Network Tester LTE

HANDBOOK

ENQT

Do you have questions about our products?

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Content

About Network Tester LTE

The LTE network tester (hereinafter referred to as NT) is a high-end measuring device for mobile networks to support your digitization project.

The following instructions will introduce you to the functions of the NT.

Differentiation network tester LTElite / LTE / LTE+ / LTEmax

The illustrations in this manual refer to the LTE+ and LTEmax network testers.The LTE and LTElite network testers are not illustrated in this document.

General notes

Please note:

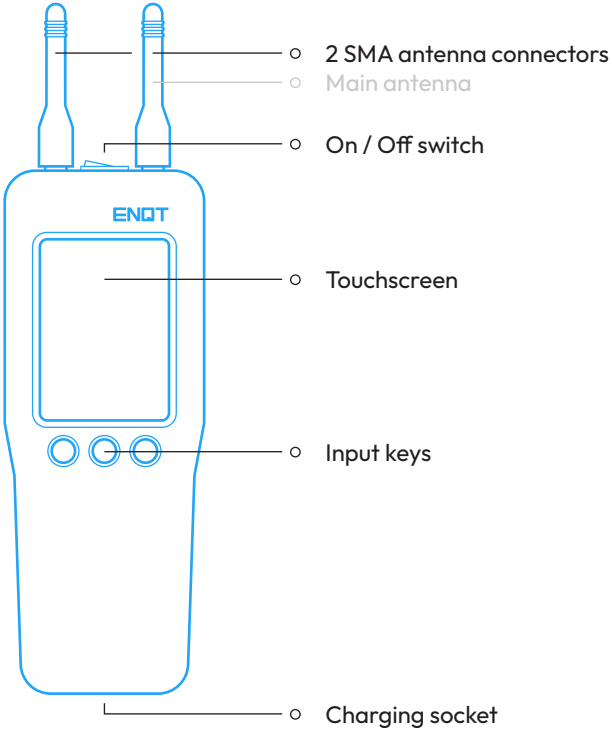
- Please use only the supplied charging cable and the supplied and approved accessories to charge the power tester!
- The included stylus is recommended for input! The display also responds to direct touch inputs, but is optimized for handling the input pen!

Quick guide & safety instructions

ATTENTION:
Do not screw the antennas too tightly, otherwise there is a risk of damaging the device.

Safety instructions:

- Do not use the device during thunderstorms.
- Use only antennas suitable for GSM communication.
- Do not use the device with external antenna amplifiers.



Functions of the network tester

Function overview

ENQT's network testers LTE have various functions depending on the equipment, which are listed in more detail below. The individual functions are explained in more detail in this chapter. Which version you have is indicated on the top left of the tester above the display. If you still have a previous version, the LTE corresponds to the TMate Field Live and the LTEmax to the TMate Field Complete.

	LTE Lite	LTE	LTE+	LTEmax
2G/3G/4G	✓	✓	✓	✓
Counter test	✓	✓	✓	✓
LiveSignal	✓	✓	✓	✓
Language support	✓	✓	✓	✓
Simple video tutorials	✓	✓	✓	✓
Provider configuration	✓	✓	✓	✓
Survey+ (Interval measurement)		✓	✓	✓
Stable carrying case		✓	✓	✓

RSSI/RSRP/RSRQ Switch		✓	✓	✓
International networks		✓	✓	✓
LiveHistory (History diagram)		✓	✓	optional
Local measurement data export		✓	✓	✓
InstaMeasure		✓	✓	✓
Color coding		✓	✓	✓
EasyIntegration (QR-Scan)			optional	optional
Ongoing updates			✓	✓
Remote maintenance & configuration			✓	✓
Export Live-Measurement data			✓	✓
Speedtests & Transit time measurement				✓
Measurement data portal				✓
ChannelScan				✓
API-Integration				✓
FrequencyLock				✓
CloudSync				✓

Switching the device on / off

Make sure that the power tester is sufficiently charged. The NT is switched on/off via the toggle switch on the top of the device. The device boots up in approx. 20 seconds.

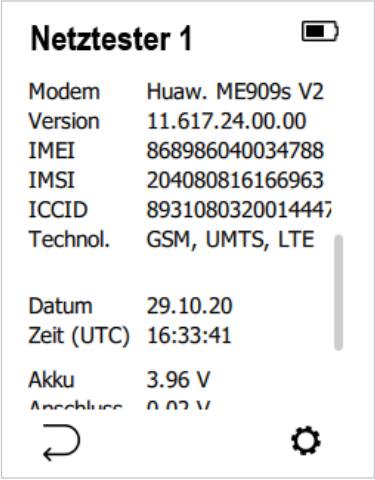
Start screen / status screen

The start screen may vary on the different devices. The NT LTElite does not have an export function. The NT LTEmax uploads measured data directly to the measurement data portal. Therefore, these devices do not have an „Export“ selection on the start screen.

1 - Start screen

Here you can see the current charge status as well as the synchronization status. Furthermore, you can reach from here by clicking on:

- the ENQT Logo: the status screen.
- on COUNTER TEST: the meter entry screen and then the possibility of full net metering.
- on SIGNAL: the possibility to measure live the attenuation of a provider & standard.
- on PROVIDER: the possibility to make settings regarding the providers to be tested.
- on EXPORT: the possibility to export your measurement data from the device via WLAN. (LTE and LTE+)



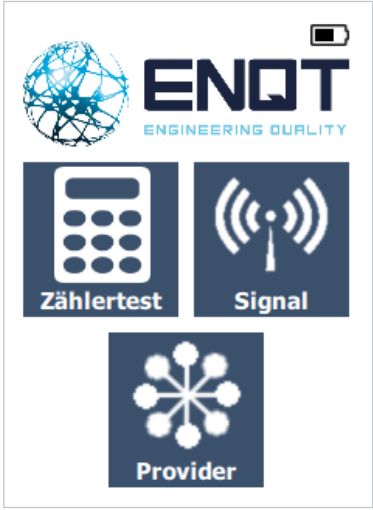
2 - **Status screen**

By clicking on the ENQT logo you reach the status screen.

The following data can be checked here:

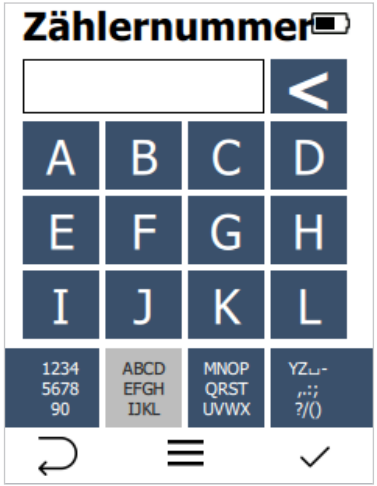
- Serial number of the device
- Software version
- Modem ID
- IMEI
- IMSI
- Battery voltage
- Charging voltage
- System time & date
- Cloud sync status
- General status
- Last error message

Counter test / measurement



1 - **Status screen**

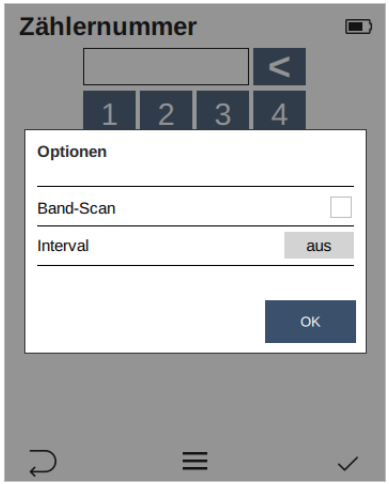
Clicking on „COUNTER TEST“ will take you to the counter input screen.



2 - Counter test

Here they can enter the number of the meter at the test location.
Alphanumeric entries are also possible to enter meter point designations.

Confirm your input by pressing the right Enter key.

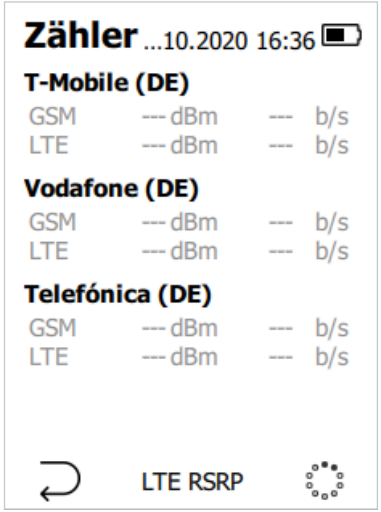


2.1 - Additional measurement functions

By clicking on the middle enter button, you will get to further measurement options.

You can set a band scan or a measurement interval here to perform several measurements in succession.

If you want to cancel the operation, press the left Enter key on the device.



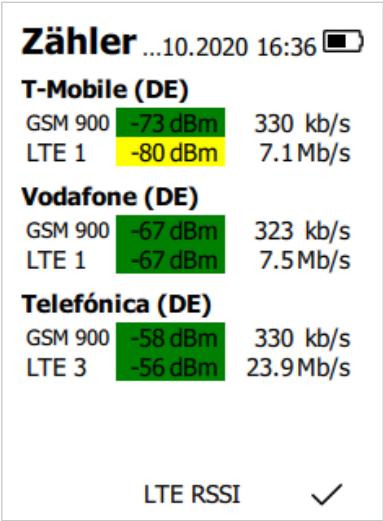
3 - Measurement

The measurement to the previously entered meter number is started.You can see live the progress for the respective provider & mobile standard. During the measurement, numerous technical data are recorded.

You can choose between RSRQ, RSRP and RSSI display. The band used is displayed directly (LTE, LTE+ and LTEmax).

You can cancel this process at any time by pressing the left Enter key.

If you want to customize the list of providers and/or standards to be measured, you can select this via the start screen under the „Provider“ item.

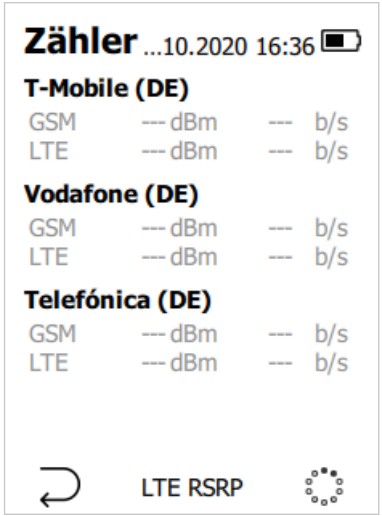


4 - **Measurement result**

When the measurement is complete, you can view the data directly.

By pressing the right enter key you confirm the measurement.the data are now available for export.(LTE only LTE+)

ATTENTION: The data for this specific measurement can then only be displayed there and no longer directly on the device.



5 - **Data export**

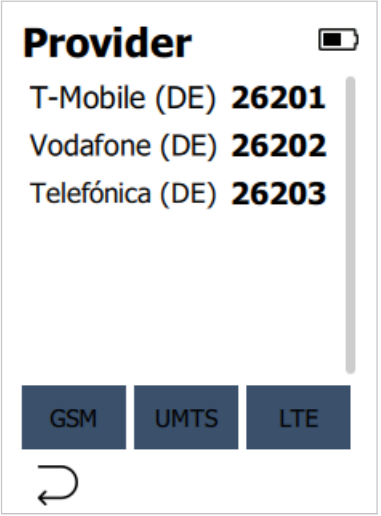
Once you have confirmed the measurement, you will return to the start screen.

A small symbol now appears at the top of the display when „EXPORT“ is selected. This indicates that a measurement from the device is ready for export. The number indicates how many new measurements are currently available. (LTE and LTE+)

Signal

1 - Start screen

From the home screen, click on „SIGNAL“ to access the feature to measure the current attenuation of the signal for a provider & standard live.

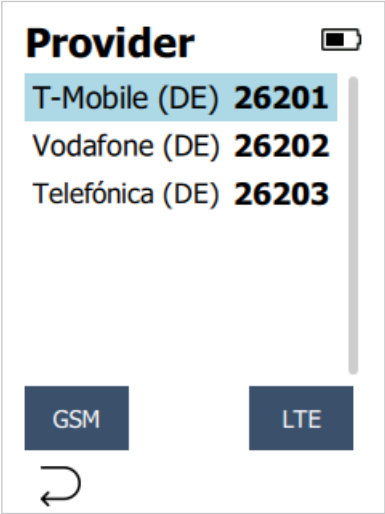


2 - **Signal**

After clicking on Signal you have the possibility to choose the desired provider.

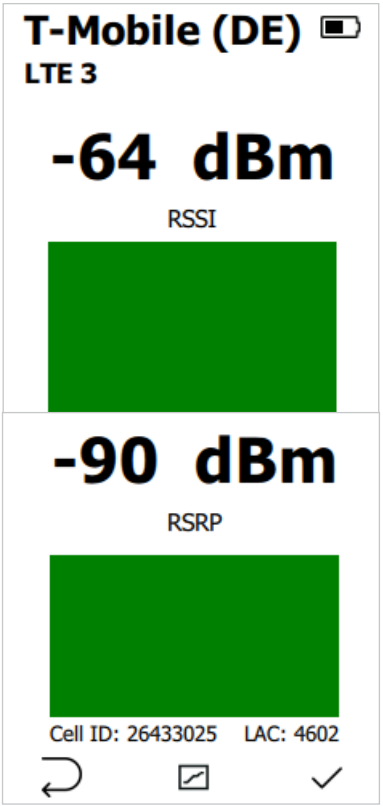
Click on a desired provider and then on the desired standard at the bottom, for live signal measurement of attenuation.You can cancel the process if you click on the arrow at the bottom left.

Then you will return to the home screen.



3 - **Provider selection**

When you have selected the provider and the standard, you can start the measurement by pressing the Enter key at the bottom right.



4 - Live display

The bar rises and turns from red to yellow to green, the better the currently measured attenuation turns out to be.

The traffic light is defined as follows for the RSSI measurement:

RSSI > -80	RSSI > -105	RSSI > -125	RSSI <

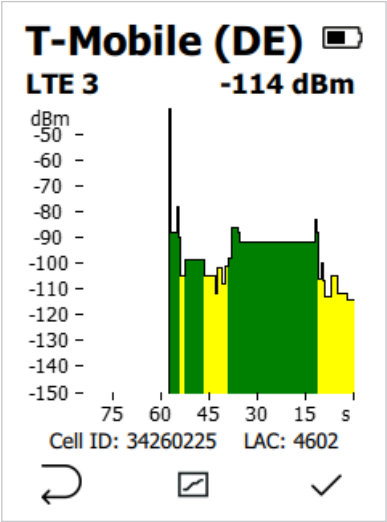
(LTE, LTE+ and LTEmax)

Depending on the technology and device configuration, the attenuation (RSSI), the signal quality (RSRP) or the reference signal (RSRQ) is displayed here.

Additionally, the currently used cell is displayed with Cell ID and LAC.

Pressing the left Enter key will take you back to the previous selection.

Confirm the measurement with the right enter key, you will return to the start screen.



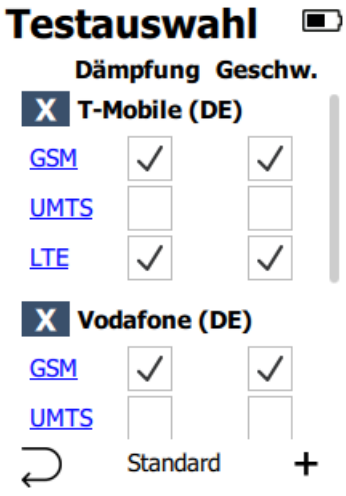
5 - Live display bar graph

Pressing the middle Enter key or pressing the history symbol on the touchscreen takes you to a bar graph. This is a visualization of the attenuation values measured over time. (LTE, LTE+ and LTEmax)

Provider - selection and editing

1 - Start screen

From the home screen, click on „PROVIDER“ to access the feature to customize the list of providers & standards to be tested.



2 - Test selection / setting of bands and frequencies

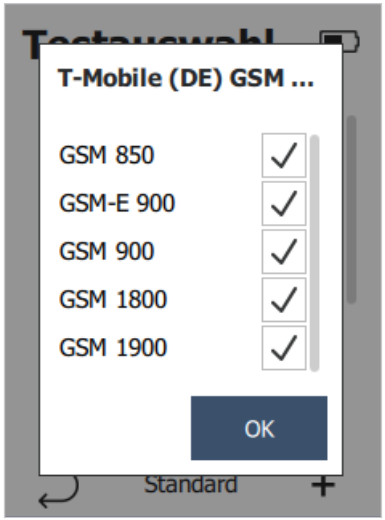
Click on „X“ to remove a provider from the list. Otherwise you can switch on/off the individual standards or the attenuation measurement or the data speed measurement.

By clicking on the respective standard (GSM / UMTS / LTE), you can make settings for these with regard to the bands and frequencies (step 2.1-2.3).

Pressing the left Enter key will take you back to the Home screen.

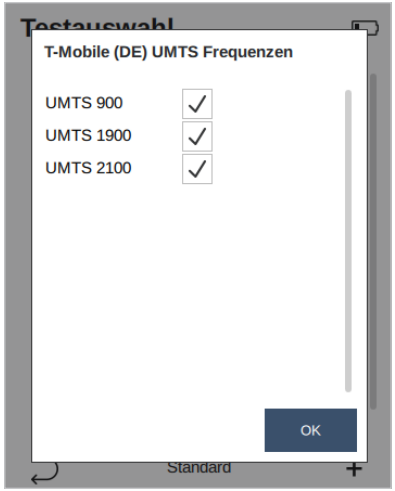
Pressing the middle Enter key will set the default configuration (see Step 3).

By pressing the right Enter key, you can add a provider to the list (see step 4).



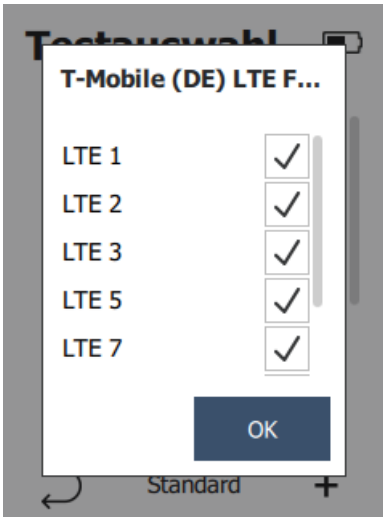
2.1 - **Ex. settings GSM Telekom**

In the displayed list you can select the frequencies to be tested in the GSM network and confirm them with OK.



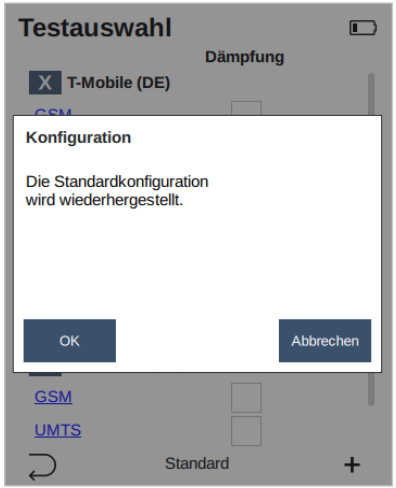
2.2 - Ex. settings UMTS Telekom

In the displayed list you can select the frequencies to be tested in the UMTS network and confirm them with OK.



2.3 - Ex. settings LTE Telekom

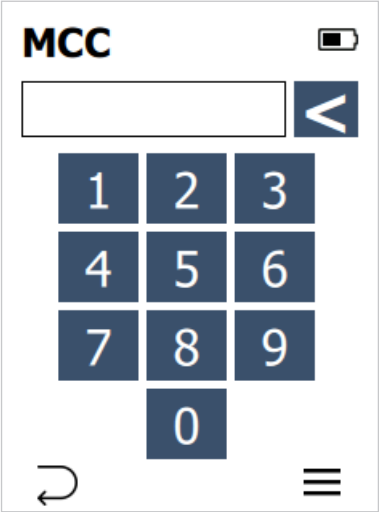
In the list that appears, you can select the frequencies to be tested in the LTE network and confirm them with OK.



3 - **Default restore**

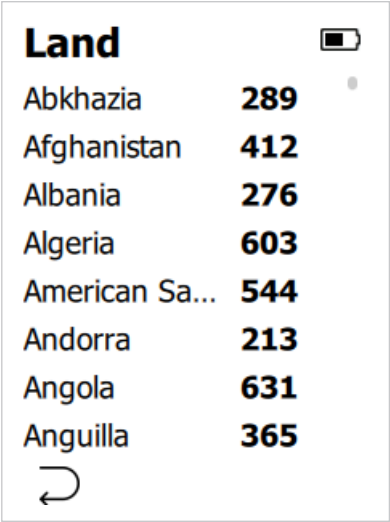
If you pressed the middle Enter key in the step before, you will get the warning message to reset the provider configuration.

With OK you confirm this, with CANCEL the current configuration remains.



4 - Add provider

If you pressed „+“ in the step before, you will get this input mask.
If you know the MCC (country code) of the desired provider, you can enter it here.
Using the right Enter key, you can access the MCC overview.You can cancel the process by pressing the left Enter key.
If you have accidentally deleted a provider, you can add it again this way. (LTE, LTE+ and LTEmax)



5 - **MCC overview**

First find the country code of the provider you want to add. Mark it by clicking on the entry and then confirm with the right enter key.
The NT supports all providers in the EU, worldwide on request.
You can cancel the process by pressing the left enter key.

6 - Provider Choice

Select the appropriate provider by clicking on it and confirm the operation by pressing the right Enter key.
The provider has now been added to the list for measurements etc.Y ou can cancel the operation by pressing the left Enter key.

Datenexport LTE und LTE+

1 - Export

From the start screen, click on „Export“ to access the feature to export your measurement data from the handheld device.

2- Hotspot

After pressing „Export“, your Netztester LTE will automatically open a hotspot.
Connect to a desired WLAN-enabled device using the displayed SSID (network name) and PSK (password / enter hyphens as well).
Then enter the specified URL (IP address) in the browser.

As soon as you have successfully established the connection and entered the URL in the browser on your end device, you will see the following screen, which provides you with various options in addition to the ID of your device:

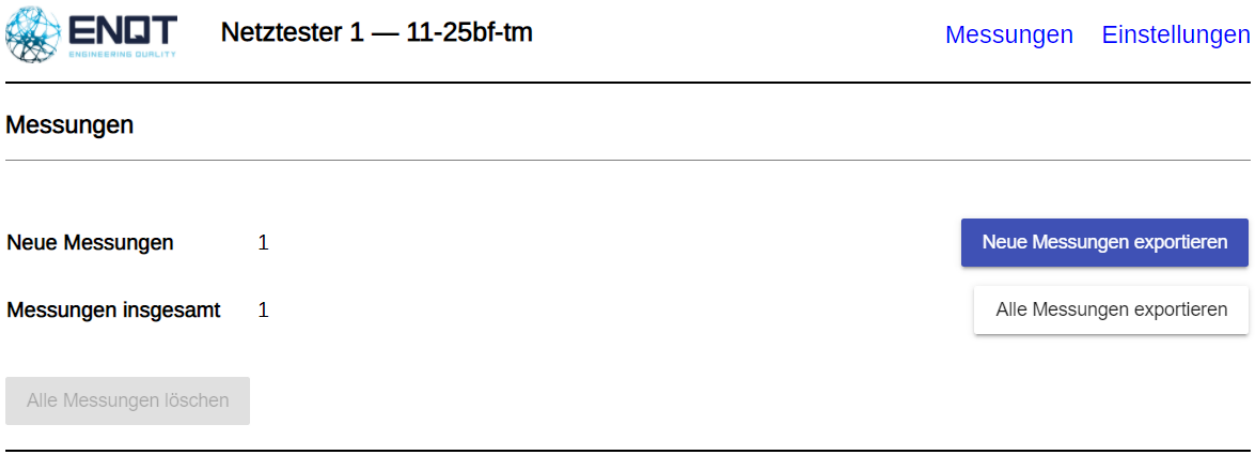


Figure 1: Network tester LTE export browser view

You start in the Measurements area. The currently available new measurements and the total number of measurements are displayed here. You now have the option to export only the new measurements or to export all existing measurements together.

You can also delete the saved measurement data at this point.

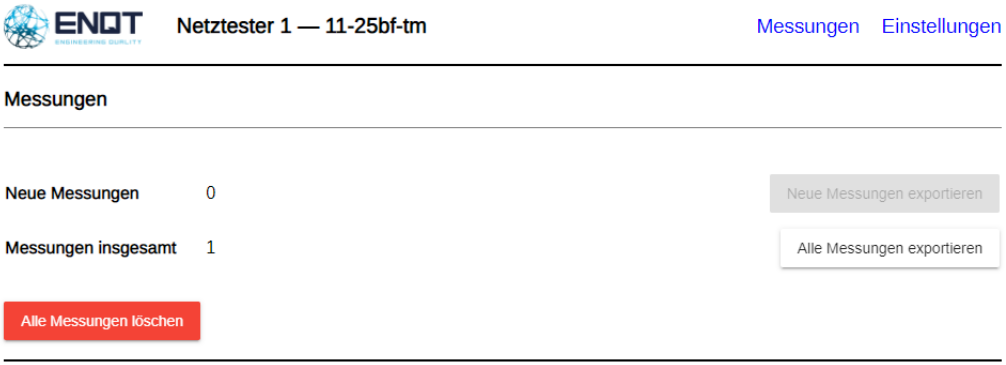


Figure 2: Network tester LTE export browser view 2

However, this only works if you have successfully exported the measurement data at least once (security function).
The measurement values are output as a .csv file.

In addition to the measurements, you also have the option of viewing further information about your terminal device. This can be very helpful, especially in the event of a fault clearance. You can also synchronize the system time with that of your terminal device, view the current firmware version and download the error log.

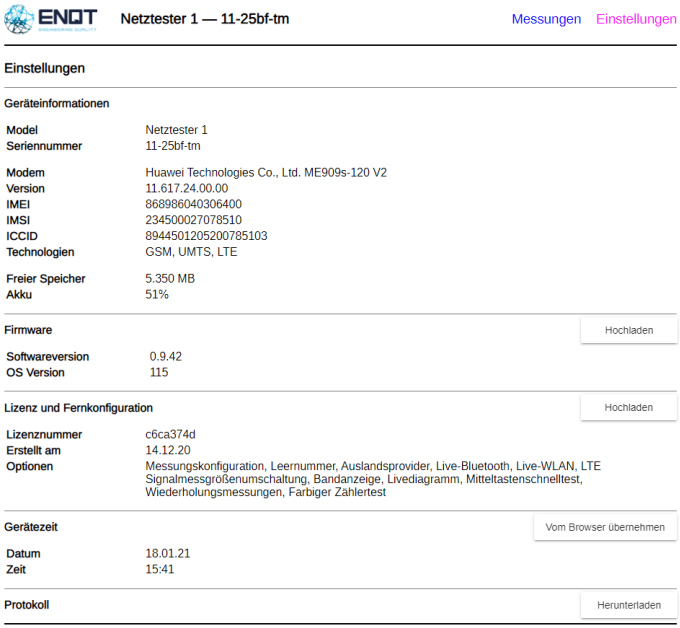


Figure 3: Network tester LTE export browser view 3

Data export LTEmax

The NT LTEmax sends the measured meter reading data directly to the measurement data portal provided by ENQT. You can access this via https://tmate.de/login. With your access data you can download all past measurements as often as you like. The output as .csv files can be read out in e.g. MS Excel.

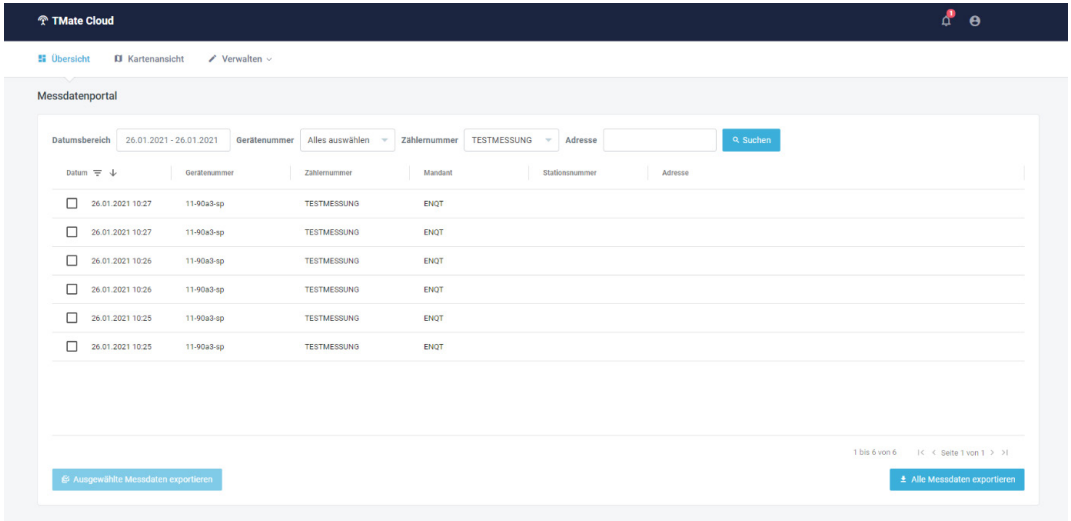


Figure 4: Measurement data on the TMate Cloud

Explanation of the measurement data

When exporting the .csv file, various data are shown, which require a more detailed explanation. The column „Value range“ is filled only if necessary.

Value of the .csv file	Meaning	Value range
ARFCN	Frequency number used	-
BAND	Band used (2G)	-
BSIC	Base Station Identity Code (2G)	-
Cell_ID	Cell ID / base station number	-
Client*	Assigned customer account	-
device_id	Hardware serial number of the device	-
DRX	Discontinous Reception	-
EC/N0	RSCP/ RSSI	-

*Only available with TMate.de portal access.

frequency	Approved frequency bands for the test (can be restricted on the device)	-
LAC	Location Area Code / Base Station Area	-
lte_sinr	Signal to Interference & Signal to Noise Ratio	-
MCC	Country code	-
measurement_date	Date and time of the measurement	-
Meter_id	Meter number entered on the device	-
MNC	Calculated position of the base station (lat)	-
network_bts_location_lat*	Calculated position of the base station (long)	-
network_bts_location_long*	Error codes	-
network_error	Technology used	-
network_technology	Network operator name	LTE/UMTS/GSM

*Only available with TMate.de portal access.

Operator	Network operator name	Ex. Telekom, Telefonica & Vodafone
PCI	Physical Cell Identifier	-
ping_avg*	Average package runtime	-
ping_max*	Maximum package runtime	-
ping_min*	Minimum package runtime	-
Ping_packet_loss*	Packets lost during runtime measurement	Ideal 0
PSC	Synchronization code	-
RSCP	Received Signal Code Power	0 dBm to -124 dBm
RSRP	Receive level reference signal	-150 dBm to -50 dBm
RSRQ	Receive quality reference signal	-0 dBm to -20 dBm
RSSI	Signal attenuation	0 dBm to -125 dBm

*Only available with TMate.de portal access.

RXLEV	Network feedback of the terminal RSSI (can be converted to RSSI bands, larger = better reception)	-
RxQuality	Voice quality (2G) smaller=better	0 – 7
speed_download*	Download speed (bit/s)	Ideal: >1000000
speed_upload*	Upload speed (bit/s)	Ideal: >1000000
station_id*	Station number	-
TA	Terminal adapter	-
TAC	Tracking area code	-
URA	UTRAN registration area	-
wcdma_ecio	UMTS signal quality	0 to -20

*Only available with TMate.de portal access.

Broken down value ranges

The color coding corresponds to the visualization of the meter.

GSM (dBm)	LTE RSRP (dBm)
Bis -70	Bis -84
-70 bis -85	-85 bis -102
-86 bis -100	-103 bis -111
Ab -100	Ab -111

- **Gute Signalstärke** - Im grünen Wertebereich ist ein problemloser Einbau möglich.
- **Riskante Signalstärke** - Ab einem gelben und orangen Messwert ist mit Verbindungsabbrüchen zu rechnen.
- **Keine ausreichende Signalstärke** - Im roten Bereich ist von regelmäßigen Verbindungsabbrüchen oder keiner Verbindung auszugehen.

FAQ

Which antennas can be used with the network tester?
All antennas with SMA connection can be connected. Further antennas can be connected via corresponding adapters (e.g. SMA to FAKRA).

Which antenna connector must be used if the antenna has only one connector?
The right antenna connector, this is for the main antenna.

Why can't I connect with a station antenna, but I can with the supplied antenna?
Please check the SMA connector of the antenna. If the antenna connector does not have a central pin, an adapter from Female-SMA to Male-SMA must be used (optionally available).

I get good attenuation values in the green range, why can't I connect anyway?

Possible causes:
- The signal is disturbed, i.e. other participants are still transmitting on the same frequency.
- The cellular base station is overloaded.
- The mobile phone base station is currently disturbed.
- There is a general network malfunction (Internet outage).

Please check with your contact at the respective network operator for further information about network disturbances and current maintenance work.

Which LTE bands are measured in?

The device supports all currently used LTE bands. The exact information about the band used can be found in the .csv file from the measurement data portal. If desired, you can configure the device so that only certain bands are measured.

How can the measurement data be retrieved?

Currently, retrieval is only possible via the measurement data portal. With the NT LTE, LTE+ and LTEmax, the measurement data can be exported via WLAN to a desired device as a .csv file.

Are there video tutorials on how to use the meters?

Yes! On our homepage you will find many explanatory videos on the operation of our measuring instruments.

Country codes

Source: https://de.wikipedia.org/wiki/Mobile_Country_Code

2 – Europe

ID	Country
202	Greece
204	Netherlands
206	Belgium
208	France
212	Monaco
213	Andorra
214	Spain
216	Hungary
218	Bosnia and Herzegovina
219	Croatia
220	Serbia
221	Kosovo
222	Italy
225	Vatican City
226	Romania
228	Switzerland
230	Czech Republic
231	Slovakia
232	Austria
234	United Kingdom
235	United Kingdom
238	Denmark
240	Sweden
242	Norway
244	Finland
246	Lithuania
247	Latvia
248	Estonia
250	Russia
255	Ukraine
257	Belarus
259	Moldova
260	Poland
262	Germany
266	Gibraltar
268	Portugal
270	Luxembourg
272	Irland
274	Iceland
276	Albania
278	Malta
280	Cyprus
282	Georgia
283	Armenia
284	Bulgaria
286	Turkey
288	Faroe Islands
290	Greenland
292	San Marino
293	Slovenia
294	Macedonia
295	Liechtenstein
297	Montenegro

3 – North America / Caribbean

This grouping is not congruent with the participants in the North American Numbering Plan.

ID	Country
302	Canada
308	Saint-Pierre und Miquelon
310	USA
311	USA
312	USA
313	USA
314	USA
315	USA
316	USA
330	Puerto Rico
332	American Virgin Islands
334	Mexico
338	Jamaica
340	Guadeloupe
340	Martinique
342	Barbados
344	Antigua and Barbuda
346	Cayman Islands
348	British Virgin Islands
350	Bermuda
352	Grenada
354	Montserrat
356	St. Kitts and Nevis
358	St. Lucia
360	St. Vincent and the Grenadines
362	Netherlands Antilles
363	Aruba
364	Bahamas
365	Anguilla
366	Dominica
368	Cuba
370	Dominican republic
372	Haiti
374	Trinidad andTobago
376	Turks and Caicos Islands

4 – Asia

ID	Country
400	Azerbaijan
401	Kazakhstan
402	Bhutan
404	India
405	India
410	Pakistan
412	Afghanistan
413	Sri Lanka
414	Myanmar
415	Lebanon
416	Jordan
417	Syria
418	Iraq
419	Kuwait
420	Saudi Arabia
421	Yemen
422	Oman
424	United Arab Emirates
425	Israel
426	Bahrein
427	Qatar

428	Mongolia
429	Nepal
430	United Arab Emirates
431	United Arab Emirates
432	Iran
434	Uzbekistan
436	Tajikistan
437	Kyrgyzstan
438	Turkmenistan
440	Japan
441	Japan
450	South Korea
452	Vietnam
454	Hong Kong
455	Macao
456	Kambodscha
457	Laos
460	China
461	China
466	Taiwan
467	North Korea
470	Bangladesch
472	Maldives

5 – Oceania

ID	Country
502	Malaysia
505	Australia
510	Indonesia
514	East Timor
515	Philippines
520	Thailand
525	Singapore
528	Brunei
530	New Zealand
534	Northern Mariana Islands
535	Guam
536	Nauru
537	Papua-Neuguinea
539	Tonga
540	Salomons
541	Vanuatu
542	Fiji
543	Wallis andFutuna
544	American Samoa
545	Kiribati
546	New Caledonia
547	French Polynesia
548	Cook Islands
549	Samoa
550	Federated States of Micronesia
551	Marshall Islands
552	Palau

6 – Africa

ID	Country
602	Egypt
603	Algeria
604	Morocco
605	Tunisia
606	Libya
607	Gambia
608	Senegal
609	Mauritania
610	Mali
611	Guinea
612	Ivory Coast
613	Burkina Faso
614	Niger
615	Togo

616	Benin
617	Mauritius
618	Liberia
619	Sierra Leone
620	Ghana
621	Nigeria
622	Tschad
623	Central African Republic
624	Cameroon
625	Kap Verde
626	São Tomé and Príncipe
627	Equatorial Guinea
628	Gabun
629	Republic of the Congo
630	Democratic Republic of Congo
631	Angola
632	Guinea-Bissau
633	Seychelles
634	Sudan
635	Ruanda
636	Ethiopia
637	Somalia
638	Djibouti
639	Kenya
640	Tanzania
641	Uganda
642	Burundi
643	Mozambique
645	Zambia
646	Madagascar
647	Réunion
648	Zimbabwe
649	Namibia
650	Malawi
651	Lesotho
652	Botswana
653	Swaziland
654	Comoros
655	South Africa
657	Eritrea
710	Nicaragua
712	Costa Rica
714	Panama
716	Peru
722	Argentina
724	Brazil
730	Chile
732	Colombia
734	Venezuela
736	Bolivia
738	Guyana
740	Ecuador
742	French Guiana
744	Paraguay
746	Suriname
748	Uruguay

7 – Central and South America

ID	Country
702	Belize
704	Guatemala
706	El Salvador
708	Honduras

Other

ID	Country
001	Test networks
901	Worldwide

Licenses & other information

Open Source Software

The device uses open source software, on request you will receive a corresponding license list and source code.

Disposal

The device uses open source software, on request you will receive a corresponding license list and source code.

Document versions

Name	Date	Reason for change	Version
M. Richter	20181107	Initial fabrication	0.1.0
M. Richter	20181122	Adjustments & corrections	0.2.0
C. Niemöller	09.06.2020	Adaptations to current software	1.0
M. Block	27.10.2020	Name adjustment	1.1
M. Block	14.12.2020	Customization of the product variants	1.2
T. Bergs	01.02.2021	Delimitation of the product variants	1.3

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