**Customer Care Solutions Technical Documentation** 

# **Troubleshooting Instructions**

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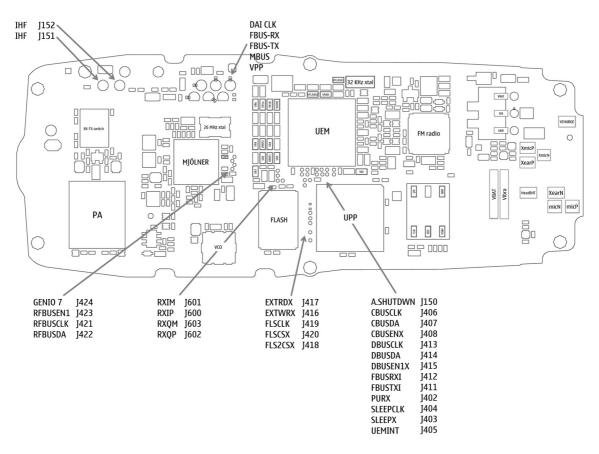
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# **Baseband troubleshooting**

## **Baseband testpads**

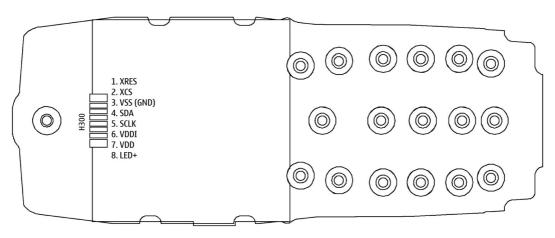
#### Component side (PWB backside)



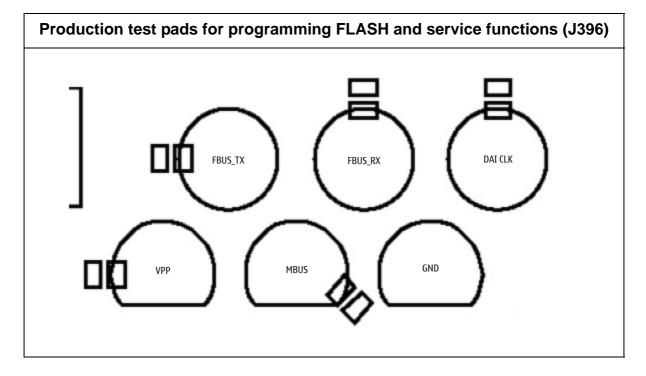


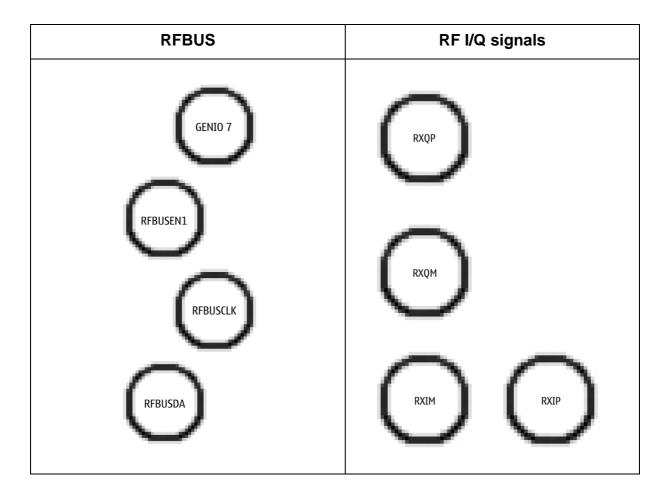
Display connector (PWB front side)





Close up of testpads



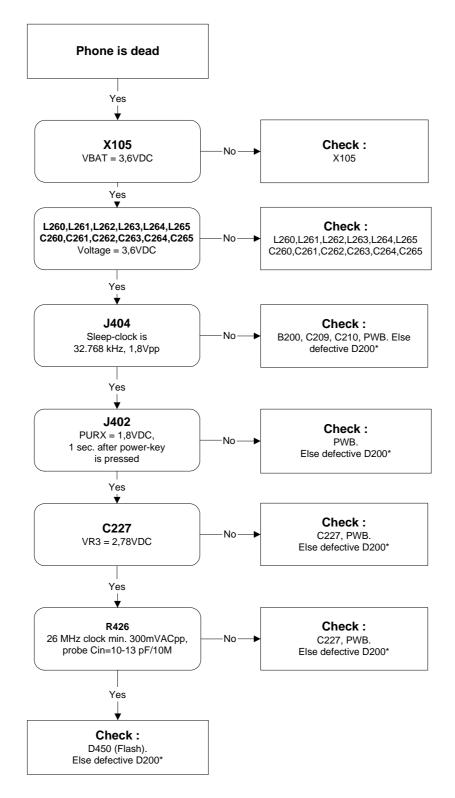


FLASH	CBUS / DBUS / FBUS / MBUS / SLEEPX / PURX / AUDIO SHUTDOWN
FLSCSX	
FLS2CSX	
EXTRDX	
EXTWRX	FBUSTXI FBUSTXI FBUSTXI FBUSTXI FBUSTXI FBUSTXI
FLSCLK	MBUSTX MBUSRX

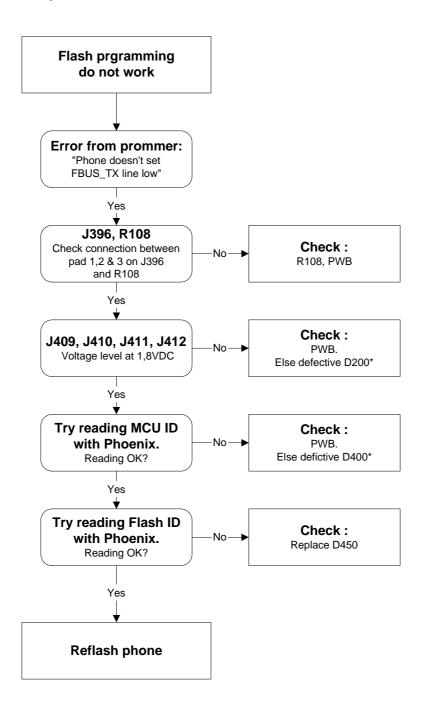
# Fault Finding Charts

### Phone is dead

Nominal battery voltage is 3.7 VDC. The phone (UEM) wont startup at battery/supply levels below 3.1 VDC. The software will turn off the phone at 3.21 VDC.



# Flash programming does not work

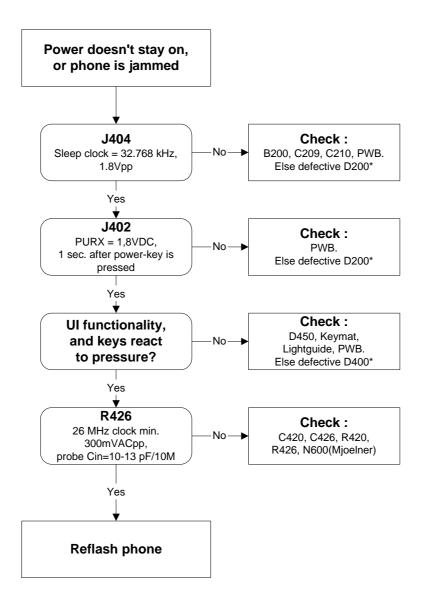


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# Power doesn't stay on or phone is jammed

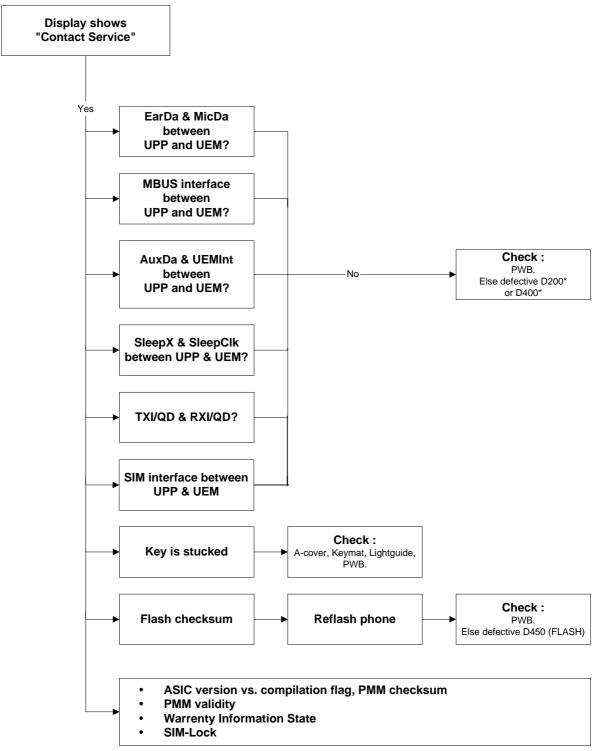
If for some reason the MCU does not service the watchdog register within the UEM, the operations watchdog will run out after approximately 32 seconds and should initiate a reset.



# Display information: "Contact Service"

This message shows when internal self-tests have failed. If any of the following cases fails the display will show the message: "Contact Service".

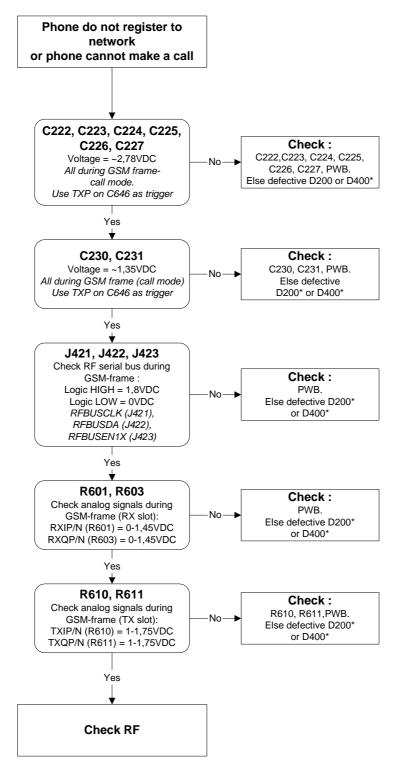
The lineup below has no chronological order. Use common sense and experience to decide which test case to start error hunting at.



## No network or no call

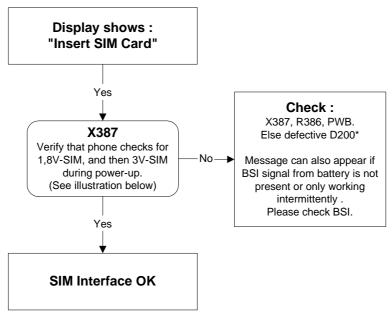
If the phone doesn't register to the network, the fault can be in either BB or RF. Only few signals can be tested since several signals is 'buried' in one or more of the inner layers of the PWB.

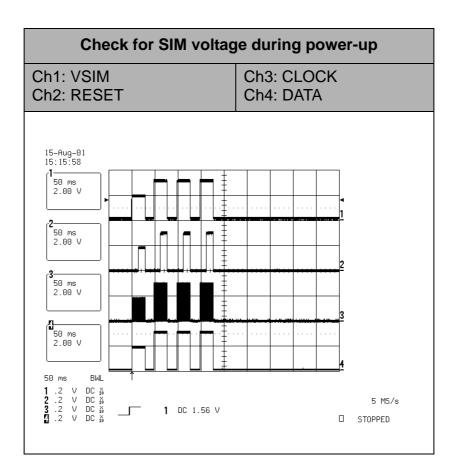
First of all check that it's not a SIM LOCK causing the error by using a Test-SIM card and connect the phone to a tester.



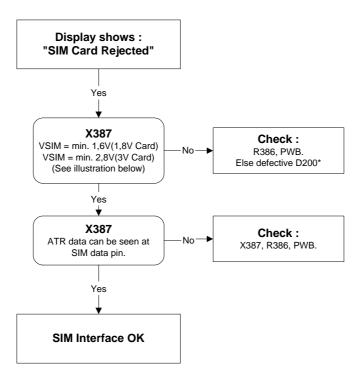
# SIM related faults

The hardware of the SIM interface from UEM (D200) to the SIM connector (X387) can be tested without a SIM card. When the power is switched on the phone first check for a 1.8V SIM card and then a 3V SIM card. The phone will try this four times, whereafter it will display "Insert SIM card".

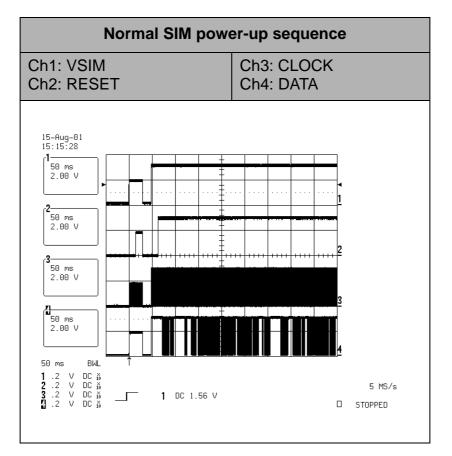




#### SIM-Card rejected



For reference a picture with normal SIM power-up is shown below.



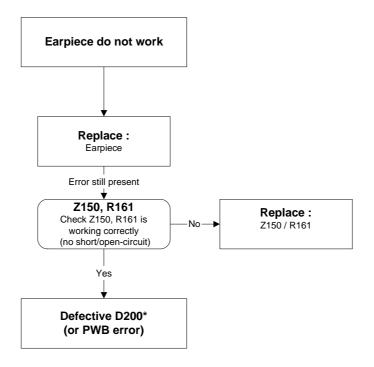
RM-4/RM-5 Troubleshooting Instructions

## Audio related faults

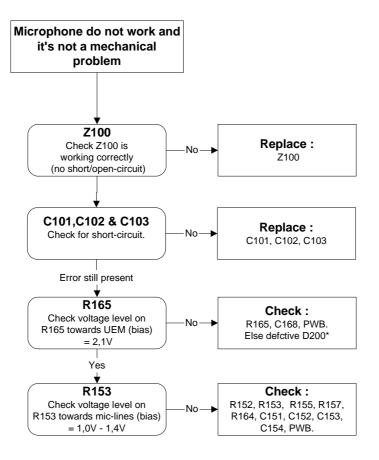
Earpiece = Speaker mounted in display assy.

IHF = Integrated handsfree. Speaker mounted in back cover (D-cover).

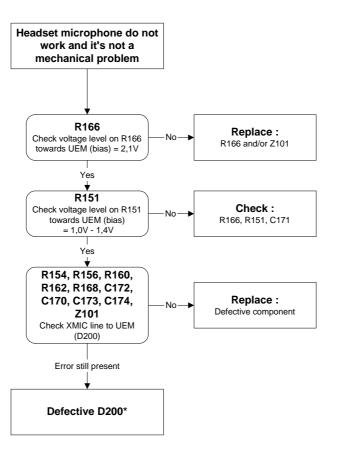
#### No sound in earpiece



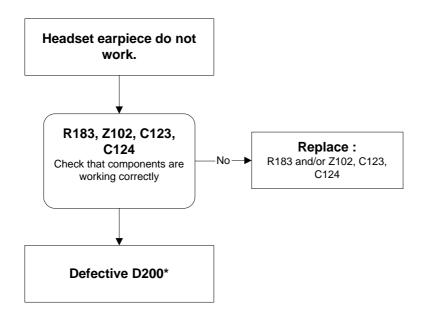
#### Microphone does not work



#### Headset microphone does not work

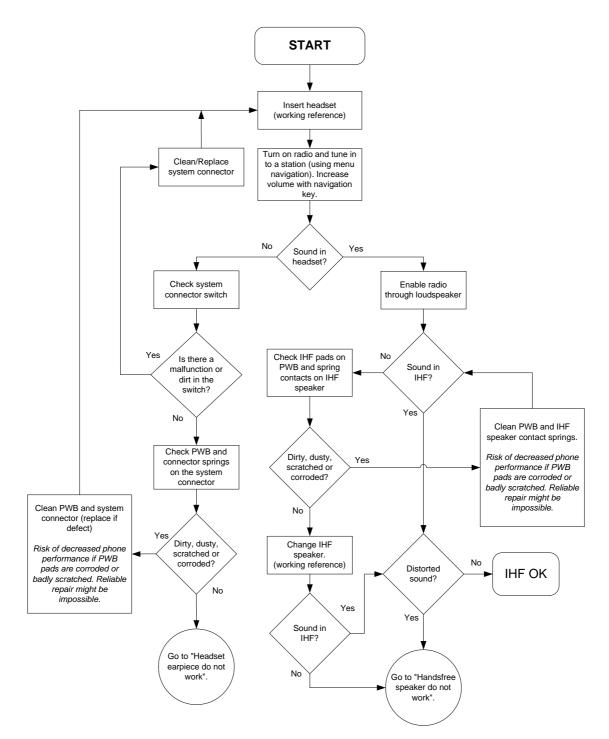


Headset earpiece does not work



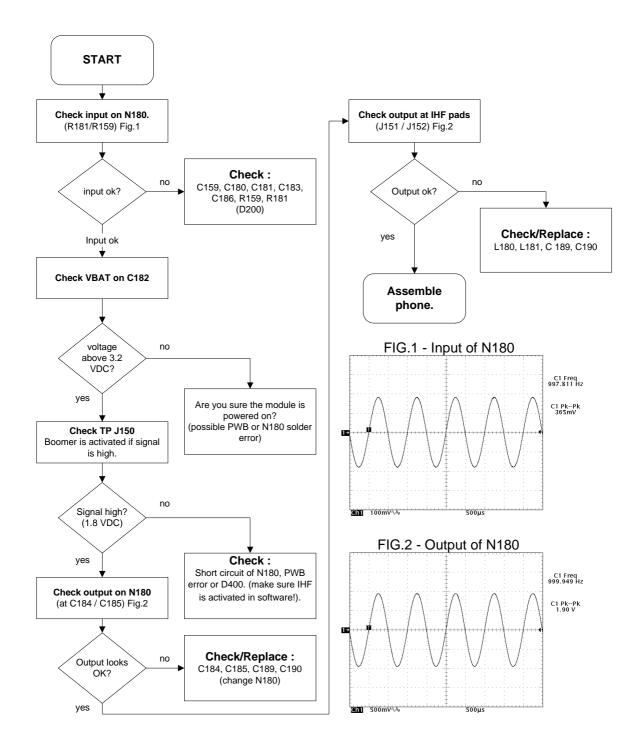
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#### No sound from IHF or headset

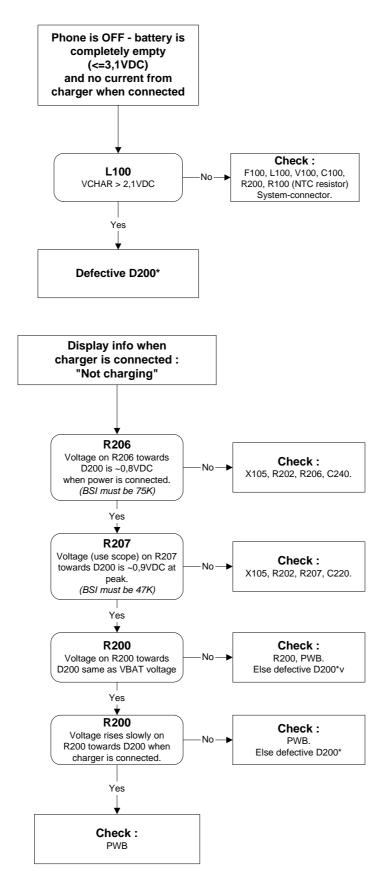


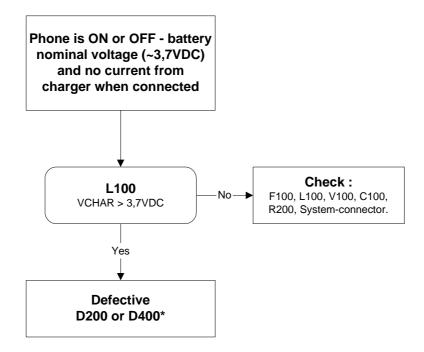
#### Handsfree speaker does not work

A FM signal generator at 88 MHz (1KHz LF) and 99% modulation was used as "radio station".



# Charging faults





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# **General RF Troubleshooting**

Two types of measurements are used in the following. It will be specified if the measurement type is "RF" or "LF".

• RF measurements are done with a Spectrum Analyser and a highfrequency 500 ohm passive probe, for example HP54006A. (Note that when measuring with the 500 ohm probe the signal will be around 20 dB attenuated. The values in the following will have these 20 dB subtracted and represent the real value seen on the spectrum analyser).

Note that the testjig have some losses which must be taken into consideration when calibrating the test system.

• LF (Low frequency) and DC measurements should be done with a 10:1 probe and an oscilloscope. The probe used in the following is 10 Mohm, 8pF passive probe. If using another probe then bear in mind that the voltages displayed may be slightly different.

Always make sure the measurement set-up is calibrated when measuring RF parameters on the antenna pad. Remember to include the loss in the module repair jig when realigning the phone.

**Most RF semiconductors are static discharge sensitive.** So, ESD protection must be applied during repair (ground straps and ESD soldering irons). Mjoelner and Bifrost is moisture sensitive so parts must be pre-baked prior to soldering.

Apart from key-components described in this document there are a lot of discrete components (resistors, inductors and capacitors) for which troubleshooting is done by checking if soldering of the component is done properly and checking if the component is missing from PWB. Capacitors can be checked for short-circuiting and resistors for value by means of an ohmmeter, but be aware in-circuit measurements should be evaluated carefully.

# RF Key component placement

PA N700 Z603 Z603 Z602 Z603 D Z603 Z602 Mjolnet N600 VCCO B600

Figure 3: RF key components

#### Table 1: RF component placement

N600	Mjoelner RF IC
Z601	PCN RX SAW
Z602	EGSM RX SAW
Z603	EGSM TX SAW
B600	26 MHz crystal
G600	VCO (4.0 GHz UHF VCO )
N700	Power Amplifier (PA)
Z700	RX/TX switch

RM-4/RM-5 Troubleshooting Instructions

Refer to the picture below for measuring points at the UEM (D200).

Figure 4: Supply points at UEM (D200)

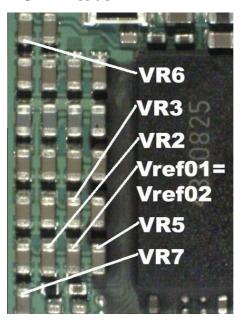
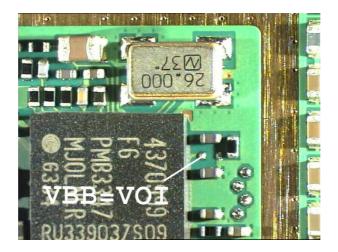


Figure 5: Supply point at Mjoelner (N600)



# General Instructions for GSM900 RX Troubleshooting

Connect the phone to a PC with the module repair jig.

Start Phoenix and establish connection to the phone

Phoenix commands

RF Controls .Band GSM 900 RX .Continuous mode

Channel 37 .AGC 8 FEG ON + 46 dB

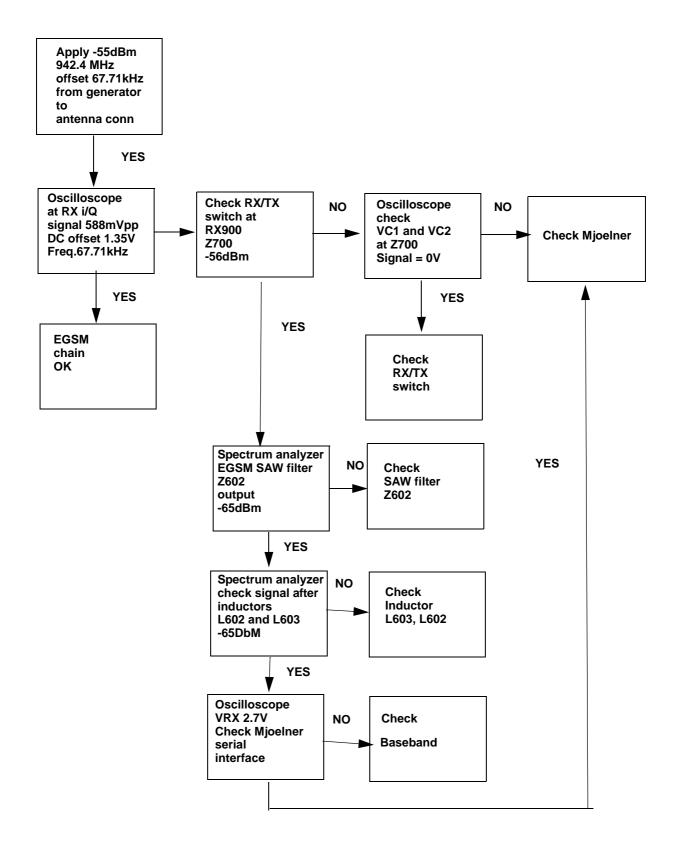
The setup should now look like this:

Figure 6: GSM900 RF Controls window

perding mode: Local 💽 Bead 🗆 Qhange with Reset	Edge:
19 Controls	
Common GSM FIF Control Volues Active Unit Fix P Pk/Tx Channel: 37 897,480000 Band: GSM 900 AFC: 3153 Operation Mode: Burst	
POCCentral Velues Monitor Chennet:	
TXControl Values Edge: Edge: TxDelta Type All 1	

#### Troubleshooting Chart for GSM900 Receiver

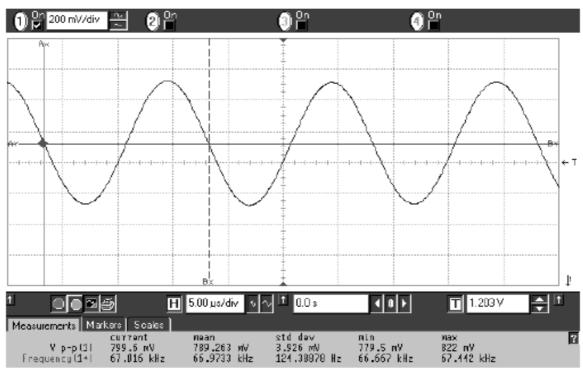
#### Figure 7: EGSM Receiver Troubleshooting chart



By measuring with an oscilloscope at RXIP or RXQP on a working GSM 900 receiver this picture should be seen.

Signal amplitude peak-peak 789 mV

DC offset 1.2 V



#### Figure 8: RX900 I/Q signal waveform

## General Instructions for GSM1800 RX Troubleshooting

Connect the phone to a PC with the module repair jig.

Start Phoenix and establish connection to the phone

Phoenix commands

RF Controls .Band GSM 1800 RX .Continuous mode

Channel 700 .AGC 8 FEG ON + 46 dB

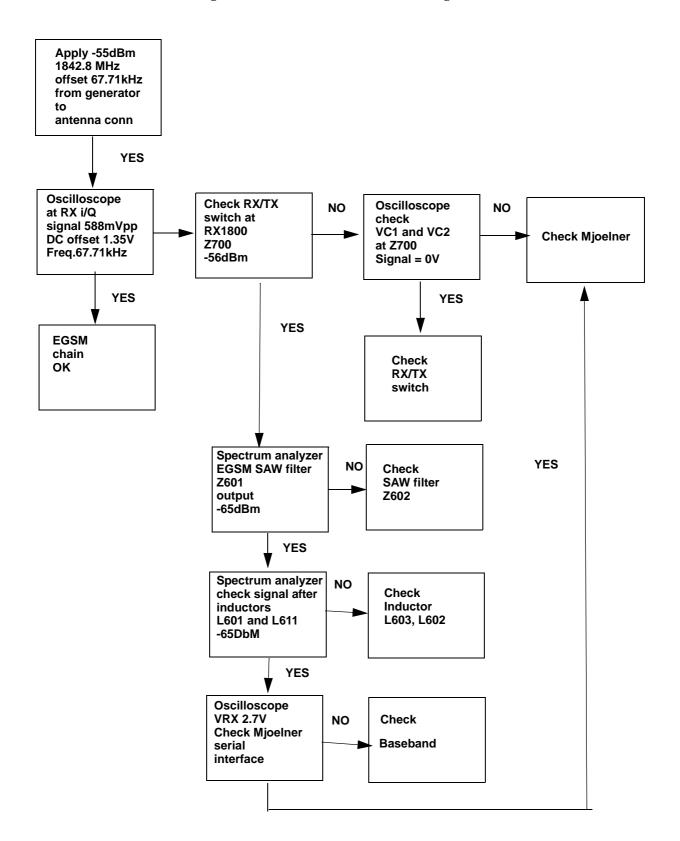
The setup should now look like this:

#### Figure 9: GSM1800 RF control window

erating mode: Local	Bead C Sharige with Reset	Edge:
		code. 1
IF Controls		
Common GSM FIF Control Volue		
Active Unit Rx 💌	and the second	
Bend: GSM 180)	AFC: 3153	
Operation Mode: Burst	•	
RKControl Values		
Monitor Channel: 700 184	00000	
and the second s		
AGC: 14 PEQ_ON + 14 UE + c	anat_DD_gain	
TX Control Values		
Edge: Of F	TxData Type	
and the second		
TxPAMode: Filgh F	Tx Power Level 5	
	Qlose Help	

#### Troubleshooting Chart for GSM1800Receiver

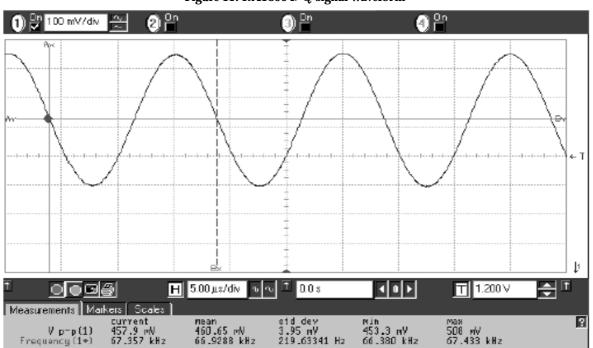
Figure 10: GSM1800 receiver Troubleshooting chart

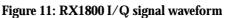


XIP or RXQP on a working GSM 1800 receiver this picture should be seen.

Signal amplitude peak-peak 460 mV

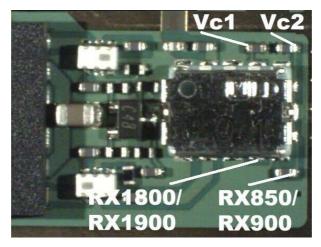
DC offset 1.2 V





#### Measurement points in the receiver

Figure 12: RX measurements point at the RX/TX Switch - Z700



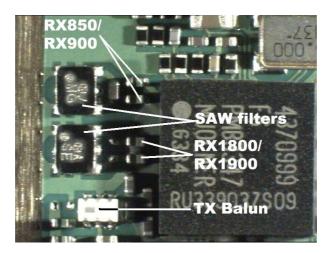
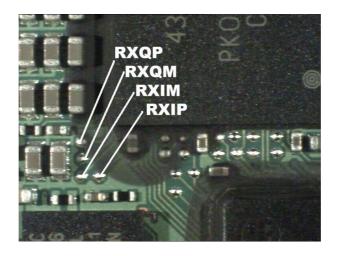


Figure 13: Measurements points at the RX-Filters – Z601/Z602

Figure 14: RX I/Q Signals, Baseband shielding can UEM (D200)



# RM-4/RM-5 Transmitter troubleshooting

Measurement points for the transmitter

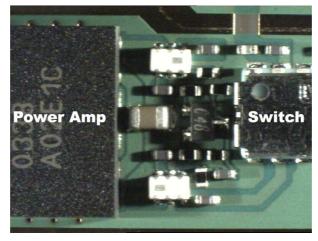
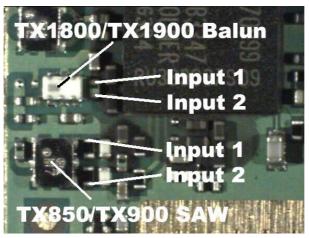


Figure 15: TX measurement points in the PA (N700) shielding can

Figure 16: TX measurement points in Mjolner (N600) shielding can



# General instructions for RM4/RM-5 GSM TX troubleshooting

Apply a RF-cable to the RF-connector to allow the transmitted signal act as normal. RF-cable should be connected to measurement equipment or to at least a 10-dB attenuator, otherwise the PA may be damaged.

Start Phoenix-Service-Software and establish a connection to the phone e.g. FBUS.

Select File and Product.

Select: Maintenance, Testing and RF Controls

Band:	GSM 900
Active Unit:	ТХ
Tx Power Level:	19
Tx Data Type:	All 1

Your screen should look like:

#### Figure 17: GSM900 RF controls window

perating mode: Local Baad C Change with Reset	Edge:
HF Controls	
Common GSM FIF Control Values Active Unit Rev Pk/Tx Channel: 37 897.480000 Band: GSM 900 RAFC: 3153 Operation Mode: Burst	
RXControl Velues           Monitor Chennel:         37           AGC:         14.7006_004+04.00 + connt_DD_gem	
DXControl Values	

Measure the output power of the phone; it should be around 32.5 dBm.

Remember the loss in the jig; around 0.3 dB.

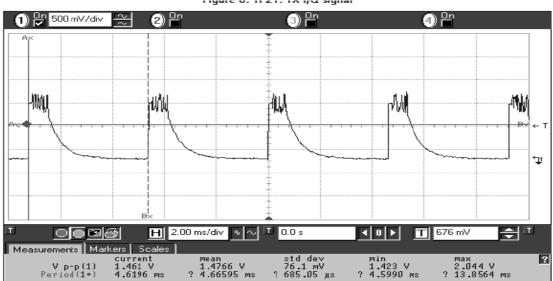


Figure 18: VPCTRL\_G and TXC signal

# PCN Transmitter General instructions for PCN TX troubleshooting

Apply a RF-cable to the RF-connector to allow the transmitted signal act as normal. RF-cable should be connected to measurement equipment or to at least a 10-dB attenuator, otherwise the PA may be damaged.

Start Phoenix-Service-Software and establish a connection to the phone e.g. FBUS.

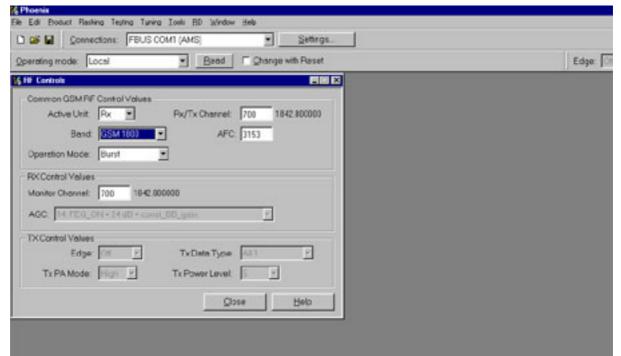
Phoenix commands

RF Controls .Band GSM 1800 RX .Continuous mode

Channel 700 .AGC 14 FEG ON + 24 dB

Your screen should look like:

Figure 19: RF controls window



Measure the output power of the phone; it should be around 28.5 dBm. Remember the loss in the jig; around 0.7 dB.

### Synthesizer

There is only one PLL synthesizer generating Local Oscillator frequencies for both RX and TX in both bands (PCN and EGSM). The VCO frequency is divided by 2 for PCN operation or by 4 for EGSM operation inside the Mjoelner IC.

### 26 MHz Reference Oscillator (VCXO)

The 26 MHz oscillator is located in the Mjoelner IC (N600). The coarse frequency for this oscillator is set by an external crystal (B600). The reference oscillator is used as a reference frequency for the PLL synthesizer and as the system clock for BaseBand. The 26MHz signal is divided by 2 to achieve 13MHz inside the UPP IC (D400).

The 26 MHz signal from the VCXO can be measured by probing R425 (must be measured on the UPP side of R425 i.e. the end **not** connected to C425). The level at this point is approx. 700mVpp. Frequency of this oscillator is adjusted by changing the AFC-register inside the Mjoelner IC. This is done via the Mjoelner serial interface.

Example Signal Measured at VCXO output (R425)

Tek Run: 4.00GS/s ET Sample PrTriq Cursor Δ: 664mV @: 348mV Function Off H Bars 1-V Bars Pàiréd M 12.5ns Ch1 \ 200mV/v 84mV Amplitude Time Function Mode Units Units H Bars Indep seconds Base

#### Figure 20: VCXO 26 MHz waveform

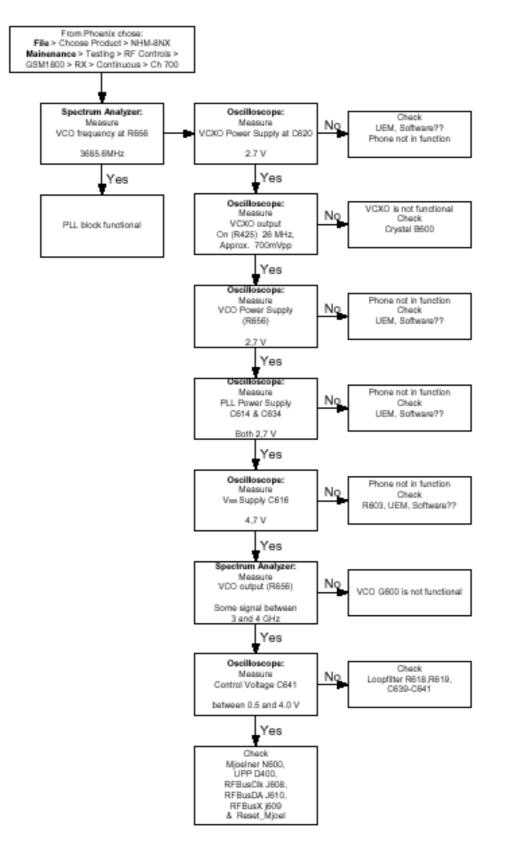
### VCO

The VCO is an ASIC with all the frequency determining parts inside.

In order to reduce the requirements of the tuning voltage and coverage of the VCO, the VCO core is composed of four VCOs in parallel. This VCO circuit enables a very wide tuning range of 3.4 - 4.0 GHz.

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### Troubleshooting diagram for PLL Synthesizer Figure 21: PLL Troubleshooting diagram



### Phone fails after power on

If the phone stops working a short time after the power is turned ON, a possible reason for this could be that the 26MHz system clock signal is not getting to the UPP clock-input in BaseBand. In this case check the following:

- 1 Turn on the phone and check
- 2 VCXO Power supply (C620) = 2.7V
- 3 VCXO output (R420 end not connected to C425) is 26MHz and approx. 700mVpp

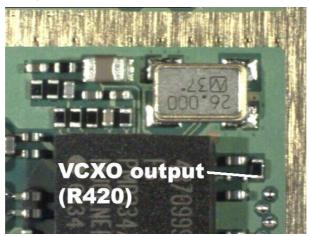
If this is not the case check the reference crystal (B600) and Mjolner (N600) as well as R420, R426, C420, C426.

#### Measurement points at the VCXO



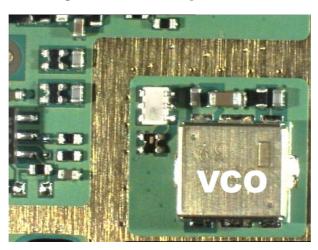
Figure 22: Measurement point for VCXO supply

Figure 23: Measurement point for VCXO output



### Measurement points at the PLL/VCO

Figure 22: Measurement point for PLL



# Manual Alignment using Phoenix

In Phoenix select connection Fbus and Product Gemini. If you power up the board before selecting Fbus, it works without any error messages.

Use Jig or other device for RF and bus connection. Attenuation in the probe alone is 0.5dB for 900 and 1dB for 1800. Use CMD55 or other suitable device. Default channels are 37 for GSM900 and 700 for GSM1800. The alignments and calibrations must be performed in the order shown to give reliable results.

The way to save data to the phone and to load data from the phone is made different in the various tunings. Always look what is shown in the windows regarding these issues and act accordingly.

To vary a selected parameter you can use + and – key or in some cases directly type the new value. + and – steps the value for every press. Repeat function seems not to work. In I/Q you can use the side arrows.

### **RX** calibration

#### Select Maintenance, Tuning, RX Calibration

Select Band: GSM 900

Select Automatic and follow the prompts

The result should be like the shown:

76 Phoenix		. # X
Ele Edi Poduct Rashina Testina Tunina Iool		
Operating mode: Local		
Autom + 60 dbm 1st Man 60	dom 2nd Man 195 dbm	Band: CEM 190
14 flx Collection		•
PH volues.           VCN0 cal:         547,000000           At: value:         3153,000000           Slope C1:         2728,000000           Slope C2:         -464,000000           Slope C3:         1,000000           Slope C3:         1,000000           Slope C3:         1,000000           Pasil 0         63,734375           Pasil 1         597,243375           Pasil 4         67,734375           Pasil 4         67,734375           Pasil 5         96,421875           Pasil 6         102,421875           Pasil 7         100,421875           Pasil 1         122,421875           Pasil 1         124,421875           Pasil 1         124,421875           Pasil 1         124,421875           Pasil 1         124,421875           Pasil 1         150,421875           Pasil 1         150,421875	Image: Stage to Phone     Image: Stage to Phone       Image: Stage to Phone     Stage       Calibration mode     Image: Stage       Image: Stage to Phone     Image: Stage       Calibration mode     Image: Stage       Image: Stage to Phone     Image: Stage       Calibration mode     Image: Stage       Image: Stage to Phone     Image: Stage       Image: Stage     Image: Stage <td< th=""><th></th></td<>	

Figure 23: RX calibration window

NOKIA

### GSM1800 RX calibration

- 1 The existing data in the phone is shown
- 2 Calibrate, and the new data is shown
- 3 Stop, and the little window pops up where you can select to save or not
- 4 Select GSM1800 in the top bar and repeat at channel 700

eenik Edk Boduct Rashing Testing Tuning Ioo	BD Window Hele	
Genections FBUS COM	AMS Settings	
erating mode: Local	Bead C Shange with Reset	
and the second se	dom 2nd Man 95 dbm	Bend: CEM 1800
Calibration		
PM volues.	F Loadfrom Phone	
VCX0 cal : 547.000000 Atc value : 3153.00000	P Load from Phone	
Slope C1 : 2728.000000	Çalbrate	
Slope C2 : -484.000000 Slope C3 : 1.000000	F Save to Phone Stop	
Resi 0 : 60.076125 Resi 1 : 66.078125		
Resi 2 : 72.078125 Resi 3 : 78.078125	Celibraton mode	
Ausi 4 : 84.078125 Ausi 5 : 92.734375		
Assi 6 . 98.734375 Assi 7 . 104.734375	C Menual	
Resi0 : 110.734375 Resi9 : 116.734375	1	
Real 10 122,734375		
Rosi11 : 128.734376 Rosi12 : 134.734375		
Resi13 : 140.734375 Resi14 : 146.734375		
	8	
	V 244, 13:06:02	RH-12, LEIMAP III

Figure 24: GSM1800 RX calibration window

- 1 The existing data in the phone is shown
- 2 Calibrate, and the new data is shown
- 3 Stop, and the little window pops up where you can select to save or not

### RX channel select filter

- 1 Select Maintenance, Tuning, Rx Channel Select Filter Calibration.
- 2 Press Start and you can select to load values from the phone or not.
- 3 Press AutoTune
- 4 Press Stop and you can select to save values to the phone or not to..

Figure 25: RX channel selection window

rating mode: Local · Baad / Change	with Raset	Po/Tx Channel: 37	942.408000	Active Usit	Rx
d: G5M 100 F					
Channel Select Filter Calibration		=	×		
Filter Adjustment	🖓 Load from Phon	e 8,21	1		
Decmel 35		Tyne			
Hex 0x23 xTeu	🕫 Seye to Phone	Stop			
Binary 100011		Hylp			
Capacitor array	- Tuning Mode				
D C C C C C	(* Arto				
	C Manual				

Note: This calibration requires no input signal

### **RX Band Filter Response**

- 1 Select Maintenance, Tuning, Rx Band Filter Response Compensation
- 2 Press Start, Read from PM area and you can select to load values from the phone or not
- 3 Press Manual Tuning
- 4 Set the Signal generator according to the pop-up windows
- 5 When finished press Stop, Write to PM area and you can select to save values to the phone or not
- 6 Repeat for GSM1800

#### . # × le Edit Product Rashing Testing Tuning Iools BD Wind D 😂 🖬 🛛 Connections: FBUS COM1 (AMS) Baad F Change with Reset Operating mode: Local Bend SSM Operation Mode: Burst . Tx Data Type: 4 Rx/Tx Channel 700 1642 800000 12 TxPA Mode: High F Edge: Or Its Band Filter Fless X -60 -F Load from Phone Input Signal Level (dEm): Input Freque Tune ed Le d c. ce (d0) -1.313 Channel R Seve to Phone Stop -0.715 0.500 0.500 Tuning mode Help 0.094 F Automatic 0.781 C Manuel 0.094 0.297 0.500 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 ying table to clipbor a mouse left button a left top of the table 8.000 V 244, 13-06-03, RH-18, (c) NMP FBUS CONT JANS

#### Figure 26: RX Band filter response window

Note: This calibration requires a lot of different frequencies from the generator. If you have a signal generator with a frequency list option you can with advantage use Auto Tuning (Dwell should be around 10ms).

RM-4/RM-5 Troubleshooting Instructions

### Tx Power tuning

Select Maintenance, Tuning, Tx Power Level Tuning

#### TX power tuning GSM

1 Select edge off, GSM 900

#### Figure 27: TX power tuning window1

Coefficient         Target dBm         DAC         Star           0         0.6687         29.5         684           1         0.6032         280         617           2         0.6331         280         617           2         0.6331         280         644           3         0.4750         240         466           4         0.4321         22.0         442           5         0.3937         200         405         Load hore           6         0.3688         16.0         154         Save to           9         0.3146         12.0         321         140         364           9         0.3146         12.0         321         Parmanert memory         P           10         0.3027         100         306         P         Save to           12         0.2030         0.7         202         304         P         Pormanert memory           10         0.3027         100         306         202         202         202           13         0.2038         40         287         Bend:         DSM 100         9           14         0.2735         2	percting m	node: Local		Beed	C Change with Reset	TxPA.Mode:	High 💌	TxData Type:	All 1
Coefficient         Target dBm         DAC         Dent           0         0.6697         29.5         684         Star           1         0.6032         280         617         Star           2         0.6321         260         544         Star           3         0.4750         24.0         486         Calculate coefficients           4         0.4021         22.0         442         Load from           5         0.3357         200         405         Load from           6         0.3688         18.0         374         Parmasert memory           7         0.3458         16.0         354         Save to           9         0.3146         12.0         321         Parmasert memory           10         0.3027         100         306         Parmasert memory           11         0.25933         0.3         300         Parmasert memory           12         0.2086         40         287         Band         Star 180           13         0.2086         40         287         Band         Star 180         V	FC 3153	Active			met 708 1747.800000				
0         0.6647         29.5         684           1         0.6032         280         617           2         0.5321         260         544           3         0.4750         240         466           4         0.4021         220         442           5         0.3957         200         405           6         0.5688         180         377           7         0.3458         160         354           9         0.3146         120         321           140         356         Save to           19         0.3146         120         321           10         0.3027         100         106           11         0.29373         0.3         260           13         0.2036         40         267           13         0.2036         20         282           14         0.2755         20         282	Te Power	Level Tuning							
1     0.6032     280     617     Step       2     0.6331     260     544       3     0.4760     240     466       4     0.4011     220     462       5     0.3957     200     405       6     0.588     180     377       7     0.3458     160     354       9     0.3146     120     321       10     0.2027     100     306       11     0.27933     0.9     200       12     0.2086     40     267       13     0.2086     40     267       14     0.2785     20     282		Coefficient	Target dBm	DAC	Dert				
2       0.5321       260       544         3       0.4750       240       466         4       0.4321       220       442         5       0.3957       200       405         6       0.3957       200       405         7       0.3458       160       354         8       0.3231       140       336         9       0.3146       120       121         9       0.3146       120       121         9       0.3146       120       121         9       0.3146       120       121         9       Permanent memory       P         10       0.3027       100       306         11       0.2933       0.9       306         12       0.2016       6.0       292         13       0.2836       40       287         14       0.2755       20       282	0			684					
0       0.4750       240       485       Chicking coefficients         0       0.3957       200       465       Load hore         0       0.3957       200       465       Load hore         0       0.3688       180       177         0       0.3231       140       336         0       0.3146       120       121         0       0.3027       100       106         1       0.2933       0.3       300         2       0.2936       60       252         3       0.2816       40       267         4       0.2755       20       282		0.6032		617	Sigp				
0.4021       220       442         0.3957       200       405         0.3957       200       405         0.3957       200       405         0.3957       200       405         0.3957       200       405         0.3957       200       405         0.3957       140       356         0.39146       120       321         0       0.3027       100       106         1       0.2933       0.3       300         2       0.2936       60       292         3       0.2938       40       287         8 end:       DSM100       9			26.0						
0 3957         200         405         Local from           0 3958         180         177         Formaniant memory         *           0 3958         160         354         Seve to         *           0 3145         120         321         Permanent memory         *           0 3146         120         321         Permanent memory         *           0 0 3027         100         306         Permanent memory         *           0 0 3027         0.0         306         Permanent memory         *           2 0 2050         60         292         *         *           3 0 2038         40         287         *         *           4 0 2255         20         282         *         *	1				Calculate coefficients				
0.3688     180     377       0.3688     160     354       0.3231     140     336       0.3146     120     321       0     0.3277     100       0     0.2937     0.9       0     0.2937     0.9       0     0.2936     60       2     0.2936     60       3     0.2938     40       4     0.2785     20       2     282		0.4321	22.0						
0 3458         160         354           0 3231         140         136           0 3146         120         321           0 3146         120         321           0 3027         100         309           0 20303         0.9         3000           0 20306         60         292           0 20308         40         287           0 2755         20         282		0.3957	20.0	405	Loed from				
0 3231 140 136 0 3146 120 121 0 0 3027 100 309 0 02830 60 292 0 02830 40 287 1 0 2755 20 282 Bend: DSM100 ¥		0.3638	18.0	377	Permakert memory *				
0 3146         120         321         P Parmanent memory           0 30027         100         309         IP Parmanent memory           0 2000         60         292         IP Parmanent memory           0 0 2000         60         292         IP Parmanent memory           0 0 2000         60         292         IP Parmanent memory           0 0 2000         60         292         IP Parmanent memory		0.3458	16.0						
0 3027         100         309         IPC           0.2933         0.0         300         IPC           0 2050         60         292           0 2050         60         292           0 2050         40         287           0 02755         20         282				336	Serve to				
0.2933         0.0         360         PC           0.2950         60         292           0.2838         40         287           0.2755         20         282		0.3146	12.0	321	P Permanent memory				
0 2090 60 292 0 2090 40 207 0 2755 20 202 Band: SSM1000 Y			10.0		E pp				
0 2838 40 287 Bend: SSM1000 x		0.2933	0.0	300	1. 100				
0.27%5 20 282 Band postfried		0 2850	6.0	292	-				
02/66 20 262					Band COLLEGO V				
0 1710 01 270		0.2785	2.0	282	Gauge Locard Lines				
		0.2729	0.0	279	Edge: Of				
nse 0.2550 -30.0 265									
ext 02510 264 TxPAMode: High =	p cf	0.2530		26.4	TxPA Mode: High				

2 Press Start and select from where to load values. It is best to have PC saved data from a good phone. The data from a "good" phone can be saved to PC for use later.

hoenix											
Edi Pod	uct Reshing To	estina Tunina Iook	BD Window	Help							
<b>S</b>	Connections	FBUS COM1 (/	WS]	· Settings_	1						
erating m	ode: Local		Beed	C Change with Reset	1	x PA.Mode	High	•	TxData Type:	All	_
3153	Active		Fx/Tx Chen	net 37 897.400000							
PowerL	evel Tuning										
10	Coefficient	TargetdBm	DAC	Ster .							
	0.6945	32.5	710								
	0.6147	31.0	628	Step							
	0.5321	290	\$44								
	0.4657	27.0	477	Qalculate coefficients							
	0.4140	25.0	424								
	0.3736	23.0	382	Loed from							
	0.3437	21.0	348	Permasent memory Y							
21	0.3145	19.0	321	-							
	0 2935	17.0	300	Save to							
	0.2755	15.0	282	P Pormanent memory							
	0.2632	13.0	269	IT PC							
	0.2530	11.0	250	1. 1~							
224	02449	9.0	250		1.1						
2	0.2385	7.0	243	Bend OSM 900							
land.	0.2334	5,0	238	Charles Lange and							
ase 📕	0.2131	-30.0	218	Edge: Of V							
tet	02131		218								
				TxPA Mode: High =							
				Zero DAC:							
charnel	: 5/ : 897.40 MHz			Help							
equency	007.40 MIT2			Deb							
					V 244, 13-06-	02, R4-12, (c)	NMP			FBUS COM	IMAS

Figure 28: TX power level tuning window 2

- 1 Select the modulation 1, 0 or random in Tx Data Type. Select random if a GSM tester is used. Then it can synchronise to the burst.
- 2 Select Tx PA Mode High
- 3 Tune the highlighted values to the wanted power (Use average burst power)
- 4 Tune base level to –28dBm (Close to lowest level CMD55 can keep synchronisation)
- 5 Calculate coefficients

Figure 29	): TX	power	level	tuning	3
-----------	-------	-------	-------	--------	---

ceretino	mode: Local		Beed	Change with Reset	TxPAMode	High #	TxData Type:	All1
_					1	1		(part)
FC: 3153	and the second second	Unit Tx	Fx/Tx Cher					
T & Power	Level Tuning							
0.01	Coefficient	Target dBm	DAC	Elen (				
5	0.6945	32.5	710					
6	0.6147	31.0	628	Step				
7	0.5321	290	544					
B	0.4657	27.0	477	<u>Calculate coefficients</u>				
9	0.4140	25.0	424	and the second se				
0	0.3736	23.0	382	Loed from				
1	0 3437	21.0	348	Permisent memory *				
2	0 31 45	19.0	321	Country				
3	0 2935	17.0	300	Save to				
4	0.2755	150	282	P Permanent memory				
15	0.2632	13.0	269	IT PC				
16	0.2530	11.0	250					
17.0	0.2.449	9.0	250	Store service in source				
18	02385	7.0	243	Bend OSM 900 Y				
19	0.2334	5.0	238					
Base	0.2131	-30.0	218	Edge: Of v				
Test	0.2131		218					
				TxPA Mode: Hgh				
				Zero DAC:				
Tx charn	at 37	10		and the second sec				
	ar. 57 57: 897.40 MHz			Help				

- 1 Select Tx PA Mode low and tune the high lighted values.
- 2 The base level coefficient is taken from the high mode. Do not change it.
- 3 Calculate and select Stop

#### Figure 30: Stop TX power level tuning dialogue

Stop Tx Power Level Tuning	×
Do you want to stop tuning?	Yes
Pressing Yes will stop the tuning and save the values to selected destinations. Pressing No will continue tuning without saving.	No
Save values to Phone Permanent Memory	
Save values to PC	Help

If you are satisfied with the coefficients and the power, then save to the Permanent memory.

You can also save the table to the PC, so that you can load it to an other phone. Or you can select not to do anything by removing both ticks.

Only way to end the tuning session is with Yes

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### TX power tuning PCN

<b>1</b>	Semicrom	FBUS COM1 (/		Settings				
perating	mode: Local		Bead	C Qhange with Reset	Tx PA Mode:	High 💌	TxDeta Type: All 1	
C: 315	3 Active I	Jat Tx P	Fx/Tx Cher	met 37 897.400000				
Le Power	Level Tuning							
	Coefficient	Target dBm	DAC	प्रभ				
5	0.6945	32.5	710					
6	0.6147	31.0	628	Stop				
7	0.5321	290	\$44					
B	0.4657	27.0	477	Qalculate coefficients				
9	0.4140	25.0	424					
10	0.3736	23.0	382	Load from				
11	0 3437	21.0	348	Permissent memory *				
12	0.3145	19.0	321					
13	0 2935	17.0	300	Save to				
14	0.2755	150	282	P Permanent memory				
15	0.2632	13.0	269	IT PC				
16	0.2530	11.0	250	1.10				
17	0.2449	9.0	250	S on the second second				
18	0.2385	7.0	243	Bend OSM 900				
19	0.2334	5,0	238					
Base	0.2101	-30.0	218	Edge: Of V				
Test	02131		218					
				TxPAMode: High 💌				
				Zero DAC:				

#### Figure 31: PCN (GSM1800) TX power tuning window

#### Figure 32: Start TX power level tuning dialogue

Start Tx Power Level Tuning	×
Load From:	OK
Permanent memory	Cancel
Permanent memory PC default values PC saved values Current values	Help

- 1 Select GSM 1800 band (PCN)
- 2 Start
- 3 Select where to get values from. Normally Permanent Memory
- 4 OK

perating	mode: Local		Beed	C Qhange with Reset	TxPAMade: High 💌	TxData Type: All 1
C 3153	Active L	ht Tr -	Fx/Tx Cher	met 700 1747.800000		
Te Power	Level Tuning					
	Coefficient	Target dBm	DAC	Def		
0	0.6687	29.5	684			
L	0.6032	28.0	617	Sigp		
2	0.5321	26.0	544			
3	0.4750	240	486	Calculate coefficients		
4	0.4321	22.0	442	Contractor of the second s		
5	0 3957	20.0	405	Loed from		
6	0.3638	18.0	377	Fernalert memory P		
7	0.3458	16.0	354			
8	0.3231	140	336	Serve to		
9	0.3146	12.0	321	P Permanent memory		
10	0 3027	10.0	309	IF PC		
11	0.2933	0.0	300	1. 1.0		
12	0 2050	6.0	292	E DATA DA MANAGAMANA MANAGAMAN		
13	0 2838	40	287	Bendt GSM1800 *		
14	0.2785	2.0	282			
15	0.2729	0.0	279	Edge: Of P		
Base	0.2590	-30.0	265			
Tool	0.25.80		264	TxPA Mode: High .		

Figure 33: GSM1800 TX power level tuning window

- 1 Select the wanted modulation. Random if a GSM tester is used, so that you can synchronise the burst.
- 2 Only high mode is possible
- 3 Tune the highlighted values to the wanted power
- 4 Tune base level to -27dBm
- 5 Stop

#### Figure 34: Stop TX power level tuning dialogue

Stop Tx Power Level Tuning	×
Do you want to stop tuning?	Yes
Pressing Yes will stop the tuning and save the values to selected destinations. Pressing No will continue tuning without saving.	<u>N</u> o
✓ Save values to Phone Permanent Memory Save values to <u>P</u> C	Help

- 6 Select where to save the values, one, both or no one can be selected.
- 7 Yes. That's the only way to end tuning.

### I/Q tuning

#### Select Maintenance, Tuning, Tx IQ tuning

Set CMD55 to Narrow Spectrum on the same band as the phone. Selected in the top menu.

Figure 35: I/Q tuning window

File Edit Poduct Rashing Testing Tuning Tools BD Window Help				<b>E</b> 18
	Settings.			
Operating mode: Local Band Change with	_	Bend GSM 18	00 💌 Operation Mo	der Burst
Px/Tx Channet 7(0 1642 800080	Tx Data Type	: AU1 🕑	TxPA Mode: High	Edge: 01
K Tc IQ Tuning				
TX[DCoffset		Start		
TXQDC offset	% V Sey	d from Product e to Product		
Ampitude difference:				
Ehase diference.	31°	Heb		
		/244.13-06-02.RH-12 (c)		FRUS CONT (ANS)
Ready		244,130600,HH11,B1		and a constraints

- 1 Select where to get values. Normally select Load From Product
- 2 Start
- 3 Tune offset values to lowest carrier. Use Side arrows or +, .
- 4 Tune Amplitude and phase to lowest sideband.
- 5 Check eventually with other modulation (0).

#### Figure 36: TX I/O tuning window

K Phoenix	
Ele Edi Poduct Reshina Testina Tunina Iooli BD Window dele	fings
Operating mode: Local Baad C Change with Re	eset Band GSM 1800  Operation Moder Burst
Pov/Tx Channet 700 1842 800080	Tx Deta Type: All 1 Tx PA Mode: High P Edge: Off
16 Te RE Tuning	
TX[DCoffiet	Stert
-10% -5% 0% 5% 10%	BZ
TXQDCoffset	년 Load from Product
-10% -5% 0% 5% 10%	9 Segle to Product
1	
Ampitude difference: 60	
· · · · · · · · · · · · · · · · · · ·	
Ehase diference. 27.3 <sup>O</sup> 153.8	o
	Heb

Note: Remember to tick Save to Product if you want to save the values in the phone.

- 1 Stop to end the tuning with the selected save option
- 2 Same procedure for PCN as for GSM.
- 3 Remember to tick Save To Product.
- 4 Stop. Ends tuning and does what you have ticked.

### NOKIA CCS Technical Documentation

### **RF** control

This menu can be placed in maintenance or in tuning depending on the Phoenix.

It is meant to check the receiver or transmitter without going in call. It works very much like a call, but you have control via the PC, and not via the tester.

The TX mode GSM900 can select between Free, High and low mode. It changes the PA mode, but changes also the power level if a level is selected that is not supported in that mode.

If you want to tune at other channels than the default, then you must select it first in RF control and then start the tuning.

A Phoenix	X
Ele Edi Posuci Rantina Testina Tunina Iosli BD Window Hele D 26 Mar Connections (FBUS COM1 (AMS) ) Settings.	
Operating mode: Local Bead C Change with Reset	Edge: Ott
A HF Controls	
Common GSM FIF Control Values Active Unit Page Pk/Tx Channel: 37 897.480000 Band: GSM 900 P AFC 3153 Upperston Noce: Eurot FXCControl Values	
Monitor Chernet:         27         272.40000           AGC:         T4.700_004+04.40 + const_00_gen         2	
TXControl Values Edge: T# TxConta Type: All 1 # TxPA.Mode: Free # TxPowerLevel: 19 #	
Beb	

Figure 37: RF control window

### Call testing

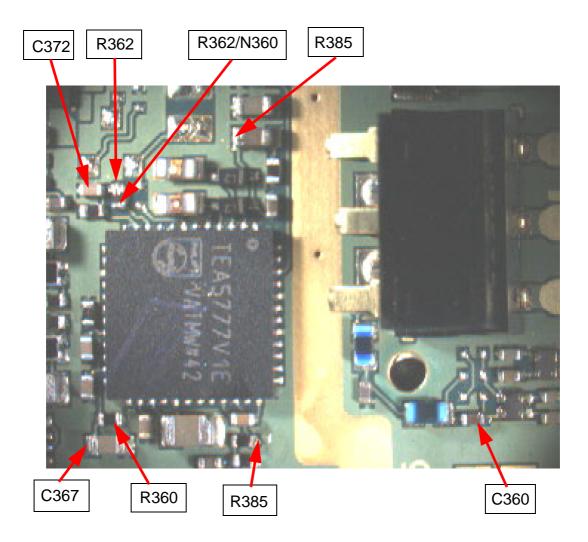
If all tunings are done, and the phone TX and RX is working a call is the ultimate test of the phone.

Set CMD55, or similar tester, to manual test and switch the phone to normal if it was in local. Remember to have a test sim card in the phone.

When the phone has made a registration a call can be made, and it is possible to let the phone answer via Phoenix. In the Autocaller (Maintenance Testing) you can answer by ticking Answer when button pushed and then posh the button.

# General instructions for RM-4/5 FM radio Troubleshooting

### Location of testpoints



### **Phoenix control**

Connect the phone to a PC with the module repair jig.

Start Phoenix and establish connection with the phone.

Select "FM Radio Control" in the Testing menu.

The setup should look like this:

K FM Radio Control	
Control Tuning	
Power: Power In Tune radio on power-on Save last listened-to channel on power-off	
✓olume:         0 ±           0         1	
<u> </u>	

Turn on the FM radio through the key marked "Power" and select Tuning. The setup should look like this:

🌃 FM Radio Control 📃 🗆 🗙
Control Tuning
Erequency:
Extended range Audio mode: Mono
ESSI:
Set: Eename Set
Channel Name Audio Mo Freque Detection Level R
<u> </u>

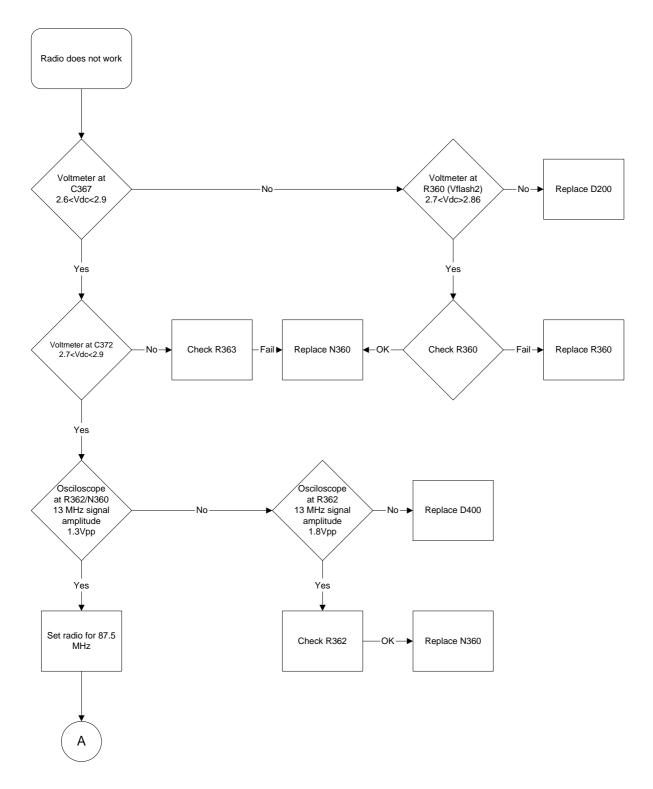
It is now possible to tune the radio for the wanted frequency.

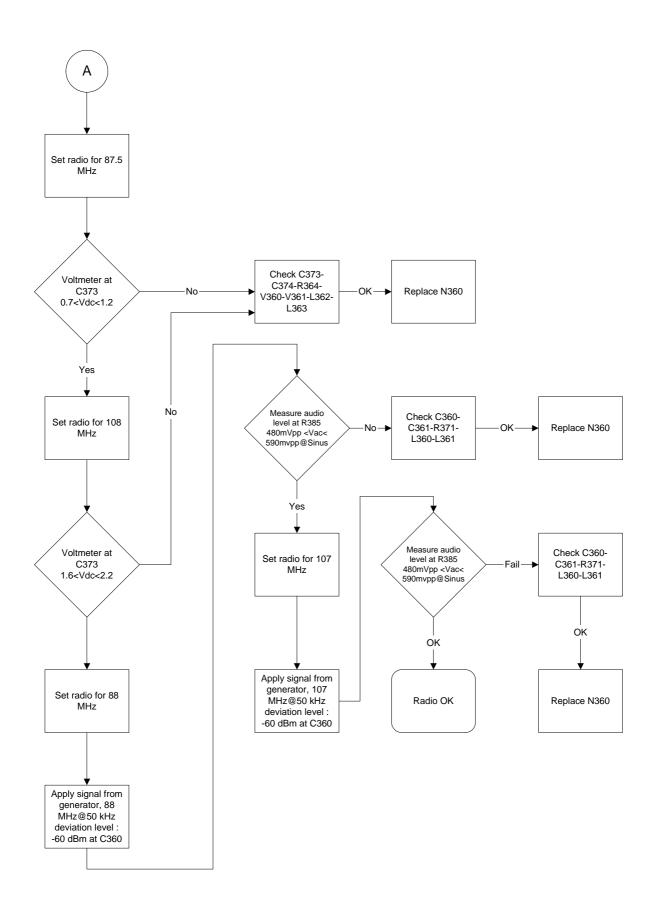
The troubleshooting guide requires that the radio is turned on.

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## Fault finding guide





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