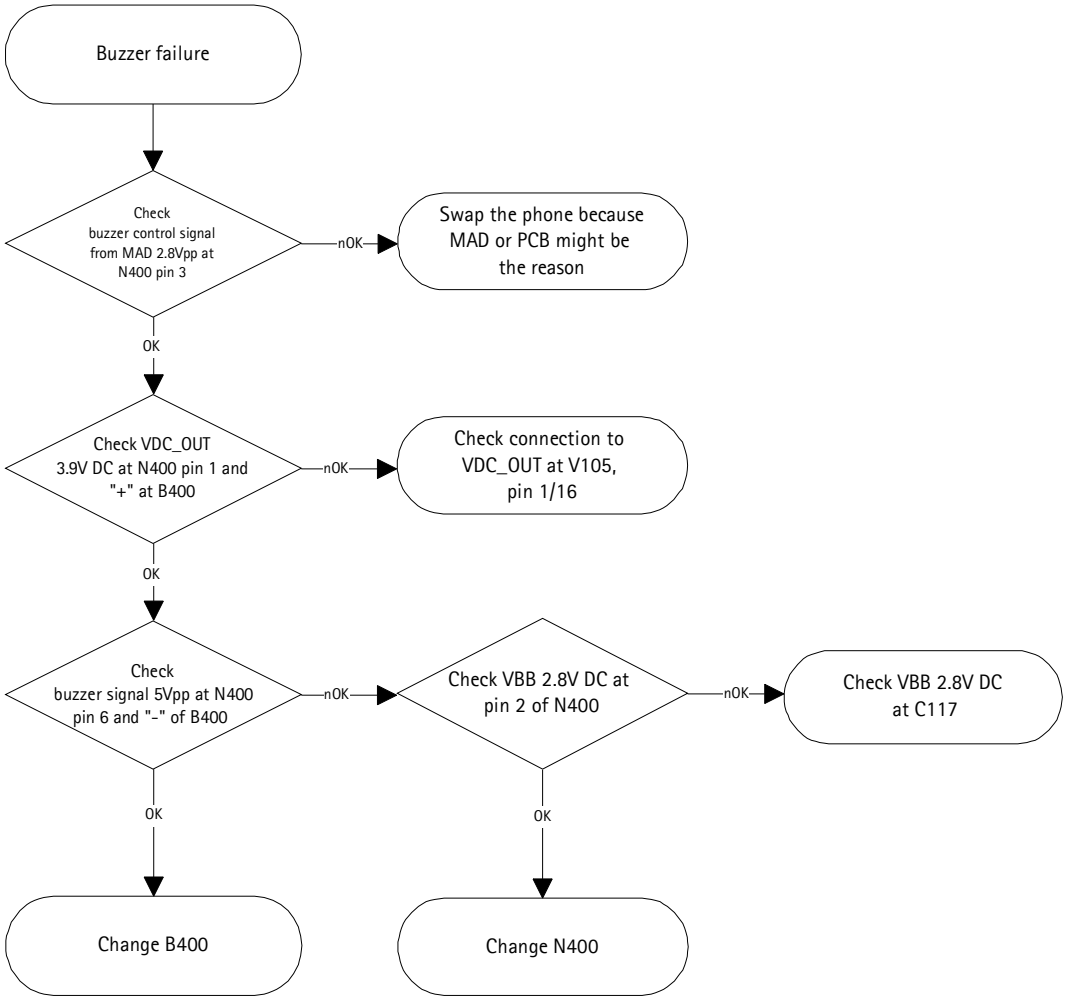
USER INTERFACE FAULTS

BUZZER FAILURE



B400 / board connections broken

Check buzzer control signal from MAD at N400, pin 3: 2.8Vpp / 1kHz
(use WinTesla/Testing/Audio Level 1, 1000Hz)
Check VDC_OUT 3.9VDC at N400, pin 1 and at Plus-pin of buzzer.
Check VBB 2.8VDC at N400, pin 2.
Check buzzer signal at Minus-pin of buzzer: 5Vpp, 1kHz.
Check board connection N400, pin 6 to Minus-pin of buzzer.
Change buzzer if all ok.

Clock time / Ringtone too fast or too slow - B100 faulty

Check Sleepclock 32.768kHz squarewave at C145 – 3Vpp
Check B100, C147, C148, C153, N100.
See Service Bulletin 017 for additional information (value change: capacitors C148, C153).

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Display Faults

If one or more lines are missing completely as in picture below, change LCD unit

Faulty display sample

Black lines on LCD

Check VBB 2.8VDC at C400 and R421
If voltage ok, change LCD

No display function

If backlight works, but no symbol on LCD appears, in the most cases there are broken solderings under CCONT N100

No LCD backlight

Check VDC_OUT = 3.2VDC at V406, V409, V412, V413
Use WinTesla/Testing/User Interface/1.Test Pattern "on"/"off".
Check LCD_LED line at N400, pin 9: 1.2VDC in "on" mode / 1.9VDC in "off" mode.
Check cathode of V406, V409, V412, V413: 1.2VDC "on"/ 1.9VDC "off".
Check LCD_LIGHT line at N400, pin 7: 2.8VDC "on".
Check also soldering of R415 and/or for shorts to GND.

KEYPAD FAILURE

Keymat faulty

Check the bottom of keymat for broken pins or mechanical damage.

Board / Dome Sheet soiled

If there are only one or two keys without function, check and clean the keyboard area and Dome Sheet if soiled.
NOTE: Different versions of Dome Sheets are available - **see HW changes on page# 9**.
If all faulty keys are in the same ROW or COL line, check connections between the corresponding keys and to GND.
If any line is disconnected between the keys, swap the unit as PCB is faulty.

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INTERNAL AUDIO FAULTS

L202, L203 faulty

Check resistance from L202, L203 to speaker pads normal 0Ω.
Check resistance from L202, L203 to GND and between both lines, Normal: high resistance range >1MΩ.

Speaker – No, quiet or distorted received audio signal.

Check mechanical condition of speaker.
Check resistance of speaker - around 30Ω.

Microphone – No, quiet or distorted transmitted audio signal.

Check contact pads of microphone.
Check resistance of microphone - around 800Ω.
Check microphone voltage 1.7VDC at C242 (use WinTesla/ Testing/ Audio/ internal/ Loop on).
Check audio signal at C258 and C259.

X503 – Bottom connector

Check microphone contact springs in connector.
Check contact springs to the board. Change connector if bent.
Clean the contact pads on PCB.

N200 COBBA faulty

Check VBB 2.8VDC at C117 near CCONT.
Check VCOBBA 2.8VDC C248 near COBBA.
Check COBBACLK 3.6Vpp at J201 - see diagram at page# 41.
Check COBBARESET impulse during initialization routine at J343 (see diagram "COBBA RESET").
Change COBBA (if not underfilled) and rewrite IMEI and SIMlock data.
If error persists - MAD or PCB might be the reason.
SWAP the unit because MAD is not changeable.

Note:
Rewrite SIMlock and IMEI entries with Nokia Security Password and make a SW-update or send these phones to a higher level NOKIA Service Center!

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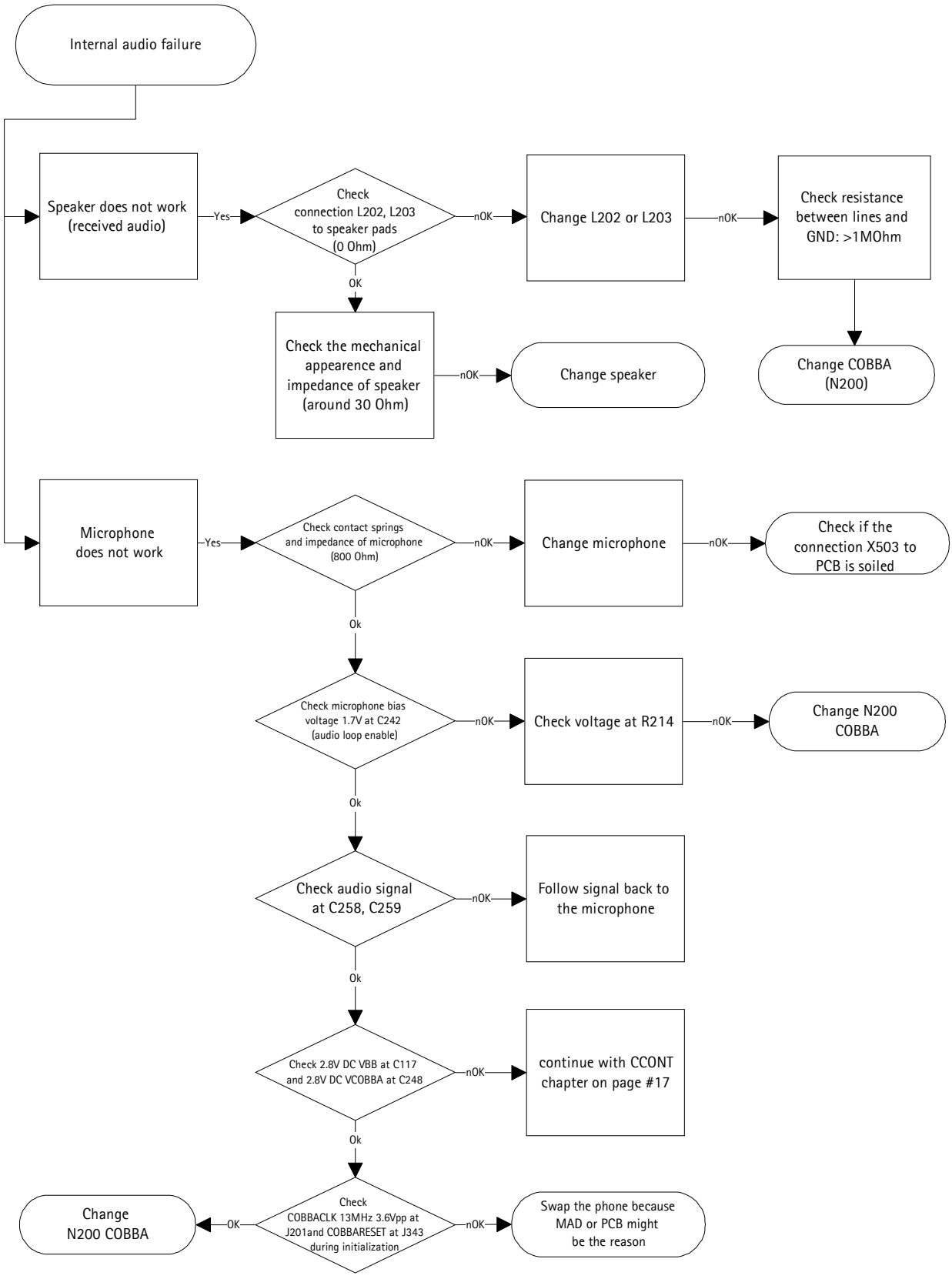
INTERNAL AUDIO FAILURE



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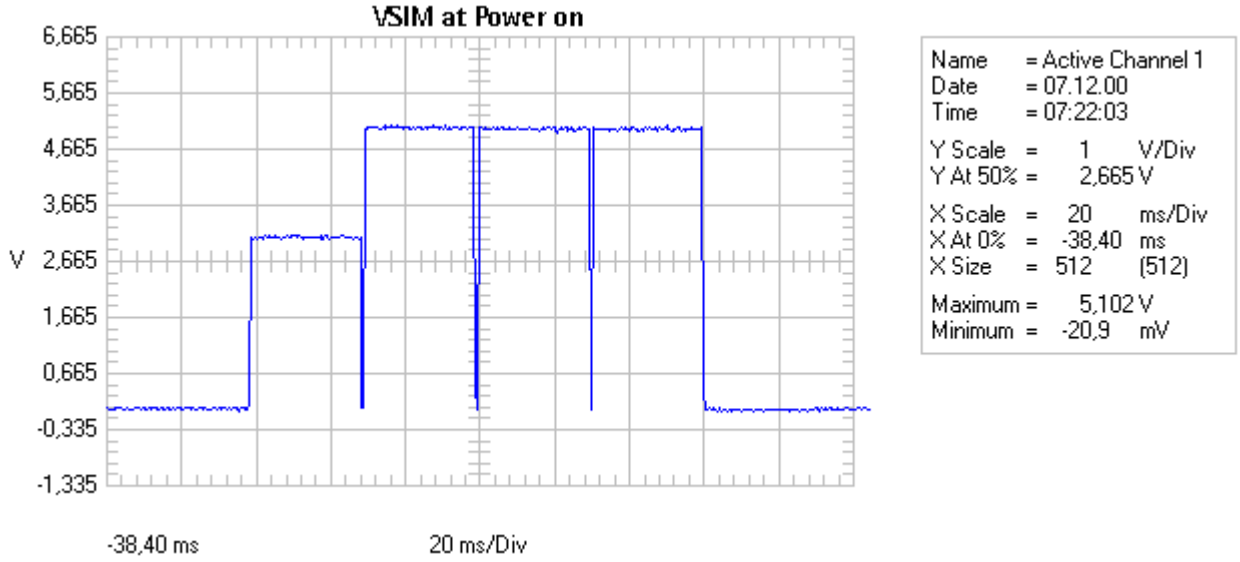
SIMCARD FAILURES

First of all – always check the mechanical condition of all connectors: X100, X101, X102 and change if contact springs are bent, soiled or possible torn off traces/pads under X100.
Also check solderings of connectors and areas for possible liquid damages.

"INSERT SIMCARD"

Check if the phone works properly with a Test SIM.
If Test SIM works check R115, R116 (both 100Ω) if these are in a high Ohm range.
Check at SIMcard reader if VSIM is pulsed to 3/5Vpp, refer to VSIM picture – if not, change N100 if necessary.
Check SIM lines and especially V112 for shorts to GND.
Check components in SIM lines (R115, R116 and C137 – C141) for short circuits or capacity loss.



"SIMCARD NOT ACCEPTED"

Open with **WinTesla/View/Quick-RF-info,** to see if a possible SIMlock is activated.
Compare the data listed in MCC & MNC with SIMlock list for the respective product code.
If SIMlock settings are ok, but the MSIN data field is closed to any special IMSI data range:
ONLY the provider is allowed to open this SIMlock!
If the listed data does not fit to the product code:
Correct SIMlock settings with NOKIA Security Password, if this procedure is permitted to you.
If SIMlock is not active and/or SIMcard is still not accepted after correct data input – change COBBA N200
NOTE:
After rework of COBBA it is necessary to rewrite SIMlock data with NOKIA Security Password if it is permitted to you.

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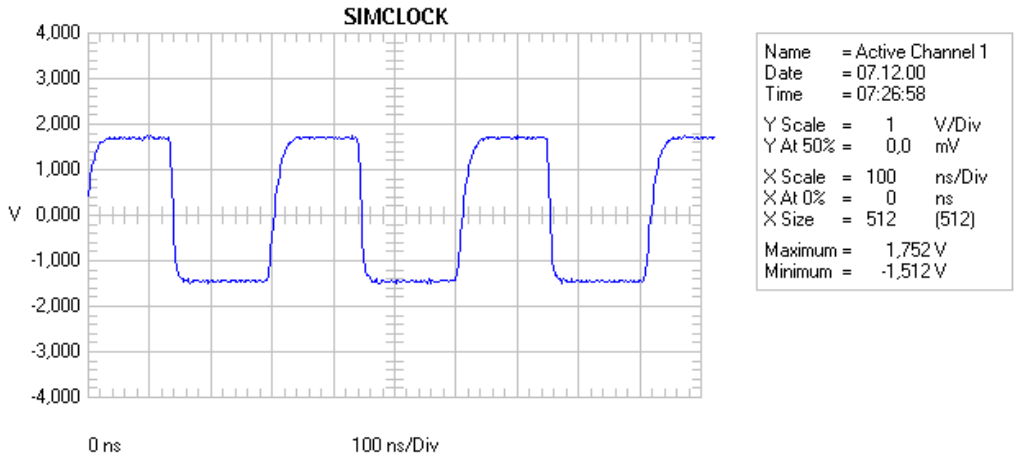
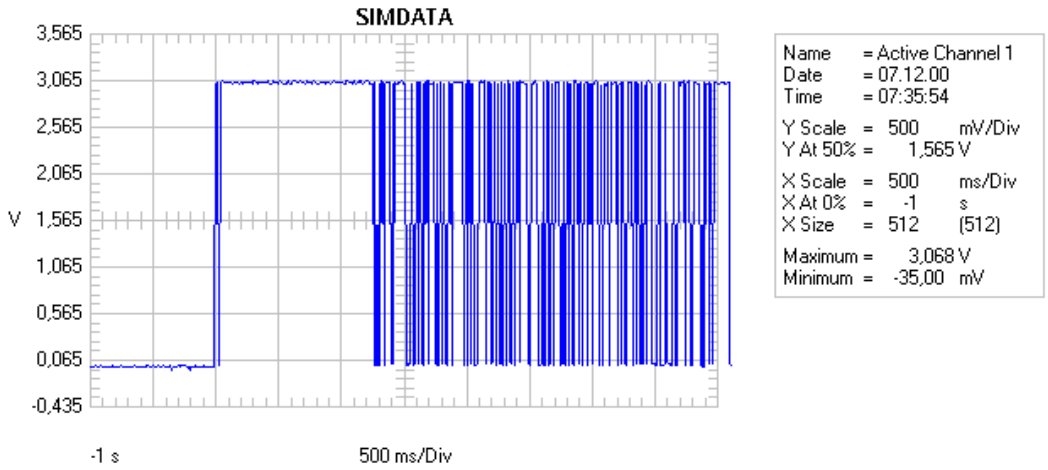
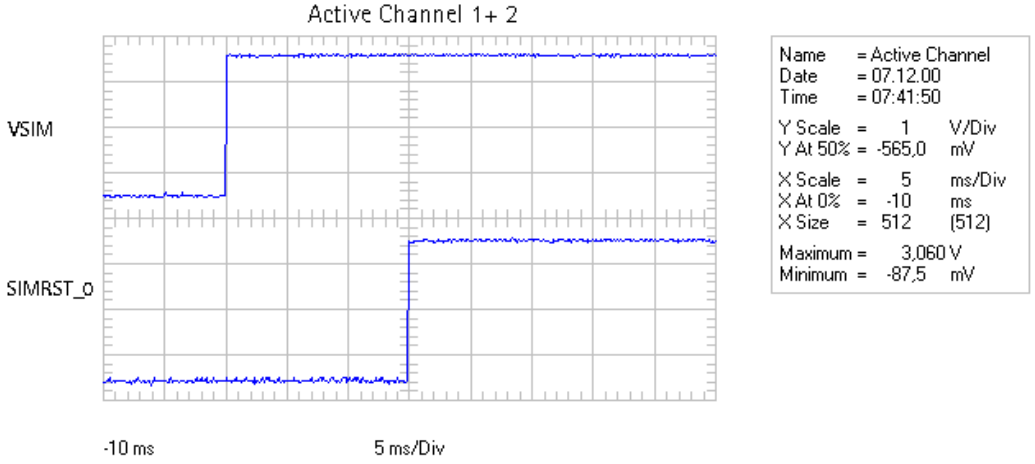
If other SIMcard problems appear, check the following signals at SIMcard reader pins:
SIMclock (pin x), SIMdata (pin 4) – but note:
These signals are only present when SIMcard is active (e.g. when phone registers to the network).





SIMreset (SIMRST_0) is low active, which means that SIMcard will be reseted when SIMreset is 0V.
This is the case after switching on the phone (see next diagram).
While VSIM is already high, SIMreset keeps low for a few milliseconds – in this time SIMcard will be reset.



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X100, SIMcard reader
Check soldering
Check contacts - change connector if bent

N100, CCONT
Check SIMDATA (Pin 4 SIMreader), SIMClock 3.25MHz (Pin 3 SIMreader), SIMReset (Pin 2 SIMreader) and VSIM 3V/5VDC (Pin 1/5 SIMreader) depends on used SIMcard
See diagramss on page# 36.

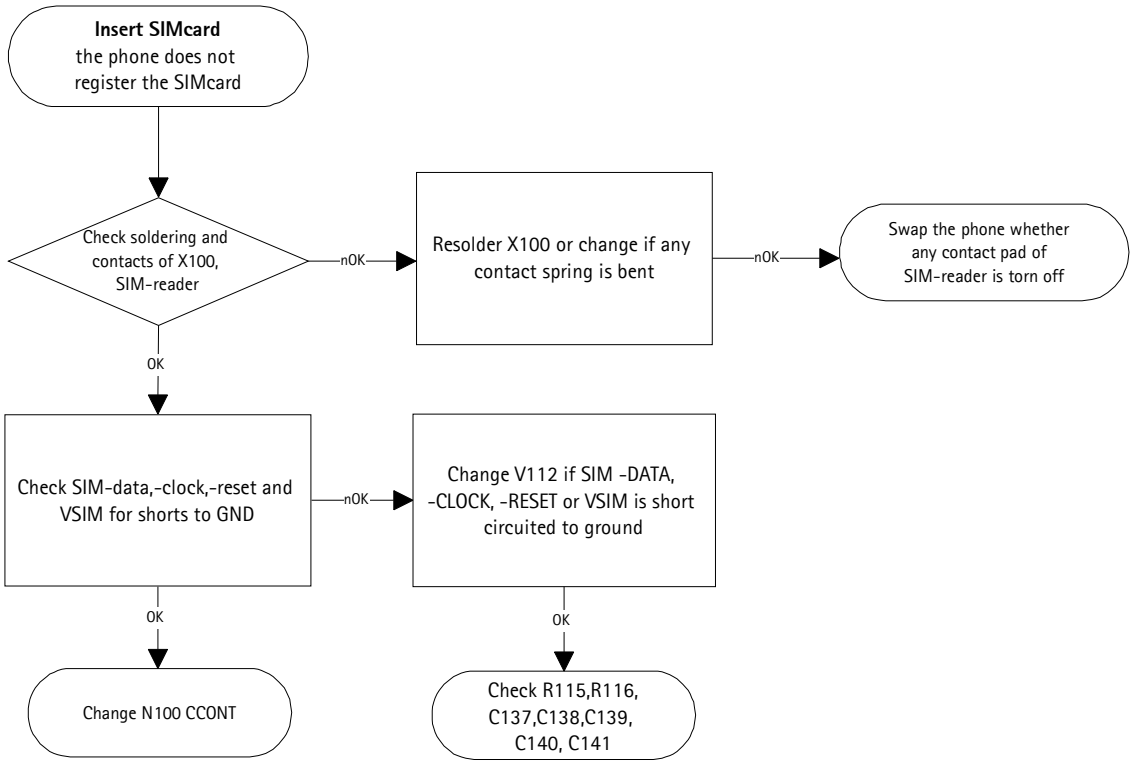
V112 faulty
Change component if SIMDATA, SIMClock, SIMReset or VSIM is short circuited to GND
Check R115, R116, C137, C138, C139, C140, C141 for short circuits or capacity loss

CCONT N100 faulty
Refer to "Insert SIM Card" procedure – **see Flowchart on page# 37.**

COBBA N200 faulty
Change COBBA if all SIM LOCK entries and SIMcard signals from CCONT are ok
Swap the phone if component is underfilled!

Note:
Rewrite SIMlock and IMEI entries with Nokia Security Password and make a SW-update or send these phones to an authorized NOKIA Service Center.

"Insert Simcard" failure



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RF PART FAILURES

In case of any fault you suppose in the RF part of your phone: Try to calibrate RX/TX-values first to define the fault. Refer to spectrum samples on page#46

Low receiver signal strength indicator – Antenna faulty

Check the fixed position of the antenna – do not touch the conductive area with bare fingers!
Check spring connector X501 – change if spring contacts are bent (the GND spring will always look bend down a bit)
Check the indicator level with a new antenna.

No service or long time to get network coverage

Check sleepclock frequency 32.768kHz at B100 – change B100 if frequency does not fit
(see also chapter "Phone does not switch on – B100 faulty")

Z501 faulty (low RX Quality / GSM1800)

If RX calibration fails – see RF part faults in previous chapter
If RX calibration works or in some cases the low reference level cannot be set – check if Z501 bent
Change Z501 if necessary

No service failures summary

At first set the RF-Generator to a high RF-level output: e.g. –40dBm
Use WinTesla to set the phone in the following mode: Local mode/Testing/RF Controls/Active unit "RX"/continuous mode

G701 – VCTCXO faulty

Check 13MHz reference frequency at SUMMA N700, pin 15 – frequency error ±50Hz / 900mVpp
(see also chapter "Phone does not switch on – G701 faulty") **for additional information see Service Bulletin 018**

If all voltages ok and no frequency deviation is realized, but intermittent call interrupts occuring over and over again - it is also possible that G701 has a not detectable internal failure – so change G701 if the phone has those intermittent call problems.

N600 CRFU faulty / Z600 faulty: "failed to set high reference ..."

Check the incoming RF-frequency (e.g. GSM/CH60: 947MHz) at N600, pin 27
Check LNA_AGC (FRACTRL) at N600, pin 28: 2.8VDC
Check VRX_1 at N600, **pin 33, 38, 45, 46**: 2.8VDC
Check LNA_OUT 2.3VDC at N600, pin 23 and output of Z600 (attenuation in/out ~15dBm) at N600, pin 18, 19
(In some cases it could be possible that Z600 shorts LNA_OUT)
Check UHF LO frequency (GSM/CH60 = 2036MHz) at N600, pin 4 (app. –20dBm) – **Frequency deviation 0Hz!**
Check 71MHz intermediate frequency output at N600, pin 15, 16.
Check soldering of N600 and/or change CRFU if necessary.

No RX in PCN-mode only

Check IF 187MHz at N600 pin 45, 46 (out) and pin 11, 12 (in)
Check IF 71MHz at N600 pin 15, 16 (out)
Check ¼ VHF 116MHz at N600 pin 9
Check V_VHF = 2.8V at N600 pin 13 – if not ok, change CCONT N100

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Z700 faulty – RX calibration fault: "failed to set high reference ..."

Check 71MHz intermediate frequency at Z700 in and out (attenuation ~15dBm)
Check components in output lines of Z700 (C701, C704, C749, L701, R701) if output amplitude is different between both lines.
Check for possibly broken solderings under the component.

Z701 faulty – RX calibration fault: "failed to set low reference ..."

Check 13MHz intermediate frequency output at N700, pin 30
Check 13MHz IF input at N700, pin 25, 26 (attenuation in/out ~20dBm)
Check 13MHz IF at Z701 (attenuation in/out ~5dbm)
Check soldering of Z701 or change if necessary
Check IF input lines (N700, pin 25, 26) to GND - 10kΩ - and periphery of Z701 (R717, R718, R719, C706)

G700 faulty

Check UHF frequency at G700 for high spurios emission and/or frequency deviation
Check VDC_OUT at N702, pin 6 and also VDC_OUT connection to L103
Check connection from N702, pin 4 to R741
Check VCP 5VDC supply voltage at N700, pin 13, 22
If VCP lower than 4.8VDC check components in VCP line back to CCONT and/or change N100 if necessary
Check UHF VC at N700, pin 21: 1.9V – 3.2VDC depending on the used channel
Check VC with oscilloscope for noise – check especially soldering of R733
Check C136 (e.g. for capacity loss) if UHF frequency is not adjustable only in higher channel range
Change G700 if necessary

N700 faulty

Check 13MHz reference frequency at N700, pin 15: 900mVpp (frequency deviation ±50Hz)
Check VRX_2 at N700, pin 35: 2.8VDC
Check incoming 71MHz IF at N700, pin 37, 38 and outgoing 13MHz IF (measurable level approximately -20dBm) at N700, pin 30
If 13MHz IF does not exist or a frequency error appears – check VHF_LO at N700, pin 8
Check VCC of G700 and G702 (check connection between both oscillator VCC´s to N702, pin 4) and R745
Check VP1/VP2 at N700, pin 9, 19: 2.8VDC
Check VCP 5VDC at N700, pin 13, 22
Check PLL control signals at N700, pin 5 (SCLK), pin 6 (SDAT), pin 7 (SENA) – see following diagrams
Check VC of G700 at N700, pin 21 (PD2) depending on the used channel and VC of G702 at N700, pin 12 (PD1): 2.2VDC
Check soldering of N700 or change SUMMA if necessary

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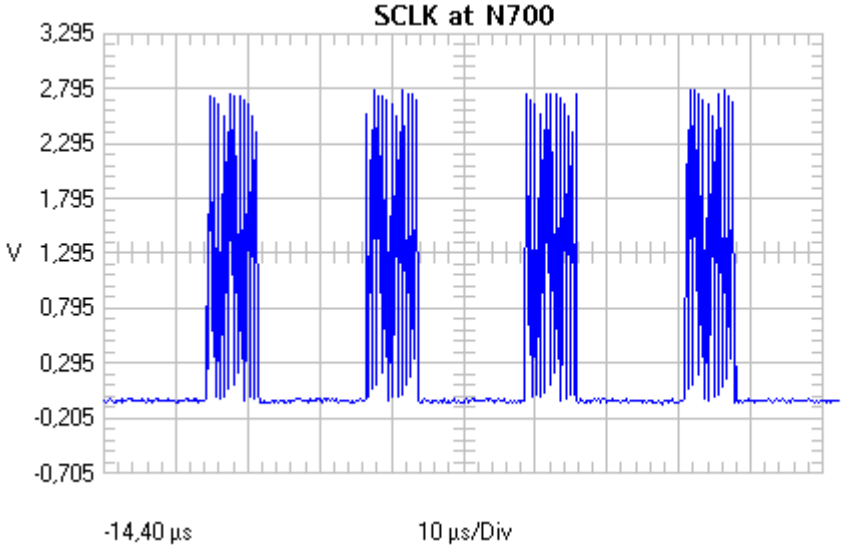
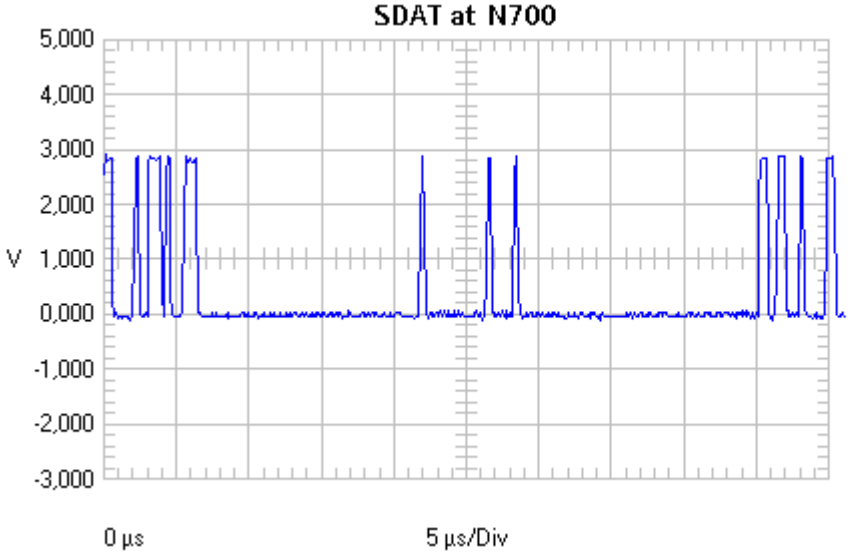
SCLK at N700



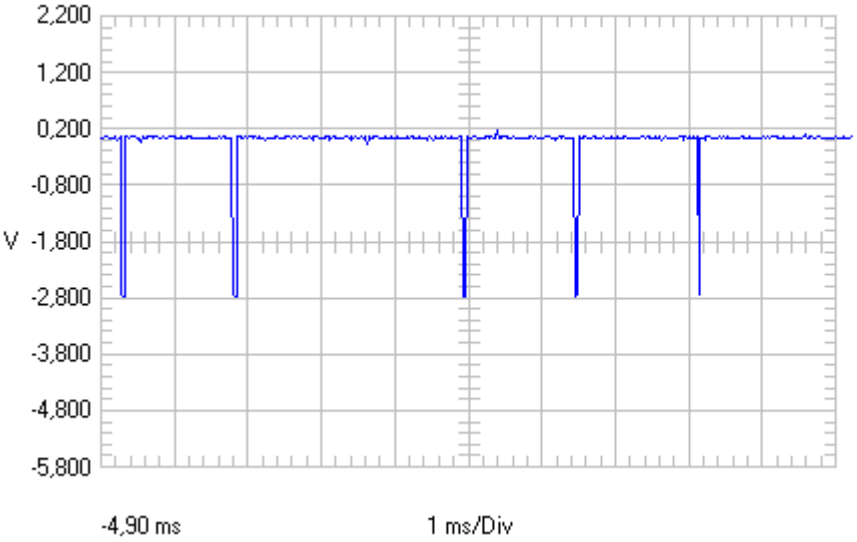
Name	= Active Channel 1	
Date	= 27.06.01	
Time	= 11:28:14	
Y Scale	= 500	mV/Div
Y At 50%	= 1,295	V
X Scale	= 10	µs/Div
X At 0%	= -14,40	µs
X Size	= 512	(512)
Maximum	= 2,777	V
Minimum	= -85,23	mV

SDAT at N700



Name	= Active Channel 1	
Date	= 26.06.01	
Time	= 14:49:47	
Y Scale	= 1	V/Div
Y At 50%	= 1,000	V
X Scale	= 5	µs/Div
X At 0%	= 0	µs
X Size	= 512	(512)
Maximum	= 2,920	V
Minimum	= -108,4	mV

SENA at N700



Name	= Active Channel 1	
Date	= 26.06.01	
Time	= 14:52:32	
Y Scale	= 1	V/Div
Y At 50%	= -1,800	V
X Scale	= 1	ms/Div
X At 0%	= -4,90	ms
X Size	= 512	(512)
Maximum	= 159,4	mV
Minimum	= -2,785	V

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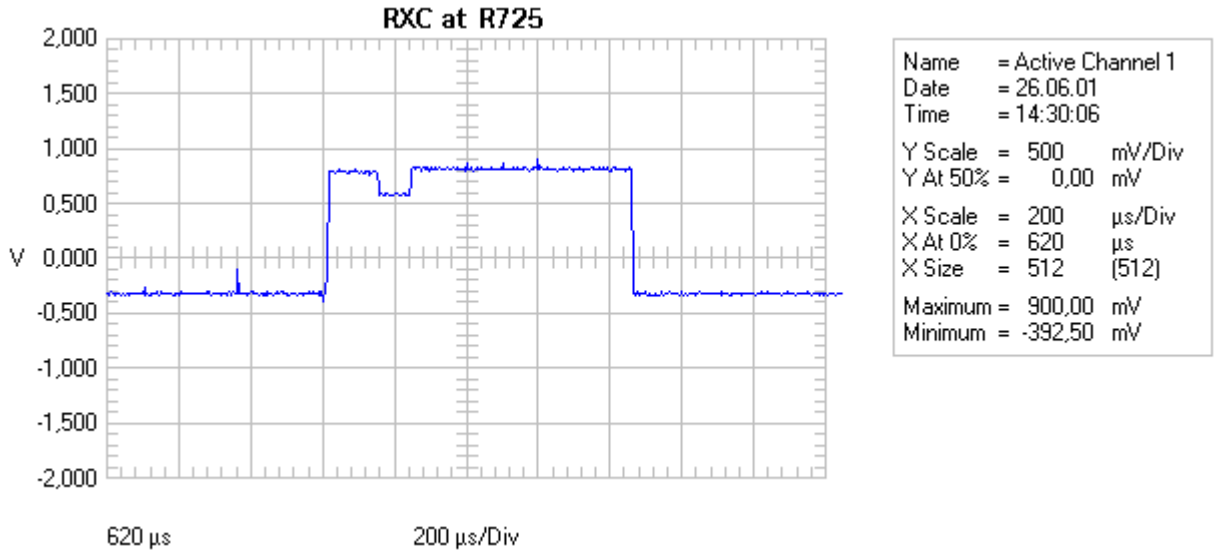
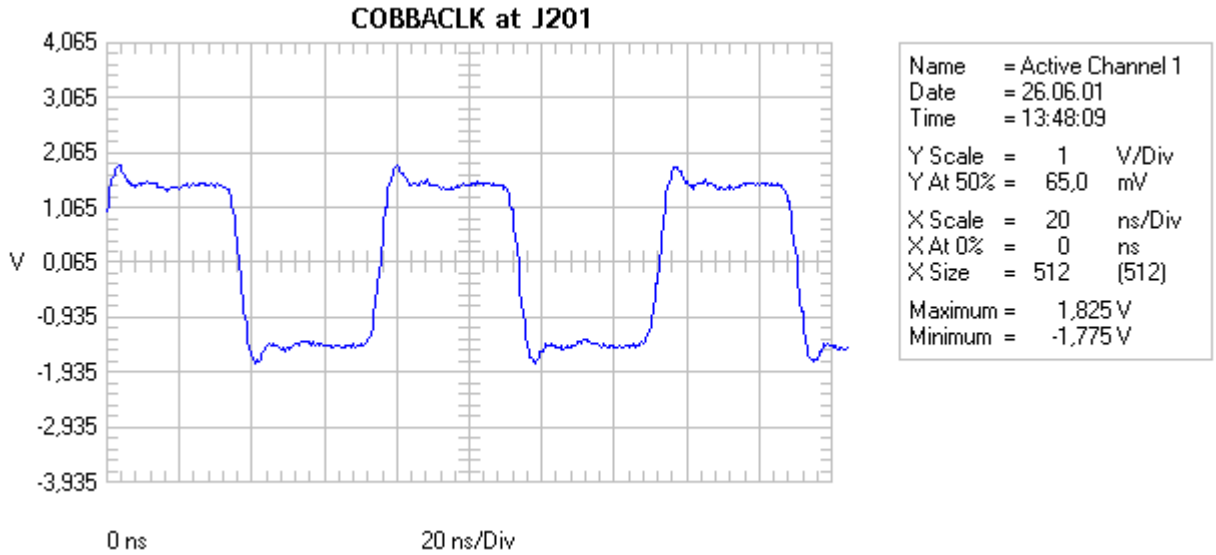
N200 COBBA faulty

Check 13MHz IF at N700, pin 23, 24 – if the generator level (-80dBm....-105dBm) is changing - amplitude of IF must also change
Check RXC signal at N700, pin 36 – if the generator level is changed – the amplitude of signal must also change
Check R725 if these signals are not measurable or too low in amplitude – **see diagram below**
Check VBB 2.8VDC at C117 (near CCONT)
Check VCOBBA 2.8VDC at C248 (near COBBA)
Check COBBACLK at J201: 3.6Vpp – **see diagram below**
If all signals and voltages are ok – set the phone in call mode with CMU/CMD
Check the RX/TX values while knocking (with a nonmetallic item) around COBBA
If any error appears – probably broken solderings under COBBA - change N200 if possible (if not underfilled)
If the errors persist after rework of COBBA – MAD or PCB might be the reason

NOTE: **If COBBA or MAD is underfilled – swap the phone, because these components are not changeable!**
If COBBA was changed - SIMlock and IMEI entries must be rewritten with NOKIA Security Password, if this procedure is permitted to you!





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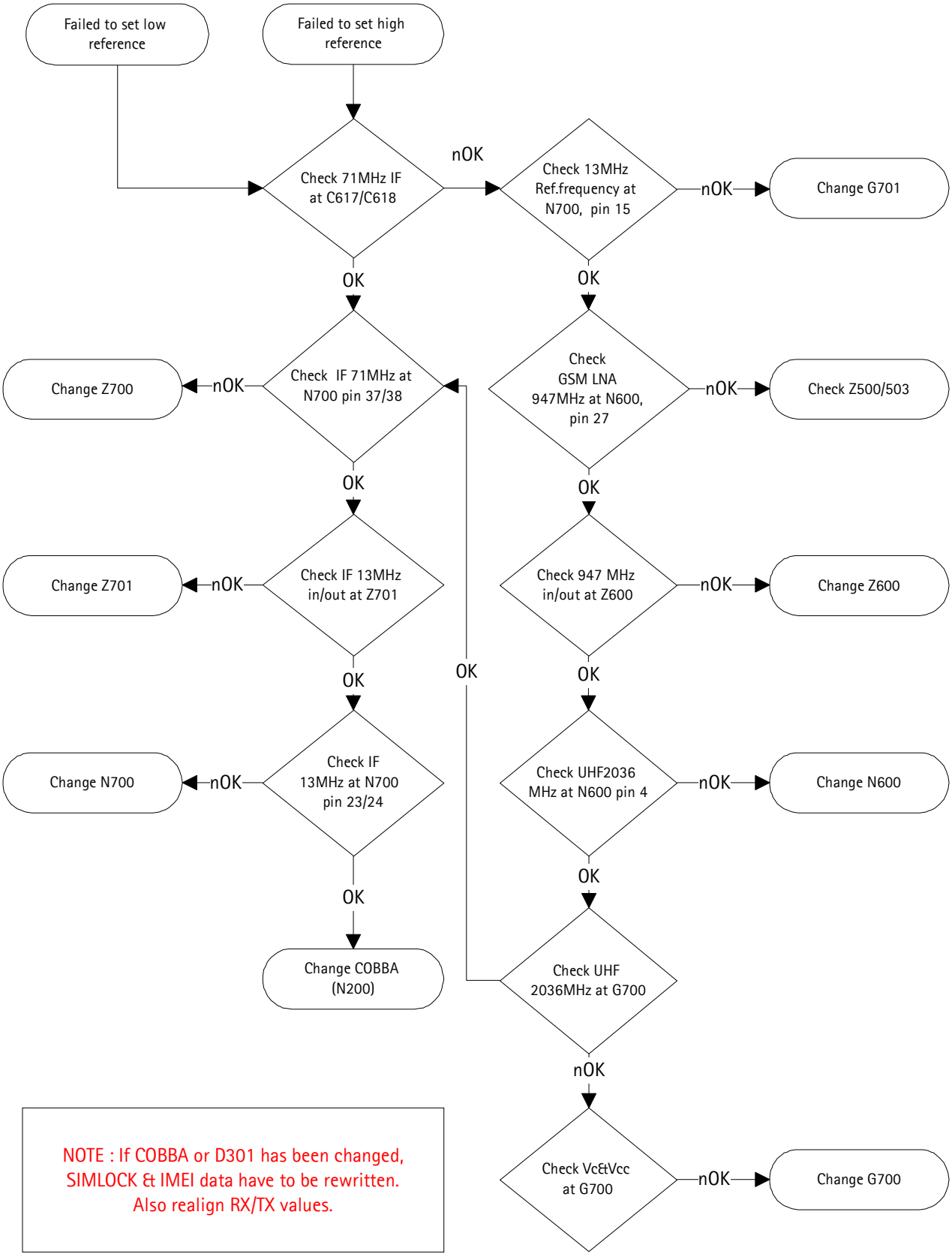
NO SERVICE GSM900 – First check TX spectrum if it is only a receiver fault, see spectrum samples on page# 46.



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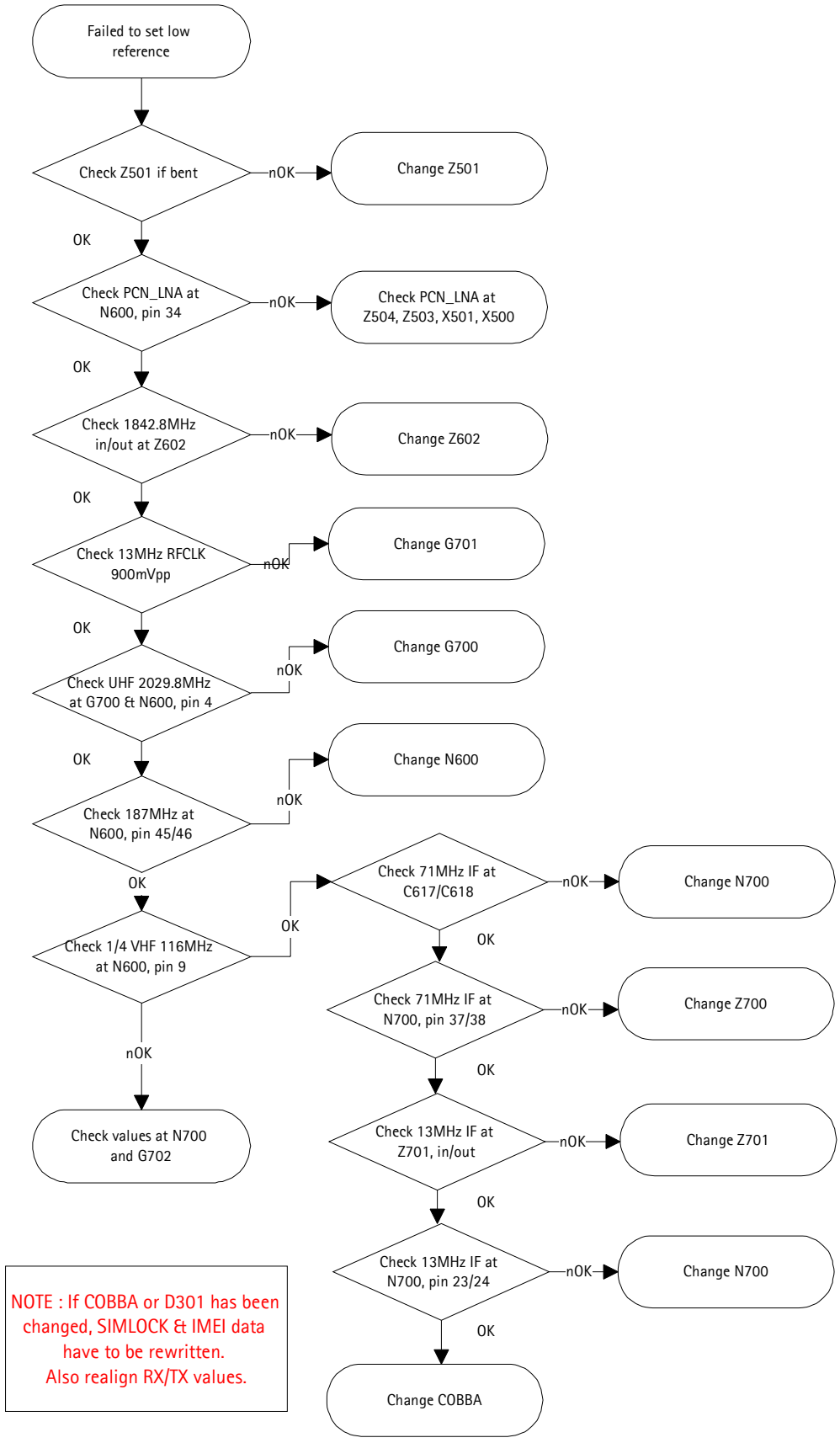
NO SERVICE GSM1800 – First check TX spectrum if it is only a receiver fault, see spectrum samples on page# 46.



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TX Power faults

FOR DETAILED TROUBLESHOOTING AND FURTHER INFORMATION SEE SERVICE MANUAL CHAPTER 4/GSM & 5/PCN TRANSMITTER

Z500 faulty – (low TX power / GSM900)

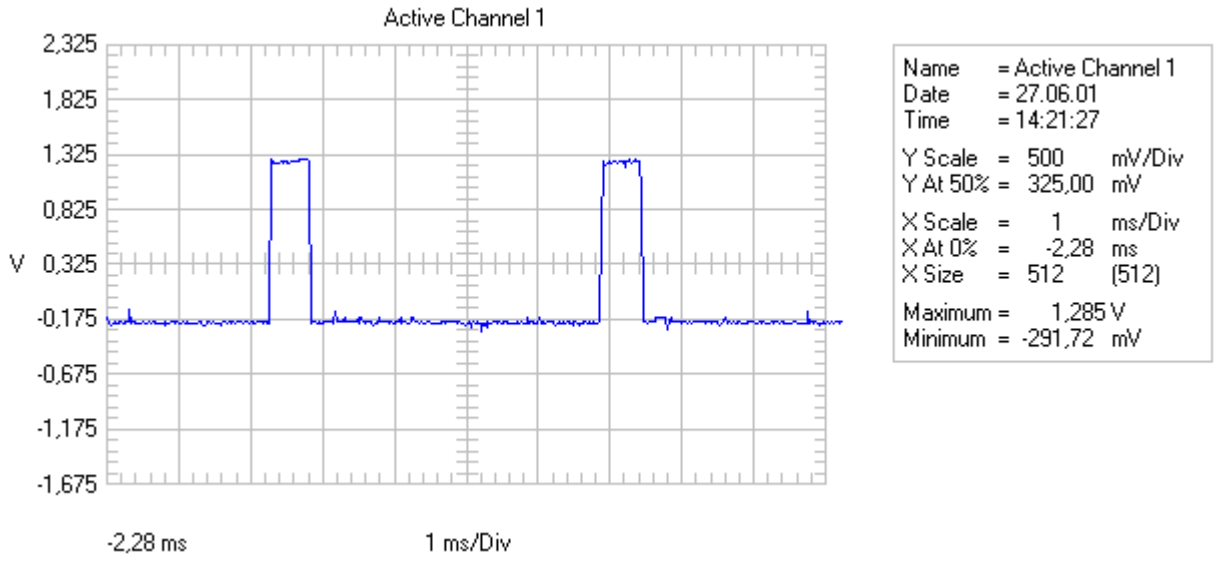
Check TX power level difference at Z500 between TX pad & Antenna pad
Check soldering of Z500

Z504 faulty (low TX power / GSM1800)

Check switching voltage at Z504 (C507): 1VDC
Check TX power difference at Z504 between TX pad & Antenna pad
If the difference > 2dBm – change Z504

N500 / N501 faulty (low TX power GSM900 / GSM1800)

All hints are always for both bands (GSM/PCN) – so take only the band depending on your faulty one
Check VDC_OUT 3.2V .... 4.2V (depending on power level) at N500 / N501
Check input / output power difference at N500 / N501
Check CTL_GSM signal at N500 (1.2Vpp .... 1.9Vpp – depending on the used power level) at N700, pin 31
Check CTL_PCN signal at N501(1.0Vpp .... 1.6Vpp – depending on the used power level) at N700, pin 28
(see diagram below)
Change corresponding PA if control lines are ok



CTL_PCN signal at N700, pin 28 – in this example measured at power level 0

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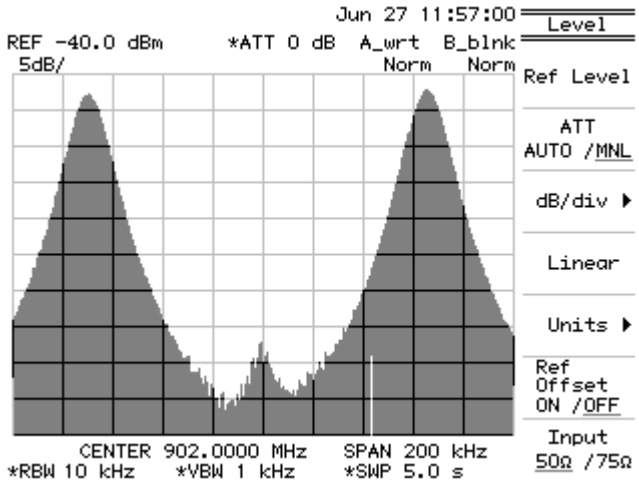
TX phase faulty

Check TX spectrum with analyzer – refer to page# 46
If the following spectrum appears – check components in TX I/Q lines for shorts:
In some cases (especially after rework in COBBA area) R708, R710, C708, C709 (near COBBA N200) could be misplaced.
If the components are ok – change COBBA N200 if not underfilled.

NOTE:
If COBBA was changed - SIMlock and IMEI entries must be rewritten with NOKIA Security Password, if this procedure is permitted to you!



TX phase faulty in high channel range in GSM1800

Check TX spectrum with analyzer – refer to page# 46
Check mechanical appearance of Z504
If measurements are ok – change Z504 – in some cases the bottom side of this component could be teared off because of mechanical stress, which only could be seen if the component is removed.

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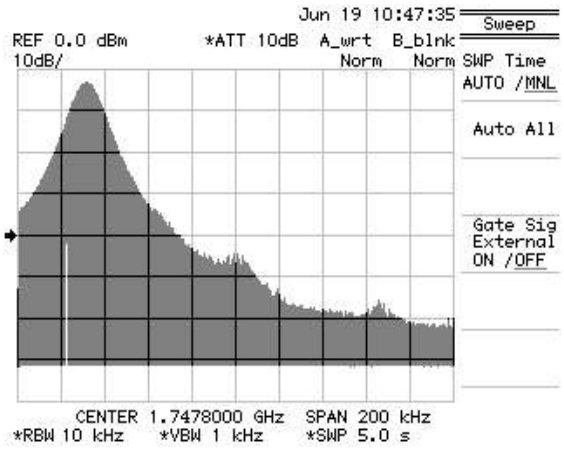
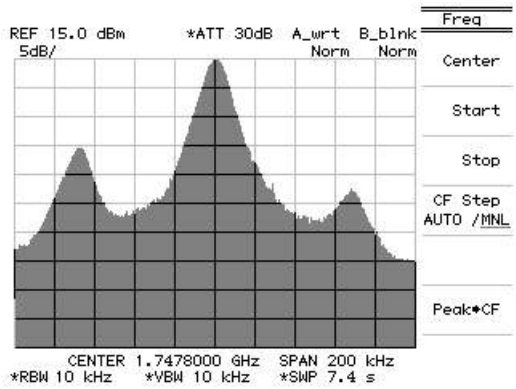
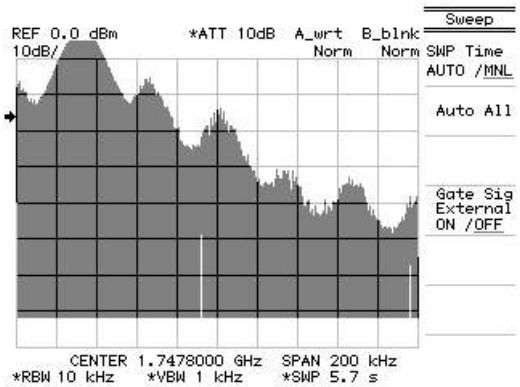
Faulty spectrum – COBBA faulty, COBBA and CCONT broken solderings



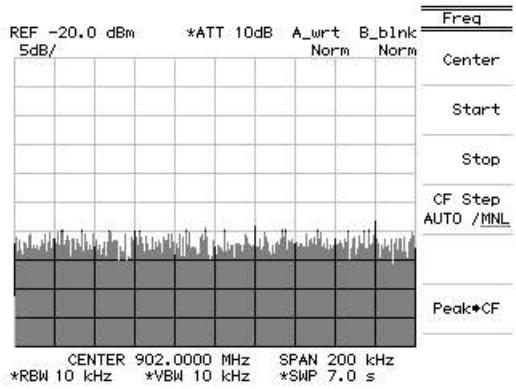
1) Normal spectrum



3) Spectrum of faulty COBBA



2) Spectrum with broken solderings under CCONT
Turns to picture 1 if CCONT is pushed
careful with some nonmetallic item



4) Spectrum of faulty oscillator G500

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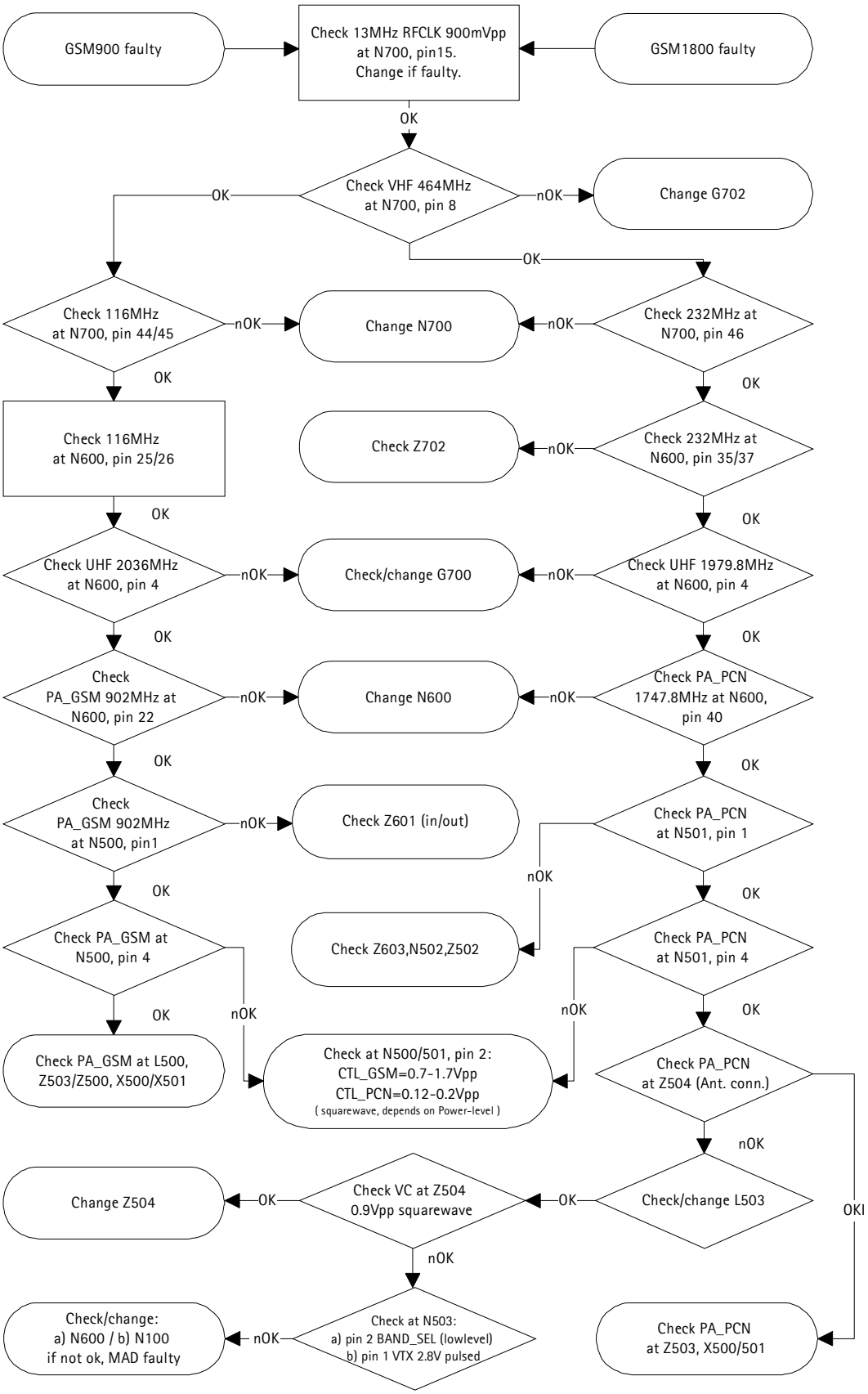
TX FAILURE



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Change history

Originator	Status	Version	Date	Comment
Jose Marquez	Draft	0.2	22.10.1999	First draft version for the repair group
Jose Marquez	Draft	0.3	02.11.1999	Insert comments from the repair team, add layout "Test Points"
Jose Marquez	approved	1.0	05.11.1999	First AMS version
Holger Klein	approved	2.0	04.02.2000	"not charging" reference to SB024 added Additions to chapter "no service" SIM-Locks updated Flowcharts page 15, 21 VCOBBA at C148 corrected to C248
TS-Training-Group	approved	3.0	07.09.2000	New appearance, RF- descriptions, Flowcharts and HW changes added. All documents reworked.
TS-Training-Group	approved	4.0	20.10.2000	Headers changed.
TS-Training-Group	approved	4.2	31.10.2000	Last SIMlock-list and Comments added.
TS-Training-Group	draft	4.6	27.08.2001	Comments from repair team added, SIMlock list removed (separated)
TS-Training-Group	approved	5.0	05.09.2001	

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