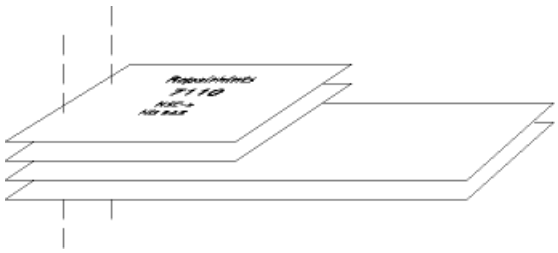
Repair Hints

Service-Level 3 & 4

1100

RH-18

General



-How to use this document

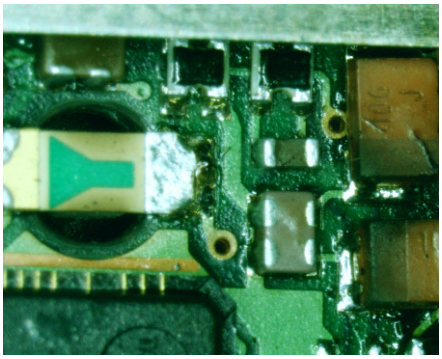
Put the colored schematics behind this manual.
Now you are able to follow these specifications with graphical layouts and it is easier for you to find the components and measuring points.

-Component characteristics

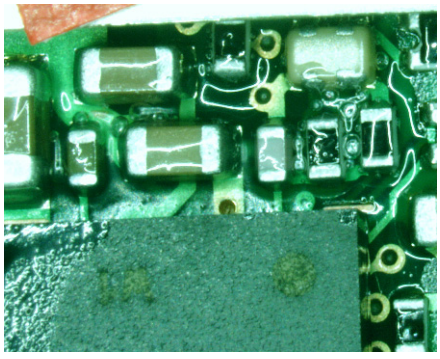
Some components contain important data such as tuning values or security data; therefore several steps described are only feasible if you are able to reflash/ realign the phone and/or rewrite IMEI/SIMlock in certain cases. Please pay attention to separate notes.

-Broken balls / underfill, µBGAs

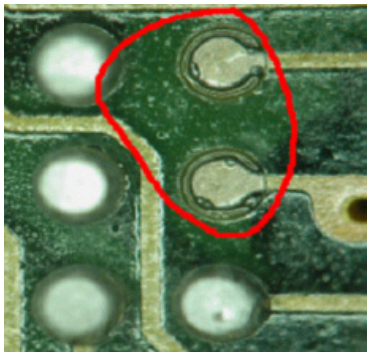
All replaceable (not underfilled) µBGA components must be renewed after removing. Reflow with uncontrolled hot-air fan is strictly forbidden! It is also not recommended only to reflow the old µBGA using a µBGA rework station! µBGA must only be soldered with NMP approved µBGA rework machines (e.g. Zevac/ OK-Metcal/ Martin) to get durable solder joints.
After removing a µBGA check soldering points; if necessary rework oxidated solderings (broken balls) carefully by tinplating these areas with few flux and a hot soldering iron. Before placing a new component remove the tin and clean the PWB; e.g. with help of solder wick and flux cleaner such as “Kontakt LR”.
Use only recommended flux type and an appropriate amount of it – avoid drowning the PWB in flux as this will lead to 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



PWB drowned in flux



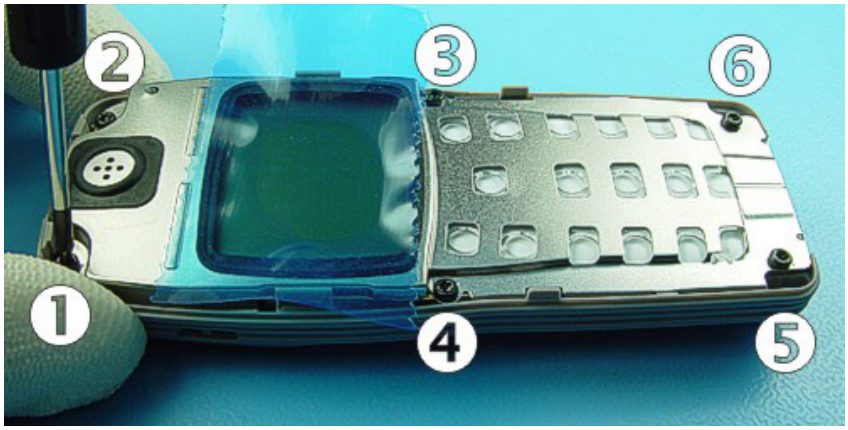
oxidated soldering

-PWB handling & cleaning

To avoid damages of PWB and/or components through electrostatic discharging, handle the module in ESD protected areas only (as shown on next page). When handling PWBs outside an ESD-bag always wear ESD-wristbands, which must be connected to earth bonding point, and gloves to avoid corrosion and fingerprints. Damage by electrostatic discharge often leads to a module not failing directly but in a short period of time!
For cleaning use only appropriate materials, do not use scratching or rubbing tools. Useful tools for cleaning are flux cleaners such as “Kontakt LR” or “Electrolube FLU” in connection with ionized compressed air.

-Screw torques

To tighten screws only use a torque screwdriver with a torque adjusted to **21Ncm**. Notice assembling: take reverse order to the one shown in the picture below!



Disassembling (1-6) and assembling (6-1) order

-Realign after repair

Characteristics of replacement parts may vary.
To prevent additional faults after repair (e.g. low standby time, 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!

-Fault report in fault log (Phoenix)

It is very important to report all repaired failures in fault log after finishing the complete phone repair.
The report content should **only** contain the self-observed fault symptom, except “no fault found”.
In this case the report content should contain the symptom code that is given from the customer, e.g. “Does not switch on”(2101) and the fault code “no fault found”(470).
If the symptom code from the customer is not the same as the observed symptom, use always the self-observed symptom code.

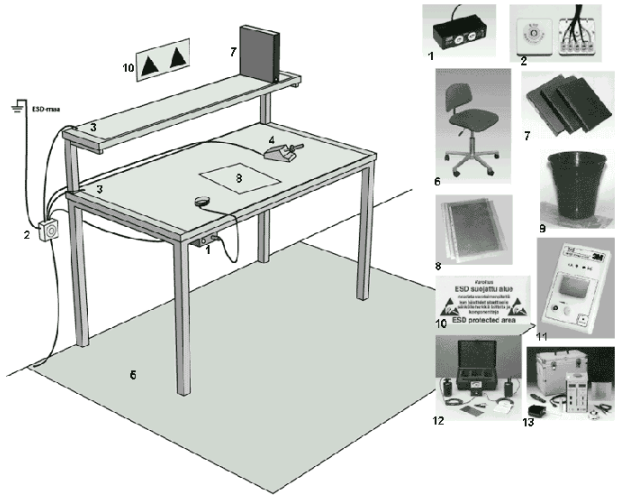
ESD Protection requirements

Electrostatic discharge can easily damage the sensitive components of electronic products. Therefore, every Service Partner has to take care of at least precautions, such as ESD restricted area, floor, table, covering, chair(s), shoes or wristbands.

For further information refer to the Partner Web Site document
"Service Partner Requirements"

example of an electrostatic protected area (epa) set up
source: www.armeka.com

example of a workbench set up
source: www.warmbier.com



example of a workbench and testers
source: http://www.armekaengineering.com

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 1100 phones.
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 this document.
It is built up based on fault symptoms (listed in "Contents"), followed by detailed description for further analysis.
The document is to be used additionally to the service manual and other service information such as Service Bulletins. For that reason it does not contain any circuit or schematic diagrams.

All measurements are made using following equipment:

Nokia repair SW:	Phoenix A11 2003.41.4.27
MCU SW:	DP16.0 MCU SW 3.45
Nokia module jig:	MJ - 15
Digital multimeter:	Fluke 73
Oscilloscope:	Fluke PM 3380A/B
Spectrum Analyzer:	Advantest R3131 with an analog probe
RF-Generator / GSM Tester:	Rohde & Schwarz CMU 200

While every endeavor 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) in error.

Please send to:

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Contents

Chapter 1: List of figures

Chapter 2: Not charging

Pre-check

In case the charging of battery fails, first thing to do is to run energy management calibration.
Note that calibration only works with JBV-1, DA-10 docking station adapter and 12 VDC power supply.

In case charging does not work permantly or charging is possible from time to time only, especially check spring contacts of bottom connector I011 and battery connector X105 if bent, soiled or corroded. Also make sure that contact pads for the connectors on the PWB are clean. If necessary clean the PWB with an appropriate amount of alcohol. Do not use any scratching or rubbing tools!!!

Repair instructions

If pre-check is done but the symptom is the same, check the resistance of the fuse F100. It must be 0 Ohm.

Also check that V100 does not cause a short circuit to ground. Resistance of VCHAR line to ground normally is 2.6kOhm.

If all steps above are done and values checked, probably UEM (D200) is faulty. Swap the phone because UEM is underfilled and therefore not changeable.

Chapter 3: No service / drop call

Pre-check

In case that it is not possible to establish a call with your phone, the first thing to do is to perform all RF-calibrations to find out more about the fault. If, for example, TX-power is not measurable or to low, check transmitters signal path e.g. beginning with TX I/Q signals at resistors R610/611. If the receiver does not work properly, check receiver's signal path e.g. beginning with the incoming RF-signal at diplexer Z700. If both RX and/or TX do not work check parts which are needed for both signal path's (e.g. supply voltages, oscillators B600, G600, Mjoelner N600 and power amplifier N700).

Repair instructions

Check the following signals before exchanging the phone because Mjoelner is underfilled and therefore not changeable. Set the phone to local mode with Phoenix and activate TX-burstmode (channel 37 for GSM900 and channel 700 for GSM1800).

Check following supply voltages:
VR1A 4.8VDC at R603
VR2 2.8VDC at C223
VR3 2.8VDC at C620
VR5 2.8VDC at C614
VR6 2.8VDC at C610
VR7 2.8VDC at C625
VIO 1.8VDC at C207
VREF01 1.35VDC at C626

Check 26MHz reference clock at R420. Check the signal of the SHF-oscillator directly; but you can check the control voltage at C641: if this voltage is outside it's normal range (0.7VDC – 3.8VDC) this indicates that the oscillator probably is faulty or the control loop is open.
Further more check ResetX_Mjoelner at J424, which normally is 1.8VDC.

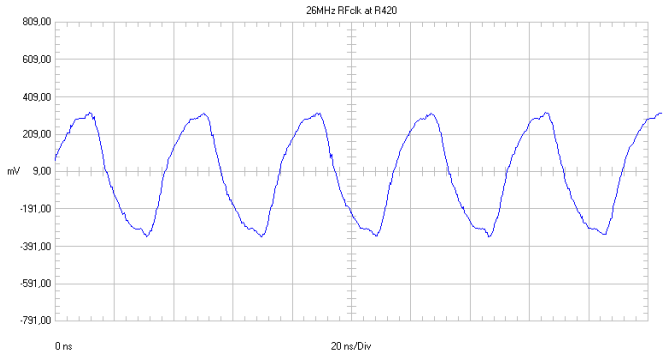

Figure 1: 26MHz RF clock at R420

Check with an oscilloscope TXC at R620 (0.5Vpp – 1.2Vpp depending on TX power level):

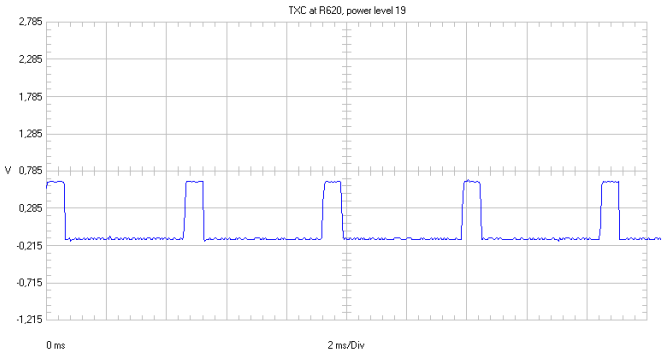

Figure 2: TXC at R620, power level 19

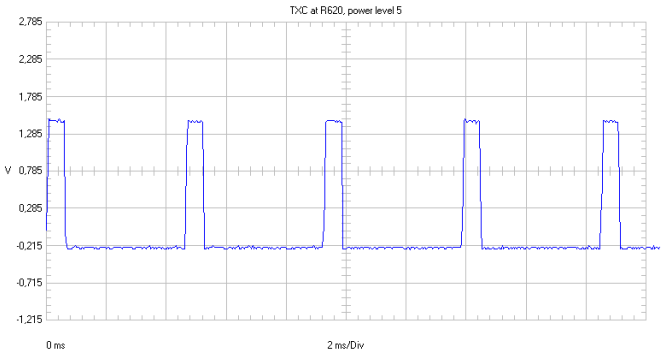

Figure 3: TXC at R620, power level 5

Check TXP 1.8Vpp at C646 and TX I/Q - signals at both sides of R610 and R611:

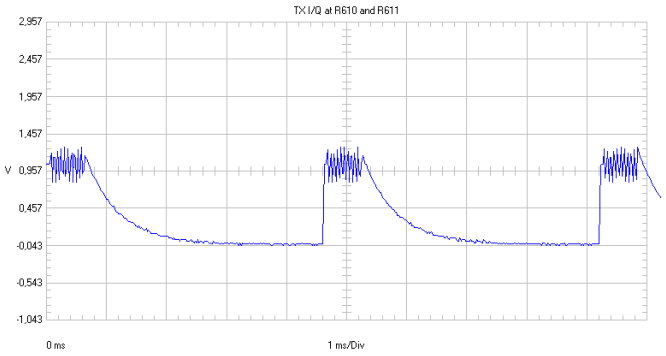

Figure 4: TX I/Q at R610 and R611

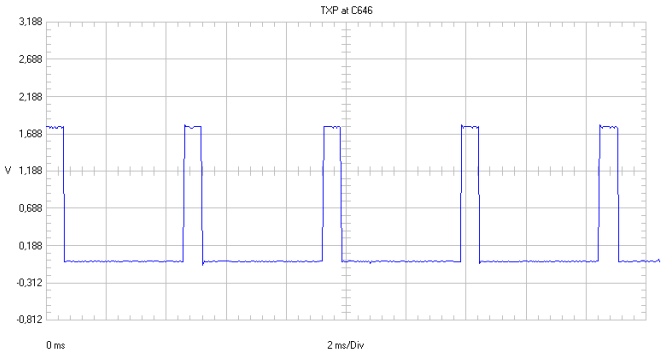

Figure 5: TXP at C646

Also check with an oscilloscope RFBusClk at J421, RFBusData at J422 and RFBusEN at J423:

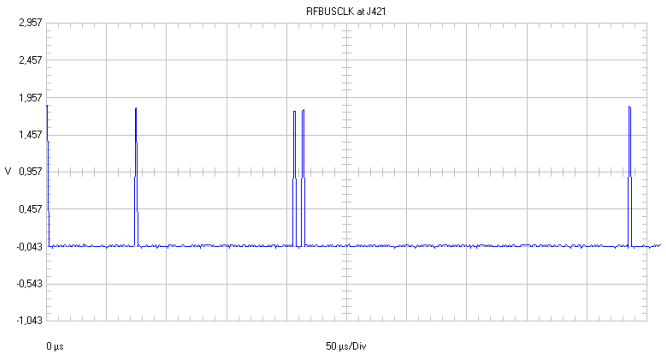

Figure 6: RFBusClk at J421

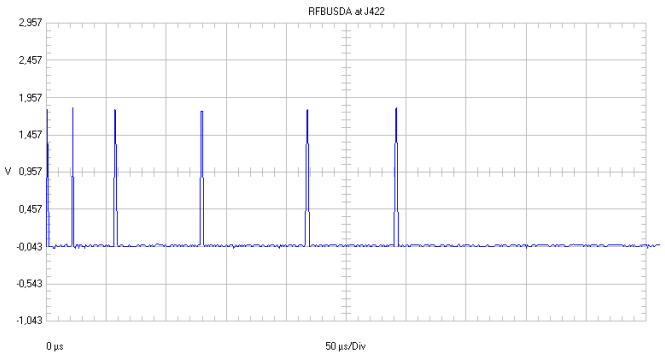

Figure 7: RFBusData at J422

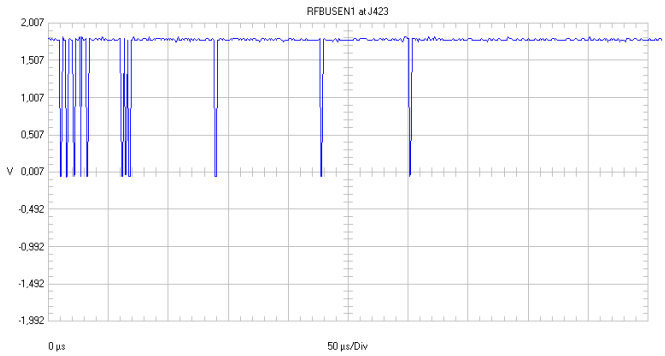

Figure 8: RFBusEn at J423

If all these signals are ok but no TX-signal is measurable at L606 in GSM900 mode and at L613 in GSM1800 mode, Mjoelner N600 is faulty in all probability.

Swap the phone because Mjoelner is underfilled and therefore not changeable.

In case that power amplifier N700 seems to be responsible for the TX fault, check the following signals and voltages that are necessary for a proper working amplifier before exchanging.
Set phone to local mode via Phoenix and activate TX-burstmode (channel 37 for GSM900 and channel 700 for GSM1800).

Check VBAT 3.6VDC at both sides of L703.
Check VPCTRL 1.2Vpp – 2.2Vpp dependent on TX power level at R713 in GSM900 mode and at R708 in GSM1800 mode.

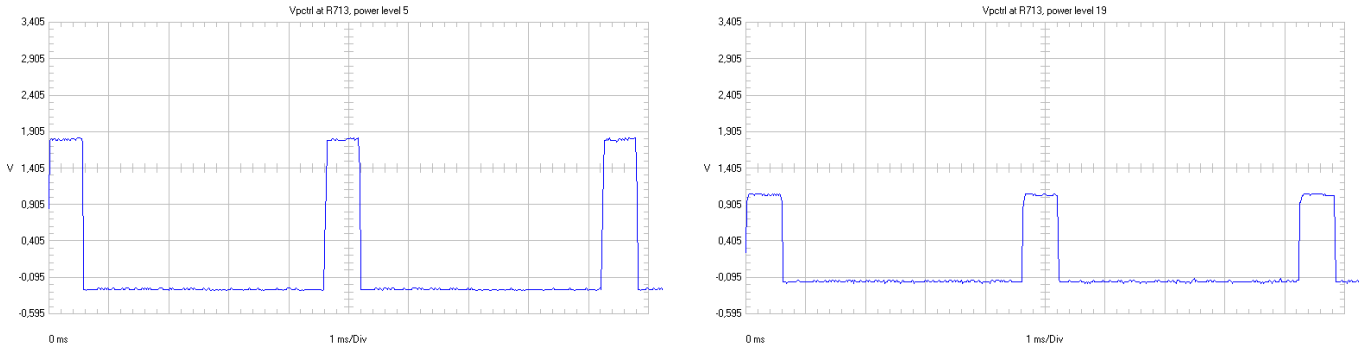

Figure 9: VPCRLT at R713 for power level 5 and 19

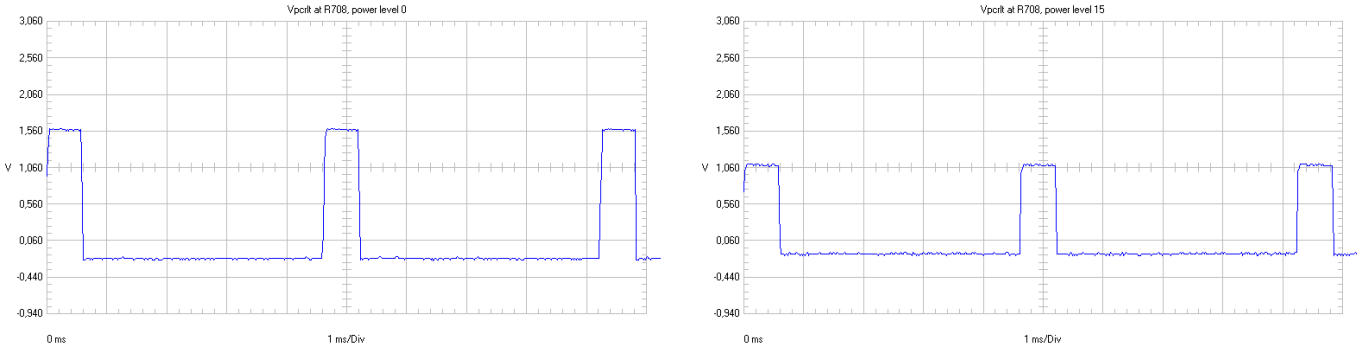

Figure 10: VPCRLT at R708 for power level 0 and 15

If the VPCRLT-signal at the amplifier's input at R713 in GSM900 mode and at R713 in GSM1800 mode above mentioned is ok but still there is no or too low TX power at the output of the amplifier, it is necessary to exchange the N700.

Remember to perform RF-calibrations after exchanging the power amplifier!!!

Change history

Originator	Status	Version	Date	Comment
TS Training Group	Draft	0.1	05/01/2004	First draft version for the repair group
TS Training Group	Approved	1.0	09/02/2004	Approved version