

## Test Instructions

- mechanical -

*Sony Xperia Ion*



*LT28i, LT28h*



*LT28at*

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*Test Instructions (mech)*

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**For general information about test procedures, refer to  
1220-1333: Generic Repair Manual - mechanical**

## 1 Pre-Test Preparations

### 1.1 Hardware

#### 1.1.1 Water indicator inspection

Before starting any tests the liquid intrusion indicator has to be checked.

The Water Indicator is located as shown in this picture after the Cover Rear Top is removed.

If affected (red color) - handle the phone according to the local directives.

If not affected by liquid, proceed to the 'Pre-Test Preparation' below.



## Pre-Test Preparations

### 1.2 Software

#### 1.2.1 Software update

##### 1.2.1.1 Software version verification

Check the software version of the phone for fault verification. The latest improvements are found on the support pages under the support news

<http://www.sonyericsson.com/cws/marketingurlportal?pageid=key.SupportZone.Overview>

- Start up the phone
  - Note: Make sure the phone is in call setup.
- Press the following keypad combination: **\*##7378423#\*#\***
- Select 'Service info'
- Select 'Software info'
- Check the software file revisions and, if needed, update as described below:

**For more information, refer to 1220-1333: Generic Repair Manual - mechanical**

##### 1.2.1.2 Software version update

**Mandatory first repair action!**

**Use the USB cable to connect with the Micro USB connector of the phone for this purpose!**

Ensure the phone is powered off and proceed as follows:

- Open the Emma application and log in.
- Press and hold the volume down key on the phone, connect the phone to the USB cable and then release the volume down key.
- Select the appropriate service and follow the on-screen instructions.

**Note: For phones with eMMC flash memory (built in "SD card" memory), the only service which erase this eMMC memory is Service's "Refurbish" and "Customize". See also emma User Guide info. [http://emma.extranet.sonyericsson.com/documents/emma\\_user\\_guide.pdf](http://emma.extranet.sonyericsson.com/documents/emma_user_guide.pdf) (see "Service Types" and "Aspects of large files")**

In Swap flow, when change a phone from Customer A to Customer B, always use the service Customization script.

## 2 Tests

### 2.1 Service Test Mode

**Note: Make sure the phone is in call setup when pressing these touching keypads to get into the Service menu!**

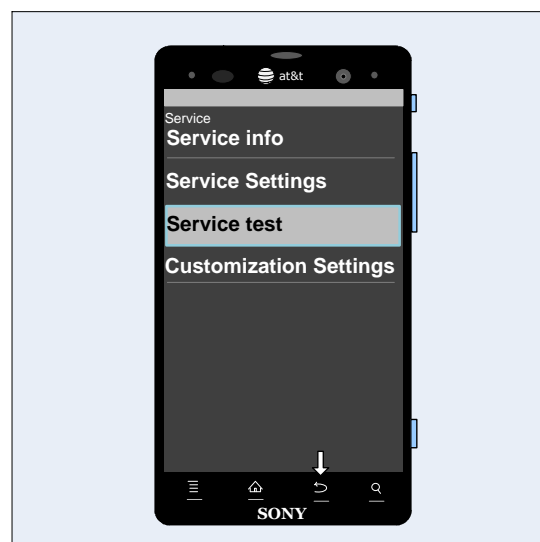
Start up the phone and enter the service menus:

- Press the following keypad combination: **\*##7378423##\***



- Select 'Service tests'
- Select one of the tests and follow the test instructions as described below
- To stop the test and return to the 'Service tests' menu, press the Back key

**For more information, refer to 1220-1333: Generic Repair Manual - mechanical**



**The following pictures will show a simplified basic phone for a general visualization of the service tests!**

## Tests

## 2.2 Service Tests

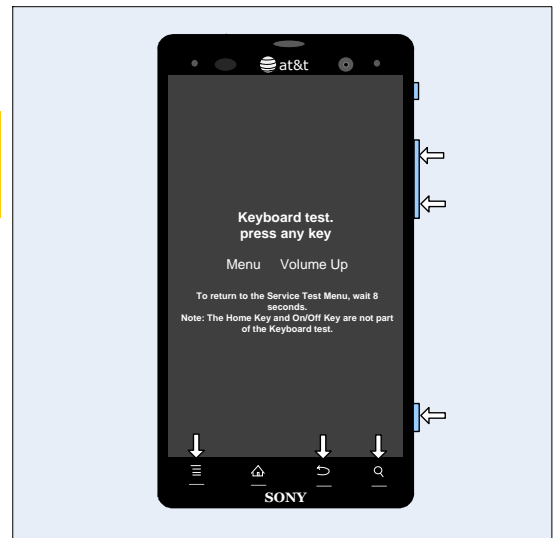
### 2.2.1 Keyboard & Switch

**Text Note: The Home Key and On/Off key are not part of the keyboard test, but are in the Manual tests.**

**To return to the Service Test Menu, wait for 8 seconds.**

Press all keys on the:

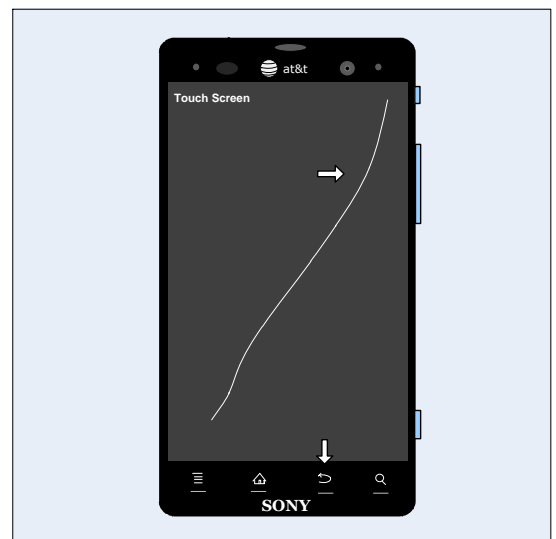
- Back key
- Menu key
- Search key
- Auto Focus Key(*half pressed*)/Camera key(*fully pressed*)
- Volume up key
- Volume down key



### 2.2.2 Touch Screen

Move a finger across the touch screen, a line will be drawn as it touches.

Press the Back key to return to the Service Test Menu.



### 2.2.3 Display

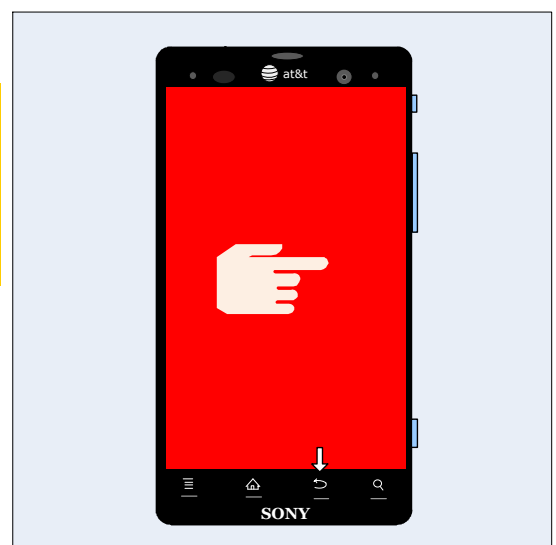
**Minor variations in the display's brightness and color may occur between phones.**

**There may be tiny bright dots on the display, called defective pixels and which occur when individual dots have malfunctioned and cannot be adjusted.**

**Two defective pixels are considered to be acceptable.**

Touch the display using a finger. With every touch, the display will show six test patterns of White, black, red, green, blue and rainbow colors on the full screen. Make sure that there are no missing segments and that the colors and contrast are OK.

Press the Back key to return to the Service Test Menu.



## Tests: Service Tests

### 2.2.4 LED/Illumination

Check that the:

- Display Backlight illumination goes from low to high strength back to low again.
- Notification LED on the top right corner changes, showing four colors in the following sequence: red, red, green, green, blue, blue and off.
- The underlines backlight illumination of menu, home and back keys goes from low to high strength back to low again.

Press the Back key to return to the Service Test Menu.



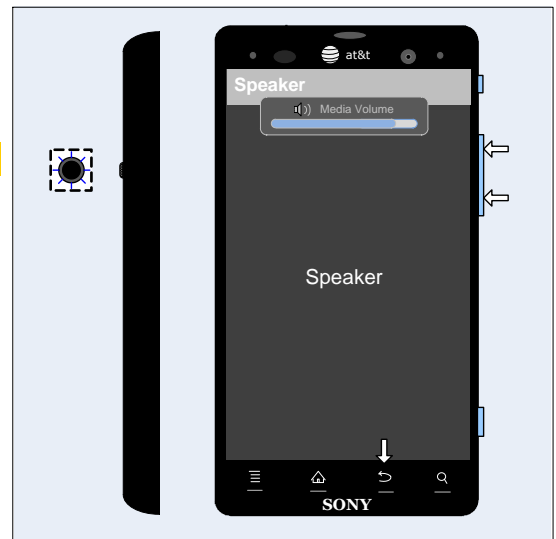
### 2.2.5 Speaker

**Do not hold the phone close to an ear during this test!**

Make sure that the sound from the speaker port on the middle top back side of the phone is emitted loud and clear and that the test includes maximum volume.

Press the volume up/volume down key to adjust the speaker volume.

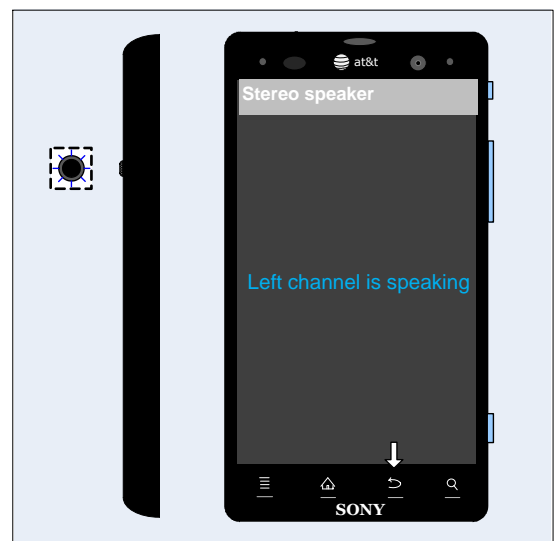
Press the Back key to return to the Service Test Menu.



### 2.2.6 Stereo speaker

N/A

Press the Back key to return to the Service Test Menu.





## Tests: Service Tests

### 2.2.7 Earphone

Make sure that the sound from the Earphone port on the top of the phone is emitted loud and clear and that the test include maximum volume.

Press the volume up/volume down key to adjust the earphone volume.

Press the Back key to return to the Service Test Menu.



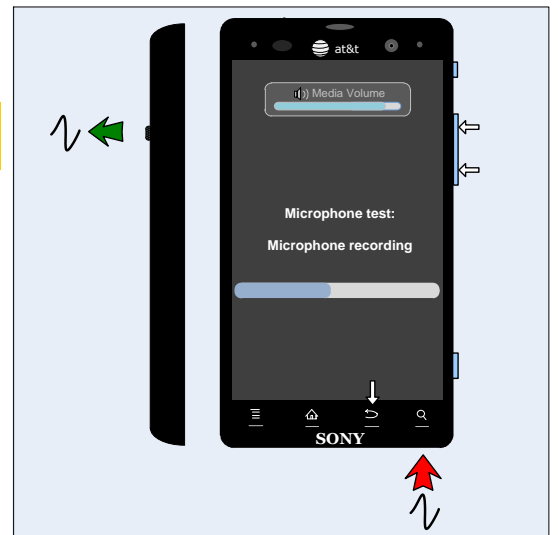
### 2.2.8 Microphone

**The previous 'Speaker' test must have been successfully carried out before doing this test!**

The phone will start to record and after approximately ten seconds the sound is played back through the Speaker. Speak into the microphone during the 'Microphone Recording' phase.

Check the quality by listening to the recording from the Speaker during the 'Playing recorded sound' phase at maximum volume.

Press the Back key to return to the Service Test Menu.



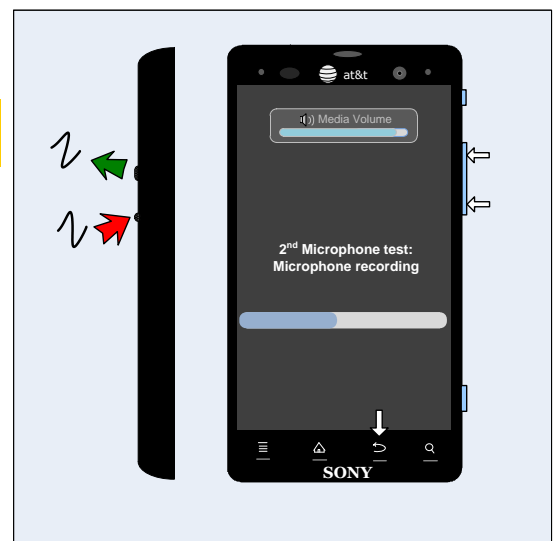
### 2.2.9 Secondary Microphone

**The previous 'Speaker' test must have been successfully carried out before doing this test!**

The phone will start to record and after approximately ten seconds the sound is played back through the Speaker. Speak into the secondary microphone during the 'Microphone Recording' phase.

Check the quality by listening to the recording from the Speaker during the 'Playing recorded sound' phase at maximum volume.

Press the Back key to return to the Service Test Menu.



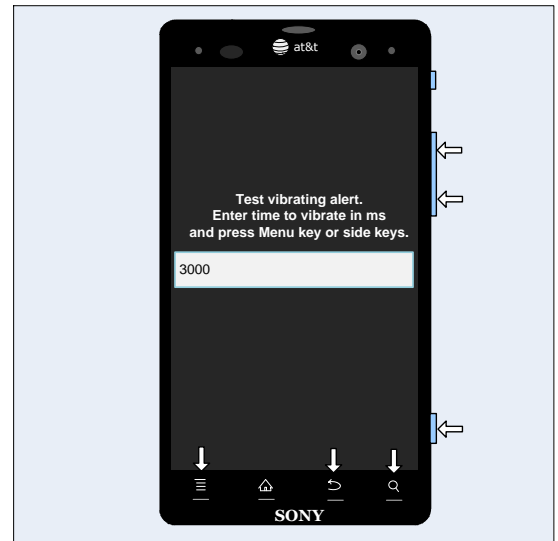
## Tests: Service Tests

### 2.2.10 Vibrator

Press the menu key, search key or side keys to start the vibrator test.

It is possible to modify the duration of this test.

Press the Back key to return to the Service Test Menu.



### 2.2.11 Camera

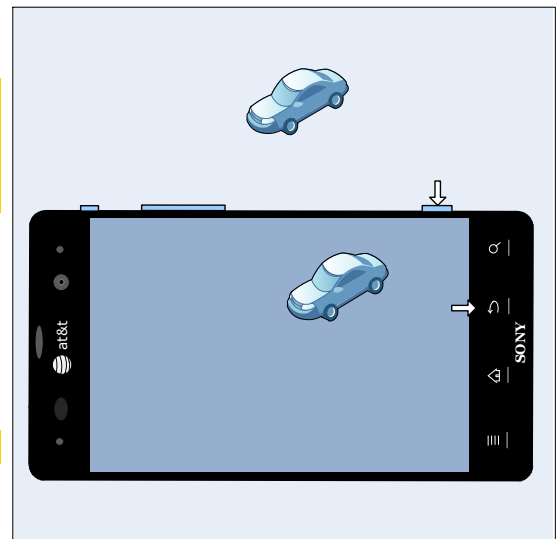
**Minor variations in image appearance may occur between phones, but is not uncommon and should not be regarded as an indication of a defective camera module!**

Aim the camera (located at the back of the phone) at an object and check the quality of the image shown in the display.

Press the 'Camera' key to preview the photo's auto focus quality.

**Photos are taken but not saved during this test!**

Press the Back key to return to the Service Test Menu.

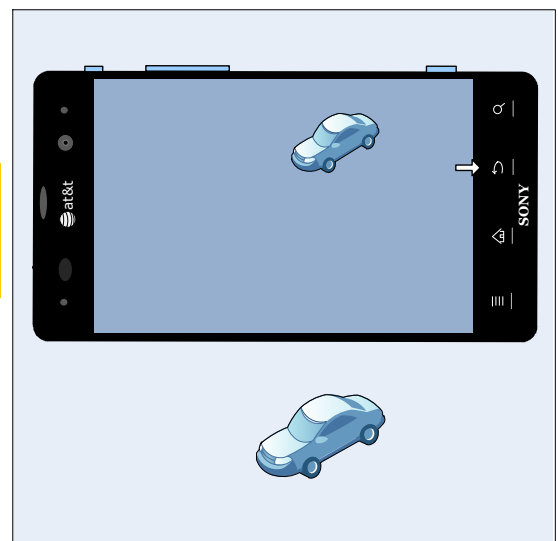


### 2.2.12 Secondary Camera

**Minor variations in image appearance may occur between phones, but is not uncommon and should not be regarded as an indication of a defective camera module!**

Aim the camera (located in front of the phone) at an object and check the quality of the image shown in the display.

Press the Back key to return to the Service Test Menu.

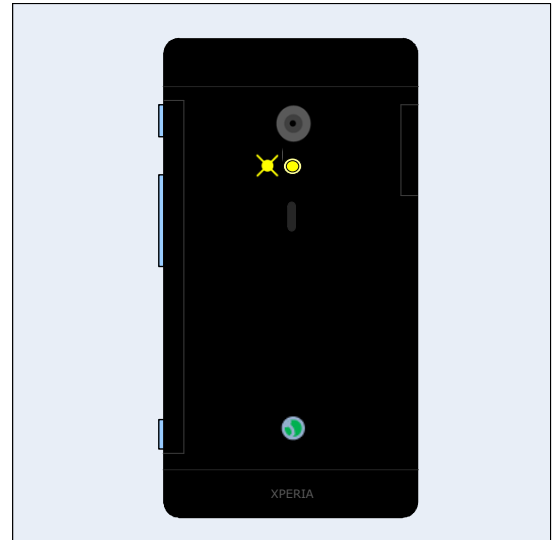


## Tests: Service Tests

### 2.2.13 Flash LED

Check the Flash LED at the back side of phone to see whether it's turned on.

Press the Back key to return to the Service Test Menu.



### 2.2.14 Bluetooth

**During this test, the distance between the phone and the target Bluetooth device must be 1.5 to 5 meters! Make sure the target Bluetooth device is enabled and visible always!**

The Bluetooth test will be done in following sequences:

Step 1: Enable Bluetooth; wait 4-5 seconds, shows OK;

**There is a permission request, select 'Yes'.**

Step 2: Searching;

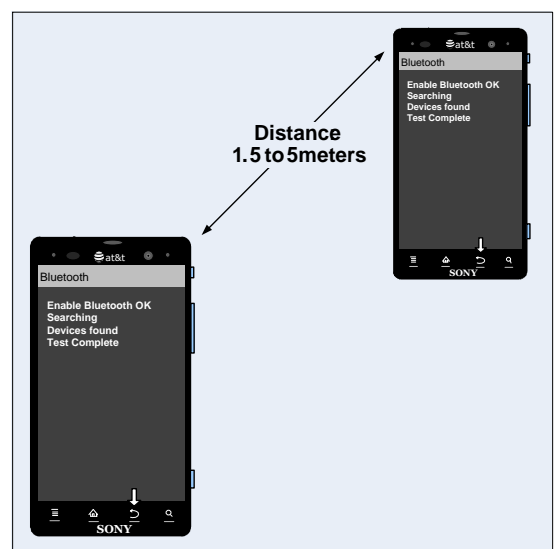
Step 3: Show the Device Found list;



Step 4: Select the Target Bluetooth Device, and type the PIN code to pair;

Step 5: Type the Pairing PIN code on the Target Bluetooth Device also, when successful, it shows "Test Complete".

Press the Back key to return to the Service Test Menu.



## Tests: Service Tests

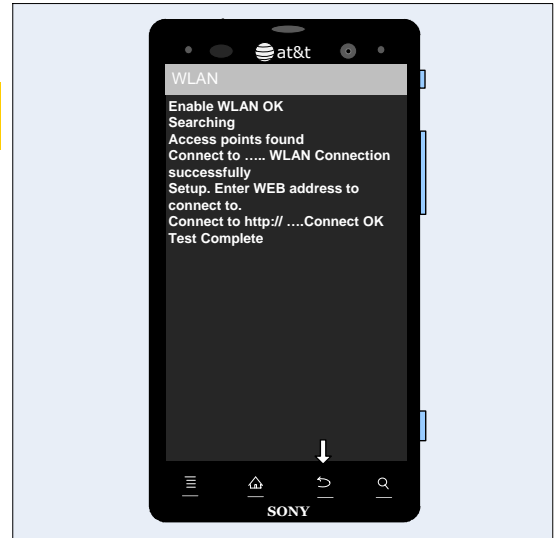
### 2.2.15 WLAN

**Make sure there's a WLAN network before performing this test.**

The WLAN test will be done in following sequences:

- Step 1: Enable WLAN; wait 4-5 seconds, shows OK;
- Step 2: Searching;
- Step 3: Access points found list;
- Step 4: Select the Target WLAN network, and type the password to get connected;
- Step 5: Enter a web address (e.g. Google.com)
- Step 6: When connection succeeded, it shows "Test Complete".

Press the Back key to return to the Service Test Menu.



### 2.2.16 NFC

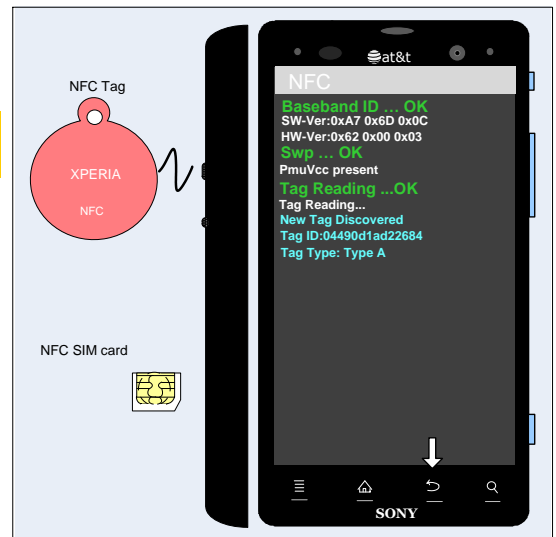
**A NFC SIM card 3FF should be inserted in the phone before the start of this test!**

The NFC test will be done in following sequences:

- 1. Step 1: Select "NFC"
- 2. Step 2: NFC Diag Test
- 3. Step 3: After "Tag Reading...Enabled" can be seen on the display, bring a NFC Tag close to the camera lens.

Don't touch each other to avoid Rear Cover scratch.

Press the Back key two times to return to service test menu.

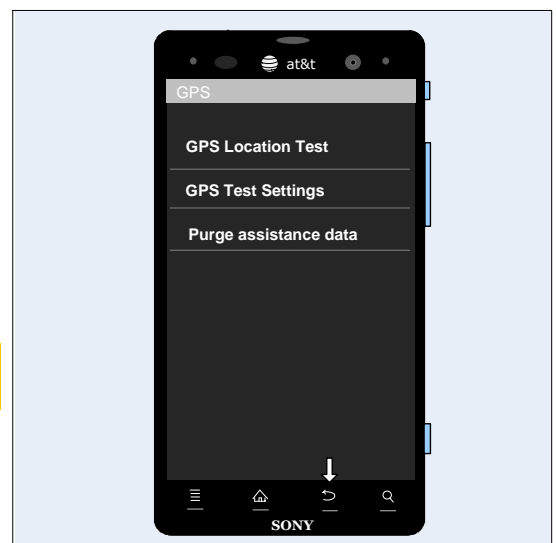


### 2.2.17 GPS

Enter the GPS Location Test, and wait for the GPS location data.

Press the Back key to return to the Service Test Menu.

**For GPS testing, refer to 1220-1333: Generic Repair Manual – mechanical**



## Tests: Service Tests

### 2.2.18 Compass

Do calibration with hand movements as shown in the phone, and then check the actual direction with measured value.  
(Yaw:0=North, 90=East, 180=South, 270=West)

Press the Back key to return to the Service Test Menu.



### 2.2.19 Accelerometer

The accelerometer test displays the actual position of the phone as a 3D coordinate X: Y: Z.

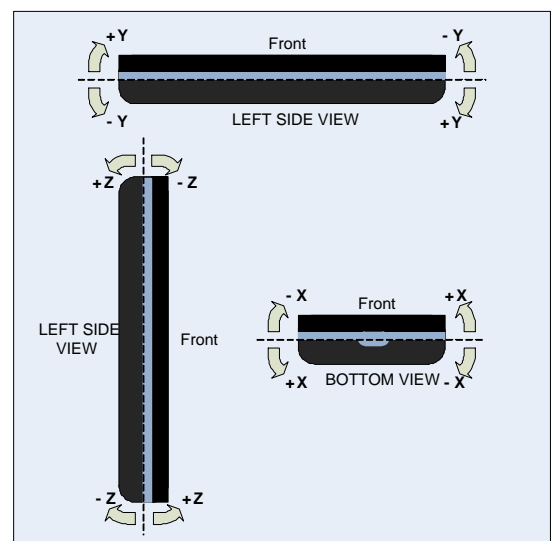
Press the Back key to return to the Service Test Menu.



By tilting the phone in various directions, the X: Y: Z values will change in size and polarity depending on the angle and direction as shown in the adjacent picture.

Check by tilting the phone that the X: Y: Z values shown in the display are in accordance with the tilting shown in the picture.

Press the Back key to return to the Service Test Menu.



## Tests: Service Tests

### 2.2.20 Gyroscope

The gyroscope test displays the actual position of the phone as a 3D coordinate X: Y: Z.

Check by moving the phone that the X: Y: Z values shown in the display are in accordance with the moving.

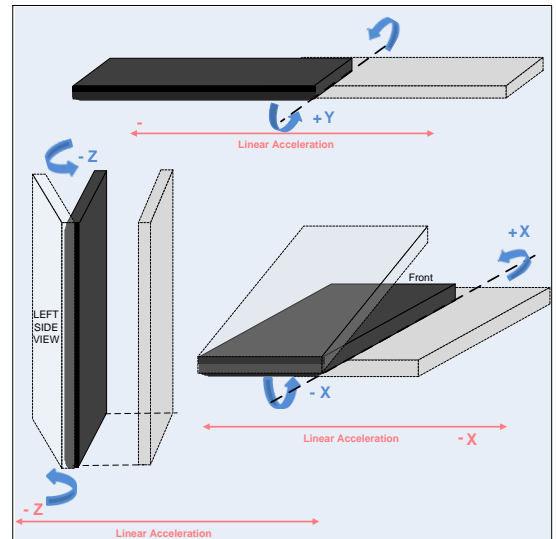
Press the Back key to return to the Service Test Menu.



Check “Gravity Values” “Linear Acceleration Values” “Rotation Vector Values” and “Gyroscope Values” by moving the phone:

“Gravity Values” can be refer to Accelerometer;  
 “Linear Acceleration Values” and “Rotation Vector Values” are in accordance with the action shown in the picture.  
 “Gyroscope Values” are updated while moving the phone.

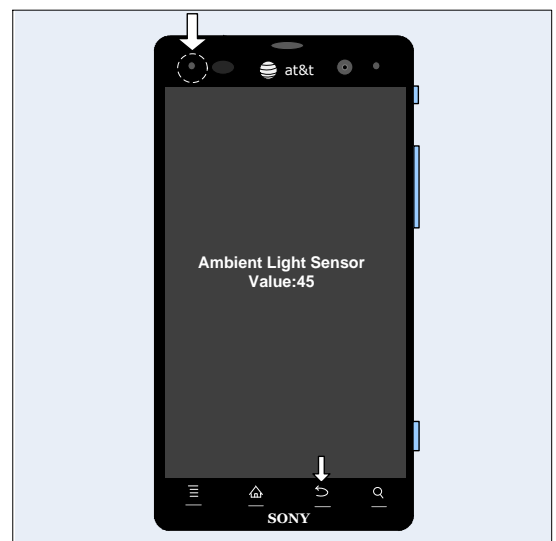
Press the Back key to return to the Service Test Menu.



### 2.2.21 Ambient Light Sensor

The Ambient light test states a value. The value should increase when the window gets more light and decrease when the window gets less light.

Press the Back key to return to the Service Test Menu.



## Tests: Service Tests

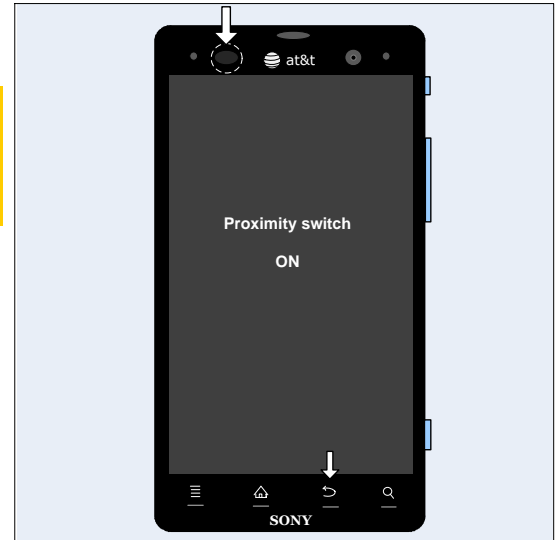
### 2.2.22 Proximity switch

**The previous 'Speaker' test should have been successfully carried out before doing this test!**  
**Make sure the phone is not in 'silent mode' before performing this test.**

When entering into the test, the screen shows 'Proximity switch OFF' and a tone is emitted.

When covering the proximity switch area (on the right side of the Ear Speaker), the screen will show 'Proximity switch ON' with a different type of tone.

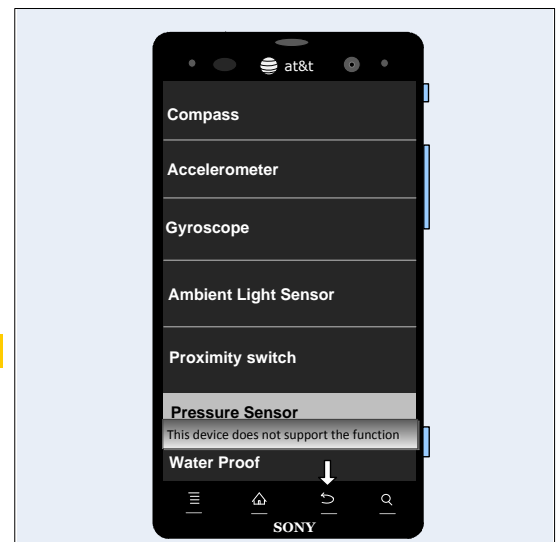
Press the Back key to return to the Service Test Menu.



### 2.2.23 Pressure Sensor

N/A.

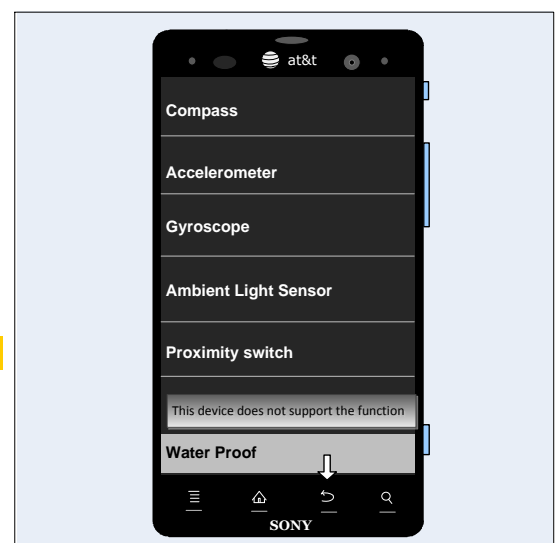
**This test is not available for this product!**



### 2.2.24 Water Proof test

N/A.

**This test is not available for this product!**

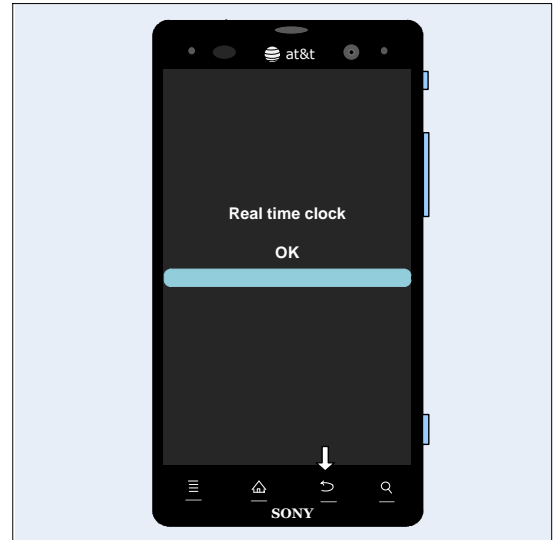


## Tests: Service Tests

### 2.2.25 Real time clock

During the actual test the text 'Real time clock test' is displayed, and then followed by a message stating whether the test was OK or not.

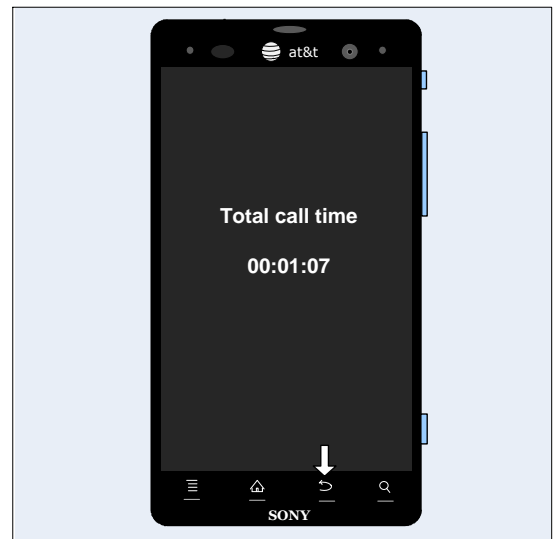
Press the Back key to return to the Service Test Menu.



### 2.2.26 Total call time

The total call time is displayed in the format HH:MM:SS (hours: minutes: seconds).

Press the Back key to return to the Service Test Menu.



### 2.2.27 Storage

Memory Storage status

- Internal Mass Storage is 'Inserted/Mounted' as shown on the screen!

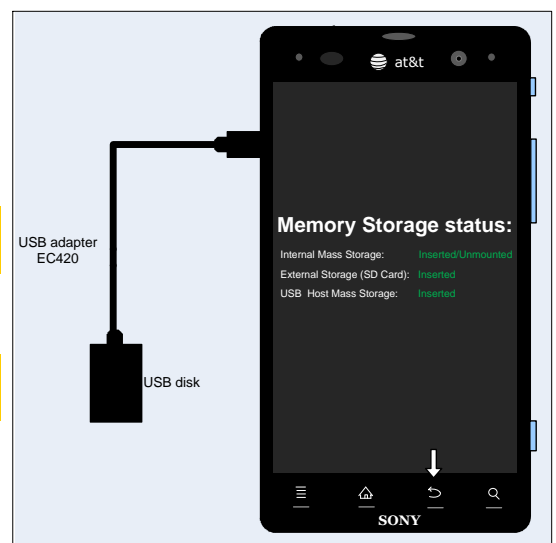
**A memory card should be inserted in the phone before starting this test!**

- External Storage (SD Card) is 'Inserted' as shown on the screen!

**Attach USB Adaptor between phone and an USB disk as shown in picture.**

- The USB Host Mass Storage status is shown on the screen.

Press the Back key to return to the Service Test Menu.





## Tests: Service Tests

### 2.2.28 Security

The DRM keys are shown in the display.  
There may be different content shown based on different market software versions.

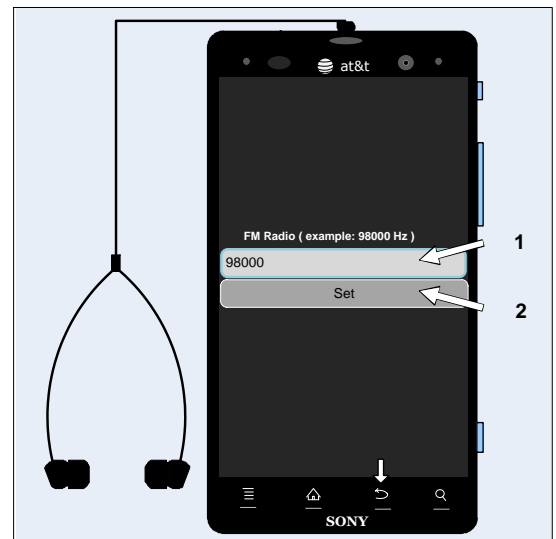
Press the Back key to return to the Service Test Menu.



### 2.2.29 FM radio

Verify that the phone can detect a radio station:  
Connect a headset and then set your local radio station in Hz.  
Verify that the reception and sound quality is normal.

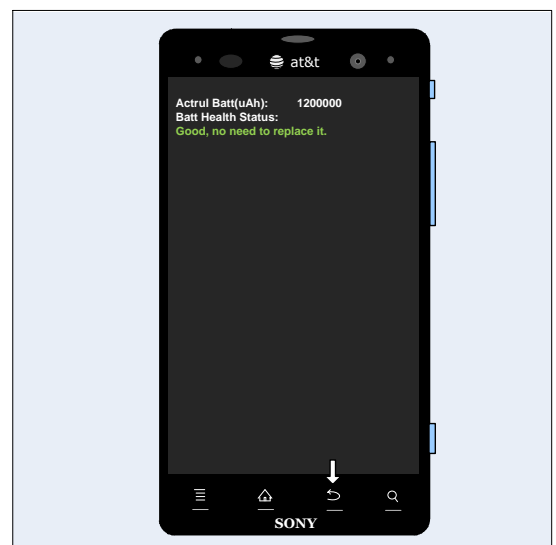
Press the Back key to return to the Service Test Menu.



### 2.2.30 Battery Health Test

- This test is intended to verify the battery health status when the consumer has complained about the charging or standby time before trying to replace the battery.
- When entering the battery health test menu, the screen will have:  
Green writing and say 'Good, no need to replace it' if the battery is OK and red writing and say 'Bad, need to replace it' if the battery is not OK.

Press the Back key to return to the Service Test Menu.



## Tests: Service Tests

### 2.2.31 Flip slider counter

N/A.

***This test is not available for this product!***

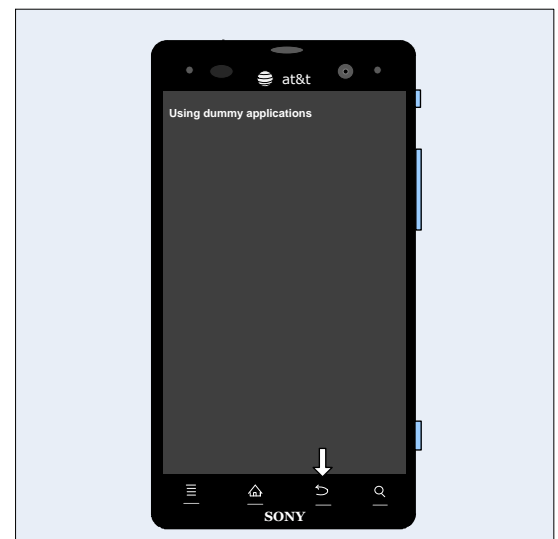
Press the Back key to return to the Service Test Menu.



### 2.2.32 Verify certificates

N/A.

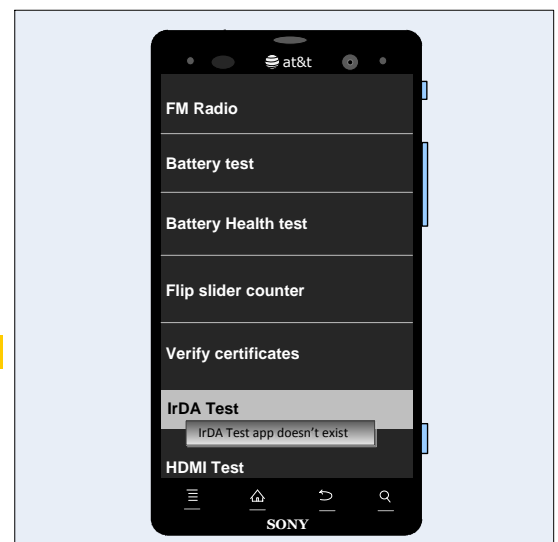
Press the Back key to return to the Service Test Menu.



### 2.2.33 IrDA Test

N/A.

***This test is not available for this product!***



## Tests: Service Tests

### 2.2.34 HDMI Test

Press HDMI On.

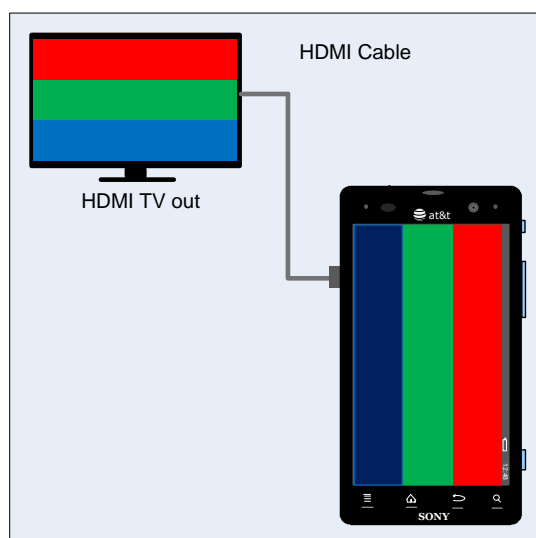
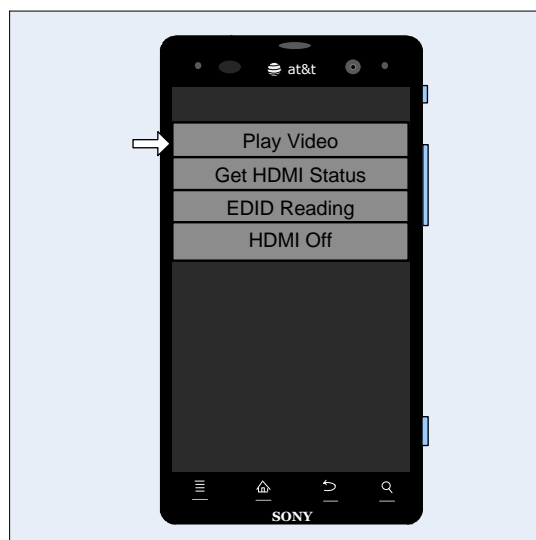
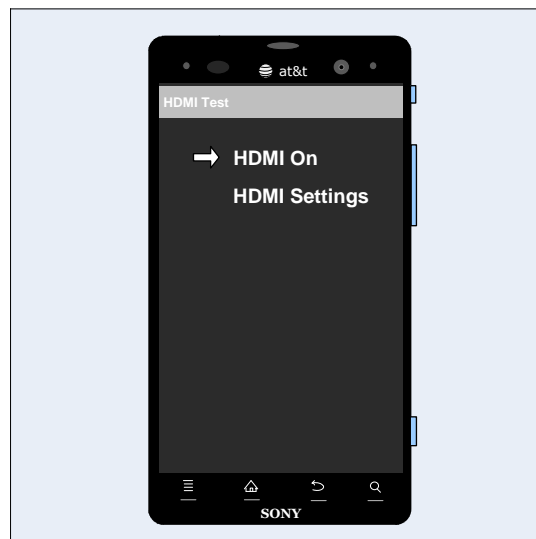
(HDMI Settings is usually not needed since the unit should be in automatic resolution and the HDMI TV out monitor should set the resolution automatic. If you get no picture on the HDMI TV out monitor you can try different resolutions under HDMI Settings)

Attach HDMI cable between phone and HDMI TV out.

Press HDMI Play.

Receive a test tone and a red-green-blue test picture in the HDMI TV out Monitor and phone.

**Note: If the HDMI TV out Monitor doesn't automatically identify the picture, the Monitor may require to set the HDMI port chosen as source manually in the Monitors menus.**



## Tests: Service Tests

Press Get HDMI Status:

You should now get:

Power Status: Active

HPD Status: H

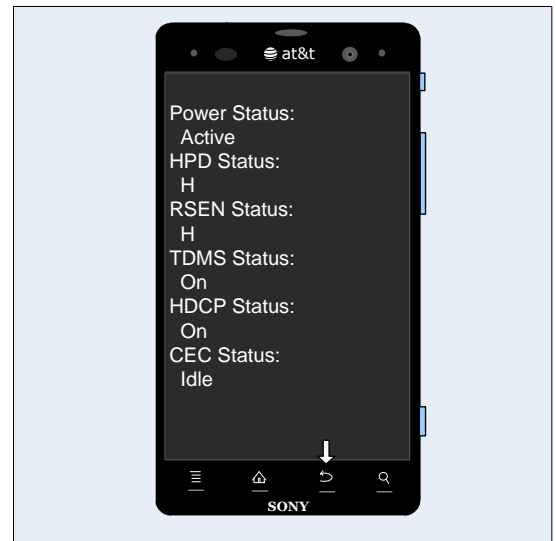
RSEN Status: H

TDMS Status: On

HDCP Status: On

CEC Status: Idle

Press the Back key to return to the Service Test Menu.

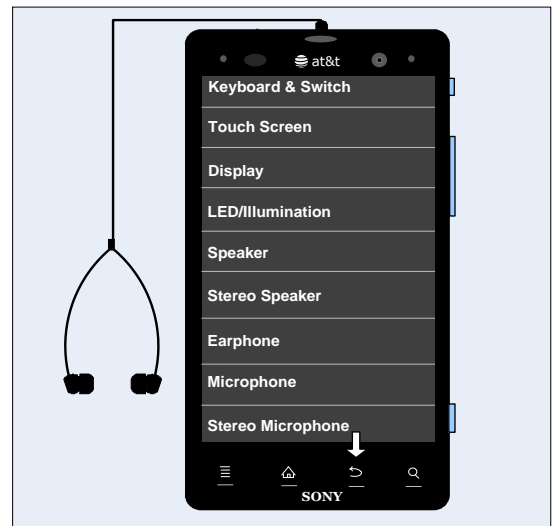


### 2.2.35 Audio Jack test

Connect a CTIA headset.

Repeat the test of “2.2.5 Speaker”, “2.2.7 Earphone” and “2.2.8 Microphone”.

Make sure that the sound from Headset earphone ports are emitted loud and clear.



## Tests

### 2.3 Manual Tests

#### 2.3.1 SIM

Verify that the phone can detect a SIM card:

- Insert a SIM card, and start the phone.
- If the SIM card is detected by the phone, the start-up procedure will continue.
- Pull down the Status Bar (put finger next to the receiver and drag the menu down from the Status Bar)
- To see SIM card operator name.
- The SIM card operator name will be displayed above the Time clock when phone is in Lock status.
- If not detected, the message 'Emergency call only' will be displayed instead in the pull down Status Bar.

- Press Back key to return to Standby Menu.



#### 2.3.2 On/Off key test

Press the On/Off key for a long time to turn the phone on or off.

Press the On/Off key for a short time to enter Sleep mode

- or to exit Sleep mode.



#### 2.3.3 Home key test

Whatever the phone shows now during operation, press the Home key for the phone go directly back to the Stand by screen.



## Tests: Manual Tests

### 2.3.4 Charging via USB (Charger or Computer)

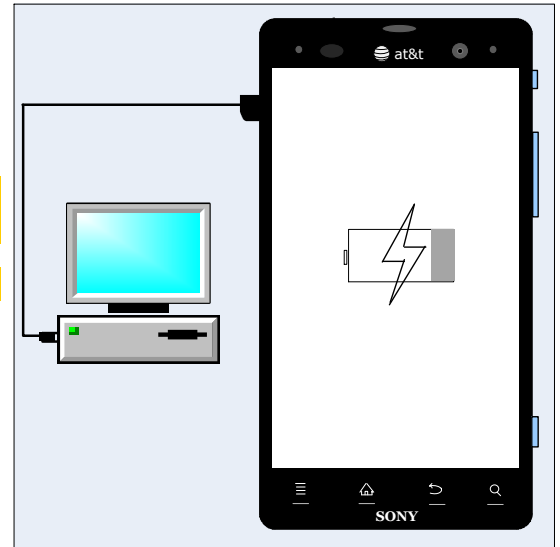
Verify that the phone can charge the battery by a USB port:

**Ensure that no computer application, such as PC Suite or Emma, is active!**

**Do not start the phone.**

- Connect a USB cable from a computer or charger to the phone.
- Verify that the phone is being charged by the notification LED and Battery icon in the display.

Remove the USB cable from the connector and verify that the notification LED and Battery icon no longer indicates charging.

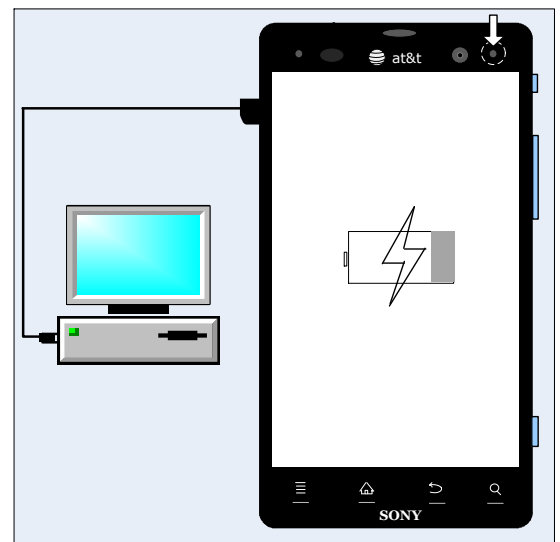


The Notification LED colour status is depended on battery remaining capacity:

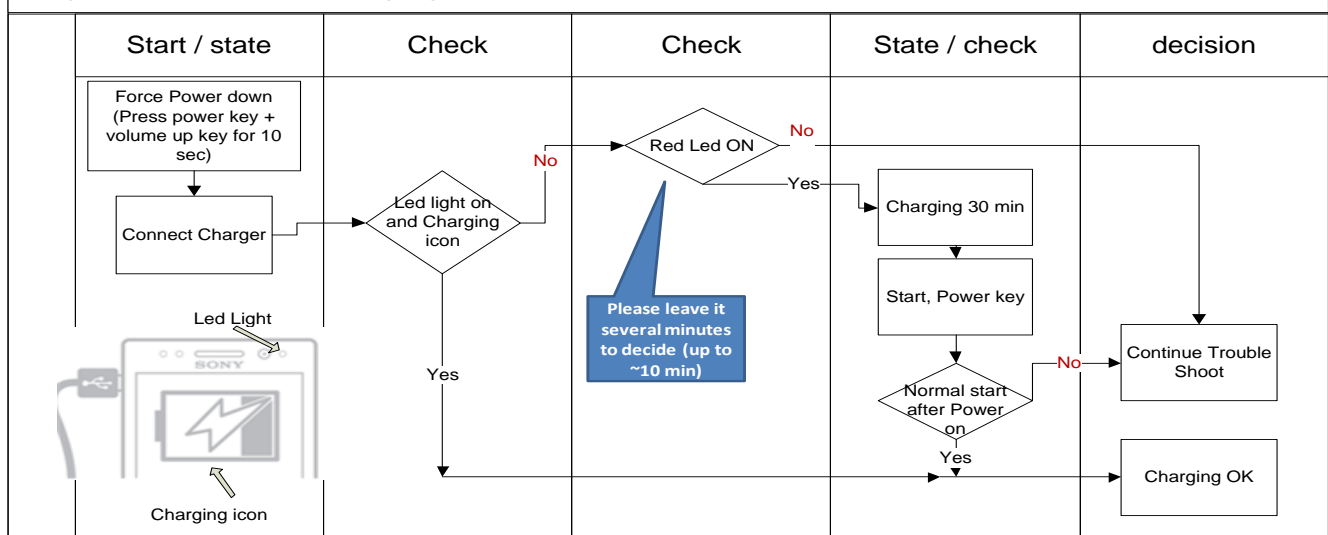
- Red: Battery level is between 1% and 10%;
- Orange: Battery level is between 11% and 89%;
- Green: Battery is between 90% and 100%;

If above fails, perform below Diagnostic battery / Charging Status check.

Perform a force shut down (Press Power key + Volume Up for 10sec). If phones vibrate three times the shutdown is performed. If no vibration is detected, the battery might be discharged.



#### Diagnostic Battery / Charging Status



## Tests

### 2.4 Network Test

*Generally it is requested to check all mobile technologies supported by a phone. Therefore a live network signal must be available!*

#### 2.4.1 On-the-air call to mobile

*If a live network is available you need an activated SIM, USIM or USIM with LTE capabilities depending on which network technology to test (no Test SIM Cards).*

##### 2.4.1.1 How to specify the relevant mobile network a phone should log on?

**For LT28at variant, press the following keys: `*##info##` to select phone information → set preferred network type → GSM only / WCDMA only / LTE only for the separate test.**

#### GSM

Go to the phone menu and select "GSM only":

Press Menu key → Settings ⇒ Wireless & networks ⇒ Mobile networks ⇒ Network Mode ⇒ GSM only

To verify phone's radio functions (GSM), follow the test procedure as described in chapter 2.4.1.2.

#### UMTS

Go to the phone menu and select "WCDMA only":

Press Menu key → Settings ⇒ Wireless & networks ⇒ Mobile networks ⇒ Network Mode ⇒ WCDMA only

Switch off the phone and then start it up again to enable search for an available UMTS signal.

Ensure that the UMTS/3G icon now is visible at the top of the display.

To verify phone's radio functions (UMTS), follow the test procedure as described in chapter 2.4.1.2.

#### LTE

Go to the phone menu and set:

Press Menu key → Settings ⇒ Wireless & networks ⇒ Mobile networks ⇒ Network Mode ⇒ LTE only

Switch off the phone and then start it up again to enable search for an available LTE signal.

Ensure that the 4G LTE icon now is visible at the top of the display.

To verify phone's radio functions (USIM with LTE capabilities), follow the test procedure as described in chapter 2.4.1.3.

##### 2.4.1.2 Procedure when testing GSM and UMTS

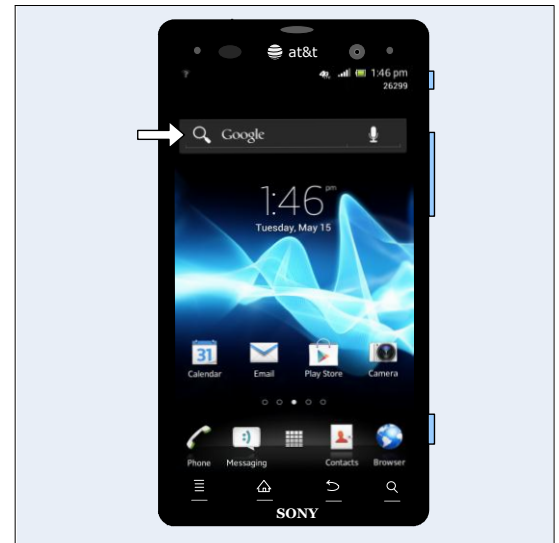
1. Select corresponding mobile technology as described in chapter 2.4.1.1
2. Set up a call from a landline phone (PSTN).
3. Check that there is a ring signal.
4. Check that the display backlight illuminates.
5. Answer the call and check the sound quality in both phones.
6. Adjust the volume up and down with the side keys and verify that the sound level is altered.
7. End the call and check that the elapsed time is displayed and that the termination is done properly.



## Tests: Network Test

### 2.4.1.3 Procedure when testing LTE (data connection only)

1. Select corresponding mobile technology as described in chapter 2.4.1.1.
2. To verify phone's radio functions, open the browser.
3. Enter [www.sonymobile.com](http://www.sonymobile.com) if not done by default.
4. Select your relevant country if not done by default.
5. Select "Software".
6. Select a phone model.
7. Press "Download for PC" button.
8. Press "Download PC Companion" button.
9. Monitor download via task bar if download is completed.
10. Open Settings menu and select "Storage".
11. Choose "Downloads".
12. Mark PC Companion files and delete by pressing Recycle Bin icon.





## 3 Revision History

Rev.	Date	Changes / Comments
1	2012-May-18	Initial release
2	2012-July-25	Added LT28h