

Repair-Hints

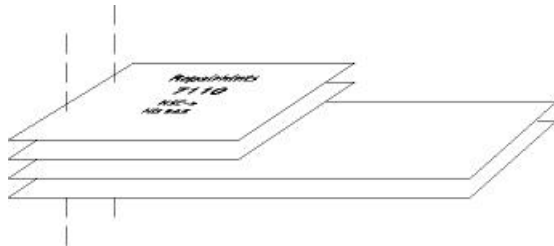
8210/8850

NSM-2/3

HD 914/916



GENERAL



-How to use this document

Put the QUICK REPAIR 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 measurepoints.

-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, μ BGA

It is not possible to change underfilled components. The trial will damage PCB surely.

All replaceable μ BGA-components must be renewed after removing.

Check soldering points, remove oxidated solderings (broken balls) carefully by enclosing few new solder before placing new components.

μ BGA must be soldered only with μ BGA-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.

-Realign after repair

Characteristics of spare parts are different.

To prevent additional faults after repair (eg. 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 authorised NOKIA service centers only.

The purpose of this document is to provide some further service information for NOKIA 8210/8850 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 built 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	: NSM2 03.11.00- 25.05.2000
Nokia Module Jig	: MJS 9
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:

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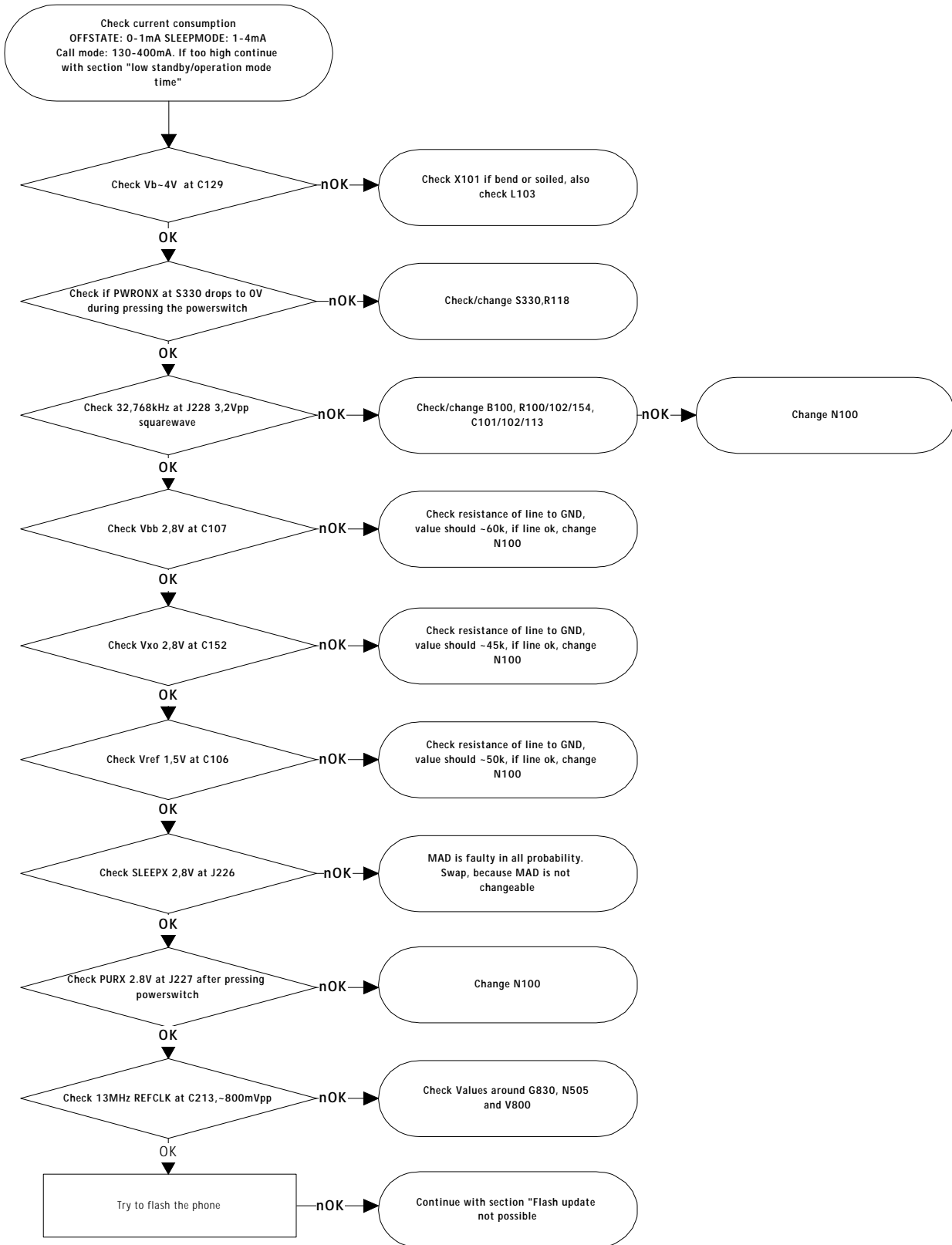
Service & Analysis Center Europe

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D-44807 Bochum / Germany

Email: training.sace@nokia.com

PHONE DOES NOT SWITCH ON



Battery connector

Check if bent or soiled.

Clean pads of connector on PCB if soiled.

Power on/off switch S330 faulty

Check that PWRONX at S330 decreases to 0V during pressing the powerswitch.

B100

Check voltage at B100, both 1.6V DC.

Check 32.768kHz sinewave at C102, 700mVpp.

Check parts around B100- like R100, R102, R154, C101, C102.

Check sleepclock 32.768kHz squarewave at J228, 3.2Vpp.

G830 Reference oscillator faulty

Check Vcc 2.7V at C831 and Vcon (varies between 0.3V and 2.3V) at C832.

Check 26MHz Clk-frequency at C830, 900mVpp.

Check 13MHz Clk-frequency at C829, 300mVpp. If not ok, check values around N505.

Check 13MHz Clk-frequency at C213, 800mVpp. If not ok, check values around V800.

N100 CCONT faulty

Check Vb 3.6V at C129.

Check that PWRONX decreases to 0V at S330 when powerswitch is pressed. Also check R118.

Check 32.768kHz squarewave 3.2Vpp at J228.

Check 13MHz Clk-frequency at C213.

Check Vbb 2.8V at C107.

Check Vxo 2.8V at C152.

Check Vref 1.5V at C106.

Check SLEEPX 2.8V at J226.

Check PURX 2.8V at J227.

Probably broken solderings under CCONT N100. Replace CCONT with μ BGA rework machine.

Note that it is necessary to run energy management calibration after changing CCONT!

D200 MAD faulty.

Check 32.768kHz squarewave at J228.

Check 13MHz Clk-frequency at C213.

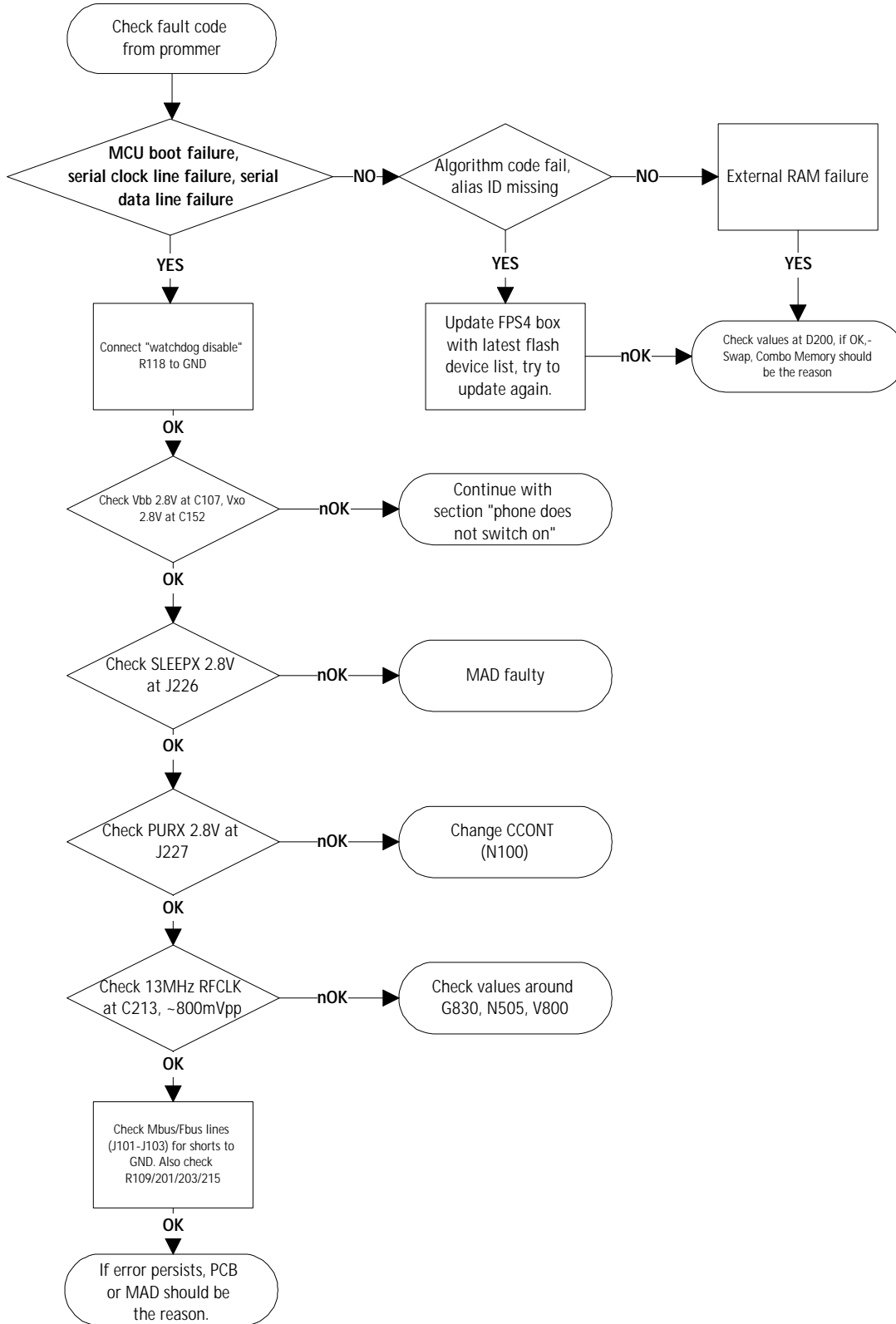
Check Vbb 2.8V at C201.

Check SLEEPX 2.8V at J226.

Check PURX 2.8V at J227.

MAD is probably faulty, swap the unit, because MAD is not changeable.

FLASH UPDATE NOT POSSIBLE



Mbus / Fbus lines faulty

Check that there's no short at J101- J103 to GND, resistance of lines should be between 60kOhm and 220kOhm.

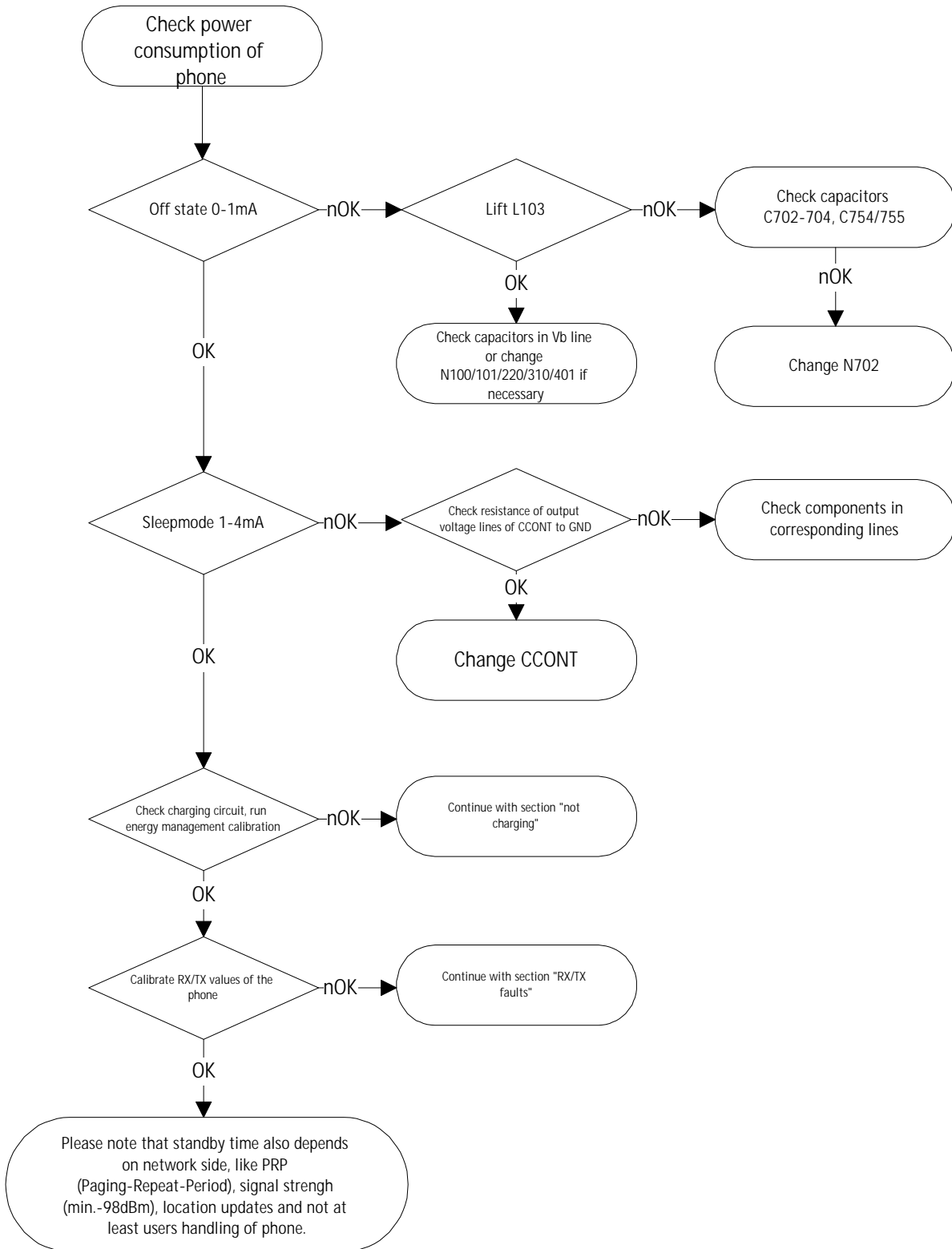
ComboMemory

If "algorithm code / alias ID missing from prommer box" appears while flashing, make sure that your FPS4 box is updated with the latest flash device list.

Contact service

If "contact service" appears while flashing, change C205 from 1 μ F to 2.2 μ F (Code 2610203) to stabilize flash programming voltage.

Low standby / operation mode time



Check the current consumption in different operation modes:

Funktion mode	Minimum current in mA	Maximum current in mA
Off state	0	1
Sleep mode	1	4
Call mode GSM 900	140	400
Call mode GSM 1800	130	370

Off state current fail

Lift L103 to define the fault if off state current is not ok.

If current is still not ok, lift C702/703/704 and C754/755 one by one.

If fault remains, change power amplifier N702, which is the reason in most cases.

If current is ok after removing L103, resolder it. After that you have to check capacitors in Vb line (C100,C105,C129,C142,C165...).

If fault remains, change N100, N101, N220, N310 or N401. In most cases CCONT (N100) is responsible for this fault.

Sleep mode current fail

Check resistance of every output voltage line of CCONT (N100) to GND. The values should be higher than 10kOhm, except Vsyn1 (3kOhm) and Vsyn2 (0.9kOhm).

If resistance of any line is not ok, check/change parts of this line.

If resistance of all lines is ok, change CCONT (N100).

If the standby/operation mode time is still not ok, check the charging circuit and run the energy management calibration. It can also be necessary to calibrate the RX/TX values of the phone.

CONTACT SERVICE

This fault means that the phone software is able to run and thus the watchdog of CCONT (N100) can be served. Selftest functions run when power is switched on and software is executed from ComboMemory. If any selftest fails, a "Contact Service" text is shown on LCD.

Possible failures:

MCU ROM Checksum failed

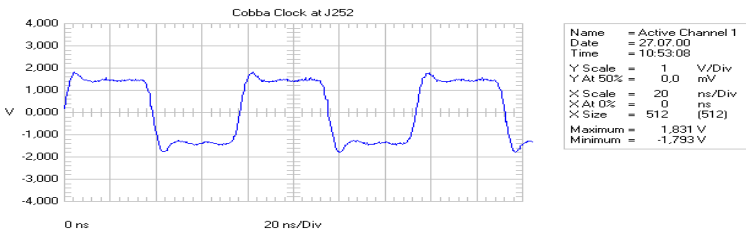
Try to flash the phone. If not ok after flashing, probably ComboMemory is faulty, which is not changeable.

CCONT Interface failed

Probably broken solderings under CCONT (N100).
If CCONT is not underfilled, replace it with μ BGA rework machine.
If not ok after reworking the CCONT, probably MAD or PCB faulty.
Note that you have to run energy management calibration after changing CCONT!

COBBA parallel/serial failed

Check Vbb 2.8V at C201 and VCOBBA 2.8V at C248.
Check COBBAC1k at J252.



Probably broken solderings under COBBA (N250) – replace COBBA. If fault remains, MAD or PCB faulty.
Note: IMEIdata and SIMlock must be rewritten after COBBA- change, also retune RF-values.

DSP alive test failed.

In most of all DSP alive selftest failures MAD is faulty, which is not changeable.

Eeprom tune checksum failed

Use WinTesla to check if phonedata like Imei, product-code or PSN are corrupted.
If phone data is ok, try to reset the phone. If phone data is not ok or fault remains after reset, ComboMemory is faulty in all probability.

RTC Battery failed

First try to charge RTC battery by switching on the phone for 10 to 15 minutes.
If fault remains, check contact springs of battery, bend them if nessecary.
(Also see NSM-2 Service Bulletin 20).
In some cases it can be necessary to change RTC battery and/or CCONT (N100).

PHONE INTERMITTENT SWITCHES OFF/ DOESN'T SWITCH ON

Check mechanical appearance of connector X101.

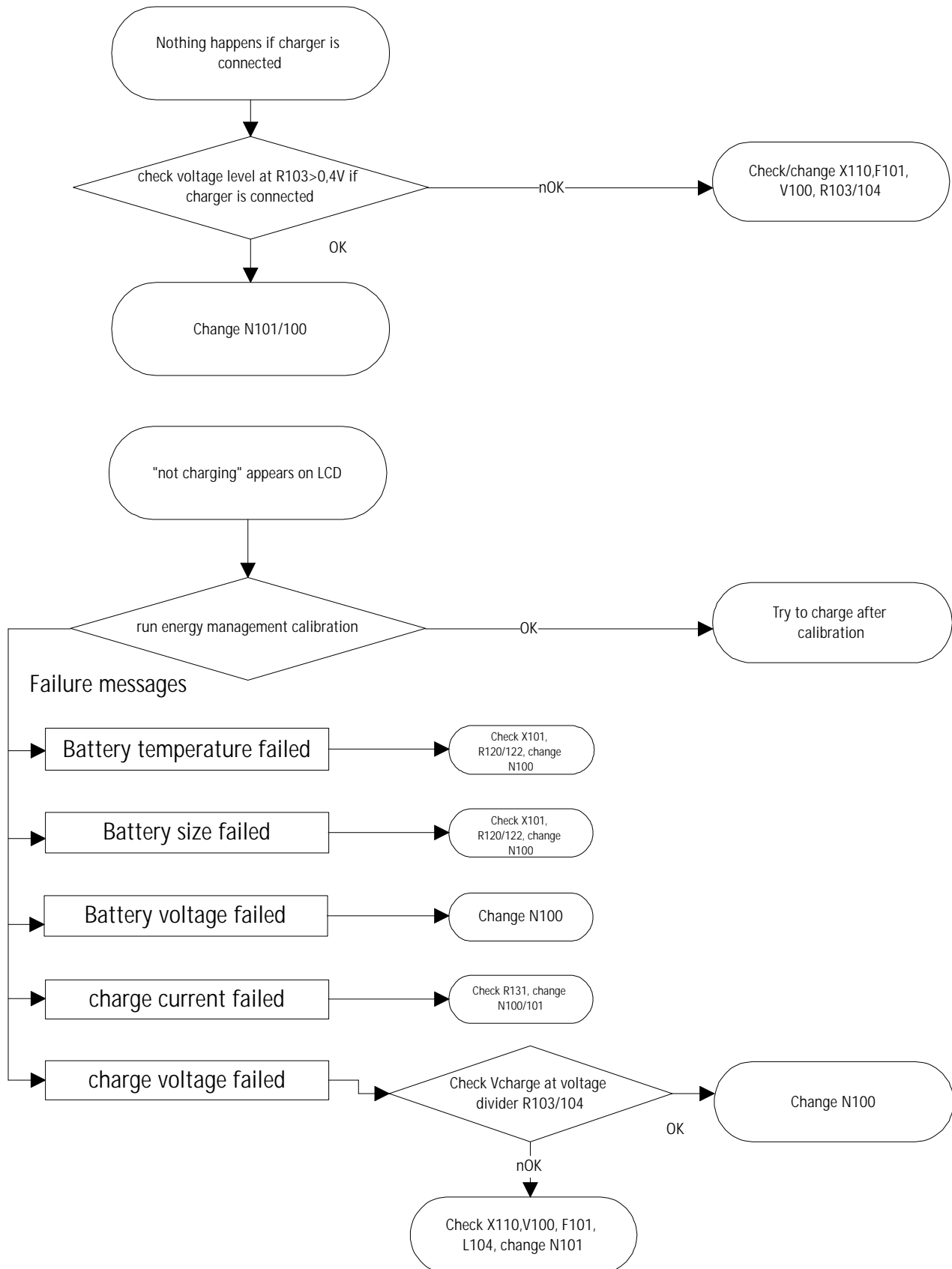
Check that pads of X101 on PCB are clean.

Check amplitude of 32.768kHz at J228, 3.2Vpp squarewave, probably broken solderings under CCONT N100.

Remove CCONT if not underfilled and replace it with μ BGA rework machine.

The same problem may cause N505, because the reference oscillator G830 (26MHz) is divided to 13MHz system clock by HAGAR N505. If broken solderings exist under HAGAR, rework as described above.

Not charging



X110 DC/HS connector, X101 battery connector

Check mechanical appearance of connectors, make sure that pads for connectors on PCB are clean.

F101 faulty

Check resistance of F101 (0 Ohm).

Vcharge line shorted to GND.

Check resistance of Vcharge line at F101 to GND (50 kOhm).

If resistance is not ok, remove L104 and check again. If resistance is still not ok, V100 faulty in all probability.

If resistance is ok now, C103/C114 or N101 should be the reason.

N100 faulty

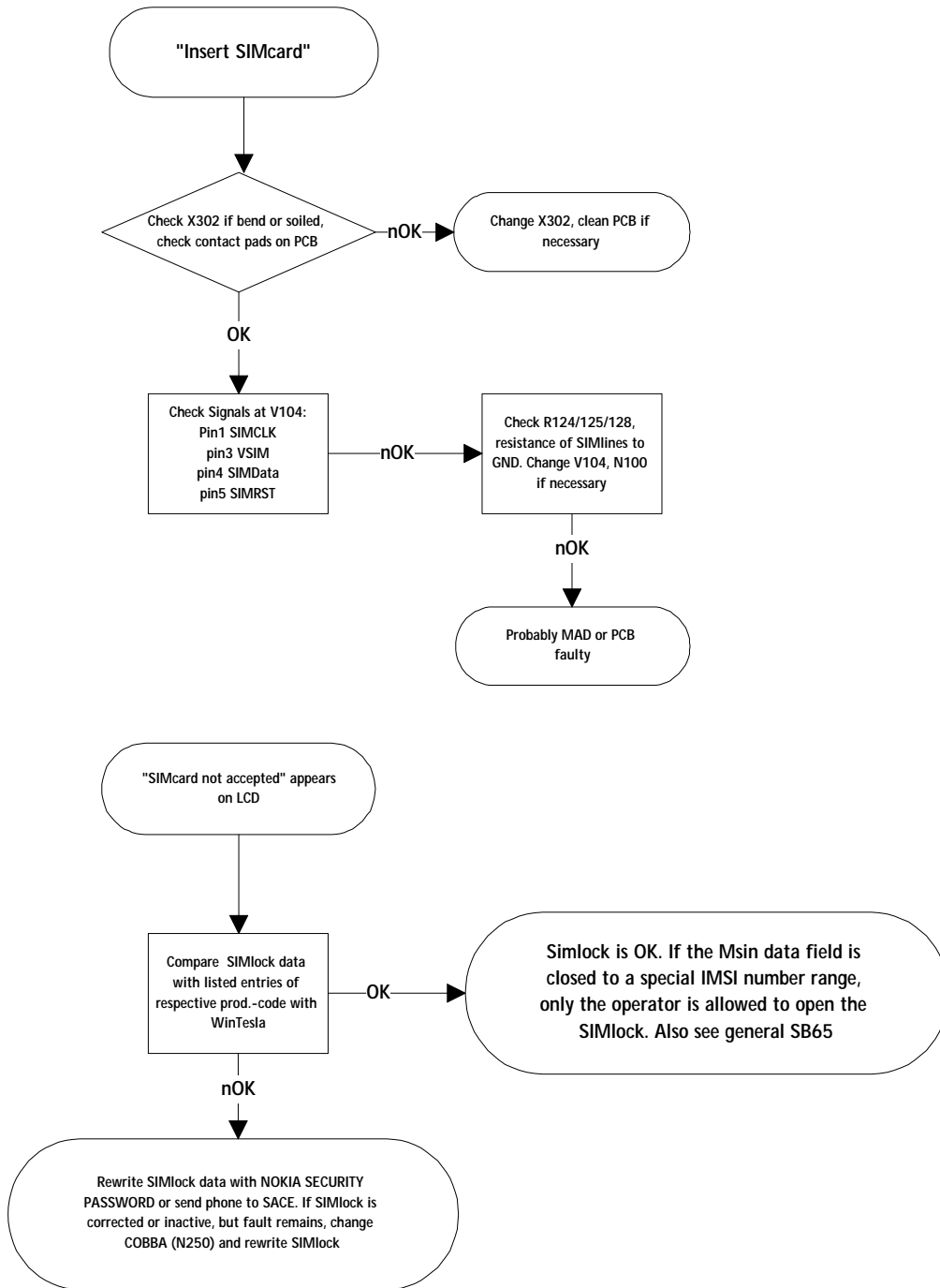
Change CCONT (N100) if any A/D value is out of limit while DC voltage is ok.

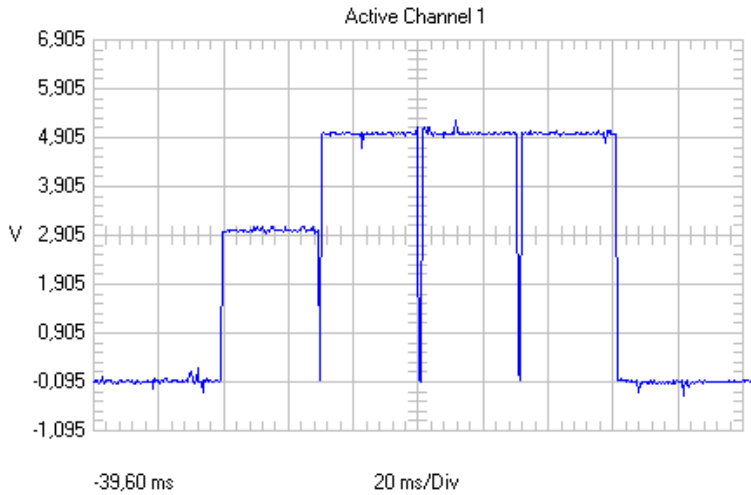
If DC voltages are not ok, check corresponding voltage dividers and battery connector X101 and run energy management calibration.

Energy management calibration

Run calibration if charging stops too early, if message "not charging" appears on LCD or any part in the charging circuit has been replaced.

SIMCARD FAULTS

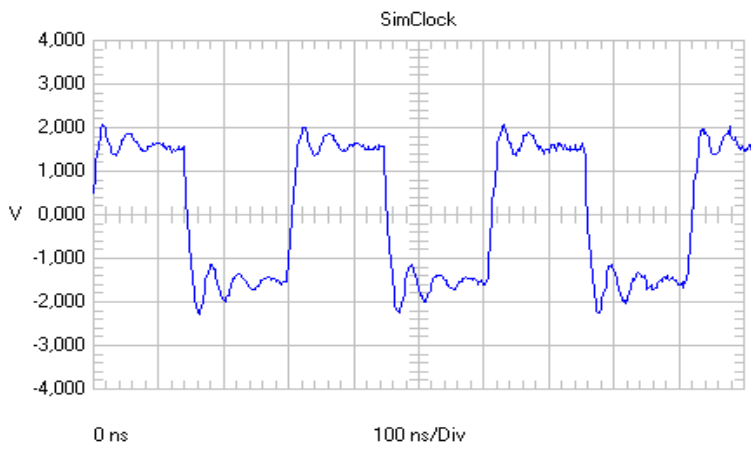




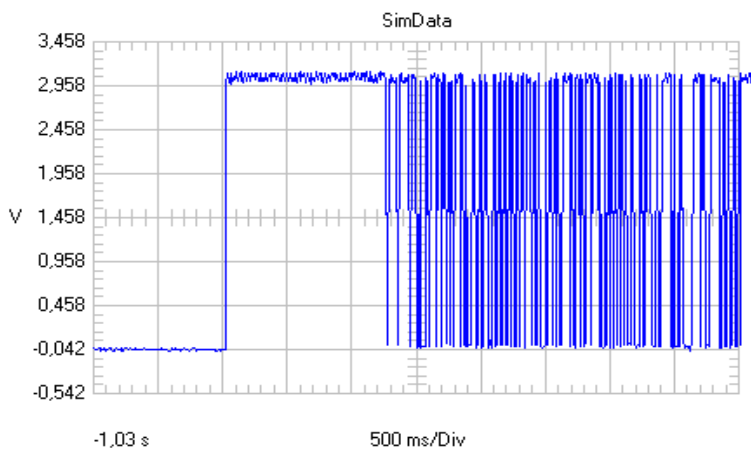
Name	= Active Channel 1
Date	= 25.08.00
Time	= 08:00:46
Y Scale	= 1 V/Div
Y At 50%	= 2,905 V
X Scale	= 20 ms/Div
X At 0%	= -39,60 ms
X Size	= 512 (512)
Maximum	= 5,263 V
Minimum	= -377,5 mV

VSIM after switching on the phone without SIMcard. CCONT pulses up VSIM four times, at first the amplitude is 3 Volt, the next three times 5 Volt.

If the phone is switched on with SIMcard, Vsim stays on level with which SIMcard works, expected that SIMcard is not dirty or damaged.

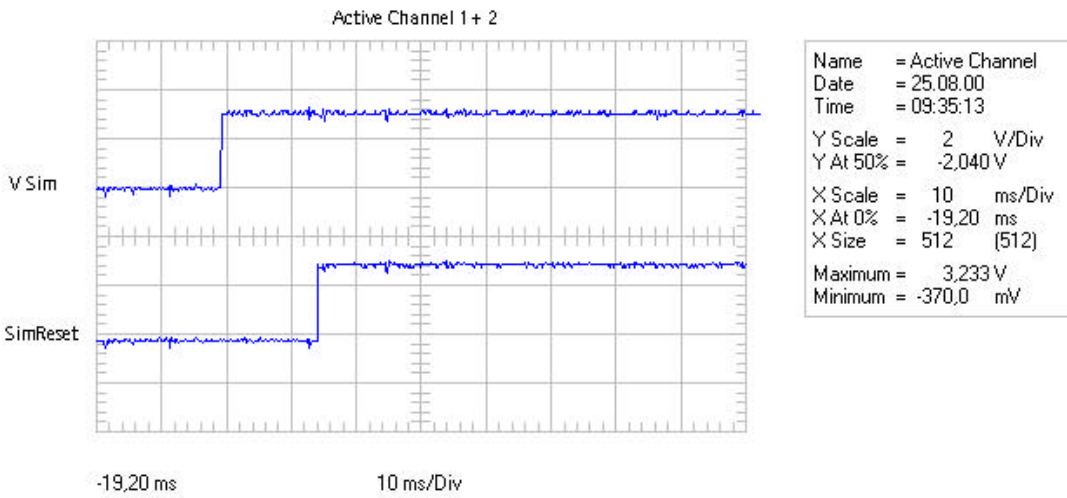


Name	= Active Channel 1
Date	= 28.08.00
Time	= 12:02:43
Y Scale	= 1 V/Div
Y At 50%	= 0,0 mV
X Scale	= 100 ns/Div
X At 0%	= 0 ns
X Size	= 512 (512)
Maximum	= 2,075 V
Minimum	= -2,281 V



Name	= Active Channel 1
Date	= 25.08.00
Time	= 10:40:07
Y Scale	= 500 mV/Div
Y At 50%	= 1,458 V
X Scale	= 500 ms/Div
X At 0%	= -1,03 s
X Size	= 512 (512)
Maximum	= 3,120 V
Minimum	= -60,05 mV

Please Note: SIMclock and SIMdata are only present when SIMcard is active, for example if 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.

X 302 SIMcard Reader

Check if bent or soiled, change if necessary.
Make sure that SIMreader’s pads on PCB are clean and check/add twin rip (NSM-2 only,- see SB 012).

V 104 faulty

Check resistance of SIMlines to GND, value shouldn’t decrease 200kOhm.
Check also R124/125/128, C127/128.

CCONT (N100) faulty

Check SIMClock, SIMData, SIMReset and Vsim.
Probably broken solderings under CCONT (N100). Remove CCONT and replace it with µBGA rework machine.
Run energy management calibration after changing CCONT!

COBBA (N250) 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 (N250).

Note that you have to rewrite SIMlock-data and tune RX/TX-values of the phone after changing the COBBA.

NO SERVICE

First of all: Calibrate RX/TX values to define the fault.

No or too low TX power GSM 900

Use WinTesla to set phone into following mode: "Initialise/ Local mode/Testing/ RF Controls/ active unit TX, Ch.60".

Check 26MHz reference oscillator at C830, 700mVpp, frequency deviation < 100Hz.

Check TXI/Q signals at R541/546, refer to signals shown on next pages.

If not ok, check values at COBBA (N250)- see below.

Check 902 MHz at T700 pin 4 and 6. If not ok, check signals at HAGAR (N505)- see below.

Check 902 MHz at N702 pin 8. If not ok, check parts like T700, Z700, Z671 or V801.

Check 902 MHz at L553 pin 1. If not ok, check values at N702.

Check 902 MHz at J600 (Antenna pad). If not ok, check L553 in & out, also check signal at Z670 in & out and TXVGSM (2,8Vpp squarewave) at R671 (sets Z670 to TX-mode).

COBBA N250 faulty

Check Vbb (2.8V) at C201 and VCOBBA (2.8V) at C248.

Check 13MHz COBBAclk at J252 (see diagram in chapter „Contact Service“).

Probably broken solderings under COBBA (N250). Replace COBBA with µBGA rework machine and retune RX/TX values.

HAGAR N505 faulty

Check voltages at HAGAR :

Vtcxo 2.8V at C550.

Vchp 4.8V at C560

Vsynte 2.8V at C561

VRXrf 2.8V at C557

Vlna 2.8V at C562

Vref 1.35V at C535

Check 26MHz reference oscillator at C830, 700mVpp.

Check TXI/Q signals at R541 and R546.

Check Sdata at J237, Sclk at R205 and Sena at R206 – refer to signals shown on next pages.

Check TXC at C792 (diagram on next page).

Check TXP at pad of R745, 2.8Vpp squarewave/ 217Hz. (R745 is not assembled, you can find the pads of it between R791 and R541. TXP is measurable at the pad located near to R744).

Check frequency of SHF oscillator – refer to frequencies worksheet.

If all values are ok, but low or even no TX signal is measurable at T700, probably HAGAR has broken solderings or defect.

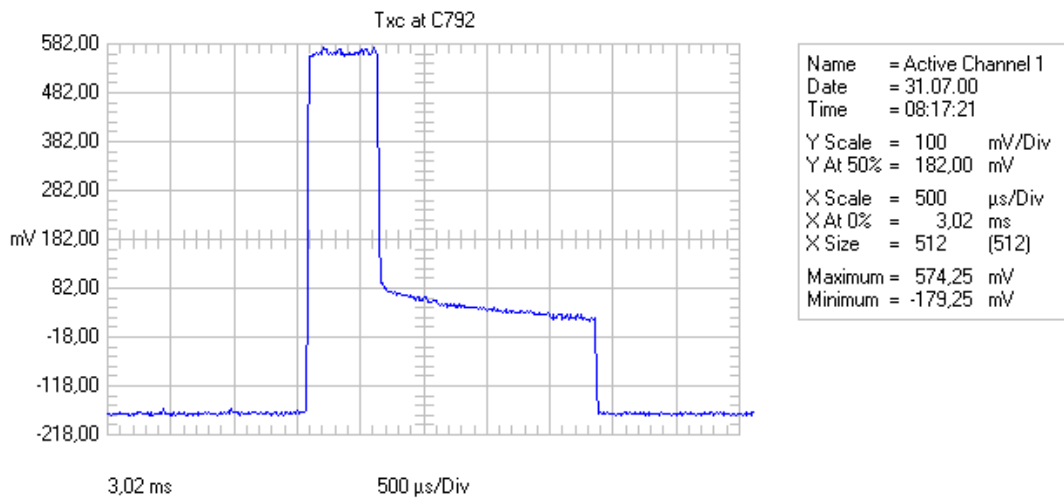
Replace HAGAR with µBGA rework machine and align RX/TX values.

26MHz reference oscillator faulty

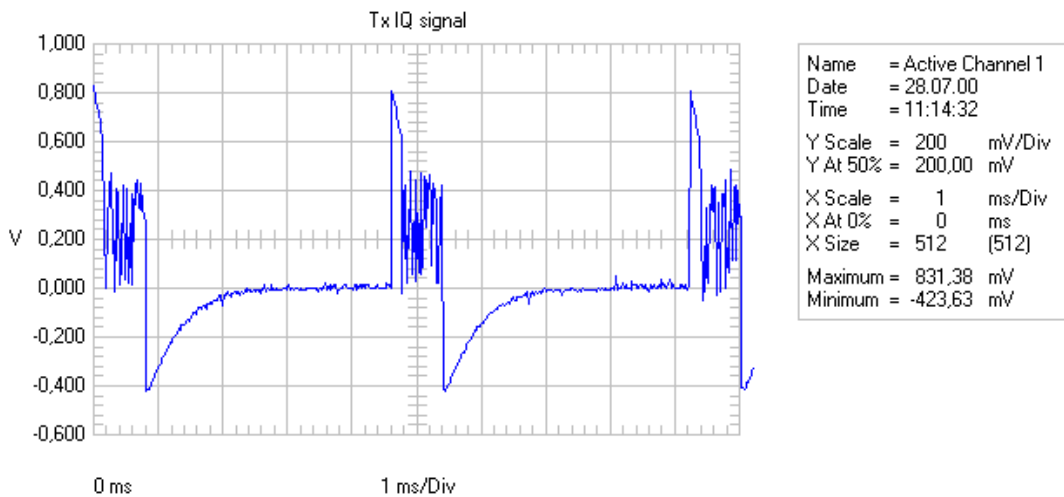
Check Vcc 2.7V at C831 and Vcon (varies between 0.3V and 2.3V) at C832.
If frequency deviation is higher than +/- 100 Hz, it is necessary to change the oscillator.
Check appearance and pads of R832.(AFC-line).

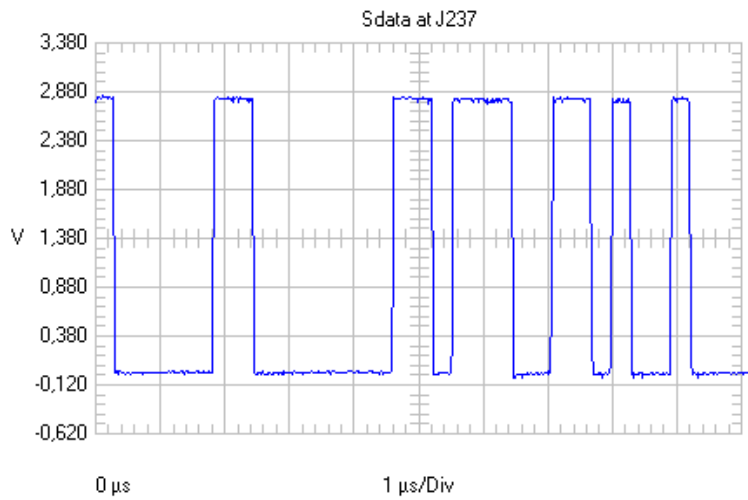
G800 SHF oscillator faulty

Check frequency of oscillator if possible – refer to frequencies worksheet on page 27. If you have no possibility to check frequency (~4GHz), check oscillator by measuring Vcc at C804 (2.8V) and Vc at C803, which varies between 0.7V and 3.8V, dependent on the used channel. If Vc is ~4.8V, the oscillator doesn't work in all probability.

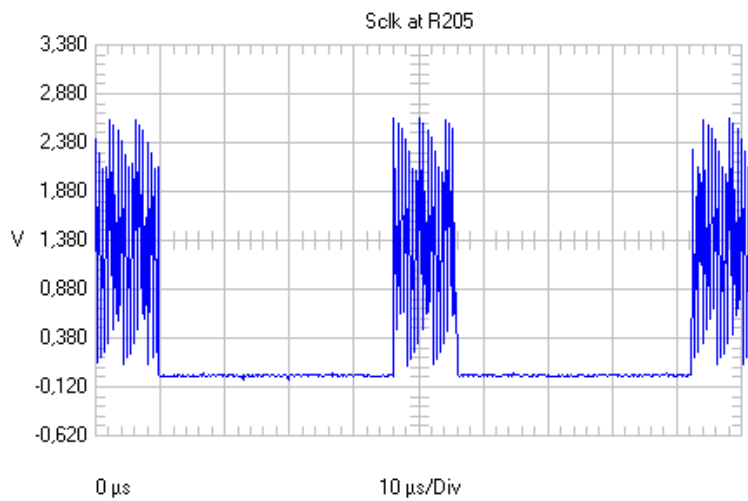


The amplitude of TXC depends on the chosen powerlevel. It varies between 0,4Vpp on powerlevel 19 and 1,6Vpp on powerlevel 5.

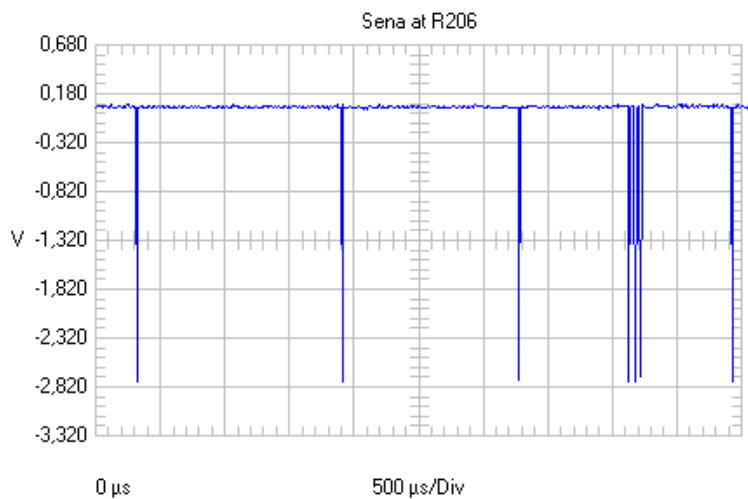




Name	= Active Channel 1
Date	= 31.07.00
Time	= 07:59:24
Y Scale	= 500 mV/Div
Y At 50%	= 1,380 V
X Scale	= 1 μs/Div
X At 0%	= 0 μs
X Size	= 512 (512)
Maximum	= 2,842 V
Minimum	= -40,23 mV



Name	= Active Channel 1
Date	= 31.07.00
Time	= 08:04:24
Y Scale	= 500 mV/Div
Y At 50%	= 1,380 V
X Scale	= 10 μs/Div
X At 0%	= 0 μs
X Size	= 512 (512)
Maximum	= 2,638 V
Minimum	= -40,23 mV



Name	= Active Channel 1
Date	= 31.07.00
Time	= 08:07:35
Y Scale	= 500 mV/Div
Y At 50%	= -1,320 V
X Scale	= 500 μs/Div
X At 0%	= 0 μs
X Size	= 512 (512)
Maximum	= 80,16 mV
Minimum	= -2,760 V

N702 power amplifier faulty

Check TX power signal at pin 8 of N702.

Check TXVGSM at pin 1 of N702 (2.8Vpp squarewave/ 217Hz).

Check Vapc at pin 7 of N702 (1- 1.6Vpp depending on powerlevel).

Check Vbatt at pin 3 and 6 of N702.

If all values are ok but still there´s no or too low TX power measurable at L553 pin 1, change N702.

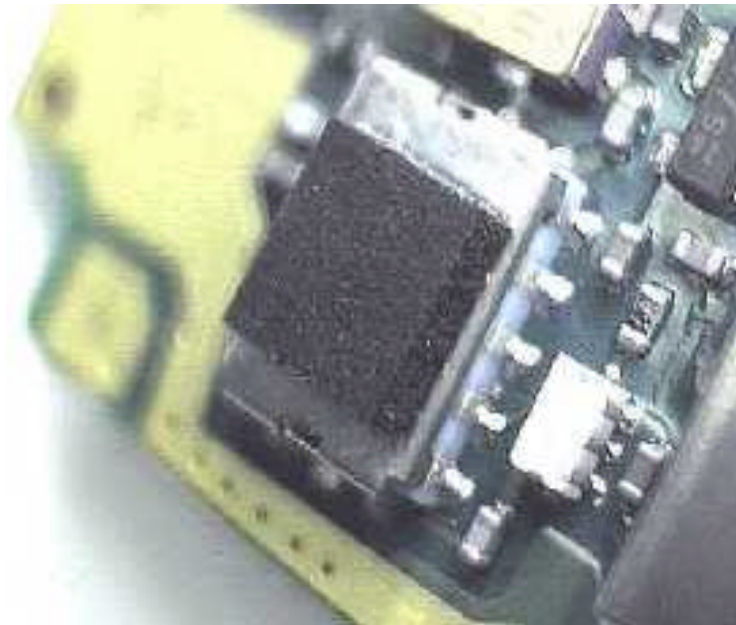
Z670 Diplexer faulty

Check TX power signal at pin 7 of L553.

Check TXVGSM 2.8Vpp squarewave at R671 (near HAGAR).

If all values are ok but still there´s no or too low TX power signal at J600 (Antenna pad), check solderings of Z670.

If it is necessary to change Z670, don't forget to replace foam on sparepart. (NSM-2 only, see also Service Bulletin 22).



No or too low TX power GSM 1800:

Use WinTesla to set phone in following mode:
Initialise/Product/Band/PCN/Testing/RF Controls/active unit TX Ch.700.

To find a fault in GSM 1800 TX mode, you can proceed almost the same way as described for GSM 900:
Check 26MHz reference oscillator at C830, 700mVpp, frequency deviation < 100Hz.
Check TXI/Q signals at R541/546. If not ok, check signals at COBBA (N250).
Check 1747.8 MHz at T740 pin 4 and 6. If not ok, check signals at HAGAR (N505).
Check 1747.8 MHz at N702, pin 8. If not ok, check parts like T740, Z671 or V801.
Check 1747.8 MHz at L553 pin 3. If not ok, check values at N702.
Check 1747.8 MHz at J600 (Antenna pad). If not ok, check L553 in & out, signal at Z670 in & out and TXVDCS (2.8Vpp squarewave) at R670 (sets Z670 to TX-mode).

No RX- calibration GSM 900 possible.

Use WinTesla to set phone in following mode: Initialise/Local mode/Testing/RF Controls/active unit RX Ch.60, burst mode.
Set RF- generator to a high RF- level output, e.g. -40dBm.

Check 26MHz reference oscillator at C830, 700mVpp, frequency deviation < 100Hz .
Check 947MHz at Z620 in & out. If not ok, check signals at Z670.
Check 947MHz at C610. If not ok, check values at V904 and V907.
Check 947MHz at both sides of L600. If not ok, check Z600, T600.
Check RXI/Q signal at R530. If not ok, check signals at HAGAR N505.
If signal at R530 is ok but still no RX-calibration possible, check signals at COBBA (N250). Probably MAD faulty.

Diplexer (Z670) faulty

Check 947MHz at J600 (Antenna pad).
Check 947MHz at C614. If not ok, check solderings of Z670. If it is necessary to change Z670, don't forget to replace foam on sparepart. (NSM-2 only, see also Service Bulletin 22).

HAGAR (N505) faulty.

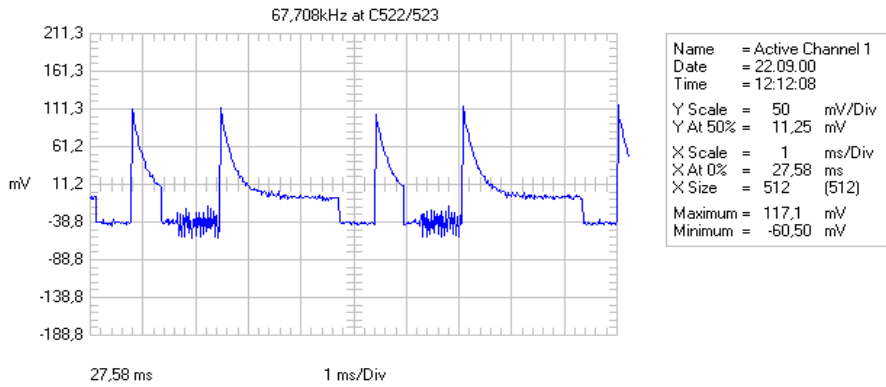
Check voltages at HAGAR :

Vtcxo 2.8V at C550.

Vsynte 2.8V at C561.

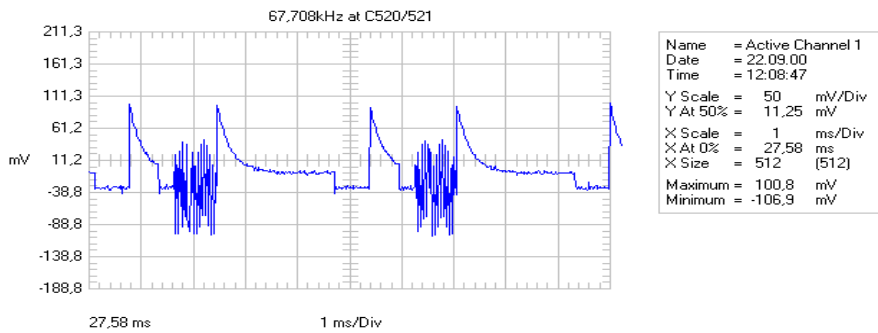
Vlna 2.8V at C562.

Check 26MHz reference oscillator at C830, 700mVpp, frequency deviation < 100Hz.
Check 947MHz at both sides of L600.
Check Sdata at J237, Sclk at R205 and Sena at R206, see diagrams in section TX-faults.
Check 67.708kHz at C522/523 (burst mode, input level -65dBm).

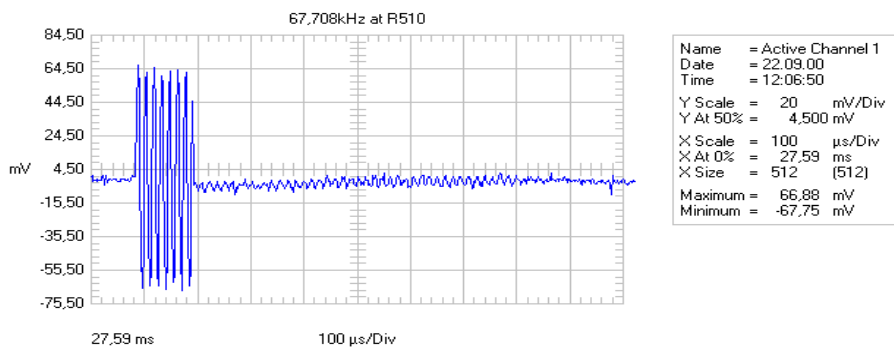


If signal is not ok, check VRXrf 2.8V at C557, check also Vchp 4.8V at C560 and frequency of G800 at C788 (RX Ch.60: 3788MHz) or change HAGAR (N505).

Check 67,708kHz at C520/521 (burst mode, input level -65dBm).

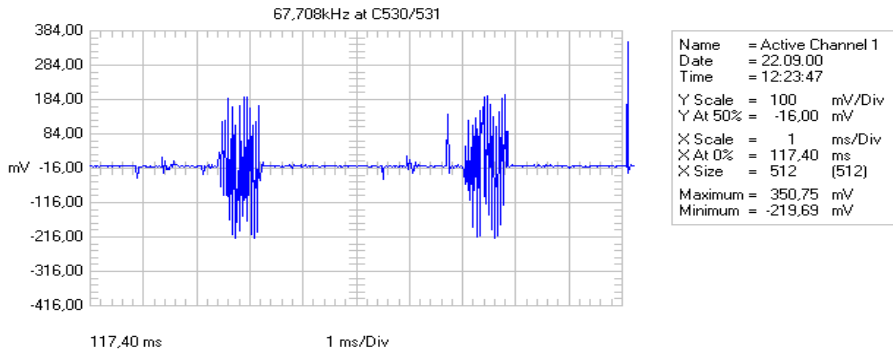


Check 67,708kHz at R510 (burst mode, input level -65dBm).

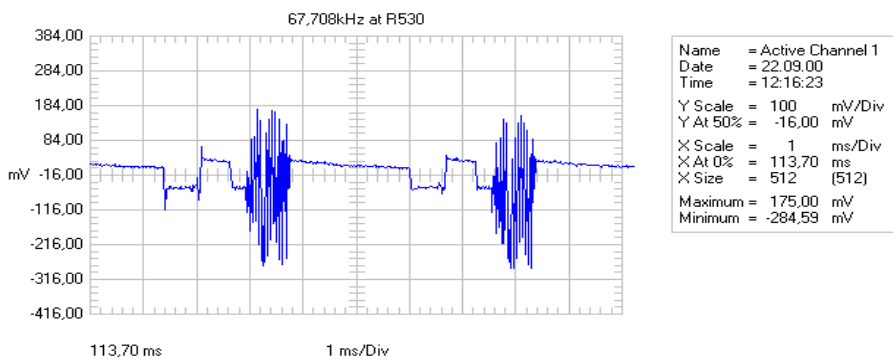


If signal is not ok at R510, check C510- C513 for shorts to GND, check resistance of R510 (4 * 100R) or change HAGAR (N505).

Check 67.708kHz at C530/531 (burst mode, input level -65dBm).



Check 67.708kHz at R530 (burst mode, input level -65dBm).



If signal is not ok at R530, check Vref 1,35V at C535, also check C530-C533 if broken or broken soldered, change HAGAR (N505) if necessary.

COBBA (N250) faulty

Check Vbb 2,8V at C201 and VCOBBA 2.8V at C248.
Check COBBAclk at J252 (see diagram in chapter "Contact Service").
Probably broken solderings under COBBA (N250). Remove COBBA, replace it with μ BGA rework machine and retune RX/TX values of the phone.

G830 26MHz reference oscillator faulty.

Check Vcc 2.7V at C831 and Vcon (varies between 0.3V and 2.3V) at C832.
If frequency deviation is higher than +/- 100 Hz, it is necessary to change the oscillator.

G800 SHF oscillator faulty

Check frequency of oscillator if possible – refer to frequencies worksheet (page 27)
If you have no possibility to check frequency, check oscillator by measuring Vcc at C804 (2,8V) and Vc at C803, which varies between 0.7V and 3.8V.
If Vc is 4.8V, the oscillator doesn't work in all probability.

No RX - calibration GSM 1800 possible.

Use WinTesla to set phone in following mode: Initialise/Product/Band/PCN
Testing/RF Controls/ active unit RX Ch.700, burst mode.
Set RF- Generator to a high RF- Level output, eg -40dBm.

To find a fault in GSM 1800 RX mode, you can proceed almost the same way as described for GSM 900:

Check 26MHz reference oscillator at C830, 700mVpp, frequency deviation < 100Hz
Check 1842.8MHz at Z620 in & out. If not ok check values at Z670.
Check 1842.8MHz at C640. If not ok check values at V903 and V905.
Check 1842.8MHz at both sides of L631. If not ok check Z600, T630.
Check RXI/Q signal at R530. If not ok check values at HAGAR (N505).
If signal at R530 is ok but still no RX-calibration possible, check signals at COBBA (N250), probably MAD faulty.

Low receiver signal strength indicator

Calibrate RX values of the phone.
Check if antenna pad on PCB is dirty or antenna spring is bent.
Check receivers signal strength indicator with a new antenna.

Bit error too high.

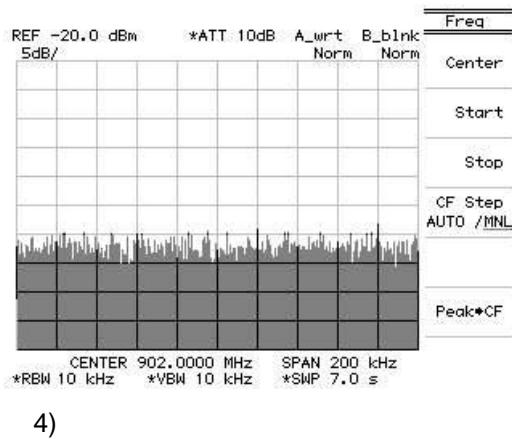
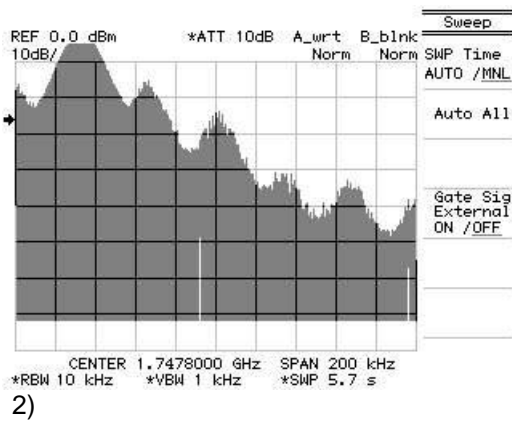
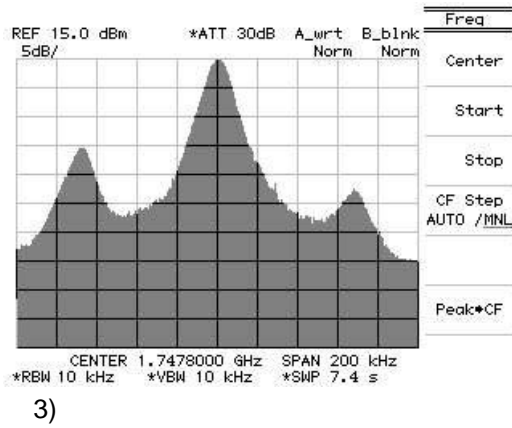
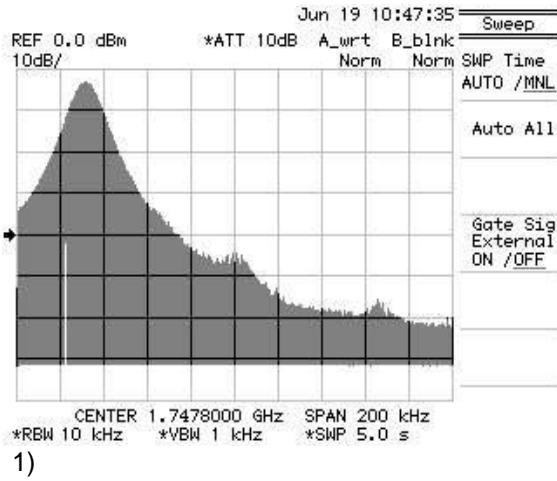
If bit error is too high, probably Z620 faulty. Change filter, retune phone values and check phone in call mode with a simulator.

Oxidized pads under COBBA

Check the module in call mode with a simulator.
Knock carefully around the COBBA with a nonmetallic item.
If errors like RX quality/level or TX power/phase/frequency appear, there are probably oxidized pads under COBBA. Remove COBBA, tinplate oxidized pads carefully with flux and solder, replace COBBA with μ BGA rework machine.

Note that you have to rewrite SIMlock-data and tune RX/TX-values of the phone after changing the COBBA.

Faulty TX - spectrum



Pic.1: Normal spectrum

Pic.2: Spectrum with broken solderings under CCONT.
Spectrum turns to picture 1 if CCONT is pushed carefully with a nonmetallic item.

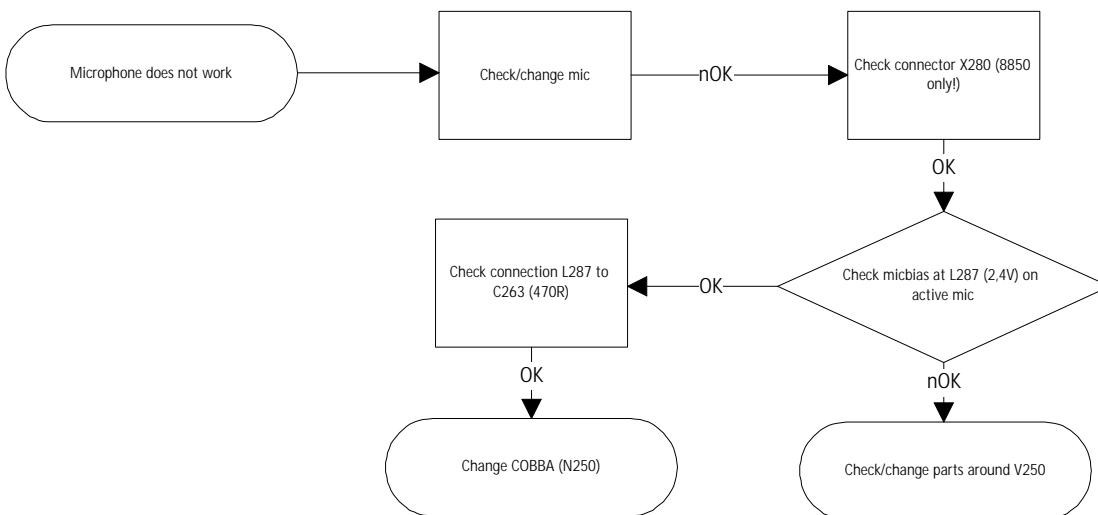
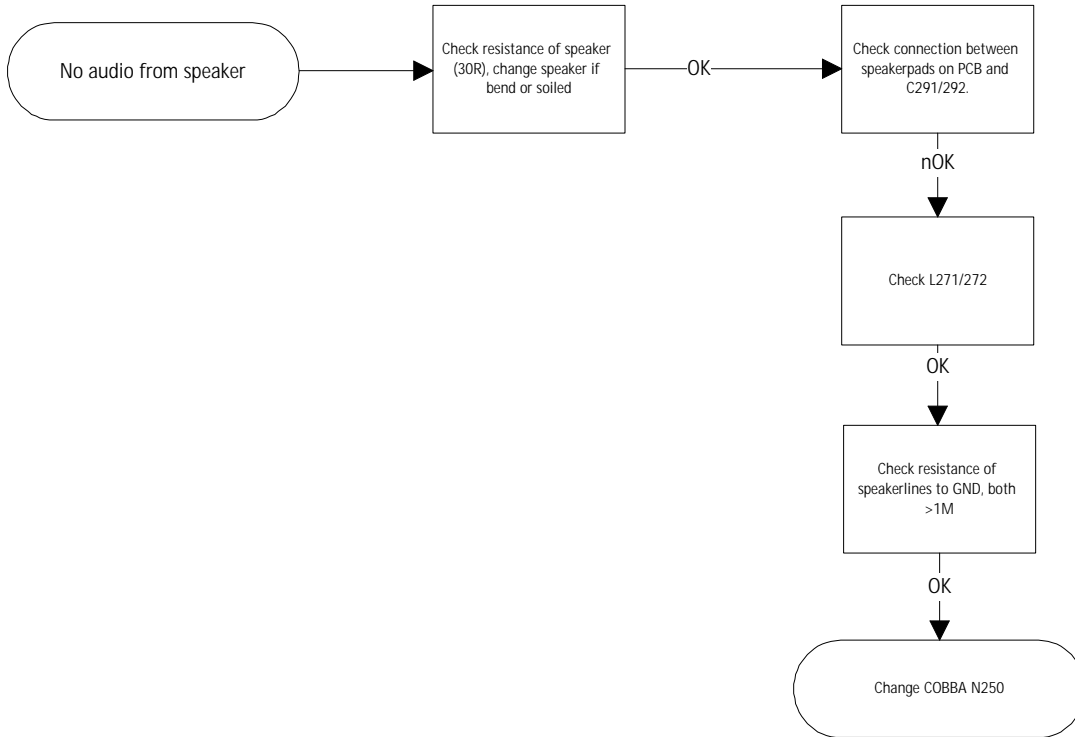
Pic.3: Spectrum of faulty COBBA (RSSI-Alignment not possible, TXI/Q faulty).

Pic.4: Spectrum of faulty oscillator G800, both COBBA or HAGAR can be the reason.

FREQUENCY LIST

EGSM Channel	Channels TX MHz	& RX MHz	Frequencies VCO - TX MHz	VCO VC at C803 VOLT	VCO - RX MHz	VCO VC at C803 VOLT
975	880,2	925,2	3520,8	2,66	3700,8	1,46
976	880,4	925,4	3521,6		3701,6	
977	880,6	925,6	3522,4		3702,4	
978	880,8	925,8	3523,2		3703,2	
979	881	926	3524		3704	
980	881,2	926,2	3524,8		3704,8	
981	881,4	926,4	3525,6		3705,6	
982	881,6	926,6	3526,4		3706,4	
983	881,8	926,8	3527,2		3707,2	
984	882	927	3528		3708	
985	882,2	927,2	3528,8	2,69	3708,8	1,51
986	882,4	927,4	3529,6		3709,6	
987	882,6	927,6	3530,4		3710,4	
988	882,8	927,8	3531,2		3711,2	
989	883	928	3532		3712	
990	883,2	928,2	3532,8		3712,8	
991	883,4	928,4	3533,6		3713,6	
992	883,6	928,6	3534,4		3714,4	
993	883,8	928,8	3535,2		3715,2	
994	884	929	3536		3716	
995	884,2	929,2	3536,8	2,72	3716,8	1,56
996	884,4	929,4	3537,6		3717,6	
997	884,6	929,6	3538,4		3718,4	
998	884,8	929,8	3539,2		3719,2	
999	885	930	3540		3720	
1000	885,2	930,2	3540,8		3720,8	
1001	885,4	930,4	3541,6		3721,6	
1002	885,6	930,6	3542,4		3722,4	
1003	885,8	930,8	3543,2		3723,2	
1004	886	931	3544		3724	
1005	886,2	931,2	3544,8	2,75	3724,8	1,61
1006	886,4	931,4	3545,6		3725,6	
1007	886,6	931,6	3546,4		3726,4	
1008	886,8	931,8	3547,2		3727,2	
1009	887	932	3548		3728	
1010	887,2	932,2	3548,8		3728,8	
1011	887,4	932,4	3549,6		3729,6	
1012	887,6	932,6	3550,4		3730,4	
1013	887,8	932,8	3551,2		3731,2	
1014	888	933	3552		3732	
1015	888,2	933,2	3552,8	2,78	3732,8	1,66
1016	888,4	933,4	3553,6		3733,6	
1017	888,6	933,6	3554,4		3734,4	
1018	888,8	933,8	3555,2		3735,2	
1019	889	934	3556		3736	
1020	889,2	934,2	3556,8		3736,8	
1021	889,4	934,4	3557,6		3737,6	
1022	889,6	934,6	3558,4		3738,4	
1023	889,8	934,8	3559,2	2,81	3739,2	1,7
0	890	935	3560		3740	
Standard						
1	890,2	935,2	3560,8	2,81	3740,8	1,7
60	902	947	3608	3	3788	2,01
124	914,8	959,8	3659,2	3,2	3839,2	2,34
512	1710,2	1805,2	3420,4	2,03	3610,4	0,84
700	1747,8	1842,8	3495,6	2,36	3685,6	1,3
885	1784,8	1879,8	3569,6	2,66	3759,6	1,77

INTERNAL AUDIO FAULTS



Speaker faulty

Check resistance of speaker (30 Ohm).

Check mechanical appearance of speaker if audio signal is too quiet or distorted.

Ear N/P disconnection or short circuit to GND.

Check resistance of L271/272 (0 Ohm).

Check resistance of lines to GND (> 1MOhm).

Microphone doesn't work.

Check/change microphone.

Check connector X280 if bent or soiled (8850 only), change if necessary, also see SB-005.

Check microphone voltage at L287 (2,4V) on active micro.

Check connection between L287 and C263 (470 Ohm).

Change COBBA (N250) if necessary.

TDMA – noise

If audio is distorted by TDMA – noise, make sure that PCB is clean.

Further more it is necessary to assemble the phone with a torque screwdriver with the required torque of 17 Ncm.

NSM-3: Try to change the mainframe assy, RF can, antenna.

NSM-2: Try to change the B-Cover and/or the speaker/ metal gasket and/or slide.

USER INTERFACE FAILURE**Display failure**

Check mechanical appearance of display.
Check Vbb 2.8V at C330.
Probably MAD faulty.

Keypad no function

Check if contacts of domesheet / keymat are dirty.
Clean PCB if necessary, check surface of LCD-module (bend?).
Check resistance of ROW and COL lines between the keys.
Probably MAD faulty.

Backlight failure

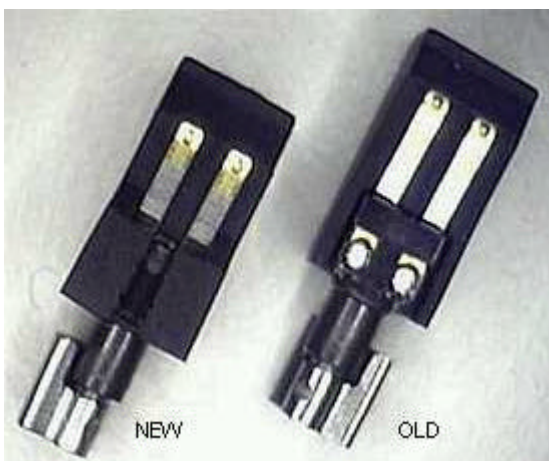
Check KBlights 2.8V at pin 7/15 of N310. If not ok, there could be a break between D200 and N310, or MAD is faulty.
Check Vb 3.6V pin 1 and Vbb 2.8V pin 2 of N310.
Check resistance of R310 and R311.
Check Vb at LED's V320-325 and V331-340.
If keypad backlight is not bright enough, change resistor R311 from 39kOhm to 10kOhm (See also NSM-2 service bulletin 23).

Buzzer failure

Check mechanical condition of buzzer.
Check Vb 3.6V at B301.
Check Vb 3.6V pin 1 and Vbb 2.8V pin 2 of N310
Check buzzer signal at pin 6 of N310.
Check buzzer_cnt signal at pin 3 of N310. If not ok, there could be a break between D200 and N310, or MAD is faulty.

Vibra failure (only for 8210)

Check version of vibramotor, add support tape if necessary (see also NSM-3 service bulletin 11).
Check Vb 3.6V at V350.
Check Vb 3.6V pin 1 and Vbb 2.8V pin 2 of N310.
Check vibra signal at pin 16 of N310. If not ok, check vibra_cnt at pin 19 of N310.
If signal is ok at pin 19, change N310, else there is a break between D200 and N310, or MAD is faulty.



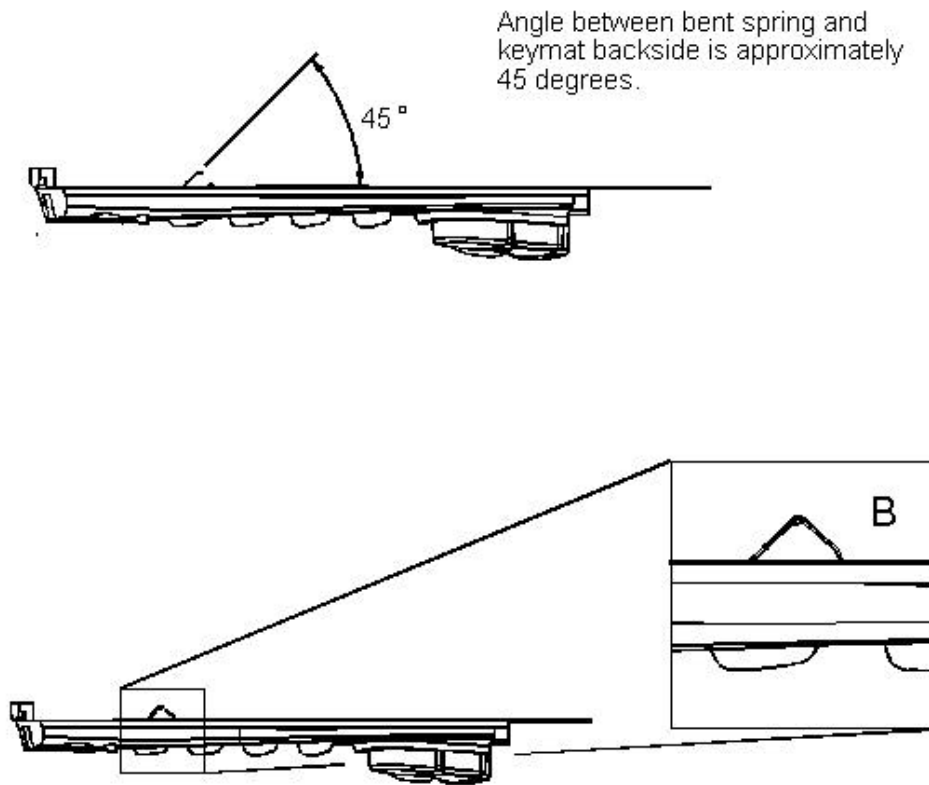
CLOCK TIME PROBLEMS

Clock time has to be corrected in short periods.

Check amplitude and frequency of sleepclock oscillator at J228 (3,2Vpp squarewave at 32.768kHz).
If amplitude or frequency is not ok, change crystal B100. If fault persists, check parts around B100 like R100/102/154 and C101/102/113.

Clock time is lost after removing battery

Check mechanical appearance of RTC-battery, especially the angles of the battery springs.
If necessary bend them as shown in the first picture for the plus (short) spring and in the second for the minus (longer) spring with help of tweezers. Also see NSM2 service bulletin 20.



The bending of the battery-spring should be always done, also with new batteries!
After changing the RTC-battery it is necessary to charge it. This can easily be done by putting the battery on the phone for 10 to 15 minutes (It is not necessary to switch on the phone).After that, RTC-battery should be able to save the clocktime.
If the fault still remains, it is probably necessary to change CCONT (N100) or CHAPS (N101).
Note that you have to run energy management calibration after changing CCONT!

Product-Codes NSM - 2		06. Jul 00
Product-Code	SIM-Lock Data	Operator
0501899		APAC / BASIC TR
0502573		APAC - A
0502939		EURO - A
0502940		EURO-C
0503072		APAC-A
0503093		EURO-B
0503094	No SIM-Lock	EURO-D
0503095	MCC & MNC 00101	EURO-E
0503096	MSIN 000000001	EURO-F
0503097		EURO-G
0503098		EURO-H
0503525		EURO-F
0503526		EURO-E
0503527		EURO-C ALS
0503528		EURO-D
0503529		APAC-B
0503530		APAC-C
0503595		APAC BOPOMOFO TR
0503596		APAC STROKE TR
0503597		APAC LATIN TR
0503612		APAC-C
Product-Codes NSM - 3		30. Aug 00
0502688		APAC / Basic TR
0502689		EURO - C
0503139		Basic TR "RED"
0503140		APAC STROKE
0503220		EURO - A
0503240		EURO - B
0503241	No SIM-Lock	EURO - D
0503242	MCC & MNC 00101	EURO - E
0503243	MSIN 000000000	EURO - F
0503244		EURO - G
0503245		EURO - H
0503246		APAC - A
0503247		APAC - B / Blue
0503377		EURO - D / Russia
0503378		EURO - E / Hungary
0503379		EURO - F / Poland
0503380		EURO - I
0503381		EURO - C ALS
0503472		APAC Bopomofo

Product-Codes NSM - 3		
Product-Code	SIM-Lock Data	Operator
0503473		APAC - A STROKE
0503474		APAC - C
0503475		APAC - C
0503491		Basic TR / APAC - B / STROKE Blue
0503974		EURO - C Network Monitoring
0504317		EURO - C Bouygues
0504415		Orange / Basic TR / Blue / Logo
0504416		Movistar / Basic TR / Grey / Logo
0504418		Basic TR "BLUE"
0504419		EURO - A Blue
0504422		EURO - D Blue
0504427		EURO - E Blue
0504428		EURO - F Blue
0504431		EURO - G Blue
0504432		EURO - H Blue
0504433	No SIM-Lock	EURO - E Blue / Hungary
0504434	MCC & MNC 00101	EURO - F Blue / Poland
0504435	MSIN 000000000	EURO - C ALS Blue
0504436		EURO - C Blue
0504450		EURO - D Blue / Russia
0504451		EURO - B
0504573		Basic TR / TIM / Blue / Logo
0504578		EURO - C TIM
0504580		Basic TR / BLU / Blue / Logo
0504581		Basic TR / APAC / Bopomofo Blue
0504582		APAC - A
0504584		EURO - C / BLU
0504585		APAC - A STROKE Blue
0504586		Basic TR / Airtel / Grey / Logo
0504587		Basic TR / APAC-A / STROKE Blue
0504611		Basic TR / Amena / Grey / Logo
0504615		EURO - A / Amena
0504761		EURO - F / ERA Poland Blue
0504763		EURO - F / Centertel Poland
0504778		APAC - C Korea Blue
0504779		APAC - C NOKIA Blue
0504780		APAC - B Basic TR / Blue

Product-Code	SIM-Lock Data	Operator
0504339	MCC & MNC 20810 MSIN ??????????	EURO - C SFR
0504344	MCC & MNC 26806 MSIN ??????????	EURO - D TMN
0504369	MCC & MNC 20408 MSIN ??????????	EURO - C KPN
0504372	MCC & MNC 23203 MSIN ??????????	EURO - C Maxmobil
0504392	MCC & MNC 26801 MSIN ??????????	EURO - D Telecel
0504417	MCC & MNC 21407 MCC & MNC 21402 MSIN ??????????	EURO - A Movistar
0504437	MCC & MNC 23433 MCC & MNC 23486 MSIN ??????????	EURO - I Orange
0504470	MCC & MNC 23201 MSIN ??????????	EURO - C Mobilkom
0504504	MCC & MNC 26001 MSIN ??????????	EURO - F Polcomtel
0504579	MCC & MNC 23205 MSIN ??????????	EURO - C Connect
0504588	MCC & MNC 21401 MSIN ??????????	EURO - A Airtel Club
0504591	MCC & MNC 23430 MSIN ??????????	EURO - C One2One
0504760	MCC & MNC 26801 MSIN ??????????	EURO - D Telecel (Blue)
0504783	MCC & MNC 23205 MSIN ??????????	EURO - C Connect (Blue)
0504807	MCC & MNC 26806 MSIN ??????????	EURO - D TMN (Blue)
0505030	MCC & MNC 23203 MSIN ??????????	EURO - C MaxMobil
0505161	MCC & MNC 23201 MSIN ??????????	EURO - C Mobilkom
0505167	MCC & MNC 21403 MSIN ??????????	EURO - A Amena Exclusivo

CHANGE HISTORY

Originator	Status	Version	Date	Comment
CC-Training-Group	Draft	0.1	05.10.2000	First draft version for the repair group
CC-Training-Group	Draft	0.3	09.10.2000	Comments of repairgroup added.
CC-Training-Group	Approved	1.0	11.10.2000	First CC version.
CC-Training-Group	Approved	2.0	16.10.2000	Frequency list added.