Narda

5G FR2 Antenna

Handling and Safety Instructions

narda
Safety Test Solutions

English

EN

1 Introduction

1.1 General information about this guide

This guide is valid for the 5G FR2 antennas (3591/01 and 3591/02) and their associated accessories. In the following, the 5G low-noise block down-converter are referred to as the LNB antenna.

⇒ These instructions offer a quick introduction on how to install the product. For more information, please refer to the SRM-3006 operating manual (3006/98.21).

⇒ Also read the Narda General safety instructions (3300/98.10) carefully for information about how to operate the LNB antenna in a safe way together with the unit it is connected to.

⇒ Keep this guide, the Narda General safety instructions (3300/98.10) and the guide of the basic unit the LNB antenna is connected to, so that they are always available to all users.

⇒ Only ever pass the LNB antenna and basic unit (SRM-3006) on to third parties together with the guides mentioned above.

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1.2 Product description

Two LNB antenna models are available: a directional antenna with high sensitivity and an omnidirectional antenna. Both antennas include a down-converter that converts the millimeter wave band from 24.25 GHz to 29.5 GHz into the SRM-3006's receive band. This means that the RF cable between antenna and basic unit only transmits frequencies up to a maximum of 6 GHz, which greatly reduces the cable loss compared to a 20 GHz cable. In addition, due to the fact that the downconverter is integrated in the antenna, it can be used with all SRM-3006 devices without any hardware modifications. Only a firmware update is required, which easily can be done by the user.

The LNB antennas have a built-in battery, which is independent from the basic unit. Thus, the runtime of the SRM-3006 is not affected by the operation of the antennas. The battery can be charged via an USB-C socket. Connected to a USB power bank, long-term measurements can also be performed.

Narda recommends to generally connect the antennas to the SRM-3006 using an RF cable.

3591/01 LNB Antenna, 24.25 to 29.5 GHz, dir.

When measuring inside buildings, the field strengths are often very low. For example, a modern, coated glass window can attenuate a signal at 24 GHz by about 30 dB. To be able to detect a field strength of such a low level, a high gain antenna is needed. In turn high gain antennas have a high directivity due to their design. The LNB antenna 3591/01 is a directive antenna with high gain.

In addition, the directional characteristic can be used to detect the field strength of geographically separated base stations. Depending on how the antenna is held, it receives primarily horizontally or vertically polarized RF signals. A label on the antenna indicates the polarization.

3591/02 LNB Antenna, 24.25 to 29.5 GHz, omn.

For EMF measurements, national and international standard recommendations require EMF measurements to be performed isotropically. However, isotropic antennas are not available for the FR2 frequency range.

The LNB antenna 3591/02 offers an omnidirectional characteristic that roughly corresponds to the shape of a donut, which is as close as you get to an isotropic characteristic in the FR2 frequency range. Ideal results with the 3591/02 antenna are therefore obtained in an X-Y spatial plane. To cover all three spatial axes for isotropic measurements, the antenna must be moved accordingly during the measurement.

NOTE: To move the antenna easily, the antenna must be connected to the basic unit via an extension cable.

⇒ The omnidirectional LNB antenna has its minimum in axial direction (donut shape antenna pattern). Therefore, do not align the antenna axially with the RF source during the measurement, as this will create significantly underestimated results!

Product highlights

- Extends SRM-3006 to cover 24.25 GHz to 29.5 GHz.
- Calibrated antennas for reliable measurements
- Measurements are displayed in field strength or in percent of limit values, e.g. ICNIRP, FCC...
- Omnidirectional antenna design for environmental measurements
- Directional antenna design for weak signals
- Easy to setup
- Simple operation
- Fast and reliable measurement results

⇒ For more information, please refer to the datasheet (www.narda-sts.com).

2 General safety instructions

2.1 Usage

Intended use

⇒ Use the LNB antenna only under the conditions and for the purposes for which it was designed.

⇒ Pay particular attention to the information in the LNB antenna datasheet (www.narda-sts.com).

Intended use also means the following:

⇒ Observe the national accident prevention regulations at the deployment location.

⇒ The LNB antenna may only be operated by appropriately qualified and trained personnel.

Not intended use

The LNB antenna products listed in the chapter *General information about this guide* on page 31 in combination with a basic unit (SRM-3006) are no warning devices that actively warn of the existence of dangerous fields by means of optical or acoustic signals.

⇒ Always consider the LNB antenna and basic unit (SRM-3006) as a measuring device, never as a warning device.

⇒ Only approach unknown field sources with careful observation of the current measured and displayed value.

⇒ In case of doubt, also use a wideband warning device such as **RadMan** or **Nardalert** from Narda Safety Test Solutions.

2.2 Storage and transport

Storage of the device at too high temperatures or in the sun may cause overheating and consequential damages.

⇒ Do not expose the product or battery to high temperatures, high humidity or direct sunlight during operation, transportation and storage.

⇒ Do not leave the product in a car with closed windows, especially when it is hot outside.

⇒ Do not expose the product to dust, smoke or steam

⇒ Use and store the LNB antenna and its accessories within the guaranteed operating range (for details, see *Recovery after shipping and storage* on page 39).

2.3 Handling lithium-ion batteries

This product includes a rechargeable lithium-ion battery.

⇒ Before using this product, read and carefully follow all instructions for handling and charging the battery in the **Safety Instructions (3300/98.10)** delivered with the product.

⇒ Dispose of used batteries in accordance with local laws or regulations.

Battery life

The life of the rechargeable battery is limited. Over time, the performance of the battery slowly degrades. Battery life also depends on storage method, usage, environment, and other factors.

Charging should be performed in an environment with a temperature between 0 °C and 30 °C. In environments with deviating conditions, the charging process may be impaired under certain circumstances.

When not in use

If the LNB antenna is not used for a long period of time, it should be sufficiently charged before storage and fully charged at least once every 6 months to ensure performance.

2.4 Commissioning

Commissioning of damaged equipment or accessories may cause consequential damage.

⇒ Inspect the LNB antenna and all accessories for transport damage after unpacking.

⇒ Do not put a damaged device into operation, but rather contact your responsible sales partner in case of damage.

Both the LNB antenna and the basic unit, when stored or transported at low temperatures, may develop condensation when placed in a warm room. Operating the devices in this condition can damage them.

⇒ To avoid damages, wait until no more condensation is visible on the surface of the LNB antenna and the basic unit (SRM-3006).

2.5 Installation

Mounting the LNB antenna on a tripod

⇒ Make sure that the tripod is mounted in such a way that it is stable so that it does not tip over easily.

⇒ The mounting should be resistant against external influences (for example, wind or shocks to the tripod).

NOTE: Please note that for most applications the LNB antenna must be moved/ swept during the measurement to cover all spatial axes.

Usage/Installation in extreme conditions

Usage/installation in extreme weather conditions may cause personal injury and/or damage to the LNB antenna.

⇒ Do not use the LNB antenna during lightning storms. This also applies to installations on a tripod.

⇒ Extra caution must be taken in extreme weather conditions (for example storm, hail).

⇒ If ice is deposited on the LNB antenna, the measurement results may not be as accurate as under standard conditions.

⇒ If there is a risk of corrosion to the connectors (antenna/cable) due to environmental influences (salty air, airborne chemicals, and so forth), take suitable measures to protect and seal the unit and the connectors.

2.6 Operation

Electrical voltages are present inside the unit.

⇒ Do not bring the LNB antenna into contact with live parts.

⇒ Do not open the LNB antenna. Opening the LNB antenna invalidates any warranty claim.

⇒ Only use accessories intended for the LNB antenna.

Operation of a damaged LNB antenna or accessories may result in significant measurement errors and consequential damages.

⇒ Check the LNB antenna and accessories regularly for damage. Cracks or fractures in the housing indicate possible interior damage and, thus, possible incorrect measurement results.

⇒ In the event of damage or suspected malfunction, take the LNB antenna out of operation and contact your responsible sales partner. Addresses can be found on the Internet under www.narda-sts.com.

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2.7 Electromagnetic fields

Strong electromagnetic fields

Very strong electromagnetic fields are generated in the vicinity of certain radiation sources, which can lead to injuries or death in the case of endangered persons.

⇒ Observe safety barriers and markings.

⇒ People with active implants in particular must avoid dangerous areas.

Extreme field strengths can damage the sensor.

⇒ If necessary, immediately remove the device from the environment of the field source.

Unsuitable frequency range

By selecting an unsuitable frequency range, dangerous fields can be overlooked. Staying within such fields may cause injury or death to persons at risk.

⇒ Select the largest selectable or appropriate frequency range.

⇒ Only approach unknown field sources with careful observation of the current measured and displayed value.

⇒ In case of doubt, also use a wideband-measurement warning device such as **RadMan** or **Nardalert** from Narda Safety Test Solutions.

Measurements with the LNB antenna

Metallic stickers in the sensor area of the LNB antenna can lead to measurement errors, in particular to an underestimation of the electromagnetic field strength and misleading results.

⇒ Do not attach metallic materials (for example, labels) to the radome of the LNB antenna.

Use of a defective LNB antenna

Through a defective LNB antenna, it is possible that existing high radiation values cannot be detected and bearing results are misleading.

⇒ Make sure that you know the frequency, field strength and polarization to be expected before starting an RF radiation measurement.

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2.8 Cleaning

Penetrating liquids

Liquids that penetrate inside the device, could damage or destroy it.

⇒ Make sure that no liquids penetrate inside the LNB antenna.

Solvent

Solvents can damage the surfaces of the device.

⇒ Do not use any solvents to clean the LNB antenna.

2.9 Calibration, repair and modification

The LNB antenna is designed for low maintenance. Regular calibration is necessary to ensure the faultless measurements.

Unauthorized or improper repairs or modifications

Unauthorized or improper repairs or modifications can impair the accuracy and function of the device.

⇒ Repairs should only be carried out by approved Narda Service Centers. Otherwise, any warranty claims shall lapse.

⇒ Modifications to the LNB antenna are not permitted. Modifications void any warranty claims.

⇒ Calibration should only be carried out by suitable (accredited) laboratories. Find out in advance whether the calibration is suitable for your measuring task.

⇒ The LNB antenna can only be adjusted by Narda and in conjunction with a calibration.

⇒ If you have any questions, please contact your responsible sales partner.

3 Unpacking

3.1 Packaging

The packaging is designed to be re-used as long as it has not been damaged during previous shipping. Please keep the original packaging and use it again whenever the device is shipped.

The package contents are listed on the delivery note.

⇒ Please check that you have received all the items listed. Contact your supplier if anything is missing.

3.2 Checking the device for shipping damage

⇒ After unpacking, check the device and all accessories for any damage that may have occurred during shipping.

Damage may have occurred if the packaging itself has been clearly damaged.

⇒ Do not attempt to use a device that has been damaged.

3.3 Recovery after shipping and storage

Condensation can form on a device that has been stored or shipped at a low temperature when it is brought into a warmer environment.

⇒ To prevent damage, wait until all condensation on the surface of the device has evaporated.

The device is not ready for use until it has reached a temperature that is within the guaranteed operating range.

⇒ For temperature ranges see the corresponding datasheet. The datasheet can be downloaded from the Narda website www.narda-sts.com.

4 Device overview

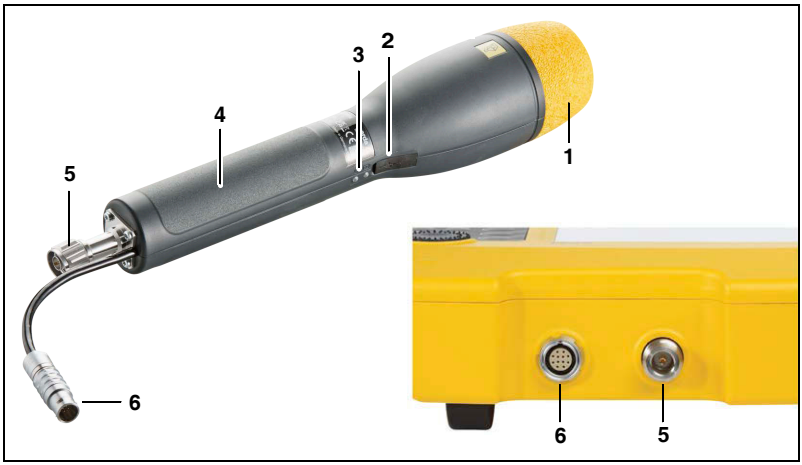

Figure 1: Overview of the LNB antenna and SRM-3006 basic unit

No.	Description		
1	Sensor area		
2	USB-C socket		
3	LEDs:	Power status:	• **Off:** device switched off • **Green:** device switched on • **Red:** error mode
		Battery status:	• **Off:** no charger connected • **Green:** battery fully charged, charger connected • **Red:** charging • **Red flashing:** battery error
4	Shaft		
5	RF-Connector		
6	Antenna control connector		

5 Setup and installation

5.1 Power supply

The standard power supply is provided via the integrated battery. Therefore the LNB antenna does not affect the runtime of the SRM-3006 basic unit.

The battery of the LNB antenna is pre-charged upon delivery and must be fully charged before first use. The LNB antenna can be connected to a power supply via a USB-C cable for operation and for charging the internal battery. Connected to a USB power bank, long-term measurements can also be performed.

NOTE: Please make sure that the AC power cord is equipped with a ferrite filter positioned next to the LNB antenna power supply. This is important to ensure the power supply is in line with the EMF standards mentioned in the datasheet.

Charging the batteries:

✓ Mains voltage must correspond to the operating voltage of the charging/ power supply device.

1. Connect the charger/power supply device to the charging USB socket of the LNB antenna.
2. Connect the charger/power supply to the mains.
   - ↳ Charging starts immediately.
   - ↳ The **Battery status LED** lights red during the charging cycle.
   - ↳ When the battery is charged, the **Battery status LED** lights green.
3. Remove charger/power supply device.

Battery error

A red flashing **Battery status LED** signals a battery error.

⇒ In this case unplug the antenna from the SRM-3006 basic unit and contact your Narda representative.

5.2 RF cable connection

When measuring, the LNB antenna should be connected to the basic unit via an RF cable. This is to reduce the risk of damaging the connector on the basic unit due to the weight of the LNB antenna. It also makes it easier to sweep the volume in question when the LNB antenna alone is moved in space compared to moving both the basic unit and the antenna, which in the long run will be very tiresome.

NOTE: Make sure that the cable does not turn while screwing. Otherwise, the electrical properties of the high-quality coaxial cable could be impaired by torsional forces.

Connecting the RF cable to the basic unit (SRM-3006):

⇒ See chapter 3.4.2 in the SRM-3006 operating manual (3006/98.21) for more detailed information.

Connecting the RF cable to the LNB antenna:

⇒ See chapter 3.4.2 in the SRM-3006 operating manual (3006/98.21) for more detailed information.

Unscrewing the plug:

1. Unscrew the union nut at the N connection.
2. Pull the control cable connector on the ribbed plug head backwards until the lock disengages.

5.3 Mounting the LNB antenna on a tripod

Special devices are needed for mounting the Narda antennas on a tripod.

⇒ Read and follow the general safety instructions described in chapter *Mounting the LNB antenna on a tripod*.

⇒ See chapter 3.4.4 in the SRM-3006 operating manual (3006/98.21) for more detailed information.

6 Operating the LNB antenna

The following measurement modes are supported by the SRM-3006 when using an LNB Antenna:

- Spectrum
- Level Recorder
- Scope
- Safety Evaluation

6.1 Switching between the FR2 bands

Thanks to the dual band design of the LNB antenna, a significant part of the 5G NR FR2 band is covered in one antenna. Switching between the two bands is possible in the Frequency submenu in almost all modes.

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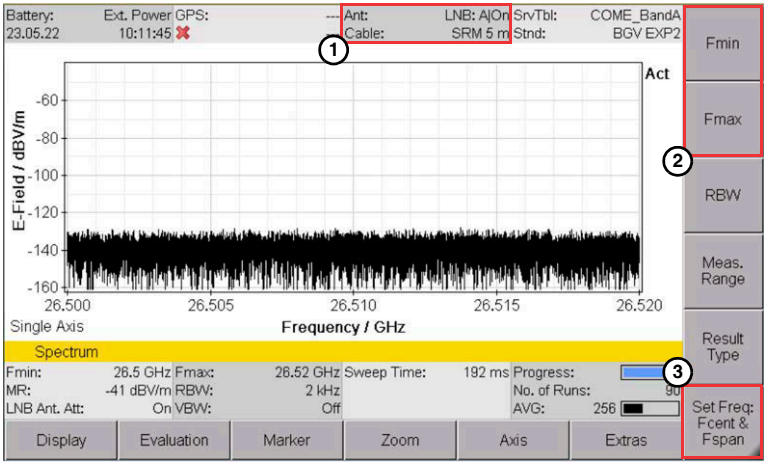
Switching the FR2 bands in the Frequency submenu

✓ An LNB antenna is connected.

✓ The SRM-3006 is in the **Frequency** submenu of one of the following modes: Spectrum, Level Recorder, Scope.

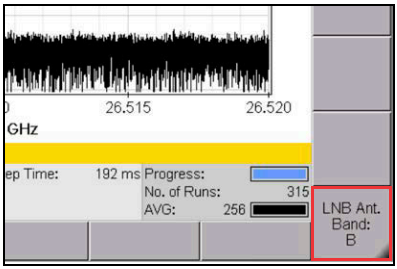


(1) Band and attenuator status

(2) Fmin/Fmax selected in the **Frequency** submenu

(3) Softkey to toggle Fcent/Fspan - Fmin/Fmax

1. Press one of the frequency setting softkeys (Fmin, Fmax, Fcent, Fspan).
   ↳ The settings window opens and the softkey **LNB Ant. Band** is shown in the button bar.



2. Press the **LNB Ant. Band:** toggle softkey and use the rotary control or the arrow keys to select a band.
3. Press the **OK** key to accept setting.
   ↳ The selected band is shown in the antenna name: Band: A, Band: B

Switching the FR2 bands in Safety Eval mode

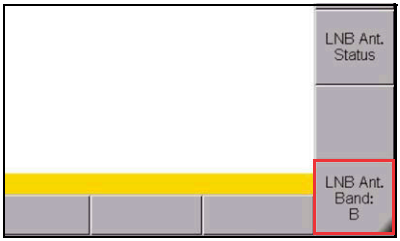
When using the Safety Evaluation Mode, make sure that a separate service table is created for each of the two bands (see SRM-3006 Operating manual), since automatic band switching within a table is not supported

⇒ The frequency band can be switched manually in the antenna menu (see **Switching the FR2 bands in the Antenna menu**).

Switching the FR2 bands in the Antenna menu

The FR2 bands can also be switched in the **Antenna** menu.

1. In the **Main** menu select **Settings > Antenna**.
   ↳ The Antenna settings page opens.
2. Press the **LNB Ant. Band** softkey to toggle bands.



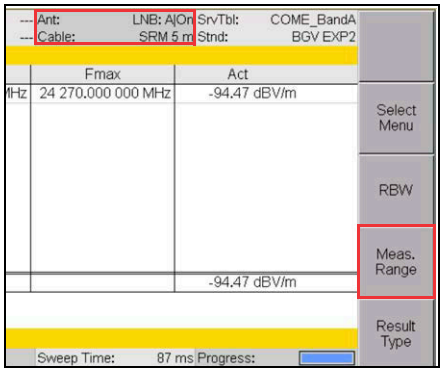
6.2 Switching the attenuator on/off

Switching the attenuation on/off is provided in the **Meas Range** submenu in each mode.

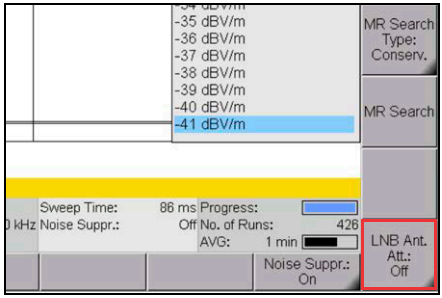
✓ An LNB antenna is connected and the SRM-3006 is in measurement view of any mode.

✓ The current attenuator status is displayed in status bar on top of the window.

1. Press the **Meas Range** softkey to open measurement range submenu.



2. Press the **LNB Ant. Att.:** toggle softkey.



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7 Warnings and status read-outs

7.1 Antenna info

Main Menu • Settings • Antennas

When an LNB antenna is connected, the selected frequency band and antenna info can be reviewed in the antenna menu.

⇒ In the Main menu select **Settings > Antenna > LNB Ant. Status**.

↳ The antenna info is diplayed, e.g.

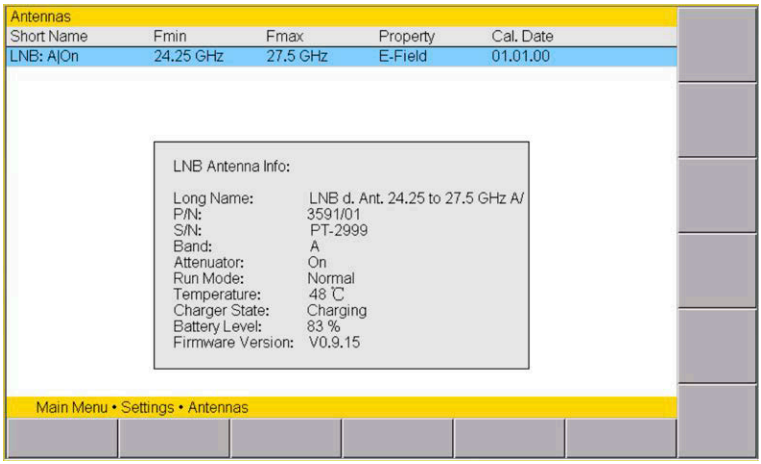
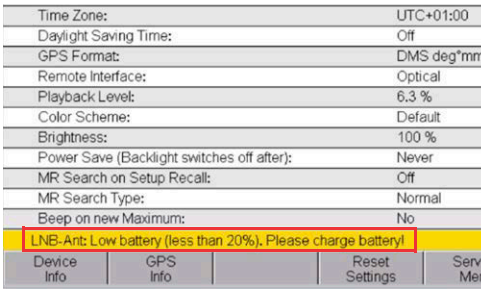
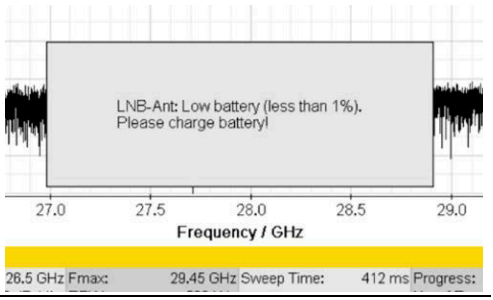


Figure 2: Antenna info

7.2 Battery level

Warnings are displayed when the the battery level is below 20 %:

Level	Message	
20% and lower	When reaching 20% battery level, a warning is displayed in the status bar at the bottom of the SRM-3006 display. For each additional drop, in steps of 5%, a new warning is displayed.	
1%	Any running measurement is stopped and a warning is shown on the display. The LNB antenna can no longer be operated.	

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8 Firmware update

When available, new firmware versions are made available for download on the www.narda-sts.com website.

The download consists of a flash tool as executable .exe file which the user can use to quickly and easily update the firmware.

Prerequisite for the flash tool is the installed Microsoft .NET Framework, version 3.5 or higher (included standard with Windows 7 and higher).

NOTE: Updating the device firmware does not require administrator rights.

Updating firmware:

✓ Device is switched on or off.

1. Connect device to the PC with the USB cable.

2. Start the flash tool with the executable .exe file.

↳ The firmware will be updated within approx. 10 s

9 Declaration of conformity

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Hereby, Narda STS declares that this equipment is in compliance with the directives 2014/30/EU, EN 61326-1:2013, 2014/35/EU, EN 61010-1:2010, and 2011/65/EU.

⇒ The full text of the EU declaration of conformity is available at www.narda-sts.com.

10 Proper disposal (EU only)

10.1 Disposal of used equipment

The crossed-out wheeled garbage can symbol indicates that this product is subject to the European WEEE Directive 2012/19/EU on the disposal of waste electrical and electronic equipment and must be disposed of separately from household waste in accordance with your national regulations.

In the European Union, all electronic measuring systems purchased from Narda after August 13, 2005 can be returned at the end of their useful life.

⇒ For more information, please contact your Narda distributor.

10.2 Disposal of permanently installed batteries

Your instrument has permanently installed Li-Ion batteries, which cannot be removed non-destructively by the user.

Non-destructive removal is only possible by Narda itself or by qualified personnel.

⇒ Instructions for non-destructive removal of the batteries can be found on the Narda website www.narda-sts.com under the corresponding product page.

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11 Technical data

All specifications are subject to change without prior notice. The technical specifications may change due to product developments.

The complete and latest technical specifications can be found in the datasheet of the product.

⇒ The datasheet can be downloaded from the Narda website www.narda-sts.com under the corresponding product page.

12 Ordering information

The ordering info can be found in the datasheet of the product.

⇒ The datasheet can be downloaded from the Narda website www.narda-sts.com under the corresponding product page.

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