PHILIPS

Philips Consumer Communications

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SERVICE MANUAL

Repair for Cellular Telephone

XENIUM DUAL BAND

LEVEL 1

Service Manual

Last updates:

DATE	MODIFICATION	PAGE
19/06/2000	CREATION	
Revision 2 : 26/07/2000	- Modification of components list	Page 23

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1.0 PURPOSE

This document establishes the functional test and inspection procedures for the first level service repair of the XENIUM DB transceiver

2.0 SCOPE

The test plan is applicable to all levels of service repair of the XENIUM DB transceiver

3.0 REFERENCE

4.0 GLOSSARY/ACRONYM LIST

Window or Bezzel	Protective plastic over the LCD display
SW	Software
PN	Hardware Configuration of the Mobile
CN	Matrix for Types of SW used on the different hardware
HW	Hardware
ASC	Authorized Service Center
NSC	National Service Center
Test SIM Card	Used for functionality of PHILIPS Mobiles
Test SIM Card “SP”	SIM Card that is used to stimulate the user interface and allow radio tests

5.0 TEST EQUIPMENT AND TOOLS

Equipment / Tools

Production Test SIM Card - Part No. : 4311 255 00781
Test SIM Card “SP” - Part No. : 4311 255 00782
RF Cable - Part No. : 941-555-1 (AMP).
Digital Multimeter - Recommended Model : Fluke
Specification with current reading in mA.
Digital Radiocommunication Tester.

6.0 TEST AND INSPECTION PLAN

The test plan is derived from the Product Test Reference for XENIUM DB.

6.1 User Interface Test

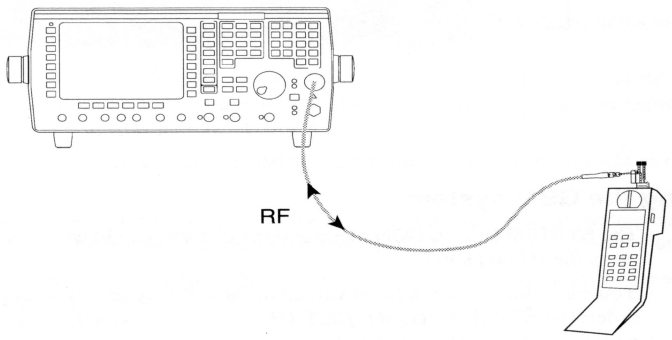
Use the Test SIM card “SP” / Production to test the transceiver as follows :

- On/off Button
- LCD Backlight
- Keyboard Test
- Buzzer Test
- Audio Test
- Antenna Test (levels 5 &10)
- LCD
- LED Test (On/Off)
- IMEI
- Tester Status/Eeprom Status

With a fast charger connected with the PRODUCT’s bottom connector, check the full scrolling from one mode to the next when charging IGN (Ignition)-Battery.

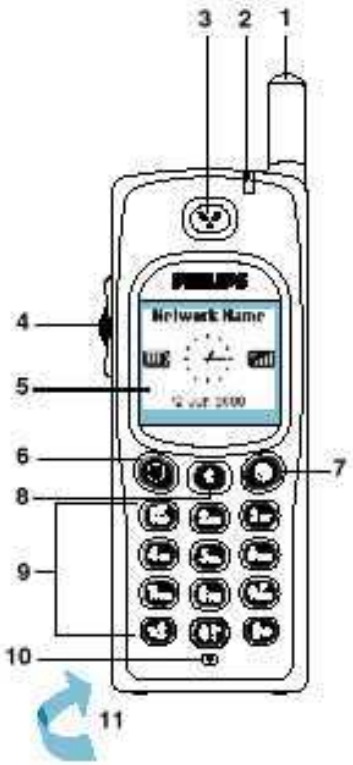
6.2 RF Test

The radio test must be performed with a Digital Radio Test Set connected to the mobile RF connector with the specific RF cable



7.0 BEFORE STARTING

7.1 Description of the transceiver



1 Antenna

2 LED
- *Green flashing slowly* - means the phone is registered with a network.
- *Green flashing quickly* - means a call has been received but not yet answered.
- *Red flashing* - means the battery is low.

3 Earpiece

4 Pilot Key
It allows fast and easy access to the different menus and allows you to confirm your choice.
- During a call, it controls the volume.
- In the Names list, menus or lists it scrolls up or down.
- When entering a name or number, it is used to move the cursor left or right.
- To return to the previous menu by pressing and holding it. To validate by pressing and holding it in an editor screen.

5 Graphic display

6 Green key symbol
- Press to accept a call or dial a number.
- Press and hold in idle screen to launch the WAP browser.
- Press in WAP mode to select the left option box displayed at the bottom of the screen.

7 Red "Hang up" and "On / Off" key symbol
- Press to switch your phone on, press and hold to turn your phone off.
- Press to end a call.
- Press in WAP mode to select the right option box displayed at the bottom of the screen.

8 Cancel key
Navigation mode:
- Press this key to return to the previous menu.
- Press and hold it to return to the idle screen.

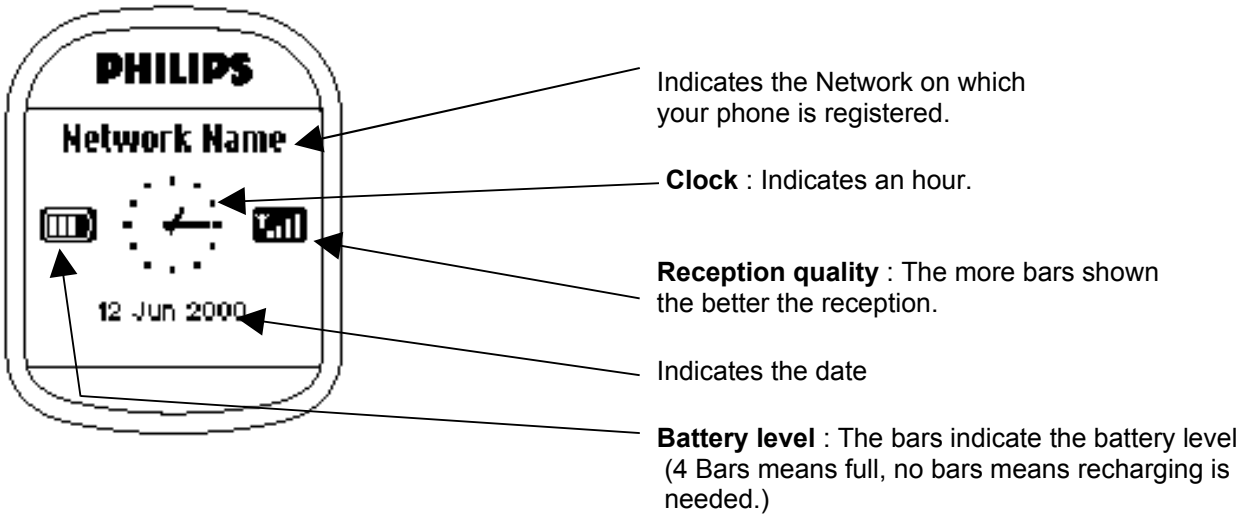
Edition mode:
- Press this key to delete a character.
- Press and hold it to delete all the characters.

9 Alphanumeric keypad
Standard phone keypad. It can also be used for entering alphabetic characters and activating hotkeys.

10 Microphone

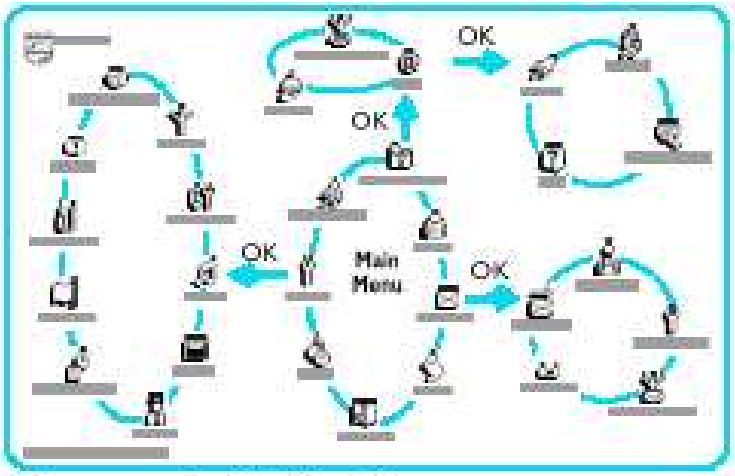
11 Battery and micro SIM card

7.2 Description of the display



7.3 Using The Carousel

The carousel is a circular loop of icons displayed on the screen. These icons provide access to the different menus and sub menus used to operate your phone.



You can use the Pilot Key in 3 ways:

- by moving it upwards
- by moving it downwards
- by pressing it in

When you switch on your phone, the idle screen appears. To access the main menu, press the Pilot Key.

When you move the Pilot Key the carousel moves across the screen:

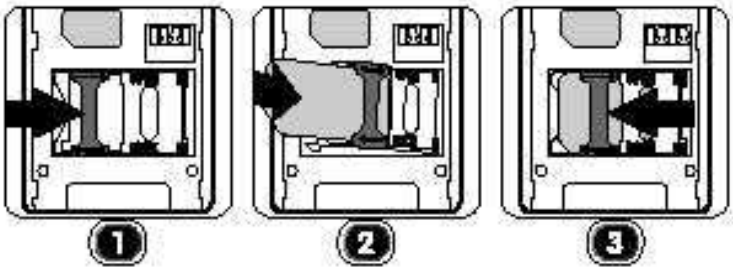
- upwards the icons scroll clockwise.
- downwards the icons scroll anti clockwise.

The Pilot Key provides access to all the menus used to operate your phone. To select a function, place the icon above the cursor ▲ and press the Pilot Key.

With the Pilot Key you can select or adjust all the functions of your phone (see Menu Memory Jogger cards and see the manual for details of menus pages 24 and 25).

7.4 Inserting the MICRO-SIM card

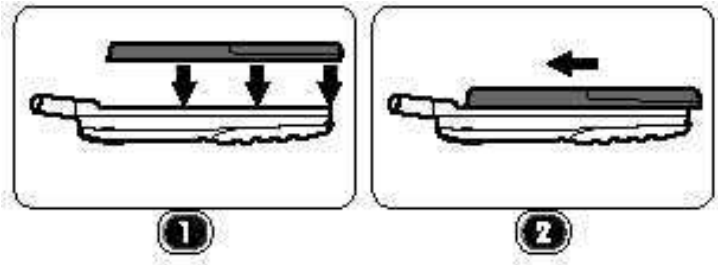
7.4.1 The mobile supports only the mini “plug-in” SIM card.
Push the metal retaining clip to the right and lift the cardholder. Slide in the SIM card between the retaining clip and the plastic tongue with the cut corner of the card at the top left. Close the cardholder and push the retaining clip to the left.



7.5 Inserting on the battery

7.5.1 Place the battery on the back of the phone (connectors downward, the top near the arrow inside the case).

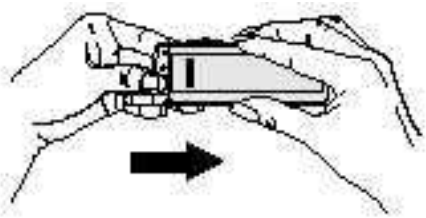
7.5.2 Then push the battery into place in the direction of the antenna.



7.6 Removing the battery

7.6.1 Press the locking button located alongside the antenna while pushing the battery in the direction of the arrow.

7.6.2 Remove battery.



7.7 Charging the battery

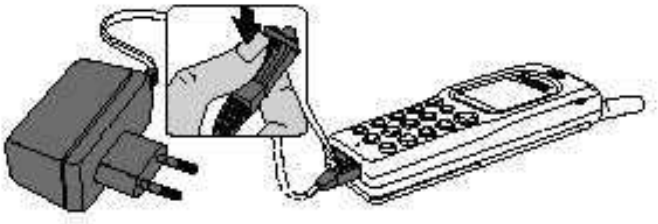
7.7.1 Plug the battery onto the transceiver

7.7.2 Plug the charger into the connector at the base of the transceiver.

7.7.3 Plug the transformer unit into the main AC power sockets.
7.7.4 The battery charge symbol indicates the state of the charge process :

- Bars moving - means the battery is being charged
- Steady - means the battery is fully charged

If the battery is totally discharged, the battery icon will show and start scrolling 2 to 3 minutes only after connecting to the charger.



8.0 TEST PROCEDURES

8.1 Initial Functional check for TCD989/J XENIUM

8.1.1 Insert the Test Production Card into the SIM Reader at the back of the cellular phone and clip a charged battery on the phone.
8.1.2 Press the «ON» button for 2 seconds at least and the LCD will show a message which contains information of FA and 12NC. (see
8.1.3 Follow the instructions as mentioned below :

Step	Procedure		Observation
1	Press Key 1 Press Key 1 again		Continue Buzzer signal Left corner displays 1 00
2	Press key 2 (Audio loop local effect) Press key 2 again		"LocalEffect" " XX XX " Left corner displays 2 01
3	Press key 3 Audio loop test (Speak to Mic and listen echo from Speaker) Press key 3 again.		"AUDIO xx xx xx " "EEP x xx xx xx " Left corner displays 3 02
4	Press key 4 (LEDs Test) Check for the Backlight function in the same time. Press key 4 again		Red and green LED blinking Left corner displays 4 03

5	Press Key 5 (Checkerboard test) Press Key 5 again		Checkerboard 1 pixel on Left corner displays 5 04
6	Press Key 6 (Inverted Checkerboard) Press Key 6 again		Checkerboard 2 pixel on Left corner displays 6 05
7	Press Key 7 Press key 7 again		All pixels and hard icons on Left corner displays 7 06
8	Press key 8 (Eeprom Status) Press Key 8 again		"EEPROM STAT" (Must be Good) H-XXXX-XXXX (Eeprom Status) L-XXXXXX-XX SimLk XXXXX (Sim lock Status) Left corner display 8 07
9	Press Key 9 Product information Compare information with label printed on back case Press key 9 again		“PROD INFO” “XXXXXXXXX” (Product 12NC) “XXXXXXXX” (PN Number) VY made in Le Mans SA made in Singapore EO made in Shenzhen Left corner displays 9 08
10	Press key 0 Press key 0 again		“ADC MEASURES” “XXXX XXXX” “XXXX XXXX” Left corner displays 0 09
11	Press * (IMEI Test) Compare IMEI with label printed on back case Press * again		"IMEI TEST" " XXXXXX/ 50 / XXXXXXX" for (TCD989/J) 06 made in Singapore 50 made in Le-Mans 69 made in China Left corner displays * 12

12	Press # (FA Status) Press # again		"FA/12NC" FA GOOD (Must be good) X XXXXXXXXXXX (12NC) Left corner displays # 13
13	Press C Press C again		Key without Test Left corner displays C 14
14	Go to the UP with the Scanswitch (Melody Test) Go to the UP again		User Melody Left corner displays 0A
15	Go to the DOWN with the Scanswitch (Memory Test) Go to the DOWN again		"MEMORY TEST" "XXXXXXXX" "XXXXXXXX" "RAM OK" Left corner displays 0B
16	Press the Scanswitch Press the Scanswitch		"PAGE" "SELECTION" "XX" Left corner display OK 0E
17	Press Green button Press Green button again		" MANUAL TEST" " GOOD " Left corner displays 0F
18	Press Red button Press Red button again		" MANUAL TEST" " BAD " Left corner displays 10

8.1.4 If any of the step failed functional, refer to Chapter 10.

8.1.5 Perform visual check on battery connectors, car kit connectors and casing.
If corrosion or deform send to NSC for repair.

8.1.6 If the product is good, it is considered as a NFF product.
All the NFF products must be directly returned to the customer.

8.2 RF TEST

8.2.1 The Test SIM Card “SP” must be inserted into the phone before starting the tests.

8.2.2 Set the equipment as shown on the picture in chapter 6.2.

8.2.3 Set in the offset field of the radio tester a – 0.3 dBm lose for GSM Test

8.2.4 The following operations must be done:

- Synchronization/Registration
- Call set up from the mobile
- Voice loopback (to check the sound quality)
- Call release
- Call set up from tester
- Call release from tester

8.2.5 The following parameters must be checked in TCH loop mode :

Emission parameters :

- Power level
- RMS phase error
- Peak phase error
- Frequency error
- Power ramping

Reception parameters :

- Rx level
- Rx quality
- BER (Byte Error Rate)
- FER (Frequency Error Rate)

Generally the test sequences built inside the testers will be used to check the mobile. You must assess that the test sequences limits comply with the standard specifications.

8.2.6 GSM Specification (900 Mhz)

Test Parameters	**Channel**	**Level**	**Standard Specification**
EMISSION			
Phase Error RMS	1, 62, 124	5, 10, 15	0 to 5 degrees
Phase Error Peak	1, 62, 124	5, 10, 15	-20 to +20 degrees
Frequency Error	1, 62, 124	5, 10, 15	-90 Hz to +90 Hz
Power Ramping	1, 62, 124	5, 10, 15	Mask
Modulation	1, 62, 124	5, 10, 15	Mask
Switching Transients	1, 62, 124	5, 10, 15	Mask
Power Reading			

Output Power Average	1, 62, 124	Level 15	11.2 dBm to 14.8 dBm
	1, 62, 124	Level 10	21.2 dBm to 24.8 dBm
	1, 62, 124	Level 5	31 dBm to 34.1 dBm

RECEPTION			
Rx Level	1, 62, 124	-83 dBm	+/-2.5 dBm
Rx Level	1, 62, 124	-60 dBm	+/-2.5 dBm
Rx Level	1, 62, 124	-40 dBm	+/-2.5 dBm
TCH LOOP			
SENSITIVITY			
BER	1, 62, 124	-85 dBm	0%
FER	1, 62, 124	-85 dBm	0%
BER	1, 62, 124	-102 dBm	< 2.44%
FER	1, 62, 124	-102 dBm	0%
BER	1, 62, 124	-103 dBm	< 2.44%
FER	1, 62, 124	-103 dBm	0%

If a phone is out of the specifications, it must be sent to the Repair Center.

8.2.7 PCN Specification (1800 Mhz)

Test Parameters	**Channel**	**level**	**Standard Specification**
EMMISSION			
Phase error RMS	512, 635, 760,885	0,5,10	0 to 5 degree
Phase error Peak		0,5,10	-20 to +20 degree
Frequency Error		0,5,10	-180 Hz to + 180 Hz
Power Ramping		0,5,10	Mask
Modulation		0,5,10	Mask
Switching Transcients		0,5,10	Mask
Power reading			
Output Power		level 0	30 +/- 2 dbm
		level 10	10 +/- 4.0 dbm
		level 19	0 +/- 5.0 dbm
RECEPTION			
Rx Level	512, 635, 760,885	-100dbm	8 to 13
Rx Qual		-100dbm	0 to 1
Rx Level	512, 635, 760,885	-80dbm	28 to 33
Rx Qual		-80dbm	0 to 1
Rx Level		-60dbm	48 to 53
Rx Qual		-60dbm	0 to 1
TCH LOOP			

SENSITIVITY

BER at -85dbm	512,635,760,885	0%
FER at -85dbm		0%
BER at -103dbm		2.44%
FER at -103dbm		0%

If a phone is out of the specifications, it must be sent to the Repair Center.

8.3 Charging IGN (Ignition) – Battery

8.3.1 Plug the connector of the charger into the round socket set at the base of the transceiver.

The battery symbol should indicate the state of the charge process :

- Bars moving - means the battery is being charged.
- Steady - means the battery is fully charged.

If the battery is totally discharged, the battery icon will start scrolling 2 to 3 minutes only after being connected to charger.

8.3.2 Remove the charger by unplugging the connector from the round socket at the base of the transceiver.

8.3.3 Remove the battery.

8.3.4 Lift the bottom left side of Production Test SIM Card with a tweezer.

8.3.5 Gently slide the card out away from the grooves of the Product

9.0 ASSEMBLY / DISMANTLEMENT PROCEDURES

During dismantlement and assembly operations, an antistatic bracelet must be used.

9.1 Dismantlement

9.1.1 Unscrew the ANTENNA
9.1.2 Take the product, remove BATTERY
9.1.3 Remove the SIM card

9.2 Assembly

9.2.1 Check the REAR HOUSING on the product
9.2.2 Check the LABEL on the back
9.2.3 Screw the ANTENNA

10.0DEFAULTS SETTINGS

10.1 Reset customer parameters.

To reset customer parameters, it must use a GSM String. This Gsm String is *#RSAV*# or *#7728*#.
So, the defaults settings of the manufacturer are actived.

10.2 Use of the GSM string *#RSAV*# or *#7728*#.

Procedure to follow :

- Turn on the mobile (a SP SIM card is not necessary).
- Enter the Gsm String *#RSAV*# or *#7728*#.
- You can see “Reset” but the customer parameters are not reset yet.
- Turn off the mobile.
- When you will turn on, the defaults settings will be actived.

11.0SOLUTIONS IN CASE OF PROBLEMS DURING THE TESTS

If for any reasons the phone needs to be disassembled (on level 2 only) to fix a defect detected during the test procedure, a complete functional test and a RF test must be done.

11.1 The phone does not switch on.

- Check the tactile feeling of the “ON/OFF” button.
- Remove the battery. Check that both the contacts of the phone and those of the battery are not damaged.
- Clean the contacts.
- Plug the battery again, making sure that it is securely fitted. Charge the mobile until the icon has stopped flashing.
  Then unplug from the charger and attempt to switch the mobile on.

If it still does not switch on, send the mobile for repair.

11.2 Charge does not start or no detection of the charger.

- Check the charger contacts for dust or missing pins.
- Check the mobile connector.
- Remove the battery. Check that both the contacts of the phone and those of the battery are not damaged.
- Check the charger individually with a reference mobile. If the charger works properly try to charge the customer mobile with a reference battery.

If neither of the battery and the charger can be incriminated, send the mobile for repair.

11.3 The display shows “No SIM card. Please insert your SIM card.” or “SIM FAILURE”

- If the SIM card cannot be inserted, check for any foreign part and try to remove it.
- Check the SIM Card connector. All the contacts must be at the same level. Make sure that there is no dust on the connector contacts and the SIM card contacts.

- If the test SIM card can be detected but the message “SIM Failure” remains on the customer’s card, his card must be damaged. Ask him to contact his network operator.

Otherwise send the mobile for repair

11.4 Display problems

Contrast, icons and matrix of the display can be checked with the test SIM card by pressing keys ”5”, “6” and “7” .
If everything works in test configuration it then means that a phone setting is disabled or does not suit well. It can be solved in the phone menu.

Otherwise send the mobile for repair

11.5 Buzzer problems

Buzzer tone can be checked with the test SIM card by pressing key “1” and “2”.
- If it does not sound properly send the mobile for repair.

11.6 No sound in Loudspeaker

The sound from the loudspeaker can be checked with the test SIM card by pressing key “3”.

- Check the microphone and the earpiece, If the failure cannot be found out, send the mobile for repair.

11.7 Communication problems

- Sound quality can be checked in audio loop test (sound distortion, whistling, echo, …)
- If the mobile passes the radio tests successfully, we can assume that the phone works properly. The customer must check the coverage area of his network operator or that he does not use the phone in a radio shadow (outside the coverage area, in a tunnel or between tall buildings, …)

- If the mobile does not pass the radio tests, send the mobile for repair.

11.8 Defective antenna

- If the antenna is broken or curved => replace it

11.9 Keyboard problems

-The keyboard can be checked with the test SIM card.
- If a key or a row does not respond, check the keyboard.

11.10 Problems to send SMS messages

Check the Center number. It may be empty or wrong.

12.0RECOMMENDED PART LIST- TCD 989 XENIUM DB

12.1 Common parts – out of warranty

REFERENCE	DESIGNATION	POSITION	REPAIR LEVEL

4311 257 61141	Antenna ass’y X16 DB	0906	1
4311 258 72846	Battery Slim 800mAh (Li-on)	-	1
4311 258 75075	Vibra Battery (900 mAh Li-on)	-	1
3122 427 20946	Fast Charger Europe	-	1
3122 427 21206	Fast Charger UK	-	1

ANNEXE 1

IRIS REPAIR CODING SYSTEM

Symptom code

The code '0000' is used for No Fault Found

Condition code

1-Constant
2-Intermitent
4-Two hours after switch on.

		1	NO ACTION	2	LEVEL	3	QUALITY	4	NOISE	6	PHYSICAL PROBLEMS	7	SPECIAL FUNCTIONS	8	OTHER CONDITIONS
1	GENERAL	117 119 11B 11X	**Power problem** Short autonomy Does not switch on Switch on/off recurrent Other Pow Sup problem	121	**Charging problem** Does not charge battery	136 13B 13B	**Display function problem** Character/pixel absent No backlight No backlight			166 169 16G	**Physical damage** Damaged plug or socket Defective antenna Broken LCD	171 178	**General function problem** Faulty clock function Faulty memory function	185 18Z	**Special requirements** Upgrade to be done only Symptom not available
2	COMMUNICATION	21A	**No reception** Interrupted communication	220	**Reception level problem**	231 234	**Transmission problem** No emission No radio link between Handset & Base	240 244	**Noisy communication** Echo			277 278 279	**Special communication problem** No ringing (dial) tone No buzzer ring Not registering		
5	AUDIO	510	**No audio**	521	**Audio level problem** Low audio level					560	**Poor Audio recording** (answering)	57A	**Poor special audio function** Hands-free problem		
6	MECHANISM	61B 61D	**No mechanical** Vibrator not operable Pilot/compass key not operable					648	**Mechanical noise** Foreign parts inside						
7	DATA PROCESSING	715 72B	**No data processing operation** No keyboard operation No subscription									774 775	**Special data processing function problem** Defective CLI Tariff update failure	781 782 783 785	**SIM card problem** Simblock IMSI Does not read SIM card SIM Error 48xx

Each returned product must have an IRIS code to identify the failure.