Service Manual
Level 1-2
for
BenQ mobile
EF71

Release	Date	Department	Notes to change
R 1.0	12.09.2006	BenQ Mobile CC S CES	New document

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1 Key Feature

System	• Tri-Band GSM 900/1800/1900
Battery	• Li-Ion 750 mAh
Stand – by Time	• Up to 225h
Talking Time	• Up to 3 h
Antenna	• Integrated
Main Display	• 262, 144 TFT, 176x220 pixels, 2.2 inches
Sub - Display	• White OLED, 128 x 64 pixels
Storage	• 24 MB
Camera	• 2.0 megapixel, 3 x linear digital zoom
Connectivity	• USB 1.1, Bluetooth: Object Push Profile, Object Exchange, Handsfree Profile, Headset Profile
Memory Slot	• MicroSD
Processor	• TI

2 Spare Part Overview of EF71

Overview Upper Parts

No.	Description CM	Order Number
1.	Lower Base Case Shell	Tbd.
2.	Upper Base Case Shell	Tbd.
3.	Battery Cover	Tbd.
4.	Battery	Tbd.
5.	Transflash card holder	Tbd.
6.	Base Screws	Tbd.
7.	Screw Cover	Tbd.
8.	Side Key Left	Tbd.
9.	Screw Cover	Tbd.
10.	Screw caps	Tbd.
11.	Keypad	Tbd.
12.	RF Control Board	Tbd.
13.	Side Key PCB	Tbd.
14.	Rubber gasket	Tbd.
15.	Vibra Alert	Tbd.

Overview Lower Parts

No.	Description CM	Order Number
16.	Lift Case Cap	Tbd.
17.	Upper Lift Case Shell	Tbd.
18.	Display Module	Tbd.
19.	Camera Module	Tbd.
20.	Earpiece	Tbd.
21.	???	Tbd.
22.	Lift Screws	Tbd.
23.	Screw Cover	Tbd.
24.	Flex Cable	Tbd.
25.	Hinge	Tbd.

3 Disassembly of EF71

All repairs as well as disassembling and assembling have to be carried out in an ESD protected environment and with ESD protected equipment/tools. For all activities the international ESD regulations have to be considered.

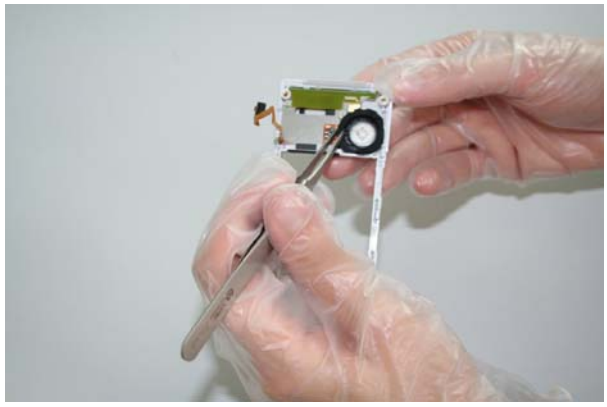
For more details please check information in c – market

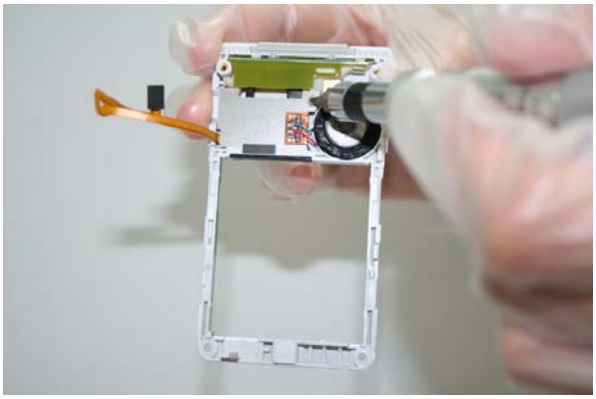
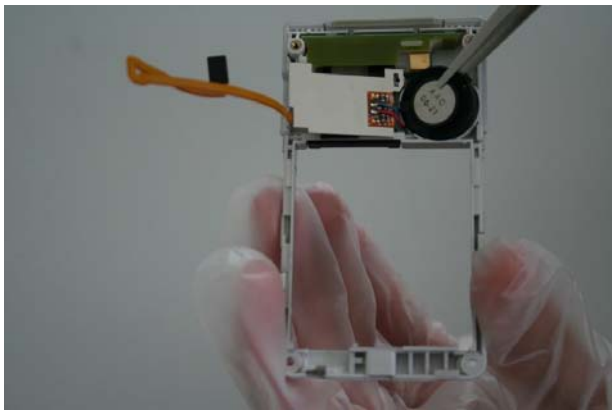
https://market.benqmobile.com/SO/welcome.lookup.asp

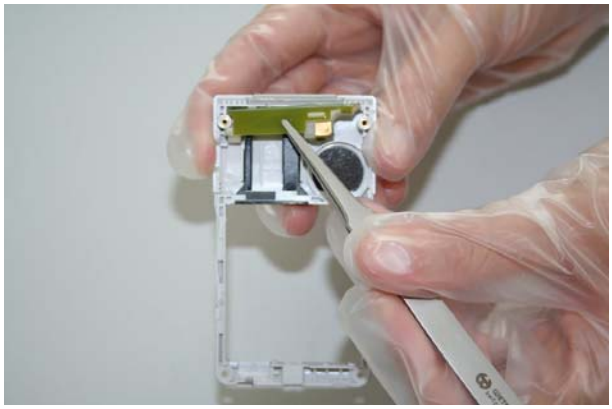
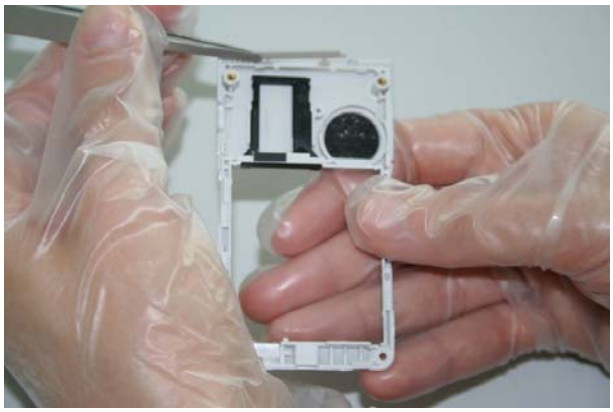
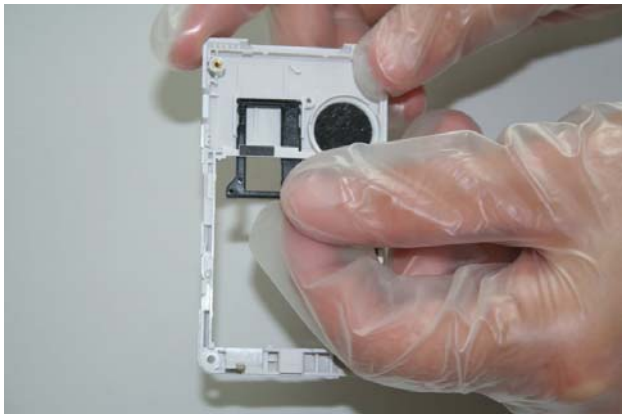
There you can find the document “ESD Guideline”.

Step 1 	Remove Battery Cover.
Step 2 	Remove Battery.

Step 3 	Remove Screw Cover by using Tweezers.
Step 4 	Remove screws with the Torque – Screwdriver T5+
Step 5 	Remove screws with the Torque – Screwdriver T5+

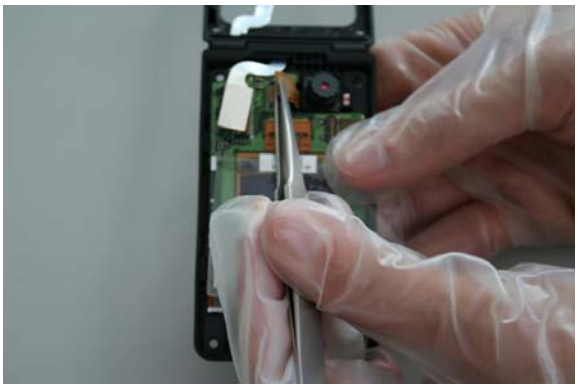
Step 6 	Remove Lower Base Case Shell with the Alternative Opening Tool carefully.
Step 7 	Use Tweezers to disconnect the Flex Cable from the RF Control Board socket.
Step 8 	Remove rubber gasket from ringer.

Step 9 	Remove Screws with the Torque – Screwdriver
Step 10 	Remove Vibra Alert with the Alternative Opening Tool carefully
Step 11 	

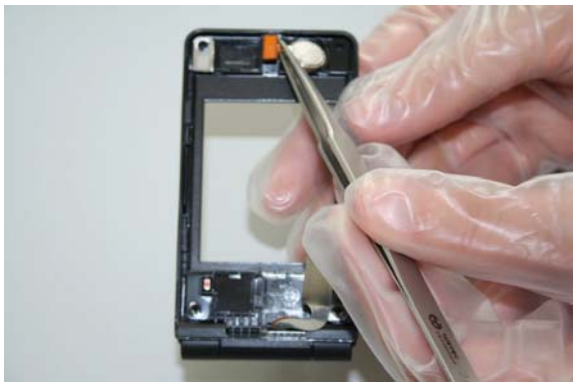
Step 12 	Remove the antenna PCB.
Step 13 	Remove the Side Key .
Step 14 	Remove Transflash card holder

Step 15 	
Step 16 	.
Step 17 	Remove the Keypad PCB.

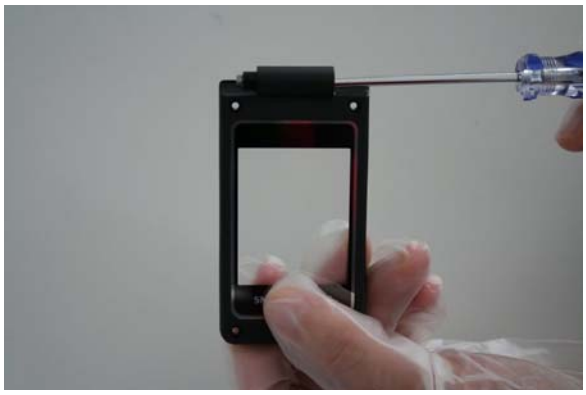
Step 18 	Remove the Keypad by using Tweezers.
Step 19 	Remove screws with the Torque – Screwdriver T5+. .
Step 20 	Remove Lower Lift Case Cap by using the Alternative Opening Tool carefully.

Step 21 	It is mandatory to place a Protection Foil onto the Display.
Step 22 	Disconnect the Flex Cable.
Step 23 	Remove the Camera Module by disconnecting it from the socket.

Step 24 	
Step 25 	It is mandatory to place a Protection Foil onto the Display to avoid scratches.
Step 26 	Remove Vibra carefully by using tweezers

Step 27 	
Step 28 	Remove hinge cap
Step 29 	

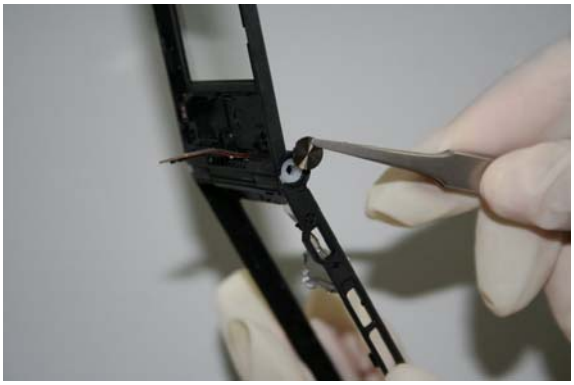
Step 30 	Use the Hinge Tool very carefully to remove the Upper Base Case Shell from the Lower Lift Case Shell.
Step 31 	Take care of the Flex Cable, it easily rips. .

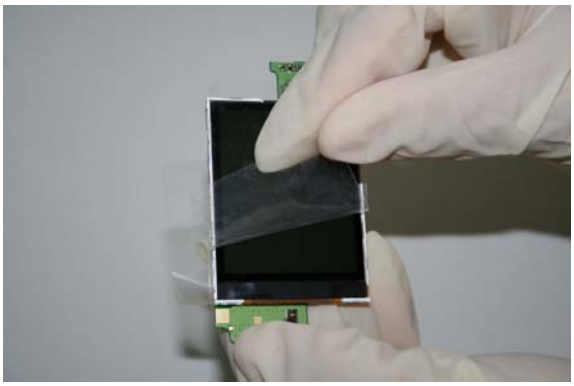
Step 32 	.
Step 33 	Remove the Ringer by using Tweezers carefully.

4 Assembly of EF71

Step 1 	Assemble the Hinge.
Step 2 	Assemble the Flex Cable. Take care of it!
Step 3 	Insert the Flex Cable into the Lower Lift Case Shell. .

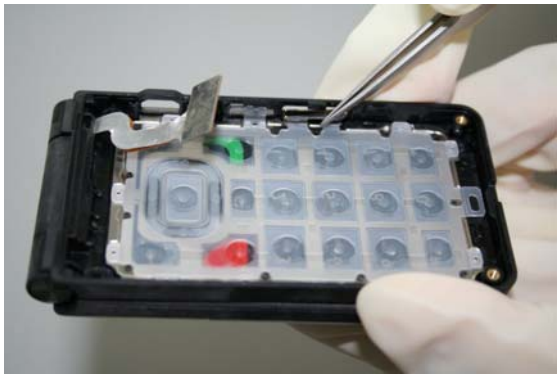
Step 4 	
Step 5 	Assemble the Lower Lift Case Shell and the Upper Base Case Shell by using the Hinge Tool.
Step 6 	Assemble the Lower Lift Case Shell and the Upper Base Case Shell by using the Hinge Tool.

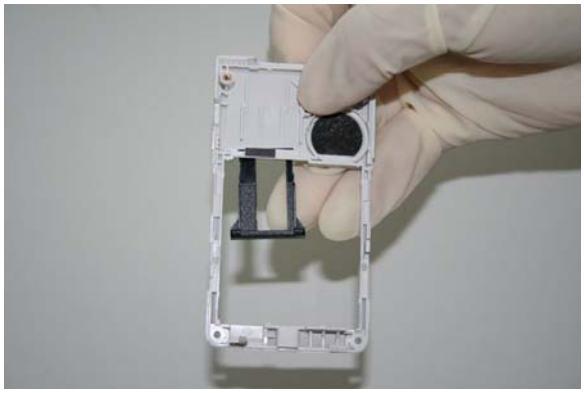
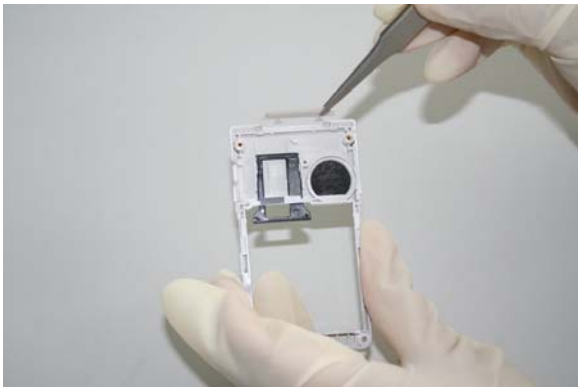
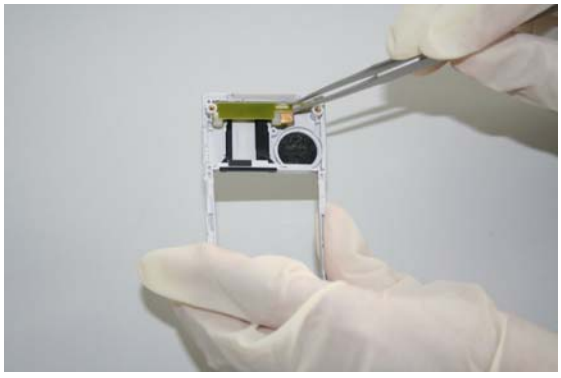
Step 7 	Assemble Screw Cover by using Tweezers.
Step 8 	
Step 9 	Assemble the vibra.

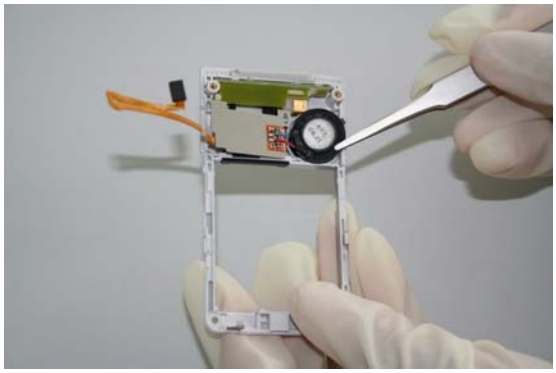
Step 10 	Remove Display Foil.
Step 11 	Assemble the Display Module. .
Step 12 	

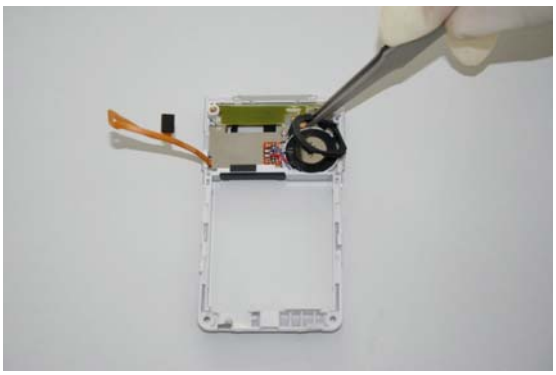
Step 13 	Assemble the Camera Module by connecting it to the socket.
Step 14 	Remove Display Foil.
Step 15 	Assemble Upper Lift Case and Lower Lift Case.

Step 16 	Place screws by using the Torque – Screwdriver T5+.
Step 17 	
Step 18 	Assemble Keypad.

Step 19 	Assemble the Side Key PCB by using Tweezers.
Step 20 	Assemble Keypad PCB.
Step 21 	

Step 22 	Assemble transflash card holder.
Step 23 	Assemble the Side Key by using Tweezers.
Step 24 	Assemble the antenna PCB by using Tweezers. .

Step 25 	Assemble the Ringer-Alert by using Tweezers.
Step 26 	Place screws by using the Torque – Screwdriver T5+.

Step 27 	Assemble rubber gasket.

Step 28 	Connect flex cable connector.
Step 29 	Assemble the Lower Base Case Shell.
Step 30 	Place screws with Torque – Screwdriver T5+.

Step 31 	Place screws with Torque – Screwdriver T5+.
Step 32 	. Assemble Battery.
Step 33 	Assemble Battery Cover.

5 BenQ Service Equipment User Manual

Introduction

Every LSO repairing BenQ handset must ensure that the quality standards are observed. BenQ has developed an automatic testing system that will perform all necessary measurements. This testing system is known as:

BenQ Mobile Service Equipment

- **For disassembling / assembling**

	**Torque – Screwdriver** **Part Number: F 30032 – P 228 – A1**
	**Opening tool** **(Case opening without destroying)** **Part Number: F 30032 – P 38 – A1**
	**Alternative Opening tool** **Part Number: F30032 – P583 – A1**
	**Tweezers**

- **For SW UPDATE**

	**Torque – Screwdriver** **Part Number: F 30032 – P 228 – A1**

- **For testing**

All mobile phones have to be tested with the GRT – Software. The service partner is responsible to ensure that all required hardware is available.

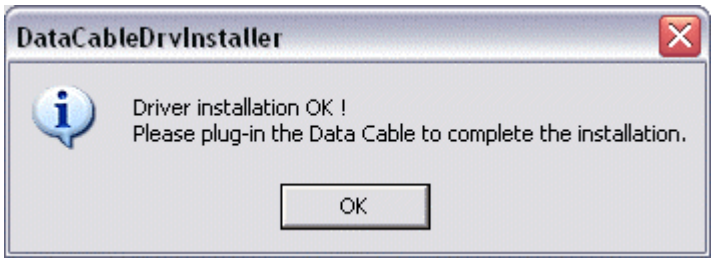
For additional Software and Hardware options as well as the supported GRT equipment, please check the GRT User manual.

6 Setup of the Software

Download of the required software:
Download the driver, the XCSD software mobile software (core-software and language files) from the Technical Support Page:

https://market.benqmobile.com/so/welcome.lookup.asp

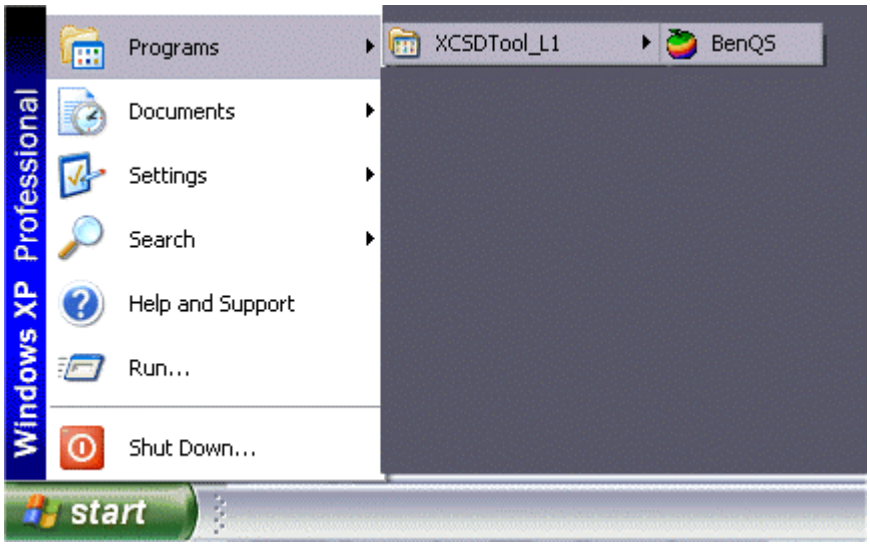
Installation of USB – Serial converter boot cable:
Start the “DataCableDrvInstaller.exe” file and follow the instructions of the installer.



Plug in the Data cable and follow the installation instructions to complete the process.

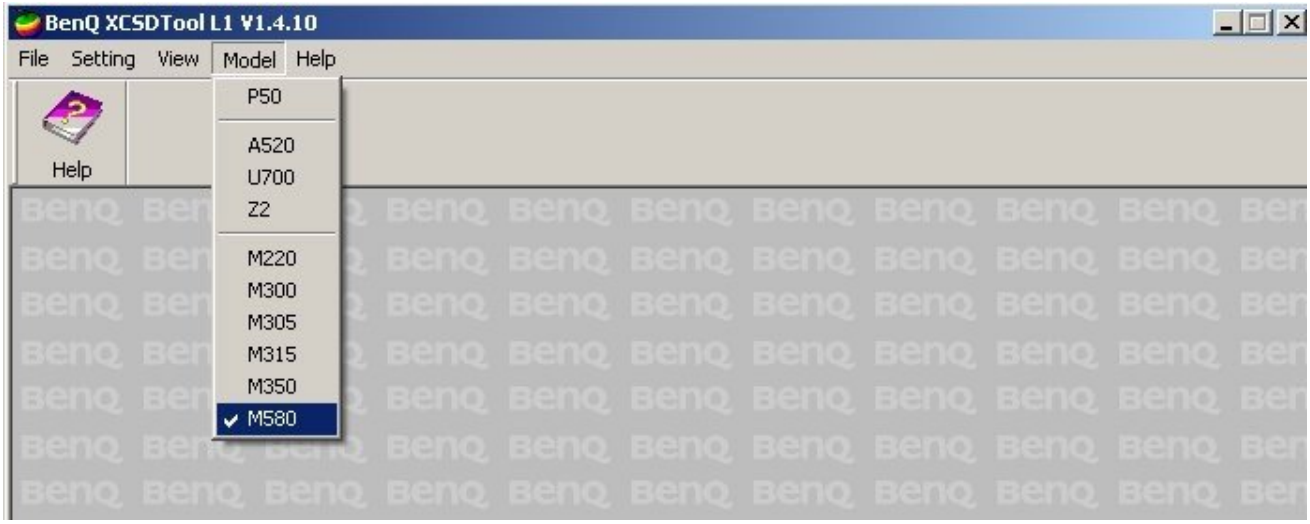
Check the Comport number of the data cable in the device manager.
(XCSD tool supports only Comport 1 to 10)

Installation of XCSD tool:
Start “setup.exe” file and follow the instructions.
The installer creates a shortcut in the start menu bar. Start – Programs – XCSDTool_L1 - BenQS

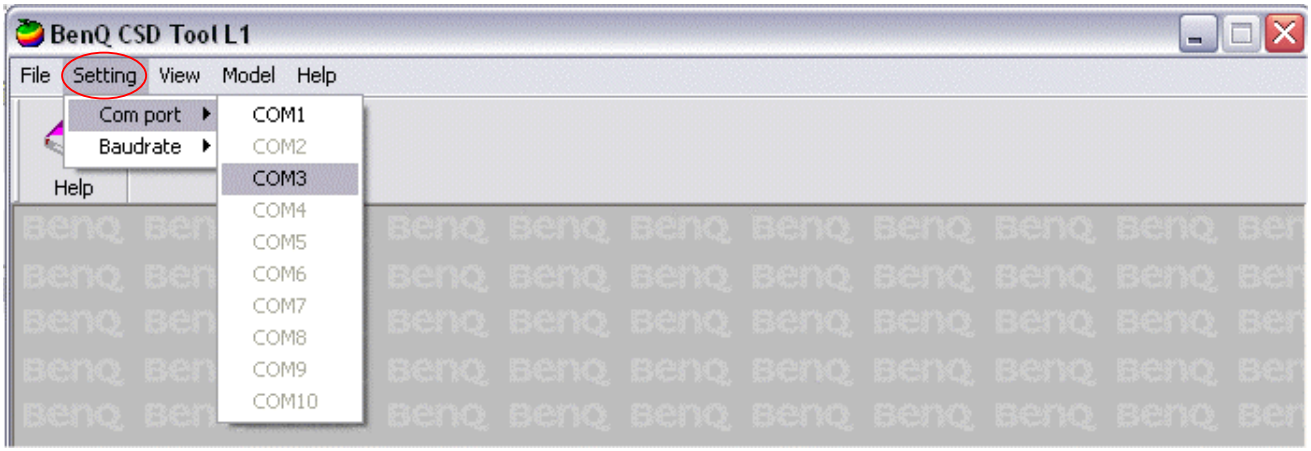


7 Software basic settings

- Start the software (BenQS.exe). The XCSD tool will be shown on the screen
- Select Model (for example see the screenshot below):

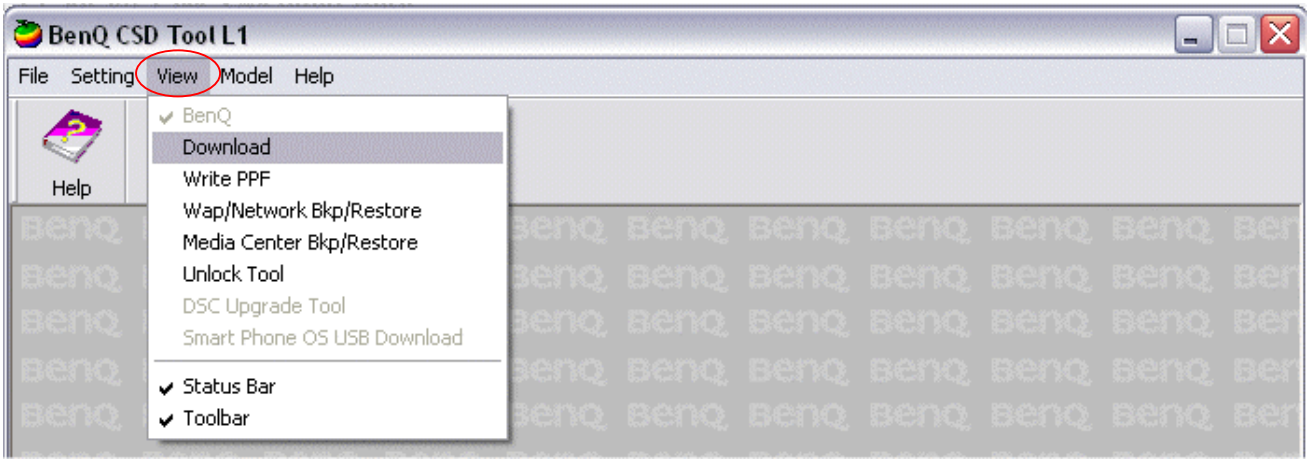


- Select Com port (Setting – Com port):

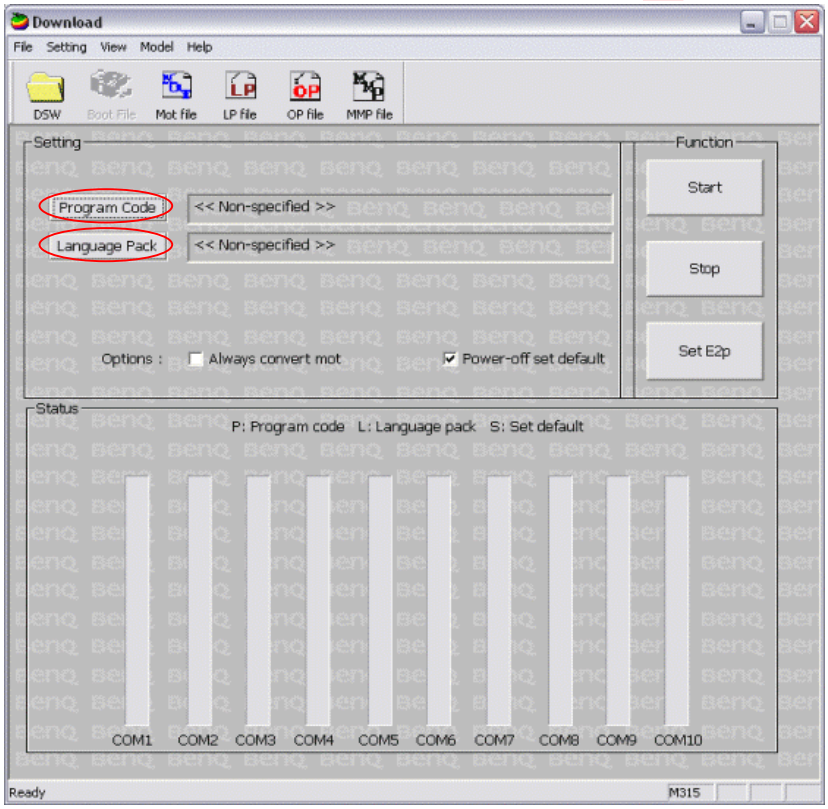


8 Software Download procedure

- Select Download Option (View – Download):



- Select Program Code (example: E22 1 11710.mot) and Language Pack (example E22 L 11711.mot)



Status bar colour scheme:

yellow	waiting for update
blue	update in progress
red	error occurred
black	Comport not available
green	Update successful

- Connect mobile phone with data cable. Phone must be switched off. Click on “Start” button and press the power on button on the handset to start the download. During download process status bar shows the state of the process of P = Program code, L = Language file and S = Set default (if activated). After successful SW download, the status bar of the used Com port is changed to green.

Erase of customer data:

Select the “Power-off set default” option to erase all customer data of the phone during the download process.

- Click the “Set E2p” to erase the customer data without software update.

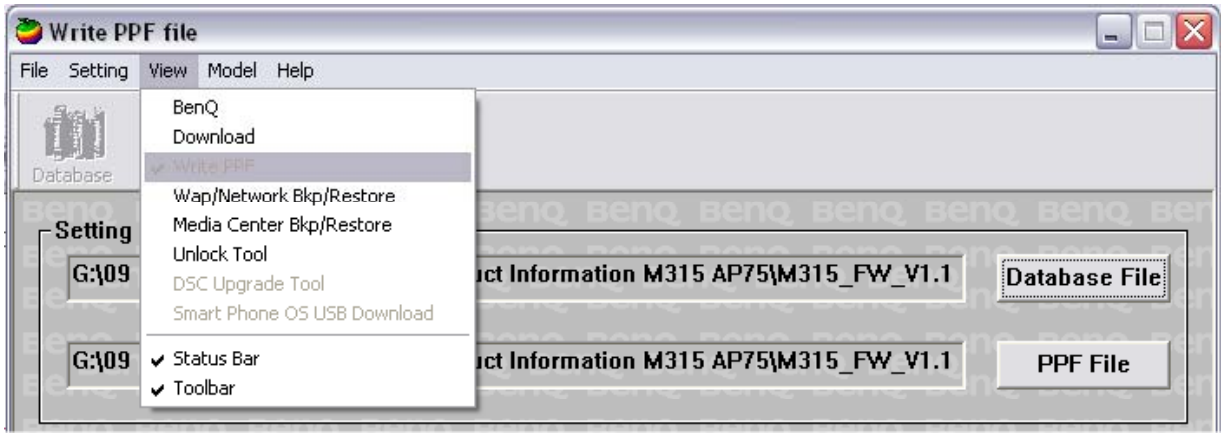
SW files naming rules:

Program Code E22111710
Language Pack E22L11711

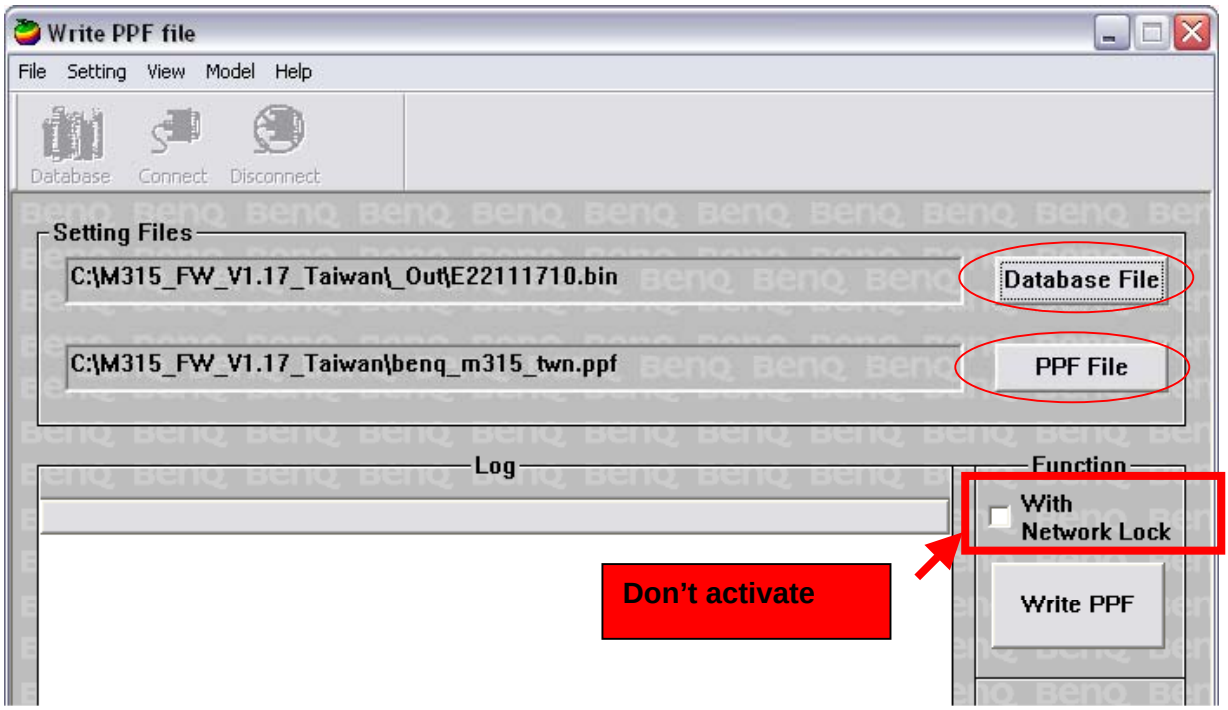
E22 Project name
117 Program Code
L Language Pack
117 Version 1.17
10/11 Program Code ID

9 Download PPF (Handset configuration)

- Select write PPF option (View – Write PPF):

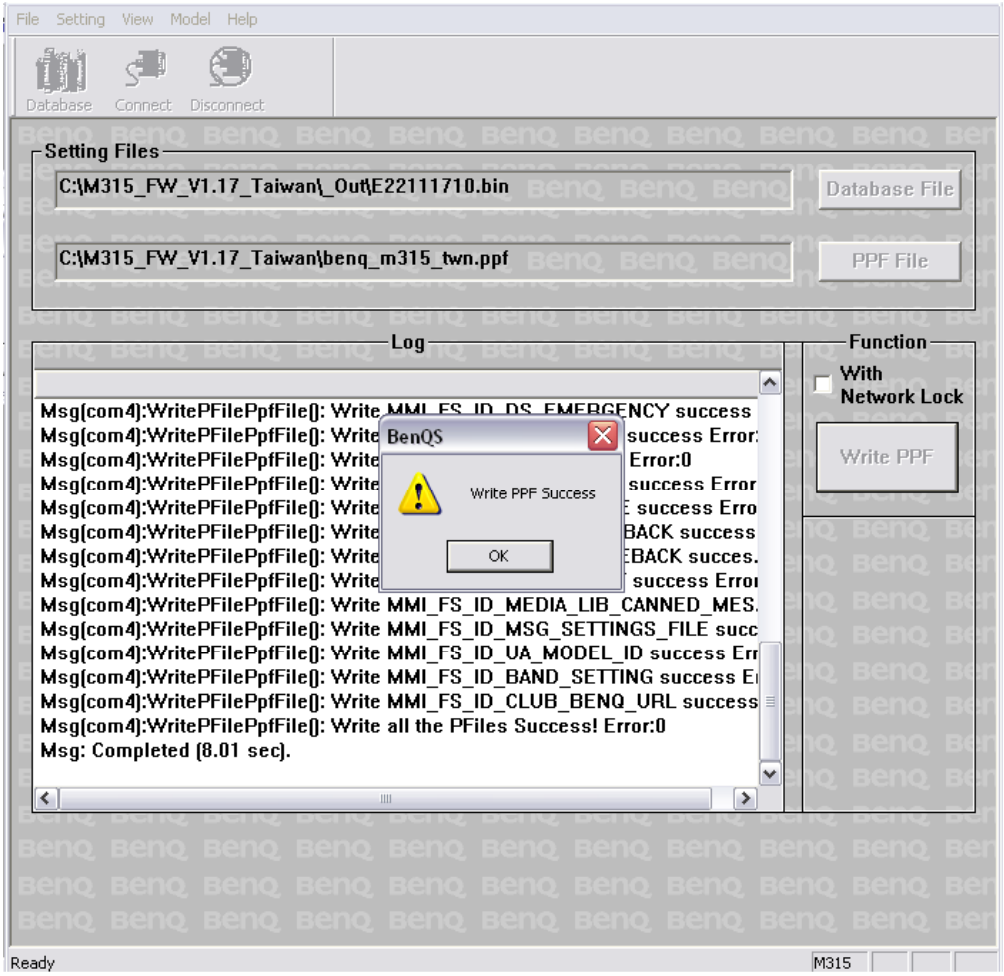


- Select Database File (example: E22111710.bin) and
  PPF File (example benq_m315_twn.ppf)



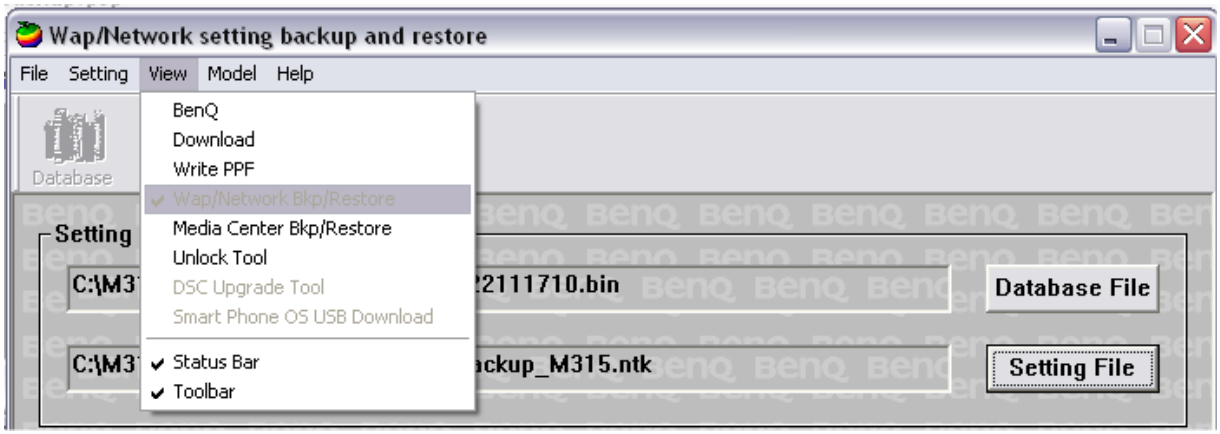
- Connect mobile phone with data cable. Phone must be switched on. Click to "Write PPF" button to start the process.

- Confirmation about successful write of PPF appears after process is completed.

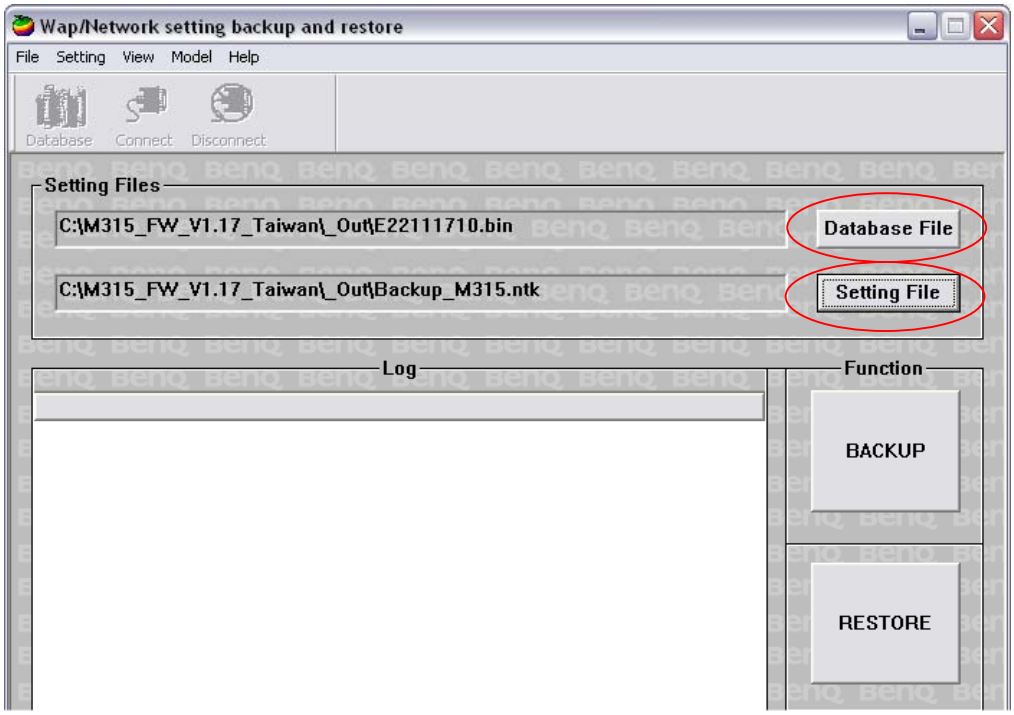


10 Backup and Restore of Wap and Network Setting

- Select Back and Restore of Wap and Network Settings option (View – Wap/Network Bkp/Restore):



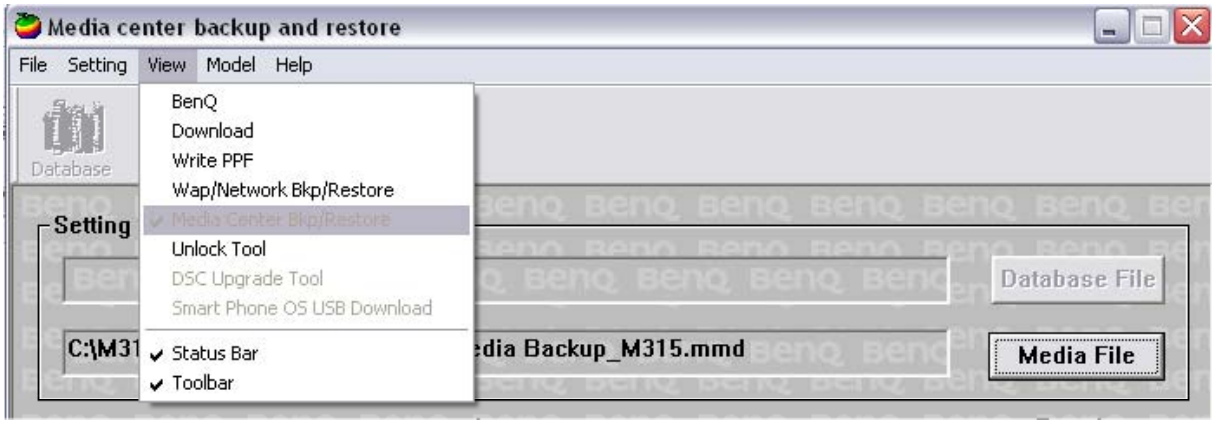
- Select Database File (example: E22111710.bin) and
  Setting File (create new txt file and rename it to ntk file for settings backup)



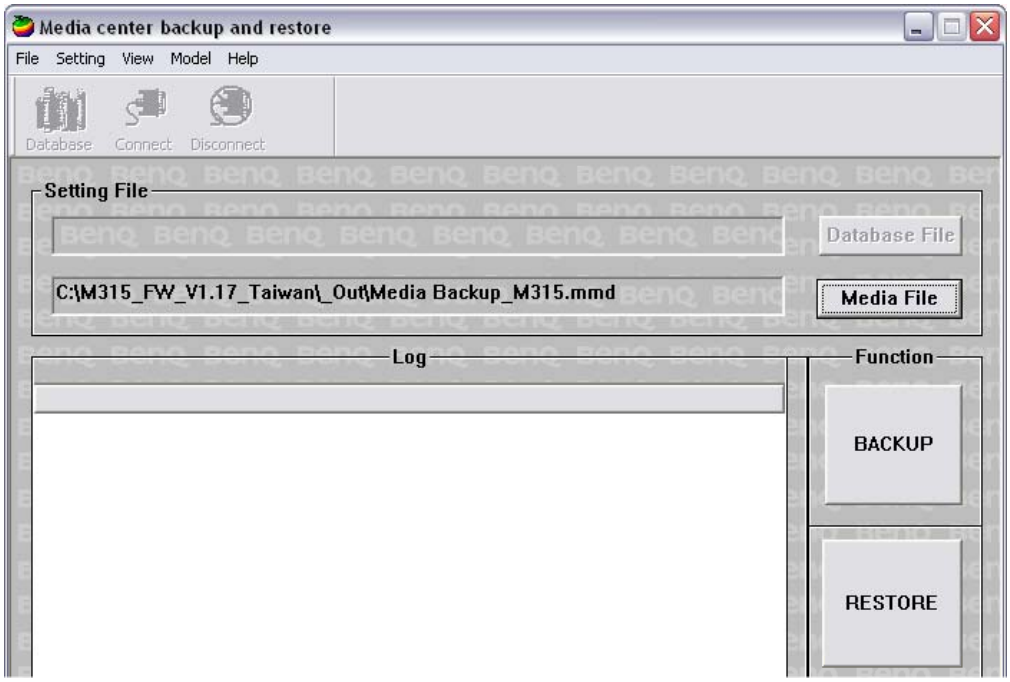
- Connect mobile phone with data cable. Phone must be switched off.
- Click to “Backup” button to start the transfer the settings into the selected file.
- Click to “Restore” button to start the transfer from selected file into handset.

11 Backup and Restore of Media Center content

- Select Back and Restore of Media center (View – Media center Bkp/Restore):



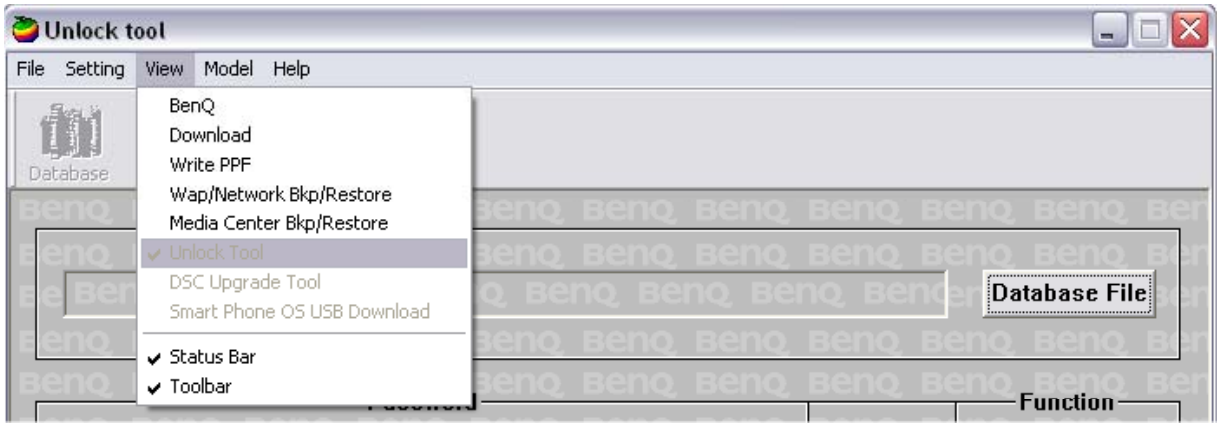
- Select Media File (create new txt file and rename it to mmd file)



- Connect mobile phone with data cable. Phone must be switched on.
- Click to “Backup” button to start the transfer the settings into the selected file.
- Click to “Restore” button to start the transfer from selected file into handset.

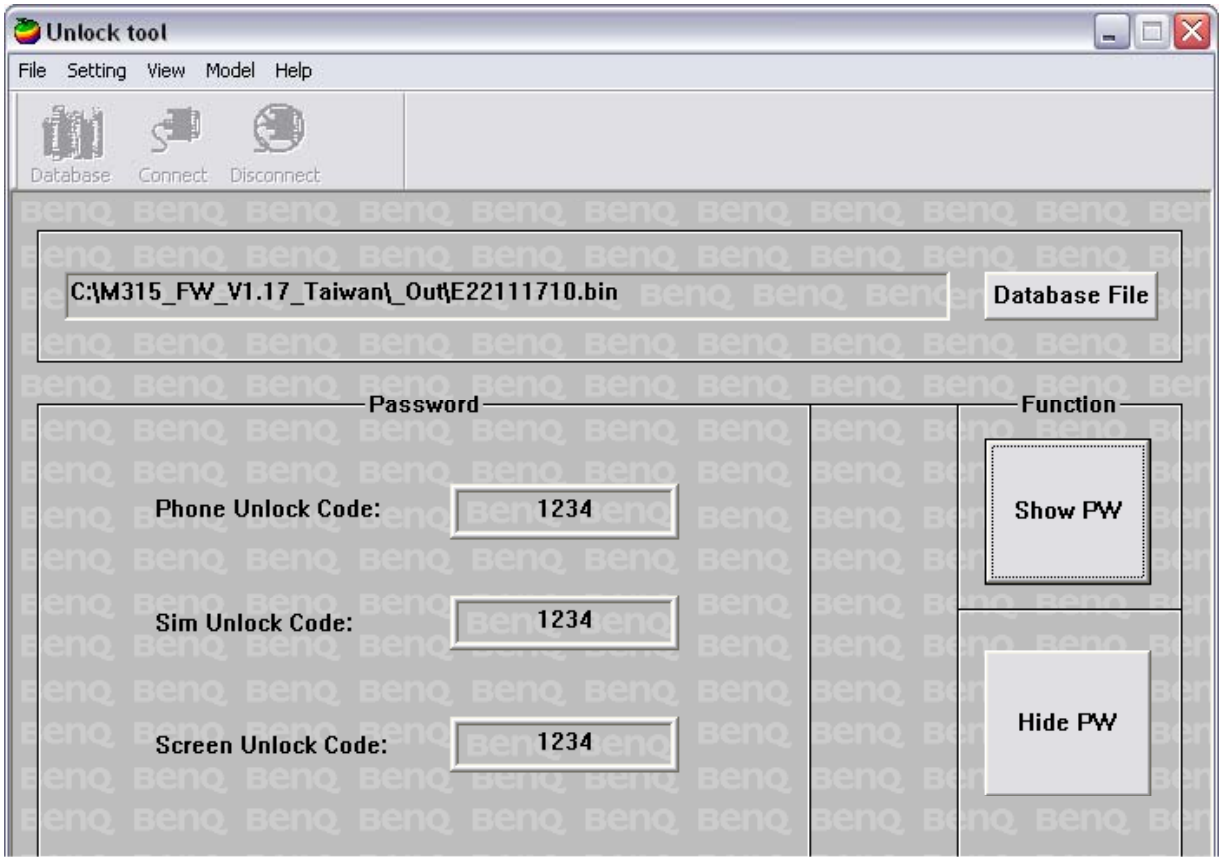
12 Unlock Tool

- Select Unlock tool function (View – Unlock Tool):

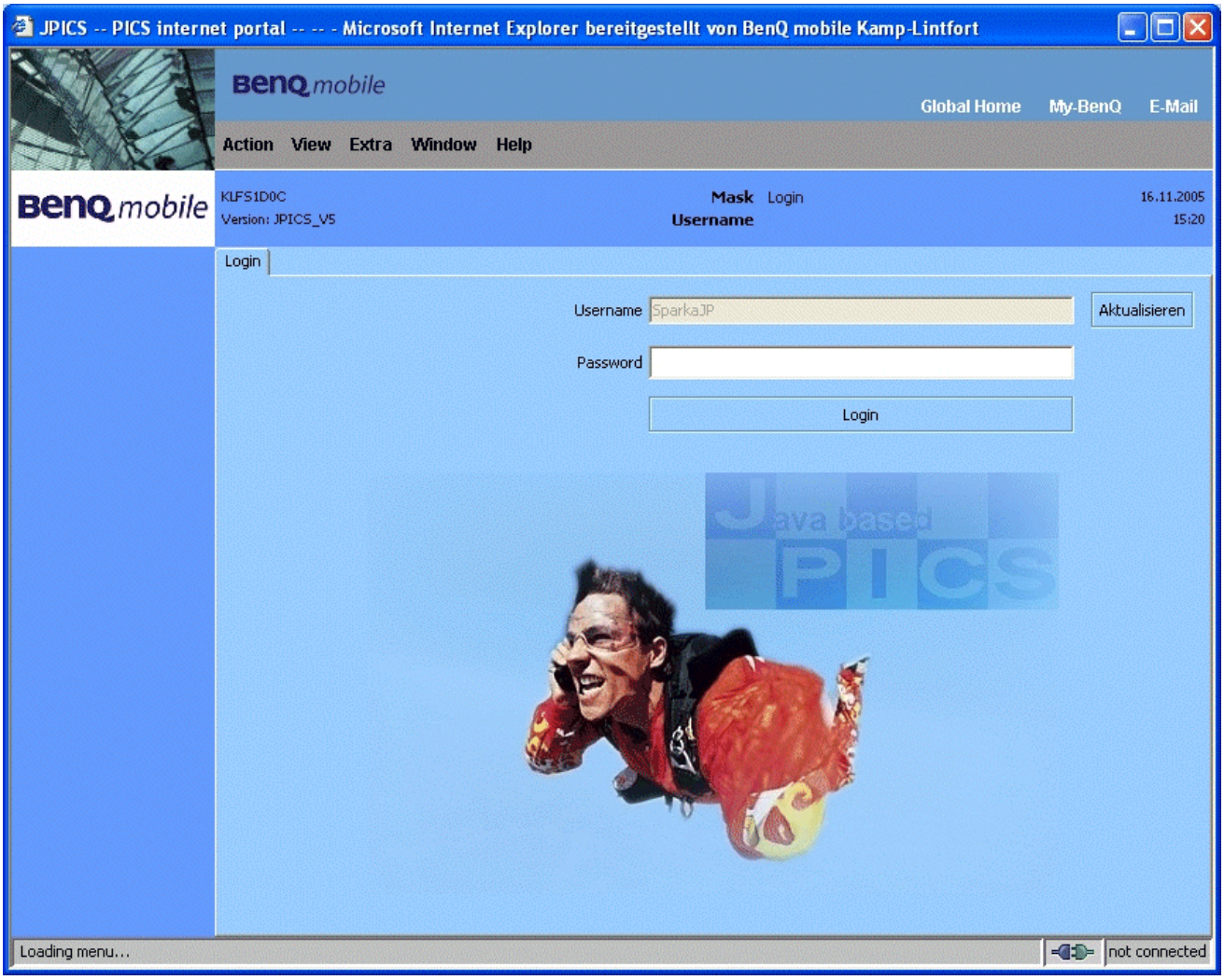


Select Database File (example: E22111710.bin)

- Click to “Show PW” button to get the codes.
- Unlock the codes in the mobile phone menu.
- Click to “Hide PW” button to hide the codes.



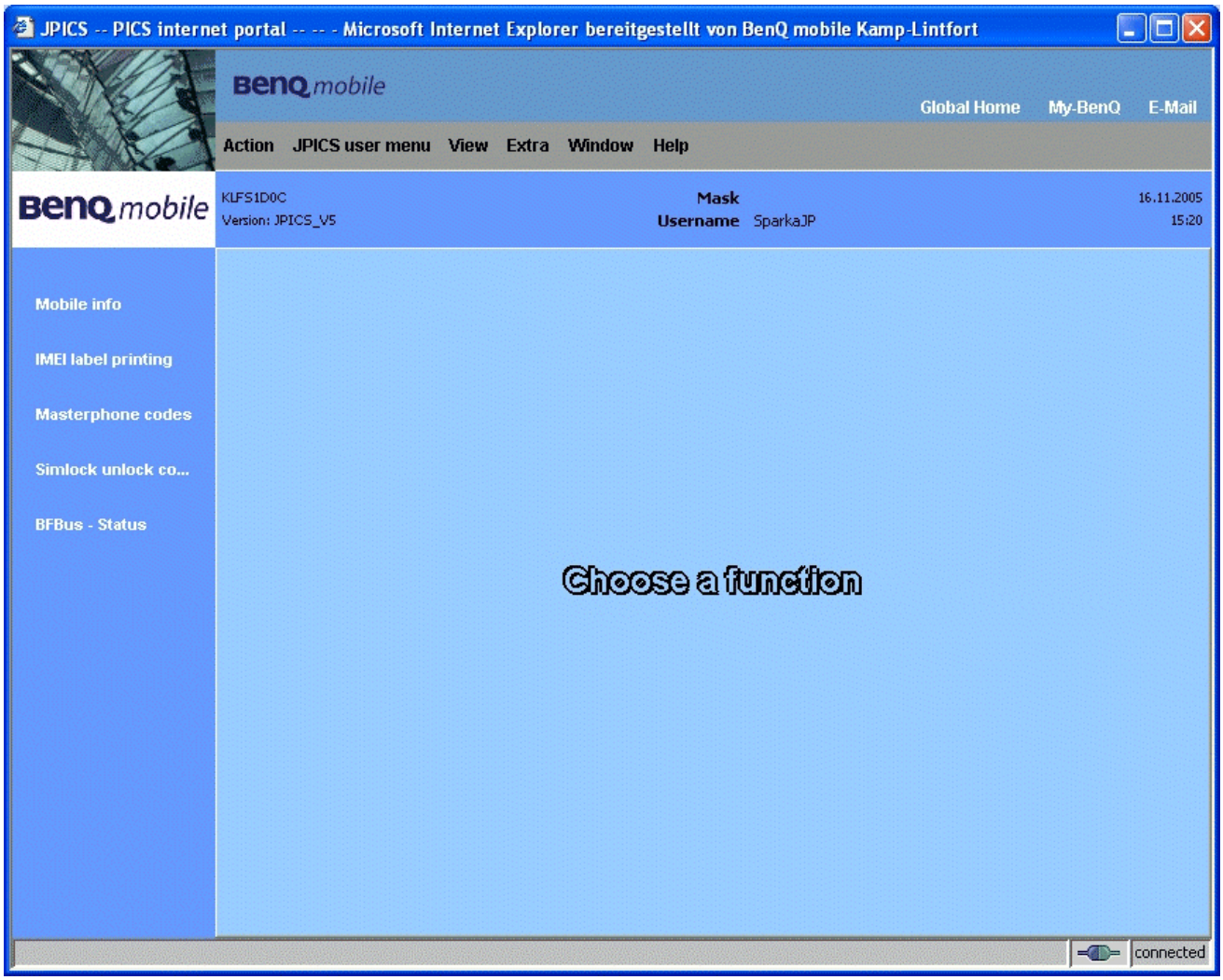
13 JPICS (Java based Product Information Controlling System)



Overview

The following functions are available for the LSO:

- General mobile information
- Generate PINCODE
- Generate SIMLOCK – UNLOCK – Code
- Print IMEI labels



The access to the JPICS server which is located in Kamp – Lintfort is protected by chip card and in addition using secure socket layer (SSL) connection.
The JPICS server is only available for authorized users with a specially coded smart card. These smart cards and the administration of the JPICS web server and the PICS database – server can only be provided by the JPICS – TRUST – Center of the responsible department in Kamp – Lintfort.
In case of any questions or requests concerning smart cards or administration of the databases please ask your responsible BenQ Customer Care Manager.

Installation overview

The following installation description assumes that a web browser is already installed.

JPICS is tested with the following browsers:

1. Internet Explorer Version 5.5 and higher
2. Netscape Version 6 and higher

For further information regarding supported browsers, browser version and supported operating systems, see the Sun FAQ's.

Here is a step by step instruction to install all the required components:

It is necessary to follow this order!

1. Smart Card Reader (Omnikey: Cardman 2020 USB or Cardman 3121 USB)
2. CardOS interface (Siemens Version 3.0 B)
3. Java Runtime Environment (Sun)
4. Java additional components

Every user is responsible for a proper installation matching the license agreements.

For installation and further access you need the following:

1. The JPICS Installation – CD
2. The Smart Card JPICS.

Remark: We recommend using Cardman 2020 USB or Cardman 3121 USB. Serial card readers are not supported!!!

Generate Codes

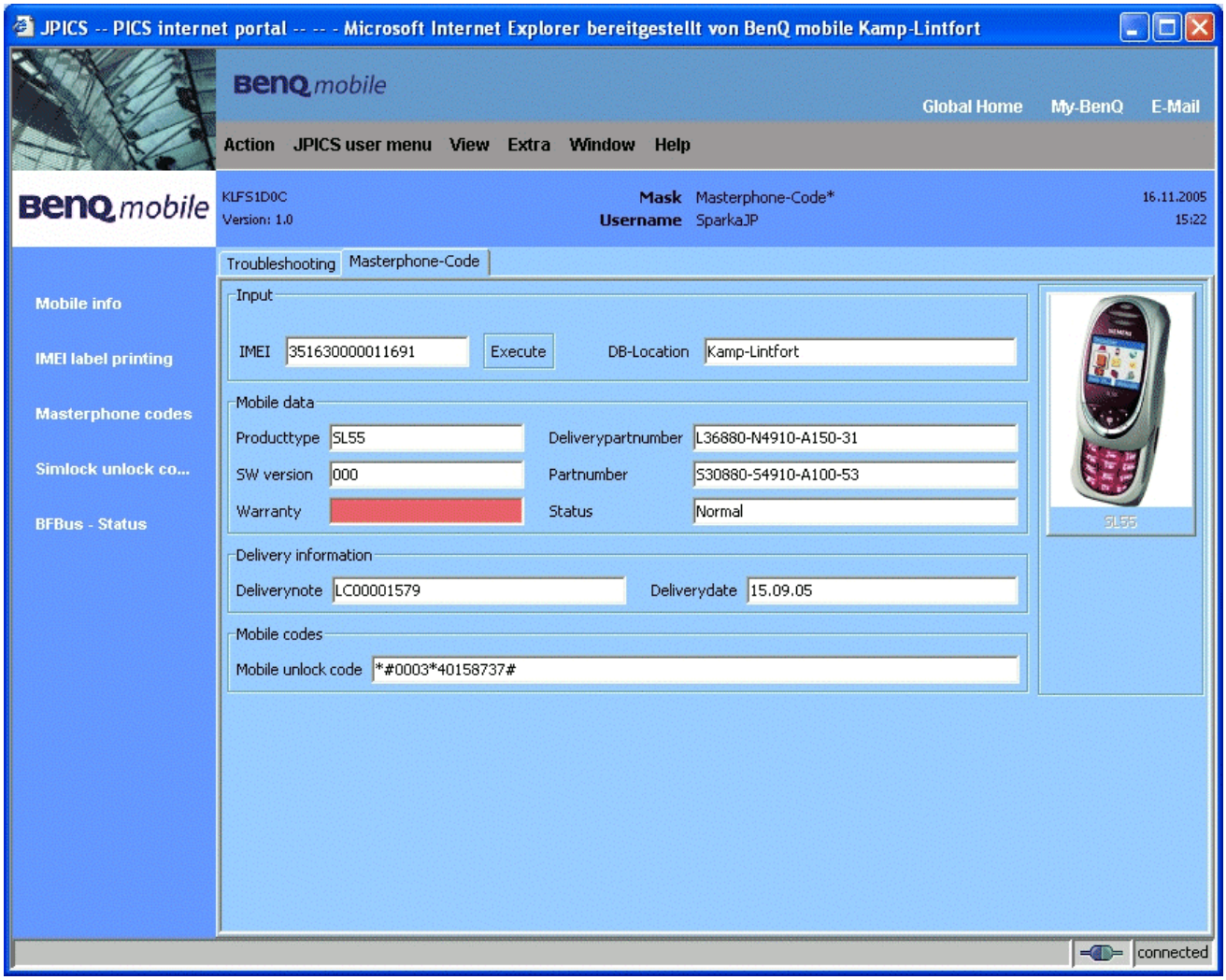
In the JPICS application you can choose to generate:

- **Masterphone codes**
- **Simlock – Unlock – Codes**

Masterphone codes

The **Masterphone code** is used to unlock blocked mobiles.

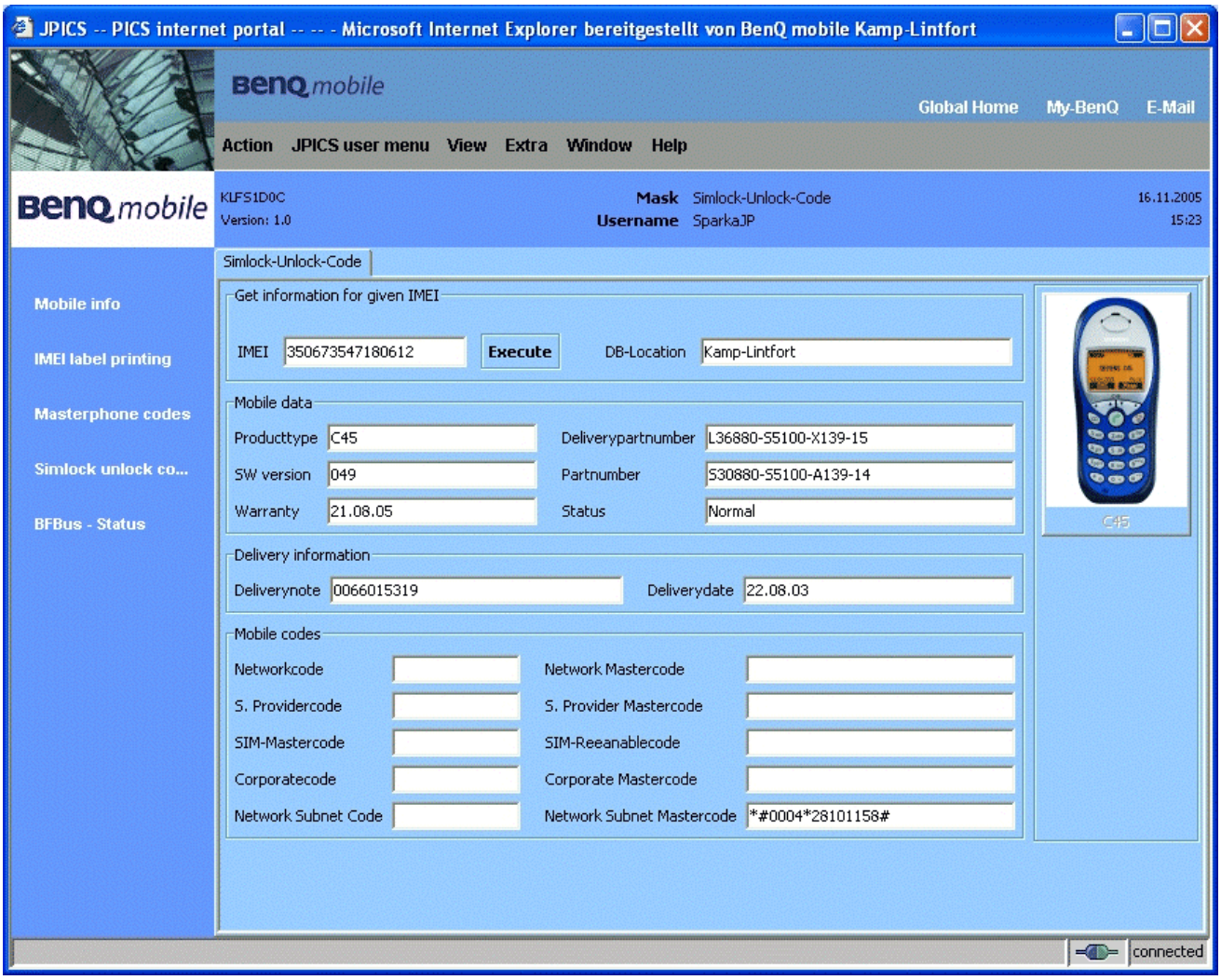
Masterphone codes can only be supplied for mobiles which have been delivered in a regular manner.



Simlock – Unlock – Code

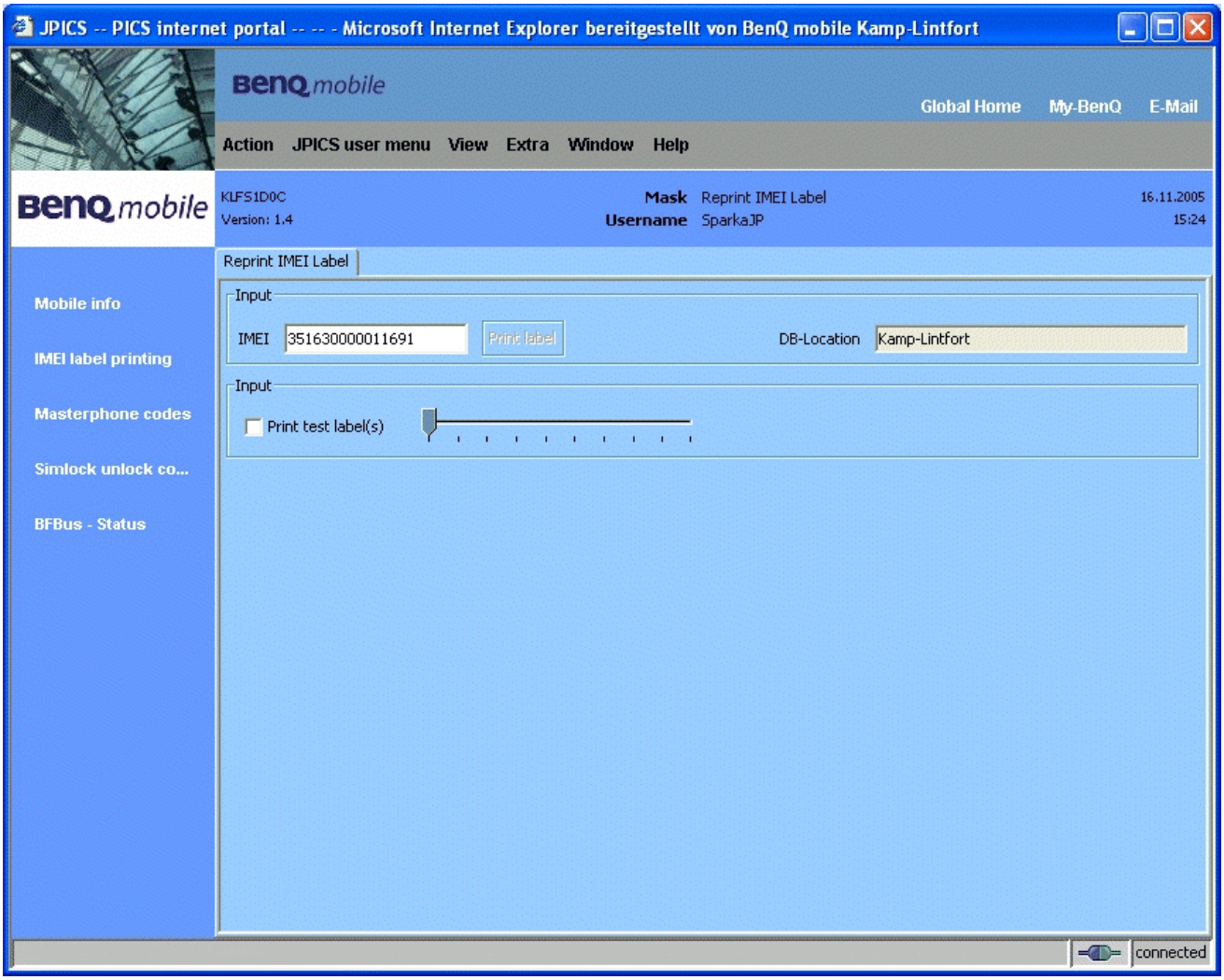
The **Simlock – Unlock – Codes** can only be generated if the following conditions are given:

- Mobile must have an active **Simlock** inside.
- The user must be given the authorization to obtain **Simlock – Unlock – Codes** for the variant of the operator to which the mobile was delivered last time.



Printing IMEI label

The module **"printing IMEI label"** offers the possibility to re-print IMEI labels for mobiles again.



You are able to print 1 label in just one step.

To prevent that misaligned labels are being printed, the setting "Print test labels = ✓" is activated by default. After having printed a well aligned test label you can uncheck the setting and print the correct label.

Hint:

For correct printing of IMEI labels you must have a **Zebra – label printer** with special material that fits for label printing. This printer has to be connected to local LPT1 printer port

(also see Installation of IMPRINT) and MUST feature a printing resolution of 300dpi.

14 International Mobile Equipment Identity, IMEI

The mobile equipment is uniquely identified by the International Mobile Equipment Identity, IMEI, which consists of 15 digits. Type approval granted to a type of mobile is allocated 6 digits. The final assembly code is used to identify the final assembly plant and is assigned with 2 digits. 6 digits have been allocated for the equipment serial number for manufacturer and the last digit is spare.

CF61 series IMEI label is accessible by removing the battery.

Re – use of IMEI label is possible by using a hair – dryer to remove the IMEI label.

Date code is shown on IMEI label: Detailed description on how to read date code is given in Annex 2.

To display the IMEI number, exit code and SW/HW version, key: * # 300 #
Code *#301# activates self diagnosis.

15 General Testing Information

General Information

The technical instruction for testing GSM mobile phones is to ensure the best repair quality.

Validity

This procedure is to apply for all from Siemens AG authorized level 2 up to 2.5e workshops.

Procedure

All following checks and measurements have to be carried out in an ESD protected environment and with ESD protected equipment/tools. For all activities the international ESD regulations have to be considered.

Get delivery:

- Ensure that every required information like fault description, customer data a.s.o. is available.
- Ensure that the packing of the defective items is according to packing requirements.
- Ensure that there is a description available, how to unpack the defective items and what to do with them.

Enter data into your database:

(Depends on your application system)

- Ensure that every data, which is required for the IRIS-Reporting is available in your database.
- Ensure that there is a description available for the employees how to enter the data.

Incoming check and check after assembling:

!! Verify the customers fault description!!

- After a successful verification pass the defective item to the responsible troubleshooting group.
- If the fault description can not be verified, perform additional tests to save time and to improve repair quality.
  - Switch on the device and enter PIN code if necessary unblock phone.
  - Check the function of all **keys** including **side keys.**
  - Check the **display** for error in line and row, and for illumination.
  - Check the **ringer/loudspeaker** acoustics by individual validation.
  - Perform a **GSM Test** as described on page 36.

Check the storage capability:

- Check internal resistance and capacity of the battery.
- Check battery charging capability of the mobile phone.
- Check charging capability of the power supply.
- Check current consumption of the mobile phone in different mode.

Visual inspection:

- Check the entire board for liquid damages.
- Check the entire board for electrical damages.
- Check the housing of the mobile phone for damages.

SW update:

- Carry out a software update and data reset according to the master tables and operator/customer requirements.

Repairs:

The disassembling as well as the assembling of a mobile phone has to be carried out by considering the rules mentioned in the dedicated manuals. If special equipment is required the service partner has to use it and to ensure the correct function of the tools.
If components and especially soldered components have to be replaced all rules mentioned in dedicated manuals or additional information e.g. service information have to be considered

GSM Test:

With the availability of the GRT Test /Alignment software, this tool has to be used to perform the outgoing test!

>Connect the mobile/board via internal antenna (antenna coupler) and external antenna (car cradle/universal antenna clip) to a GSM tester

>Use a Test SIM

For Triple Band phones use a separate test case, if the test software allows only one handover.

Skip the GSM Band test cases if not performed by the mobile phone

Example: 1. Test file Band 1 = GSM900 / Band 2 = GSM1800
2. Test file Band 1 = GSM1900

Internal Antenna				
Test case		Parameter	Measurements	Limits
1	Location Update	• GSM Band 1 • BS Power = -55 dBm • middle BCCH	• Display check	• individual check
2	Call from BS	• low TCH • highest PCL • BS Power = -75 dBm • middle BCCH	• Ringer/Loudspeaker check	• individual check
3	TX GSM Band 1	• low TCH • highest PCL • BS Power = -75 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
4	Handover to GSM Band 2 Including Handover Check			
5	TX GSM Band 2	• low TCH • highest PCL0 • BS Power = -75 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
6	Call release from BS			

External Antenna				
7	Call from MS	• GSM900 • high TCH • second highest PCL • BS Power = -75 dBm • middle BCCH	• Keyboard check	• individual check
8	TX GSM Band 1	• high TCH • second highest PCL • BS Power = -75 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
9	RX GSM Band 1	• high TCH • BS Power = -102 dBm • 50 Frames • middle BCCH	• RX Level • RX Qual • BER Class Ib • BER Class II • BER Erased Frames	• GSM Spec.
10	Handover to GSM Band 2 Including Handover Check			
11	TX GSM Band 2	• high TCH • second highest PCL • BS Power = -75 dBm • middle BCCH	• Frequency Error • Phase Error RMS • Phase Error Peak • Average Power • Power Time Template	• GSM Spec.
12	RX GSM Band2	• high TCH • BS Power = -102 dBm • 50 Frames • middle BCCH	• RX Level • RX Qual • BER Class Ib • BER Class II • BER Erased Frames	• GSM Spec.
13	Call release from MS			

Final Inspection:

The final inspection contains:

1) A 100% network test (location update, and set up call).

2) Refer to point 3.3.

3) A random sample checks of:

- Data reset (if required)
- Optical appearance
- complete function

4) Check if PIN-Code is activated (delete the PIN-Code if necessary).

Basis is the international standard of **DIN ISO 2859**.

Use Normal Sample Plan Level II and the Quality Border 0,4 for LSO.

Remark: All sample checks must be documented.

Annex 1

Test SIM Card

There are two different “Test SIM Cards” in use:

1) Test SIM Card from the company **“ORGA”**

   Pin 1 number: 0000
   PUK 1 : 12345678

   Pin 2 number: 0000
   PUK 2 : 23456789

2) Test SIM Card from the company **“T-D1”**

   Pin 1 number: 1234
   PUK : 76543210

   Pin 2 number: 5678
   PUK 2 : 98765432

Annex 2

Device Date Code overview

GSN rule:
(ex: GS11500001TG0)

GS	1	9	5	00001	TG0
Big class	Date	Month	Year	S/N	Factory

Code	Meaning	Content
D	Date	1~9, A=10, B=11, C=12, D=13, E=14, F=15, G=16, H=17, J=18, K=19, L=20, M=21, N=22, P=23, R=24, S=25, T=26, V=27, W=28, X=29, Y=30, Z=31 (Don't use: 0, I, O, Q, U)
M	Month	1=Jan, 2=Feb, 3=Mar, 4=Apr, 5=May, 6=Jun, 7=Jul, 8=Aug, 9=Sep, A=Oct., B=Nov, C=Dec
Y	Year	Last digit of Year (Christian era) ex. Year 2004 → "4"

Based on the definition above, GSC55... below means 2005/05/12.