Repair Hints

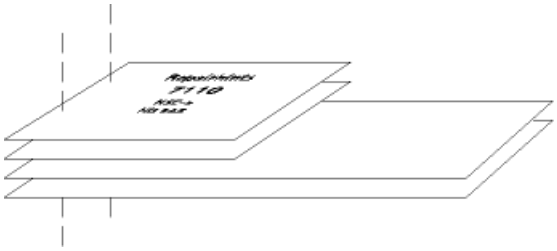
Service Level 3 & 4

6310 / 6310i

NPE-4 / NPL-1

Customer Care Europe, Middle East & Africa
SCCE Training Group

General



-How to use this document

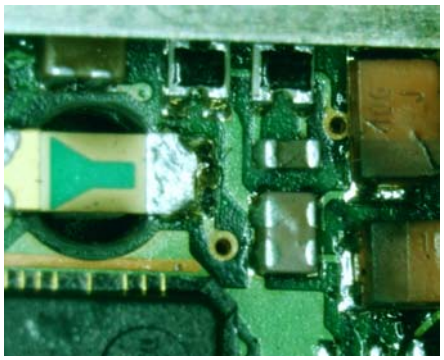
Place the colored schematics behind this manual.
Now you are able to follow these specifictions with graphical layouts and it is easier for you to find the components and measuring points.

-General handling

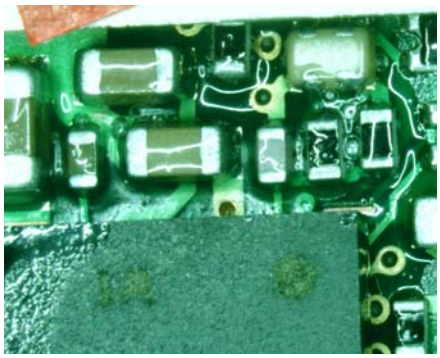
Be very careful when disassembling the NPE-4/NPL-1 while removing the A-Cover from the Back-Cover.
Refer to disassembling instructions at the service manual of NPE-4/NPL-1.

- Broken balls / underfill, µBGA

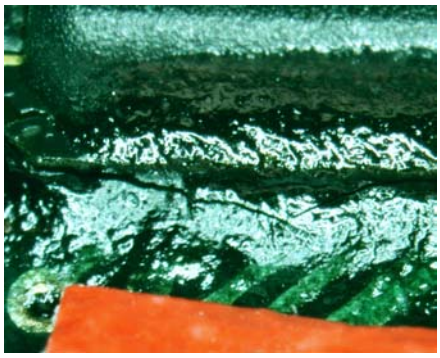
All replaceable (not underilled) µBGA components must be renewed after removing.
Reflow with uncontrolled hot air fan is strictly forbidden!
The µBGA must be soldered with NMP approved µBGA rework machines (e.g. Zevac / OK-Metcal / Martin) only .
Check the soldering points after removing a µBGA. Rework the oxidated solderings (broken balls) carefully by tinplating these areas with few flux and a hot soldering iron, if it is necessary.
Before placing a new component remove the tin and clean the PCB, e.g. with help of soder wick and flux cleaner such as “Kontakt LR”. Use only the mmended Fluxtype and an appropriate amount of it – avoid to wning the PCB in flux as this will result in additional faults!
Also check underfilled parts for broken underfill material below. In this case carefully evaluate possible repair actions as the phone probably was exposed to strong mechanical stress.



“rework” done with uncontrolled hot air



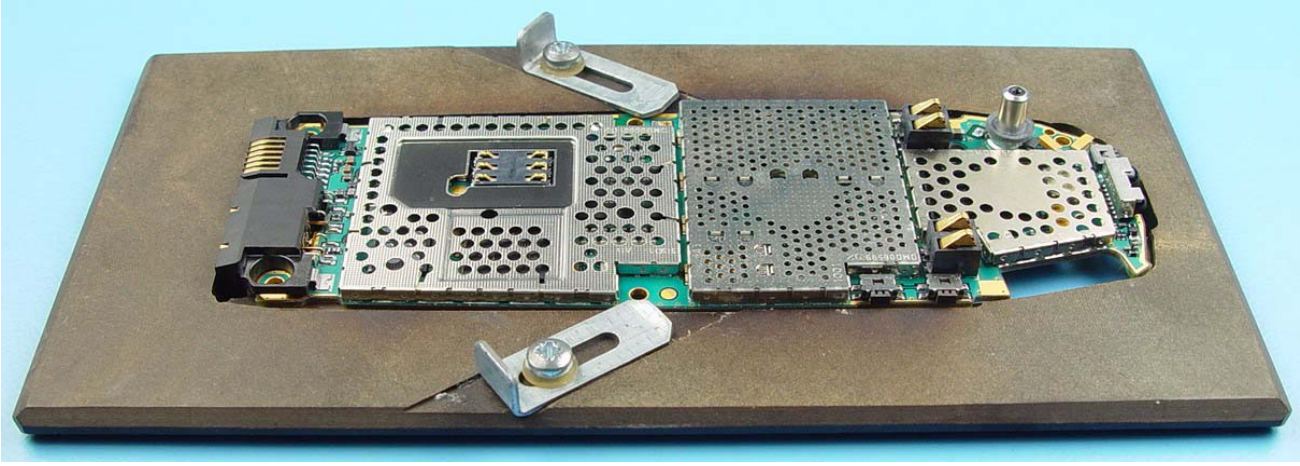
PCB drowned in flux



broken underfill of an µBGA part

-PCB handling & cleaning

To avoid damages of PCB and/or components through electrostatic discharging, handle the module in ESD-suitable cases only.
Outside an ESD-bag always wear ESD-bracelets, which must be connected to earth bonding point.
A damage caused by electrostatic discharge does not produce a directly apparent fault, but it will appear (however) within shortest time.
For cleaning use appropriate materials only. Do not use scratching or rubbing tools.
Usefull tools for cleaning are fluxcleaners such as “Kontakt LR” or “Electrolube FLU” in connection with ionized compressed air.
For shield disassembling or any other work on the PCB it is very important to place the PCB into the rework jig JBT-13U (NMP-code 0770242) to prevent damaging the LEDs – the pads the LEDs are connected with to the PCB are torn off by applying only little pressure onto the PCB!!!



-Component charactaristics

Some components contain important data as tuning values or security data.
Therefore several steps described are only feasible if you are able to reflash/ realign the phone and/or rewrite IMEI/SIMlock in certain cases. Please pay attention to separate notes.

-Shieldings, screw torques

To avoid RF-problems it is not allowed to reuse any shielding that once has been removed from shielding frame. Always use new shieldings after successful repair!
To tighten screws only use a torque screwdriver with a torque adjusted to 17Ncm. Notice tightening order that is shown in the picture below!

-Realign after repair

Characteristics of replacement may vary.
To prevent additional faults after repair (low standby,, losing network etc.) it is necessary to retune phone values after repair, but never try to cover up a fault by justing the phone settings!

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 NPE-4 6310 / NPL-1 6310i.
It contains a lot of collected tips and hints to find faults 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.
It is 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 such as Service Bulletins.
Ffor that reason it does not contain any circuit descriptions or schematics.

All measurements are made by using the following equipment:

Nokia repair SW	:	Phoenix
Phoenix Application	:	04.13.005
Flash SW (CMT)	:	5.01 6310 / 5.50 6310i
Test Jig	:	MJS-40
Docking station	:	JBV-1
Docking Adapter	:	MJF-9
Digital Multimeter	:	Fluke 73
Oscilloscope	:	Fluke PM 3380A/B
Spectrum Analyzer	:	Advantest R3162 with an analogue probe
RF-Generator /	:	CMU 200
GSM Tester		

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

Please state:
Title of the document + issue number/date of publication.
Page(s) and/or figure(s) of error.

Please send to:

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Contents

PREFACE **GENERAL** 2

CHAPTER 1 **Additional information** 6
- BB shield removing instructions 6
- Different battery connectors 7
- Auto power off 7

NPE-4 (6310) & NPL-1 (6310i) 8

CHAPTER 2 **CarKit problems** 8
- "Phone not connected" or "Phone error" 8
- Problems Solved by the MCU SW 5.50(only NPL1) 8

CHAPTER 3 **Totally dead/ "Does not switch on"** 9
- Check current consumption 9
- Flash the phone 9
- Voltages and signals to check 10

NPE-4 6310 12

CHAPTER 4 **Electrical faults** 12
- Drop calls 12
- No service, memory problem 13
- No service, no RSSI 13
- RX flowchart 15
- No service, no TX 16
- TX flowchart 18
- Display too dark/ too light 19

CHAPTER 5 **Hookswitch problems** 20
- Sometimes not possible to release "incoming call" 20
- No voice dial possible 20

NPL-1 6310i 21

CHAPTER 6 HW Changes 21
- Different UEM versions 21
- Value change of R133 & R134 21
- Replacement of C164 with R169 “Reduce noise on Headset HDC-9P” 21
- New Bluetooth module BT202 21

CHAPTER 7 No Service 22
- Drop calls 22
- No TX at GSM1800/1900 23
- No service flowchart 24
- “Phone restricted” error 25

CHAPTER 8 Keypad faulty 26

CHAPTER 9 BB Selftest explanation for NPE-4/NPL-1 27

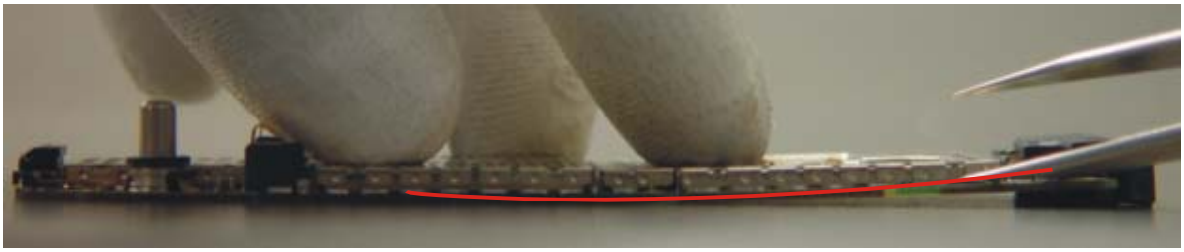
CHAPTER 10 Change History 28

Additional Information

BB shield removing instructions

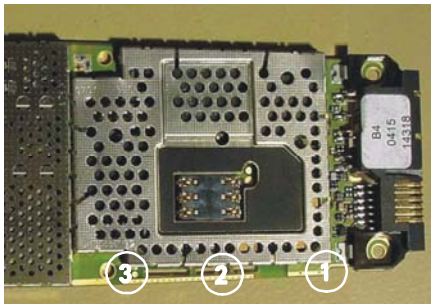
For BB shield removing it is important to lay the PWB on level surface in away that the bottom connector does not touch the underground to prevent bending of PWB and cracking of the connector's solderings (See pictures below).

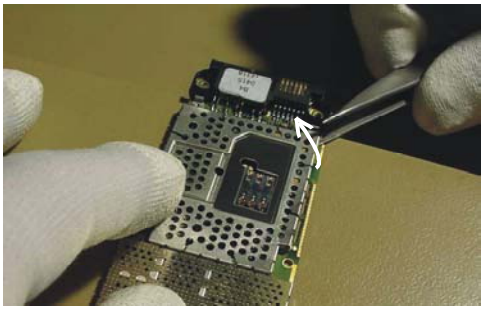
Wrong

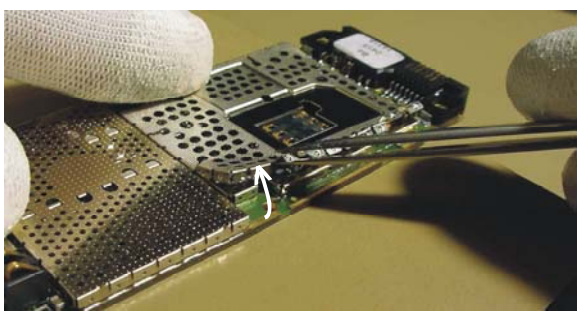


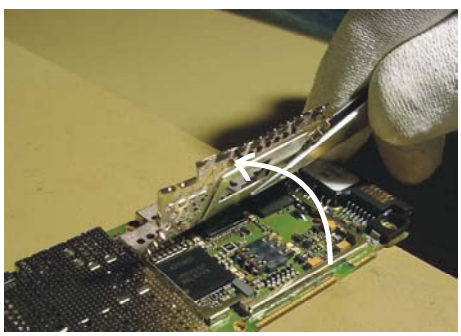
Correct

When removing the BB shield, be very careful because the Flash D450 could be damaged (see pictures on the next page). Start by lifting and bending the lid with tweezers at the marked points 1- 3 (see pictures below).
Do not use too much force on the frame because it could be damaged and also the PWB could be mechanically stressed.

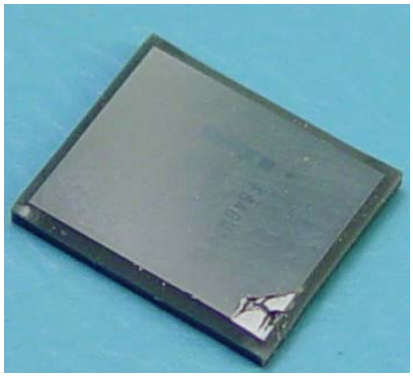


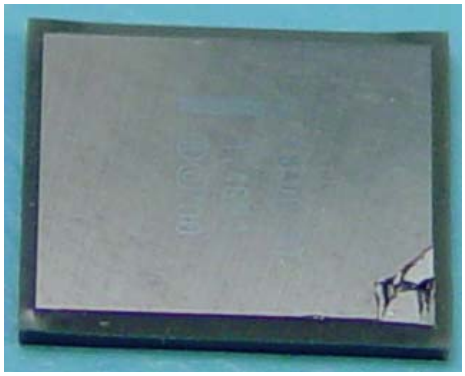






Example of a broken Flash D450:

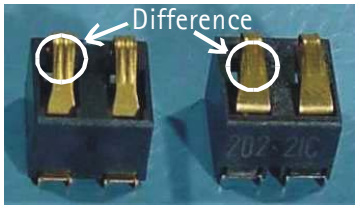


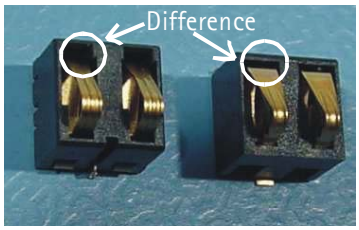


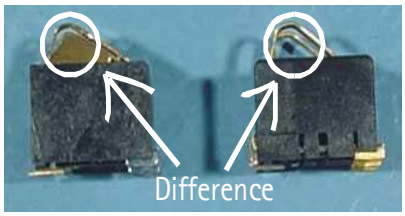
Different battery connectors

There are two different battery connectors with the same part code 5400239 (see pictures below).
If it is necessary to exchange the battery connector X101/ X102, take care that you use the corresponding part.
Wrong replacement causes switch-off trouble.

Different surface, width and position of spring contacts:



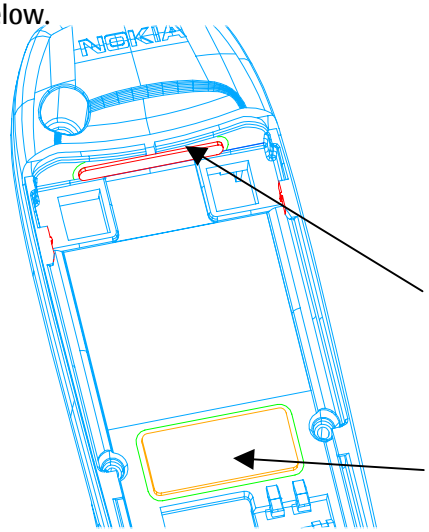




Note! It is not allowed to use the battery connectors of NPE-3 (part code 5469069) because of smaller size.

Auto power off

The phone turns off, because the contact pads on the battery and the battery connectors are worn out so that the phone has lost the contact to the battery.
Assemble the Y- and Z-Pads, as in the picture below.
For more information see SB-010 (NPE-4).



Battery Pad Y

Battery Pad Z

NPE-4 6310 & NPL-1 6310i

Carkit problems (Daimler Chrysler & Mercedes Benz)

"Phone not connected" or "Phone error"

If "Phone not connected" or "Phone error" appears on the display while the phone charges, it is necessary to find out the version of interface box DME-1. This can be done, by checking the product code on the label. Only the new version "Ramses 6310" works with NPE-4 (6310) & NPL-1 (6310i) phones (see table).

	Old versions		New version
Project	Ramses	Ramses 6210	Ramses 6310
Product type	DME-1E	DME-1E	DME-1E
Customer No.	A 203 820 32 26	A 203 820 99 26	A 203 820 25 85
Product code	0630231	0630427	0630589 or 0630587

If new interface box version is needed, the customer should contact his Daimler Chrysler Dealer to get an "upgrade Kit".

Note: It is also necessary to update the phone with the latest MCU SW version 5.01 / 6310 and 5.50 / 6310i or later versions. See therefore SB 038 for 6310 and SB 030 for 6310i.

Problems solved by the MCU SW 5.50

The following fault descriptions are solved by the latest MCU SW 5.50

- "*Switch to a defined Profile not possible*"

In this case it is not possible to switch the profile to one from the user-defined profile (Menu → settings → accessory settings →hands free → default profile → e.g general).

- "*No ringing tone in CarKit*"

This problem could occur if a user switches the phone to "silent" or "meeting" profile and has not switched to "general" manually before. There will be no ringing tone in the CarKit even if "general" profile is set as default.

- "*Echo*"

The user hears an echo of the conversation partner.

- "*Poor sound quality using HSU-1"*

If the volume is too high, the sound quality gets poorer by using HSU-1

- "*Resets*"

Sometimes a reset occurs, especially when driving and starting or ending calls.

Totally dead

The first thing to do in this case is to make a kind of precheck.
This should be done in the following order:

Check current consumption

After switching on the phone, the current consumption is initially around 120 mA for a few seconds.
Afterwards current lowers to around 70 mA (again for a few seconds) and finally goes down to 1-3 mA (sleepmode).

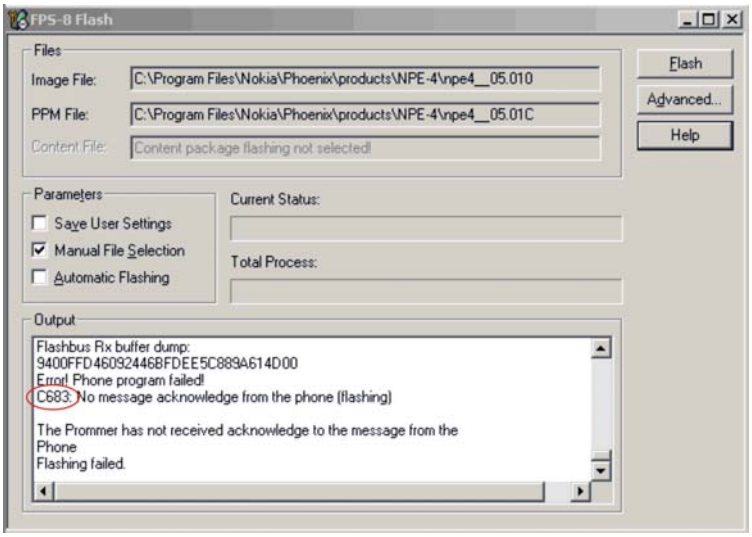
In cases where the phones have a current consumption around 11mA – 24 mA for about 32 seconds, the indication is that flash (D450) or bluetooth module (V130) are empty or defective.

Flash the phone

The result of the flash procedure helps to encircle the reason for the fault and sometimes to solve the problem.
So it is absolutely necessary in this case to flash the phone before starting any repair action.
In the best case flash is only "empty". The phone should "go on" after a succesful flash update.

- If the flash update is not succesful, check error messages of the failed flash update (see picture below).

Possible error message:



The failure codes **C683** or **C686** indicate in most cases a defective bluetooth module V130 (D200 & D400 also possible).
Other failure code messages give no certain indication about any defective component.
Flash (D450), UEM (D200), UPP (D400) or other defective components could distinguish the same or similar failure messages.

Therefore, absolutely independently from the flash failure message and in every case after precheck procedure, some voltages and signals should be checked to encircle the failure source.

Do not change the flash (D450) or bluetooth module (V130) before ensuring that following voltages and signals are OK!

"Totally dead" voltages and signals to check

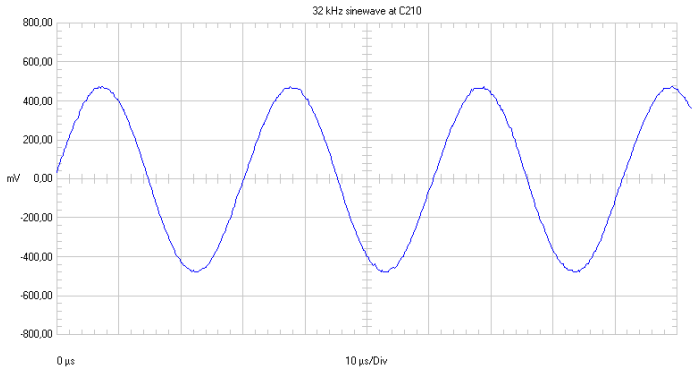
To make the following measurements it is necessary to press the power switch button on several times, otherwise all signals and voltages are only visible for around 250ms (except VBATIN).

Check VBATIN=3.6 VDC at L260 (depends on workbench supply). If not ok, check X101, X102 battery connectors for mechanical damages or cold solderings. **Refer also to chapter "Additional information/Different battery connectors".**

Check 32.768 kHz sinewave, Vpp = 800 mV at C210 (see picture below).

Oscilloscope settings:

Ampl: 200mV
Time/Div: 10µs/Div
AC/DC/GND: AC



If there is no signal, check B200 circuit for shorts or disconnection and change faulty components.

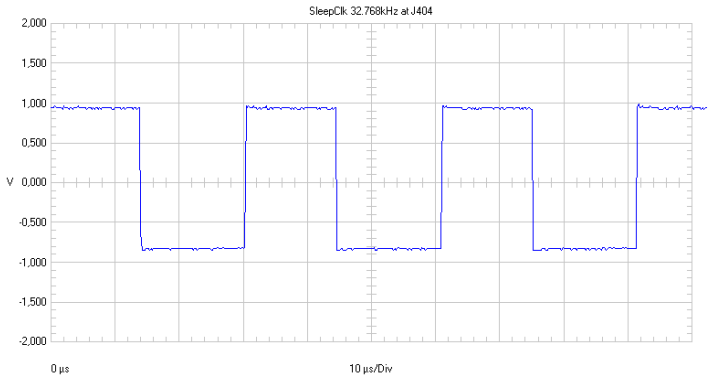
Check PWRONX at S300 pin 2/ 4: Key not pressed = 3.6 VDC (depends on Workbench supply voltage)
Key pressed = 0 VDC

If not ok, check PWRONX-line from S300 to UPP D400 for shorts or disconnections.

Check SleepClk = 32.768 kHz, Vpp = 1.8 V square wave at J404 (see picture below).

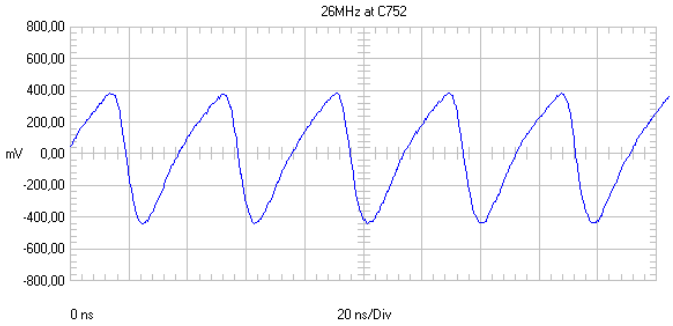
Oscilloscope settings:

Ampl: 500mV
Time/Div: 10µs/Div
AC/DC/GND: AC



If not ok, check 32kHz B200 circuit for shorts or disconnections.

Check VCORE = 1.8 VDC at C400; PURX = 1.8 VDC at V130 Pin 44. If not ok, check UEM D200.
Check System Clk = 26 MHz, Vpp = 800 mV at C752 for NPE-4, and at R618 / for NPL-1 (See picture below)



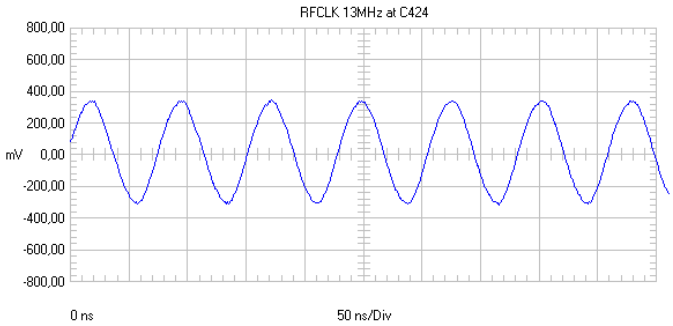
Oscilloscope settings:

Ampl: **500mV**
Time/Div: **20ns/Div**
AC/DC/GND: **AC**

If not ok, check 26 MHz G740 (NPE-4) circuit /B601 (NPL-1) circuit.

This step is only for NPE-4.
For NPL-1 phones go one step further.

Check RFClk = 13 MHz, Vpp = 600 mV at C424.
If not ok, check/change N600 Hagar.



Check VIO = 1.8 VDC at C450. If not ok, check VIO line to UEM D200 for shorts or disconnections and change faulty components.

Check VPP at C454 = 1.8VDC
If VPP is not ok - check C454. If UPP D400 is faulty, change PWB, because UPP is not changeable.

Check Vana at C278 = 2.8VDC
If not ok - check C278, if C278 ok - UEM D200 will be faulty. Change PWB, as UEM is not changeable.

Resume

Change **Flash D450** in the following cases and if all signals and voltages described above are ok:

- Mechanical damages (see picture in Additional Information/Example of broken Flash D450 on page 7).
- IMEI not rewriteable or SIMLock Test fails.
- Failure code messages after failed flash update! Except codes **C683** or **C686** (change Bluetooth module in this case).

After changing the Flash D450, rewrite product code, HW-ID, IMEI and SIMlock settings.
If the fault persists, probably UEM D200 is faulty and not changeable. Change the PWB.

Note! Rewrite SIMlock and IMEI data by use of NOKIA SECURITY PASSWORD and tune the phone again, if the procedure is permitted to you (see General SB–037).

NPE-4 6310

Electrical faults

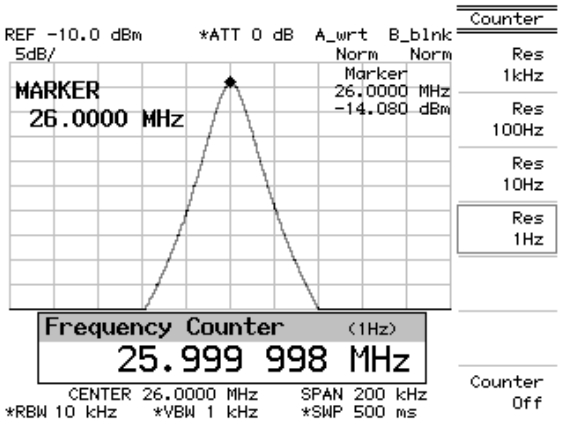
Drop calls

Disassemble the NPE-4 and the RF- shield, and then connect the PWB to the MJS-40 jig.
Insert a SIMcard and connect the coaxial cable to the tester (e.g. CMD). Now start a call.
After the call is established, check if the testers (e.g. CMD) analyzer display shows a frequency error.
If fault does not appear or appears intermittently only, press on 26MHz oscillator G740 with a non-metallic item.

If the frequency error appears or increases in this case, probably the 26MHz circuit is faulty.

Open the Phoenix menu Testing/ RF controls and activate local mode RX GSM900.
Check 26MHz +/- 100Hz at C752 or R752 on spectrum analyzer and active frequency counter (**see figure 26 MHz**)

Figure "26 MHz"

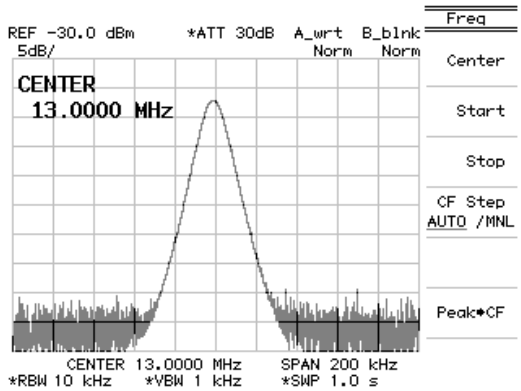


If the frequency drift is higher than +/ - 100Hz, check VR3 (VCC) = 2.8 VDC at R740 and check AFC (1.3 – 2.3 VDC) at C744
- If not ok, check UEM D200.

Check if fault is getting stronger by pressing the top of the 26MHz oscillator G740. Change 26MHz oscillator if necessary.

Check 13 MHz +/- 100Hz at C424 with spectrum analyzer (**see figure "13 MHz"**).

Figure "13 MHz"



- If not ok, check /change Hagar N600.

No service

Memory problem

Set phone to local mode with Phoenix.

Check RX calibration in GSM/PCN in Menu Tuning/RX Calibration.
If not ok, **refer to chapter No Service/No RX.**

Check TX power in GSM/PCN in Menu Tuning/TX power.
If not ok, **refer to chapter No Service/No TX.**

If RX and TX OK, insert Test-SIM and set phone to normal mode and start a Test call
- If not ok, make a SW update and try connecting again.
- If the fault persists after SW update, rewrite IMEI and SIMLock settings.

Note! Rewrite SIMlock and IMEI data by use of NOKIA SECURITY PASSWORD and make a SW-update again, if the procedure is permitted to you (See General SB–037).

No Service → no RSSI

Set the RF generator to GSM 942.4 MHz at channel 37, RF level –55 dBm and also the phone to the same frequency and channel.

Check System Clk = 26 MHz at C752 (how to check see figure "26 MHz" at chapter "*Drop calls*" on **page 12**).

- If not ok, check VR3 = 2.8 VDC at C602 and Vcon (AFC) = 1.25 – 2.3 V, if ok change 26 MHz osc. G740. Otherwise, go to next step.

Check RFClk 13 MHz at C424 (how to check see figure "13 MHz" at chapter "*Drop calls*" on **page 12**).

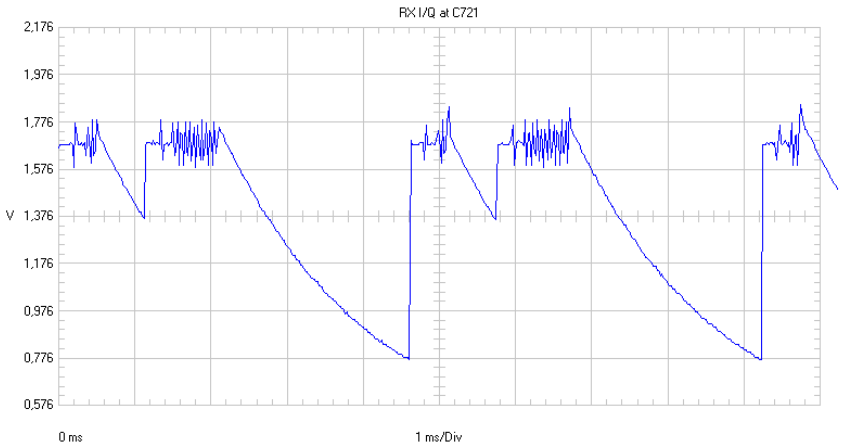
- If not ok, check / change Hagar N600.

Check RX I/Q signals at C721 and C722 as described on next page (see picture below).

Make the following measurements in burst mode with an oscilloscope in DC mode.

Oscilloscope settings:

Ampl: 200mV
Time/Div: 1ms/Div
AC/DC/GND: DC



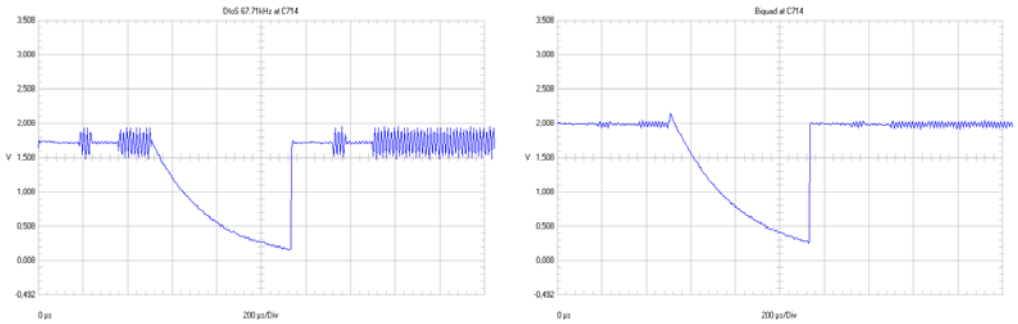
If not ok, check 67.71 kHz at C714 (DtoS and Biquad filter).

Order of measurement points at C714 (counted from N600 Hagar side): pins (3/4)= DtoS I/Q;
pins (1/2)= Biquad (CM_F and CP_F I/Q).

DtoS **Biquad**

Oscilloscope settings:

Ampl: 500mV
Time/Div: 200µs/Div
AC/DC/GND: DC



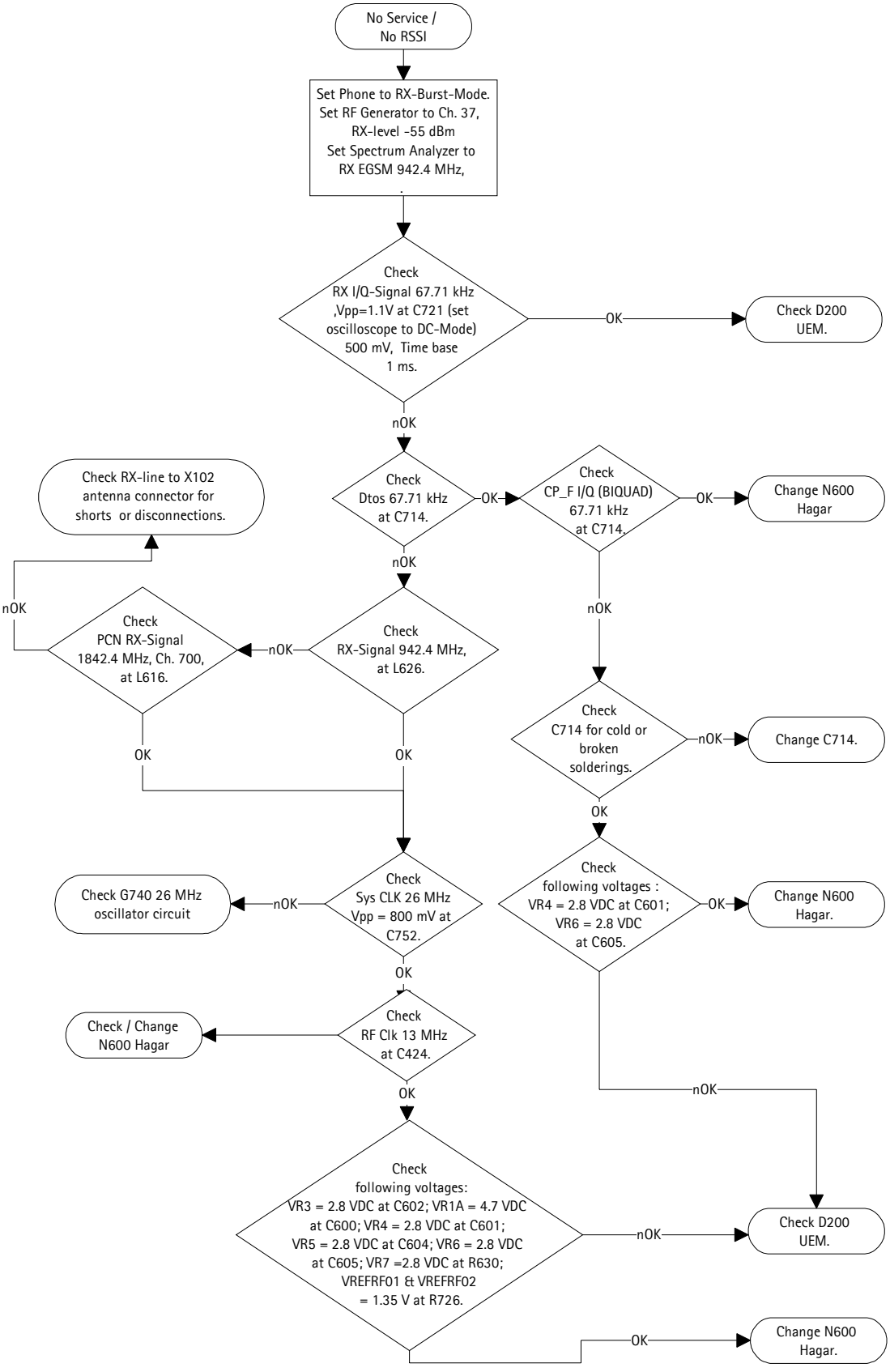
If the signal is not ok, check in GSM the RX signal 942.4 MHz at channel 37, RF level –55 dBm at L626.
If the signal is not ok, check in PCN the RX signal 1842.4 MHz at channel 700, RF level –55 dBm at L616
If both RX signals not ok, check RX lines from N600 Hagar to X802 antenna connector for shorts or disconnections.

Check the following voltages:

Check VR4 = 2.8 VDC at C601
Check VR5 = 2.8 VDC at C604
Check VR6 (VBB) = 2.8 VDC at C605
Check VR1A (VCP) = 4.7 VDC (supply for control voltage VC for SHF oscillator) at C600
Check VR7 = 2.8 VDC at C299 (supply voltage VCC for SHF oscillator)
Check VREF01 and VREF02 = 1.35 VDC at R726

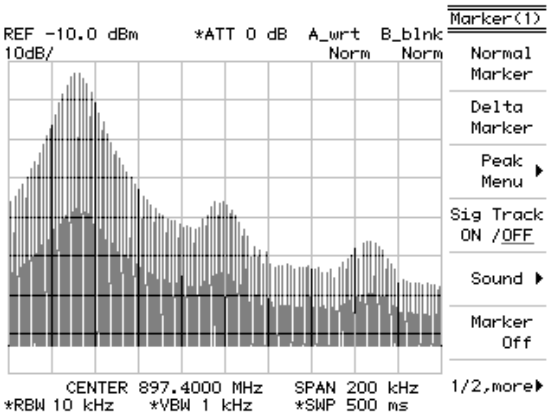
- If one of the voltages described above is not ok, check UEM D200.

Flowchart - No service → no RX



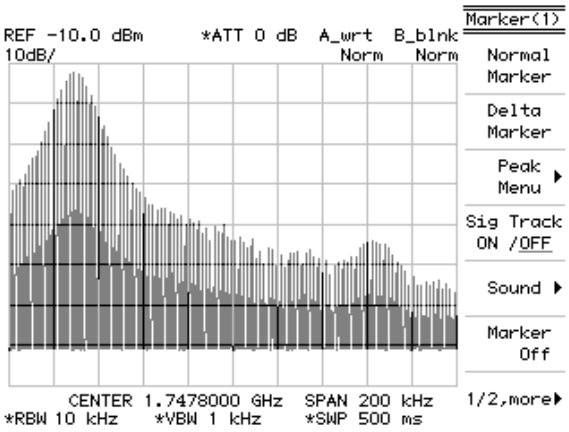
No service → no TX

Check EGSM TX signal at R656 / R657 (see picture below).
Set spectrum analyzer to TX EGSM 897.4 MHz, channel 37.
Set phone to TX mode, EGSM 897.4 MHz, channel 37 and power level 10.



If there is no signal measurable, check PCN TX signal at L662 (see picture below).

Set spectrum analyzer to TX PCN 1747.8 MHz, channel 700.
Set phone to TX mode, PCN 1747.8 MHz, channel 700 and power level 10.

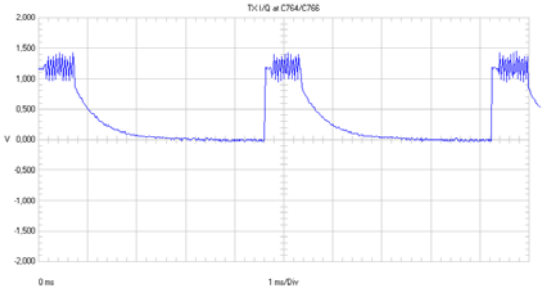


If both TX signals ok, check EGSM/ PCN TX lines between Hagar N600 and antenna connector X802 for shorts or disconnections

If there is no TX signal measurable at L662, check TX I/Q at C764 and C766 on both sides of capacitors. (see picture below).

Oscilloscope settings:

Ampl: **500mV**
Time/Div: **1ms/Div**
AC/DC/GND: **DC**



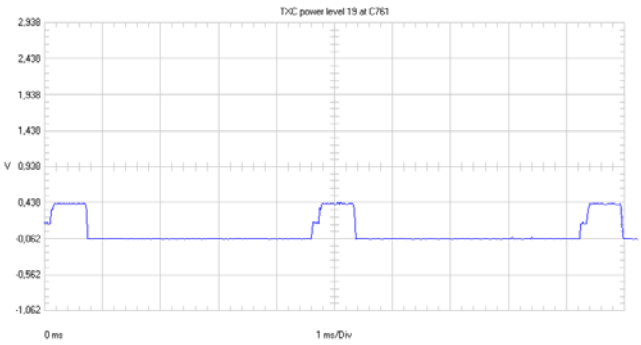
If the TX I/Q signal is not ok, check UEM D200

Check TXC at C761, power level 19 and 5 (See picture below).

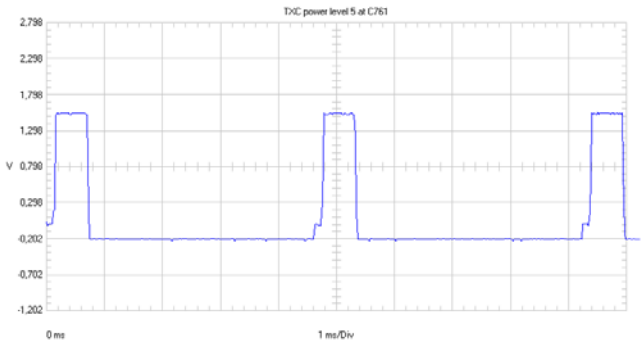
Oscilloscope settings:

Ampl: **500mV**
Time/Div: **10ms/Div**
AC/DC/GND: **AC**

Power level 19



Power level 5

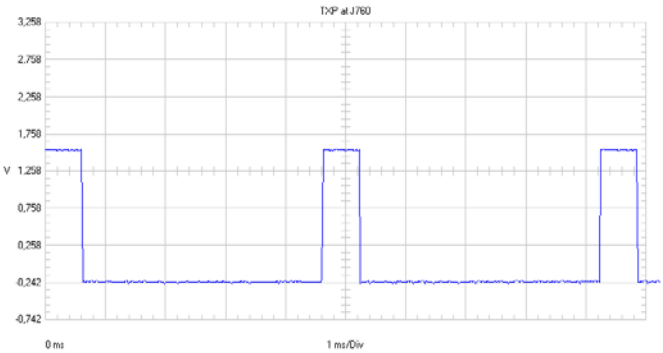


If the TXC signals are not ok, check UEM D200.

Check TXP signal at J760 (See picture below).

Oscilloscope settings:

Ampl: **500mV**
Time/Div: **1ms/Div**
AC/DC/GND: **AC**



If the TXP signal is not ok, check UPP D400.

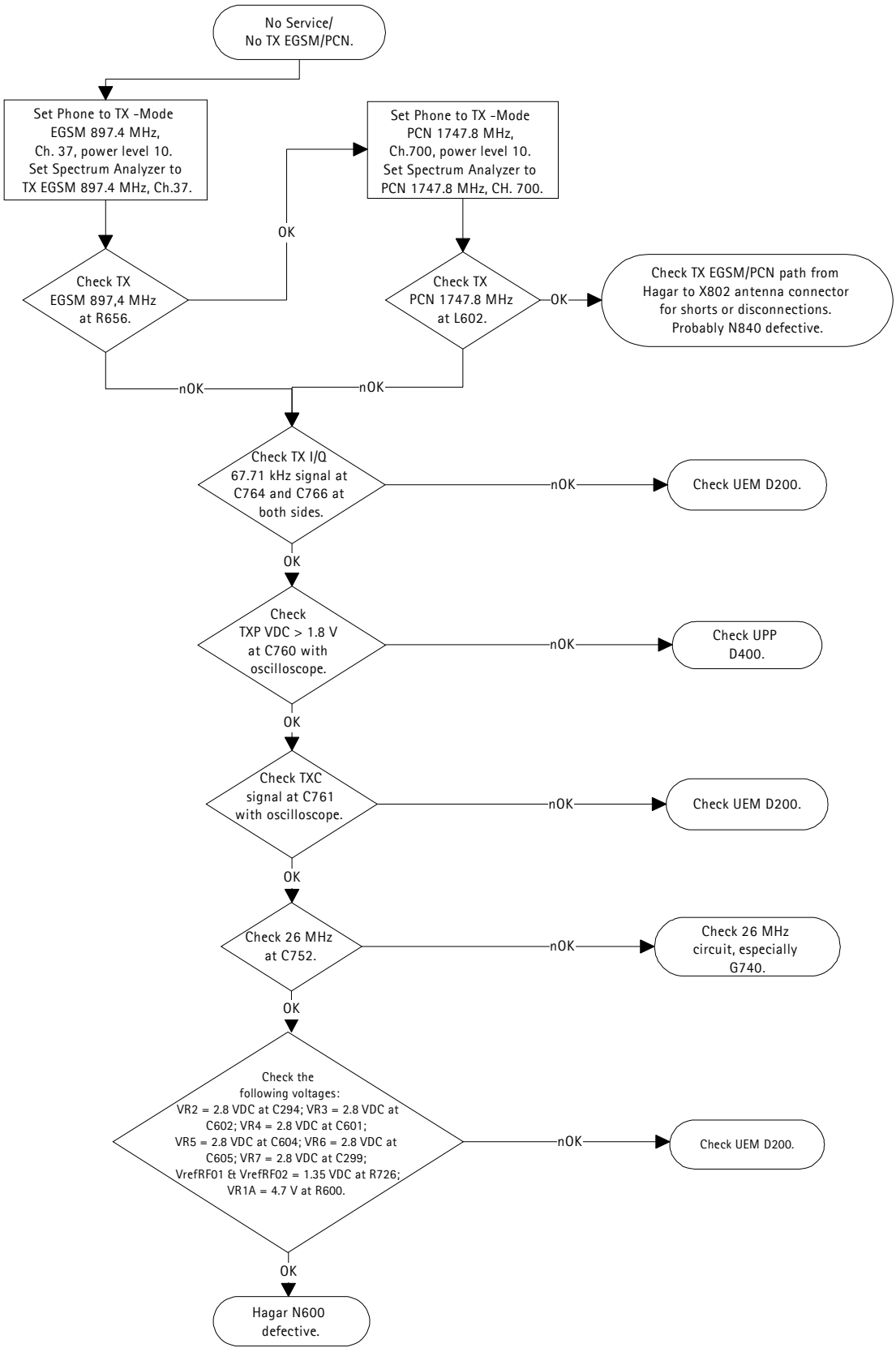
Check System Clk = 26 MHz at C752 (see picture at chapter Electrical faults/ Totally dead)
If also the System Clk is ok, check the following voltages:

Check VR3 = 2.8 VDC at C602 (supply voltage for 26 MHz oscillator G740)
Check VR4 = 2.8 VDC at C601
Check VR5 = 2.8 VDC at C604
Check VR6 (VBB) = 2.8 VDC at C605
Check VR1A (VCP) = 4.7 VDC at C600 (control voltage VC for SHF oscillator)
Check VR7 = 2.8 VDC at C299 (supply voltage VCC for SHF oscillator)
Check VREF01 and VREF02 = 1.35 VDC at R726

If one of the voltages described above is not ok, check UEM D200.

If all voltages are ok, change Hagar N600.

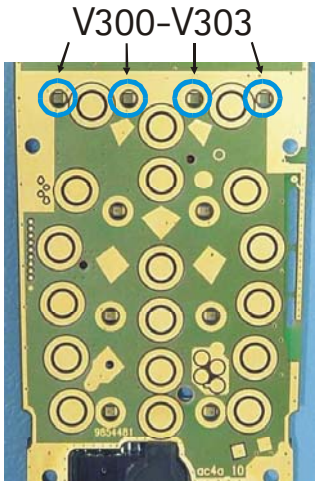
Flowchart - No service → no TX



Display too dark/ too bright

When switching on the phone, the display LED´s V300 – V303 (see picture below) show in different levels of brightness.
This is caused by the use of different LEDs. In this case change **all** LEDs and assemble the right ones with **spare part code 4864293**.

Note! When changing the LEDs, first the RF frame has to be removed. Be very careful when lifting the frame with hot air. A little drift aside and some small components might be pushed away.



Hookswitch problems

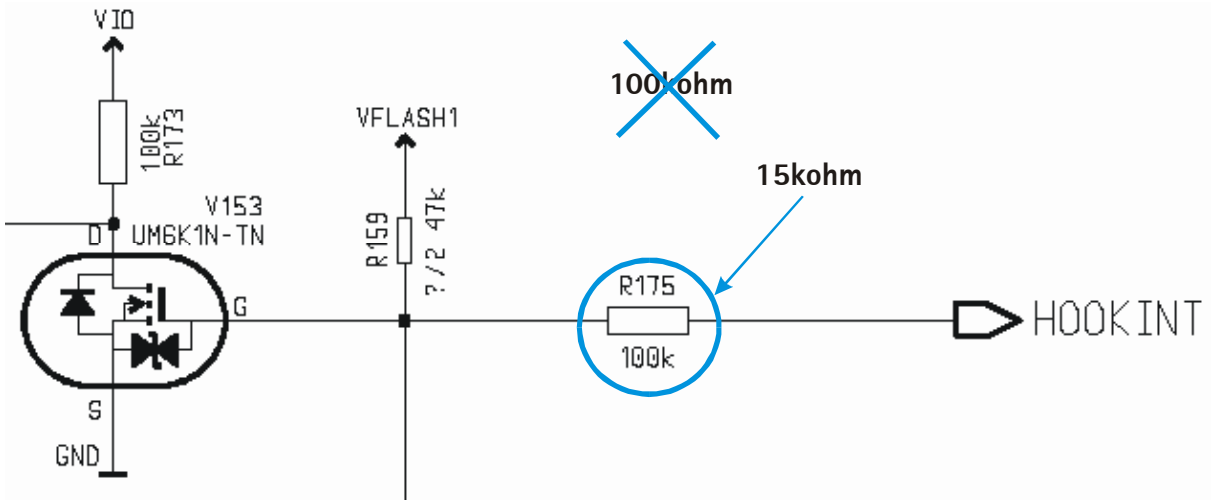
Sometimes not possible to release "incoming call"
No voice dial possible

When the headset HDC-9P is connected to the bottom connector of NPE-4 and a call is coming in, it is often not possible to release the call by pressing the hookswitch.
Often it is also not possible to initiate the voice call by pressing the hookswitch.

If one of the problems mentioned above occurs, changing the R175 can solve the problem.

Note: Do not check audio function of the phone with HDC-9P by using the JBV-1 docking station!
Only noise will be audible,I f testing in this way

Open the BB-shield and measure the resistor **R175=100kΩ.**
If **R175=100kΩ,** change the resistor to **15kΩ.** (see pictue below).
Note! Up to HW-ID 06.01 there is a 100kΩ resistor. From HW-ID 06.02 the value has changed to 15kΩ.
For more information also see **SB 024 (NPE-4).**



NPL-1 6310i

HW changes

NPL-1						
HW version	**UEM version**	**C207 / Code**	**C158 / Code**	**V130 BT / Code**	**C164 / R169**	**R133 & R134**
<1530	**4.4** Printed number (4370805)	2.2 µF / 2316001	10µ (10V) / 2610003	LRB-2 BT / 0630271	Del C164 Add R169	47 kohm / 1430796 **&** 10 kohm / 1430778
1530 since IMEI 350780/20/709519/4	**6** Printed number (4370841)	1 µF / 2320481	10µ (10V) / 2610003	LRB-2 BT / 0630271	Del C164 Add R169	2 kohm / 1430762 **&** 1 kohm / 1430754
1532 since IMEI 350780/20/794982/0	**6** Printed number (4370841)	1 µF / 2320481	10µ (10V) / 2610003	LRB-2 BT / 0630271	R169 2 x 2.2kohm / 1620105	2 kohm / 1430762 **&** 1 kohm / 1430754
1711 since IMEI 350984/20/939669/7	**UEM_K** Printed number (4370825)	1 µF / 2320481	10µ (**6V3**) / 2313213	LRB-4 BT202 / 070079	R169 2 x 2.2kohm / 1620105	2 kohm / 1430762 **&** 1 kohm / 1430754

New UEM versions

The UEM HW has changed from version 4.4 to 6 and from version 6 to UEM_K. According to the different UEM versions there are some important component changes, which are related to the different HW versions.

In case the C207 is defect, it must be replaced with the correct value of the capacitor, this depends on the UEM version installed (see Table). See also **SB 020 (NPL-1)**.

Value change of R133 & R134

If it is necessary to change R133 or R134, use new values for the resistors and change always both resistors (See table) See also **SB 020 (NPL-1)**.

Replacement of C164 with R169 "Reduce noise on Headset HDC-9P"

Since HW version 1532 the C164 is replaced with R169 to reduce noise on Headset HDC-9P (poor field strength) But the change must be done also in older HW versions (HWID 1530 or lower). Therefore it must be carried out on type label if the IMEI is lower than *350780/20/794982/0*. Optionally, it is possible to check HWID with Phoenix service software in Menu "Phone Information". See also **SB 021 (NPL-1)**.

New Bluetooth module BT202

Since HW version 1711 the Bluetooth module LRB-2 is replaced with LRB-4. See also **SB 026 (NPL-1).**.
Note: LRB-4 cannot be replaced with LRB-2 or vice versa.

No service

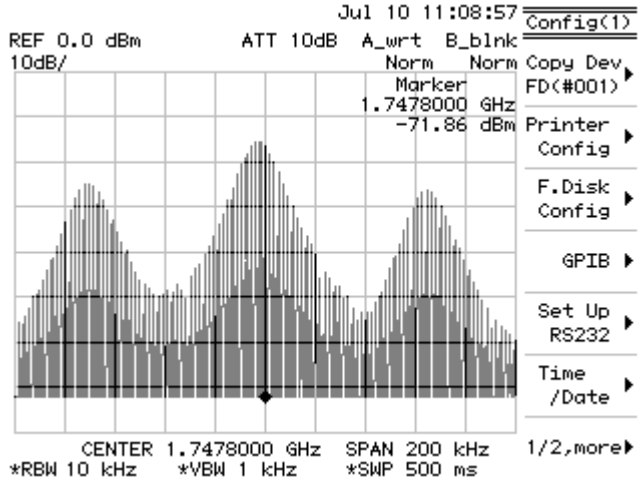
Drop calls
No TX 1800/1900

Insert test SIM into the phone and try to establish a connection at GSM900/1800 and 1900 with a CMD, for example.
If a connection is established try to make a call. Find out which TX band is faulty.
If a connection is possible in GSM900 only, refer to **No GSM1800/1900** later on in this chapter.

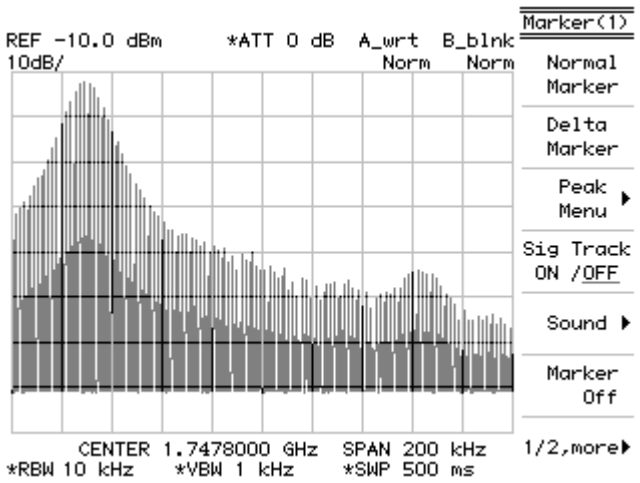
Drop calls

If, in all GSM Bands, a connection is possible, but the bit error rate is too high and the connection is bad, set phone in local mode and check TX spectrum at R805 (GSM900) (see picture below)

Bad spectrum



Spectrum ok

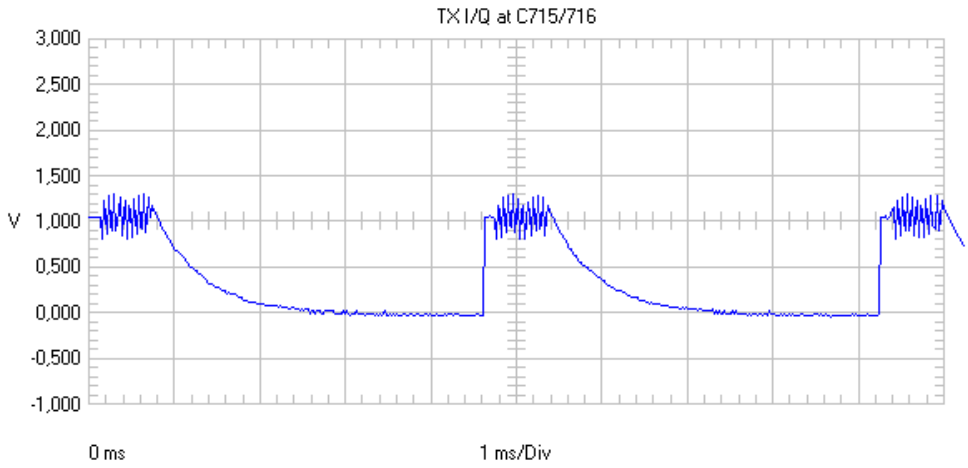


If the spectrum is not ok, check following measurement points:

VIO = 1.8VDC at R630
VR1A = 4.7VDC at R623
VR2 = 2.8VDC at C622
VR3 = 2.8VDC at R610
VR4 = 2.8VDC at C296
VR5 = 2.8VDC at R628
VR7 = 2.8VDC at C299
TX I and Q at C715/C716 on **both sides** (see picture below)

Oscilloscope settings:

Ampl: 500mV
Time/Div: 1ms/Div
AC/DC/GND: DC



If one of the four TX I/Q signals is missing or too low (TX IN, TX IP and TX QN, TX QP), check R713 on both sides.
If TX I/Q signals towards UEM D200 are not ok, UEM or PWB is faulty.
If one of the voltages described is missing, probably UEM D200 is faulty.
If all signals towards RF-IC N601 are ok, change Mjoelner N601.

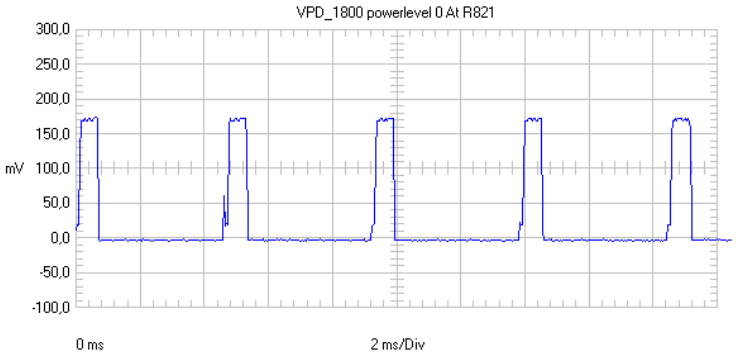
No TX 1800/1900

Check VAPC_DCS signal at R821 (see picture below).
Use Phoenix and open menu Testing/RF controls. Set phone to TX 1800 / Powerlevel 0 or 15.

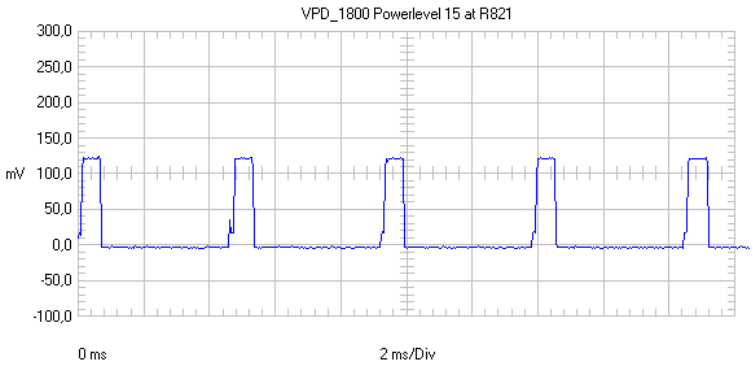
Oscilloscope settings:

Ampl: 50mV
Time/Div: 2ms/Div
AC/DC/GND: DC

Powerlevel 0

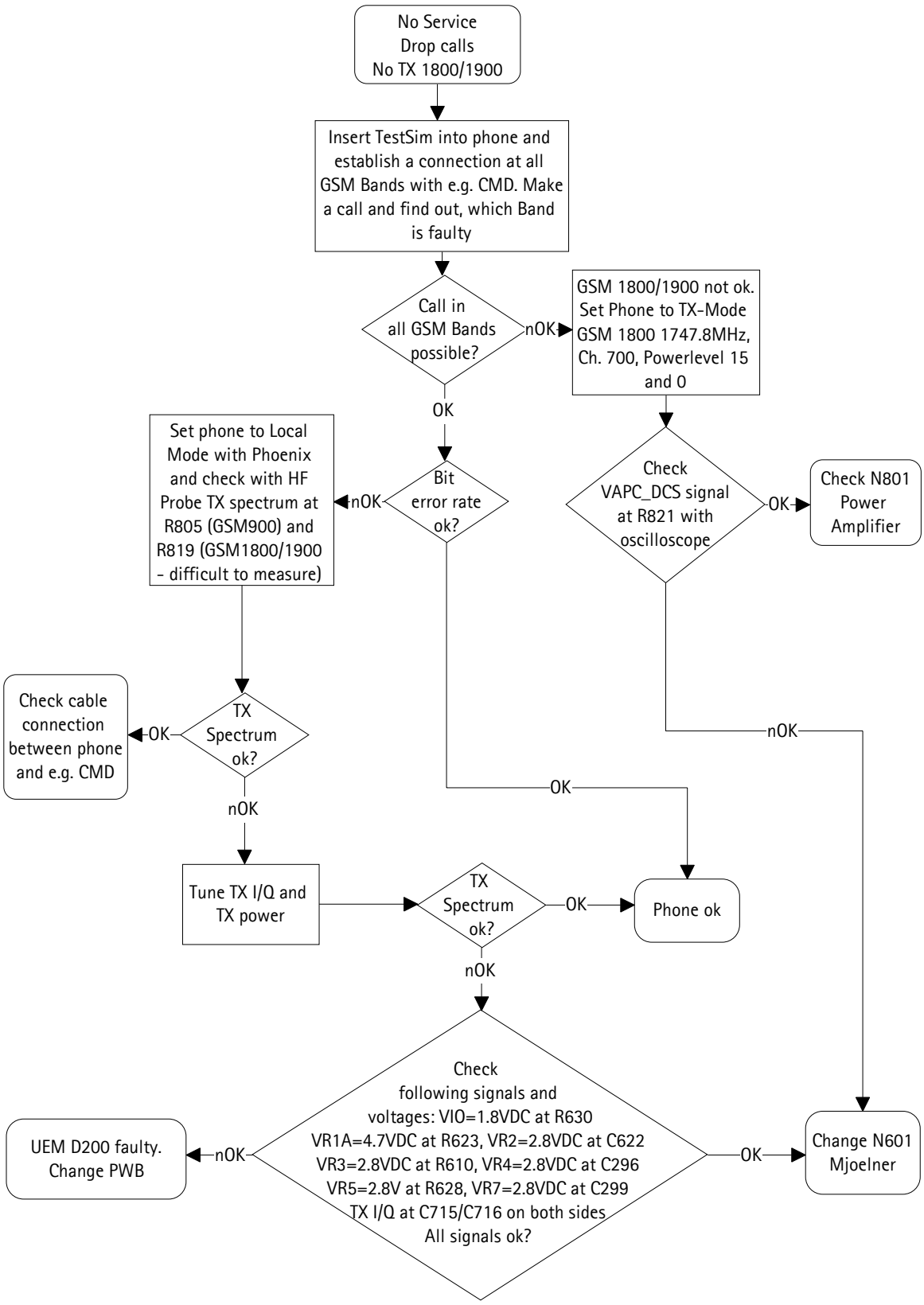


Powerlevel 15



If there is no signal measureable, check R821, R820 and C832 for cold or broken solderings and resolder or change if necessary. If all three components are ok, change N601 Mjoelner.

Flowchart No Service



"Phone restricted" error

If the failure message "Phone restricted" (notice: it depends on the language used) appears on the display, it is not necessary to exchange the flash or scrap the phone.
The solution is just to rebuild the SIMlock. After this, the message will disappear. **(see also SB 030).**

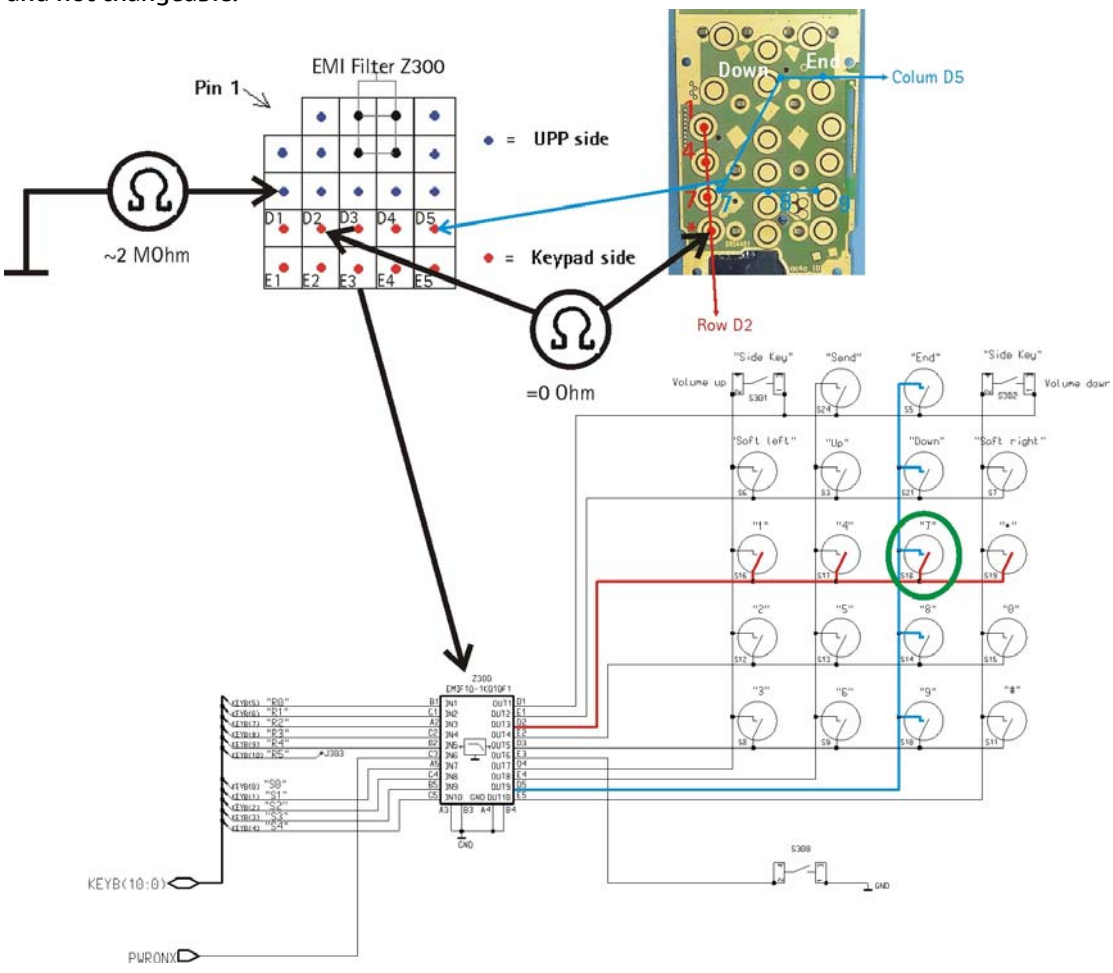
Keypad faulty

If one or more keys are not working, disassemble phone and check resistance = 0Ω between keys on same colum and row with ohmmeter.

For example: key 7 is not working:

Check row D2 ➔ keys "**1**", "**4**", "**7**", "*****" ➔ resistance between the one and the other keys= 0Ω
Check colum D5 ➔ keys "**End**", **Down**" **7**", "**8**", "**9**" ➔ resistance between the one and the other keys = 0Ω

If between two keys the resistance is approximate MΩ, change PWB because of broken connection.
If all resistance = 0Ω, remove Z300 EMI-Filter and measure the connection between keypad and **red** marked solderpads from EMI-Filter. If connection is not ok, change PWB, because of broken connection.
If connection is ok, check with ohmmeter the resistance between ground and blue marked solderpads ➔ resistance around 2MΩ
If resistance is lower than 1MΩ or higher than 10MΩ, scrap the phone, because the UPP D400 is faulty and not changeable.



BB Selftest explanation for NPE-4/NPL-1

3.1. ST_AUX_DA_LOOP_TEST
This function tests the connection of AuxDa and UemInt signals between UPP and UEM. UPP loops 70us high pulse via AuxDa line to UEM and back to UPP via UemInt line. If there is no connection, the result is ST_NO_SIGNAL. If everything is ok, the result is ST_OK

3.1.1. ST_EAR_DATA_LOOP_TEST
This function tests the connection of EarData and MicData signals between UPP and UEM. If there is no connection the result is ST_NO_SIGNAL. If there is short circuit, the result is ST_SHORT_CIRCUIT. If everything is ok, the result is ST_OK.

3.1.2. ST_IR_LOOP_TEST
This function tests the connection of IRTx and IRRx signals between UPP and UEM. UPP loops test signal via IRTx line to UEM and back to UPP via IRRx line. If there is no connection, the result is ST_NO_SIGNAL. If there is short circuit between IRTx and IRRx the result is ST_SHORT_CIRCUIT. If everything is ok, the result is ST_OK.

3.1.3. ST_KEYBOARD_STUCK_TEST
This function tests to see if a key is stuck. If any key is stuck/pressed, it is re-tested withST_KBD_REPEAT several times with ST_KBD_DELAY interval. If key is still down, result is ST_FAIL. If no key is stuck, the result is ST_OK. If some key is stuck, the result is ST_FAIL.

3.1.4. ST_MBUS_RX_TX_LOOP_TEST
This function tests the connection of MBusTx and MBusRx signals between UPP and UEM. If everything is ok, the result is ST_OK. If there is no connection, the result is ST_NO_SIGNAL.

3.1.5. ST_PPM_VALIDITY_TEST
This function checks the validity of PPM on flash.

3.1.6. ST_SIM_CLK_LOOP_TEST
This function tests the connection of SimClk and SimIODa signals between UPP and UEM. This test also requires that SimIOCtrl signal can be set to high state (see also st_sim_io_ctrl_loop_test). If everything is ok, the result is ST_OK. If there is no connection, the result is ST_NO_SIGNAL. If there is short circuit, the result is ST_SHORT_CIRCUIT.

3.1.7. ST_SIM_IO_CTRL_LOOP_TEST
This function tests the connection of SimIOCtrl and SimIODa signals between UPP and UEM. This test also requires that SimClk signal state can be switched (See also st_sim_clk_loop_test). If everything is ok, the result is ST_OK. If there is no connection, the result is ST_NO_SIGNAL.

3.1.8. ST_SLEEP_X_LOOP_TEST
This function tests the connection of SleepX and SleepClk signals between UPP and UEM. UEM_V2 or later required. If everything is ok, the result is ST_OK. If there is no connection, the result is ST_NO_SIGNAL.

3.1.9. ST_TX_IDP_LOOP_TEST
This function tests the connection of TxIdp and RxIdp signals between UPP and UEM. UEM_V2 or later required. If everything is ok, the result is ST_OK. If there is no connection the result is ST_NO_SIGNAL. If there is short circuit, the result is ST_SHORT_CIRCUIT.

3.1.10. ST_TX_IQ_DP_LOOP_TEST
This function tests the connection of TxQdp and RxQdp signals between UPP and UEM. UEM_V2 or later required. If everything is ok, the result is ST_OK. If there is no connection the result is ST_NO_SIGNAL. If there is short circuit, the result is ST_SHORT_CIRCUIT.

3.1.11. ST_BACKUP_BATT_TEST
This function tests if the backup battery was ok during power-up. Ok means that there was enough power in the battery. If backup battery is not, ok the result is ST_FAIL. If backup battery is ok, the result is ST_OK.

3.1.12. ST_UPP_REGISTER_VER_TEST
This function compares the ASIC version with the compilation flag. Major ASIC version in UPP version register is compared against ASIC version compilation flag. If the version is correct, the result is ST_OK. If the version is wrong, the result is ST_FAIL.

3.1.13. ST_RF_CHIP_ID_TEST
This is the product specific self-test. Each product makes its own implementation. This test checks whether the ID register on the RF Chip can be read and that it contains reasonable values. Usually this is done by asking RF Chip ID from DSP. In a word, this tests the RFBUS lines (data, clock, enable) between the UPP and RF part.

3.1.14. ST_WARRANTY_TEST
This function tests the Warranty Information State. If WIS is not WT_INFO_STATE_DEF, the result is ST_OK. If WIS is WT_INFO_STATE_DEF, the result is ST_FAIL.

3.1.15. ST_FLASH_CHECKSUM_TEST
This function calculates the checksum over flash ROM areas, and checksum is compared to precalculated checksum in flash header. If checksums are the same, the result is ST_OK. If checksums are not same, the result is ST_FAIL.

3.1.16. ST_LCD_TEST
This function tests the connection of LCD by checking voltage level of VLCD. If voltage level is ok, the result is ST_OK. If voltage level is not ok, the result is ST_FAIL.

3.1.17. ST_IR_IF_TEST
This function performs a self-test on the IR device. The test checks that IR energy is looped back when the module is operating normally.

3.1.18. ST_UEM_CBUS_IF_TEST
This function checks that the connection to UEM via CBUS works. First the, value is written to UEM register and then it is read back. The written and read values are compared with each other. If the values are the same, the result is ST_OK. If the values are not same, the result is ST_FAIL. So basically this tests the CBUS lines (data, clock, enable) between UEM and UPP.

3.1.19. ST_PA_TEMP_TEST
This function tests whether PA temp line AD conversion is within reasonable limits. This means that the value is not at the bottom or top end of the scale. First, several raw values of the temperature (PATEMP) are read. Then the average is calculated and compared to the limits. If temperature is within the limits, the result is ST_OK. If temperature is outside the limits the result is ST_FAIL. In a word, this tests the PATEMP line between the UEM and RF.

3.1.20. ST_RADIO_TEST
This function provides a method to turn on the radio and verify that the radio chip is present. If the detection fails, the chip will automatically turn off power. If radio supply voltage VFLASH2 is missing or FMCtrlClk and FMCtrlDa lines are not working the result is ST_FAIL. If the radio chip is present and working, the result is ST_OK.

CHANGE HISTORY

Originator	Status	Version	Date	Comment
TS Training Group	Draft	0.1	17.04.2002	First draft version for the repair group
TS Training Group	Approved	1.0	27.05.2002	Approved version
TS Training Group	Draft	1.1	09.08.2002	NPL-1 – chapter added
TS Training Group	Approved	2.0	15.08.2002	Approved version
TS Training Group	Draft	2.1	07.04.2003	"Carkit problems" chapter added "Totally dead / Does not switch on" chapter added "HW changes" (NPL-1) chapter added
TS Training Group	Approved	3.0	22.04.2003	Approved version