

NB-IoT Tester

Designed for testing signal level in NB-IoT,
Cat-M and GSM Networks

Owners Manual



Introduction

The **NB-IoT Tester** incorporates all the best a “Made in Sweden” measuring instrument can offer.

NOTE: **NB-IoT Tester** is a high precision instrument and should always be handled with care!

Disclaimer

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Application

Measuring signal level in NB-IoT, Cat-M, GSM Networks. Performing new installation on various NB-IoT meters (like; electrical-, water- and gas- meters) and doing service- repair- works on such.

NB-IoT Tester components

The following components are included in the package:

Item	Description	Quantity
1	NB-IoT Tester	1
2	Rubber boot	1
3	Antenna	1
4	Neck strap	1
5	Power supply	1

Basics

NOTE: The **NB-IoT Tester** is a rugged field instrument designed to withstand field environment. However, to ensure best performance, it is important to keep maintenance as described later in this manual.

Getting started !

Place SIM-card in the SIM-card reader.

Beneath the unit there is compartment for the internal battery-pack and the SIM-card. Open up the lid and place the SIM-card in the SIM-card reader. Insert the card with connections down and the cut-corner first.



Charging the internal battery-pack

Make sure that that unit is properly charged before using it.
Charge the unit at least 4-6 hours before using it the first time.

Turn On the NB-IoT Tester

Press and hold down the On-button for a couple of seconds then release the button.
The unit will turn On.

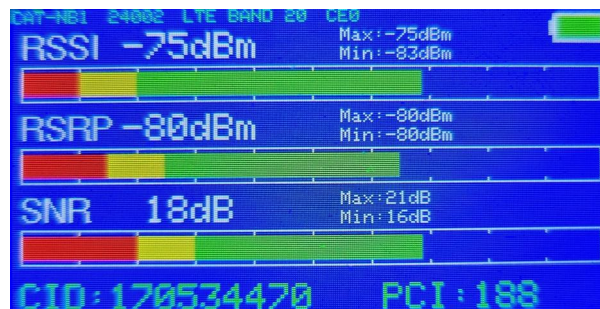
- The Tester starts in “ready-mode” after a few seconds and will start to search for available Networks (according to the installed SIM-card).
Display will show “Connecting” and a timer will tell about the elapsed time.



- Connecting can take up to 3 minutes the first time with a new SIM. Even longer if all bands are searched.
- If a connection is not made in 3 minutes the problem is either that there is no base-station within reach or that the operator needs to be selected manually by entering a MCC/MNC.

Measuring mode

- If the Network is found (in connection with the SIM-card) the unit will go into "Measuring-mode" and the display will show signal strength in the form of thermometer scales.



Top row will display operating mode, Operator MCC/MNC code and Band currently used.

The values shown in Measuring mode are:

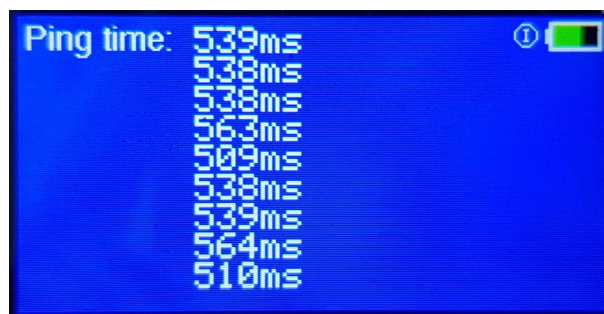
RSSI	Received Signal Strength Indicator in dBm.
RSRP	Reference signal Receive Power in dBm.
RSRQ	Reference signal Receive quality in dB.
SNR	Signal Noise Ratio in dB.

- The signal levels should be as high as possible and the bars as long as possible (with low values in Red/Yellow and top values in Green and as far to the right as possible).
- In this mode the Tester will also tell You the servicing cell ID. This is shown at the bottom of the display.
- If GPS is enabled a green 'G' will be shown to the left of the battery when the GPS has locked. When GPS is locked a third screen is available by pushing 'mode-button' showing GPS information.

Ping-mode (latency)

Pressing the mode button will take the meter to the Ping-mode where latency is being tested. It is important that a connected device will be able to connect and transmit data as fast as possible. Long delays or even lost packages are a signs of poor signal where another installation site/external antenna can be required.

- Example of good quality, short ping-times:



Menu

Pressing the Menu-button will display this:

FINGERPRINT TEST
FINGERPRINT TEST DELAYED
INFO
SOUND
SETUP

Here You can perform a variety of tasks and setup's.

Use the "UP" / "DOWN" buttons on the meter and verify with the "OK" button to enter the various setup's.

1. FINGERPRINT TEST

A very useful and accurate test for checking the signal level at a site. Place the meter where You want to install the new device (like an electrical NB-IoT meter).

Press the “Ok” button and the unit will check the signal level and perform a “ping-test”

It will take about 10 seconds and the result can look like this example:



All the information on the left side is available in the QR-code on the right side. You can read this QR-code with Your mobile phone making documentation easier. Use a QR code reader app to read this.

2. FINGERPRINT TEST DELAYED

Sometimes new devices (new NB-IoT meters) will be placed in a closed steel-cabinets.. Such cabinets attenuates the signal level quite a bit and in some cases so much that the device can't communicate when closing the door to the cabinet.

In such a case use this method for testing:

Chose the “FINGERPRINT TEST DELAYED”

- Chose a delay time for performing the test (10sec is normally just fine).
- Place the unit inside the cabinet and close the door.
- A FINGERPRINT TEST will be performed when the chosen delay time has run out.
- The meter will “beep” when the test is made (don't open the door to early – the test takes a little more than 15 seconds under good conditions).

3. INFO

Information about the instrument, modem and connection.

4. SOUND

Under some circumstances it can be good to listen to a pitch-tone when doing installations/searching for the highest signal level.

The higher the tone the better the signal level.

Turn the built in beeper On by selecting one of the three measuring options:

BEEPER OFF
BEEPER ON RSSI
BEEPER ON RSRP
BEEPER ON SNR

The unit will use this function until its turned Off (BEEPER OFF).

5. SETUP

This is the setup sub-menu.

EXIT
AUTO TURN OFF
PING
SERVER
SET APN MANUALLY
SELECT OPERATOR (MCC/MNC)
COMMUNICATION MODE
SELECT BAND
GPS
VIEW

1. EXIT

Exit setup menu.

2. AUTO TURN OFF

Set the preferred time for turning off the unit automatically. Can be setup for 5, 10, 20 or 30 minutes "Auto Off". Or set in the mode "Always On"

3. PING

This is the ping sub-menu.

EXIT
PING SERVER IP

1. EXIT

Exit setup menu.

2. PING SERVER IP

Use this to manually set up the server to connect with (PING). Use the "Up"/"Down" buttons to change the numbers in the IP-address. Enter and save with EXIT.

4. SERVER

This is the UDP server sub-menu. This server is used to transfer measurements to. To use this function a UDP server is needed.

EXIT
USE UDP SERVER
UDP SERVER IP
UDP SERVER PORT

1. EXIT

Exit setup menu.

2. USE UDP SERVER

Select to use the UDP server reporting.

3. UDP SERVER IP

Use this to manually set up the server to connect with (UDP). Use the "Up"/"Down" buttons to change the numbers in the IP-address. Enter and save with EXIT.

3. UDP SERVER PORT

Use this to set up the port.

5. SET APN MANUALLY

Set APN information.

EXIT
SET APN
SET USER
SET PASSWORD

1. EXIT

Exit setup menu.

2. SET APN

Set APN if the network requires it.

3. SET USER

Set user name. Normally not used.

3. SET PASSWORD

Set password. Normally not used.

6. SELECT OPERATOR (MCC/MNC)

Use this setting for selecting operator. Normally USE SIM is used and information on SIM-card is used. But if roaming the operator might need to be selected manually. A good web page to find out operators MCC/MNC numbers in different countries is: <http://www.mcc-mnc.com/>

7. COMMUNICATION MODE

Select mode of operation. NB-IoT, Cat-M or GSM.

8. SELECT BAND

Set the frequency band to operate on or select ALL to have the band automatically searched for. Selecting ALL bands will take the instrument much longer time to connect to the network but is good as a starting point if the band is unknown. When the band is known it is recommended to select the single band. When first connection is made the band used will be displayed at the top of screen.

9. GPS

1. Enable GPS

Use GPS.

2. Disable GPS

Turn off GPS.

10. VIEW

Choose what signal bar to view on signal page.

1. View RSSI bar

View RSSI, RSRP, SNR.

2. View RSRQ bar

View RSRP, RSRQ, SNR.

3. View RSRP only

View the RSRP bar only.

11. TIMEZONE

Set current timezone for clock.

TECHNICAL SPECIFICATION

3GPP Release	LTE Cat NB1, LTE Cat M1, GSM
Data	Cat NB1: 32Kbps(DL), 70Kbps(UL) Cat M1: 375Kbps(DL), 375Kbps(UL) EDGE: 296Kbps(DL), 236.8Kbps(UL) GPRS: 107Kbps(DL), 85.6Kbps(UL)
NB IOT/Cat-M bands	B1,B2,B3,B4,B5,B8,B12,B13,B18,B19, B20,B25,B26,B28,B39
GSM bands:	850, 900, 1800, 1900MHz
Signal level readout	-51dBm to -135dBm
Digital readout	RSSI Received Signal Strength Indicator/dBm RSRP Reference signal Receive Power/dBm RSRQ Reference signal Receive Quality/dBm SNR Signal to Noise Ratio in dB.
Latency	0 ms-10000 ms
Latency test	Yes
Transmit Power	23 dBm
Built in SIM-card reader	Yes
Input impedance	SMA connector, 50 ohm
Digital readout	RSSI, RSRP, RSRQ and SNR showing strength, quality and min/max hold values:
Memory	Built in SD-card reader.
Firmware upgrade	Yes, via micro-USB connector.
Display	Color LCD 320x160 pixels.
Battery	Built in, rechargeable battery-pack
Battery capacity	3000mAh.
Power consumption	max 300mA
Operational fully charged	10 hours
Charging time (drained)	6 hours
Powersupply/charger	Input: 220V, output 5V, 1 amp, micro-USB
Weight	0.3kg
Size	185x115x50mm.
Accessories:	Powersupply Rubber-case Antenna Owners manual