

# R&S<sup>®</sup>ZNH

## Handheld Vector Network Analyzer

### Getting Started



1334597902  
Version 03

**ROHDE & SCHWARZ**  
Make ideas real



This manual applies to the following R&S®ZNH models with firmware version 1.10 and higher

- R&S®ZNH4 (1321.1611.04)
- R&S®ZNH8 (1321.1611.08)
- R&S®ZNH18 (1321.1611.18)
- R&S®ZNH26 (1321.1611.26)
- R&S®ZNH4 (1321.1611.54, equivalent to 1321.1611.04)
- R&S®ZNH8 (1321.1611.58, equivalent to 1321.1611.08)
- R&S®ZNH18 (1321.1611.68, equivalent to 1321.1611.18)
- R&S®ZNH26 (1321.1611.76, equivalent to 1321.1611.26)

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Subject to change – data without tolerance limits is not binding.

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Trade names are trademarks of the owners.

1334.5979.02 | Version 03 | R&S®ZNH

The following abbreviations are used throughout this manual: R&S®ZNH is abbreviated as R&S ZNH.

# Safety Instructions

## Instrucciones de seguridad

### Sicherheitshinweise

### Consignes de sécurité

---

#### **WARNING**

##### **Risk of injury and instrument damage**

The instrument must be used in an appropriate manner to prevent electric shock, fire, personal injury or instrument damage.

- Do not open the instrument casing.
  - Read and observe the "Basic Safety Instructions" delivered as printed brochure with the instrument.
  - Read and observe the safety instructions in the following sections. Note that the data sheet may specify additional operating conditions.
  - Keep the "Basic Safety Instructions" and the product documentation in a safe place and pass them on to the subsequent users.
- 

#### **ADVERTENCIA**

##### **Riesgo de lesiones y daños en el instrumento**

El instrumento se debe usar de manera adecuada para prevenir descargas eléctricas, incendios, lesiones o daños materiales.

- No abrir la carcasa del instrumento.
  - Lea y cumpla las "Instrucciones de seguridad elementales" suministradas con el instrumento como folleto impreso.
  - Lea y cumpla las instrucciones de seguridad incluidas en las siguientes secciones. Se debe tener en cuenta que las especificaciones técnicas pueden contener condiciones adicionales para su uso.
  - Guarde bien las instrucciones de seguridad elementales, así como la documentación del producto, y entréguelas a usuarios posteriores.
-



## **WARNUNG**

### **Gefahr von Verletzungen und Schäden am Gerät**

Betreiben Sie das Gerät immer ordnungsgemäß, um elektrischen Schlag, Brand, Verletzungen von Personen oder Geräteschäden zu verhindern.

- Öffnen Sie das Gerätegehäuse nicht.
  - Lesen und beachten Sie die "Grundlegenden Sicherheitshinweise", die als gedruckte Broschüre dem Gerät beiliegen.
  - Lesen und beachten Sie die Sicherheitshinweise in den folgenden Abschnitten; möglicherweise enthält das Datenblatt weitere Hinweise zu speziellen Betriebsbedingungen.
  - Bewahren Sie die "Grundlegenden Sicherheitshinweise" und die Produktdokumentation gut auf und geben Sie diese an weitere Benutzer des Produkts weiter.
- 



## **AVERTISSEMENT**

### **Risque de blessures et d'endommagement de l'appareil**

L'appareil doit être utilisé conformément aux prescriptions afin d'éviter les électrocutions, incendies, dommages corporels et matériels.

- N'ouvrez pas le boîtier de l'appareil.
  - Lisez et respectez les "consignes de sécurité fondamentales" fournies avec l'appareil sous forme de brochure imprimée.
  - Lisez et respectez les instructions de sécurité dans les sections suivantes. Il ne faut pas oublier que la fiche technique peut indiquer des conditions d'exploitation supplémentaires.
  - Gardez les consignes de sécurité fondamentales et la documentation produit dans un lieu sûr et transmettez ces documents aux autres utilisateurs.
-

# Safety instructions for rechargeable lithium ion batteries

**⚠ WARNING**

**Risk of serious personal injury or even death.**

You must fully observe the following instructions in order to avoid serious personal injury – or even death – due to an explosion and/or fire.

1. Do not dismantle, open or crush the batteries or drop them from a great height. If mechanical damage occurs, there is a risk that chemicals may be released. Gases that are released can cause breathing difficulties. Immediately ventilate the area and in serious cases consult a doctor.  
Irritation can occur if the chemicals that are released come in contact with the skin or eyes. If this happens, immediately and thoroughly rinse the skin or eyes with water and consult a doctor.
2. Do not expose cells or batteries to heat or fire. Do not store them in direct sunlight. If overheating occurs, there is the risk of an explosion or a fire, which can lead to serious personal injuries.
3. Keep the batteries clean and dry. If the terminals become soiled, clean them with a dry, clean cloth.
4. Charge the batteries prior to using them.  
Only use the appropriate Rohde & Schwarz charger to charge the batteries. See the device manual or data sheet for the exact designation of the charger.  
If the batteries are improperly charged, there is a risk of explosion, which can cause serious personal injury.
5. The charging temperature must be between 0 °C and 45 °C (see manual for information on possible restrictions).
6. Discharging may take place only at temperatures between 0 °C and 50 °C (see manual for information on possible restrictions).
7. Only charge batteries until they are fully charged. Frequent overcharging can reduce the battery lifetime.
8. Remove the battery from the device when the battery is not being used. Following a longer period of storage, it may be necessary to charge and discharge the battery several times in order to obtain the full capacity.
9. Only use the battery with designated Rohde & Schwarz devices. See the device manual for details.
10. Do not dispose of the batteries with unsorted municipal waste. The batteries must be collected separately. After the end of their life, dispose of the batteries at a suitable collection point or via a Rohde & Schwarz customer service center.



EU labeling for batteries and secondary cells

11. Follow the transport stipulations of the carrier (IATA-DGR, IMDG-Code, ADR, RID) when returning lithium batteries to Rohde & Schwarz subsidiaries.
12. Keep this safety information for future reference.

# Instrucciones de seguridad para baterías recargables de ión litio

## **ADVERTENCIA**

**Posibilidad de lesiones graves que en determinadas circunstancias puede causar la muerte.**

Tenga en cuenta los siguientes avisos en caso de explosión y/o incendio para impedir lesiones graves en personas que, en determinadas circunstancias, podrían incluso causar la muerte.

1. No desarme las baterías, no las abra, no las triture ni las deje caer desde una gran altura.  
En caso de daños mecánicos existe el riesgo de salida de sustancias químicas. En caso de salida de gases pueden producirse dificultades respiratorias. Ventile inmediatamente la habitación y acuda a un médico en casos graves.  
Si sustancias químicas provenientes de la batería entran en contacto con la piel o los ojos pueden producirse irritaciones. Enjuague en estos casos la piel y los ojos inmediatamente con abundante agua y acuda a un médico.
2. No exponga las celdas o baterías al calor ni al fuego. No las almacene bajo la luz solar directa. En caso de sobrecalentamiento existe peligro de explosión o de incendio, lo que puede provocar lesiones graves en personas.
3. Mantenga las baterías limpias y secas. Si los conectores están sucios, límpielos con un paño seco y limpio.
4. Cargue las baterías antes de su uso.  
Solamente está permitido cargar la batería con el correspondiente cargador de Rohde & Schwarz. Consulte en el manual o en las especificaciones técnicas del equipo la denominación exacta del cargador.  
Si las baterías se cargan de forma incorrecta existe peligro de explosión, lo que podría causar lesiones graves en personas.
5. La temperatura de carga debe encontrarse entre 0 °C y 45 °C (consulte el manual para posibles restricciones).
6. La descarga solamente puede efectuarse entre 0 °C y 50°C (consulte el manual para posibles restricciones).
7. Cargue las baterías solamente el tiempo necesario hasta que se hayan cargado por completo. La sobrecarga frecuente reduce la vida útil de la batería.
8. Extraiga la batería del equipo si no se va a utilizar. Después de un periodo de almacenamiento prolongado puede ser necesario cargar y descargar varias veces la batería para recuperar su capacidad completa.
9. Utilice la batería exclusivamente con los equipos Rohde & Schwarz correspondientes. Consulte para ello el manual del equipo.
10. No elimine las baterías junto con los residuos urbanos sin clasificar, sino por separado. Para eliminar la batería una vez finalizada su vida útil, diríjase a un punto de recogida de residuos adecuado o a una oficina de representación de Rohde & Schwarz.  
Etiquetado de la UE para baterías y acumuladores
11. En caso de devolver baterías de litio a las filiales de Rohde & Schwarz, debe cumplirse las normativas sobre los modos de transporte (IATA-DGR, código IMDG, ADR, RID).
12. Conserve estas instrucciones de seguridad para fines de información y consulta posterior.

# Sicherheitshinweise für wiederaufladbare Li-Ion-Batterien

## **WARNUNG**

### **Mögliche schwere Verletzungen, unter Umständen mit Todesfolge.**

Beachten Sie die folgenden Hinweise vollständig, um schwere Verletzungen von Personen - unter Umständen mit Todesfolge - durch Explosion und/oder Brand zu verhindern.

1. Batterien nicht zerlegen, öffnen, zerkleinern oder aus großer Höhe fallen lassen. Bei mechanischer Beschädigung besteht die Gefahr des Austritts von Chemikalien. Austretende Gase können zu Atembeschwerden führen. Sofort lüften, in schweren Fällen einen Arzt konsultieren.  
Bei Haut- oder Augenkontakt mit austretenden Chemikalien können Hautirritationen und Reizungen auftreten. In diesen Fällen die Haut oder Augen sofort gründlich mit Wasser ausspülen und einen Arzt konsultieren.
2. Zellen oder Batterien weder Hitze noch Feuer aussetzen. Nicht im direkten Sonnenlicht lagern. Bei Überhitzung besteht die Gefahr einer Explosion oder eines Brandes, was zu schweren Verletzungen bei Personen führen kann.
3. Batterien sauber und trocken halten. Falls die Anschlüsse verschmutzt sind, mit einem trockenen, sauberen Tuch reinigen.
4. Batterien vor dem Gebrauch laden.  
Die Batterie darf ausschließlich mit dem entsprechenden Rohde & Schwarz Ladegerät geladen werden. Siehe Handbuch oder Datenblatt des Gerätes für die genaue Bezeichnung des Ladegerätes.  
Wenn Batterien unsachgemäß geladen werden, besteht Explosionsgefahr, was zu schweren Verletzungen bei Personen führen kann.
5. Die Ladetemperatur muss zwischen 0 °C und 45 °C betragen (für mögliche Einschränkungen siehe Handbuch).
6. Ein Entladen darf nur zwischen 0 °C und 50 °C erfolgen (für mögliche Einschränkungen siehe Handbuch).
7. Batterien nur so lange laden, bis sie vollständig aufgeladen sind. Ein häufiges Überladen führt zu einer geringeren Lebensdauer der Batterie.
8. Die Batterie aus dem Gerät entfernen, wenn sie nicht benutzt wird. Nach längerer Lagerzeit kann es erforderlich sein, die Batterie mehrmals zu laden und zu entladen, um die volle Leistungsfähigkeit zu erlangen.
9. Die Batterie nur mit dafür vorgesehenen Rohde & Schwarz-Geräten betreiben. Siehe dazu das Handbuch des Gerätes.
10. Die Batterien nicht über unsortierten Siedlungsabfall entsorgen, sondern getrennt sammeln. Nach Ende der Lebensdauer über eine geeignete Sammelstelle oder eine Rohde&Schwarz-Kundendienststelle entsorgen.  
EU - Kennzeichnung für Batterien und Akkumulatoren
11. Bei Rücksendungen von Lithiumbatterien zu Rohde & Schwarz - Niederlassungen müssen die Transportvorschriften der Verkehrsträger (IATA-DGR, IMDG-Code, ADR, RID) befolgt werden.
12. Diese Sicherheitsinformationen für zukünftige Informations- und Nachschlagezwecke aufbewahren.





# Consignes de sécurité pour batteries rechargeables lithium-ion

## AVERTISSEMENT

### Risque de blessures graves pouvant entraîner la mort.

Respecter intégralement les consignes ci-dessous afin d'éliminer tout risque de blessures graves voire mortelles par suite d'explosion et/ou d'incendie.

1. Ne pas démonter, ouvrir ou découper les batteries ni les faire tomber d'une hauteur importante. Des produits chimiques peuvent s'écouler en cas de détérioration mécanique et les gaz libérés peuvent provoquer des difficultés respiratoires. Aérer immédiatement les locaux. Dans les cas graves, consulter un médecin. Si la peau ou les yeux entrent en contact avec les produits chimiques libérés, des irritations peuvent se produire. Rincer immédiatement et abondamment la peau ou les yeux à l'eau claire et consulter un médecin.
2. Ne pas exposer les cellules ou les batteries à la chaleur ou au feu. Ne pas les stocker dans un endroit exposé à la lumière directe du soleil. Toute surchauffe risque de provoquer une explosion ou un incendie, ce qui peut entraîner des blessures graves.
3. Conserver les batteries dans un lieu sec et propre. Nettoyer les points de contact sales à l'aide d'un chiffon sec et propre.
4. Charger les batteries avant utilisation. Utiliser seulement le chargeur Rohde & Schwarz approprié pour recharger les batteries. Les références exactes du chargeur sont indiquées dans le manuel ou la fiche technique de l'appareil. Une recharge incorrecte des batteries peut entraîner des explosions susceptibles de causer des blessures graves.
5. Recharger impérativement à des températures comprises entre 0 °C et 45 °C (restrictions éventuelles : voir le manuel).
6. Décharger impérativement à des températures comprises entre 0 °C et 50 °C (restrictions éventuelles : voir le manuel).
7. Terminer la charge dès que les batteries sont complètement rechargées. Une surcharge répétée diminue la longévité des batteries.
8. Retirer les batteries de l'appareil lorsqu'elles ne sont pas utilisées. Après un stockage prolongé, plusieurs cycles de recharge et de décharge peuvent s'avérer nécessaires pour rétablir la pleine capacité des batteries.
9. Utiliser les batteries exclusivement dans les appareils Rohde & Schwarz auxquels elles sont destinées. Voir le manuel fourni avec chaque appareil.



10. Ne pas éliminer les batteries avec les déchets municipaux non triés mais s'assurer qu'elles soient collectées séparément. Recycler les batteries en fin de vie en les confiant à un point de collecte compétent ou à un point de service après-vente Rohde & Schwarz.

Marquage UE pour batteries et accumulateurs

11. Lors des renvois de batteries au lithium à des filiales Rohde & Schwarz, il convient de respecter les prescriptions de transport (IATA-DGR, code IMDG, ADR, RID) fixées par les transporteurs.
12. Conserver ces consignes de sécurité de sorte à pouvoir vous y reporter ou vérifier ultérieurement certains points.



# Customer Support

## **Technical support – where and when you need it**

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

## **Contact information**

Contact our customer support center at [www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support), or follow this QR code:



*QR code to the Rohde & Schwarz support page*

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# 1 Documentation Overview

This section provides an overview of the R&S ZNH user documentation.

## 1.1 Manuals

You find the documents on the R&S ZNH product page at:

<http://www.rohde-schwarz.com/manual/znh>

### Getting started manual

Introduces the R&S ZNH and describes how to set up and start working with the product. The printed document is delivered with the instrument.

### User manual

Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance and instrument interfaces. Includes the contents of the getting started manual.

The *online version* of the user manual provides the complete contents for immediate display on the internet.

### Basic safety instructions

Contains safety instructions, operating conditions and further important information. The printed document is delivered with the instrument.

### Service manual

Describes the performance test for checking the rated specifications, module replacement and repair, firmware update, troubleshooting and fault elimination, and contains mechanical drawings and spare part lists. The service manual is available for registered users on the global Rohde & Schwarz information system (GLORIS, <https://gloris.rohde-schwarz.com>).

## 1.2 Data Sheet

The data sheet contains the technical specifications of the R&S ZNH. It also lists the options and their order numbers as well as optional accessories.

The brochure provides an overview of the R&S ZNH and shows its specific characteristics.

<http://www.rohde-schwarz.com/brochure-datasheet/znh>

## 1.3 Calibration Certificate

The document is available on <https://gloris.rohde-schwarz.com/calcert>. You need the device ID of your instrument, which you can find on a label on the rear panel.

## 1.4 Release Notes, Open Source Acknowledgment

The release notes list new features, improvements and known issues of the current firmware version, and describe the firmware installation.

The open source acknowledgment document provides verbatim license texts of the used open source software.

<http://www.rohde-schwarz.com/firmware/znh>

## 1.5 Application Notes, Application Cards, Videos

These documents contain information about possible applications and background information on various topics, see [www.rohde-schwarz.com/appnotes](http://www.rohde-schwarz.com/appnotes)

## 2 Welcome to the R&S ZNH

The R&S ZNH is a new generation Rohde & Schwarz vector network analyzer developed to meet demanding customer requirements. Offering touchscreen input, the analyzer enhances user experience in making measurements fast and easy.

This user manual contains a description of the functionality that the instrument provides. The latest version is available for download at the product homepage (<http://www.rohde-schwarz.com/product/znh.html>).

## 3 Preparing for Use

### 3.1 Putting into Operation

This chapter describes the basic steps to be taken when setting up the R&S ZNH for the first time.

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**⚠ WARNING****Risk of injury due to disregarding safety information**

Observe the information on appropriate operating conditions provided in the data sheet to prevent personal injury or damage to the instrument. Read and observe the basic safety instructions provided with the instrument, in addition to the safety instructions in the following sections. In particular:

- Do not open the instrument casing.
- 

**NOTICE****Risk of instrument damage due to inappropriate operating conditions**

Specific operating conditions are required to ensure accurate measurements and to avoid damage to the instrument. Observe the information on appropriate operating conditions provided in the basic safety instructions and the instrument's data sheet.

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**NOTICE****Instrument damage caused by electrostatic discharge**

Electrostatic discharge (ESD) can damage the electronic components of the instrument and the device under test (DUT). Electrostatic discharge is most likely to occur when you connect or disconnect a DUT or test fixture to the instrument's test ports. To prevent electrostatic discharge, use a wrist strap and cord and connect yourself to the ground, or use a conductive floor mat and heel strap combination.

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**NOTICE****Risk of instrument damage during operation**

An unsuitable operating site or test setup can cause damage to the instrument and to connected devices. Ensure the following operating conditions before you switch on the instrument:

- The instrument is dry and shows no sign of condensation.
- The instrument is positioned as described in the following sections.
- The ambient temperature does not exceed the range specified in the data sheet.
- Signal levels at the input connectors are all within the specified ranges.
- Signal outputs are correctly connected and are not overloaded.

 **EMI impact on measurement results**


Electromagnetic interference (EMI) may affect the measurement results.

To suppress generated electromagnetic interference (EMI):

- Use suitable shielded cables of high quality. For example, use double-shielded RF and LAN cables.
- Always terminate open cable ends.
- Note the EMC classification in the data sheet.

### 3.1.1 Unpacking and Checking the Instrument

Check the equipment for completeness using the delivery note and the accessory lists for the various items. Check the instrument for any damage. If there is damage, immediately contact the carrier who delivered the instrument. Make sure not to discard the box and packing material.

 **Packing material**

Retain the original packing material. If the instrument needs to be transported or shipped later, you can use the material to protect the control elements and connectors.

**NOTICE****Risk of damage during transportation and shipment**

Insufficient protection against mechanical and electrostatic effects during transportation and shipment can damage the instrument.

- Always make sure that sufficient mechanical and electrostatic protection is provided.
- When shipping an instrument, the original packaging should be used. If you do not have the original packaging, use sufficient padding to prevent the instrument from moving around inside the box. Pack the instrument in antistatic wrap to protect it from electrostatic charging.
- Secure the instrument to prevent any movement and other mechanical effects during transportation.

### 3.1.2 Accessory List

The instrument comes with the following accessories:

- Power supply cable and adapter set
- Li-ion rechargeable battery
- USB2.0 cable A-Mini
- Side strap
- "Getting Started" printed manual
- Document folder containing safety instructions, KC and CE certificate

Optional accessories and their order numbers are listed in the data sheet.

### 3.1.3 Setting up the R&S ZNH

The R&S ZNH is mainly used for diagnostic purpose during the installation of RF feeder cables and antennas for all kinds of radio transmitters. It can also be used to characterize both amplitude and phase measurements on complex test devices and discrete components with its S-parameters measurements.

Depending on the environment, you can adjust the viewing angle of the display and either lay it out horizontally or prop it up using the support on the back of the R&S ZNH.

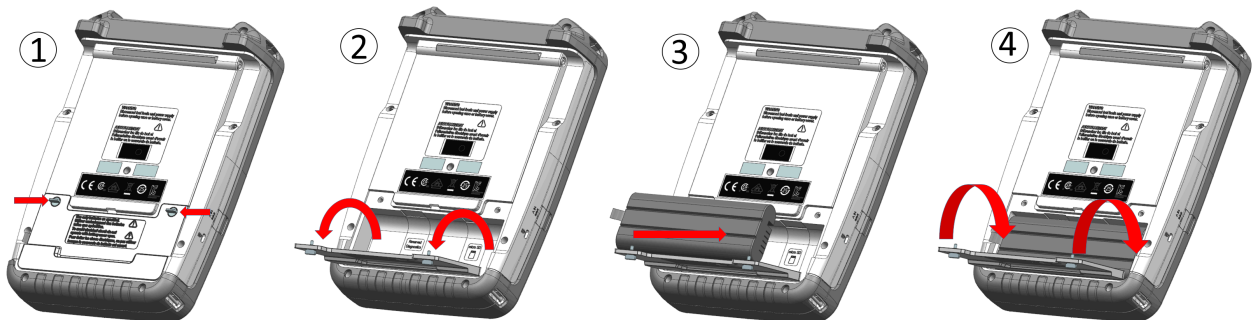


When laid out horizontally for operation from above, the R&S ZNH is tilted slightly due to the micro-stand at the back. This position provides the optimum viewing angle for the display.

To allow easy operation from the front and still be able to read the display, you can swing out the support on the back of the R&S ZNH.

Before you turn on the R&S ZNH, you should insert the lithium ion battery included in the delivery into the battery compartment located at the back of the R&S ZNH.

### Insert battery



1. Unscrew the two thumb screws located on the battery compartment.
2. Open the cover.
3. Insert the battery into the R&S ZNH.
4. Close the cover and screw back the thumb screws.

You can operate the R&S ZNH with the AC adapter or the battery. Both are included in the delivery.

### 3.1.4 Using the AC Adapter

#### NOTICE

##### Risk of instrument damage

To avoid instrument damage:

- Only use the power supply (R&S HA-Z301, order number 1321.1386.02) included in the delivery.
- Make sure that the AC supply voltage is compatible to the voltage specified on the power supply unit.
- Attach the appropriate adapter to the power supply.

Connect the AC adapter to the DC port on the left side of the R&S ZNH (item 1 of [Figure 3-1](#)). Make sure to fully insert the AC adapter plug into the DC port.

Depending on the system you need, firmly connect the appropriate power cable included in the delivery to the AC adapter (item 2 of [Figure 3-1](#) ).

Finally, connect the power cable plug to an AC power outlet.



**Figure 3-1: AC adapter**

- 1 = AC adapter  
2 = Power cable

The voltage range of the AC power supply is 100 V to 240 V AC.

After the R&S ZNH is connected to the power supply, you can turn it on with the [Power] key on the front panel.

### 3.1.5 Battery Operation

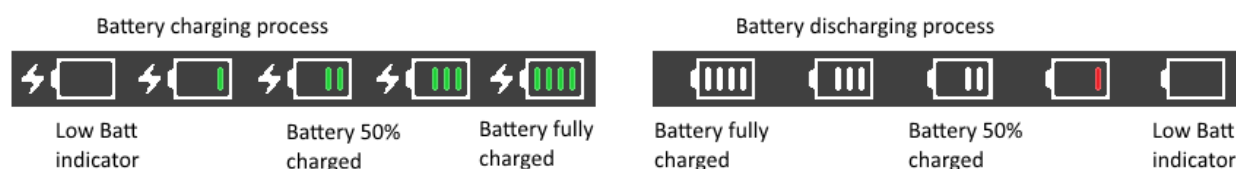
The R&S ZNH has a smart battery indicator which displays the battery charging status on the [Power] key as well as the battery icon shown at the top right corner of the display screen. See [Chapter 4.6, "Display Overview"](#), on page 24.

The lithium ion battery has a capacity of 6.9Ah / 74Wh (at nominal voltage of 10.80V) and it allows operation at preset condition of up to 4 hours when it is fully charged.

The actual operation time depends on the current charged status (see [Figure 3-2](#)), the ambient temperature and the operating mode of the R&S ZNH.

For a summary of the LED indication of the [Power] key, see [Table 3-1](#).

The battery charging and discharging process of the battery icon indicated in the display screen is illustrated below:



**Figure 3-2: Battery charging and discharging process**

Charging time is about three hours when the R&S ZNH is in inactive mode (i.e. R&S ZNH is switched off). If the instrument is in active mode (i.e. R&S ZNH is switched on), the charging time is extended to about five hours because the charging current is reduced as the power is partially drained by the usage of the R&S ZNH.

During operation in the field, you can also charge the battery with the car adapter (R&S HA-Z302, order number 1321.1340.02). You can connect the car adapter to the DC port. With the car adapter, you are able to charge the R&S ZNH via the car's cigarette lighter socket. A replacement battery (R&S HA-Z306, order number 1321.1334.02) with the same capacity and charging time as the battery included in the standard delivery is also available if necessary.

**i** Battery dispatched during delivery is not fully charged, for battery operation you have to charge it first.

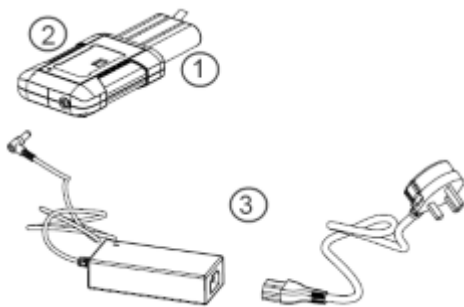
To charge the battery, connect the charger to AC power adapter included in the delivery. For more information, see "[Using an external battery charger](#)" on page 14.

### Using an external battery charger

You can also use an external battery charger (R&S HA-Z303, order number 1321.1328.02) to charge the battery.

To charge the battery externally, put the battery into the external charger and supply it with power via the AC power adapter.

An amber LED on the charger indicates the charging process. The LED turns to green when the battery is fully charged. A red LED on the charger indicates that the battery is not charging or the charging failed.



**Figure 3-3: External battery charger**

1 = Lithium ion battery R&S HA-Z306

2 = External charger R&S HA-Z303

3 = Power supply unit R&S HA-Z301 or car adapter R&S HA-Z302

### **⚠ WARNING**

#### **Risk of traffic accidents, physical injury and property damage**

- Turn off the R&S ZNH while driving or while the engine is on.
- Operation of the R&S ZNH via the cigarette lighter socket while driving or while the engine on is prohibited.

### 3.1.6 Battery Maintenance

The R&S ZNH comes with a lithium-ion battery. In general, these batteries are easy to handle. When you handle the battery, follow the instruction mentioned in the safety instructions and in the following chapters.

#### 3.1.6.1 Handling

- The battery has been designed for a specific application. Do not use it for any other applications.
- Do not connect batteries in series or parallel as it can cause serious damage.
- Observe correct polarities during installation and charging.
- Do not heat over 70°C. The battery contains thermal fuses that could activate and render the battery inoperable.
- The battery contains an electronic device for protection against deep discharge, overcharge and short-circuiting between the terminals.
  - If you cannot discharge the battery, it may be deep discharged. Charge the battery for 0.5 hours and check again.
  - If you cannot charge the battery, it may be overcharged. Discharge the battery and check again.
  - If the battery has been short-circuited, charge it to reset the electronics.
  - If the battery still does not work, contact the Rohde & Schwarz customer support.
- Do not allow metallic objects to come into contact with the terminals.
- Do not solder directly to the battery.

#### 3.1.6.2 Storage

The battery self-discharges while not in use. When storing the battery for an extended period of time, make sure to

- Handle the battery carefully to avoid short circuits. Make sure that leads and terminals are insulated.
- Keep the battery in the supplied packaging before use. The temperature should not exceed 30°C.
- Store the battery at an initial state of charge between 15% and 50% of its capacity. When calculating the initial state of charge, consider



## Switching the Instrument On and Off

- The maximum consumption of electronic devices
- The self-discharge of the battery - the higher the state of charge, the higher the rate of self-discharge
- Avoid a deep discharge of the battery. A deep discharge occurs when the state of charge falls below 5% of the battery's capacity.
- Recharge the battery at least every six months.

Should the battery voltage be low or even 0 V, the battery protection circuit may have gone into a sleep mode. In that case, reset the battery with an approved charger.

### 3.1.6.3 Transportation

No special regulations apply for transporting the battery. The battery cells contain no metallic lithium.

### 3.1.6.4 End of Life

The capacity of the battery decreases after it has gone through numerous charge cycles and nearing its end of life. When the battery is dead, do not open the battery. Do not dispose battery in fire.

## 3.2 Switching the Instrument On and Off

The instrument can be powered with an AC or DC (battery operated or via car adapter) input. See [Chapter 3.1.4, "Using the AC Adapter"](#), on page 12.

- ▶ Press [Power] key to switch on the instrument.  
During booting, the R&S ZNH displays a splash screen to indicate the operable frequency range of the instrument. Depending on the frequency upgrade option installed, the respective splash screen is loaded.  
After booting, the instrument is ready for operation.  
Refer to the instrument brochure for the list of options available.
  
- ▶ Press [Power] key to switch off the instrument.






**NOTICE****Risk of losing data**

If a running instrument (without battery) is disconnected directly from the power cord, the instrument loses its current settings. Furthermore, program data may be lost.

Press [Power] key first to shut down the application properly.

The following shows the [POWER] key behavior in different operation modes.

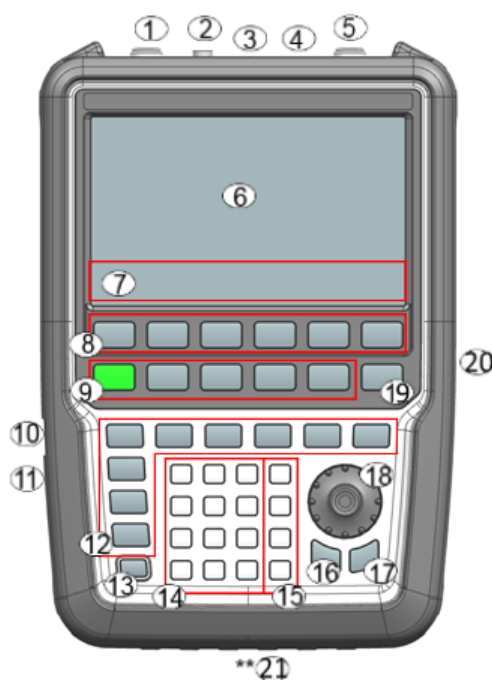
**Table 3-1: Summary of LED indication on POWER key**

LED indication on [Power] key		Descriptions
Green LED		Instrument is in operation mode.
Blue LED		Instrument is in switch off mode with a fully charged battery. A blinking blue LED indicates that the battery charging is in process.
Amber LED		Instrument is in switch off mode with AC supply and there is no battery in it.
Red LED		There is an error in the battery charging.
LED "OFF"		This is an indication that there is no AC or DC supply to the instrument. The instrument is in a switch off mode.

## 4 Instrument Tour

This chapter describes the instrument in different views.

### 4.1 Front View



**Figure 4-1: Front view of R&S ZNH**

- 1 = RF port 1
- 2 = BNC connector
- 3 = Headphone jack
- 4 = USB ports
- 5 = RF port 2
- 6 = Touch-sensitive screen area
- 7 = Softkey labels (on display)
- 8 = Softkey
- 9 = Systems keys
- 10 = DC port (behind protective cap)
- 11 = Kensington lock
- 12 = Function keys
- 13 = On/off key
- 14 = Alphanumeric key
- 15 = Unit keys
- 16 = Back key

- 17 = Cancel key
- 18 = Rotary knob
- 19 = Screenshot key
- 20 = LAN and mini USB port (behind protective cap)
- 21 = Micro-SD card slot (not visible as it is located behind the battery compartment)

For a description of the keys, see "Front Panel Keys" in the R&S ZNH user manual.

### NOTICE

#### Instrument damage caused by cleaning agents

Cleaning agents contain substances that may damage the instrument. For example, cleaning agents that contain a solvent may damage the front panel labeling, plastic parts, or the display.

Never use cleaning agents such as solvents (thinners, acetone, etc.), acids, bases, or other substances.

The outside of the instrument can be cleaned sufficiently using a soft, lint-free dust cloth.

## 4.2 Top View



- 1 = RF port 1
- 2 = BNC connector
- 3 = Headphone jack
- 4 = USB type A connector
- 5 = RF port 2

#### RF port 1 / RF port 2

Depending on the instrument models, different RF connectors are used.

- Type N connectors for model 04 / 08 / 18
- RPC 3.5 mm connectors for model 26

The RF ports serve as output for the RF stimulus signal and as input for the measured RF signals from the DUT (response signals). Maximum permissible power at the RF input port is 0 dBm, maximum 50 Vdc. Depending on the models, connect a cable or DUT to the RF input with a respective connector. Use a cable to connect the DUT to the R&S ZNH, if necessary.

- With a single RF port, it is possible to generate a stimulus signal and measure the response signal in reflection. For measurement examples, see CAT measurements in the R&S ZNH user manual.
- With two RF ports, it is possible to perform a full two-port measurement. For measurement examples, see VNA measurements in the R&S ZNH user manual.

---

**⚠ WARNING****Risk of electrical shock**

To avoid electrical shock, the DC input voltage must never exceed the value specified on the housing.

---

**NOTICE****Risk of instrument damage**



To avoid damage to the coupling capacitor, input attenuator or the mixer, the DC input voltage must never exceed the value specified in the data sheet.

---

**NOTICE****Risk of DUT damage**

The R&S ZNH displays a signal source indicator on the [title bar](#). When the indicator shows a full green circle, signal source is present on the RF out connector.


To prevent damage on DUT, it is important to consider maximum input power on DUT before connection.

-  : Signal source is present on the RF out connector
-  : Signal source is not present on the RF out connector

**BNC connector**

You can connect the BNC connector for various applications. It supports an external trigger signal or an external reference signal. It can also be configured as a BIAS port.

When the BNC connector is configured as a trigger input, it controls the start of a measurement. The trigger mode is selected in the SWEEP menu. The trigger threshold is similar to that of TTL signals.

When the BNC connector is configured as reference input, you can apply a 10 MHz external reference signal to it for frequency synchronization. The external reference label  is displayed at the top right corner of the [title bar](#) to indicate that the reference signal is supplied via external signal input. The label turns green when the reference signal is detected.

The level of the reference signal must be larger than 0 dBm. If there is no reference signal present at the BNC connector, the R&S ZNH displays an appropriate message. Thus, measurements without a valid reference can be avoided.

With R&S ZNH-K10 (order number 1334.6846.02), the BNC connector can be configured as an internal DC bias port providing direct current output. Active equipment under test can be supplied with power via the bias port.

**NOTICE****Risk of instrument damage**

To avoid damage to the tracking generator output, never apply currents greater than 600 mA or voltages greater than 20 V to the BNC connectors if the BNC connectors are not configured as BIAS output ports.

If they are configured as BIAS ports, never apply currents greater than 600 mA or voltages greater than 50 V.

**Headphone jack**

The 3.5 mm connector for headphones has an internal impedance of approximately 10  $\Omega$ .

**USB type A connector**

The USB port provides the USB interface to connect a memory stick and store data sets or screenshots. It can also be used to control the operation of the external power sensor.

**⚠ WARNING****Risk of electrical shock**

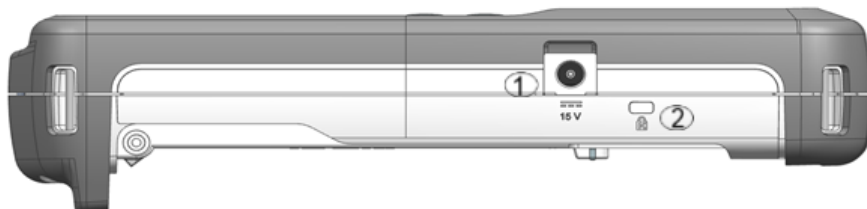
To avoid electrical shock, the DC input voltage must never exceed the value specified on the housing.

**NOTICE****Risk of instrument damage**

- Make sure not to overload the RF input and keep within the maximum allowed signal levels. Refer to the datasheet for the maximum allowed signal levels.
- To avoid damage to the coupling capacitor, input attenuator or the mixer, the DC input voltage of 50 V must never be exceeded.



### 4.3 Left View



1 = DC input

2 = Kensington lock slot

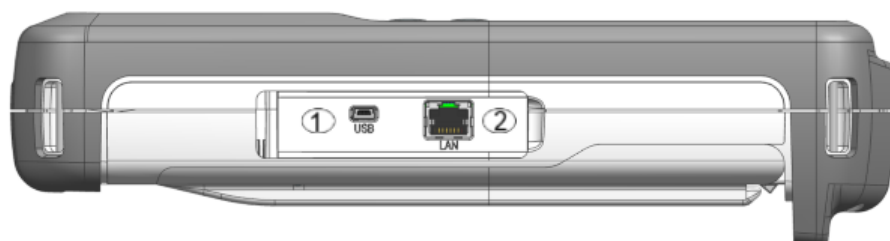
#### DC input

The R&S ZNH is supplied with power by the AC/DC transformer power supply via the DC connector. You can also use the DC connector to charge the battery.

#### Kensington lock slot

A Kensington lock can be anchored to the R&S ZNH housing to secure it to a workstation mechanically.

### 4.4 Right View



1 = Min USB port

2 = LAN port

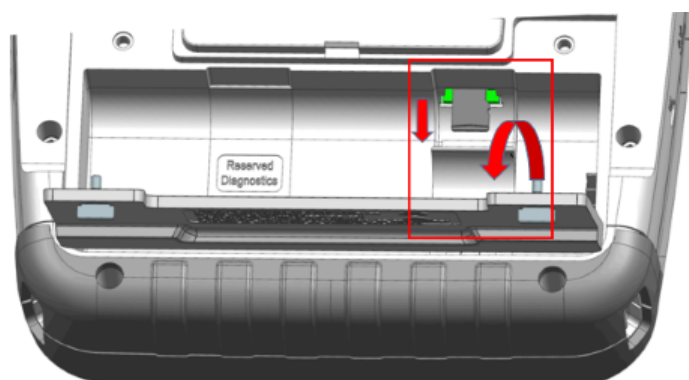
#### LAN connector

RJ-45 connector to connect the instrument to a Local Area Network (LAN) and transfer data in both directions. It supports up to 100 Mbit/s.

### USB type B connector (mini USB)

Mini USB connector to connect a computer for remote control of the instrument and transfer data in both directions.

## 4.5 Rear View



The micro-SD card slot is located behind the battery compartment of the R&S ZNH.

Peel open the micro-SD card protective cap to access to the micro-SD card slot. You can use the micro-SD card to store datasets or screenshots.

## 4.6 Display Overview

The display area has a touch-sensitive screen, the touch functionality can be turned on or off in the instrument setup menu.

For information on the different sections of the display area and touchscreen gestures, see "Screen Layout and Elements" and "Touchscreen Gesture Elements" in the R&S ZNH user manual.

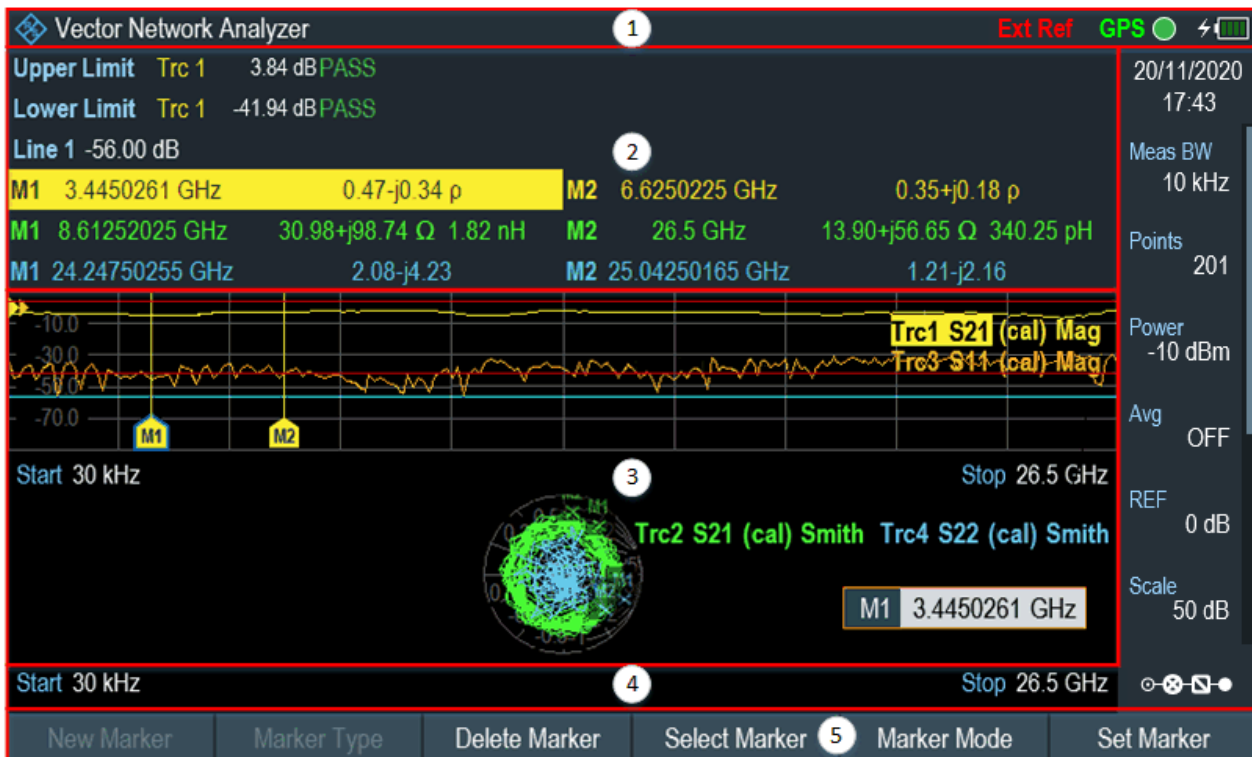


Figure 4-2: Display overview

- 1 = Title bar
- 2 = Measurement result view
- 3 = Measurement trace window
- 4 = Parameter view
- 5 = Softkey functions

## NOTICE

### Risk of touchscreen damage during operation

- Never touch the screen with ball point pens or other pointed objects with sharp edges.
- It is recommended that you operate the touchscreen by finger only. As an alternative, you may use a stylus pen with a smooth soft tip.
- Never apply excessive force to the screen. Touch it gently.
- Never scratch the screen surface, e.g. with a finger nail. Never rub it strongly, for example with a dust cloth.

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