R&S®EDST300
TACAN/DME Station Tester
Getting Started

1179564702
Version 01

ROHDE&SCHWARZ

Make ideas real

This manual applies to the following R&S®EDST300 models with software version 4.20 and later:

- R&S®EDST300 (5202.9009.02)

In addition to the base unit, the following options are described:

- R&S®EDST-B2 Low-Power Interrogator (5202.9509.02)
- R&S®EDST-B3 Internal Battery (5202.7187.02)
- R&S®EDST-B6 ADDITIONAL TRIGGER OUT (5202.9167.02)
- R&S®EDST-K1 TACAN Analysis (5202.9515.02)
- R&S®EDST-K2 Pulse Shape Analysis (5202.9521.02)

1   Safety and regulatory information

The product documentation helps you use the product safely and efficiently. Follow the instructions provided here and in the following chapters.

Intended use

The R&S EDST300 is an analyzer designed for installing, testing and servicing pulsed terrestrial navigation systems like DME and TACAN ground equipment. Use the product only for its designated purpose. Observe the operating conditions and performance limits stated in the data sheet.

Target audience

This document is aimed at installers, technicians and operators of the R&S EDST300. It assumes the readers are familiar with basic handling of electrical equipment and have knowledge of avionic navigation systems.

Where do I find safety information?

Safety information is part of the product documentation. It warns you of potential dangers and gives instructions on how to prevent personal injury or damage caused by dangerous situations. Safety information is provided as follows:

* In Chapter 1.1, "Safety instructions", on page 3. The same information is provided in many languages as printed "Safety Instructions". The printed "Safety Instructions" are delivered with the product.
* Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

1.1   Safety instructions

Products from the Rohde & Schwarz group of companies are manufactured according to the highest technical standards. To use the products safely, follow the instructions provided here and in the product documentation. Keep the product documentation nearby and offer it to other users.

Use the product only for its intended use and within its performance limits. Intended use and limits are described in the product documentation such as the data

sheet, manuals and the printed "Safety Instructions". If you are unsure about the appropriate use, contact Rohde & Schwarz customer service.

Using the product requires specialists or specially trained personnel. These users also need sound knowledge of at least one of the languages in which the user interfaces and the product documentation are available.

Reconfigure or adjust the product only as described in the product documentation or the data sheet. Any other modifications can affect safety and are not permitted.

Never open the casing of the product. Only service personnel authorized by Rohde & Schwarz are allowed to repair the product. If any part of the product is damaged or broken, stop using the product. Contact Rohde & Schwarz customer service at https://www.rohde-schwarz.com/support.

Operating the product

The product is intended for mobile use. The maximum weight of the product is provided in the data sheet. If the product casing is not waterproof, use an adequate weather protection to carry the product outdoors with you.

When using the product in a vehicle or aircraft, make sure that the product is properly secured. If stacking is possible, secure the whole stack of products so that they cannot fall over and cause injury.

Observe the ambient conditions such as altitude, operating temperature and climatic loads; see the data sheet.

Due to their exposed location, mobile communications systems are at risk of damage from lightning. This also poses a risk to persons nearby. Vehicles carrying mobile communications systems require an electrically conductive body, a grounded antenna and also equipotential bonding that includes the cables routed into the vehicle.

Connecting to power

The product runs on DC voltage. For the specifications of the supply voltage for the product, refer to the data sheet. Under normal conditions, contact with DC voltage in this range poses a low risk of electric shock.

Take the following measures for your safety:

● If you connect the product to an external power supply, use one recommended in the product documentation.

● Before switching on the product, ensure that the voltage and frequency indicated on the product match the available power source.

● Only use intact cables and route them carefully so that they cannot be damaged. Also ensure that nobody can trip over loose cables.

Handling batteries safely

The product contains exchangeable or built-in lithium polymer or lithium ion cells or batteries. The use of the word battery in the following always means all types. Only the battery contents are potentially hazardous. As long as a battery is undamaged and the seals remain intact, there is no danger.

Impact, shock or heat can cause damage such as dents, punctures and other deformations. A damaged battery poses a risk of personal injury. Handle a damaged or leaking battery with extreme care. Immediately ventilate the area since the battery releases harmful gases. If you come into contact with the battery fluid, immediately remove all contaminated clothing. Irritation can occur if the battery fluid comes in contact with your skin or eyes. Immediately and thoroughly rinse your skin or eyes with water and seek medical aid.

For safe handling, follow these rules:

● Do not short-circuit the battery.

● Do not mechanically damage the battery. Do not open or disassemble the battery.

● Do not expose the battery to high temperatures such as open flames, hot surfaces and sunlight.

● Only use the battery with the designated Rohde & Schwarz product.

● Only use the appropriate Rohde & Schwarz charger to charge the batteries. If the batteries are improperly charged, there is a risk of explosion. For charging and discharging temperature ranges, see the product documentation.

● Replace exchangeable batteries only with the same battery type.

● Store the battery in the product or use the product packaging.

● Dispose of exchangeable batteries separately from normal household waste as specified by the local waste disposal agency.

If you disregard these rules, you risk serious personal injury or even death due to explosion, fire or hazardous chemical substances. The product documentation provides further details.

If exchangeable batteries or products with built-in batteries are defective, contact the Rohde & Schwarz customer service. Rohde & Schwarz classifies the severity of the defect. When returning batteries or Rohde & Schwarz products containing batteries, use a carrier qualified to transport dangerous goods and notify the car-

rier of this classification. Follow the carrier's transport stipulations in line with IATA-DGR, IMDG-Code, ADR or RID.

Using headphones

Take the following measures to prevent hearing damage. Before using headphones, check the volume and reduce it if necessary. If you monitor varying signal levels, take off the headphones and wait until the signal has settled. Then adjust the volume.

Meaning of safety labels

Safety labels on the product warn against potential hazards.

⚠	Potential hazard Read the product documentation to avoid personal injury or product damage.
⎓	DC - direct current Connect to a DC power supply of the specified voltage range.

1.2 Labels on the product

Labels on the casing inform about:

- Personal safety, see "Meaning of safety labels" on page 6
- Product and environment safety, see Table 1-1
- Identification of the product, see Chapter 5.3, "Device ID", on page 30:

Table 1-1: Labels regarding product and environment safety

🗑	Labeling in line with EN 50419 for disposal of electrical and electronic equipment after the product has come to the end of its service life. For more information, see the product user manual, chapter "Disposal".
🗑	Labeling in line with directive 2006/66/EC for disposal of batteries after they have come to the end of their service life. For more information, see the product user manual, chapter "Disposal".

1.3   Warning messages in the documentation

A warning message points out a risk or danger that you need to be aware of. The signal word indicates the severity of the safety hazard and how likely it will occur if you do not follow the safety precautions.

NOTICE

Potential risks of damage. Could result in damage to the supported product or to other property.

1.4   Korea certification class A

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

2 Documentation overview

This section provides an overview of the R&S EDST300 user documentation. Unless specified otherwise, you find the documents at:

www.rohde-schwarz.com/manual/EDST300

Further documents are available at:

www.rohde-schwarz.com/product/EDST300

Getting Started manual

Introduces the R&S EDST300 and describes how to set up and start working with the product. Includes basic operations and general information, e.g. safety instructions, etc.

A printed version is delivered with the instrument.

User manual

The 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, instrument interfaces and error messages. Includes the contents of the getting started manual.

The user manual is also available for download or for immediate display on the Internet.

Data sheet and brochure

The data sheet contains the technical specifications of the R&S EDST300. It also lists the firmware applications and their order numbers, and optional accessories.

The brochure provides an overview of the instrument and deals with the specific characteristics.

Release notes and open source acknowledgment (OSA)

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

The software makes use of several valuable open source software packages. An open-source acknowledgment document provides verbatim license texts of the used open source software.

Application notes, application cards, white papers, etc.

These documents deal with special applications or background information on particular topics.

See www.rohde-schwarz.com/appnotes.

3   Welcome to the R&S EDST300

The R&S EDST300 is an analyzer designed for installing, testing and servicing pulsed terrestrial navigation systems like DME and TACAN ground equipment. Its wide dynamic range and compact design make the R&S EDST300 ideal especially for wired and field measurements on DME and TACAN ground stations.

The R&S EDST300 provides high-precision stimulus and analysis functions for DME / TACAN signals in the frequency range from 960 MHz to 1215 MHz. It performs TX/RX measurements required for DME und TACAN ground stations in line with the relevant civil and military standards accurately and efficiently.

The R&S EDST300 can precisely determine characteristic parameters such as peak power, main delay, reply efficiency, and can decode the identifier of the ground station to be tested. The instrument also measures the parameters of TACAN stations (R&S EDST-K1 option) and performs in-depth pulse analysis (R&S®EDST-K2 option).

The modular design of the R&S EDST300 provides a high degree of flexibility to adapt it to the task at hand. An interrogator (R&S EDST-B2 option) with adjustable output power (-80 dBm to +30 dBm peak power) is available for distance measurements. An internal battery (R&S EDST-B3 option) and a test antenna (R&S EDST-Z1 option) deliver maximum flexibility when carrying out field measurements. Measured data can be exported to a control system via remote control (LAN), or stored on a USB flash drive.

4　　Preparing for use

Here, you can find basic information about setting up the product for the first time.

4.1　　Lifting and carrying

The carrying handle on the side of the instrument is designed to lift or carry the instrument. Do not apply excessive external force to the handle. The maximum weight of the product is provided in the data sheet.

4.2　　Unpacking and checking

1. Unpack the product carefully.

2. Retain the original packing material. Use it when transporting or shipping the product later.

3. Using the delivery notes, check the equipment for completeness.

4. Check the equipment for damage.

    If the delivery is incomplete or equipment is damaged, contact Rohde & Schwarz.

4.3　　Choosing the operating site

Specific operating conditions ensure proper operation and avoid damage to the product and connected devices. For information on environmental conditions such as ambient temperature and humidity, see the data sheet.

If you operate the product with an external power supply, you can use it indoors only in pollution degree 2 environments where nonconductive contamination can occur.

See also "Operating the product" on page 4.

Operating altitude

The maximum operating altitude is provided in the data sheet. It differs in battery operation and operation with an external power supply.

Electromagnetic compatibility classes

The electromagnetic compatibility (EMC) class indicates where you can operate the product. The EMC class of the product is given in the data sheet.

- Class B equipment is suitable for use in:
  - Residential environments
  - Environments that are directly connected to a low-voltage supply network that supplies residential buildings
- Class A equipment is intended for use in industrial environments. It can cause radio disturbances in residential environments due to possible conducted and radiated disturbances. It is therefore not suitable for class B environments.
  If class A equipment causes radio disturbances, take appropriate measures to eliminate them.

4.4   Setting up the product indoors

The R&S EDST300 can be operated in various places without detrimental effects on its features. Even the movement caused by transportation or mobile use does not impair its functioning.

See also:

- "Intended use" on page 3

4.4.1   Placing the product on a bench top

If you want to set up the R&S EDST300 on a benchtop or prepare the R&S EDST300 for mobile use, proceed as follows.

**To place the product on a bench top**

1. Place the product on a stable, flat and level surface. Ensure that the surface can support the weight of the product. For information on the weight, see the data sheet.

2. Always fold the feet completely in or out. With folded-out feet, do not place anything on top or underneath the product.

3. **CAUTION!** A stack of products can fall over and cause injury. Never stack more than three products on top of each other. Instead, mount them in a rack.

   Stack as follows:

   ● If the products have foldable feet, fold them in completely.
   ● It is best if all products have the same dimensions (width and length). If the products have different dimensions, stack according to size and place the smallest product on top.
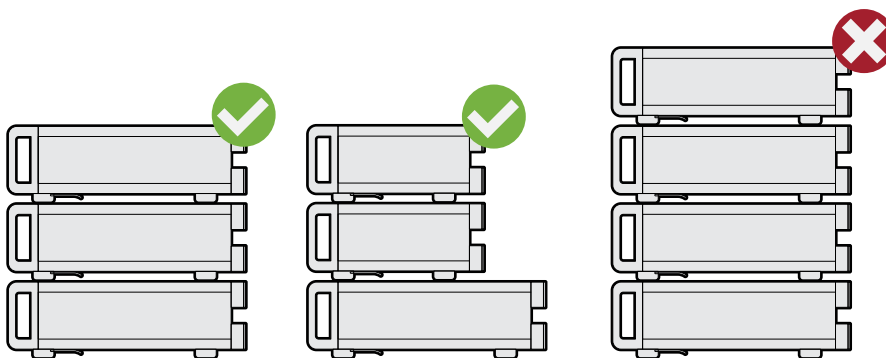
Left   = Stacked correctly, same dimensions
Middle = Stacked correctly, different dimensions
Right   = Stacked incorrectly, too many products

4. **NOTICE!** Overheating can damage the product.

   Prevent overheating as follows:

   ● Keep a minimum distance of 10 cm between the fan openings of the product and any object in the vicinity.
   ● Do not place the product next to heat-generating equipment such as radiators or other products.

4.4.2   Mounting the R&S EDST300 in a rack

If you use the product in a vehicle or in aircraft, install it in a rack provided for this purpose. Secure the product safely so that it cannot fall out and hurt passengers when the vehicle or aircraft is moving.

To prepare the rack

1. Observe the requirements and instructions in "Operating the product" on page 4.

2. **NOTICE!** Insufficient airflow can cause overheating and damage the product. Design and implement an efficient ventilation concept for the rack.

To mount the R&S EDST300 in a rack

1. Use an adapter kit to prepare the R&S EDST300 for rack mounting.
    a) Order the rack adapter kit designed for the R&S EDST300. For the order number, see the data sheet.
    b) Mount the adapter kit. Follow the assembly instructions provided with the adapter kit.

2. Lift the R&S EDST300 to shelf height.

3. Grab the handle and push the R&S EDST300 onto the shelf until the rack brackets fit closely to the rack.

4. Tighten all screws in the rack brackets with a tightening torque of 1.2 Nm to secure the R&S EDST300 in the rack.

To unmount the R&S EDST300 from a rack

1. Loosen the screws at the rack brackets.

2. Remove the R&S EDST300 from the rack.

3. If placing the R&S EDST300 on a bench top again, unmount the adapter kit from the R&S EDST300. Follow the instructions provided with the adapter kit.

4.5   Preparing for outdoor usage

If you want to perform a walk test, the R&S EDST300 requires weather protection because the product casing is not waterproof. Only use the internal battery as a power supply for outdoor operation.

See also "Operating the product" on page 4.

4.6   Considerations for test setup

Cable selection and electromagnetic interference (EMI)

Electromagnetic interference (EMI) can affect the measurement results.

To suppress electromagnetic radiation during operation:

- Use high-quality shielded cables, for example, double-shielded RF and LAN cables.
- Always terminate open cable ends.
- Ensure that connected external devices comply with EMC regulations.

Signal input and output levels

Information on signal levels is provided in the data sheet. Keep the signal levels within the specified ranges to avoid damage to the product and connected devices.

4.7   Connecting to power

To ensure high mobility and flexibility while using the R&S EDST300, it is equipped with an internal battery and a DC power supply connector on the rear panel of the instrument.

DC power can be supplied by one of the following sources:

- The installed battery (R&S EDST-B3)
- The provided DC power supply unit connected to a 230 V AC power supply (for indoor use only)
- External DC power sources with a voltage of 24 VDC±5%, protected by a 5 A fuse
  (Requires R&S EDST-B3)

Do not connect the instrument to available DC networks.

For safety information, see "Connecting to power" on page 4.

To connect the provided DC power supply

1. Plug the AC power cable of the provided DC power supply unit into a two-pin power outlet with ground contact.

   The green operating LED on the power supply unit lights up.

2. Connect the DC power supply unit to the "POWER supply" connector on the back of the R&S EDST300 (see Chapter 5.2, "Rear panel view", on page 27).

   The yellow "Standby" LED on the R&S EDST300 lights up.

To connect an optional external DC power supply

1. If necessary, connect a 12-Volt to 24-Volt DC/DC converter to the DC power supply. The supported DC range is provided in the data sheet.

2. Connect the DC power supply unit (or the DC/DC converter) to the "POWER supply" connector on the back of the R&S EDST300 (see Chapter 5.2, "Rear panel view", on page 27).

   The yellow "Standby" LED on the R&S EDST300 lights up.

4.8   Connecting external devices

Various interfaces for external devices are provided.

4.8.1   Connecting an antenna

The standard R&S EDST300 base unit provides two receiving antenna connections ("RF1 IN/OUT", "RF2 IN", see Chapter 5.1, "Front panel view", on page 20).

If the interrogator option R&S EDST-B2 is installed on the R&S EDST300, the instrument can also provide HF output to a transmitter antenna via the "RF1 IN/OUT" connector (see also Chapter 5.1.4.1, "Antenna connections RF1 IN/OUT and RF2 IN", on page 22).

To connect a receiver antenna

► Connect the receiver antenna to the "RF1 IN/OUT" or the "RF2 IN" interface on the front panel of the R&S EDST300.
The "RF2 IN" connector provides a higher sensitivity.

To connect a transmit antenna

► Connect the transmit antenna to the "RF1 IN/OUT" on the front panel of the R&S EDST300.

The R&S EDST300 transmitter antenna provides a maximum output of 20 W (43 dBm).

4.8.2   Connecting a suppressor line

Using a bi-directional suppressor line, the instruments in an aircraft send signals to each other. While a signal is being sent on the suppressor line, no other instrument can send a signal at the same time. Any receivers are switched off temporarily to avoid overloading.

► Connect the suppressor line to the "SUPPRESS IN / OUT" interface on the rear panel of the R&S EDST300 (see Chapter 5.2.2, "SUPPRESS IN / OUT connector", on page 28).

4.8.3   Connecting a GPS receiver

You can connect a GPS receiver to the RS232 interface on the rear panel of the R&S EDST300 (see also Chapter 5.2.10, "RS232 GPS interface", on page 30).

If available, the NMEA protocol data provided by the GPS receiver is displayed and stored with the recorded data.

4.8.4   Connecting an external monitor

You can connect an external monitor (or projector) to the "DVI" connector on the instrument's rear panel (see also Chapter 5.2.9, "DVI", on page 30). The screen resolution is always 640x480 pixels.

4.9   Activating the TACAN option

The TACAN (Tactical Air Navigation) option R&S EDST-K1 is implemented as a USB stick. The TACAN stick is linked to the R&S EDST300 unambiguously via the instrument's MAC address. The R&S EDST300 can evaluate TACAN signals only if the TACAN stick with the TACAN software is inserted in one of the USB ports.

ⓘ   The TACAN stick must be inserted *before* the R&S EDST300 is switched on. Do not remove the stick before switching off the R&S EDST300, or else the application is closed.

When the R&S EDST300 firmware is started, the TACAN functionality is copied from the stick to the RAM. After the R&S EDST300 is shut down, no TACAN functionality remains in the instrument.

The TACAN stick cannot be used to store data; however, a second USB stick can be connected simultaneously for data logging.

4.10   Switching on or off

The power state is indicated by two LEDs over the "Power" key.

Table 4-1: Overview of power states

Status	Left LED	Right LED	Position of power switch
Off	Off	Off	[0]
Ready	🟢 green		[I]
Standby		🟡 yellow	[I]

To switch on the product

The product is off but connected to power.

The right power LED is yellow. See Table 4-1.

► Press the [Power] key.

The left power LED lights up green. The product boots.

After the instrument has fully booted, the most recently used measurement mode is automatically started.

(i) **Using the installed battery**

If the R&S EDST300 is powered using the internal battery and the batteries become empty, the instrument switches itself off. You cannot switch it back on until the DC power supply is connected.

See Chapter 4.7, "Connecting to power", on page 15.

To shut down the product

The product is in the ready state.

► Press the [Power] key.

The operating system shuts down. The LED changes to yellow.

To disconnect from power

The product is in the standby state.

The right power LED is yellow. See Table 4-1.

► **NOTICE!** Risk of data loss. If you disconnect the product from power when it is in the ready state, you can lose settings and data. Shut it down first.

Disconnect the product from the power source.

5 Instrument tour

5.1 Front panel view

This chapter describes the front panel of the R&S EDST300, including all function keys and connectors.
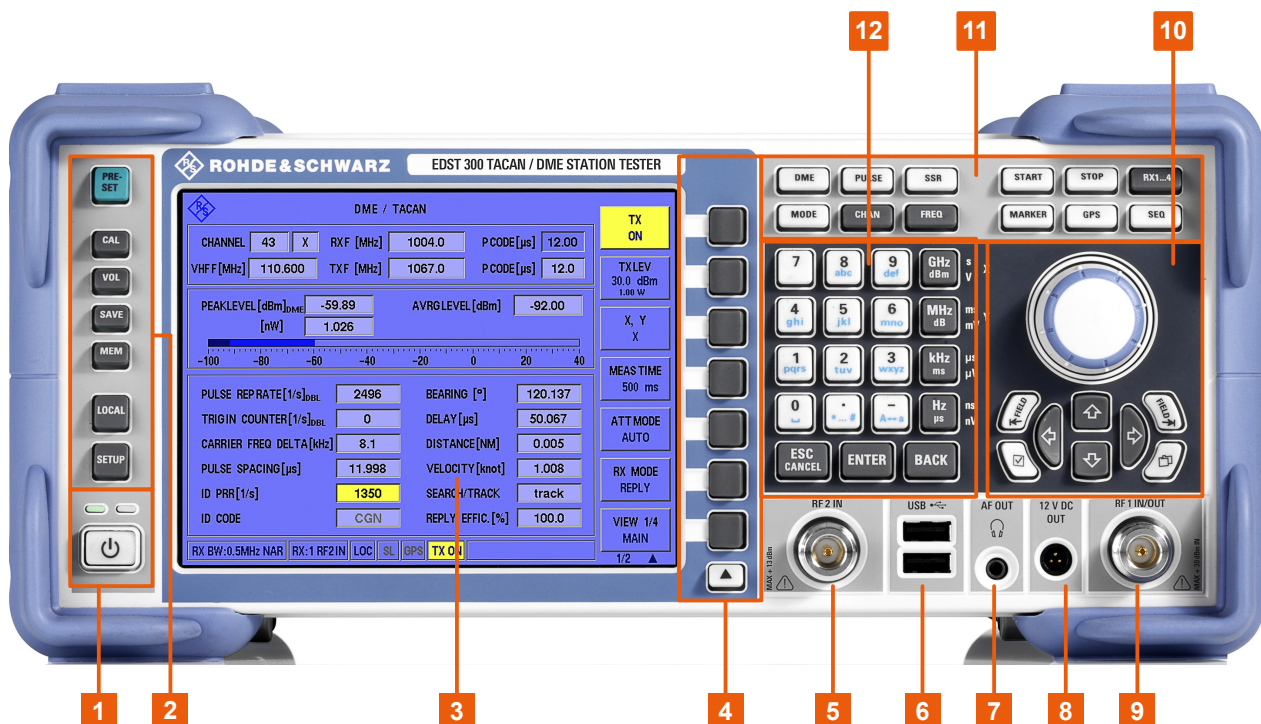
Figure 5-1: Front panel view of the R&S EDST300

1 = Power key (ON / OFF switch) with status LEDs
2 = System keys
3 = TFT Colour Display
4 = Softkeys
5 = RF 2 IN connector
6 = USB interface
7 = Headphone output AF OUT
8 = Voltage supply for external consumers: 12 VDC OUT
9 = RF 1 IN/OUT connector
10 = Navigation controls and general functions
11 = Measurement keys
12 = Keypad

5.1.1 Power key

The [Power] key is located on the lower left corner of the front panel. It starts up and shuts down the instrument.

See also "Connecting to power" on page 4 and Chapter 4.10, "Switching on or off", on page 18.

The status LEDs indicate the status of operation, see Table 4-1.

5.1.2 System keys

System keys set the instrument to a predefined state, change basic settings, and provide print and display functions.

A detailed description of the corresponding functions is provided in the R&S EDST300 user manual.

Table 5-1: SYSTEM keys

SYSTEM key	Assigned functions
[PRESET]	Resets the instrument to the default state.
[CAL]	Starts a calibration on the R&S EDST300
[VOL]	Volume control for audio output
[SAVE]	for future use
[MEM]	
[LOCAL]	Switches between remote and local operation of the R&S EDST300
[SETUP]	Provides basic instrument configuration functions, e.g.: • Reference frequency (external/internal), noise source • Date, time, display configuration • LAN interface • Self-alignment • Software update and enabling of options • Information about instrument configuration incl. software version and system error messages • Service support functions (self test etc.)

5.1.3   Softkeys

Softkeys are variable, software-defined keys. The functions depend on the measurement mode and current display.

The arrow toggles between different sets of functions in the same menu, if more menu items are available than softkeys.

5.1.4   Front panel interfaces

Various interfaces are provided on the front panel of the R&S EDST300.

5.1.4.1   Antenna connections RF1 IN/OUT and RF2 IN

The standard R&S EDST300 base unit provides two receiving antenna connections ("RF1 IN/OUT", "RF2 IN".

See also Chapter 4.6, "Considerations for test setup", on page 15 and Chapter 4.8.1, "Connecting an antenna", on page 16.

Table 5-2: Specification of RF input for the receiver units

Input level:	"RF1 IN/OUT":
	Max. +20 dBm (depending on attenuation mode)
	"RF2 IN":
	Max. +13 dBm (depending on attenuation mode)
Frequency range:	960 MHz ... 1215 MHz
VSWR:	<1.5
Connector:	N-socket, 50Ω

RF output with interrogator options

If the R&S EDST300 is equipped with the interrogator option R&S EDST-B2, the "RF1 IN/OUT" connector can provide HF output to a transmitter antenna. The antenna has an equivalent frequency range and (peak) power range (1 W).

Table 5-3: Specification of low-power interrogator, option R&S EDST-B2

Output power:	max. 1 W (+30 dBm) ±1.5 dB
Frequency range:	960 MHz ... 1215 MHz
Channel offset:	1 MHz
Distance range:	5.4 NM (approx. 10 km)
Resolution:	0.1 m
Deviation:	≤5 m
Connector:	N-socket, 50 Ω

5.1.4.2   USB interface

The front panel provides two female USB connectors (USB-A) to connect devices like a memory stick to store and reload instrument settings and measurement data. Only USB sticks using the FAT / FAT32 file system are supported.

The connectors are standard USB 2.0 ports with a maximum transmission rate of approximately 30 Mbit/s.

The rear panel provides further USB connectors (standard 3.0), see Chapter 5.2.6, "USB", on page 29.

5.1.4.3   Headphone output AF OUT

Audio output is available by connecting a headphone to the 3.5 mm jack plug "AF OUT".

Note the safety information provided in "Using headphones" on page 6.

For details, see the user manual.

5.1.4.4   Voltage supply for external consumers: 12 VDC OUT

The R&S EDST300 provides a power supply for connected external devices at the 3-pole circular "12 VDC OUT" connector. The output for external consumers such as an active receiving antenna is supplied permanently with 12 VDC / 300 mA.

5.1.5 Navigation controls and general functions

The navigation controls include a rotary knob and navigation keys. They allow you to navigate within the display or within dialog boxes.

Rotary knob

The rotary knob has several functions:

- Increases (clockwise direction) or decreases (counter-clockwise direction) numeric values with a defined increment in editing mode.
- Scrolls within lists, tables or tree views.
- Acts like the [ENTER] key, when it is pressed.
- Shifts the selection bar within focused areas (e.g. lists), if the edit mode is activated.
- Moves the scroll bar vertically, if the scroll bar is focused and the edit mode is activated.

Turning or pressing the rotary knob is equivalent to pressing the [Up] and [Down] keys or the [ENTER] key in the keypad.

Up/ Down Keys

The up and down arrow keys do the following:

- In a numeric edit dialog box, increase or decrease the instrument parameter.
- In a list, table, window or dialog box, scroll vertically.

Left/ Right Keys

The left and right arrow keys do the following:

- In an alphanumeric edit dialog box, move the cursor forward and back.
- In a list, table, window or dialog box, scroll horizontally.

General function keys

Key	Function
	Creates a screenshot of the current display
	For future use

5.1.6　Measurement keys

Measurement keys provide access to the most common measurement settings and functions.

A detailed description of the corresponding functions is provided in the R&S EDST300 user manual.

Table 5-4: Measurement keys

Measurement key	Assigned functions
DME	Selects DME/TACAN measurement mode
PULSE	Selects Pulse view mode
SSR	For future use
MODE	For future use
CHAN	Selects DME/TACAN channel number for measurements
FREQ	Toggles between RX and TX settings; Sets the center frequency and the start and stop frequencies for the RX and TX frequency range under consideration.
START STOP	Starts and stops streaming or storing measurement data.
RX1..4	Selects the receiver antenna input for measurement
MARKER	Sets and positions a measurement marker in "Pulse" view
GPS	Selects GPS mode
SEQ	For future use

5.1.7 Keypad

The keys in the data entry keypad are used to enter alphanumeric data and units.

Data entry keys are only enabled while the cursor is placed on a data input field in a dialog. Their function depends on the data type of the input field.

Keys	Description
0...9/abc	Enters the corresponding numbers (in numeric input fields) or characters (character input fields).
.	Inserts a decimal point (numeric input fields) or dot (character input fields) at the cursor position. Multiple decimal points are not allowed.
-	Changes the sign of a numeric parameter. For alphanumeric parameters, inserts a hyphen at the cursor position.
+/-	Changes the sign of a numeric parameter. For alphanumeric parameters, inserts a hyphen at the cursor position.
Unit keys	Adds the selected unit to the entered numeric value and completes the entry.
_	Adds a blank in a character input field.
*... #	Enters special characters. Toggles through the available characters if the key is pressed several times in a row.
A ↔ a	Toggles between uppercase and lowercase characters.
[BACK]	Deletes the last character before the cursor position or the selected character sequence.
[ENTER]	• Concludes the entry of dimensionless entries. For other entries, this key can be used instead of the default unit key. The new value is accepted. • Confirms ("OK") and closes open input windows. • In a dialog box, selects the default or focused button. • In a dialog box, activates the edit mode for the focused area, if available. • In a dialog box, activates or deactivates the selected option of the focused area. • Calls the next menu level. Pressing the rotary knob has the same effect.
[ESC/ESC / Cancel]	• Closes the open window without accepting new entries; the old value or parameter is retained. • Closes all kinds of dialog boxes. • In dialog boxes that contain a "Cancel" button that it activates that button.

5.2   Rear panel view

This figure shows the rear panel view of the R&S EDST300. The individual elements are described in more detail in the subsequent sections.

The meanings of the labels on the product are described in Chapter 1.2, "Labels on the product", on page 6.

Figure 5-2: Rear panel view of the R&S EDST300

1 = DC power supply connection
2 = Chapter 5.2.2, "SUPPRESS IN / OUT connector", on page 28
3 = ANALOG IN connector
4 = SYNC1 OUT
5 = ANALOG OUT connector
6 = SYNC2 OUT
7 = TRIGGER OUT connector
8 = TRIGGER IN connector
9 = USB
10 = REF 10 MHz IN/OUT
11 = LAN interface
12 = DVI
13 = RS232 GPS interface
14 = Speaker for audio output

5.2.1　DC power supply connection

To ensure high mobility and flexibility while using the R&S EDST300, it is equipped with a DC power supply connector on the rear panel of the instrument.

For safety information, refer to "Connecting to power" on page 4.

For details, refer to Chapter 4.7, "Connecting to power", on page 15.

5.2.2　SUPPRESS IN / OUT connector

The R&S EDST300 allows for a suppressor line signal to be input or output via the BNC "SUPPRESS IN / OUT" connector (see Chapter 4.8.2, "Connecting a suppressor line", on page 17).

The (digital) voltage levels for the input can range from 8 V to 30 V (when active).

The (digital) voltage levels for the output depend on the power supply of the R&S EDST300. The power supply ranges from 20 V to 28 V.

With an internal battery, the output power supply range is 24 V ±5 %.

The output voltage is the supplied voltage minus approx. 1 V.

In both cases, the impedance is 30 kΩ.

5.2.3　ANALOG IN / ANALOG OUT connectors

The R&S EDST300 can provide various analog signals as output at the "ANALOG OUT" BNC connector. The signal is output with a peak power level of 4 V and an impedance of 50 Ω.

Configure which signal to output in the general instrument settings.

The R&S EDST300 can also analyze analog baseband signals from another device via the "ANALOG IN" BNC connector. Input the signal with a peak power level of 1 V and an impedance of 50 Ω.

5.2.4　SYNC1/2 OUT

If option R&S EDST-B6 is installed, two BNC connectors are provided to output pulsed synchronization signals to a connected device. The signal voltage level is 5 V. The pulse period for the signal at the "SYNC1 OUT" connector is 135 Hz

(TACAN ARB). The pulse period for the signal at the "SYNC2 OUT" connector is 15 Hz (TACAN MRB).

5.2.5   TRIGGER INPUT / OUTPUT

Use the female BNC "TRIGGER INPUT" connector to input an external trigger. An external trigger, for example from the DME transmission system, can control the measurement on the R&S EDST300. The (digital) voltage levels can range from 3.3 V to 33 V. The input impedance is 100 kΩ.

Use the female BNC "TRIGGER OUTPUT" connector to provide a trigger signal from the R&S EDST300 to another connected device, such as the DME transmission system. The trigger can be a pulse, ARB, or MRB signal, for example. The (digital) output signal is TTL compatible (0 V / 5 V). The output impedance is 50 Ω.

Control the trigger signal in the measurement settings.

5.2.6   USB

The rear panel provides additional female USB (USB-A) connectors to connect a memory device or power sensor.

The connectors are standard USB 3.0 ports with a maximum transmission rate of 40 Mbit/s.

For further USB connectors, see also Chapter 5.1.4.2, "USB interface", on page 23.

5.2.7   REF 10 MHz IN/OUT

The "REF 10 MHz IN/OUT" connector can provide an external reference signal to the R&S EDST300, or from the R&S EDST300 to a connected device. In either case, the reference signal is at 10 MHz, with a power level of 1 V_{eff}. The connector is a 50 Ω BNC socket.

Configure whether the connector is used for input or output in the general instrument settings.

5.2.8   LAN interface

Use the "LAN" interface to connect the R&S EDST300 to a local network for remote control, printouts or data transfer. The data can be transferred with a rate of up to 1 Gbit per second. Configure the IP address and subnet mask in the general instrument settings.

5.2.9   DVI

You can connect an external (TFT) monitor or other display device to the R&S EDST300's DVI (Digital visual interface) to provide an enlarged display. The interface consists of a DVI-D socket (24+1).

For details, see Chapter 4.8.4, "Connecting an external monitor", on page 17.

5.2.10   RS232 GPS interface

2-port RS232, 9-pin D-Sub connector for a GPS receiver providing NMEA protocol data. The NMEA protocol data is displayed and stored with the recorded data.

5.3   Device ID

The unique device identifier is provided as a barcode sticker on the rear panel of the R&S EDST300.

It consists of the device order number and a serial number.

The serial number is used to define the **default instrument name**, which is:

<Type><variant>-<serial_number>

For example, `EDST300-123456`.

The instrument name is required to establish a connection to the instrument in a LAN.

6   Operating basics

This chapter provides an overview on how to work with the R&S EDST300. It describes what kind of information is displayed on the screen and how to operate the R&S EDST300 via the front panel keys and other interaction methods.

6.1   Understanding the display information

The following figure shows a typical screen display on the R&S EDST300. All different screen elements are labeled. They are explained in more detail in the following sections.
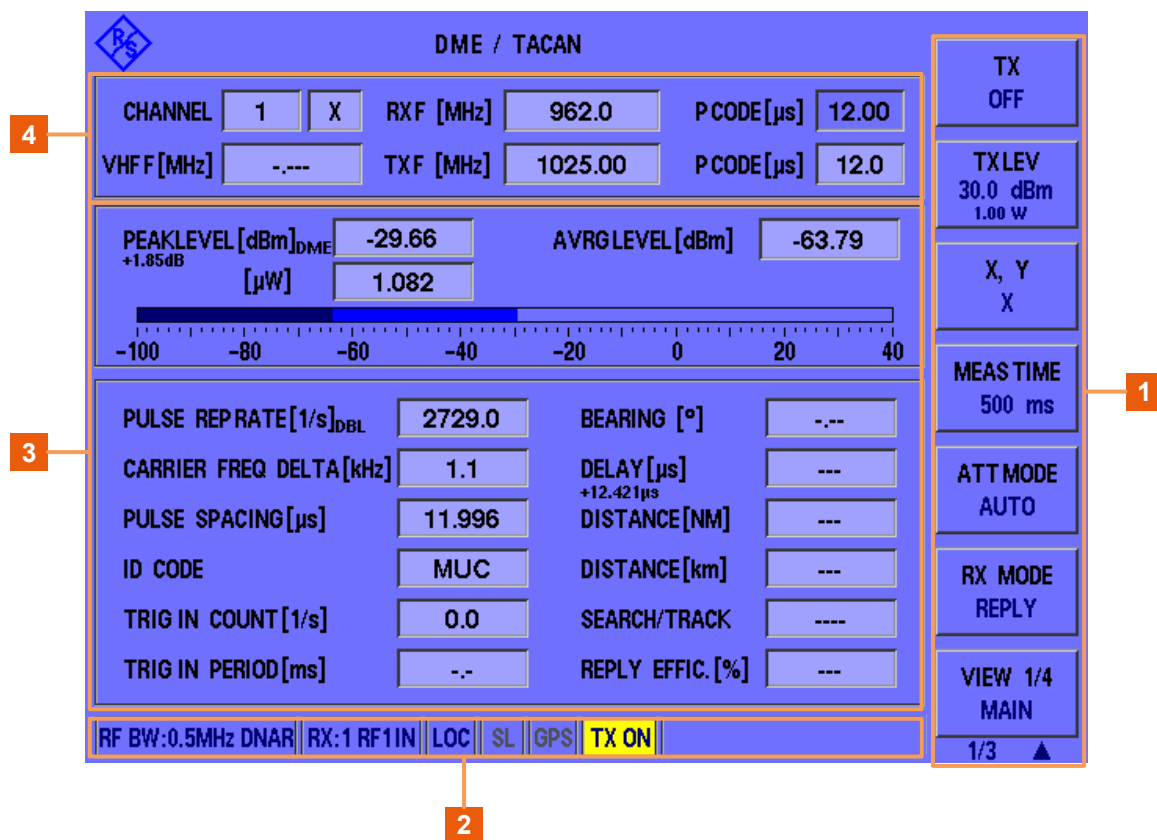

Figure 6-1: Typical R&S EDST300 screen display (using DME mode as an example)

1 = Softkeys to edit settings and activate functions
2 = Status bar
3 = Measurement result area
4 = Measurement settings area

Softkeys

Softkeys are virtual function keys whose actual function is defined by the software, depending on the currently selected measurement mode or key, or both.

Sometimes, more functions are available than softkeys can be displayed at the same time. In this case, a second or third menu of functions is available, indicated by "1/2" and "2/2" (or "1/3", "2/3", "3/3", respectively) beneath the softkeys in the display. To switch between the menus of softkey functions, press the "More softkeys" key beneath the softkeys on the front panel of the R&S EDST300.

Measurement settings and results area

During a measurement, the available settings are displayed at the top of the screen; the measurement results at the bottom. If a general instrument setting or data management function is selected, the settings and information are displayed in the main part of the screen.

Which settings and results are displayed depends on the current measurement or instrument function.

See the R&S EDST300 User Manual for details.

Status bar

The status bar at the bottom of the screen contains information on the operating status of the instrument and connected devices.
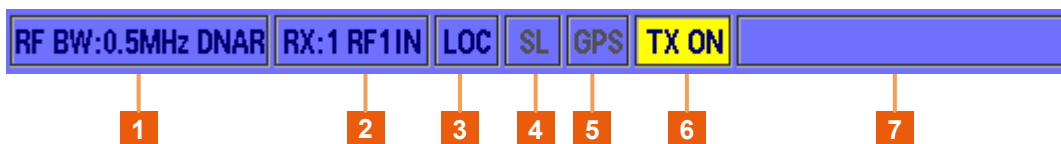

Figure 6-2: R&S EDST300 status bar

Table 6-1: Information in the R&S EDST300 status bar

	Section	Function	Example
1	Input settings	Input settings, e.g. the used RF and demodulation bandwidth (narrow, wide).	`RF BW:0.5MHz DNAR`
2	RX connectors	Connector used for each receive channel (RX1 / RX2 (optional))	`RX:1 RF1 IN` (The RF input for receive channel "RX1" is provided by the [RF1 IN] connector)
3	Operating mode	Local or remote operation of the instrument **LOC**: local operation (directly on the instrument) **REM**: remote operation by external PC (can be stopped using [LOCAL] key on front panel) **RLC**: (REMOTELOCK) local operation is locked by remote control	`LOC`
4	Suppress line status	Indicates incoming suppressor line signal (see Chapter 5.2.2, "SUPPRESS IN / OUT connector", on page 28)	"SL"
5	GPS status	GPS connection available or not (see Chapter 5.2.10, "RS232 GPS interface", on page 30)	"GPS"
6	TX status	Indicates use of "RF1 IN/OUT" connector for transmission (see Chapter 5.1.4.1, "Antenna connections RF1 IN/OUT and RF2 IN", on page 22)	`TX ON`
7	Operating status	Messages on the data logging status of the instrument, if applicable (see Error and status messages).	`USB LOGGING ON`

6.2   Accessing the functionality

All functions available on the R&S EDST300 can be accessed using the keys on the front panel of the instrument. Some keys provide a softkey menu on the display with further functions and settings.

To change a setting or activate a function

1. Select a key on the front panel of the instrument to activate a function directly, or to display a softkey menu.

2.

Select the softkey for the setting or function as required.
If necessary, select the "More softkeys" key to switch to the second softkey menu.

The function is activated, or a new window is displayed to view or change specific settings.

3. To set the focus on a specific setting in the displayed window, scroll through the individual settings by turning the rotary knob or pressing the Up and Down arrow keys on the front panel (see Chapter 5.1.5, "Navigation controls and general functions", on page 24).

4. To edit the currently selected setting, press the rotary knob or the [ENTER] key on the front panel.

5. Scroll through the available setting values by turning the rotary knob or pressing the Up and Down arrow keys on the front panel, or enter a numeric or alphanumeric value as described in Chapter 6.3, "Entering data", on page 35.

6. Confirm the new setting by pressing the rotary knob or the [ENTER] key on the front panel.

6.3   Entering data

Data can be entered in input fields using elements provided by the front panel, e.g. the keypad, rotary knob, or navigation keys.

The rotary knob has the same effect as the [ENTER] key when it is pressed.

ⓘ **Red input fields - invalid input**

1315_

If you enter invalid data in an input field, the value is displayed in red and cannot be stored.

6.3.1   Entering numeric parameters

If a field requires numeric input, the keypad provides only numbers.

1. Enter the parameter value using the keypad, or change the currently used parameter value by turning the rotary knob or pressing the Up or Down arrow keys.

2. After entering the numeric value via keypad, press the corresponding unit key. The unit is added to the entry.

3. If the parameter does not require a unit, confirm the entered value by pressing the [ENTER] key or any of the unit keys.

6.3.2   Entering alphanumeric parameters

If a field requires alphanumeric input, you can use the keypad on the front panel of the R&S EDST300. Every alphanumeric key represents several characters and one number. The decimal point key (.) represents special characters, and the sign key (-) toggles between capital and small letters. For the assignment, refer to Table 6-2.

Entering numbers and (special) characters via the keypad

1. Press the key once to enter the first possible value.

2. All characters available via this key are displayed.

3. To choose another value provided by this key, press the key again, until your desired value is displayed.

4. With every key stroke, the next possible value of this key is displayed. If all possible values have been displayed, the series starts with the first value again. For information on the series refer to Table 6-2.

5. To change from capital to small letters and vice versa, press the sign key (-).

6. When you have chosen the desired value, wait for 2 seconds (to use the same key again), or start the next entry by pressing another key.

Entering a blank

► Press the "0" key and wait 2 seconds.

Correcting an entry

1. Using the arrow keys (see Chapter 5.1.5, "Navigation controls and general functions", on page 24), move the cursor to the right of the entry you want to delete.

2. Press the [BACK] key.

   The entry to the left of the cursor is deleted.

3. Enter your correction.

Completing the entry

► Press the [ENTER] key or the rotary knob.

   For numeric values, the default unit is appended to the numeric input.
   To enter a value using a different unit, select the corresponding

Aborting the entry

► Press the [ESC] key.
   The previous entry is restored.

Table 6-2: Keys for alphanumeric parameters

Key name (upper inscription)	Series of (special) characters and number provided
7	7 μΩ°€¥ $ ¢
8	A B C 8 ÄÆÅÇ
9	D E F 9 É
4	G H I 4
5	J K L 5
6	M N O 6 Ň Ö
1	P Q R S 1
2	T U V 2 Ü
3	W X Y Z 3
0	<blank> 0 – @ + / \ < > = % &

Key name (upper inscription)	Series of (special) characters and number provided
.	. * : _ , ; " ' ? ( ) #
−	<toggles between capital and small letters>

6.4   Error and status messages

If errors or irregularities are detected, a keyword or error message is displayed at the top of the window. If an error occurs that affects the measurement, [UNCAL] is displayed in red letters at the top of the screen. In this case, check the error log for missed errors. The [UNCAL] display is only removed when the R&S EDST300 is switched off.

All error and status messages displayed on the R&S EDST300 are also stored to an error log on the instrument for later inspection.

The status bar contains status messages for the used power supply or data operations.

Table 6-3: Status messages

Message	Description
Battery	The internal battery pack is currently supplying power to the R&S EDST300.
Mains	The AC power adapter is currently supplying power to the R&S EDST300.
Mount USB-Stick	No USB storage device has been connected to the R&S EDST300 yet, for example for data logging.
Can't mount USB-Stick	The USB storage device connected to the R&S EDST300 could not be read correctly.
Mount USB-Stick: OK	The USB storage device connected to the R&S EDST300 is ready to store data.
USB LOGGING ON	Data logging to a USB storage device is active.
LOGGING STOPPED	Data logging to a USB storage device was stopped.

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