SRM-3006

Selective Radiation Meter

Operating Manual

narda
Safety Test Solutions

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Contents

1 Introduction 1

1.1 About this device 2
1.2 SRM-3006 as a field strength meter 4
1.2.1 Basic unit 5
1.2.2 Antennas 5
1.2.3 Cables 7
1.3 SRM-3006 as a laboratory device 8
1.3.1 Basic unit 9
1.4 PC software 10
1.5 About this operating manual 10
1.5.1 User interface language. 10
1.5.2 Symbols and characters used 10

2 Important Safety Instructions 13

2.1 Using this operating manual 14
2.2 Before connecting up. 14
2.3 Proper use 14
2.4 Improper use 15
2.5 General hazards 15
2.6 Dangers due to electromagnetic fields 16
2.7 AC adapter / charger 18
2.8 Rechargeable batteries 19
2.8.1 Storage 19
2.8.2 Handling 20
2.8.3 Fire hazards. 20
2.8.4 Chemical hazards 21
2.8.5 Charging and discharging 21
2.8.6 Disposal 22
2.9 Faults and unusual stresses 22
2.10 Proper disposal (EU only) 22

2.10.1 Disposal of used equipment 22
2.10.2 Disposal of removable batteries 23
2.10.3 Disposal of permanently installed batteries 23
2.10.4 Deleting private data 23

3 Connecting Up and Starting to Use the Device. 25

3.1 Unpacking the device 26
3.1.1 Packaging 26
3.1.2 Package contents 26
3.1.3 Checking the device for shipping damage 26
3.1.4 Recovery after shipping and storage 26
3.2 Device overview 27
3.2.1 Display and control panels 27
3.2.2 Device side panel with antenna / cable connectors 28
3.2.3 Device side panel with battery compartment 28
3.2.4 Device side panel with external connectors 29
3.3 Power supply 29
3.3.1 Operation from battery pack 30
3.3.2 Handling battery packs 31
3.3.3 Operation from AC adapter / charger 32
3.4 Fitting the antenna 32
3.4.1 Fitting a Narda antenna directly on the Basic Unit 32
3.4.2 Connecting a Narda antenna to the Basic Unit using a Narda cable. 33
3.4.3 Using commercially-available cables and antennas 36
3.4.4 Fitting a Narda antenna on a tripod 36

4 Operation and Basic Settings 41

4.1 Controls 42
4.1.1 Rotary control and keys 42
4.1.2 Softkeys 43
4.2 Switching the device on and off 43
4.3 LCD screen elements 44

4.3.1 The upper status bar 45
4.3.2 The lower status bar 46
4.3.3 The navigator bar. 47
4.3.4 Activating / deactivating status and info bars. 47
4.4 Fundamental operating steps 48
4.4.1 Navigating in the menus 48
4.4.2 Forwards / Backwards 49
4.4.3 Selecting entries from a list 50
4.4.4 Changing numerical values 52
4.4.5 Entering text 53
4.4.6 Softkeys with toggle function 54
4.4.7 Creating a screenshot 54

5 The Main Menu 55

5.1 Overview of functions and operating modes 56
5.2 Display and editing device and component settings 57
5.2.1 Changing the language, battery type, date, and time 58
5.2.2 Editing device-specific settings 59
5.2.3 Displaying device information 60
5.2.4 Displaying GPS information. 62
5.2.5 Resetting settings 62
5.2.6 Performing device diagnosis 63
5.2.7 Displaying and selecting the available antennas. 64
5.2.8 Displaying and selecting the available cables 65
5.2.9 Displaying and selecting the safety standards. 65
5.2.10 Displaying and creating service tables 66
5.3 The memory menu. 68
5.4 Using measurement routines. 68
5.4.1 Displaying measurement routines 69
5.4.2 Starting a measurement routine 69
5.5 Saving and loading setups. 69
5.5.1 Saving settings as a setup. 70

5.5.2 Loading settings from a setup 70
5.5.3 Editing the setup list 70
5.5.4 Deleting setups 71
5.5.5 Changing the switch on behavior 72

6 Functions Common to More Than One Operating Mode 73

6.1 Overview of functions common to more than one operating mode 74
6.2 Setting the center frequency (Fcent) 75
6.3 Setting the resolution bandwidth (RBW) 76
6.3.1 Setting the video bandwidth (VBW) 76
6.4 Setting the measurement range (Meas. Range) 77
6.4.1 Manual measurement range selection 78
6.4.2 Automatic measurement range search (MR Search) 79
6.4.3 Measurement input overload 79
6.5 Selecting the result type (Result Type) 80
6.5.1 Average formation (Result type: Average) 81
6.5.2 Reset measurement values 82
6.6 The Marker function 82
6.6.1 Using the markers separately 83
6.6.2 Using both markers to determine a difference 85
6.6.3 Displaying the marker data on the measurement screen . . . 87
6.6.4 Zooming to marker 88
6.7 Selecting an axis mode 89
6.7.1 Measurement using a three axis antenna 90
6.7.2 Measurement using a single axis antenna 92
6.8 Adjusting the Y-Scale 94
6.9 Changing the displayed units 95
6.10 Noise suppression (Noise Thresh.) 96
6.11 Measuring spatial average values (Spatial AVG) 97
6.12 Changing operating mode and keeping the same parameters . 98
6.13 Useful shortcuts 100

6.13.1 Selecting a service table or a service 100
6.13.2 Saving a setup 100

7 Safety Evaluation Mode 101

7.1 About Safety Evaluation mode 102
7.2 Basic settings. 104
7.2.1 Selecting the display mode 104
7.2.2 Activating the beeper 104
7.2.3 Showing and hiding services 105
7.2.4 Setting the resolution bandwidth (RBW) 105
7.2.5 Setting the measurement range (Meas. Range) 106
7.2.6 Selecting the result type (Result Type) 106
7.2.7 Measuring in the gaps between defined services (Others) . 107
7.3 Using the Table view 107
7.3.1 Changing the table displayed 108
7.3.2 Percentage display 109
7.4 Using the Bar Graph view 111
7.4.1 Adjusting the Y axis (Y-Scale) 111
7.4.2 Changing the displayed units (Unit). 111
7.4.3 The Marker function. 112
7.5 Selecting an axis mode 112

8 Spectrum Analysis Mode 113

8.1 About Spectrum Analysis mode. 114
8.2 Basic settings. 114
8.2.1 Changing the frequency range 115
8.2.2 Setting the resolution bandwidth (RBW) 116
8.2.3 Setting the video bandwidth (VBW). 116
8.2.4 Changing the displayed units (Unit). 116
8.2.5 Adjusting the Y axis (Y-Scale) 117
8.3 Evaluating the measurement data (Evaluation). 117
8.3.1 Displaying the peak values (Peak Table). 118

8.3.2 Integrating measured values (Integration) 120
8.4 The Marker function (Marker) 122
8.5 The Zoom function (Zoom) 122

9 Level Recorder Mode 125

9.1 About Level Recorder mode 126
9.2 Display overview 127
9.2.1 Activating the beeper 128
9.3 Basic settings 128
9.3.1 Selecting the center frequency (Fcent) 128
9.3.2 Setting the resolution bandwidth (RBW) 128
9.3.3 Setting the video bandwidth (VBW) 128
9.3.4 Setting the measurement range (Meas. Range) 129
9.3.5 Selecting the result type (Result Type) 129
9.4 Selecting an axis mode (Axis) 130
9.5 Using noise suppression (Noise Thresh.) 130

10 Scope Mode 131

10.1 About Scope mode 132
10.2 Display overview 132
10.3 Basic settings 133
10.3.1 Limits of values that can be set 134
10.3.2 Selecting the center frequency (Fcent) 134
10.3.3 Selecting Sweep Time, Time Resolution 135
10.3.4 Setting the resolution bandwidth (RBW) 135
10.3.5 Setting the video bandwidth (VBW) 135
10.3.6 Selecting the result type (Result Type) 136
10.3.7 Adjusting the Y axis (Y-Scale) 136
10.3.8 Changing the displayed units (Unit) 136
10.3.9 Extras 136
10.4 Examples for measurement parameters 136
10.4.1 Example 1: GSM 137

10.4.2 Example 2: DECT telephone 137
10.4.3 Example 3: WLAN 138
10.4.4 Example 4: Remote automobile key (ISM band) 140
10.5 Using the trigger function. 141
10.5.1 Free Run 141
10.5.2 Single and Multiple 141
10.5.3 Manual Start 143
10.5.4 Time Controlled 144
10.6 Evaluating the measurement results (Evaluation) 144

11 UMTS Mode 145

11.1 About UMTS mode 146
11.2 Display overview 147
11.3 Explanation of measurement result display 148
11.3.1 Individual results 148
11.3.2 Total result (Total) 148
11.3.3 Partial results for certain radio cells (scrambling codes) 149
11.3.4 Analog measurement result (Analog) 149
11.4 Basic settings. 149
11.4.1 Setting the center frequency (Fcent) 149
11.4.2 Showing and hiding services 150
11.4.3 Resetting the table (Reset Table) 150
11.4.4 Setting the measurement range (Meas. Range) 150
11.4.5 Selecting the result type (Result Type) 151
11.4.6 Using an extrapolation factor 151
11.5 Performing a coverage measurement 152
11.6 Using noise suppression (Noise Thresh.) 152

12 LTE mode. 153

12.1 About LTE mode 154
12.2 Display overview 155
12.3 Explanation of measurement result display 156

12.3.1 Individual results 156
12.3.2 Total result (Total) 157
12.3.3 Partial results for certain cells 157
12.3.4 Analog measurement result (Analog) 157
12.4 Basic settings 157
12.4.1 Setting the center frequency (Fcent) and channel bandwidth (CBW) 158
12.4.2 Selecting signals (Signal) 160
12.4.3 Changing CP Length and Cell Sync. 160
12.4.4 Selecting the result type (Result Type) 161
12.4.5 Setting the measurement range (Meas. Range). 161
12.4.6 Using an extrapolation factor 161
12.5 Using noise suppression (Noise Thresh.). 162
12.6 LTE TDD 163
12.6.1 Select and change the up-/downlink configuration 164

13 5G NR mode 165

13.1 About 5G NR Mode 166
13.2 Display overview 167
13.3 Explanation of measurement result display 168
13.3.1 Individual results 168
13.3.2 Total result (Total) 168
13.3.3 Partial results for certain cells 169
13.3.4 Analog measurement result (Analog) 169
13.4 Basic settings 169
13.4.1 Setting the center frequency (Fcent) 169
13.4.2 Selecting SubCarrier Spacing (SCS) 170
13.4.3 Selecting signals (Signal) 171
13.4.4 Sensitivity 172
13.4.5 Selecting the result type (Result Type) 173
13.4.6 Setting the measurement range (Meas. Range). 173

14 Spatial Averaging 175

14.1 About the Spatial Averaging function 176
14.2 Description of averaging functions 177
14.2.1 Continuous 178
14.2.2 Discrete 179
14.2.3 Discrete Axis 180
14.3 Spatial Averaging – Continuous 181
14.4 Spatial Averaging – Discrete 183
14.5 Spatial Averaging – Discrete Axis 185

15 Measurement Data Memory 189

15.1 About the Memory menu 190
15.2 Viewing data sets 191
15.3 Viewing screenshots 193
15.4 Saving measured values automatically 194
15.4.1 Conditional Storing of measured values 194
15.4.2 Time Controlled Storing of measured values 196
15.5 Changing the comment modes 198

16 Maintenance and Repairs 199

16.1 Changing the battery pack 200
16.2 Cleaning 200
16.3 AC adapter / charger 201
16.4 Updating the device software 202
16.5 Activating options 202

17 PC Software 203

17.1 PC software versions and functions 204
17.2 Connecting to the PC 205
17.3 Working with the PC software 206

18 Remote Control 207

18.1 About remote control 208

18.2 Connecting to the PC 208
18.3 Activating / deactivating remote control 209
18.3.1 Solving problems 209
18.4 Syntax rules for remote control commands 209
18.4.1 Commands to the SRM-3006 209
18.4.2 SRM-3006 responses 210
18.4.3 Example of a command sequence 211

19 Specifications 213

19.1 Definitions and conditions 214
19.2 SRM-3006 215
19.2.1 General specifications 215
19.3 Three axis E-field antenna 3501/03 217
19.3.1 General specifications 217
19.4 Three axis E-field antenna 3502/01 218
19.4.1 General specifications 218
19.5 Three axis H-field antenna 3581/02 219
19.5.1 General specifications 219
19.6 Single axis E-field antenna 3531/01 220
19.6.1 General specifications 220
19.7 Single axis E-field antenna 3531/04 221
19.7.1 General specifications 221
19.8 Single axis H-field antenna 3551/02 222
19.8.1 General specifications 222
19.9 Declaration of Conformity 223

20 Annex A 225

20.1 Pendulum method 226
20.2 Matrix method (precision measurement) 228

21 Ordering Information 231

22 Glossary. 233

Index. 237

1 Introduction

This chapter contains basic information on measuring electromagnetic fields, on using the SRM-3006, and on how this manual is laid out.

1.1 About this device (page 2)

1.2 SRM-3006 as a field strength meter (page 4)

1.3 SRM-3006 as a laboratory device (page 8)

1.4 PC software (page 10)

1.5 About this operating manual (page 10)

1.1 About this device

The SRM-3006 (**S**elective **R**adiation **M**eter) is a handy-sized frequency-selective measuring system for safety analysis and environmental measurements in high frequency electromagnetic fields in the frequency range from 9 kHz to 6 GHz. Because signals with frequencies of this magnitude are very difficult to sample digitally, the SRM-3006 uses a combination of analog and digital signal processing. It is ideal for measuring absolute and limit values of high-frequency electromagnetic fields such as those due to broadcast radio (AM, FM), TV (analog, DVB-T), BOS (Tetra), mobile telecommunications (GSM, UMTS, LTE, 5G), radar, and wireless communications (WiMax, WLAN).

In unknown field environments such as those around so-called *shared sites*, where several providers of mobile telephone services share a common antenna site, the SRM-3006 displays the total field level as well as the contributions made by the individual services, either as absolute values or as a percentage of the permitted limit level. Each service can be resolved down to its individual channels and the contribution made by each channel to the overall field emission measured using the SRM-3006. In the same way, the value can be integrated over the frequency band of the service and the total value displayed, again as an absolute value or in terms of the relevant limit value. The SRM-3006 naturally also includes all the typical functions of a spectrum analyzer and as such can be universally applied. An added bonus is the high measurement speed at small resolution bandwidths (RBW).

The device combines a very wide and varied range of functions within an extremely lightweight and handy design. This makes it possible to use the device particularly under the kind of conditions where good mobility and ruggedness are required.

The complete SRM-3006 measuring system comprises the Basic Unit SRM-3006 and the three axis antenna. Narda Safety Test Solutions also supplies other antennas for the Basic unit, including single axis antennas, covering various applications and frequency ranges. All Narda antennas can be mounted directly on the Basic Unit or connected to it using a special RF cable.

Other commercially available antennas can be connected to the SRM-3006 by cables; these cables can also be of types other than those supplied by Narda.

Figure 1: SRM-3006 in on-site use

1.2 SRM-3006 as a field strength meter

The SRM-3006 is a device for measuring electromagnetic fields in the frequency range 9 kHz to 6 GHz. The main measurement task here is the determination of the field strength.

Several operating modes can be selected. Each operating mode is designed to deliver in-situ immediate, informative results that do not require any further processing or evaluation.

In the simplest case, the complete measuring equipment for determining the field strength consists of the Basic Unit with an antenna mounted directly on it.

Depending on the selected measurement method, it may be useful or even necessary not to mount the antenna directly on the Basic Unit but to place it some distance away and use a cable to connect it.

A 1.5 m long cable is included in all SRM-3006 field strength measuring system sets including antenna that are offered by Narda Safety Test Solutions. A 5 m long cable is available for special applications (see *Ordering Information* on page 231).

The antenna needs to be exactly positioned and undisturbed for precision measurements. An optionally available tripod with a suitable antenna holder can be added to the measuring equipment for this purpose.

Regardless of the package described, cables and antennas not made by Narda can also be connected to the Basic Unit in order to perform the desired measurements (see *Using commercially-available cables and antennas* on page 36).

1.2.1 Basic unit

The SRM-3006 is a field meter that has been specially designed for use outdoors and in difficult to reach or uncomfortable measurement locations. The functions of the device have therefore been tailored to ensure ease of handling in practical situations.

Some of the most outstanding features are:

- Handy sized and light in weight despite a wide range of functions
- Ergonomically shaped non-slip grips ensure that the device can be held securely and that all controls can be easily reached during the measurement
- Additional fitting for attaching a wrist strap on the left hand side of the device
- Large, clear LCD with backlight is easy to read under various lighting conditions
- Foil keypad ensures reliable operation under poor conditions or when wearing gloves
- Fast, hassle-free rechargeable battery replacement for longer on-site operating times

1.2.2 Antennas

The standard contents of a SRM-3006 set usually include a three axis antenna. This three axis antenna allows quick and simple isotropic measurements with automatic determination of the three spatial components of the field to be measured. It too has been designed for use outdoors and in hard to reach measurement locations (see *Ordering Information* on page 231).

Narda Safety Test Solutions also supplies other single axis and three axis antennas for electric and magnetic field measurements which cover further applications and lower frequency ranges.

Every Narda antenna is equipped with a control cable in addition to the RF conductor. This is connected to the Basic Unit by a multi-pin connector, and transfers the antenna parameters (type, serial number, calibration date, list of antenna factors) to the Basic Unit so that the SRM-3006 can recognize and use this data.

Other commercially-available antennas can also be connected to the Basic Unit. The table below indicates the types of antenna that can be used to determine field strength exposure levels.

Table 1: Antenna types

Type	Field type	Frequency range (typical values)	Remarks
Three Axis	E-field	420 MHz – 6 GHz	For rapid, non-directional measurements in the frequency range of the latest generation of wireless technologies and mobile phones.
Three Axis	E-field	27 MHz – 3 GHz	Universal solution for rapid, non-directional measurements.
Single Axis	E-field	27 MHz – 3 GHz	For precision measurements in the frequency range most used by communications services.
Single Axis	E-field	9 kHz – 300 MHz	For precision measurements of electric fields around radio/TV transmitters and industrial equipment.
Three Axis	H-field	9 kHz – 250 MHz	For rapid, non-directional near field measurements on magnetic fields around radio/TV transmitters and industrial equipment.
Single Axis	H-field	9 kHz – 300 MHz	For precision near field measurements on magnetic fields around radio/TV transmitters and industrial equipment.

1.2.3 Cables

Narda Safety Test Solutions supplies two cables for the connection between the antenna and the Basic Unit. Both cables are suitable for the frequency range between 9 kHz and 6 GHz. The cables are 1.5 m and 5 m long and contain ferrite to reduce the effect of the external field on the measurement results. The cables include a control cable along with the RF conductor. This control cable is connected to the Basic Unit by a multi-pin connector, and transfers the antenna parameters (type, serial number, calibration date, list of attenuation factors) to the Basic Unit so that the SRM-3006 can recognize and use this data. This cable also allows the SRM-3006 to control successive measurement of each of the three axes to determine the isotropic result, or selection of a single axis to determine directional information.

Commercially-available cables can also be used for the connection between the Basic Unit and the antenna. However, three axis antennas cannot be controlled using such cables.

1.3 SRM-3006 as a laboratory device

Since the SRM-3006 Basic Unit has all the typical features of a spectrum analyzer, it can also be used in this capacity under laboratory conditions.

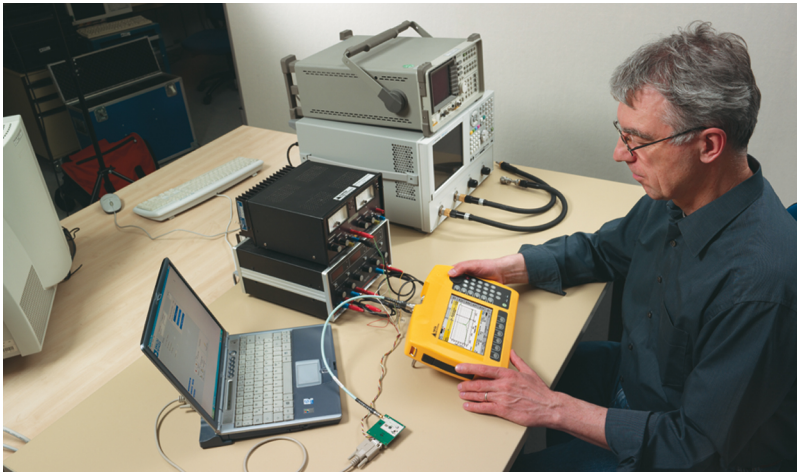


Figure 2: SRM-3006 in laboratory use

The SRM-3006 can be integrated into the required measurement environment directly via the N connector or by means of a cable. The test generator signals can be fed directly into the basic unit via the N connector.

The SRM-3006 set includes a 1.5 m long cable. A 5 m long cable can be ordered as an optional accessory (see *Ordering Information* on page 231).

1.3.1 Basic unit

The SRM-3006 Basic Unit has the following standard features of a spectrum analyzer:

- The **Integration over Frequency Band** function in **Spectrum Analysis** mode can be used to determine the wide band value for an individual channel **(Channel Power).**
- The service tables in **Safety Evaluation** mode can be used as channel tables for channel measurements **(Channel Power Plus)**. Clarity is given by displaying the results as a bar graph.
- Noisy signals can be smoothed by adjusting the video bandwidth or by selecting a narrow RBW in **Safety Evaluation** mode. A compromise with regard to time must be found when smoothing the signals.
- Signals can be observed against time in **Spectrum Analysis** mode using very narrow and very wide RBWs.

In addition to the above, the SRM-3006 has the following functions (among others):

- The field strength of pulsed signals can be determined rapidly in **Level Recorder** mode.
- Signals can be analyzed in real time or monitored over a long period of up to 24 hours in **Scope** mode.
- **Spatial averaging** and normal averaging provide important information for standard-compliant measurements e.g. for 6-minute intervals.
- **Peak Table** and **Extrapolation** functions are provided for evaluating measurements.
- **UMTS** mode enables P-CPICH demodulation and therefore field strength measurements for individual UMTS cells.
- The field strengths of cell-specific signals (particularly the reference and secondary sync signals) are measured in **LTE** mode.
- Code selective power level measurement of the cell specific and traffic independent signals i.e. Secondary Sync Signal (SSS 0 to SSS 7) of 5G NR cells.
- Certain **store events** (time, threshold value) can be set to enable recording of specific measurement results.

1.4 PC software

The device can be connected to a PC via the optical interface or the USB port (Mini B type). This allows access to the device functions and measurement results. You can find detailed information about this in the following chapters:

- *PC Software* on page 203
- *Remote Control* on page 207

1.5 About this operating manual

1.5.1 User interface language

This operating manual uses English terminology to describe the user interface.

The user interface of the SRM-3006 can however be displayed in other languages.

If you select another language for the user interface, the displayed terms will differ from the ones described in this manual.

1.5.2 Symbols and characters used

Various elements are used in this operating manual to draw attention to special meanings or important points in the text.

Symbols and terms used in warnings

The following warnings, symbols and terms are used in this document in compliance with the American National Standard ANSI Z535.6-2006:

⚠	This general danger symbol in conjunction with the terms **CAUTION**, **WARNING**, or **DANGER** warns of the risk of severe injury. Follow all subsequent instructions to avoid injury or death.
NOTICE	Indicates a danger that could lead to damage or destruction of the device.
CAUTION	Indicates a danger that represents a low or medium risk of injury.
WARNING	Indicates a danger that could lead to death or severe injury.
DANGER	Indicates a danger that will result in death or severe injury.

Warning format

All warnings have the following format:

⚠ SIGNAL WORD
Type and source of danger **Consequences of ignoring the warning** ⇒ Action needed to avoid danger

Symbols and characters

!	**Important action instruction** Indicates an instruction for action that must be followed in order to avoid danger.
✓	**Requirement** Indicates a requirement that must be fulfilled before the subsequent action can be taken. Example: ✓ The measurement screen is displayed.
⇒	**Action** Indicates a single action. Example: ⇒ Switch the device on.
1. **2.** **3.**	**Sequence of actions** Indicates a sequence of actions that must be performed in the order given.
↳	**Result** Indicates the result of an action. Example: ↳ The device starts a self test.
Bold text	**Control element or menu name** Indicates device control elements and menu names. Example: ⇒ Press the **OK** key.
Gray text	**Orientation** You will find a line of gray text at the start of every section in the descriptions of the menus and functions. This indicates the order of selection of the menus and sub-menus. Example: Main Menu • Safety Evaluation • Select Menu
Note:	Important additional information or details of special features or situations.

2 Important Safety Instructions

This chapter explains important terms that are used in this operating manual.

2.1 Using this operating manual (page 14)

2.2 Before connecting up (page 14)

2.3 Proper use (page 14)

2.4 Improper use (page 15)

2.5 General hazards (page 15)

2.6 Dangers due to electromagnetic fields (page 16)

2.7 AC adapter / charger (page 18)

2.8 Rechargeable batteries (page 19)

2.9 Faults and unusual stresses (page 22)

2.10 Proper disposal (EU only) (page 22)

2.1 Using this operating manual

⇒ Please read this manual carefully and completely before using the device.

⇒ Keep this manual so that it is readily available to all users of the device.

⇒ Always make sure that this manual accompanies the device if it is given to a third party.

2.2 Before connecting up

The device left the factory in perfect condition. We recommend that the following instructions be followed to ensure that this condition is maintained and that operation of the device is without danger.

2.3 Proper use

The device may only be used under the conditions and for the purpose for which it was constructed.

The SRM-3006 is designed for measuring and evaluating electromagnetic fields.

⇒ Only use the device under the conditions and for the purpose for which it was constructed.

Proper use also includes the following:

⇒ Following the national accident prevention rules that apply at the place of use.

⇒ Only allowing appropriately qualified and trained persons to use the device.

2.4 Improper use

The SRM-3006 is not a warning device that gives indication of the presence of dangerous fields by means of visible or audible signals.

⇒ Always consider the device as a measuring device, never as a warning device.

⇒ Always carefully observe the actual measurement value display when approaching unknown fields.

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

2.5 General hazards

⚠ CAUTION

Hot connector sockets

The connecting sockets can get very warm if the instrument is used for long periods. This is normal.

⇒ Please be careful when touching the connectors after using the instrument for a long period of time.

2.6 Dangers due to electromagnetic fields

⚠ WARNING

Strong fields

Very strong fields can occur in the vicinity of some radiation sources.

⇒ Be aware of and observe any safety barriers and markings.

⇒ In particular, persons fitted with electronic implants (e.g. pacemakers) must keep away from dangerous areas.

⚠ WARNING

Unsuitable frequency range

Dangerous fields may not be detected if an unsuitable frequency range is selected.

⇒ Always select the largest available or the most suitable frequency range.

⇒ Always carefully observe the actual measurement value display when approaching unknown fields.

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

⚠ WARNING

Misinterpretation of results when using single axis antennas

When a single axis antenna is used, only the field components that are parallel to the antenna axis will be detected. If the antenna is not correctly oriented in the field, there is a danger that the field strength value displayed will be low or even zero despite the presence of a strong field.

⇒ Always use a suitable measurement setup when making measurements with a single axis antenna.

⇒ Be aware of the polarization direction when aligning the antenna.

⚠ WARNING

Electric shock

High voltages may occur within the device.

⇒ Do not bring the measuring device or the antenna into contact with any electrically conductive items.

⇒ Do not open the device. (Opening the device will void any claim under warranty.)

⇒ Do not handle or use a device that is opened or that is visibly damaged.

⇒ Only use the accessories supplied with and designed for the SRM-3006.

NOTICE

Malfunction

Improper use, damage, and unauthorized repairs can impair the accuracy and function of the device

⇒ Only use the device under the conditions and for the purpose for which it was constructed.

⇒ Regularly check the device for signs of damage.

⇒ Only allow qualified persons to make repairs.

Metallic stickers in the (yellow) sensor area of the antenna can lead to measurement errors, specifically to an underestimation of the electromagnetic field strength.

⇒ Only apply stickers of any kind to the (black) shaft of the antenna.

Metallic stickers in the (yellow) area above the display can cause malfunction of the GPS receiver.

⇒ Only apply stickers of any kind to the back or sides of the device.

2.7 AC adapter / charger

⚠ WARNING

Electric shock

Parts carrying dangerous voltages may be exposed and cause injury through electric shock if the AC adapter / charger is damaged.

⇒ Do not use an AC adapter / charger that is damaged.

NOTICE

Destruction of the AC adapter / charger

The AC adapter / charger can be destroyed by an incorrect AC line voltage, condensation, temperatures that are too high or too low, and insufficient ventilation.

⇒ Make sure that the AC line voltage is the same as the operating voltage of the AC adapter / charger **before** you connect it up.

⇒ Do not use the AC adapter charger if condensation has formed on it. If condensation is unavoidable, e.g. when the AC adapter charger is cold and is brought into a warm room, it must be allowed to dry out before you connect it up.

⇒ Only use the AC adapter / charger indoors and at temperatures between 0 °C and +40 °C.

2.8 Rechargeable batteries

The SRM-3006 is fitted with a rechargeable Lithium-ion battery to allow portable operation.

2.8.1 Storage

⚠ CAUTION

Unsuitable environmental conditions

Excessive temperatures and humidity can lead to a short circuit which can result in a fire, which may cause injury or destroy the battery pack.

⇒ Make sure that the storage conditions are within the following limits:
- Temperature: -10 °C to +50 °C
- Air humidity: 0% to 80%

⇒ Check regularly to ensure that the storage temperature and humidity are within the prescribed limits.

⇒ Do not leave discharged batteries in the instrument for an extended period of time.

⇒ Do not store the batteries for more than 6 months without recharging them in the meantime.

⇒ Do not store the batteries together with any other metallic objects.

⇒ Long-term storage can reduce the battery capacity and shorten battery life. The casing can also be damaged internally by leaking electrolyte.

2.8.2 Handling

⇒ Observe the following instructions for correct and safe handling of the battery pack.

⚠ CAUTION

Mechanical stresses

Incorrect handling and unsuitable mechanical stresses can lead to explosion, fire, or chemical leakages, which may cause injury or destroy the battery pack.

⇒ Do not open, crush, or dismantle the battery pack.

⇒ Do not drop the battery pack from a great height.

⇒ Do not attempt to solder anything on to the battery pack.

2.8.3 Fire hazards

⚠ CAUTION

Ignition of battery pack

The battery pack may catch fire if it is not used correctly. This may result in injury and will damage the battery pack.

⇒ Do not expose the batteries to high temperatures for an extended period of time.

⇒ If the anode or cathode of the battery comes into contact with another metal, heat may be generated and the electrolyte may leak. The electrolyte is flammable. The battery must be removed immediately from proximity to fire if electrolyte leakage occurs.

⇒ If a fire occurs, only use a Type D (dry powder) extinguisher to extinguish the fire. Make sure that you are upwind of the fire before attempting to extinguish it to prevent inhaling poisonous vapors.

⇒ Irritation of the eyes, skin, and respiratory tract can occur due to smoke or vapors from a burning battery (see next section).

2.8.4 Chemical hazards

⚠ CAUTION

Leakage of dangerous substances

Dangerous substances cannot leak from the battery pack during normal use, so there is no danger of contact with toxic materials. Leakage can only occur due to mechanical damage to the casing. If there is a chemical leak, please note the following information:

⇒ Gases released by a fire or by mechanical damage can cause breathing difficulties. Ventilate the area immediately or go outside into the fresh air. In case of emergency, seek medical attention.

⇒ The chemicals may cause irritation if they come into contact with your skin. If this happens, wash the affected area thoroughly with soap and water.

⇒ Your eyes may also be irritated; if this happens, wash your eyes thoroughly with water and seek medical attention.

⇒ Mop up any leaked electrolyte using some absorbent material, taking care that you protect your skin and eyes from contact with the electrolyte and that you do not breathe it in.

2.8.5 Charging and discharging

⚠ CAUTION

Incorrect charging and discharging

Incorrectly charging or discharging the batteries can cause explosion, fire, or leakage of chemical materials. This may result in injury or in destruction of the battery pack.

⇒ Only charge the batteries in accordance with the instructions in this manual using the specified charger unit.

⇒ The charging temperature must be between 0 °C and 40 °C.

⇒ The batteries must not be discharged at temperatures outside the range from -20 °C to +60 °C (-10 °C to +50 °C when fitted in the device).

2.8.6 Disposal

The batteries do not cause any environmental damage during normal use. However, because they contain dangerous chemicals, they must be disposed of separately when they reach the end of their useful life.

The batteries are classed as dangerous waste.

Batteries must be disposed of through an approved return for disposal system. They must never be thrown away in the normal trash. Please refer to *Proper disposal (EU only)* on page 22.

2.9 Faults and unusual stresses

Take the device out of service and secure it against unauthorized use if it can no longer be used safely, for example as in the following situations:

- The device is visibly damaged.
- The device does not work any more.
- The permitted limits have been exceeded due to excessive stresses in any form.

Contact your local Sales Partner for assistance in such cases.

2.10 Proper disposal (EU only)

2.10.1 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.

2.10.2 Disposal of removable batteries

⇒ Batteries must not be disposed of in household waste, but must be disposed of separately from the product in accordance with the applicable regulations. They can be returned free of charge to the appropriate collection points, your dealer or directly via Narda.

⇒ Please discharge the batteries before disposal.

2.10.3 Disposal of permanently installed batteries

Your instrument has permanently installed Li-Metal 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.

2.10.4 Deleting private data

⇒ Make sure that you delete any stored private data before passing on or disposing of the device.

3 Connecting Up and Starting to Use the Device

This chapter describes field and laboratory use of the SRM-3006, as well as the general concept of the device.

3.1 Unpacking the device (page 26)

3.2 Device overview (page 27)

3.3 Power supply (page 29)

3.4 Fitting the antenna (page 32)

3.1 Unpacking the device

3.1.1 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.

3.1.2 Package contents

For details of the package contents, please refer to *Ordering Information* on page 231.

3.1.3 Checking the device for shipping damage

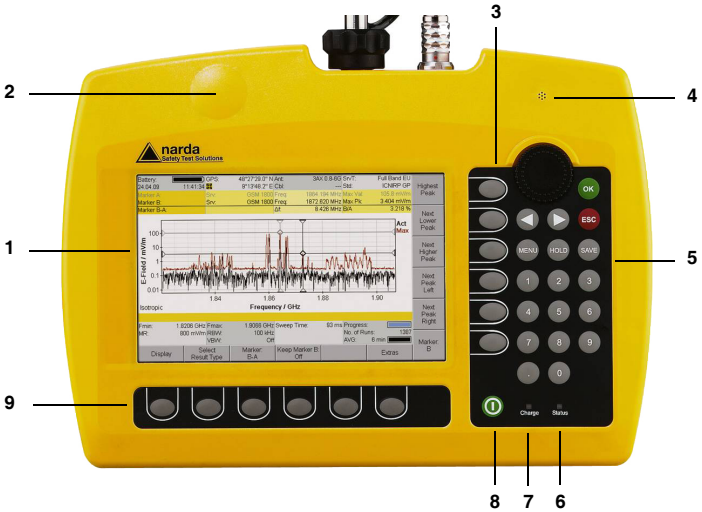
After unpacking, check the device and all accessories for any damage that may have occurred during shipping. Damage may have occurred if the packaging itself has been clearly damaged. Do not attempt to use a device that has been damaged.

3.1.4 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 of -10 to +50 °C.

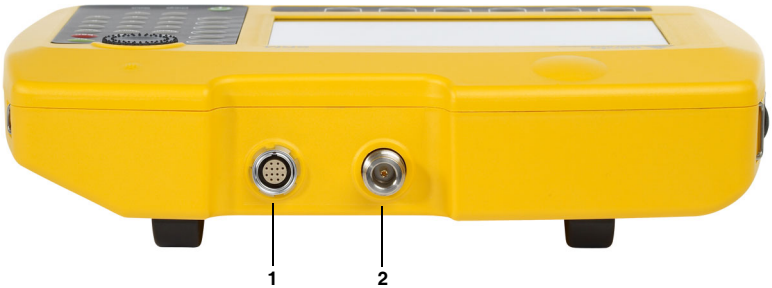
3.2 Device overview

3.2.1 Display and control panels



No.	Element	Function / Description
1	**LCD panel**	Screened, high-resolution liquid crystal display.
2	**GPS receiver**	GPS receiver antenna area. Do not attach any metallic stickers to this area.
3	**Vertical softkeys**	Context-dependent, operating mode and function selection, changing settings.
4	**Microphone**	For recording voice comments.
5	**Keypad and rotary control**	Navigation, changing settings, entering values, confirming or cancelling entries.
6	**Status display**	• LED green: device is ready for use. • LED red: device is initializing or device error.
7	**Charging indicator**	• LED red: Battery is charging. • LED green: Charging cycle finished or AC adapter / charger still connected to device charging socket.
8	**On/Off key**	Switches device on or off (hold down key).
9	**Horizontal softkeys**	Context-dependent, function selection, changing settings.

3.2.2 Device side panel with antenna / cable connectors

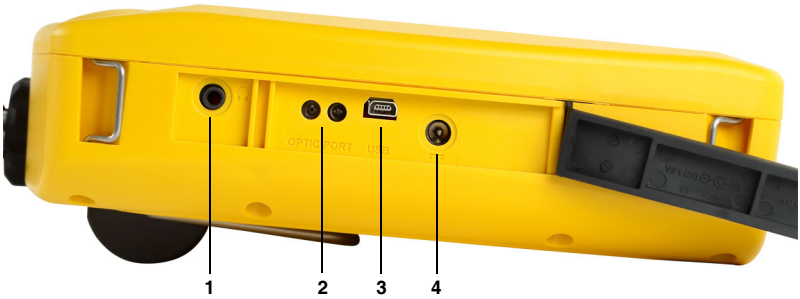


No.	Element	Function / Description
1	**Multi-pin connector**	12-pole socket for connecting the control cable (for automatic recognition of antenna and cable when using a Narda antenna or Narda cable).
2	**N connector**	Antenna connecting socket

3.2.3 Device side panel with battery compartment

No.	Element	Function / Description
1	**Battery compartment with lid and fixing screw**	Holds the rechargeable batteries.

3.2.4 Device side panel with external connectors



No.	Element	Function / Description
1	**Earphone socket**	For connecting an earphone for listening to saved voice comments.
2	**Optical connector**	For connecting optical cables for on-site device communications.
3	**USB, Mini-B type**	For connection to a computer (PC).
4	**Charging socket**	For connecting to the supplied AC adapter / charger.

3.3 Power supply

The power supply is normally taken from the rechargeable battery pack provided. It is also possible to use the AC adapter / charger supplied with the device as a power source.

3.3.1 Operation from battery pack

A fully charged battery pack is sufficient for about 2.5 hours of operation (with GPS and display backlight). This operating time can be increased significantly by using the energy saving options (Power Save) such as automatic backlight switch off (Backlight switches off after). The battery pack is supplied in a pre-charged state and must be fully charged before being used for the first time.

NOTE: Only use type 3001/90.15 battery packs or the earlier type 3001/90.01. If you are using the different types of battery pack, the device setting in the main menu under **Settings** (see *Changing the language, battery type, date, and time* on page 58) must be adjusted so that the device shows the remaining capacity correctly. The part number (P/N) of the battery type in use is printed at the lower end of the battery label. If the capacity of these battery packs is insufficient for your needs, additional battery packs can be obtained as accessories.

Charge indicator

The charge state of the battery pack is shown in the upper status line.

Display	Meaning
	The battery is fully charged.
	The battery is almost discharged.
Batt. flashes	The battery charge state is critical. You should now switch the device off or connect it to the AC adapter / charger. If you continue to operate the device from the batteries, it will switch off automatically after a short time. The device configuration will however be saved before it switches off.

Charging the battery pack

A complete recharge takes about 4.5 hours.

The batteries can be charged in the device using the AC adapter / charger supplied, or externally using the charging tray available as an option.

Starting the charge cycle

✓ The AC line voltage must be the same as the operating voltage of the AC adapter / charger.

1. Connect the AC adapter / charger to the charge socket of the SRM-3006.
2. Connect the AC adapter / charger to the AC line.
   - The charge cycle starts.
   - The **Charge LED** glows red during the charge cycle.
   - The AC adapter / charger switches to trickle charge mode automatically and the **Charge LED** glows green when the charge cycle is completed.

3.3.2 Handling battery packs

- Do not drop, damage, or disassemble the battery packs.
- Only recharge the battery packs in the way described in this operating manual.
- Do not expose the battery packs to very high temperatures for an extended period of time either separately or inside the device.
- Do not leave discharged battery packs in the device for an extended period of time.
- Do not store the battery packs for longer than six months without recharging them in the meantime.

Replacing the battery pack:

1. Undo the fixing screw **(1)** in the lid of the battery compartment.
2. Pull out the battery pack using the tab **(2)**.
3. Hold the tab on the new battery pack and slide the battery pack into the compartment.
4. Replace the lid of the battery compartment and do up the fixing screw (finger tight).

NOTE: If the old battery pack is no longer required, do not simply throw it away with the normal trash. Dispose of it according to the regulations applicable in the country of use (also refer to *Proper disposal (EU only)* on page 22).

3.3.3 Operation from AC adapter / charger

The SRM-3006 can also be operated and powered from the AC adapter / charger.

However, this is not recommended for general use, as the measurement characteristics can be significantly affected by the presence of the power supply cable in the electromagnetic field when the SRM-3006 is operated with the AC adapter / charger connected to it.

3.4 Fitting the antenna

This section describes the facilities and requirements for connecting an antenna to the SRM-3006.

3.4.1 Fitting a Narda antenna directly on the Basic Unit

✓ The SRM-3006 is switched off.

1. Stand the Basic Unit up in a vertical position.
2. Place the N connector of the antenna on to the N connector of the Basic Unit.
3. Screw the coupling nut of the antenna N connector slowly on to the Basic Unit N connector taking care not to cross-thread it.

NOTE: If the coupling nut does not turn easily, reposition it and start again. Approximately 4 full turns are needed to fully tighten the connection.

4. Place the control cable plug of the cable on to the multipin connector on the Basic Unit so that the red mark on the control cable plug is aligned with the notch in the multipin connector.
5. Push the control cable plug into the connector using the locking sleeve until the plug lock engages.
   ↳ The Narda antenna is connected.

The device automatically recognizes the antenna type that is connected. This information is shown in the display in the general device configuration section while the device is switched on.

3.4.2 Connecting a Narda antenna to the Basic Unit using a Narda cable

The connection is made in two stages:

1. **Connecting the Narda cable to the SRM-3006** (page 35)
2. **Connecting the Narda cable to the Narda antenna** (page 35)

Figure 3: Connecting the SRM-3006 to an antenna using a cable.

Connecting the Narda cable to the SRM-3006

✓ The SRM-3006 is switched off.

1. Stand the Basic Unit up in a vertical position.
2. Place the N connector of the cable on to the N connector of the Basic Unit.
3. Screw the coupling nut of the cable N connector slowly on to the Basic Unit N connector taking care not to cross-thread it.

NOTE: If the coupling nut does not turn easily, reposition it and start again. Approximately 4 full turns are needed to fully tighten the connection.

4. Place the control cable plug of the cable on to the multipin connector on the Basic Unit so that the red dot on the control cable plug is aligned with the red dot on the multipin connector.
5. Push the control cable plug into the connector using the locking sleeve until the plug lock engages.
   ↳ The Narda cable is connected.
   The device automatically recognizes the cable type that is connected. This information is shown in the display in the general device configuration section while the device is switched on.

Connecting the Narda cable to the Narda antenna

✓ The SRM-3006 is switched off.

1. Place the N connector of the cable on to the N connector of the antenna.
2. Screw the coupling nut of the cable N connector slowly on to the antenna N connector taking care not to cross-thread it.

NOTE: If the coupling nut does not turn easily, reposition it and start again. Approximately 4 full turns are needed to fully tighten the connection.

3. Place the control cable connector of the cable on to the control cable connector of the antenna so that the red dot on the control cable connector is aligned with the red dot on the antenna control cable connector.
4. Push the antenna control cable plug into the connector using the locking sleeve until the plug lock engages.
   ↳ The Narda antenna is connected.
   The device automatically recognizes the antenna type that is connected. This information is shown in the display in the general device configuration section while the device is switched on.

3.4.3 Using commercially-available cables and antennas

Automatic recognition of the cable or antenna type that is connected is not possible if third party products (commercially available cables and antennas) are used instead of Narda components.

This means that when other cables are used the cable loss will not be taken into account automatically. And the results will not be shown automatically in units of field strength or as a percentage of the selected human safety standard limit value if other antennas are used.

NOTE: The data for the connected cable and antennas must be entered in the SRM-3006 manually using the PC software if third party products are used (see description below).

Manually entering the data for third party components

The data must first be entered in the PC software, after which they can be uploaded to the SRM-3006.

To enter the data:

1. Enter the data from the calibration report for the third party components into the PC software (refer to the PC software online help for details).
2. Save the created configuration on the PC.
3. Upload the configuration data to the SRM-3006.
4. Select the cable and / or antenna on the SRM-3006.

3.4.4 Fitting a Narda antenna on a tripod

Special devices are needed for attaching the Narda antennas to a tripod. Two types of antenna holder are available from Narda for this purpose.

Antenna holder for three axis antennas

This antenna holder can be attached to the tripod to allow vertical or horizontal alignment of the antenna. Because the antenna is non-directional (three axis) the alignment should not influence the result in any way. Nevertheless, it is a good idea to align the antenna head roughly in the (presumed) direction of the field source in order to minimize any side effects.

Assembly

1. Screw the antenna holder vertically or horizontally on to the tripod.
2. Attach the antenna to the holder using the Velcro strips.
3. Connect the antenna and the Basic Unit together using a cable (see *Connecting a Narda antenna to the Basic Unit using a Narda cable* on page 33).

Figure 4: Antenna attached to the antenna holder for three axis (isotropic) antennas (3501/90.02), assembled horizontally (left) and vertically (right)

Antenna holder for single axis and three axis antennas

This antenna holder aligns the antenna in precisely defined positions.

This covers two applications:

- Single axis antennas can be simply rotated into three mutually perpendicular (orthogonal) positions in order to perform isotropic measurements.
- Three axis (isotropic) antennas can be precisely aligned in order to measure a specific single axis.

Assembly

Figure 5: Single axis E-field antenna (top) and single axis H-field antenna (bottom), fitted on the antenna holder for single axis and three axis antennas (3501⁄90.01)

1. Screw the antenna holder plate on to the tripod.
2. Screw the antenna holder on to the antenna holder plate.
3. Undo the Velcro strips and place the antenna in the holder so that the N connector and the control cable fit into the guideway (see Figure 6 on page 40).
4. Do up the Velcro strips.
5. Turn the antenna to the desired position (marked on the antenna holder) and do up the screw to fix it in position.
6. Connect the antenna and the Basic Unit together using a cable (see *Connecting a Narda antenna to the Basic Unit using a Narda cable* on page 33).

NOTICE

Damage caused by spacing screws

The black coating can be damaged by the spacing screws.

⇒ When removing the antenna from the holder, slide it up in the direction of the antenna head first before removing it from the holder.

Figure 6: Cable and N connector in guideway

4 Operation and Basic Settings

This chapter describes the controls and connectors on the device.

4.1 Controls (page 42)

4.2 Switching the device on and off (page 43)

4.3 LCD screen elements (page 44)

4.4 Fundamental operating steps (page 48)

4.1 Controls

The following controls are provided for operating the SRM-3006:

- **Rotary control**
- **Hardware keys** (referred to as **keys** in this manual)
- **Software keys** (referred to as **softkeys** in this manual)

4.1.1 Rotary control and keys

	Element	Function / Description
		Selects functions and values.
		Moves to the left or right in entry boxes.
	OK	Confirms changes in settings.
	ESC	• Cancels the current operating step; changes in values are not made. • Returns to the next higher menu level.
	MENU	Opens the main menu for selecting operating modes and changing system and device settings.
	HOLD	Freezes the display; the measurement continues. Press again to update the display to show the actual values again.
	SAVE	Saves the data in the data logger.
	1	For entering numbers and the decimal point.
		Switches the device on and off (hold down key).

4.1.2 Softkeys

The softkey functions depend on the selected menu level, operating mode, or function. The softkeys are therefore described in the menu and operating mode descriptions.

4.2 Switching the device on and off

Switching on

⇒ Press and hold down the **ON/OFF** key for a few seconds.

↳ The device switches on.

You can terminate the switch on process by pressing the **Quit** softkey.

The device performs a self test during the boot up process. The results are displayed on the screen.

The screen displayed after switch on depends on the setting of the **Power on** function. For more information about this, see *Changing the switch on behavior* on page 72.

Switching off

⇒ Press and hold down the **ON/OFF** key for a few seconds.

↳ The device switches off.

4.3 LCD screen elements

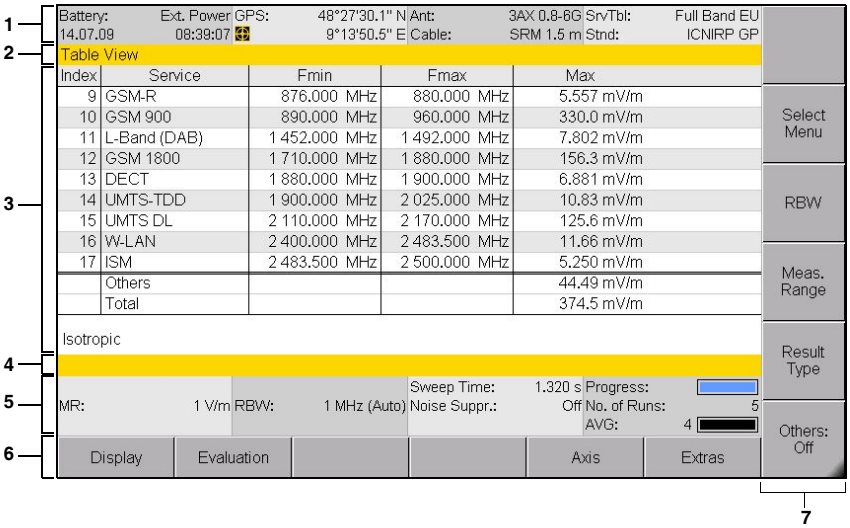


Figure 7: LCD screen

Table 2: LCD screen elements

No.	Element	Description
1	Upper status bar	Indicates general parameter settings.
2	Navigation bar	Shows information about the selected function.
3	Display area	Graphical or numerical display of measurement values.
4	Info bar	• Shows menu path to the current function. • Shows text entered by the user (for measurement routines, entry from PC only). • Indication of corrected parameters.
5	Lower status bar	Indicates settings and process analysis; displays error messages.
6	Horizontal softkeys	Displayed functions are context-sensitive.
7	Vertical softkeys	Displayed functions are context-sensitive.

4.3.1 The upper status bar

The upper status bar gives information about the device, the components used, and the general settings.

Battery:	Ext. Power	GPS:	48°27'30.0" N	Ant:	3AX 0.8-6G	SrvTbl:	Full Band EU
14.07.09	08:40:53		9°13'50.9" E	Cable:	SRM 1.5 m	Stnd:	ICNIRP GP

Figure 8: Upper status bar

Table 3: Upper status bar elements

Element	Description	
Battery	Power supply indicator:	
	Ext. Power	External supply from AC adapter.
		Battery fully charged.
		Battery almost discharged.
	Batt. (flashes)	Battery discharged, device powers down immediately and switches off.
Date, time	Indicates the date and time.	
GPS	GPS receiver status and coordinates:	
		DGPS reception.
	Coordinates	GPS reception, coordinates are displayed
		When the signal is lost, the last GPS coordinates are used until a signal is received again or the device is switched off.
		No GPS reception.
Ant.	Antenna used (displayed only if the type is automatically recognized or has been entered manually).	
Cable	Cable used (displayed only if the type is automatically recognized or has been entered manually).	
Service Table	Selected service table.	
Standard	Selected measurement standard.	

4.3.2 The lower status bar

The lower status bar gives information about the current measurement. The contents of the display may vary, depending on the operating mode.

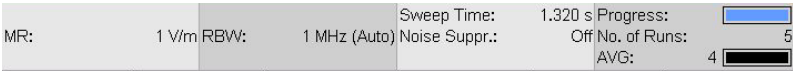


Figure 9: Lower status bar

Table 4: Lower status bar elements

Element	Description
MR	Measurement range.
RBW	Resolution bandwidth.
Sweep Time	Duration of each measurement cycle.
Noise Suppr.	Noise suppression (on/off)
Progress	Measurement progress (checks the progress of processor-intensive measurements until the first results are displayed on the screen)
No. of Runs	Number of measurements made since the measurement was last started.
AVG	Number of measurements used to form the average or time for average formation.

4.3.3 The navigator bar

The screen displays various elements that make navigation easier and which give you information about the actual position in the menu and the selected function.

The actual display mode selection is shown at the left hand edge of the navigation bar.

Arrow symbols at the right hand edge of the bar indicate further information which can be displayed by pressing the arrow keys or by turning the rotary control:

Symbol	Meaning
◀	Pressing the ◀ key displays further information (e.g. in a column of the table).
▶	Pressing the ▶ key displays further information (e.g. in a column of the table).
◀▶	Pressing the ◀ key as well as the ▶ key displays further information.
▲	Paging up by turning the rotary control displays further information (e.g. lines in the table).
▼	Paging down by turning the rotary control displays further information (e.g. lines in the table).
▲▼	Paging up or down by turning the rotary control displays further information (e.g. lines in the table).

4.3.4 Activating / deactivating status and info bars

The **upper status bar**, **info bar** and **lower status bar** can be individually activated or deactivated. If you do not need the information that is displayed in these bars, you can deactivate all of them to maximize the area of the screen that is available to display the measurement values.

To change the screen arrangement:

✓ You have selected an operating mode.

1. Press the **Display** softkey.
2. Press the **Screen Arrangement** softkey.
3. Use the rotary control and softkeys to select the settings you want and then press the **OK** key to implement the changes.

4.4 Fundamental operating steps

The operating steps described in this section are repeated in every menu and function. They are therefore described only once here. In all subsequent descriptions of operating modes, it is assumed that you are familiar with these fundamental steps.

4.4.1 Navigating in the menus

The operating modes and functions of the SRM-3006 are arranged in hierarchical menu levels. The diagram below (see Figure 10 on page 48) shows this arrangement using the main menu and some of the functions in **Safety Eval** (Safety Evaluation) mode as examples.

To navigate in the menus:

- To move down one level: Press the appropriate **Softkey**.
- To move up one level: Press the **ESC** key.
- To return to the measurement or the main menu: Press the **MENU** key.

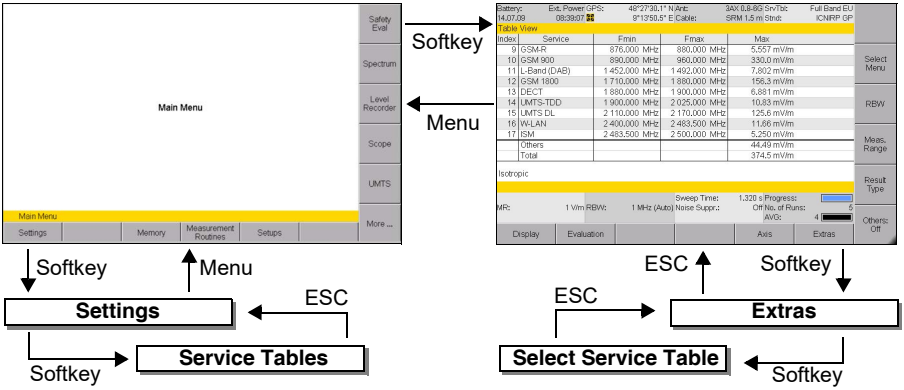


Figure 10: Examples showing how the menus and functions are arranged.

4.4.2 Forwards / Backwards

When you are changing setting parameters, two softkeys labeled **Forwards** and **Backwards** are provided to allow you to move forwards or backwards through the setting parameter history within the active operating mode.

Changes to the following parameter settings are taken into account depending on the selected operating mode:

Mode	Parameter
Safety Evaluation	Function not available
Spectrum	Fcent, Fspan, RBW
Level Recorder	Fcent, RBW
Scope	Fcent, RBW, Magnitude Condensed, Sweep Time, Time Resolution
UMTS	Fcent
LTE	Fcent, CBW
5G NR	Fcent

To move backwards or forwards:

⇒ Press the **Extras** softkey, then the **Backwards** or **Forwards** softkey.

⇒ The **Forwards** softkey is not displayed until you have pressed the **Backwards** softkey at least once.

4.4.3 Selecting entries from a list

Settings are often made by selecting entries or items from a list.

Simple list

You can only select a single item from a simple list. This is demonstrated by the selection of a measurement range (**Meas. Range**) in the example below.

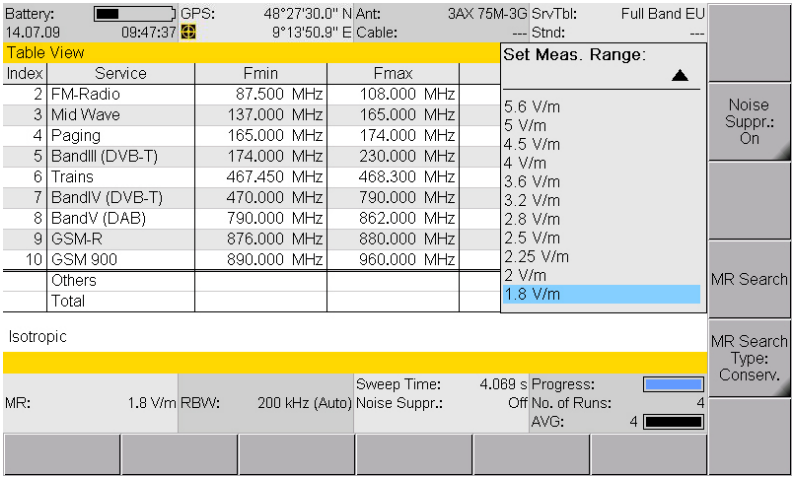


Figure 11: Example of a simple list: Select Meas Range

To select an item:

1. Use the rotary control to highlight the desired item.
2. Press the **OK** key to confirm your selection.
   ↳ The new value is set.

Extended list

You can select more than one entry or item from an extended list. You can select one item at a time or use the softkeys to select all the items. This is demonstrated by the selection of services (**Select Services**) in the example below.

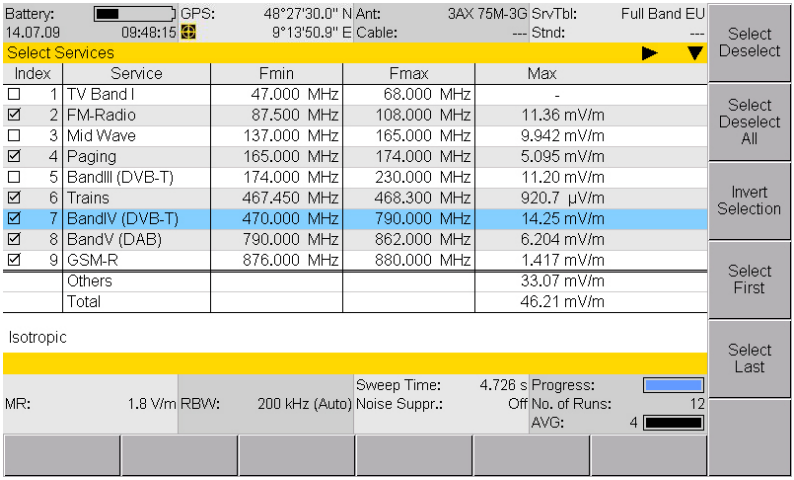


Figure 12: Example of an extended list: Select menu

☑ A selection box indicates if the option has been selected or not in an extended list.

To select or deselect items individually using the rotary control:

1. Use the rotary control to highlight the desired item.
2. Press the **Select Deselect** key to select or deselect the item.
   ↳ The selection box shows the actual status.
3. Press the **OK** key to return to the measurement display.

To select or deselect several items at the same time:

Use the following softkeys, to select or deselect all the items or a group of items in a list.

NOTE: The softkeys that are actually available depend on the Select menu that is opened.

⇒ When you have selected the items you want, press the **OK** key to revert to the measurement display again.

Select Deselect All

- If all the items were selected, they will all be deselected.
- If all the items were deselected, they will all be selected.
- If some items were selected and others deselected, they will all be selected or deselected.

Invert Selection

Changes the status of every item in the list.

Select First / Select Last

You can use these softkeys to select a group of items from the list.

1. First deselect all items using the **Select Deselect All** softkey.
2. Use the rotary control to highlight the first item in the group that you want to select and then press the **Select First** softkey.
3. Use the rotary control to highlight the last item in the group that you want to select and then press the **Select Last** softkey.
4. The highlighted section is now selected.

4.4.4 Changing numerical values

You can change numerical values using the rotary control or by using the keys.

NOTE: If you use the rotary control to change a numerical value, you cannot then use the keys to change the value or vice versa in the same setting step. To change from one control to the other, you must first exit the Select menu and then open it again.

To change a value using the rotary control:

1. Open the Select menu.
2. Use the arrow keys ◀ ▶ to select the digit you want to change and then use the **rotary control** to set the desired value.
3. Press the **OK** key to set the new value.

To change a value using the keys:

1. Open the Select menu.
2. Use the **number keys** and **decimal point key** to enter the desired value and enter the desired units using the appropriate **softkey**. (You can delete digits using the **Backspace** softkey.)
   ↳ The new value is set and the Select menu closes as soon as you have entered the units.

4.4.5 Entering text

A simple text editor opens so that you can enter alphanumeric characters (e.g. when saving setups):

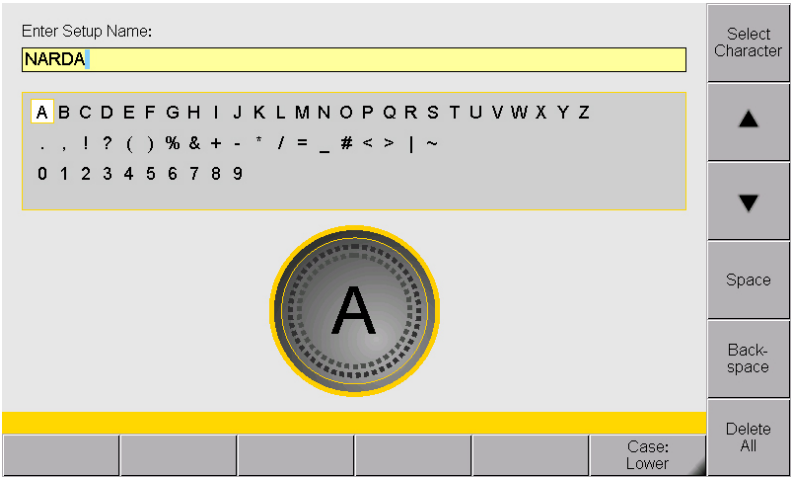


Figure 13: Text editor for entering alphanumeric characters

To enter text:

1. Use the rotary control to select a character from the character field. (You can select a line directly using the ▯ and ▯ softkeys.)
   ↳ The selected character is marked by a circle.
2. Press the **Select Character** to enter the character.
3. Press the **OK** key when you have finished entering the characters you want.

There are some further functions that you can use to enter text:

Softkey	Function
Space	Enters a space.
Backspace	Deletes the last character entered.
Delete All	Deletes all characters entered.
Case	Switches between upper and lower case characters: • Lower: lower case characters. • Upper: upper case characters.

4.4.6 Softkeys with toggle function

A black marked right lower corner indicates a toggle function.

The displayed function is the one that can be selected.
In this example: Others = On, pressing the softkey will set Other to Off.

4.4.7 Creating a screenshot

You can download the saved screenshots in PNG format from the device using the SRM-3006 PC software applications SRM-3006 Tools or SRM-3006 TS.

To create a screenshot:

1. Press the **Display** softkey.
2. Press the **Save Screenshot** softkey.

5 The Main Menu

This chapter describes all the Main Menu with all the settings that apply to the device itself and to the components connected to it. Furthermore you will find here how to use the memory, to run measurement routines and to use setups.

5.1 Overview of functions and operating modes (page 56)

5.2 Display and editing device and component settings (page 57)

5.3 The memory menu (page 68)

5.4 Using measurement routines (page 68)

5.5 Saving and loading setups (page 69)

5.1 Overview of functions and operating modes

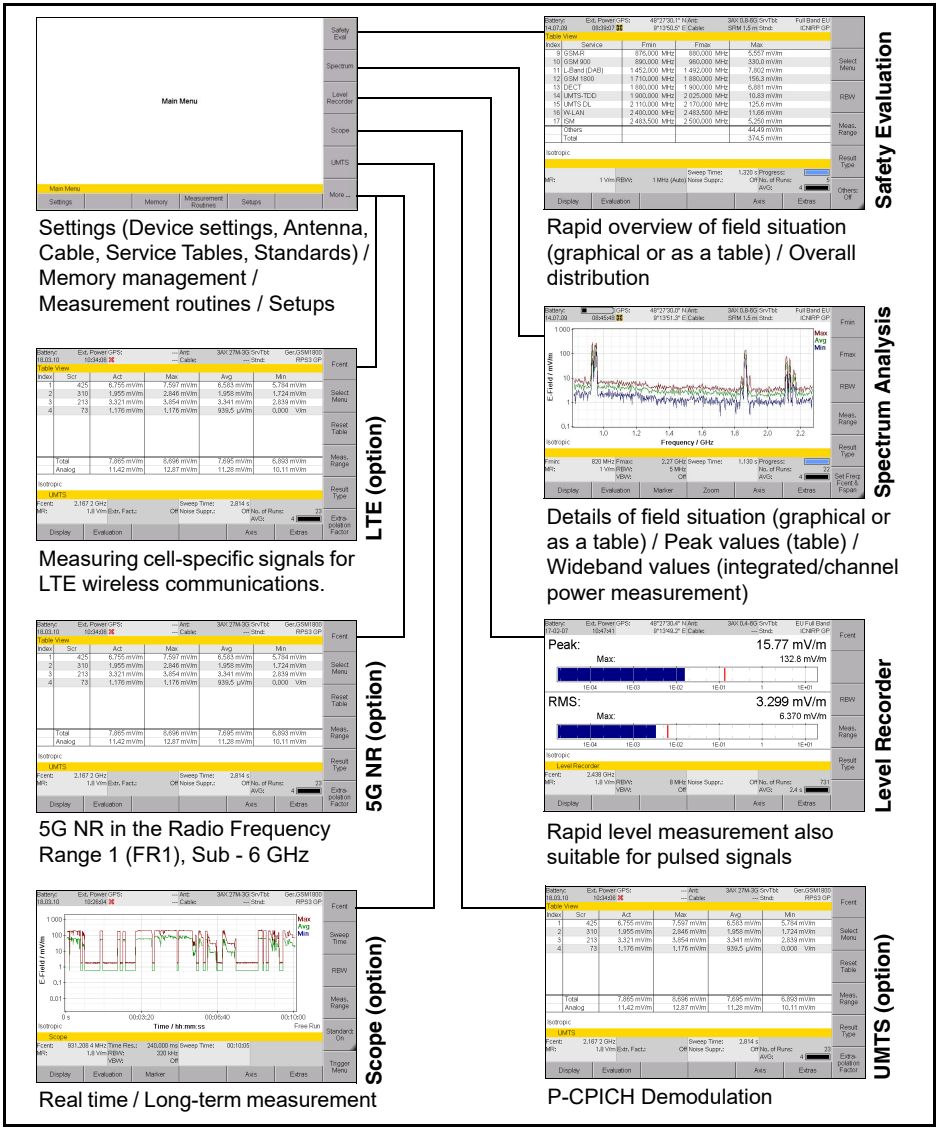


Figure 14: Overview of operating modes and functions.

5.2 Display and editing device and component settings

Main Menu • Settings

The **Settings** menu contains all the settings for the device, the connected antenna and cable, the applied measurement standard and the selected service table.

Settings		
Language:	English	Antenna
Battery Type:	3001_90_15	
Date Format:	yy-mm-dd	
Date:	17-02-09	Cable
Time Format:	24 h	
Time:	10:51:25	
Time Zone:	UTC+01:00	
Daylight Saving Time:	Off	Standard
GPS Format:	DMS deg°mm'ss" N(S,E,W)	
Remote Interface:	USB	
Playback Level:	6.3 %	Service Table
Color Scheme:	Default	
Brightness:	100 %	
Power Save (Backlight switches off after):	10 min	
MR Search on Setup Recall:	Off	
MR Search Type:	Conservative	
Beep on new Maximum:	No	
Main Menu • Settings		
Device Info / GPS Info / Reset Settings / Service Menu / Sync Time with GPS		

Figure 15: **Settings** menu

All device specific settings can be edited immediately by selecting an entry from the list using the rotary control. All other settings (e.g. antennas, cables, etc.) can be reached by means of the softkeys on the right side.

This menu allows you to perform the following actions:

- **Changing the language, battery type, date, and time** (page 58)
- **Editing device-specific settings** (page 59)
- **Displaying device information** (page 60)
- **Displaying GPS information** (page 62)
- **Resetting settings** (page 62)
- **Performing device diagnosis** (page 63)
- **Displaying and selecting the available antennas** (page 64)
- **Displaying and selecting the available cables** (page 65)
- **Displaying and selecting the safety standards** (page 65)
- **Displaying and creating service tables** (page 66)

5.2.1 Changing the language, battery type, date, and time

Main Menu • Settings

Table 5: Descriptions of Device Settings

Item	Description and available options
Language	List of available Languages: Chinese (Simplified), English, French, Spanish, Turkish
Battery Type	Battery type used: 3001/90.15 (3001_90_15) **Note:** The remaining battery capacity is only shown correctly if the right battery type is selected.
Date Format	Date format: • yy.mm.dd (year.month.day) • yy-mm-dd (year-month-day) • mm/dd/yy (month/day/year) • dd.mm.yy (day.month.year)
Date	Date
Time Format	Time format: • 12 h (12-hour clock) • 24 h (24-hour clock)
Time	Time (hour:minute:second)
Time Zone	Time zone
Daylight Saving Time	Summer / winter time change: • Off (Standard / winter time) • On (Summer time)

To change the settings:

1. Use the rotary control to highlight the item and select it by pressing **OK**.
2. Use the rotary control to change the setting and press **OK** to confirm the change or press **ESC** to cancel the changes.
   Use the arrow keys ◀ ▶ to move the cursor by one digit.
3. Press **ESC** to return to the Main menu.

To synchronize the clock to the GPS clock:

⇒ Press the **Sync Time with GPS** softkey.
↳ The time is synchronized to the GPS clock.

5.2.2 Editing device-specific settings

Main Menu • Settings

Table 6: Description of device-specific settings

Item	Description and available options
GPS Format	GPS data display format: • DegDec (-)ddd.ddddd • MinDec (-)ddd°mm.mmm • DMS deg°mm'ss" N(S,E,W)
Remote Interface	Interface used for remote control: • Optical • USB
Playback Level	Earphone playback volume control: • In steps from 1% to 100%
Color Scheme	Display color scheme • Default (display with bright background) • Night (night design) High contrast
Brightness	LCD screen brightness • In 5 % steps from 1 % to 100 %
Power Save (Backlight switches off after):	Power save mode, backlight switches off automatically: • In steps from 1 min. to 30 min • On permanently
MR Search on Setup Recall	Search for measurement range when a setup is recalled: • On • Off
MR Search Type	Measurement range search type: • Normal: The measurement range is selected so that no saturation occurs in a normal environment. • Conservative: The measurement range is selected so that no saturation occurs even in an environment with extremely variable signal strengths (multi-frequency environment).
Beep on new Maximum	Beep when new maximum detected: • Yes • No

To change the settings:

1. Use the rotary control to highlight the item and select it by pressing **OK**.
2. Use the rotary control to change the setting and press **OK** to confirm the change or press **ESC** to cancel the changes.
3. Press **ESC** to return to the Main menu.

5.2.3 Displaying device information

Main Menu • Settings • Device Info

⇒ Press the **Device Info** softkey.

↳ A list of the device information is displayed.

Table 7: Description of Device Info list

Information	Description
Device Model	Device model name
Production ID	Production number
Serial Number	Device serial number
ID Number	Unique device identification number
Firmware Version	Device software version
Firmware Date	Device software date
Bootloader Version	Bootloader software version
Manufacturer Calibration Date	Date of last calibration
Options	
Option name	Option status: • Activated • Deactivated

Displaying connected antenna information

Main Menu • Settings • Device Info • Antenna Info

NOTE: Information about the connected antenna is only displayed when you use a Narda antenna.

⇒ Press the **Antenna Info** softkey.
↳ The antenna information is displayed as a list.

Table 8: Description of *Antenna Info* list

Information	Description
Long Name	Antenna description
Serial Number	Antenna serial number
Manufacturer Calibration Date	Date of last calibration

Displaying connected cable information

Main Menu • Settings • Device Info • Cable Info

NOTE: Information about the connected cable is only displayed when you use a Narda cable.

⇒ Press the **Cable Info** softkey.
↳ The cable information is displayed as a list.

Table 9: Description of *Cable Info* list

Information	Description
Long Name	Cable description
Serial Number	Cable serial number
Manufacturer Calibration Date	Date of last calibration

5.2.4 Displaying GPS information

Main Menu • Settings • GPS Info

⇒ Press the **GPS Info** softkey.

↳ A list of the GPS information is displayed.

Table 10: Description of **GPS Info** list

Information	Description
GPS module detected	Status of GPS module: • Yes • No
Satellites in Use	Number of satellites received
GPS Quality Indicator	• NO = no GPS reception • GPS = standard GPS • DGPS = differential GPS with better accuracy than GPS
Latitude	Latitude of actual position
Longitude	Longitude of actual position
Altitude	Altitude of actual position
UTC Time	Universal Time Coordinate

5.2.5 Resetting settings

Resetting the system settings

Main Menu • Settings

The system settings (i.e. those shown in the Settings menu) are reset to their factory defaults. The following are not reset: Language, Battery Type, Date, Time, Time Zone, Daylight Saving Time, and Color Scheme.

To reset the system settings:

✓ Main Menu • Settings is displayed.

⇒ Press the **Reset Settings** softkey.

Resetting the measurement settings

Main Menu • Setups

The measurement settings (i.e. parameters used in the operating modes) are reset to their factory defaults. The system settings are not reset.

To reset the measurement settings:

✓ Main Menu • Setups is displayed.

1. Select **Factory Setup** using the rotary control.
2. Press **OK** to confirm the reset.

Resetting the device settings

Main Menu • Settings • Service Menu

You can reset the system settings (except those mentioned under *Resetting the system settings*) and the measurement settings with this function.

To reset the device settings:

✓ Main Menu • Settings • Service Menu is displayed.

1. Press the **Factory Settings** softkey.
2. Press **OK** to confirm the reset.

5.2.6 Performing device diagnosis

Main Menu • Settings • Service Menu

This menu allows you to check the display and to monitor some basic device data.

⇒ Press the **Service Menu** softkey.
  ↳ The Service Menu is displayed.

To check the display:

⇒ Press the **Display Test** softkey.
  ↳ The basic colors red, green and blue are displayed in turn. The test stops after three cycles.

⇒ Press the **ESC** key to end the test immediately.

To display the device diagnostics:

⇒ Press the **Device Diag** softkey.
  ↳ A list of some basic data is displayed.

NOTE: The displayed data is intended primarily for servicing purposes.

Table 11: Description of Device Diagnostics list

Information	Description
Mainboard Temperature	Temperature of main circuit board
RFboard Temperature	Temperature of RF circuit board
Battery Voltage	Actual battery voltage
Battery Capacity	Remaining battery capacity
Buffer Battery Voltage	Internal buffer battery voltage
Free Memory	Free memory space in megabytes, absolute
Free Memory in Percent	Free memory space in percent, relative
Calibration Data Available	Indicates whether the initial device calibration has been carried out successfully
Operating Hours Counter	Number of hours of operation so far

5.2.7 Displaying and selecting the available antennas

Main Menu • Settings • Antenna

⇒ Press the **Antenna** softkey.

↳ The available antennas are listed with their characteristic data. Only the automatically detected antenna type will be displayed when you use a Narda antenna.

Table 12: Description of **Antennas** list

Item	Description
Short Name	Short name for the antenna (shown on the screen)
Fmin	Lower frequency limit
Fmax	Upper frequency limit
Property	Field type (E-field, H-field)
Cal. Date	Date of last calibration

NOTE: The axis configuration can be selected in the measurement menus using the **Axis** function according to the antenna type (single axis or isotropic). See *Selecting an axis mode* on page 89.

5.2.8 Displaying and selecting the available cables

Main Menu • Settings • Cable

⇒ Press the **Cable** softkey.
↳ The available cables are listed with their characteristic data.

Table 13: Description of **Cables** list

Item	Description
Short Name	Short name for the cable (shown on the screen)
Fmin	Lower frequency limit
Fmax	Upper frequency limit
Cal. Date	Date of last calibration

You can still select a different cable even if the cable connected is detected automatically. This manual selection allows for the use of an attenuator, for example.

To select a cable:

⇒ Use the rotary control to select an item and press **OK** to confirm the selection.

5.2.9 Displaying and selecting the safety standards

Main Menu • Settings • Standard

⇒ Press the **Standard** softkey.
↳ The available safety standards are listed.

Table 14: Description of **Safety Standards** list

Item	Description
Short Name	Short name for the standard (shown on the screen)
Long Name	Full name of the standard (shown in the Select menu)

To select a standard:

⇒ Use the rotary control to select an item and press **OK** to confirm the selection.

5.2.10 Displaying and creating service tables

Main Menu • Settings • Service Tables

⇒ Press the **Service Tables** softkey.
↳ The available service tables are listed.

Table 15: Description of **Service Tables** list

Item	Description
Short Name	Short name for the service table (shown on the screen)
Long Name	Full name of the service table (shown in the Select menu)

NOTE: Some service table items may not be available for selection because of the antenna that is being used.

To select a service table:

⇒ Use the rotary control to select an item and press **OK** to confirm the selection.

Displaying the services in a service table

Main Menu • Settings • Service Tables • View

⇒ Press the **View** softkey.
↳ The services included in the table are listed.

Table 16: Description of **Service Table** list

Information	Description
Service	Service name
Fmin	Lower frequency limit
Fmax	Upper frequency limit
RBW	Resolution bandwidth

Creating a new service table

Main Menu • Settings • Service Tables • Create

You can create a new service table using this menu.

NOTE: The facilities for creating service tables using the SRM-3006 itself are limited. You cannot enter individual services manually or change the service names. It is much more convenient to use the **SRM-3006 Tools** or **SRM-3006 TS** PC software to create service tables. You can then upload these service tables to the SRM-3006.

To create a new service table:

1. Press the **Create** softkey and enter the desired values.
2. Press the **Save Table** softkey when you have entered all the values.
3. Enter a name for the service table and save it.

The example below shows the parameters for the GSM-900 service. The corresponding entries in the service table are found in column 3 of Table 17 (the example values are shown in bold type).

Example: GSM-900
Downlink: **935.2** – 960 MHz
Channel number: **1** – **124**
Channel width: **200 kHz**
–> without gap
–> all channels have the same width

Table 17: Description of **Create Service Table** list

Item	Description	Entries for the example GSM-900P
First Service Start Frequency	Starting frequency for the service	**935.3** (center frequency of 935.**2** – 935.**4** MHz
First Service Channel Number	First channel number in the service	**1**
Channel Step Width	Channel bandwidth	**200 kHz**
Service Bandwidth	Service bandwidth	**200 kHz**
Number of Services	Number of services	**124**
Preferred RBW	Preferred resolution bandwidth	50 kHz (**200 kHz**/4)

5.3 The memory menu

Main Menu • Memory

The following functions are contained in the Memory menu:

- Display data sets
- Display saved screenshots
- Conditional saving
- Timer controlled saving
- Set comment function

⇒ You can find detailed information about all these functions in chapter 15 *Measurement Data Memory* on page 189.

5.4 Using measurement routines

Main Menu • Measurement Routines

Measurement routines are automated sequences of setups. They are particularly useful for the following applications:

- for eliminating errors when performing repetitive measurement tasks
- for ensuring compliance with company regulations for sequences / procedures
- as a guide for semi-skilled staff.

NOTE: When you have saved setups on the device, you can create measurement routines only with the aid of the PC software on a PC. These routines must then be uploaded to the device. You can only display and start the measurement routines on the device itself.

5.4.1 Displaying measurement routines

Main Menu • Measurement Routines • View Routine

⇒ Press the **View Routine** softkey.

↳ A list of the setups contained in the routine and the sequence criteria is displayed.

Table 18: Description of **Measurement Routine ...** list

Item	Description
Index	Sequential index number
Setup Name	Name of setup
Storing Condition	Condition for storing the results
Time	Measurement duration for timer controlled storing.
No. of Runs	Number of measurements for measurement cycle controlled storing
Auto Next Step	Start next setup automatically (On, Off)

5.4.2 Starting a measurement routine

Main Menu • Measurement Routines • Start Routine

⇒ Use the rotary control to highlight the desired measurement routine and press the **Start Routine** softkey or press **OK**.

↳ The measurement routine starts.

5.5 Saving and loading setups

Main Menu • Setups

You can use this menu to save all the settings as a setup or recall and load setups that you have saved previously.

NOTE: Setups can only be created on the device itself. You cannot create setups on a PC. In contrast, you can only delete setups using the PC software. You cannot delete setups on the device itself.

5.5.1 Saving settings as a setup

Main Menu • Setups • Save Setup

1. Make the desired settings on the device.
2. Switch to the **Main Menu • Setups** menu and press the **Save Setup** softkey.
   ↳ The entry box opens.

NOTE: You can also save a setup directly from an operating mode. This function is found in the **Display** menu of the operating mode.

3. Enter a suitable name and press **OK** to confirm your entry.
   ↳ The settings are saved as a new setup and displayed in the overview bar.

5.5.2 Loading settings from a setup

Main Menu • Setups • Recall Setup

⇒ Use the rotary control to highlight the desired setup and press the **Recall Setup** softkey or the **OK** key.
   ↳ The settings saved in the selected setup will be loaded and the display switches to the measurement screen.

5.5.3 Editing the setup list

Main Menu • Setups

You can edit the setup list as well as save and recall setups.

Sorting the setup list

Main Menu • Setups • Sort

1. Press the **Sort** softkey.
2. Select sort by **Name** or **Mode** (operating mode) and press **OK**.
   ↳ The list will be resorted according to the selected criterion.

Overwriting a setup

Main Menu • Setups • Overwrite Setup

1. Use the rotary control to highlight the setup to be overwritten and press the **Overwrite Setup** softkey.
2. Confirm the action by pressing **OK**. (You can cancel the action by pressing **ESC**.)
   ↳ The settings in the existing setup will be overwritten with the actual device settings.

5.5.4 Deleting setups

You cannot delete setups in the instrument itself. You can only delete them using the PC software.

5.5.5 Changing the switch on behavior

Main Menu • Setups • Power on
Main Menu • Setups • Mark Power on Setup

You can specify the settings to be used by the device when it starts up after being switched on:

- **Factory Setup:** The factory settings will be used.
- **Last Settings:** The settings in use at the time the device was last switched off will be used.
- **Power On Setup:** The setup marked in the **Setups** menu as the **Power on Setup** will be used.

To start up using the settings last used:

⇒ Press the **Power on** softkey until **Last Settings** is shown (toggle function).

↳ The settings in use at the time the device was last switched off will be used when it is next switched on.

To start up using a selected setup:

1. Press the **Power on** softkey until **Power On Setup** is shown (toggle function).
2. Use the rotary control to highlight the desired setup and press the **Mark Power on Setup** softkey.

   ↳ The selected setup is marked in the list (‹‹...››) and will be loaded the next time the device is switched on.

6 Functions Common to More Than One Operating Mode

This chapter describes the functions that are common to more than one operating mode. These functions are then indicated in the descriptions of the individual operating modes by a cross reference to the relevant section of this chapter.

6.1 Overview of functions common to more than one operating mode (page 74)

6.2 Setting the center frequency (Fcent) (page 75)

6.3 Setting the resolution bandwidth (RBW) (page 76)

6.4 Setting the measurement range (Meas. Range) (page 77)

6.5 Selecting the result type (Result Type) (page 80)

6.6 The Marker function (page 82)

6.7 Selecting an axis mode (page 89)

6.8 Adjusting the Y-Scale (page 94)

6.9 Changing the displayed units (page 95)

6.10 Noise suppression (Noise Thresh.) (page 96)

6.11 Measuring spatial average values (Spatial AVG) (page 97)

6.12 Changing operating mode and keeping the same parameters (page 98)

6.13 Useful shortcuts (page 100)

6.1 Overview of functions common to more than one operating mode

The table below indicates the operating modes that use the functions described in this chapter.

Table 19: Functions and operating modes

Function	Safety Eval.	Spectrum	Level Rec.	Scope	UMTS	LTE	5G NR
Center frequency (Fcent)	–	(x)	x	x	(x)	(x)	(x)
Resolution bandwidth (RBW) Video bandwidth (VBW)	(x)	x	x	x	–[1)]	–	–
Channel bandwidth (CBW)	–	–	–	–	–	x	–
Meas. Range	x	x	x	x	x	x	x
Result type	x	x	(x)	(x)	x	x	x
Marker	x[2)]	x	–	x	–	–	–
Axis	x	x	x	x	x	x	x
Y-Scale	x [2)]	x	x	x	–	–	–
Unit	x	x	x	x	x	x	x
Noise Thresh.	x	–	x	–	x	x	–
Spatial AVG	x	x	x	–	–	–	–

x = identical in all these modes, described in this chapter
(x) = present but not identical (description given in the chapter covering the operating mode)
– = not present in this operating mode

1) Fixed at 3.84 MHz
2) For Bargraph only

The menu paths shown in gray immediately below the section heading indicate the operating modes and sub-menus where the function described can be found.

Screenshots, where used, only serve to illustrate the function. As a rule, the settings described apply in the same way in the other operating modes although the display on the screen may not be the same as the screenshot used in this manual.

6.2 Setting the center frequency (Fcent)

Spectrum
Level Recorder
Scope
UMTS
LTE
5G NR

You can change the center frequency in the following ways:

Enter the center frequency using the keypad:

1. Press the **Fcent** softkey.
2. Enter the frequency using the **number keys** and select the units using one of the softkeys **kHz**, **MHz** or **GHz**.

Alter the center frequency step by step using the rotary control (Fstep):

1. Press the **Fcent** softkey.
2. Press the **Fstep** softkey until **Off** is displayed (toggle function).
3. Press the **Set Fstep** softkey, select step by step using the rotary control and press **OK** to confirm the selection.
4. Change the center frequency using the rotary control.
   ↳ The change is applied immediately.
5. 5. Press **ESC** or **OK** to return to the measurement menu.

Alter the center frequency using the arrow keys and rotary control:

1. Press the **Fcent** softkey.
✓ The Fstep function is deactivated (**Fstep** softkey: indicates **On**).
2. Select a decimal place with the arrow keys ◀ ▶ and change the value using the rotary control.
3. Press **OK** to apply the value.

6.3 Setting the resolution bandwidth (RBW)

Spectrum • RBW
Level Recorder • RBW
Scope • RBW

The **r**esolution **b**and**w**idth (RBW) determines the characteristics of the spectrum analyzer with regard to its ability to distinguish between signals having the same amplitude. but different frequencies. Only signals having a frequency spacing that is greater than the defined resolution bandwidth can be distinguished from one another.

Background information:

The RBW selected for measuring signals having very close frequency spacing must be correspondingly small. A larger resolution bandwidth can be used for measuring wideband signals.

- The indicated level will be too low if the RBW is too small.
- Individual signals cannot be separated from one another if the RBW is too big.

Example:
GSM frequency spacing / signal channel width = 200kHz,
RBW = 200 kHz.

To set the resolution bandwidth:

1. Press the **RBW** softkey.
2. Use the rotary control to select the desired value and press the **OK** key.
   ↳ The selected value is applied.

6.3.1 Setting the video bandwidth (VBW)

Spectrum • RBW • VBW
Level Recorder • RBW • VBW
Scope • RBW • VBW

Noisy signals can be smoothed by selecting a suitable video bandwidth. There are two possible ways to make the setting:

- **Off**: The SRM-3006 will automatically select the correct VBW value.
- **Manual selection**

To set the video bandwidth:

1. Press the **VBW** softkey, followed by the **VBW** softkey.
   ↳ The **Select Video Bandwidth (VBW)** entry box opens.
2. Use the rotary control to select the desired setting and press the **OK** key.
   ↳ The selected value is applied.

NOTE: The smaller the VBW, the longer the measurement time (sweep time).

6.4 Setting the measurement range (Meas. Range)

Safety Eval • Meas. Range
Spectrum • Meas. Range
Level Recorder • Meas. Range
Scope • Meas. Range
UMTS • Meas. Range
LTE • Meas. Range
5G NR • Meas. Range

Background information:

The sensitivity of the system depends on the input attenuator setting. This setting is determined by the **Measurement Range (MR)** parameter. High measurement sensitivity avoids falsification of the results due to noise generated internally by the device. On the other hand, it is important that the device is not overloaded (saturated). Saturation can also be caused by signals outside the frequency band of the services being measured (shown under **Others**), e.g. high power radio transmitters when measuring mobile telephone signals.

To set the measurement range:

⇒ Press the **Meas. Range** softkey.

You can now select the measurement range as follows:

- **Manual measurement range selection**
- **Automatic measurement range search (MR Search)**

6.4.1 Manual measurement range selection

Manual adjustment is recommended if the field situation is known or if pulsed signals are being measured.

1. The **Set Meas. Range** selection box opens when you press the **Meas. Range** softkey. It displays a list of possible input sensitivities.

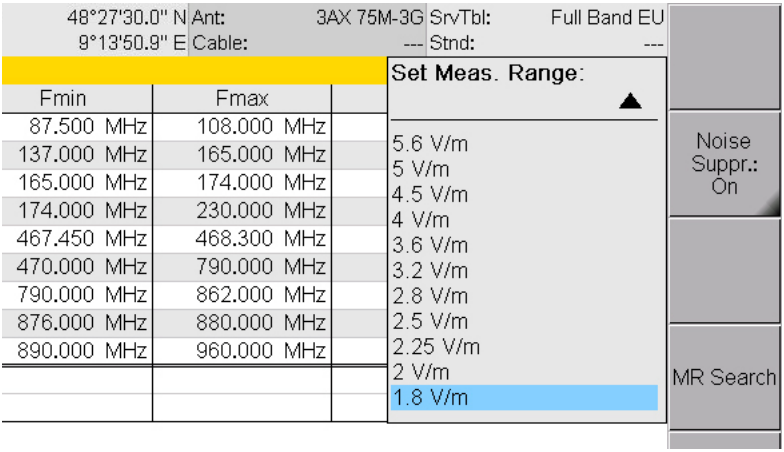


Figure 16: **Set Measurement Range** selection box

2. Use the rotary control to select the desired input sensitivity.
3. Press the **OK** key.
   ↳ The input sensitivity is set.

NOTE: The selected measurement range applies to all operating modes and does not have to be set again if you change operating mode.

6.4.2 Automatic measurement range search (MR Search)

Safety Evaluation • Meas. Range • MR Search

This softkey initiates a search for a suitable measurement range. This is recommended if the field situation is unknown.

⇒ Press the **MR Search** softkey.

↳ The message: **Searching for best measurement range. Please wait**. is displayed. A measurement over the entire frequency range covered by the antenna you are using is made in the background. This takes several seconds. When it is completed, the device sets the measurement range to the optimum value automatically and reverts to normal measurement mode.

NOTE: Press the **ESC** key if you want to cancel the process.

MR Search Type

The SRM-3006 provides two types of measurement range search which can be selected using the **MR Search Type** softkey (toggle function):

- **Normal:** This type is suitable for all largely static signals.
- **Conserv.:** This type allows for a higher overload reserve. It is better to set the measurement range manually if pulsed signals are being measured.

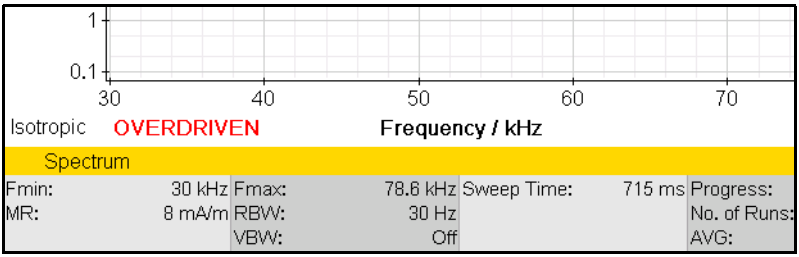
To select the search type:

⇒ Press the **MR Search Type** softkey.

↳ The switch toggles between the two types each time the softkey is pressed.

6.4.3 Measurement input overload

If the signal level is higher than the range that can be measured, the warning message **OVERDRIVEN** is shown in the display (in the part above the lower status line, next to the axis setting).



6.5 Selecting the result type (Result Type)

Safety Eval • Result Type
Spectrum • Result Type
UMTS • Result Type
LTE • Result Type
5G NR • Result Type

The result type defines how the measured values are evaluated. One value for each type is shown for each service.

The following **Result Types** can be selected / deselected (more than one can be selected at the same time):

Table 20: Result types listed in the **Result Type** box

Type	Abbreviation	Explanation
Actual	Act	Actual value measured at the moment.
Maximum	Max	Maximum value measured.
Maximum Average	MxA	Maximum value of all averaged values.
Average	Avg	Average value over a specified number of measurements or over a specified time (RMS).
Minimum Average	MnA	Minimum value of all averaged values.
Minimum	Min	Minimum value measured.
Standard	Std	Shows the permitted limit value as an unweighted limit curve.

To select or deselect a result type:

1. Press the **Result Type** softkey.
2. Use the rotary control and the softkeys to make the desired selection. For information on how to do this, see *Selecting entries from a list* on page 50.
3. When you have made your selection, press the **OK** key.
   ↳ The selected result types will be used.

Information about the Standard (Std) result type:

- The Standard (Std) result type is only displayed when an antenna has been selected or a Narda antenna is used.
- If you set the units to “%”, Standard (Std) will be set to 100%.
- Std corresponds to the unweighted limit value curve when field strength units are used. If this value is way above the measured values, it is possible that the limit value curve may no longer be displayed.

6.5.1 Average formation (Result type: Average)

An average can be formed over a specific number of measurements or over a period of time.

Taking the average of a number of measurements:

✓ Result type **Average** is selected (the actions described below can nevertheless be carried out even if this result type is not selected).

1. Press the **Result Type** softkey.
2. Press the **Average Type** softkey until **Average Time** is shown (toggle function).

NOTE: If you operate the rotary control after opening the selection window, the softkeys for selecting the average type and the parameters for forming the average will be blanked out. If this happens, close the selection window (press **ESC**) and then open it again.

3. Press the **No. of Avg** softkey, then use the rotary control to select the desired number of measurements, and then press the **OK** key.
   ↳ The measurements start. The **AVG** line shows the selected number of measurement values and a bar graph next to this shows the progress towards the formation of the first average value.

Taking the average over a period of time:

✓ Result type **Average** is selected (the actions described below can nevertheless be carried out even if this result type is not selected).

1. Press the **Result Type** softkey.
2. Press the **Average Type** softkey until **No. of Avg** is shown.

NOTE: If you operate the rotary control after opening the selection window, the softkeys for selecting the average type and the parameters for forming the average will be blanked out. If this happens, close the selection window (press **ESC**) and then open it again.

3. Press the **Average Time** softkey, then use the rotary control to select the desired time period, and then press the **OK** key.
   ↳ The measurements start. The **AVG** line shows the selected time period numerically and a bar graph next to this shows the progress towards the formation of the first average value.

6.5.2 Reset measurement values

You can reset the values for Max, MxA, Avg, MnA, and Min:

- Reset All: Resets all the above-mentioned measurement values.
- Reset Min & Max: Resets the **Minimum (Min)** and **Maximum (Max)** measurement values only.

6.6 The Marker function

Safety Eval • Marker
Spectrum • Marker
Scope • Marker

The Marker function is very useful for marking and comparing specific individual frequencies in the display. The following types of marker function can be selected:

- Two independent markers.
- Individual display of each marker or display of the difference between the markers.
- Automatic location of the highest peak value.
- Automatic location of the next peak values.

NOTE: The markers allow access to all measured values, e.g. to every spectral line measured. The spacing between two measured values (two spectral lines) is approximately half the currently selected resolution bandwidth.

Tip: Turning the rotary control slowly causes the marker to jump in small frequency steps. Turning the control faster causes larger frequency jumps. Briefly turning the control in the opposite direction stops the marker movement.

6.6.1 Using the markers separately

The two markers A and B can be displayed separately and set independently of each other by using the **Single** marker function.

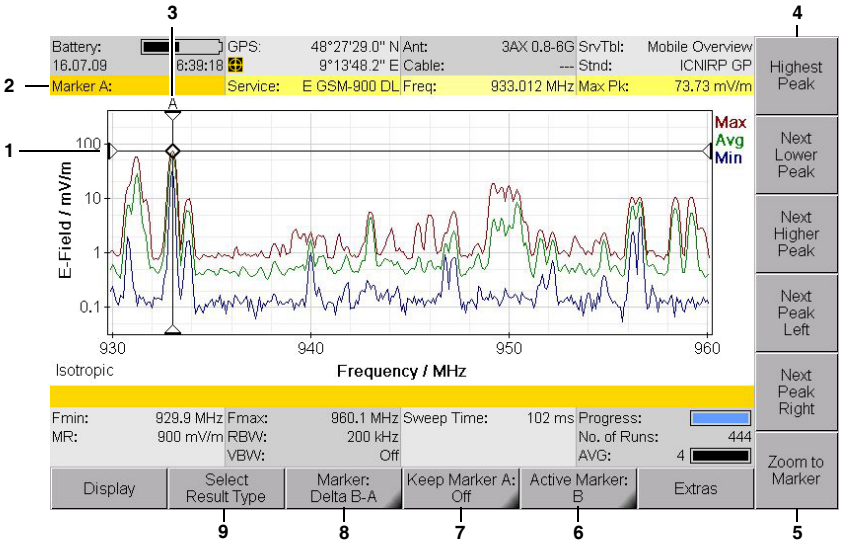


Figure 17: Single marker display

No.	Function / Description
1	Graphical display of the measurement value at the marker position.
2	Marker information: • Marker A: Marker A is active. • Service: Selected service. • Freq: Frequency at the marker position. • Max. Pk: Selected result type and measured value.
3	Graphical display of the marker position (for result type **Max** in the example).
4	Marker functions for peak value selection (see Table 21 on page 84).
5	Zoom function: Sets the marker to the center frequency and enlarges the display around the marker (reduces the span).
6	Active marker (Marker A is active in the example).
7	Marker display on the measurement screen (Marker A is shown in the example).
8	Display type (Single is selected in the example).
9	Result type selection for the active marker.

To use the markers separately:

NOTE: Remember that the softkeys always show the function that can be selected, not the function that is currently active.
Example: if **Delta B-A** is shown, this means that the **Single** marker function is active.

1. Press the **Marker** softkey until **Delta B-A** is shown (toggle function).
2. Press the **Active Marker** softkey until Marker **A** (if you want to use Marker B) or **B** (if you want to use Marker A) is shown (toggle function).
3. Select a result type by pressing the **Select Result Type** softkey, selecting a result type with the rotary control and then pressing the **OK** key.

You can now use the available functions separately for markers A and B:

Table 21: Marker functions for selecting peak values

Selection	Function
Rotary control	Moves the marker to the desired position manually.
Highest Peak softkey	Places the marker on the highest peak value.
Next Lower Peak softkey	Places the marker on the next lower peak value.
Next Higher Peak softkey	Places the marker on the next higher peak value.
Next Peak Left softkey	Places the marker on the next peak value to the left of the previous position.
Next Peak Right softkey	Places the marker on the next peak value to the right of the previous position.

NOTE: An algorithm that covers all the measurement values contained in the spectrum is used for the Peak markers.

6.6.2 Using both markers to determine a difference

The difference between the two marker positions can be determined using the **Delta B-A** marker function.

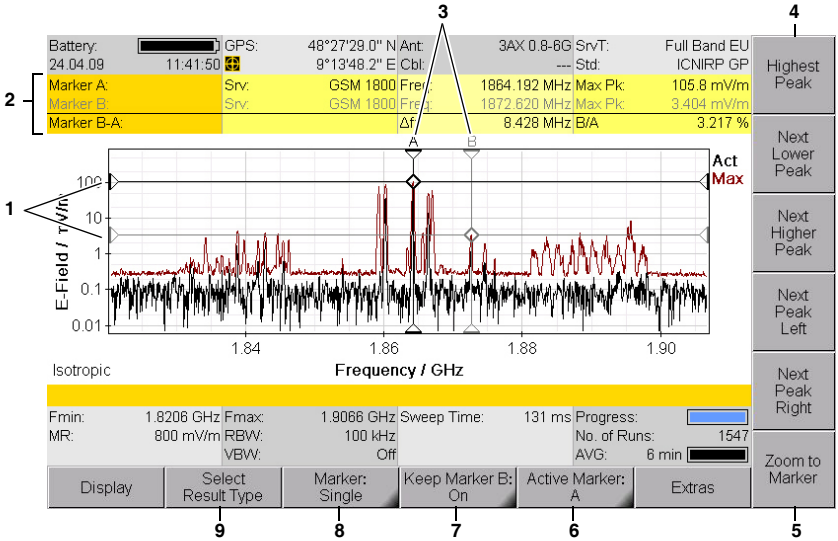


Figure 18: Display with both markers

No.	Function / Description
1	Graphical display of the measurement values at the marker positions.
2	Marker information: • Marker...: Marker A is active (black lettering), Display of difference B-A. • Service: Selected services. • Freq: Frequencies at the marker positions, frequency difference f_B - f_A. • Max. Pk: Selected result types and measured values, ratio of measured values B/A.
3	Graphical display of the marker positions (for result types **Act** and **Max** in the example).
4	Marker functions for peak value selection (see Table 21 on page 84).
5	Zoom function: Sets the marker to the center frequency and enlarges the display around the marker (reduces the span). See also *The Zoom function (Zoom)* on page 122.
6	Active marker (Marker B is active in the example)
7	Marker display on the measurement screen (Marker B is not shown on the measurement screen in the example).
8	Display type (the difference (Delta B-A) is selected in the example.
9	Result type selection for the active marker.

To use the Delta function:

NOTE: Remember that the softkeys always show the function that can be selected, not the function that is currently active.
Example: if **Single** is shown, this means that the difference function **Delta B-A** is active.

1. Press the **Marker** softkey until **Single** is shown (toggle function).
2. Press the **Active Marker** softkey until Marker **B** is shown: this means that Marker **A** is selected (toggle function).
3. Select a result type for Marker A using the **Select Result Marker** softkey.
4. Move Marker A to the desired position (either manually or using the Peak functions).
5. Press the **Active Marker** softkey until Marker **A** is shown: this means that Marker **B** is selected (toggle function).
6. Select a result type for Marker B.

The difference determined depends on the result types selected for Marker A and Marker B:

- **Same result type for Marker A and Marker B**:
  The difference between the measured values of one result type at two different frequencies is determined.
- **Different result types for Marker A and Marker B**:
  The difference in the measured values between the two result types at one frequency is determined.

7. Move Marker B to the desired position (either manually or using the Peak functions).
   ↳ The selected frequencies and the corresponding measured values along with the difference are displayed in the upper status bar.

6.6.3 Displaying the marker data on the measurement screen

If you activate the Marker function (Keep Marker = On), the frequency and measured value corresponding to the active marker are displayed in the upper status bar instead of the GPS data.

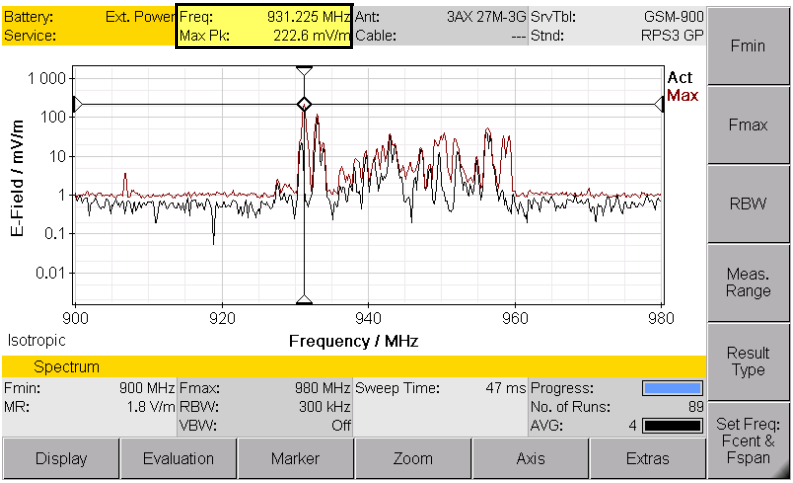


Figure 19: Display of marker data in the upper status bar.

To activate the display function:

✓ The Marker menu is active.

1. Press the **Keep Marker A** or **Keep Marker B** softkey until **On** is shown. (If you select the other marker, the **Keep Marker** softkey changes to reflect the choice of the new marker.)
2. Press the **ESC** key to return to the measurement screen.

6.6.4 Zooming to marker

The **Zoom to Marker** function allows you to display an enlargement of a section around the current marker position. The marker position is used here as the center frequency of the zoomed display, and the frequency limits are adjusted to suit.

To zoom to the marker:

1. Set the marker to the desired position.
2. Press the **Zoom to Marker** softkey.
   ↳ The display is adjusted accordingly.
3. Press **Zoom to Marker** again to further enlarge the display.

To reset the display to the full frequency range:

1. Exit from the Marker menu.
2. Press the **Set Freq** softkey until **Fmin & Fmax** is displayed.
3. Press the **Fspan** softkey and then select **Full Span**.
   ↳ The full frequency range is displayed once more.

6.7 Selecting an axis mode

Safety Eval • Axis
Spectrum • Axis
Level Recorder • Axis
Scope • Axis
UMTS • Axis
LTE • Axis
5G NR • Axis

Depending on the antenna type being used (single axis or isotropic) you can use the **Axis** softkey to select the axis to be measured or the axis mode in the case of isotropic antennas.

To select the axis or the axis mode:

1. Press the **Axis** softkey.
   ↳ The selection window opens.

   Select Axis Mode:

   X-Axis
   Y-Axis
   Z-Axis
   Automatic Isotropic
   Manual Isotropic

   – **X-Axis**, **Y-Axis**, **Z-Axis**: Individual axis selection for three axis Narda antennas
   – **Automatic Isotropic**: Automatic isotropic measurement (for three axis Narda antennas only)
   – **Manual Isotropic**: Isotropic measurement by sequential measurement of the individual spatial axes, also with single axis antennas
2. Select the item you require (see descriptions below) and confirm by pressing **OK**.

The various constellations for measurements with single axis and three axis antennas are described below.

6.7.1 Measurement using a three axis antenna

Three axis (isotropic) antennas allow you to make simple and quick isotropic measurements by automatically detecting the three spatial components of the field to be measured. Narda Safety Test Solutions offers three antennas for measuring electric or magnetic field strength:

Table 22: Three axis antenna types

Type	Frequency range	Preferred application
E-field antenna (isotropic), dipole array, passive	420 MHz – 6 GHz	Fast, non-directional measurements e.g. at mobile communications and WiMAX frequencies.
E-field antenna (isotropic), dipole array, passive	27 MHz – 3 GHz	Fast, non-directional measurements e.g. at mobile communications frequencies.
H-field antenna (isotropic), coil array, active	9 kHz – 250 MHz	Fast, non-directional near-field magnetic field measurements on radio/TV transmitters and industrial equipment.

Measuring a single axis

You can measure each axis separately from the **Axis** menu for those applications where additional information about the spatial components of the field is required.

The measurement is only useful if the orientation of the sensors relative to the field is known. A tripod with a special antenna holder can be used for Narda antennas (see *Fitting a Narda antenna on a tripod* on page 36). The positions of the three measurement axes are marked on this special holder.

To measure individual axes with a three axis antenna:

⇒ Select one of the three axes from the **Axis** menu and press **OK** to confirm the selection.

↳ The selected axis is shown at lower left and the measurement values refer to this axis.

To revert to isotropic measurement mode:

⇒ Select **Automatic Isotropic** in the **Axis** menu and press **OK** to confirm the selection.

↳ **Isotropic** is shown at lower left.

Isotropic measurement

Automatic isotropic measurement mode is selected by default. This measures all three axes rapidly one after the other. The isotropic result is calculated by the SRM-3006 and displayed. The display shows the label **Isotropic** at lower left.

NOTE: For automatic isotropic measurement each channel is active for 20 ms followed by a 20 ms switching time to the next channel. For all three channels the total measurement time is 120 ms. Events that occur during the blind phases will not be taken into account. Although in many instances, just as in the case of spectrum analysis, the result displayed will be correct, it is not possible to reliably record extreme signals such as single short impulses by means of an isotropic measurement.

To measure automatic isotropic (recommended):

✓ A three axis antenna is connected to the SRM-3006 directly or via a cable.

⇒ Select the **Automatic Isotropic** function in the **Axis** menu.

As well as the automatic isotropic measurement, it is also possible to measure each axis separately – controlled by the SRM-3006 – and then to display the isotropic result after all three axes have been measured.

To measure manual isotropic:

✓ A three axis antenna is connected directly or via a cable to the SRM-3006.

1. Select the **Manual Isotropic** function from the **Axis** menu.
2. Press the **Start X-Axis** softkey. When the measurement finishes, press the **Stop X-Axis** softkey.
3. Do the same for the Y axis and Z axis.
4. Press the **Show Isotropic** softkey to display the measurement result.

To make another measurement:

Press the **Start X-Axis** softkey and proceed as described above.

To change the settings:

1. Press the **Change Settings** softkey and then change the settings.
2. Press the **Back to Axis** softkey (highlighted in yellow) to return to measurement mode.

To finish manual isotropic measurement:

⇒ Press the **Axis** softkey and select **Automatic Isotropic**.

6.7.2 Measurement using a single axis antenna

Isotropic measurement using a single axis antenna is much more time-consuming than using a three axis antenna because each of the three axes has to be measured separately, one after the other.

The SRM-3006 provides support for sequential measurements using single axis antennas and for calculating the isotropic result.

The sections below explain how such measurements can be made.

You can of course use any suitable standard antenna and corresponding cable as well as the items supplied with the instrument.

Information about how to fit the antenna to a tripod is found in section 3.4.4 from page 36 onwards.

Table 23: Single axis antenna types

Type	Frequency range	Preferred application
E-field antenna, dipole, passive	27 MHz – 3 GHz	Precision measurements at UHF and TV frequencies.
E-field antenna, dipole, passive	9 kHz – 300 MHz	Precision electric field measurements on radio/TV transmitters and industrial equipment.
H-field antenna, coil, active	9 kHz – 300 MHz	Precise near-field magnetic field measurements on radio/TV transmitters and industrial equipment.

Single axis measurement

This is the default measurement for single axis antennas.

✓ A single axis or standard antenna is connected directly or by a cable to the SRM-3006.

⇒ Select the **Single Axis** function from the **Axis** menu (default).

Isotropic measurement

The SRM-3006 provides a sequential measurement for making an isotropic measurement using a single axis antenna. The three separate measurements are made one after the other and the overall result is calculated and displayed.

NOTE: Directional antennas such as log-periodic antennas are basically unsuitable for such sequential measurements.

To make an isotropic measurement with a single axis antenna:

✓ A single axis or standard antenna is connected directly or by a cable to the SRM-3006.

1. Select the **Manual Isotropic** function from the **Axis** menu.
2. Position the antenna in the direction of the X axis, and press the **Start X-Axis** softkey. When the measurement has finished, press the **Stop X-Axis** softkey.
3. Follow the same procedure for the Y axis and the Z axis.
4. Press the **Show Isotropic** softkey to display the measurement result.

To make another measurement:

Press the **Start X-Axis** softkey and proceed as described above.

To change the settings:

1. Press the **Change Settings** softkey and then change the settings.
2. Press the **Back to Axis** softkey (highlighted in yellow) to return to measurement mode.

To finish isotropic measurement:

⇒ Press the **Axis** softkey and select **Single Axis**.

6.8 Adjusting the Y-Scale

Spectrum • Display • Y-Scale...
Level Recorder • Display • Y-Scale...
Scope • Display • Y-Scale...

There are two ways of adjusting the Y-Scale:

- **Manual adjustment of Y-Scale and reference point**
- **Automatic adjustment of Y-Scale**

Adjusting the Y-Scale manually

You can change the scaling as well as the reference point of the Y axis. Changes you make are applied immediately.

To change the Y-Scale:

1. Press the **Y-Scale Range** softkey.
2. Use the rotary control to highlight the desired value.
   ↳ The change is applied to the display immediately.
3. Press the **OK** key or the **ESC** key.

To change the Y axis reference point:

1. Press the **Y-Scale Ref** softkey.
2. Use the rotary control to highlight the desired value.
   ↳ The change is applied to the display immediately.
3. Press the **OK** key or the **ESC** key.

Adjusting the Y-Scale automatically

⇒ Press the **Y-Scale Auto** softkey.
↳ The Y-Scale is adjusted automatically.

In this case, the scaling (Y-Scale Range) is set to 100 dB and the reference point (Y-Scale Ref) is the same as the measurement range (MR+0 dB).

6.9 Changing the displayed units

Safety Eval • Display • Unit / Spectrum • Display • Unit
Level Recorder • Display • Unit / Scope • Display • Unit
UMTS • Display • Unit / LTE • Display • Unit / 5G NR • Display • Unit

The following power and voltage units can be selected when there is no antenna connected or selected:

Table 24: Units that can be selected (without antenna)

Units	Description
dBm	Power level, referred to 1 mW
dBV	Voltage level, referred to 1 V
dBmV	Voltage level, referred to 1 mV
dBµV	Voltage level, referred to 1 µV

The following units can be selected additionally when an antenna is connected or selected:

Table 25: Units that can be selected additionally (with antenna)

Units	Measured quantity	Description
V/m	Electric field strength	Converted using the characteristic impedance of a vacuum Z_0 = 377 Ω unless measured directly.
A/m	Magnetic field strength	
dBV/m	Electric field strength	Expressed as a log. value referred to 1 V/m.
dBmV/m	Electric field strength	Expressed as a log. value referred to 1 mV/m.
dBµV/m	Electric field strength	Expressed as a log. value referred to 1 µV/m.
dBA/m	Magnetic field strength	Expressed as a log. value referred to 1 A/m.
W/m^2	Power density	Calculated using the characteristic impedance of a vacuum Z_0 = 377 Ω.
mW/cm^2	Power density	
%	% of limit value defined in a selected human safety standard	

To change the units:

✓ The top menu level of the operating mode is displayed.

1. Press the **Display** softkey.
2. Press the **Unit** softkey.
3. Use the rotary control to highlight the desired units.
4. Press the **OK** key.
   ↳ The selected units are saved.

6.10 Noise suppression (Noise Thresh.)

Safety Eval • Meas. Range • Noise Thresh. / Noise Suppr.
Level Recorder • Meas. Range • Noise Thresh. / Noise Suppr.
UMTS • Meas. Range • Noise Thresh. / Noise Suppr.
LTE • Meas. Range • Noise Thresh. / Noise Suppr.

Every electronic instrument generates a certain level of intrinsic noise. This noise is present in all frequency ranges, including those not occupied by signals. It is easy to see when a signal is swamped by the intrinsic noise when performing spectrum analysis with a graphical display of the spectrum. To enable this distinction to be made in other operating modes, it is possible to set a threshold. For any results below this threshold, the instrument will not display the measured value but indicates the threshold value and the “<” character.

You can select threshold values of 0, 3, 6, 10, 15, and 20 dB:

- 0 dB: intrinsic noise level, does not give any information about the signal
- 3 dB: usual value selected for signals with normal noise levels
- > 3 dB: for signals with higher noise levels

The threshold values are relative and always refer to the level of the intrinsic noise floor.

To activate or deactivate noise suppression:

1. Press the **Meas. Range** softkey.
2. Press the **Noise Suppr.:** softkey until **OFF** is displayed (toggle function). Noise suppression is then activated.

To select the threshold value for noise suppression:

✓ Noise suppression must be activated before you can set the threshold.

1. Press the **Meas. Range** softkey and then the **Noise Thresh.** softkey.
2. Use the rotary control to set the desired input sensitivity and then press the **OK** key.
   ↳ The threshold value is set.

6.11 Measuring spatial average values (Spatial AVG)

Safety Eval • Result Type • Spatial AVG
Spectrum • Result Type • Spatial AVG
Level Recorder • Result Type • Spatial AVG

⇒ Due to the scope of the **Spatial Averaging** function, it is handled separately in Chapter 14 *Spatial Averaging*, starting on page 175.

6.12 Changing operating mode and keeping the same parameters

You can switch directly from one operating mode to another without opening the main menu. Certain measurement parameters are kept the same when you do this, depending on the target operating mode (see table below).

Table 26: Parameters retained when changing operating mode.

Source	Parameters	Target
Spectrum	Fcent = Fcent[4)]	**UMTS**
	Fcent = Fcent Fspan ≈ CBW[3)]	**LTE**
	Fcent = Fcent	**5G NR**
	Fcent = Fcent Fspan ≈ RBW[3)]	**Level Recorder / Scope**
Safety	Fcent[1)] = Fcent Fspan[2)] = Fspan	**Spectrum**
	Fcent[1)] = Fcent[4)]	**UMTS**
	Fcent[1)] = Fcent Fspan[2)] ≈ CBW[3)]	**LTE**
	Fcent = Fcent	**5G NR**
	Fcent[1)] = Fcent Fspan[2)] ≈ RBW[3)]	**Level Recorder / Scope**
UMTS	Fcent = Fcent RBW5) = Fspan	**Spectrum**
	Fcent = Fcent RBW[5)] = CBW	**LTE**
	Fcent = Fcent	**5G NR**
	Fcent = Fcent RBW[5)] = RBW	**Level Recorder / Scope**
LTE	Fcent = Fcent CBW = Fspan	**Spectrum**
	Fcent = Fcent[4)]	**UMTS**
	Fcent = Fcent CBW = RBW	**Level Recorder / Scope**
	Fcent = Fcent	**5G NR**

Table 26: Parameters retained when changing operating mode.

Source	Parameters	Target
Level Recorder	Fcent = Fcent RBW = Fspan	**Spectrum**
	Fcent = Fcent[4)]	**UMTS**
	Fcent = Fcent RBW = CBW	**LTE**
	Fcent = Fcent	**5G NR**
	Fcent = Fcent RBW = RBW	**Scope**
Scope	Fcent = Fcent RBW = Fspan	**Spectrum**
	Fcent = Fcent[4)]	**UMTS**
	Fcent = Fcent RBW = CBW	**LTE**
	Fcent = Fcent	**5G NR**
	Fcent = Fcent RBW = RBW	**Level Recorder**
5G NR	Fcent = Fcent	**Spectrum**
	Fcent = Fcent[4)]	**UMTS**
	Fcent = Fcent	**Level Recorder / Scope**
	Fcent = Fcent	**Safety**
	Fcent = Fcent	**Scope**
	Fcent = Fcent	**LTE**

1) In Safety mode: Fcent = (Service_Fmax + Service_F_min)/2
2) In Safety mode: Fspan = Service_Fmax - Service_F_min
3) The Fspan in the source mode will be transferred into the next nearest CBW/RBW in the target mode
4) In UMTS: Fcent will be an exact multiple of 100 kHz
5) In UMTS: RBW fixed, not adjustable/settable

To change operating mode directly:

⇒ Press the **Extras** softkey, then select the desired operating mode from the navigation bar on the right.

NOTE: The RBW values set in the service tables have no function when parameters are retained as these RBW values are only used in Safety Eval mode.

6.13 Useful shortcuts

You can access several of the main menu functions directly from an operating mode. The functions and corresponding softkeys are described in the sections below.

6.13.1 Selecting a service table or a service

NOTE: Only a service table can be selected in **Safety Evaluation** mode.

⇒ Press the **Extras** softkey, then press the **Select Service Table** or **Select Service** softkey.

↳ You can now select a service table or a service.

6.13.2 Saving a setup

⇒ Press the **Display** softkey, then press the **Save Setup** softkey.

↳ The current settings are saved when you have entered a name for the setup.

7 Safety Evaluation Mode

This chapter describes the **Safety Evaluation** operating mode. Following a short introduction on the use of this operating mode, this chapter contains an overview of the different display modes and information about the basic setting functions.

7.1 About Safety Evaluation mode (page 102)

7.2 Basic settings (page 104)

7.3 Using the Table view (page 107)

7.4 Using the Bar Graph view (page 111)

7.5 Selecting an axis mode (page 112)

7.1 About Safety Evaluation mode

Demonstrating safety in electromagnetic fields means providing answers to the following questions:

- How high is the overall exposure level in relation to the permitted limit value?
- What proportion of the emissions is due to which service?
- Which service perhaps needs to reduce its transmission power?

To do this, the entire spectrum needs to be measured selectively. Nevertheless, only a few values are rally of interest: the overall level of emissions and the contributions made by the individual services in terms of field strength or as a percentage of the permitted limit value.

The SRM-3006 as expert

As a specialized instrument, the SRM-3006 provides Safety Eval mode for this purpose. This has been specifically developed for assessing the field strength exposure level in a multi-frequency environment. It delivers an overview of the exposure level values for selected frequency bands, or services, in terms of field strength units or in % of a selected human safety standard. This means that information regarding compliance with defined limit values is available directly at the site of the measurement, along with data about the contributions made by frequency bands of interest to the overall exposure level.

Service tables, which form the basis of Safety Eval mode, are normally created using the SRM-3006 Tools or SRM-3006 TS PC software and uploaded to the SRM-3006. You can find further information about this under *PC Software* on page 203 and in the on-line help for the PC software.

You can also create service tables using the SRM-3006 itself, but with a limited range of functions (see *Displaying and creating service tables* on page 66 for details).

Using the operating mode

First select from the Configuration menu the services you want to record and the standard according to which they are to be assessed. The frequency tables and weighting factors for the most common services and standards are recorded and stored in the instrument as supplied from the factory. These tables can be edited or new ones created using the PC software: Simply assign a name to the service, enter the lower and upper frequency limits, and upload the data to the instrument via the serial interface.

Now you only have to press a button to run the measurement. The SRM-3006 measures the bands corresponding to the services one after the other and also captures what is happening between the bands. It automatically sets the resolution bandwidth so that four spectral lines can still be detected in the narrowest band. In this way, the SRM-3006 achieves a high degree of measurement accuracy without wasting time.

None of this is visible, as you don't have to do anything about it. The only thing you will see is the result, the field strength proportions due to individual services (such as GSM and UMTS), the proportions due to the frequencies between services (Others), and the total field exposure level (Total). The SRM-3006 automatically integrates all the corresponding spectral lines for this purpose.

As a rule, the measurement service requires the result in terms of a percentage of the permitted limit value. To do this, the SRM-3006 automatically evaluates each individual spectral line according to the specified standard or regulation. If you want absolute values, however, simply switch to display field strength (V/m) or power density (W/m^2). The standard weighting is not then taken into account.

7.2 Basic settings

This section describes the settings that are identical for both display modes **Table** and **Bar Graph**.

7.2.1 Selecting the display mode

Safety Evaluation • Display • Views

Two display modes are available:

- **Table** (see page 107)
- **Bar Graph** (see page 111)

To switch the display mode:

1. Press the **Display** softkey.
2. Press the **Views** softkey.
   ↳ The **Select View** window opens.
3. Use the rotary control to highlight a view and press the **OK** key:
   – Table
   – Bar Graph
   ↳ The selected view will be displayed.

NOTE: Pressing the **ESC** key returns you to the top menu level in the measurement screen. (Press the **MENU** key to return to the Main menu.)

7.2.2 Activating the beeper

Main Menu • Settings • Beep on new Maximum

A new maximum level can also be indicated by a beeper. To do this, you must activate the **Beep on new Maximum** function in the main menu under **Settings**.

To activate the beeper:

⇒ See *Editing device-specific settings* on page 59.

7.2.3 Showing and hiding services

Safety Evaluation • Select Menu

You can specify the services that are to be measured in the **Select Menu**.

To show or hide specific services:

1. Press the **Select Menu** softkey.
   ↳ The Select menu opens.
2. Select the services required using the rotary control and the softkeys. You can find information on how to select items from a list under *Selecting entries from a list* on page 50.
3. After you have selected the services, press the **OK** key.
   ↳ The selected services will be displayed.

7.2.4 Setting the resolution bandwidth (RBW)

Safety Evaluation: RBW

Setting RBW automatically

The SRM-3006 sets the RBW automatically using the basic setting **Automatic**:

$$\mathbf{RBW} \leq \frac{\mathbf{Fspan}\ (\mathbf{narrowest\ service})}{\mathbf{4}}$$

(The next smaller available RBW value will be used.)

This ensures that the narrowest service to be measured is resolved finely enough.

Setting the RBW manually for the entire table

You can also enter the resolution bandwidth manually:

1. Press the **RBW** softkey.
2. Use the rotary control to highlight the desired value.
   (The largest value displayed is the only largest possible value of all services shown.)
3. Press the **OK** key.

NOTE: Finer resolution normally means slower measurement speed.

Regardless of the selected value, the narrowest resolution bandwidth is limited by the narrowest service:

$$\mathbf{RBW} \leq \frac{\mathbf{Fspan\ (narrowest\ service)}}{\mathbf{4}}$$

Setting the RBW separately for each service

NOTE: Separate RBWs cannot be selected unless **Others = OFF**.

The value selected manually on the device applies to the entire table. You can also enter the resolution bandwidth for each service separately using the PC software. Refer to the online Help function of the PC software for information on how to do this.

Tip: More information about the RBW is found in the *Glossary* on page 233.

7.2.5 Setting the measurement range (Meas. Range)

Safety Eval • Meas. Range

⇒ See *Setting the measurement range (Meas. Range)* on page 77.

7.2.6 Selecting the result type (Result Type)

Safety Eval • Result Type

⇒ See *Selecting the result type (Result Type)* on page 80.

7.2.7 Measuring in the gaps between defined services (Others)

Safety Evaluation • Others

The field strengths of the services not selected in the service table can be measured and their overall value shown by activating the **Others** function.

NOTE: Only those other services between the first and last service to be measured are taken into account.

To activate and deactivate the function:

⇒ Press the **Others** key until the desired status (On, Off) is displayed.

↳ The table view shows **Others**; the graphical view shows **O**.

Tip: The measurement can be speeded up by deactivating **Others**.

7.3 Using the Table view

The services and measured values are displayed as a table in the Table view. The values displayed depend on the table type (see page 108) and from the selected result types (see page 80).

Figure 20: Table view in Safety Evaluation mode

NOTE: Information about the status bars is found under *The upper status bar* on page 45 and *The lower status bar* on page 46.

7.3.1 Changing the table displayed

You can make changes to the following table settings:

- Table type
- Units
- Sort order

Changing the table type

Safety Evaluation • Display • Table

The table below shows the measured values that are displayed depending on the table type and the selected result types.

Table 27: Table type **Condensed**

Index	Service	Result types, e.g. Max
These columns are displayed continuously.		A maximum of three result types can be displayed. If more than three result types have been selected, you can use the ◀ ▶ keys to scroll through all of the result types. Arrow symbols in the navigation bar indicate that further result types are available and the possible scrolling direction.

Table 28: Table type **Detailed**

Index	Service	Fmin, Fmax	RBW	Result types, e.g. Max
These columns are displayed continuously.			RBW is only displayed if he resolution bandwidth is selected individually using the PC software. If this is not done, the RBW is shown only in the lower status bar.	A maximum of three result types can be displayed. If more than three result types have been selected, you can use the ◀ ▶ keys to scroll through all of the result types. Arrow symbols in the navigation bar indicate that further result types are available and the possible scrolling direction.

To change the table type:

1. Press the **Display** softkey.
2. Press the **Table** softkey until the desired table type is shown (toggle function).
3. Press the **ESC** key to return to the measurement menu.

Changing the displayed units

Safety Evaluation • Display • Unit

1. Press the **Display** softkey.
2. Press the **Unit** softkey.
3. Use the rotary control to select the desired units and press the **OK** key.
4. Press the **ESC** key to return to the measurement menu.

Changing the sort order

Safety Evaluation • Display • Sort

1. Press the **Display** softkey.
2. Press the **Sort** softkey.
3. Use the rotary control to select the desired sort order and press the **OK** key.
   ↳ The list is re-sorted.
4. Press the **ESC** key to return to the measurement menu.

7.3.2 Percentage display

The SRM-3006 can also display values as percentages in various menus. These values express different factors depending on the context. These various uses are explained in the table below:

Application	Selection	Explanation
Safety Evaluation • Table View	Unit = % Displays the result types Act, Max, ...	The measured values for the result types indicate the percentage of the selected measurement standard limit value.
	Unit = % Displays the result type Std	Because the measurement standard is the reference quantity in the corresponding frequency band (e.g. 60 V/m), the result type Standard will always show 100% if percentage units are selected.
Safety Evaluation • Distribution	–	The measured value shows the percentage contributed by the service to the overall level.
Safety Evaluation • Bar Graph: Marker Spectrum: Marker	Marker: Single: (Delta B-A is active) Unit = V/m, A/m, W/m, mW/cm^2, %	The difference is displayed as a percentage.
Spectrum • Peak Table	–	Actual measured value as a percentage of the maximum value.

Displaying the field strength distribution in percent

Safety Evaluation • Evaluation • Distribution

You can use the **Distribution** function to display the percentage contribution of each service to the overall field strength. The total field strength value is set to 100%.

To display the percentage distribution:

✓ The top menu level of the operating mode is displayed.

1. Press the **Evaluation** softkey.
2. Press the **Distribution** softkey.

The display depends on the table type selected. A (selectable) absolute value is also shown continuously alongside the percentage value. This absolute value can be selected using the **Select Result Type** softkey.

Display for table type: **Standard**:

Index	Service	Max	Distribution
1	Srv_0001	-68.35 dBV	4.031 %
2	Srv_0002	-68.22 dBV	4.152 %
3	Srv_0003	-68.71 dBV	3.709 %

Result type selected using the **Select Result Type** softkey

Percentage value

Display for table type: **Detailed**:

Index	Service	Fmin	Fmax	RBW	Max
1	Srv_0001	935.100 MHz	935.300 MHz	50 kHz	-68.35 dBV
2	Srv_0002	935.300 MHz	935.500 MHz	50 kHz	-68.22 dBV
3	Srv_0003	935.500 MHz	935.700 MHz	50 kHz	-68.71 dBV

Switches between the result type selected using the **Select Result Type** softkey and the percentage value.

7.4 Using the Bar Graph view

The measured values are shown as bars in the Bar Graph view. The selected result types are shown as abbreviations in the diagram on the right and shown in the corresponding colors in the diagram.

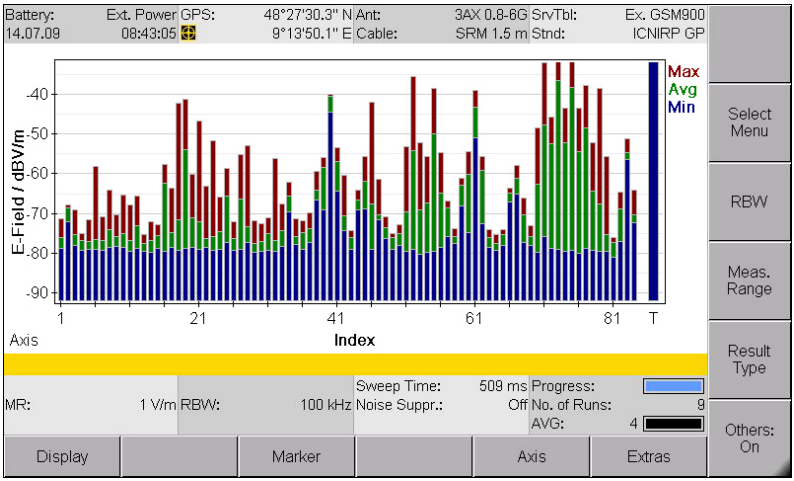


Figure 21: Bar Graph view in Safety Evaluation mode

NOTE: Information about the status bars is found under *The upper status bar* on page 45 and *The lower status bar* on page 46.

7.4.1 Adjusting the Y axis (Y-Scale)

Safety Eval • Display • Y-Scale Range
Safety Eval • Display • Y-Scale Ref
Safety Eval • Display • Y-Scale Auto

⇒ See *Adjusting the Y-Scale* on page 94.

7.4.2 Changing the displayed units (Unit)

Safety Eval • Display • Unit

⇒ See *Changing the displayed units* on page 95.

7.4.3 The Marker function

Safety Eval • Marker

⇒ See *The Marker function* on page 82.

7.5 Selecting an axis mode

Safety Eval • Axis

⇒ See *Selecting an axis mode* on page 89.

8 Spectrum Analysis Mode

This chapter describes the **Spectrum Analysis** operating mode. Following a short introduction on the use of this operating mode, this chapter contains an overview of the basic settings and information about evaluating the results.

8.1 About Spectrum Analysis mode (page 114)

8.2 Basic settings (page 114)

8.3 Evaluating the measurement data (Evaluation) (page 117)

8.4 The Marker function (Marker) (page 122)

8.5 The Zoom function (Zoom) (page 122)

8.1 About Spectrum Analysis mode

All the field components in the selected range can be recorded to give an overview of the detected spectrum or to determine the maximum values in **Spectrum Analysis** mode. The extended functions of the device enable you to perform optimum evaluation of the measured values directly on site. Marker functions and a peak table are provided for rapid assessment of the results of spectrum analysis. You can also display the wideband value of the integrated level for a freely-definable frequency band.

8.2 Basic settings

This section describes the basic settings for the measurement screen.

If the settings are identical in several operating modes, a cross reference will indicate the appropriate description in Chapter 6, *Functions Common to More Than One Operating Mode* on page 73.

8.2.1 Changing the frequency range

Spectrum • Set Freq
Spectrum • Fcent, Fspan, Fmin, Fmax

You can set the frequency range in two ways in **Spectrum Analysis** mode:

- By entering the lower and upper frequency limits: Fmin, Fmax
- By entering the center frequency and the bandwidth: Fcent, Fspan

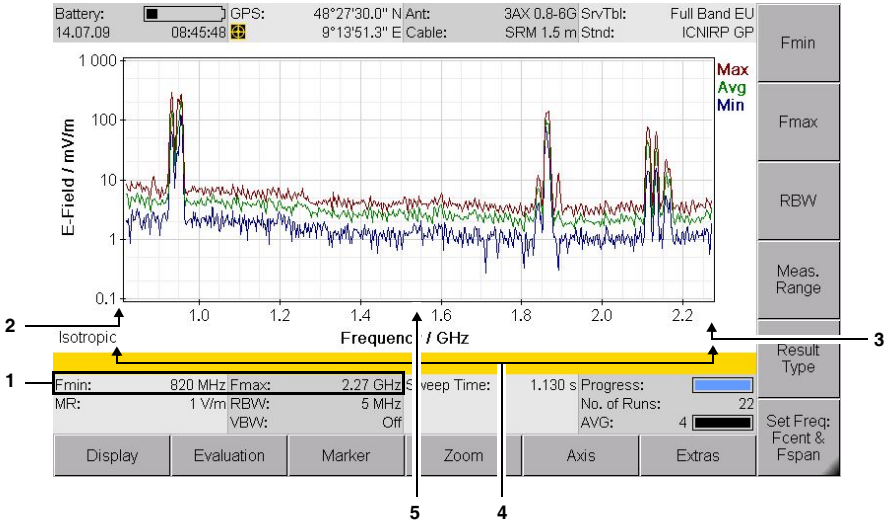


Figure 22: Entering the frequency range

No.	Function / Description
1	Indication of Fmin / Fmax or Fcent / Fspan in the lower status bar.
2	Fmin in the diagram
3	Fmax in the diagram
4	Fspan = Fmax - Fmin
5	Fcent = (Fmin + Fmax) / 2

To change the frequency range:

1. Press the **Set Freq** softkey until the desired entry parameters are shown (toggle function): **Fmin & Fmax / Fcent & Fspan**
   ↳ The labels on the softkeys also change to match the entry parameters **Fmin / Fcent** and **Fmax / Fspan.**
2. If **Fmin & Fmax** selected: Enter the desired values using the **Fmin** and **Fmax** softkeys.
   If **Fcent & Fspan** is selected: Enter the desired values using the **Fcent** and **Fspan** softkeys.

NOTE: You can enter the frequency values using the rotary control or using the keypad. For information on how to enter numerical values, see under *Changing numerical values* on page 52.

Selecting the maximum possible frequency range

You can use the Full Span function to reset all the frequency values already set using **Fmin**, **Fmax**, **Fcent** or **Fspan** to their limit values. In this case, the frequency range will be determined by the antenna connected, by the cable used, or by the SRM-3006 itself.

⇒ When entering **Fmin**, **Fmax**, **Fcent** or **Fspan** press the **Full Span** softkey.

8.2.2 Setting the resolution bandwidth (RBW)

Spectrum • RBW

⇒ See *Setting the center frequency (Fcent)* on page 75

8.2.3 Setting the video bandwidth (VBW)

Spectrum • RBW • VBW

⇒ See *Setting the video bandwidth (VBW)* on page 76

8.2.4 Changing the displayed units (Unit)

Spectrum • Display • Unit

⇒ See *Changing the displayed units* on page 95

8.2.5 Adjusting the Y axis (Y-Scale)

Spectrum • Display • Y-Scale Range
Spectrum • Display • Y-Scale Ref
Spectrum • Display • Y-Scale Auto

⇒ See *Adjusting the Y-Scale* on page 94

8.3 Evaluating the measurement data (Evaluation)

The **Evaluation** menu contains the following functions for evaluating the measurement data:

- **Peak Table**
  Generates a table containing 50 measured peak values.
- **Integration**
  Integrates the measured values over a defined frequency range.

8.3.1 Displaying the peak values (Peak Table)

Spectrum • Evaluation • Peak Table

The highest peaks (up to 50) in the frequency spectrum under consideration are listed in the Peak Table. These are true peak values.

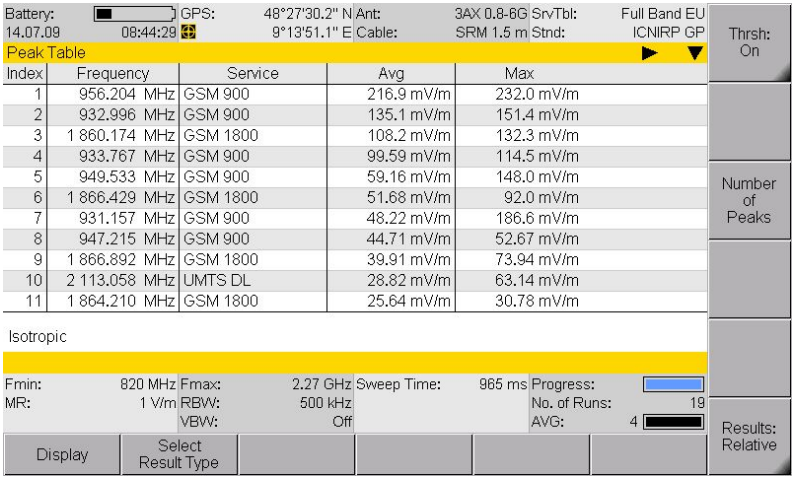


Figure 23: Peak Table in **Spectrum Analysis** mode

Table 29: Elements in the Peak Table

Column header	Description
Index	Sequence number of the peak (up to 50)
Frequency	Frequency value of the peak
Service	Service to which the peak (frequency value) belongs
Avg Max	Result types The columns displayed depend on the result types that have been selected (see next section).

Specifying the number of peaks to be displayed

Spectrum • Evaluation • Peak Table • Number of Peaks

A maximum of 50 peaks can be displayed.

1. Press the **Number of Peaks** softkey.
2. Use the rotary control to highlight the desired number and then press the **OK** key.

Selecting the result types

Spectrum • Evaluation • Peak Table • Select Result Type

The **Select Result Type** softkey is used to select the result type to be displayed in the first column after the **Service** column. You can only select from the result types that were highlighted under **Spectrum • Result Type**. The selected result type is shown relative to the actual value if the relative display mode is selected.

1. Press the **Select Result Type** softkey.
2. Use the rotary control to select the desired result type and press the **OK** key.

Selecting absolute or relative display mode

Spectrum • Evaluation • Peak Table • Results:

The measured values are shown relative to the selected result type in relative display mode.

⇒ Press the **Results** softkey:
- For **absolute values**: The softkey label must show **Relative**.
- For **relative values**: The softkey label must show **Absolute**.

Setting a threshold

Spectrum • Evaluation • Peak Table • Thrsh:

When a threshold is activated, only the peaks that are above the selected threshold will be shown in the table.

1. Press the **Thrsh** softkey until the label shows **On** (toggle function).
2. Press the **Set Thrsh** softkey and use the rotary control to select a threshold value.
3. Press the **OK** key.

8.3.2 Integrating measured values (Integration)

Spectrum • Evaluation • Integration

You can determine the wideband value for the measured values in a defined frequency band using the **Integration over Frequency Band** function. This allows you to make measurements of channel power levels.

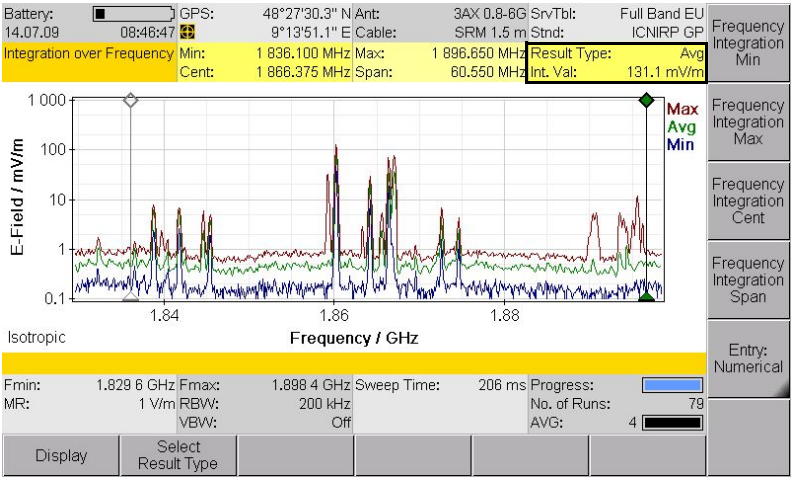


Figure 24: Integration in Spectrum Analysis mode.
Int. Val: Shows the result of the integration.

NOTE: The integration function takes all the spectral lines within the integration range into account, including those which lie within the noise floor. The result of this evaluation function is therefore very dependent on the intrinsic noise level and therefore from the selected measurement range if the signal levels present are close to the intrinsic noise level.

Possible entry methods

The type of entry method is selected using the **Entry** softkey:

- **Numerical**: Numerical entry using the number keys and decimal point key in the keypad.
- **Graphical**: Entry using the rotary control together with the arrow keys.

NOTE: The description of how to define the frequency range given here does not explain how to use the rotary control and keypad. Information about this is found under *Fundamental operating steps* on page 48.

Selecting the result type

The **Select Result Type** softkey is used to select the result type to be used for integration. You can only select from the result types that were highlighted under **Spectrum • Result Type**.

1. Press the **Select Result Type** softkey.
2. Use the rotary control to select the desired result type and press the **OK** key.

Setting the integration range using frequency limits

1. Press the **Frequency Integration Min** softkey to set the lower frequency limit.
   ↳ The diamond of the left marker will be filled out in black if graphical entry is selected.
2. Use the rotary control or the keypad to specify the lower frequency limit and then press the **OK** key to save the setting.
3. Softkey **Frequency Integration Max** softkey to set the upper frequency limit.
   ↳ The diamond of the right marker will be filled out in black if graphical entry is selected.
4. Use the rotary control or the keypad to specify the upper frequency limit and then press the **OK** key to save the setting.

Setting the integration range using a center frequency and a frequency band

1. Press the **Frequency Integration Cent** softkey to set the center frequency.
   ↳ The diamond of the center marker will be filled out in black if graphical entry is selected.
2. Use the rotary control or the keypad to specify the center frequency and then press the **OK** key to save the setting.
3. Press the **Frequency Integration Span** softkey to set the frequency band.
   ↳ The diamonds of both markers will be filled out in black if graphical entry is selected.
4. Use the rotary control or the keypad to specify the frequency band and then press the **OK** key to save the setting.

8.4 The Marker function (Marker)

Spectrum • Marker

⇒ See *The Marker function* on page 82.

8.5 The Zoom function (Zoom)

Spectrum • Zoom

You can display a narrower section of the selected frequency band in more detail so that you can examine the measurement trace more precisely. A new measurement is performed when you activate this function. New measurement parameters such as a new resolution bandwidth might be set automatically for this measurement.

Possible entry methods

The type of entry method is selected using the **Entry** softkey:

- **Numerical**: Numerical entry using the number keys and decimal point key in the keypad.
- **Graphical**: Entry using the rotary control together with the arrow keys.

NOTE: The description of how to define the zoom range given here does not explain how to use the rotary control and keypad. Information about this is found under *Fundamental operating steps* on page 48.

Setting the zoom range using frequency limits

1. Press the **Zoom Min** softkey to set the lower frequency limit.
   ↳ The diamond of the left marker will be filled out in black if graphical entry is selected.
2. Use the rotary control or the keypad to specify the lower frequency limit and then press the **OK** key to save the setting.
3. Press the **Zoom Max** softkey to set the upper frequency limit.
   ↳ The diamond of the right marker will be filled out in black if graphical entry is selected.
4. Use the rotary control or the keypad to specify the upper frequency limit and then press the **OK** key to save the setting.

Setting the zoom range using the center frequency and frequency band

1. Press the **Zoom Cent** softkey to set the center frequency.
   ↳ The diamond of the center marker will be filled out in black if graphical entry is selected.
2. Use the rotary control or the keypad to specify the center frequency and then press the **OK** key to save the setting.
3. Press the **Zoom Span** softkey to set the frequency band.
   ↳ The diamonds of both markers will be filled out in black if graphical entry is selected.
4. Use the rotary control or the keypad to specify the frequency band and then press the **OK** key to save the setting.

Zooming to marker

The **Zoom to Marker** function allows you to display an enlargement of a section around the marker. As this is a marker function, it is described under *Zooming to marker* on page 88.

9 Level Recorder Mode

This chapter describes **Level Recorder** mode. Following a short introduction to the operating mode, an overview of the measurement screen is given along with information about the settings.

9.1 About Level Recorder mode (page 126)

9.2 Display overview (page 127)

9.3 Basic settings (page 128)

9.4 Selecting an axis mode (Axis) (page 130)

9.5 Using noise suppression (Noise Thresh.) (page 130)

9.1 About Level Recorder mode

Level Recorder mode allows you to make selective measurements at a defined frequency (Fcent) e.g. for monitoring the field strength of a DECT channel. You can set the resolution bandwidth (RBW) according to the channel width, and averaging over selectable time periods such as 6 minutes is possible. Max-Hold functions make it easier to evaluate the results on site.

The results are displayed numerically and as bar graphs. One advantage of Level Recorder mode is that there are **no time gaps** in the recording of the results if a single axis antenna is used or only one axis is measured using a three axis antenna. The operating mode is therefore also particularly useful for measuring pulses.

Successive measurement of three axes is not compatible with real-time determination of measurement values versus time. Nevertheless, you can make isotropic measurements using single axis measuring antennas in Level Recorder mode.

9.2 Display overview

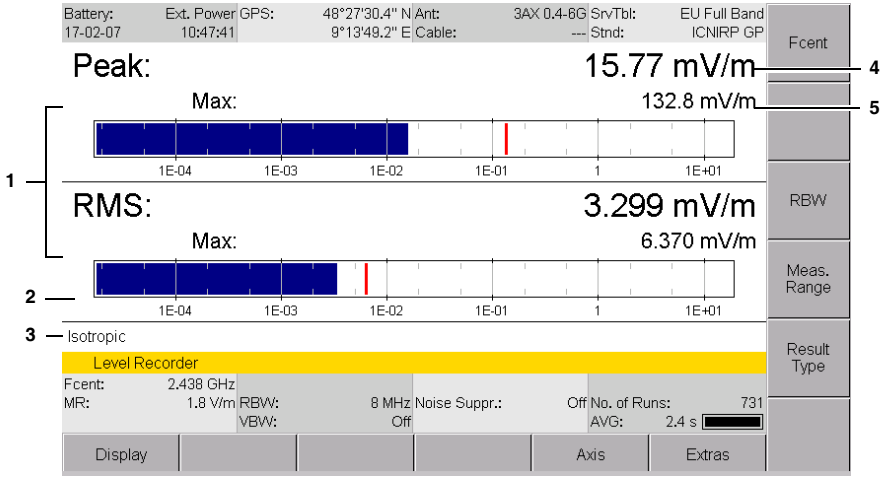


Figure 25: **Level Recorder** mode with display of Peak and RMS.

No.	Function / Explanation
1	Display area with selectable detector types Peak and RMS
2	Bar graph displaying the current level: • Red line: indicates the maximum measured level • Bar: indicates the level at the moment **NOTE:** The maximum extent of the bar corresponds to the selected measurement range (Meas. Range softkey)
3	Selected axis type
4	Numerical display of current measured value
5	Numerical display of maximum measured value

9.2.1 Activating the beeper

Main Menu • Settings • Beep on new Maximum

A new maximum level can also be indicated by a beeper. To do this, you must activate the **Beep on new Maximum** function in the main menu under **Settings**.

To activate the beeper:

⇒ See *Editing device-specific settings* on page 59.

9.3 Basic settings

This section describes the basic settings. If these settings are identical in more than one operating mode, a cross-reference will indicate the relevant section in Chapter 6 *Functions Common to More Than One Operating Mode* on page 73 where the setting is described.

9.3.1 Selecting the center frequency (Fcent)

Level Recorder • Fcent

1. Press the **Fcent** softkey.
2. Use the arrow keys ◀ ▶ to select a decimal digit and then change the value using the rotary control.
3. Press the **OK** key to set the value.

9.3.2 Setting the resolution bandwidth (RBW)

Level Recorder • RBW

⇒ See *Setting the center frequency (Fcent)* on page 75.

9.3.3 Setting the video bandwidth (VBW)

Level Recorder • RBW • VBW

⇒ See *Setting the video bandwidth (VBW)* on page 76.

9.3.4 Setting the measurement range (Meas. Range)

Level Recorder • Meas. Range

The sensitivity of the system depends on the setting of the input attenuator, which is determined by the Measurement Range parameter. A high measurement sensitivity setting avoids falsification of the result due to intrinsic noise. On the other hand, it is important that the instrument is not overdriven. Such overloading can also be caused by signals that are outside the frequency range of the service you want to measure, e.g. from a powerful radio transmitter although you are only measuring mobile phone signals.

To set the measurement range:

⇒ See *Setting the measurement range (Meas. Range)* on page 77.

NOTE: The measurement range setting defines the maximum value indicated by the bar graph (right-hand limit of bar frame).

9.3.5 Selecting the result type (Result Type)

Level Recorder • Result Type

In contrast with other operating modes, the **Result Type** menu in Level Recorder mode allows selection of the detector type, i.e. Peak and RMS. The following can be displayed:

- Peak only
- RMS only
- Peak and RMS

To select a detector type:

1. Press the **Result Type** softkey.
2. Use the rotary control to select the desired result type and then press the **OK** key to make the setting.

To select the averaging time:

1. Press the **Result Type** softkey.
2. Press the **RMS Average Time** softkey.
3. Use the rotary control to select the desired averaging time and then press the **OK** key to make the setting.

The maximum values are also shown in addition to the actual or mean values:

Table 30: Values displayed in **Level Recorder** mode

Type	Explanation
Peak	Displays the instantaneous measured value. **NOTE:** The peak value display (Peak) is held for 480 ms. The value displayed therefore corresponds to the highest level measured within the last 480 ms. This means that the numerical display is more stable and the graphical display is smoothed. **Max:** Displays the maximum value that has occurred since the measurement started.
RMS	Displays the RMS value averaged over a defined period of time. The bar **AVG** in the lower status bar indicates the progress of the measurement until the averaging time is reached. When this time is reached (complete bar), the instrument refreshes the resulting value using the new measurement results and discards the oldest results (*progressive* averaging over time). **Max:** Displays the maximum value of the averaged values that has occurred since the measurement started.

9.4 Selecting an axis mode (Axis)

Level Recorder • Axis

⇒ See *Selecting an axis mode* on page 89.

9.5 Using noise suppression (Noise Thresh.)

Level Recorder • Meas. Range • Noise Thresh. / Noise Suppr.

⇒ See *Noise suppression (Noise Thresh.)* on page 96.

10 Scope Mode

In **Scope** mode, the SRM-3006 measures continuously and selectively at a fixed frequency setting. This enables it to also detect brief peaks, e.g. from pulsed radar equipment. The operating mode is also suitable for timer-controlled measurements.

10.1 About Scope mode (page 132)

10.2 Display overview (page 132)

10.3 Basic settings (page 133)

10.4 Examples for measurement parameters (page 136)

10.5 Using the trigger function (page 141)

10.6 Evaluating the measurement results (Evaluation) (page 144)

10.1 About Scope mode

In **Scope** mode, the SRM-3006 measures selectively at a pre-selected frequency and displays the result as a graph continuously versus time. The display can be “frozen” by means of a trigger function with variable threshold. It is also possible to make long-term measurements over periods of up to 24 hours.

10.2 Display overview

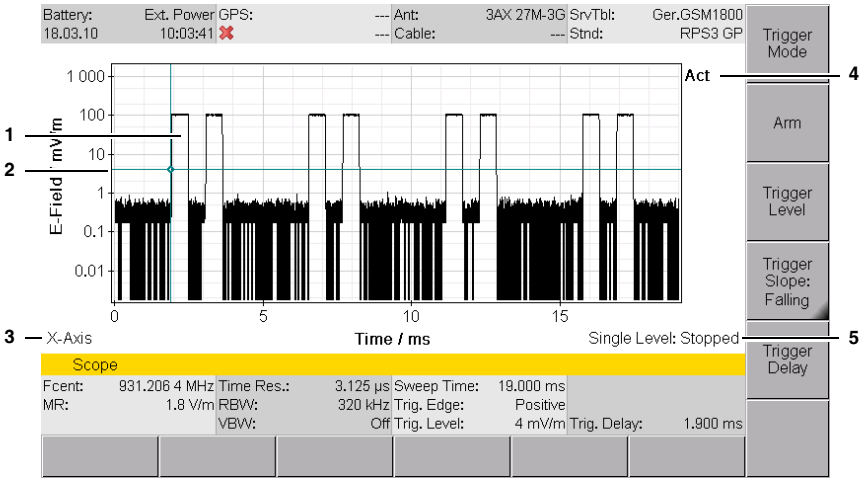


Figure 26: **Scope** mode with activated trigger function

No.	Function / Explanation
1	Display of the measured signal versus time
2	Trigger: • horizontal line = Trigger Level • vertical line = Trigger Delay
3	Axis type: X axis shown here (isotropic for long-term measurements)
4	Result type: The result type used depends on various factors, such as the measurement period and resolution • Act = real-time measurement (for shorter measurement times) • Max/Avg/Min = compressed values over longer measurement periods
5	Measurement “frozen” by trigger function

10.3 Basic settings

This section describes the basic settings. If the settings are identical in several operating modes, a cross reference will indicate the appropriate description in Chapter 6, *Functions Common to More Than One Operating Mode* on page 73.

The parameters described in Table 31 must be set to match the channel being measured to obtain meaningful results.

Table 31: Measurement parameters and their functions

Parameter	Function / Setting
Fcent	Center frequency of channel under observation
RBW	Resolution bandwidth (e.g. channel bandwidth)
Result Type	Before you make any other settings, select here between ACTUAL and CONDENSED.
Sweep Time	Measurement duration, e.g. total time for the channels of a service.
Time Resolution	Time resolution = 1 / RBW

10.3.1 Limits of values that can be set

The values that can be entered for Fcent, Sweep Time, Time Resolution and RBW are subject to certain more or less strict limits, which result from interdependence between the parameters and from measurement restrictions. The table below shows the relationships. The SRM-3006 will therefore correct your entries to sensible or permissible values where necessary.

Table 32: Measurement parameter limiting

Increase in limiting	Parameter	Limiting	Reason for limiting
↓	**Fcent**	none	–
	RBW	none	–
	Time Resolution (31.25 ns – 90 min)	• **> 1/RBW:** Result type Max, Avg, Min compressed display • **= 1/RBW:** Result type Act Display in real time	Physical relationship with the RBW
	Sweep Time (500 ns – 24 h)	≥ 16 x Time Resolution ≤ 16000 x Time Resolution (Actual) ≤ 4000 x Time Resolution (Condensed)	At least 16 measured values per measurement

10.3.2 Selecting the center frequency (Fcent)

⇒ Press the **Fcent** softkey and enter the desired values.

NOTE: You can alternatively select the center frequency and bandwidth in **Spectrum** mode and keep these parameter settings by switching to Scope mode using **Extras/Scope** (see *Changing operating mode and keeping the same parameters* on page 98).

10.3.3 Selecting Sweep Time, Time Resolution

1. Press the **Sweep Time** softkey.
   ↳ Entry is in seconds by default.
2. Enter the desired time. This can be done in the following ways:
   – **Keys:** Type in a value using the numerical keys and select the units using the softkeys.
   – **Rotary control + arrow keys:** Change the value with the rotary control:
   To increase: Keep turning the rotary control or use the ◀ key to select a higher value digit and then use the rotary control to change the value. (Additional digits can be displayed using the ◀ key. The starting value is always “0”, e.g. 0 028 s).
   To decrease: Keep turning the rotary control or use the ▶ key to select a lower value digit and then use the rotary control to change the value. Press the ▶ key when a digit reaches “0”. You can then decrease the value further.
   – **Entry in hh:mm:ss format:** Press the **Mode** softkey. Select a section using the ◀ ▶ keys and change the value using the rotary control.
3. Press the **Time Resolution** softkey and enter the time in the same way.
4. Press **OK** to complete entry.

10.3.4 Setting the resolution bandwidth (RBW)

You must choose a resolution bandwidth that allows the entire signal to be captured. The maximum possible time resolution (1/RBW) results from the bandwidth setting.Axis:

⇒ See *Setting the resolution bandwidth (RBW)* on page 76.

10.3.5 Setting the video bandwidth (VBW)

⇒ See *Setting the video bandwidth (VBW)* on page 76.

10.3.6 Selecting the result type (Result Type)

Table 33: Result types available in the **Result Type** window

Type	Abbrev.	Description
Magnitude Actual	Act	Value measured at the moment
Magnitude Condensed	Max, Avg, Min	Maximum, averaged, and minimum value
Magnitude Actual & Standard	Std	Value measured at the moment and standard
Magnitude Condensed & Standard	Std	Maximum, averaged, and minimum value and standard

To select a result type:

1. Press the **Result Type** softkey.
2. Use the rotary control to select an item and press **OK** to confirm.

10.3.7 Adjusting the Y axis (Y-Scale)

Scope • Display

⇒ See *Adjusting the Y-Scale* on page 94.

10.3.8 Changing the displayed units (Unit)

Scope • Display

⇒ See *Changing the displayed units* on page 95.

10.3.9 Extras

Scope • Extras

⇒ See *Changing operating mode and keeping the same parameters* on page 98.

10.4 Examples for measurement parameters

In this section you find some examples for setting the measurement parameters of typical applications.

10.4.1 Example 1: GSM

GSM is characterized by the following properties:

- BCCH and several traffic channels
- Channel bandwidth 200 kHz
- Cycle time: 8 timeslots of 577 µs each = 4.6 ms

This results in the following settings:

Parameter	Function / Setting
Fcent	Center frequency of GSM channel to be observed, e.g. **931.1879 MHz**
RBW	**200 kHz**
Result Type	**Act**
Sweep Time	> 4,6 ms, selected: **5 ms**
Time Resolution	Automatic from 1/RBW = **5 µs**

10.4.2 Example 2: DECT telephone

DECT is characterized by the following properties:

- Frequency range: 1880 MHz – 1900 MHz
- Base station is permanently active
- Number of channels: 10
- Channel bandwidth: 1728 kHz
- Cycle time: 24 timeslots of 368 µs each = 8 ms

This results in the following settings:

Parameter	Function / Setting
Fcent	e.g. Channel 10: **1897.344 MHz**
RBW	1728 kHz –> selected: **2 MHz**
Result Type	**Act**
Sweep Time	24 timeslots x 368 µs = **8 ms**
Time Resolution	Automatic from 1/RBW = **500 ns**

10.4.3 Example 3: WLAN

WLAN is characterized by the following properties:

- Frequency ranges:
  – 2.400 GHz – 2.497 GHz
  – 5.150 GHz – 5.350 GHz
  – 5.725 GHz – 5.825 GHz
- Number of channels:
  – 2.4 GHz: 14 (overlapping), 3 (non-overlapping)
  – 5 GHz: 12 (non-overlapping)
- Channel bandwidth:
  – 10 MHz, 20 MHz, 40 MHz
  – 16.6 MHz and 20 MHz are most often used
- Cycle time: 0.25 ms – 2 ms

This results in the following settings:

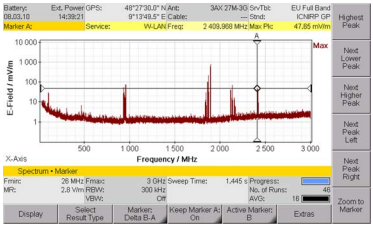
Parameter	Function / Setting
Fcent	e.g. Channel 10: **2.457 GHz**
RBW	**20 MHz**
Result Type	**Condensed**
Sweep Time	**1 ms**
Time Resolution	**400 ns**

Because of the large spread of possible setting values, it is not possible to specify fixed values. However, two representative examples are given below.

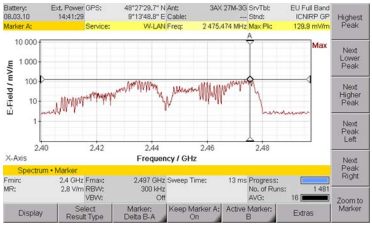
Procedure for example 3:

1. Switch to **Spectrum** mode, select a suitable frequency using the marker function, and then switch to **Scope** mode (parameters are retained)
   ↳ Frequency hopping can make this selection more difficult.

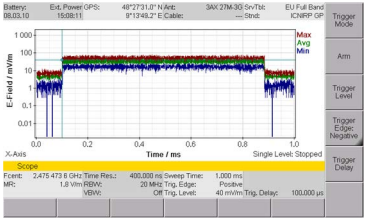
Spectrum Analysis mode

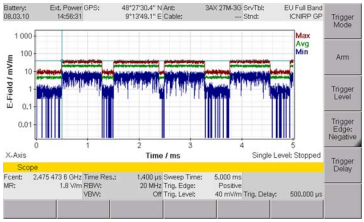


Frequency hopping



2. Examples of different settings, RBW = 20 MHz and Result Type = Condensed:
   - Sweep Time = 1 ms
   - Time resolution = 400 ns
   - Sweep Time = 5 ms
   - Time resolution = 1400 ns



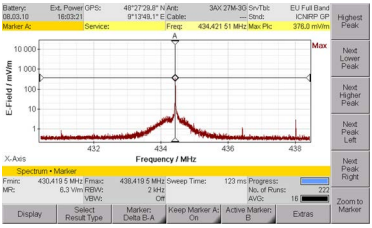


10.4.4 Example 4: Remote automobile key (ISM band)

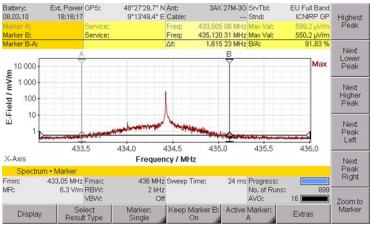
Only the frequency range 433.05 MHz - 434.79 MHz can be specified for remote automobile keys using the ISM band. The following describes how the other parameters can be determined:

1. Switch to **Spectrum** mode and activate the marker function:
   - Find Fcent: Set the marker to the maximum (here: 434.422 MHz).
   - Find RBW: Set markers A and B: Bandwidth is the difference between the two frequency points (here: 1.615 MHz = 2 MHz).

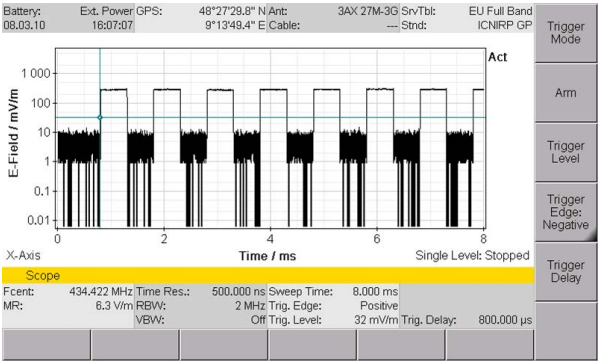
Find Fcent



Find RBW



2. Switch to **Scope** mode.
3. Settings in the example:
   - Fcent = 434.422 MHz
   - RBW = 2 MHz (from the spectrum)
   - Result Type = Actual
   - Sweep Time = 8 ms
   - Time Resolution = 1/RBW = 1/2 MHz = 500 ns



10.5 Using the trigger function

The trigger function allows you to synchronize the measurement cycle with the signal. The result is that after triggering, the display appears “frozen” so that the signal characteristics can be seen and you can measure the individual signal components, for example.

NOTE: You cannot generate a screenshot if the trigger function has been selected but not started. You must either start the trigger (**Arm** softkey) or exit from the Trigger menu to generate a screenshot.

You can select the following trigger types:

- **Free Run:** No trigger function
- **Single:** The display is frozen after the first valid event.
- **Multiple:** The display is frozen after each valid event.
- **Manual Start:** The measurement is started manually and stops as soon as the sweep time has elapsed.
- **Time Controlled:** The measurement is timer controlled; it starts at the date and time set and stops as soon as the sweep time has elapsed.

10.5.1 Free Run

The display updates continuously. **Free Run** is displayed at the lower right of the screen.

10.5.2 Single and Multiple

These trigger types freeze the display after the first valid event (Single) or after every new valid event (Multiple). If you select one of these trigger types, you must then set the following functions:

- Trigger Level: Level activating the trigger
- Trigger Slope: Signal edge activating the trigger:
  - Rising
  - Falling
- Trigger Delay: Delay in activating the trigger

To use the Single or Multiple trigger types:

1. Press the **Trigger Mode** softkey and select the appropriate function.
2. Press the **Trigger Level** softkey and use the rotary control to set a threshold value.
   ↳ The threshold is indicated by a horizontal blue line in the display.
3. Press the **Trigger Edge** softkey to select the edge (toggle function):
   – Softkey is labeled **Falling**: rising edge is selected (= Rising).
   – Softkey is labeled **Rising**: falling edge is selected (= Falling).
4. Press the **Trigger Delay** softkey and select a value:
   – Negative value: earlier time
   – Positive value: later time
   ↳ When you select a negative value, the trigger delay will be shown as a vertical blue line in the display.

When you have selected Single or Multiple, the readiness of the trigger function is indicated at the lower right of the measurement screen:

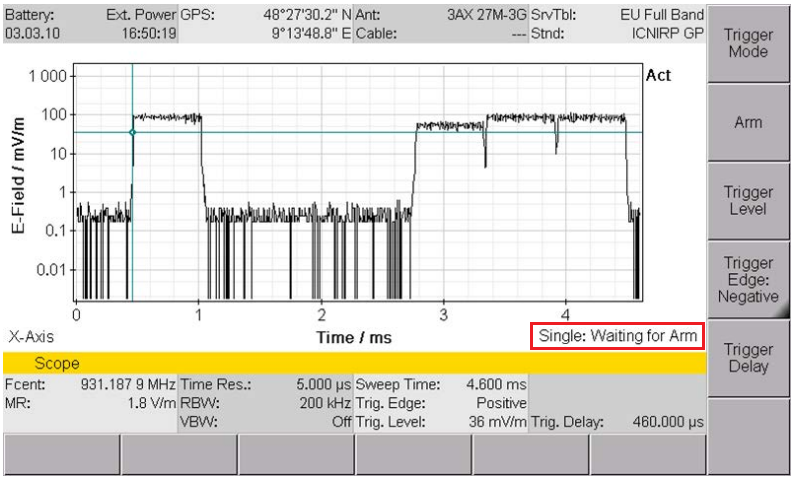


Figure 27: **Scope** operating mode, trigger function **Single** selected but not yet started

The following status messages are possible:

Table 34: Trigger messages

Message	Explanation
Waiting for Arm	Trigger mode has been activated (Single or Multiple) but the trigger function has not yet been started (**Arm** softkey)
Armed	The trigger function has been activated (**Arm** softkey has been pressed) but no valid event has occurred yet
Triggered	This message appears only briefly when the trigger condition is met.
Stopped	An event has fulfilled the trigger condition, the display stops and the signal characteristic is frozen

To start the recording:

⇒ Press the **Arm** softkey.

↳ The message **Armed** appears on the screen and the **Arm** softkey is now labeled **Break**.

To break off recording:

⇒ Press the **Break** softkey.

10.5.3 Manual Start

You can start the recording manually using this trigger type. The recording stops as soon as the sweep time has elapsed.

To start the recording:

1. Press the **Trigger Mode** softkey and select **Manual Start**.
2. Press the **Start Now** softkey.

   ↳ The message **Triggered** appears on the screen and the **Arm** softkey is now labeled **Break**. The display stops refreshing after the sweep time has elapsed and the message **Stopped** is displayed.

To break off recording:

⇒ Press the **Break** softkey.

10.5.4 Time Controlled

This trigger type allows you to start the recording at a specified time. Recording stops as soon as the sweep time has elapsed.

To start the recording:

1. Press the **Trigger Mode** softkey and select **Time Controlled**.
   ↳ The message **Waiting for Arm** appears on the screen.
2. Press the **Start Date** softkey and enter the desired date.
3. Press the **Start Time** softkey and enter the desired time.
   ↳ The start date and time are displayed in the lower status line.
4. Press the **Prog Start** softkey to activate the trigger function.
   ↳ The message **Armed** is displayed on the screen. (If the start time precedes the actual time, the trigger function starts immediately.)

The recording starts when the specified time has been reached and stops when the sweep time has elapsed.

To deactivate the trigger function or break off recording:

⇒ Press the **Break** softkey.

10.6 Evaluating the measurement results (Evaluation)

The **Duty Cycle** function is provided for evaluating the results in **Scope** mode. This function automatically displays the ratio of the average to the maximum power level (Pavg/Ppeak), calculated for the displayed time period. This evaluation can be used to determine the duty cycle of transmitters.

To activate the Duty Cycle function:

⇒ Press the **Evaluation** softkey, then press the **Duty Cycle** softkey.
↳ The ratio Pavg/Ppeak is displayed in the upper information pane.

11 UMTS Mode

This chapter describes **UMTS** mode. An overview of the measurement screen and information about the settings follow a brief introduction to the operating mode.

11.1 About UMTS mode (page 146)

11.2 Display overview (page 147)

11.3 Explanation of measurement result display (page 148)

11.4 Basic settings (page 149)

11.5 Performing a coverage measurement (page 152)

11.6 Using noise suppression (Noise Thresh.) (page 152)

11.1 About UMTS mode

With GSM, individual channels can simply be measured frequency-selectively and allocated to a particular radio cell. This is not possible for UMTS because the information for the individual channels here is scrambled and spread over an entire frequency channel of 5 MHz. This procedure is also called W-CDMA (Wideband Code Division Multiple Access). A P-CPICH (Primary Common Pilot Channel) is embedded in the multiplex signal for each radio cell. This channel transmits continuously at a constant level. Every radio cell has its own P-CPICH with its own scrambling code.

In **UMTS P-CPICH Demodulation** mode (or **UMTS** mode for short), the SRM-3006 decodes all the scrambling codes that are present in a selected UMTS frequency channel. In this way, it can record and list separately the contributions made by each of the individual radio cells to the overall field exposure level. It also calculates the total of these contributions. It is then possible to use a selectable extrapolation factor to determine the *worst case* situation that would occur if all traffic channels were fully loaded. The SRM-3006 additionally indicates the analog measurement value. This corresponds to the actual field exposure level integrated over the complete UMTS frequency channel of 5 MHz.

NOTE: The SRM-3006 also records even those UMTS channels that have levels up to 15 dB below the highest measured channel level.

11.2 Display overview

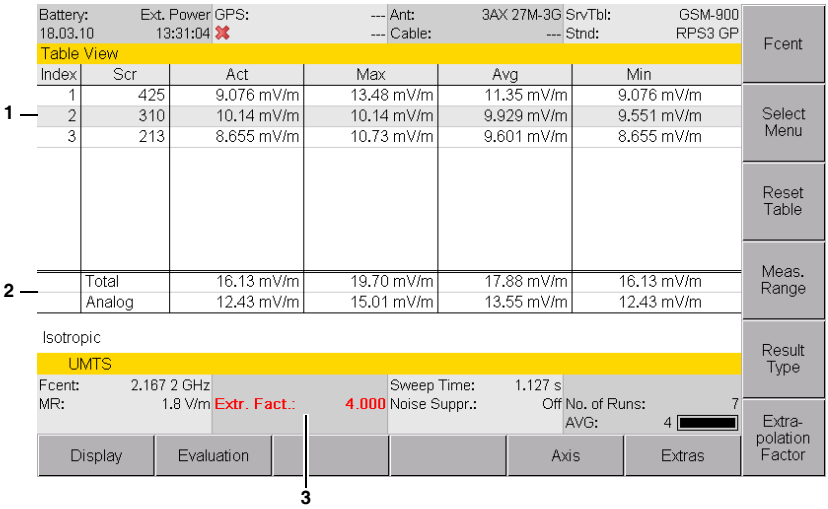


Figure 28: Measurement screen for **UMTS** mode

No.	Function / Explanation
1	Table display of individual results: • **Index:** Consecutive index number of scrambling codes detected • **Scr:** Detected scrambling code number • **Act:** Actual (instantaneous) measured value • **Max, Max Avg, ...:** Other result types as selected
2	Table display of overall results: • **Total:** Total result calculated from the individual results of instantaneous measured values (Value), as well as the overall result calculated from the stored maximum values (Max. Value) • **Analog:** Result of analog field strength measurement in the selected 5 MHz UMTS frequency channel
3	Display of extrapolation factor (if used) with which the individual results and the overall result are multiplied, but not the result of the analog field strength measurement

11.3 Explanation of measurement result display

When you start the measurement, the SRM-3006 searches through the specified UMTS frequency channel for scrambling codes and measures the associated field strengths. It also makes an analog measurement of the total power level of the UMTS frequency channel. The sections below explain the various measurement results that are displayed.

11.3.1 Individual results

The **Scr** column successively shows the numbers of the scrambling codes that are detected (numbers between 0 and 511), sorted in ascending order and numbered consecutively in the **Index** column. The list can contain up to 16 scrambling codes.

NOTE: If no scrambling code is detected, the message **No Scr. Code found** is displayed. This could be due to the center frequency Fcent not being set correctly. **Fcent must be set to an exact multiple of 100 kHz.**

The **Act** column shows the actual measurement results for each scrambling code multiplied by the extrapolation factor (Extr. Fact.).

The remaining columns show the selected result types (Result Type), e.g. the maximum, average, and minimum values that occurred since the start of the measurement, multiplied by the extrapolation factor (Extr. Fact).

The maximum and minimum values can be cleared using the Result Type / Reset Min & Max softkeys. The entire table can be cleared using the Result Type / Table Reset softkeys. You can clear the scrambling codes no longer received from the list in this way to make room for new ones.

NOTE: Any change in parameters resets the entire table (same as Reset All).

11.3.2 Total result (Total)

This value corresponds to the total power of all the scrambling codes listed, multiplied by the extrapolation factor (Extr. Fact.). A total result is determined from both the instantaneous and maximum individual results.

11.3.3 Partial results for certain radio cells (scrambling codes)

It is often necessary to determine the proportion of the overall field strength within a UMTS frequency channel that is due to certain cells only. You can use the **Select Menu** softkey function to select the cells of interest by means of their scrambling codes.

To select individual cells:

1. Press the **Select Menu** softkey.
2. Use the rotary control to highlight items and select them with the softkeys.
3. Press the **OK** key to confirm the selection.

The selection applies to all display types and all evaluations, i.e. the numerical overall result (Total) as well as the graphical display versus time only take the selected scrambling codes into account.

If you select only one scrambling code, you can display the field strength versus time for this one cell.

11.3.4 Analog measurement result (Analog)

This value directly shows the result for the selected UMTS frequency channel, determined by analog measurement using a fixed resolution bandwidth (RBW) of 5 MHz. The extrapolation factor is not applied to this result.

11.4 Basic settings

This section describes the basic settings. If these settings are identical in more than one operating mode, a cross-reference will indicate the relevant section in Chapter 6 *Functions Common to More Than One Operating Mode* on page 73 where the setting is described.

11.4.1 Setting the center frequency (Fcent)

UMTS • Fcent

NOTE: The center frequency must be set to an exact multiple of 100 kHz.

To set the center frequency:

1. Press the **Fcent** softkey.
2. Use the arrow keys ◀ ▶ to select a decimal digit and use the rotary control to change the value.
3. Press the **OK** key to set the value.

The frequency can be transferred from another operating mode, e.g. from Spectrum mode:

1. Switch to **Spectrum** mode and select a frequency using the marker function

   – or –

   use the Span and Fcent values directly without using the marker function.
2. Use the **Extra** softkey to switch back to **UMTS** mode directly.
   ↳ The marker frequency is set as the new center frequency (the RBW is not transferred!).

11.4.2 Showing and hiding services

UMTS • Select Menu

You can specify the services to be measured using the **Select Menu**.

To show or hide services:

1. Press the **Select Menu** softkey.
   ↳ The Select menu opens.
2. Use the rotary control and the softkeys to select the services required. Information on how to select items from a list is found under *Selecting entries from a list* on page 50.
3. When you have made your selection, press the **OK** key.
   ↳ The selected services are displayed.

11.4.3 Resetting the table (Reset Table)

UMTS • Reset Table

Resets the maximum, minimum, and average values.

11.4.4 Setting the measurement range (Meas. Range)

UMTS • Meas. Range

⇒ See *Setting the measurement range (Meas. Range)* on page 77.

11.4.5 Selecting the result type (Result Type)

UMTS • Result Type

⇒ See *Selecting the result type (Result Type)* on page 80.

11.4.6 Using an extrapolation factor

UMTS • Extrapolation Factor

The traffic channel levels can be extrapolated on the basis of the values measured for the control channels by means of the extrapolation factor. Up to three digits can be entered after the decimal point. This allows you to enter a close approximation of values such as $\sqrt{2}$.

Example: The factor **3** is chosen for 3 traffic channels. The level found is then multiplied by 3.

NOTE: The extrapolation factor is applied to the power level. The analog value (Analog display) is not multiplied by the extrapolation factor, which also does not affect the Ratio Pilot/Analog function.

To set the factor:

1. Press the **Extrapolation Factor** softkey, then press the **Extrapolation** softkey until the label shows **Off** (toggle function).
   ↳ Extrapolation is now activated and the lower part of the display shows the current value of the factor in red.
2. To change the factor: Press the **Extrapolation Factor** softkey and enter a factor using the keypad or select a decimal digit using the arrow keys ◀ ▶ and use the rotary control to change the value. You can enter values precisely to three decimal places.
3. Press the **OK** key to set the value.

11.5 Performing a coverage measurement

A coverage measurement determines the ratio of the pilot signal to the analog value.

⇒ Press the **Evaluation** softkey, then press the **Ratio Pilot / Analog** softkey.

↳ The pilot to analog ratio is displayed in the right hand column.

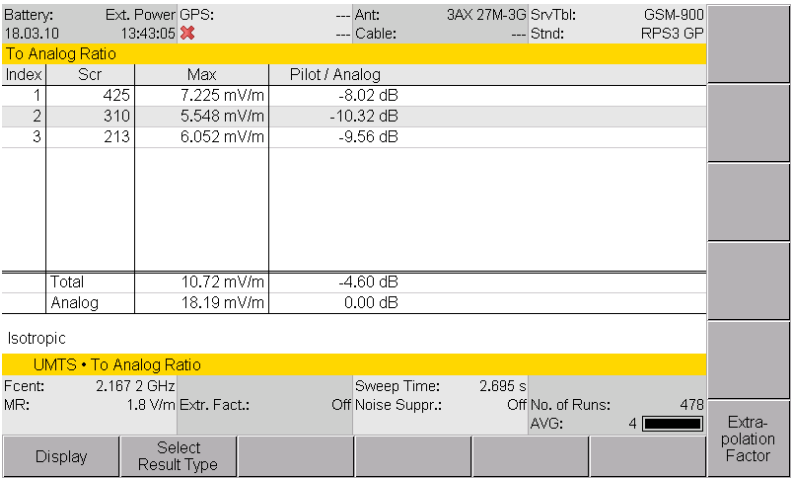


Figure 29: **UMTS** mode with display of Pilot / Analog.

11.6 Using noise suppression (Noise Thresh.)

UMTS • Meas. Range • Noise Thresh. / Noise Suppr.

⇒ See *Noise suppression (Noise Thresh.)* on page 96.

12 LTE mode

This chapter describes the **LTE** operating mode. Two LTE options are available:
– LTE (for FDD networks)
– LTE (for TDD networks)

Because operation and functions are mostly identical both options are called LTE only in this chapter. The TDD specific functions are described In chapter *LTE TDD* on page 163.

12.1 About LTE mode (page 154)

12.2 Display overview (page 155)

12.3 Explanation of measurement result display (page 156)

12.4 Basic settings (page 157)

12.5 Using noise suppression (Noise Thresh.) (page 162)

12.6 LTE TDD (page 163)

12.1 About LTE mode

LTE (Long Term Evolution) is a new wireless communications standard, which can achieve considerably higher download rates of up to 300 megabits per second. LTE is also known as “4G” (fourth generation) and can be considered as the successor to UMTS. The SRM-3006 supports all LTE channel bandwidths (CBW) from 1.4 MHz up to 20 MHz.

Table 35: Channel bandwidths supported

CBW (MHz)	TBW (MHz)[1)]	Number of sub-carriers	CBW (MHz)	TBW (MHz)[1)]	Number of sub-carriers
1.4	1.08	72	10	9.00	600
3	2.70	180	15	13.50	900
5	4.50	300	20	18.00	1200

1) TBW (transmit bandwidth) is the actual bandwidth occupied by all the carriers. Frequency spacing is 15 kHz. The center carrier is not used. The CBW corresponds to the minimum permissible channel separation.

The **PSS** (primary sync signal) and **SSS** (secondary sync signal) are only transmitted in the center 0.96 MHz of the TBW and are used for synchronization to the system. There are only three different PSS (one for each of the three sectors in a group) and 168 different groups. The cell ID can be determined unambiguously from the SSS: Cell ID = Group ID *3 + Sector ID.

The **RS** (reference signal) is distributed over the entire TBW. The SRM-3006 measures the RS within the TBW that corresponds to the CBW setting. The CBW setting on the SRM-3006 can also be selected to be smaller than the CBW of the signal to be measured. This has the advantage of a shorter measurement duration but the disadvantage of increased inaccuracy, particularly if the signal being measured is subject to strong fading.

The RS can be transmitted from either one, two, or four antennas. The SRM-3006 detects the number of antennas used and measures the RS power on all antennas separately (RS 0, RS 1, RS 2, and RS 3). The SRM-3006 can also display the average power of all antennas used (RS Avg), the sum power of all antennas used (RS Sum), and the maximum power of all antennas used (RS Max).

NOTE: The user should be aware that when measuring LTE (TDD or FDD) the decoding algorithm can, in rare cases, detect Cell IDs not actually existing. For example, when measuring LTE FDD in a LTE TDD network there is a small chance that Cell IDs are detected. Such results must be critically evaluated and disregarded if not plausible. False Cell IDs are detected only sporadically and normally with much lower field strength levels than real Cell IDs.

12.2 Display overview

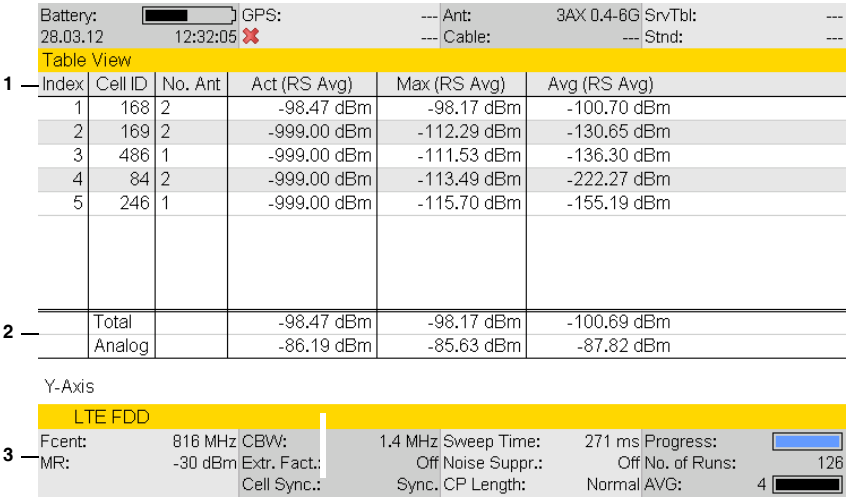


Figure 30: Measurement screen for **LTE FDD** mode (example)

No.	Function / Explanation
1	Tabular display of individual results: • **Index:** Consecutive index number of cells detected • **Cell ID:** ID of detected cell • **No. Ant:** Number of antennas (up to 4 antennas can be active) • **Act, Max, Avg, ...:** Result and signal types as selected
2	Tabular display of total results: • **Total:** Total result calculated from the individual results • **Analog:** Result of analog field strength measurement
3	Display of settings and measurement parameters: • **Extr. Fact.:** Extrapolation factor (where used) by which the individual results and the total result are multiplied, but not the analog field strength measurement result. • **Cell Sync.:** Cell synchronization setting: No Sync., Sync. • **CP Length:** Selected cyclic prefix length: Normal, Extended

12.3 Explanation of measurement result display

After the measurement is started, the SRM-3006 searches for cells in the frequency channel that has been set and measures the corresponding field strengths. It also makes an analog measurement of the total power of the LTE frequency channel at the same time. The sections below explain the results that are displayed.

12.3.1 Individual results

The IDs of the cells that are detected are shown one after the other in the **Cell ID** column, sorted in ascending order and numbered consecutively in the **Index** column.

NOTE: The table remains empty if no cell can be detected. This can happen if the center frequency Fcent has not been set correctly. **Fcent must be set to an exact multiple of 100 kHz.**

The columns show the values for the result and signal types selected that have occurred since the start of the measurement, multiplied by the extrapolation factor (Extr. Fact.). The maximum and minimum values can be deleted using the **Result Type / Reset Min & Max** softkeys. All the result

types are reset using the **Result Type / Reset All** softkey. To reset the entire table including the Cell IDs, press the **Result Type / Reset Table** softkey. This allows you to clear cells that can no longer be received from the list and make space for new ones.

NOTE: Every change in the parameters resets the entire table (corresponds to **Reset Table**).

12.3.2 Total result (Total)

This value corresponds to the total power of all cells listed multiplied by the extrapolation factor (Extr. Fact.).

12.3.3 Partial results for certain cells

Often, only the contribution to the overall field strength due to certain cells within an LTE frequency channel needs to be determined. You can select the cells that you are interested in by means of their Cell ID using the **Select Menu** softkey function.

To select individual cells:

1. Press the **Select Menu** softkey.
2. Highlight an item using the rotary control and select it using the softkeys.
3. Press the **OK** key to confirm the selection.

The selection applies to all display types and all evaluations.

12.3.4 Analog measurement result (Analog)

The **Analog** line displays the actual received analog power of the set LTE frequency channel. The extrapolation factor is not applied to this result. The measurement bandwidth corresponds to the selected channel bandwidth CBW (-6 dB).

12.4 Basic settings

This section describes the basic settings. If these settings are identical in more than one operating mode, a cross-reference will indicate the relevant section in Chapter 6 *Functions Common to More Than One Operating Mode* on page 73 where the setting is described.

12.4.1 Setting the center frequency (Fcent) and channel bandwidth (CBW)

LTE • CBW
LTE • Fcent

Before measuring an unknown transmitter, the TBW of the signal and its center frequency in the spectrum must first be determined to the exact multiple of 100 kHz. Only then can the center frequency (Fcent) and channel bandwidth (CBW) be set to meaningful values.

The choice of channel bandwidth (along with CP Length and Cell Sync) also determines the measurement speed.

The following relationships apply:

- **Small CBW**
  - Fast measurement
  - Less accurate
  - At least the cell IDs are recognized because the sync channels are in the center of the bandwidth
- **Matched CBW**
  - Longer measurement time
  - Accurate measurement

The figures below show the effects of different channel bandwidths on the measurement result.

Battery:		Ext. Power	GPS:	48.458 83	Ant:	---	SrvTbl:	122	
30.03.12		17:32:46		9.230 70	Cable:	---	Stnd:	---	
Table View									
Index	Cell ID	No. Ant	Act (SSS)	Act (RS Avg)	Max (SSS)	Max (RS Avg)			
1	0	1	-4.46 dBm	-3.28 dBm	-3.97 dBm	-2.71 dBm			
2	4	2	-4.74 dBm	-5.79 dBm	-4.69 dBm	-4.91 dBm			
3	8	4	-7.25 dBm	-6.45 dBm	-6.94 dBm	-6.00 dBm			
	Total		-0.55 dBm	-0.18 dBm	-0.32 dBm	0.12 dBm			
	Analog		-11.65 dBm		-11.57 dBm				
Single Axis									
LTE FDD									
Fcent:	2.654 3 GHz	CBW:	1.4 MHz	Sweep Time:	261 ms	Progress:			
MR:	10 dBm	Extr. Fact.:	1200.000	Noise Suppr.:	Off	No. of Runs:	70		
		Cell Sync.:	Sync.	CP Length:	Normal	AVG:	64		

Figure 31: LTE FDD mode: CBW = 1.4 MHz (example)

Battery:	Ext. Power	GPS:	48.458 60	Ant:	---	SrvTbl:	122
30.03.12	17:34:13		9.230 70	Cable:	---	Stnd:	---

Table View

Index	Cell ID	No. Ant	Act (SSS)	Act (RS Avg)	Max (SSS)	Max (RS Avg)
1	0	1	-4.07 dBm	-3.40 dBm	-3.55 dBm	-3.01 dBm
2	4	2	-6.10 dBm	-4.42 dBm	-4.09 dBm	-4.40 dBm
3	8	4	-7.36 dBm	-5.77 dBm	-6.96 dBm	-5.68 dBm
	Total		-0.86 dBm	0.35 dBm	0.12 dBm	0.50 dBm
	Analog		-0.02 dBm		0.00 dBm	

Single Axis

LTE FDD

Fcent:	2.654 3 GHz	CBW:	20 MHz	Sweep Time:	2.490 s	Progress:	
MR:	10 dBm	Extr. Fact.:	1200.000	Noise Suppr.:	Off	No. of Runs:	21
		Cell Sync.:	Sync.	CP Length:	Normal	AVG:	64

Figure 32: LTE FDD mode: CBW = 20 MHz (example)

To set Fcent and CBW from Spectrum mode:

1. Switch to **Spectrum** mode and select a frequency using the marker function.

   – or –

   Use Fcent and Span directly without using the marker function.
2. Use the **Extra** softkey to switch directly back to **LTE** mode.
   ↳ Fcent is set as Fcent and Span as CBW.

To set Fcent directly:

1. Press the **Fcent** softkey.
2. Use the arrow keys ◀ ▶ to select a digit and use the rotary control to change the value.
3. Press **OK** to set the value.

To set CBW directly:

1. Press the **CBW** softkey.
2. Use the rotary control to select a value and press **OK** to set the value.

12.4.2 Selecting signals (Signal)

LTE • Signal

- PSS (Primary Sync Signal)
- SSS (Secondary Sync Signal)
- RS Avg (Reference Signal Average)
- RS Sum (Reference Signal Sum)
- RS Max (Reference Signal Maximum)
- RS 0 (Reference Signal antenna 0)
- RS 1 (Reference Signal antenna 1)
- RS 2 (Reference Signal antenna 2)
- RS 3 (Reference Signal antenna 3)

NOTE: The average power per resource element from all elements of the signal type under investigation is displayed.

These signals can be combined with the usual result types. If all signals and result types are selected, 54 values will be shown for each cell.

To select signals:

1. Press the **Signal** softkey.
   ↳ The selection menu opens.
2. Use the rotary control and softkeys to select the desired signals. Information on how to select items from a list is given under *Selecting entries from a list* on page 50.
3. Press **OK** when you have selected the signals you want.
   ↳ The selected signals are displayed.

12.4.3 Changing CP Length and Cell Sync.

LTE • Signal

The CP Length and Cell Sync. parameters only need to be adjusted if no Cell ID or too few Cell IDs are found.

- **If no Cell ID is found:**
  Change the **Cyclic Prefix Length** from **Normal** (default) to **Extended**. The extended CP is sometimes used for very large cells or in rural areas.
- **To ensure that all Cell IDs are found:**
  Change **Cell Sync.** from **Sync.** (default) to **No Sync.** and select the setting for which the most Cell IDs are displayed.
  In general, the synchronization parameter should be left set on Sync since the Cells from one operator are typically synchronized. If however, expected Cell IDs are missing or when changing the setting from Sync to

No Sync more Cell IDs are detected, then some Cells are after all probably not synchronized and the No Sync setting is necessary to detect all Cell IDs. The disadvantage of the No Sync setting is that it will increase the decoding time. Therefore, it should only be used when necessary.

To change the settings:

1. Press the **Signal** softkey.
2. Press the **CP Length** softkey (toggle function). The setting shown is the one that can be selected (i.e. the setting that is inactive at the moment).
   ↳ You can switch between **Normal** and **Extended**.
3. Press the **Cell Sync.** softkey (toggle function). The setting shown is the one that can be selected (i.e. the setting that is inactive at the moment).
   ↳ You can switch between **Sync.** und **No Sync.**

Both functions are activated immediately they are selected.

12.4.4 Selecting the result type (Result Type)

LTE • Result Type

⇒ See *Selecting the result type (Result Type)* on page 80.

12.4.5 Setting the measurement range (Meas. Range)

LTE • Meas. Range

⇒ See *Setting the measurement range (Meas. Range)* on page 77.

12.4.6 Using an extrapolation factor

LTE • Extrapolation Factor

The extrapolation factor is used to determine the total power under full load from the measured signals. The extrapolation factor to be used corresponds approximately to the number of sub carriers in the system under investigation.

Example: The factor 600 is selected for an LTE system with channel bandwidth 10 MHz and 600 sub carriers. The measured power is then multiplied by 600.

You can enter up to 3 places after the decimal point. This allows you to enter the exact value where the extrapolation factor is known.

NOTE: The extrapolation factor applies to the power and is visible directly when units of power are shown (W/m^2, mW/cm^2). It is not applied to the analog value (**Analog** display).

To set the factor:

1. Press the **Extrapolation Factor** softkey, then press the **Extrapolation** softkey until **Off** appears (toggle function).
   ↳ Extrapolation is now activated and the currently selected factor is shown in red in the lower part of the display.
2. To change the factor: Press the **Extrapolation Factor** softkey and enter a factor using the keypad or use the arrow keys ◀ ▶ to select a digit and use the rotary control to change the value. The value can be entered with an accuracy of up to three decimal places.
3. Press the **OK** key to set the value.

12.5 Using noise suppression (Noise Thresh.)

LTE • Meas. Range • Noise Thresh. / Noise Suppr.

⇒ See *Noise suppression (Noise Thresh.)* on page 96.

12.6 LTE TDD

The SRM-3006 makes the LTE TDD decoding in the background as for all modes. The only difference compared to LTE FDD is the **Up/Downlink Configuration** softkey and the information which configuration is currently used for decoding the LTE TDD signal.

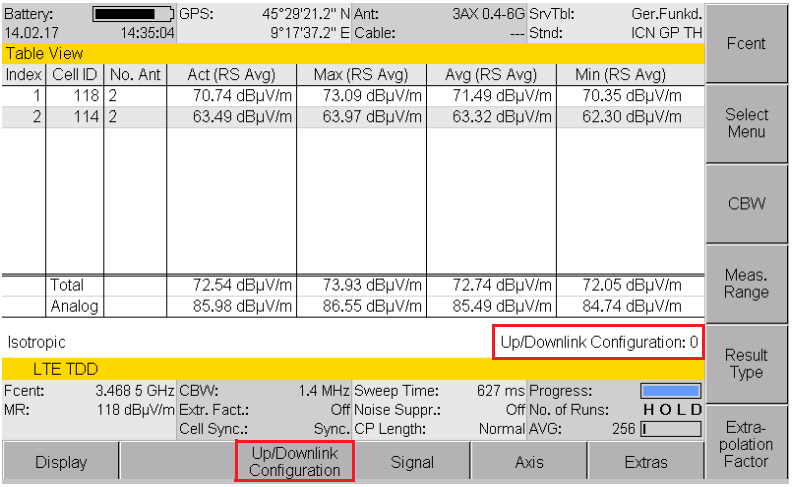


Figure 33: Measurement screen for LTE TDD.

NOTE: The recommended Up/Downlink configuration setting is the Up/Downlink configuration 0. With configuration 0 the SRM will, regardless of the actual base station configuration only measure downlink (DL) symbols. In configuration 0 the DL subframes are at the same time as in all the other configurations (see table below). That means no low power uplink (UL) subframes will be measured that would give an underestimated result. If the actual base station configuration is known and used/applied in the SRM the measurement result will improve only slightly.

Table 36: The seven possible configurations for a LTE TDD frame. As an example, showing subframe 5 with DL symbols only in all configurations.

UL/DL Configuration	**Subframe number**									
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
0	DL	S	UL	UL	UL	DL	S	UL	UL	UL
1	DL	S	UL	UL	DL	DL	S	UL	UL	DL
2	DL	S	UL	DL	DL	DL	S	UL	DL	DL

Table 36: The seven possible configurations for a LTE TDD frame. As an example, showing subframe 5 with DL symbols only in all configurations.

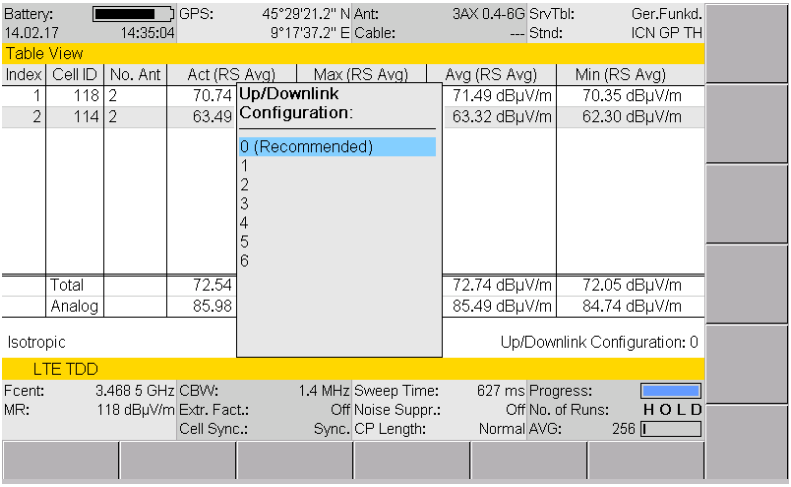
UL/DL Configuration	Subframe number									
	0	1	2	3	4	5	6	7	8	9
3	DL	S	UL	UL	UL	DL	DL	DL	DL	DL
4	DL	S	UL	UL	DL	DL	DL	DL	DL	DL
5	DL	S	UL	DL	DL	DL	DL	DL	DL	DL
6	DL	S	UL	UL	UL	DL	S	UL	UL	DL

12.6.1 Select and change the up-/downlink configuration

Main menu • LTE TDD

You can select and change the up- and downlink configuration in a scroll down list.

1. Press the **Up/Downlink Configuration** softkey.
2. Use the rotary control to highlight the desired configuration (choosing from the scroll down list a configuration between 0 and 6).
3. Press the **OK** key to confirm the selection.



13 5G NR mode

This chapter describes the **5G NR** operating mode.

13.1 About 5G NR Mode (page 166)

13.2 Display overview (page 167)

13.3 Explanation of measurement result display (page 168)

13.4 Basic settings (page 169)

13.1 About 5G NR Mode

5G NR (5th Generation New Radio) is a new wireless communications standard, which can achieve considerably higher download rates of up to 2 Gb/s (in downlink direction) and 1 Gb/s (in uplink direction). 5G NR can be considered as the successor to LTE. The SRM-3006 measuring system supports 5G NR in the Radio Frequency Range 1 (FR1), Sub – 6 GHz.

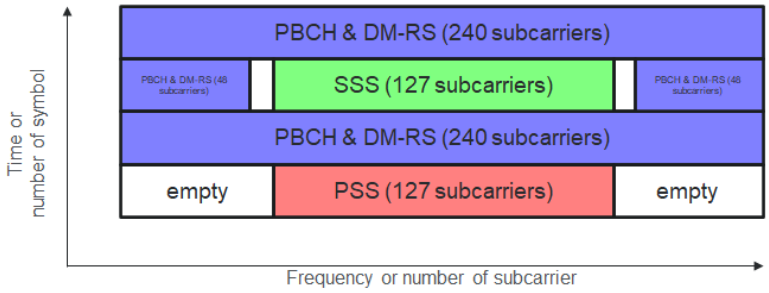
Similar to UMTS and LTE, there is an option for 5G NR.

In 5G NR, compared to LTE, the antenna pattern utilize beam forming to deal with the path loss for SSBs (Synchronization signal Block) and data signals. Another update/difference is the increased bandwidth with up to 100 MHz for FR1.

The Sub Carrier Spacing (SCS) in 5G NR depends on the base station settings and can have a bandwidth of 15 kHz or 30 kHz in the FR1 frequency band. This value is necessary for code-selective measurement and should be known before starting the measurement.

The 5G NR measurement method is based on the code selective power level measurement of the cell specific and traffic independent signals SSS 0 to SSS 7 (Secondary Sync Signal) of 5G cells. A code selective field probe can measure the received signal strength of the SSS separately for each cell.

The SSS is part of the PBCH block. In contrast to LTE, the center frequency of the PBCH block is usually not in the middle of the transmission band! For code-selective measurement, the center frequency of the PBCH block must be entered as parameter Fcent to an exact multiple of 5 kHz. For this reason, the center frequency of the PBCH block should be known as accurately as possible before starting the measurement.



TDD and FDD are both available in 5G NR and the decoding of SSB works in the same way for both duplex modes. There are therefore no separate options for 5G NR in the SRM-3006.

NOTE: The user should be aware that when measuring 5G NR the decoding algorithm can detect Cell IDs not actually existing. This can happen especially when the decoding sensitivity parameter is set to **High**.
Such results must be critically evaluated and disregarded if not plausible. False Cell IDs are detected only sporadically and normally with much lower field strength levels than real Cell IDs.

13.2 Display overview

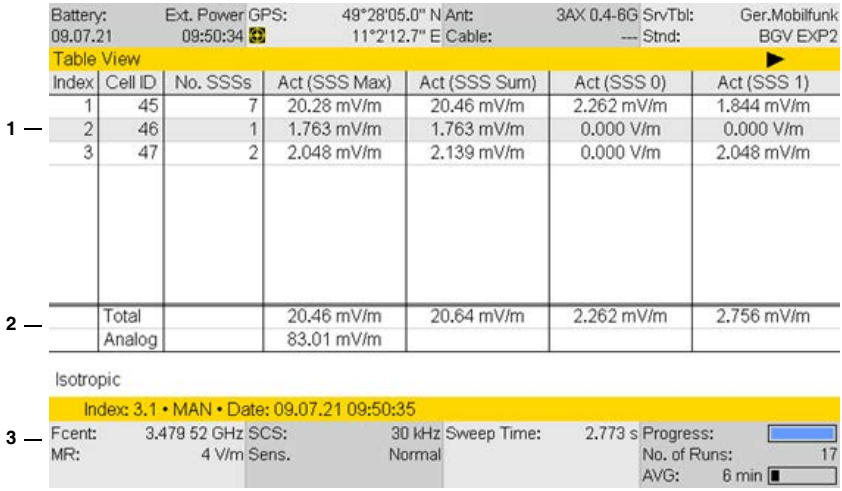


Figure 34: Measurement screen for 5G NR mode (example)

No.	Function / Explanation
1	Tabular display of individual results: • **Index:** Consecutive index number of cells detected • **Cell ID:** ID of detected cell • **No. SSSs:** Number of decoded Secondary Synchronization Signals (SSSs). • **Act, Max, Avg, ...:** Result and signal types as selected
2	Tabular display of total results: • **Total:** Total result calculated from the individual results • **Analog:** Result of analog field strength measurement
3	Display of settings and measurement parameters: • **Sens.:** Measurement Sensitivity: Low, Normal and High. • **SCS:** Subcarrier Spacing: 15 kHz, 30 kHz.

NOTE: **No. SSSs** shows the number of decoded Secondary Synchronization Signals (SSSs) in the current measurement run. However, if a value of **1** is displayed, this does not necessarily mean that the base station is not using beamforming. A value of **0** or **1** could also occur due to the fact that the SRM-3006 cannot receive any or only one beam at the current location.

13.3 Explanation of measurement result display

After the measurement is started, the SRM-3006 searches for cells in the frequency channel that has been set and measures the corresponding field strengths. The sections below explain the results that are displayed.

13.3.1 Individual results

The IDs of the cells that are detected are shown one after the other in the Cell ID column and are numbered consecutively in the Index column.

NOTE: The table remains empty if no cell can be detected. This can happen if the center frequency Fcent has not been set correctly. Fcent must be set to an exact multiple of 5 kHz.

The columns show the values for the result and signal types selected that have occurred since the start of the measurement. The maximum and minimum values can be deleted using the **Result Type / Reset Min & Max** softkeys. All the result types are reset using the **Result Type / Reset All** softkey.

To reset the entire table including the Cell IDs:

⇒ Press the **Result Type / Reset Table** softkey.

This allows you to clear cells that can no longer be received from the list and make space for new ones.

NOTE: Every change in the parameters resets the entire table (corresponds to **Reset Table**).

13.3.2 Total result (Total)

This value corresponds to the total power of all cells listed.

13.3.3 Partial results for certain cells

Often, only the contribution to the overall field strength due to certain cells within an 5G NR frequency channel needs to be determined. You can select the cells that you are interested in by means of their Cell ID using the **Select Menu** softkey function.

To select individual cells:

1. Press the **Select Menu** softkey.
2. Highlight an item using the rotary control and select it using the softkeys.
3. Press the **OK** key to confirm the selection.

The selection applies to all display types and all evaluations.

13.3.4 Analog measurement result (Analog)

The **Analog** line displays the actual received analog power of a channel defined by the current frequency and a bandwidth of 320 x SCS.

This is a legacy value and will be removed in one of the next firmware versions.

13.4 Basic settings

This section describes the basic settings. If these settings are identical in more than one operating mode, a cross-reference will indicate the relevant section in *chapter 6* on page 73 where the setting is described.

13.4.1 Setting the center frequency (Fcent)

5G NR • Fcent

Before measuring an unknown transmitter, the PBCH signal center frequency in the spectrum must first be determined to the exact multiple of 5 kHz. Only then can the center frequency (Fcent) be set to meaningful values.

To set Fcent from Spectrum Analysis mode:

1. Switch to **Spectrum Analysis** mode and select a frequency using the marker function.

   – or –

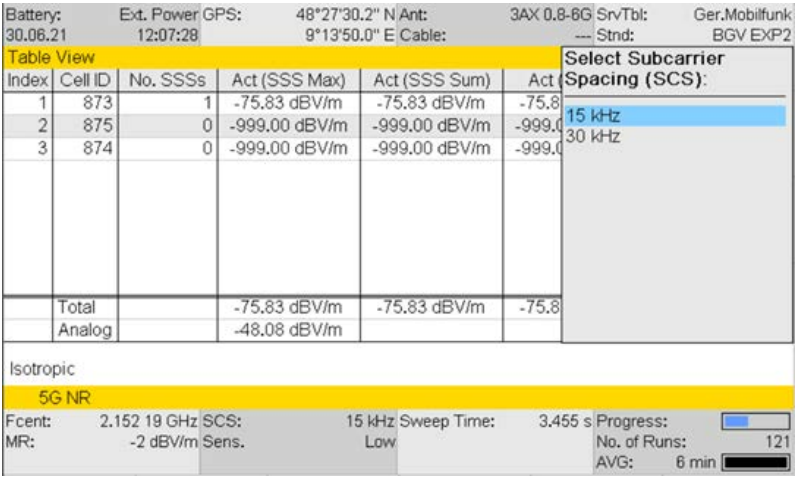
   Use Fcent directly without using the marker function.
2. Use the **Extra** softkey to switch directly back to **5G NR** mode.
   ↳ Fcent is set as **Fcent**.

To set Fcent directly:

1. Press the **Fcent** softkey.
2. Use the arrow keys ◀ ▶ to select a digit and use the rotary control to change the value.
3. Press **OK** to set the value.

13.4.2 Selecting SubCarrier Spacing (SCS)

5G NR • SCS



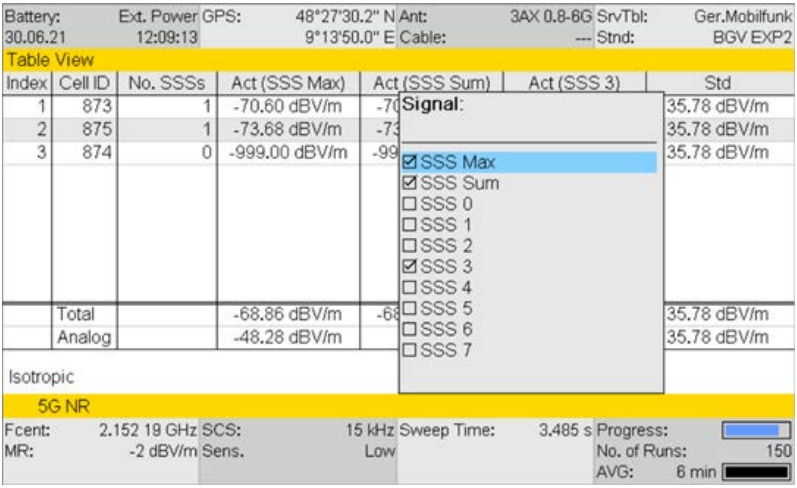
To select SCS:

1. Press the **SCS** softkey.
   ↳ The selection (dropdown) menu opens.
2. Use the rotary control to select the desired SCS value (15 kHz or 30 kHz).
3. Press **OK** to set the value.

13.4.3 Selecting signals (Signal)

5G NR • Signal

- SSS Max (Maximum SSS average power level of SSS 0 to SSS 7)
- SSS Sum (ERP radiated power per resource element of all SS/PBCH beams summed over SSS 0 to SSS 7)
- SSS 0 (Secondary Sync Signal 0)
- SSS 1 (Secondary Sync Signal 1)
- SSS 2 (Secondary Sync Signal 2)
- SSS 3 (Secondary Sync Signal 3)
- SSS 4 (Secondary Sync Signal 4)
- SSS 5 (Secondary Sync Signal 5)
- SSS 6 (Secondary Sync Signal 6)
- SSS 7 (Secondary Sync Signal 7)



These signals can be combined with the usual result types. If all signals and result types are selected, 60 values will be shown for each cell (plus Standard).

NOTE: If the base station under test does not support beamforming, only one of the SSS entries shows a valid value. However, this does not necessarily have to be SSS 0.

To select signals:

1. Press the **Signal** softkey.
   ↳ The selection menu opens.
2. Use the rotary control or softkeys to select the desired signals. The softkeys can be used to select/deselect all signals at once.

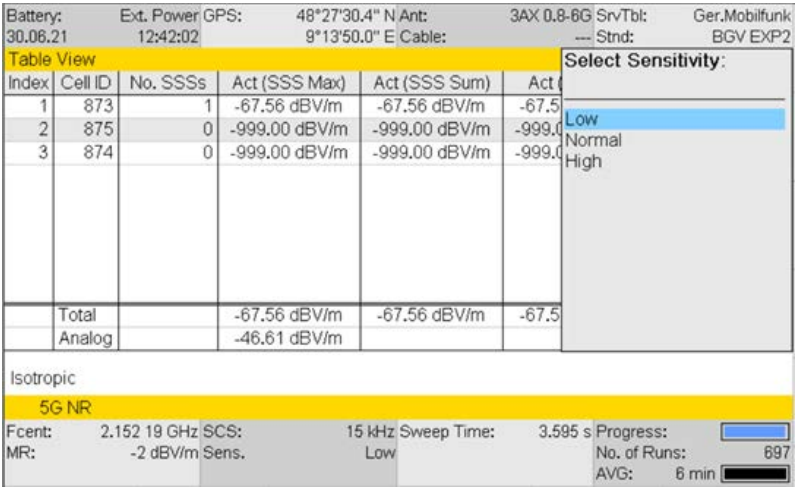
Information on how to select items from a list is given under *Selecting entries from a list* on page 50.

3. Press **OK** when you have selected the signals you want.
   ↳ The selected signals are displayed.

13.4.4 Sensitivity

5G NR • Sensitivity

Depending on the setting of the **Sensitivity** parameter, the decoding of the PBCH block is more or less sensitive. The sensitivity contains the levels Low, Normal and High. By default, the decoding sensitivity is set to **Normal**. If many false cells are displayed during a measurement, this can be remedied by setting **Low**. If you are at a location with low reception, the setting **High** can be used for more detected cells.



To select a sensitivity level:

1. Press the **Sensitivity** softkey.
   ↳ The selection (dropdown) menu opens.
2. Use the rotary control to select the desired sensitivity (Low, Normal or High).

Information on how to select items from a list is given under *Selecting entries from a list* on page 50.

3. Press **OK** when you have selected the sensitivity you want.

13.4.5 Selecting the result type (Result Type)

5G NR • Result Type

⇒ See *Selecting the result type (Result Type)* on page 80.

13.4.6 Setting the measurement range (Meas. Range)

5G NR • Meas. Range

⇒ See *Setting the measurement range (Meas. Range)* on page 77.

14 Spatial Averaging

This chapter describes the Spatial Averaging mode.

14.1 About the Spatial Averaging function (page 176)

14.2 Description of averaging functions (page 177)

14.3 Spatial Averaging – Continuous (page 181)

14.4 Spatial Averaging – Discrete (page 183)

14.5 Spatial Averaging – Discrete Axis (page 185)

14.1 About the Spatial Averaging function

The standards and regulations governing the protection of humans from high-frequency radiation specify limit values which normally have to be averaged over the entire human body. This is because the fields may vary greatly within a given volume. This is particularly the case in the vicinity of the antennas used for mobile telecommunications, which have a primary lobe in the desired direction of radiation but many secondary lobes in different directions. As a result, the measured value depends on the spatial height as well as the distance from the antenna.

The standard method of spatial averaging uses a simplified model of the human body, often in the form of a dummy made of non-conducting material. The dummy is the same size as a normal adult and is marked at specific heights. The field strength is measured at each of these heights, and the results averaged mathematically. The spacing and heights of these markings vary from one standard to another. For example, IEEE C95.1-1999 requires measurements from 0 cm (floor level) to 200 cm at equal intervals of 20 cm. Other standards, such as Canada's Safety Code 6 require two-dimensional measurements in vertical and horizontal directions. The revised ECC Recommendation (02)04 of October 2003 specifies measurements at 1.1, 1.5 and 1.7 m above floor level.

Such measurements are difficult, particularly in the vicinity of modern mobile communications sites shared by several providers, because the field strengths are changing all the time: paging systems transmit sporadically, the number of occupied mobile phone channels changes continually, and so on. For this reason, the results of measurements can often depend more on the time than on the spatial location.

The averaging process

The SRM-3006 simplifies the measurement by automatically averaging the values measured at different points in the room. The SRM-3006 determines the root mean square value (RMS), i.e. the average power level. For this reason it is a good idea to set the detector function in Level Recorder mode to RMS, although the PEAK setting is also available.

Spatial Averaging can be applied in the following operating modes:

- **Safety Evaluation** (see page 101)
- **Spectrum Analysis** (see page 113)
- **Level Recorder** (see page 145)

It cannot be used in the modes **UMTS P-CPICH Demodulation**, **LTE** and **5G NR**.

According to the operating mode, the SRM-3006 determines the average of:

- the individual results for the different services (**Safety Eval** mode),
- the individual spectral values (**Spectrum** mode), or
- the individual measured values (**Level Recorder** mode).

14.2 Description of averaging functions

The following types of Spatial Averaging are available:

- **Continuous:** measured values are recorded continuously
- **Discrete:** one measured value recorded each time a key is pressed
- **Discrete Axis:** one single axis measured value recorded each time a key is pressed

These three averaging functions are described briefly below.

14.2.1 Continuous

In *Continuous Averaging* mode, the SRM-3006 records the values continuously and averages them. In this way, particular paths can be tracked through the room with the antenna. Recording of measurement values is started by pressing the **Start** key and can be halted by pressing the **Pause** key and then restarted at a different point in the room by pressing the **Continue** key. The measurement continues in the background even if the instrument is switched to “Pause”; this can be seen by the incrementing of the “No. of Runs” indicator. These results are not, however, used for the evaluation. This is indicated by the “No. of SAVG” display remaining static. Intermediate and final results can be saved at any time by pressing the **SAVE** key.

The SRM-3006 averages all the measured values recorded between “Start” and “Pause” or “Continue” and “Clear”, regardless of when the measurement was started or resumed. If several parallel paths are to be traversed with the antenna, for example, you should try to keep the speed of movement the same.

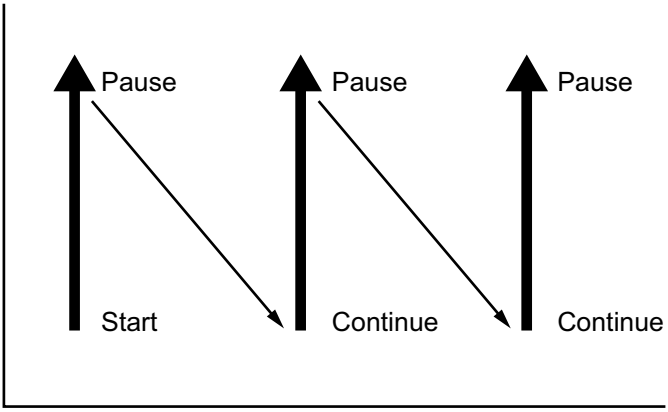


Figure 35: Example of continuous recording of values at three points in a room

Example application for Continuous Averaging:

FCC RFR Guidelines (USA)

14.2.2 Discrete

The measurement is controlled manually by pressing the **Add Value** key. Each time you press the key, the SRM-3006 performs just one measurement, confirms this with a beep, and increments the value of “No. of SAVG” by one. The SRM-3006 averages all the measured values obtained in this way. The order in which you measure the various points in the room therefore does not matter if the field is constant over time. Intermediate and final results can be saved at any time by pressing the **SAVE** key.

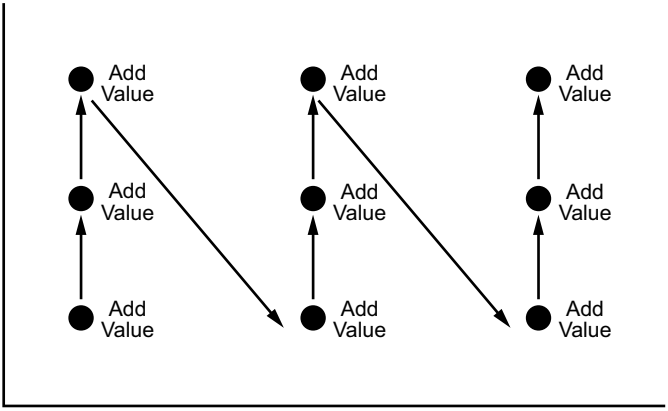


Figure 36: Discrete recording of three measured values at each of three points in the room

Example application for Discrete Averaging:

EN 50492:2008*

* Basic standard for the in-situ measurement of electromagnetic field strength related to human exposure in the vicinity of base stations.

14.2.3 Discrete Axis

Discrete Axis allows you to determine the average value using a single axis antenna. Three measurements will then need to be performed at every measurement point within the room. The SRM-3006 calculates the isotropic result for each measurement point and averages the isotropic results of all measurement points. Intermediate and final results can be saved at any time by pressing the **SAVE** key.

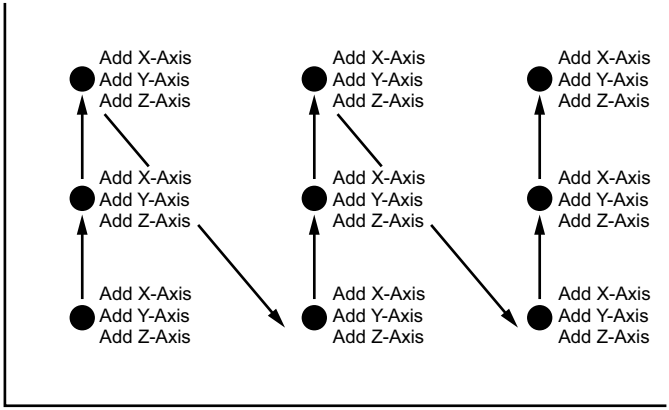


Figure 37: Three separate measurements must be performed at each point in the room if a single axis antenna is used

Example application for Discrete Axis:

EN 50492:2008* with single axis antenna

* Basic standard for the in-situ measurement of electromagnetic field strength related to human exposure in the vicinity of base stations.

14.3 Spatial Averaging – Continuous

Safety Eval • Result Type • Spatial AVG
Spectrum • Result Type • Spatial AVG
Level Recorder • Result Type • Spatial AVG

✓ You have selected the desired operating mode and made all the settings you want.

1. Press the **Result Type** softkey.
   ↳ The **Result Type** selection box opens.

NOTE: The selection of a Result Type has no relevance here, as the SRM-3006 always uses the actual value (Act or Peak) for Spatial Averaging regardless of the result type selected.

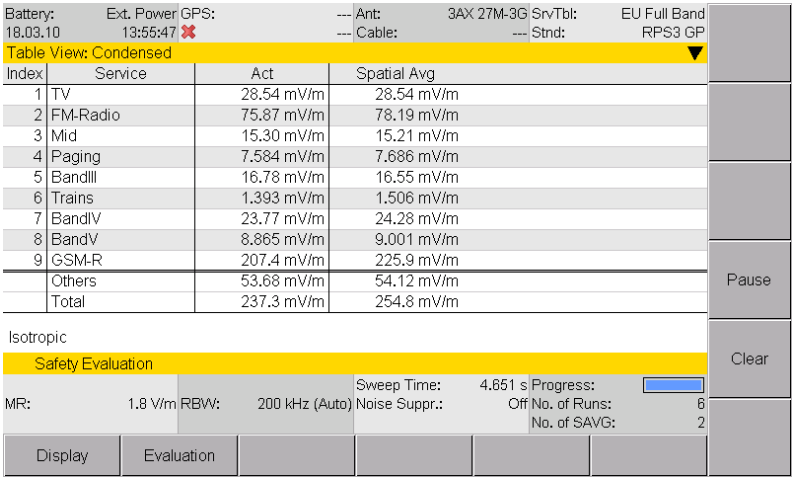


Figure 38: Example: Safety Eval • Result Type • Spatial AVG (Continuous)

2. Press the **Spatial AVG Type** softkey, select **Continuous** using the rotary control, and press the **OK** key.
3. Move to the desired position in the room and press the **Spatial AVG** softkeys to switch the instrument so it is ready to measure.
4. Press the **Start** softkey to start the measurement.
   ↳ The instrument starts measuring and indicates the number of measurements made (No. of Runs) and the number of averages determined (No. of SAVG) in the display.
5. Move the antenna along the path to be measured in the room.

To pause the measurement:

6. Press the **Pause** softkey.
   ↳ The instrument stops averaging (No. of SAVG is static) and displays the averaged result. It continues measuring in the background (indicated by No. of Runs) but does not use these values for determining the average.
7. If required, move to a new position in the room and press the **Continue** softkey.
   ↳ The instrument resumes averaging (indicated by No. of SAVG).
8. Move the antenna along the next path to be measured in the room.
9. You can repeat steps 6 through 8 as often as necessary until you have the final result.

To save the result in the measurement data memory:

⇒ Press the **SAVE** key.

To delete the result:

⇒ Press the **Clear** softkey.

To exit from Spatial Averaging:

⇒ Press the **ESC** key.

NOTE: The instrument saves the actual (current) result of spatial averaging in the measurement data memory when you press the **SAVE** key. You can therefore use this function to save intermediate results.
When you press the **Continue** softkey, the instrument resumes averaging and takes account of all the measured values obtained so far. The instrument does not clear all the measurement values recorded and start a new spatial averaging procedure until you press the **Clear** softkey.

14.4 Spatial Averaging – Discrete

Safety Eval • Result Type • Spatial AVG
Spectrum • Result Type • Spatial AVG
Level Recorder • Result Type • Spatial AVG

✓ You have selected the desired operating mode and made all the settings you want.

1. Press the **Result Type** softkey.
   ↳ The **Result Type** selection box opens.

NOTE: The selection of a Result Type has no relevance here, as the SRM-3006 always uses the actual value (Act or Peak) for Spatial Averaging regardless of the result type selected.

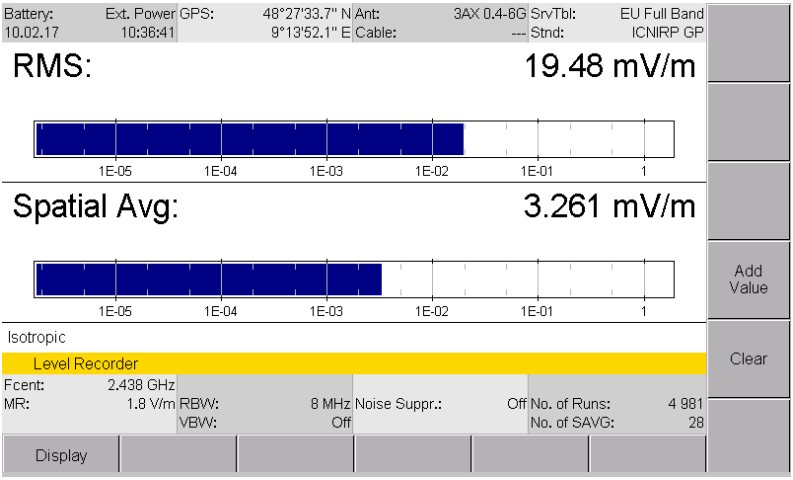


Figure 39: Example: Level Recorder • Result Type • Spatial AVG (Discrete)

2. Press the **Spatial AVG Type** softkey, select **Discrete** using the rotary control, and press the **OK** key.
3. Move the antenna to the first position in the room to be measured and press the **Spatial AVG** softkeys to switch the instrument so it is ready to measure.
4. Press the **Add Value** softkey to start the measurement.
   ↳ The instrument makes the measurement and confirms this with a short beep. The number of averaged values (No. of SAVG) now indicates 1. The instrument continues measuring in the background (indicated by No. of Runs) but does not use these values for determining the average.

NOTE: The measuring antenna must not be moved during the measurement, i.e. from the time you press the Add Value key until the beeper sounds.

5. Move the antenna to the next position in the room to be measured and press the **Add Value** softkey.
   ↳ The number of averaged values (No. of SAVG) now indicates 2.
6. Repeat the process for all of the points in the room that are to be recorded.

To save the result in the measurement data memory:

⇒ Press the **SAVE** key.

To delete the result:

⇒ Press the **Clear** softkey.

To exit from Spatial Averaging:

⇒ Press the **ESC** key.

NOTE: The instrument saves the actual (current) result of spatial averaging in the measurement data memory when you press the **SAVE** key. You can therefore use this function to save intermediate results.
When you press the **Continue** softkey, the instrument resumes averaging and takes account of all the measured values obtained so far. The instrument does not clear all the measurement values recorded and start a new spatial averaging procedure until you press the **Clear** softkey.

14.5 Spatial Averaging – Discrete Axis

Safety Eval • Result Type • Spatial AVG
Spectrum • Result Type • Spatial AVG
Level Recorder • Result Type • Spatial AVG

✓ The antenna is fitted on a tripod by means of the antenna holder. See *Fitting a Narda antenna on a tripod* on page 36.

✓ You have selected the desired operating mode and made all the settings you want.

1. Press the **Result Type** softkey.
   ↳ The **Result Type** selection box opens.

NOTE: The selection of a Result Type has no relevance here, as the SRM-3006 always uses the actual value (Act or Peak) for Spatial Averaging regardless of the result type selected.

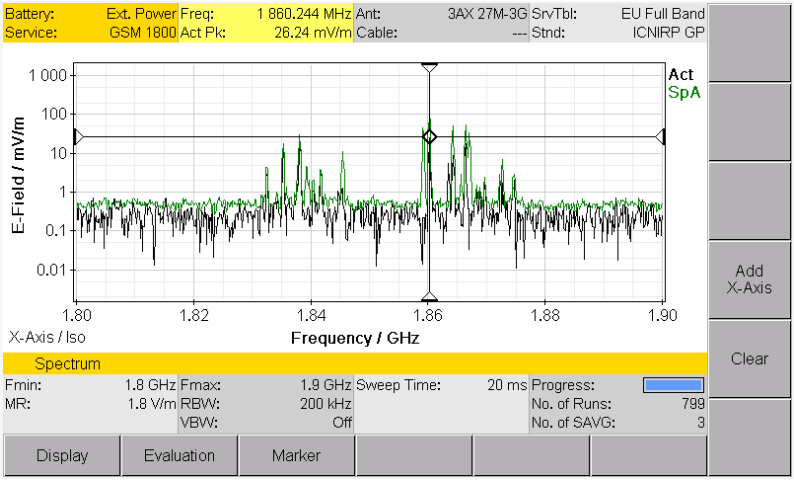


Figure 40: Example: Spectrum • Result Type • Spatial AVG (Discrete Axis)

2. Press the **Spatial AVG Type** softkey, select **Discrete Axis** using the rotary control, and press the **OK** key.
3. Move the antenna to the first position in the room to be measured, orient the antenna in the direction of the X axis, and press the **Spatial AVG** softkeys to switch the instrument so it is ready to measure.

4. Press the **Add X-Axis** softkey.
   ↳ The instrument makes the measurement and confirms this with a short beep. The number of averaged values (No. of SAVG) still indicates 0. The instrument continues measuring in the background (indicated by No. of Runs) but does not use these values for determining the average.

NOTE: The measuring antenna must not be moved during the measurement, i.e. from the time you press the Add Axis key until the beeper sounds.

5. Orient the antenna in the direction of the Y axis and press the **Add Y-Axis** softkey.
   ↳ The instrument makes the measurement and confirms this with a short beep. The number of averaged values (No. of SAVG) still indicates 0. The instrument continues measuring in the background (indicated by No. of Runs) but does not use these values for determining the average.
6. Orient the antenna in the direction of the Z axis and press the **Add Z-Axis** softkey.
   ↳ The instrument makes the measurement and confirms this with **two beeps**. The number of averaged values (No. of SAVG) now indicates 1 because the isotropic measurement for the first measurement point has now been completed. The instrument continues measuring in the background (indicated by No. of Runs) but does not use these values for determining the average.
7. Move the antenna to the next position in the room to be measured and repeat the process for the X, Y, and Z axis positions.
   ↳ The number of averaged values (No. of SAVG) now indicates 2. The instrument averages the two isotropic results and displays the overall result numerically. The instrument continues measuring in the background (indicated by No. of Runs).
8. Repeat the process for all of the points in the room that are to be recorded.

To save the result in the measurement data memory:

⇒ Press the **SAVE** key.

To delete the result:

⇒ Press the **Clear** softkey.

To exit from Spatial Averaging:

⇒ Press the **ESC** key.

NOTE: The instrument saves the actual (current) result of spatial averaging in the measurement data memory when you press the **SAVE** key. You can therefore use this function to save intermediate results.
When you press the **Add Axis** softkey, the instrument resumes averaging and takes account of all the measured values obtained so far. The instrument does not clear all the measurement values recorded and start a new spatial averaging procedure until you press the **Clear** softkey.

15 Measurement Data Memory

This chapter describes how to display measurement data and screenshots, how to save data by condition and timer controls, and how to use the comment function.

15.1 About the Memory menu (page 190)

15.2 Viewing data sets (page 191)

15.3 Viewing screenshots (page 193)

15.4 Saving measured values automatically (page 194)

15.5 Changing the comment modes (page 198)

15.1 About the Memory menu

Main Menu • Memory Menu

The Memory sub menu of the Main menu contains the following functions:

- Recall or delete stored data
- Display screenshots
- Save results using conditions or timers
- Activate comment mode

To open the menu:

⇒ Switch to the Main menu and press the **Memory** softkey.

↳ The Memory menu is displayed with the stored data.

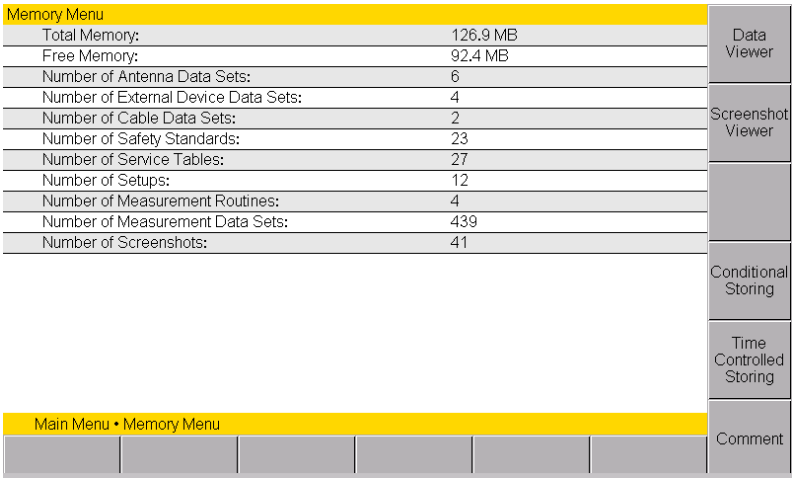


Figure 41: **Memory** menu

Function	Explanation
Total Memory	Total memory space
Free Memory	Memory space still available
Number of Antenna Data Sets	Number of antenna data sets saved
Number of Cable Data Sets	Number of cable data sets saved
Number of Safety Standards	Number of safety standards saved
Number of Service Tables	Number of service tables saved
Number of Setups	Number of setups saved
Number of Measurement Routines	Number of measurement routines saved
Number of Measurement Data Sets	Number of measurement data sets saved
Number of Screenshots	Number of screenshots saved

15.2 Viewing data sets

Main Menu • Memory • Data Viewer

⇒ Press the **Data Viewer** softkey.

↳ The list of the stored data sets is displayed.

To view a data set:

⇒ Select a data subset using the rotary control and press the **Recall Data Set** softkey or the **OK** key.

↳ The data set is displayed in the form that it was saved. **RECALL** on the screen indicates that the data set is a saved data set.

Tip:

- You can use the ▯ ▯ softkeys to page through the list.
- You can use the ⏮ ⏭ softkeys to jump to the previous or next data subset without having to go back to the Memory menu.
- You can use the ◀|| ||▶ softkeys to jump to the previous or next data subset if several results are saved in one data set.

To delete a data set:

⇒ Use the rotary control to select a data set and press the **Delete Dataset** softkey.

To delete all data sets:

1. Press the **Delete Menu** softkey.
2. Press the **Select All** softkey.
3. Press the **Delete Selection** softkey.

To delete a range of data sets:

1. Press the **Delete Menu** softkey.
2. Select the range you want to delete using the appropriate softkey. There are several ways to select a range using the **Invert Selection**, **Select**, **Select First** and **Select Last** softkeys.
3. Press the **Delete Selection** softkey.

15.3 Viewing screenshots

Main Menu • Memory • Screenshot Viewer

⇒ Press the **Screenshot Viewer** softkey.
↳ The list of the stored screenshots is displayed.

To view a screenshot:

⇒ Use the rotary control to select a screenshot and press the **Recall Screenshot** softkey to display it.
(Press the ▯ ▯ softkeys to show the first or last entries of the list.)
↳ The selected screenshot is displayed.

NOTE: The SRM-3006 displays the original image at reduced size on a black background. These images may appear blurred due to the reduced number of pixels. Nevertheless, the screenshot remains saved with full resolution and will be displayed full size on the PC screen.

⇒ Press **Previous Screenshot** or **Next Screenshot** softkey to skip through the list.

⇒ Press **ESC** to return to the Screenshot Viewer menu.

To delete a screenshot:

⇒ Use the rotary control to select a data set and press the **Delete Screenshot** softkey.

To delete all screenshots:

1. Press the **Delete Menu** softkey.
2. Press the **Select All** softkey.
3. Press the **Delete Selection** softkey.

To delete a range of screenshots:

1. Press the **Delete Menu** softkey.
2. Select the range you want to delete using the appropriate softkey. There are several ways to select a range using the **Invert Selection**, **Select**, **Select First** and **Select Last** softkeys.
3. Press the **Delete Selection** softkey.

15.4 Saving measured values automatically

You can also save results automatically in the data memory instead of pressing the **SAVE** key each time you want to save a result. There are two memory functions for this purpose:

- **Conditional storing:** As soon as a value exceeds a predefined threshold, the instrument begins saving results.
- **Timer-controlled storing:** Storing of data is controlled by a start time and a duration.

NOTE: After saving the results Min and Max are reset, whereas Min Avg and Max Avg are not.

NOTE: The internal memory of the SRM-3006 has the capacity to store large quantities of data. A large number of data sets can take a long time to upload to a PC, so it is a good idea not to let the data memory fill up too much and to update and manage the data regularly.

15.4.1 Conditional Storing of measured values

Main Menu • Memory Menu • Conditional Storing

In conditional storing mode, the instrument starts storing results as soon as a measured value exceeds a predefined threshold value. The threshold along with other parameters can be set in the **Conditional Storing** menu.

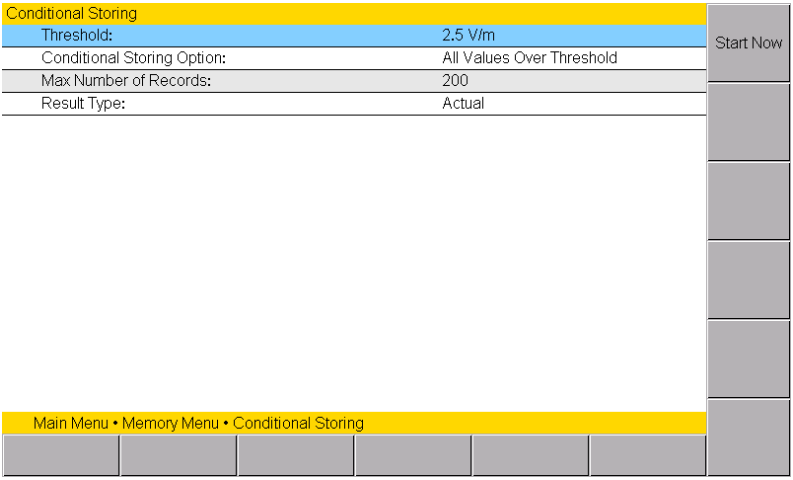


Figure 42: Conditional storing

To store measured values by conditional control:

1. Select the desired operating mode and then press the **MENU** key to open the Main menu.
2. Press the **Memory** softkey, then press the **Conditional Storing** softkey and set the parameters:

Figure 43: Conditional Storing parameters

Condition	Explanation	Possible settings
Threshold	Threshold above which storage of values begins	–
Conditional Storing Options	Number of values to be stored	• First Value Over Threshold: only the first value exceeding the threshold • All Values Over Threshold: all the values exceeding the threshold
Max Number of Records		• As many as possible • 2, 3, 5, 10, 20, 30, 50, 100, 200, 300, 500
Result Type	Result type viewed	• Peak • Maximum Peak

3. Press the **Start Now** softkey.
   ↳ Automatic storage is activated.
   The screen displays the view of the operating mode previously selected. The info line shows *Conditional Storing* and the number of records still to be recorded.

To stop storing values:

⇒ Storing stops automatically when the Max. Number of Records is reached. To stop storing values before this, press the **Stop** softkey.
   ↳ The operating mode is again displayed normally. You can view the stored measurement values from the **Memory** menu (see *Viewing data sets* on page 191).

15.4.2 Time Controlled Storing of measured values

Main Menu • Memory Menu • Time Controlled Storing

For time controlled storing you specify the start time, duration, and interval between store events in the **Time Controlled Storing** menu.

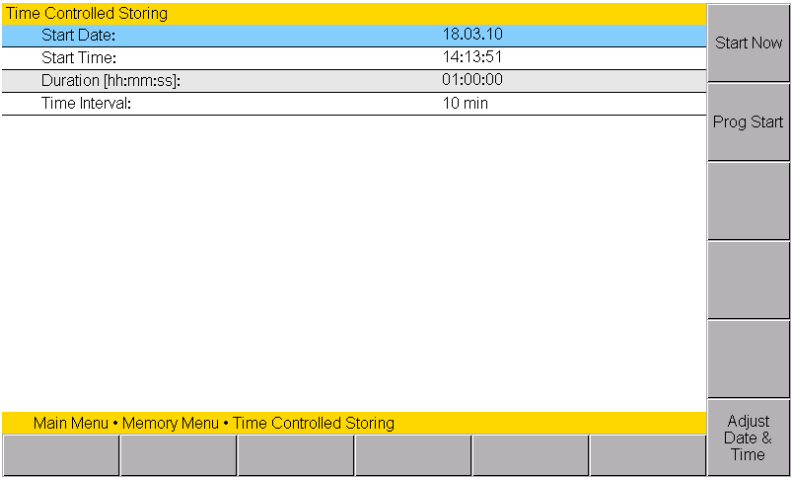


Figure 44: Time controlled storing

To save measured values by time control:

1. Select the desired operating mode and then press the **MENU** key to open the Main menu.
2. Press the **Memory** softkey, then press the **Time Controlled Storing** softkey and set the parameters:

Figure 45: Time Controlled Storing parameters

Condition	Explanation	Possible settings
Start Date		You can use the date and time settings from the SRM-3006 by pressing the **Adjust Date & Time** softkey
Start Time		
Duration	Duration of recording	Maximum 99 hours 59 minutes 59 seconds
Time Interval		• As often as possible • Maximum 60 minutes

To start storing values immediately:

3. Press the **Start Now** softkey.
   ↳ Automatic storage is activated.
   The screen displays the view of the operating mode previously selected. The info line shows *Time Controlled Storing* and the remaining recording time (duration).

To start storing at the specified time:

4. Press the **Prog Start** softkey.
   ↳ Automatic storage is activated.
   ↳ The screen displays the view of the operating mode previously selected. The info line shows *Time Controlled Storing* and the remaining time until the start of recording. Storing starts when the countdown reaches 0.

To stop storing:

⇒ Storing stops automatically when the specified duration has elapsed. To stop storing values before this, press the **Stop** softkey.

⇒ The operating mode is again displayed normally. You can view the stored measurement values from the **Memory** menu (see *Viewing data sets* on page 191).

15.5 Changing the comment modes

Main Menu • Memory • Comment

⇒ Press the **Comment** softkey.
↳ The **Comment** dialog is displayed.

Comments can be added to data sets or screenshots. In both cases the comment mode and the default comment text can be set individually. Following table shows the available comment modes:

Table 37: Comment modes

Mode	When saving a dataset or a screenshot ...
No Comment	... no comment can be added.
Standard Text	... the text saved in **Standard Data Set Comment Text** or **Standard Scr.shot Comment Text** is added as a comment.
Individual Text	... the text saved in **Standard Data Set Comment Text** or **Standard Scr.shot Comment Text** is displayed in the text editor and can be edited.
Voice Comment	... a voice comment can be added (voice comment is available for datasets only).

To change the comment mode:

1. Use the rotary control to select **Dataset Comment Mode** or **Screenshot Comment Mode** and press **OK**.
2. Use the rotary control to change the mode and press **OK**.

To change the default comment text:

1. Use the rotary control to select **Standard Data Set Comment Text** or **Standard Scr.shot Comment Text** and press **OK**.
   ↳ The text editor opens.
2. Enter the default text and press **OK**.
   ↳ This text will be used when **Standard Text** is set as Comment Mode. When **Individual Text** is set, the entered text is suggested in the editor and can be complemented or overwritten.

16 Maintenance and Repairs

This chapter describes the maintenance and repairs that can be undertaken by the user.

16.1 Changing the battery pack (page 200)

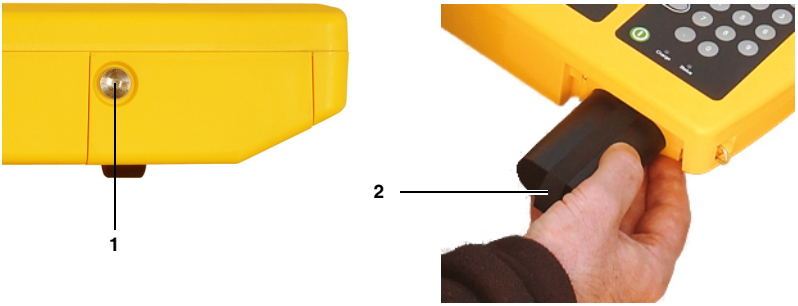
16.2 Cleaning (page 200)

16.3 AC adapter / charger (page 201)

16.4 Updating the device software (page 202)

16.5 Activating options (page 202)

16.1 Changing the battery pack



1. Undo the fixing screw **(1)** in the lid of the battery compartment.
2. Pull out the battery pack using the tab **(2)**.
3. Hold the tab on the new battery pack and slide the battery pack into the compartment.
4. Replace the lid of the battery compartment and do up the fixing screw (finger tight).

NOTE: If the old battery pack is no longer required, do not simply throw it away with the normal trash. Dispose of it according to the regulations applicable in the country of use (also refer to *Proper disposal (EU only)* on page 22).

16.2 Cleaning

- Do not use solvents to clean the Basic Unit, the antennas, or the AC adapter / charger. We recommend the use of lukewarm water to which a drop of liquid detergent has been added as cleaning fluid.
- Only use a lightly moistened cloth for cleaning. Water must not get into the device under any circumstances.
- To avoid spots and drying marks, wipe off the device while it is still damp with a dry cloth.

16.3 AC adapter / charger

Opening the device

⚠ WARNING

Electric shock

Parts carrying dangerous voltages that can cause injury through electric shock may be exposed if the AC adapter / charger is opened.

⇒ The AC adapter / charger is not designed to be repaired. If it is defective or malfunctioning, the entire device should be replaced.

⇒ Do not open the AC adapter / charger.

Damage to the device

NOTICE

Damage to the device

Improper repairs may change the characteristics of the AC adapter / charger to the extent that it could be destroyed by short circuits e.g. across creepage and air paths.

⇒ Repairs must only be performed by qualified persons.

Spare parts

NOTICE

Damage to the device

If constructional changes are made to the AC adapter / charger, the safety of the device can no longer be guaranteed.

⇒ Only use original spare parts for repairs to the AC adapter / charger.

16.4 Updating the device software

The device software is updated using the PC software. You will find information about the PC software and about connecting the device to a PC in Chapter 17 starting on page 203.

You will find detailed information on how to use the PC software in the online help provided with each PC software version.

16.5 Activating options

Options are activated using the PC software. You will find information about the PC software and about connecting the device to a PC in Chapter 17 starting on page 203.

You will find detailed information on how to use the PC software in the online help provided with each PC software version.

17 PC Software

The PC software is an application for PC that allows convenient handling and management of the SRM-3006.

17.1 PC software versions and functions (page 204)

17.2 Connecting to the PC (page 205)

17.3 Working with the PC software (page 206)

17.1 PC software versions and functions

There are two versions of the PC software for the SRM-3006:

SRM-3006 Tools

The Tools version is free and is included with the SRM-3006.

It contains the following functions:

- Download measurement data to the PC
- Download screenshots to the PC
- Create antenna, cable, and service tables, measurement routines, and user standards
- Set the instrument configuration
- Activate options and update the device software (firmware)

SRM-3006 TS

The TS version can be ordered as an option at additional cost.

All the functions of SRM-3006 Tools are included. Additional functions include:

- Visualizing stored measurement results
- Offline analysis of stored measurement results
- Remote control of the SRM (image based, transfer and display of the device display on a PC)
- Convenient export of measurement results to Microsoft Office applications
- Management of measurement data in databases
- Direct printout of measurement results

17.2 Connecting to the PC

The connectors for the optical interface (RS 232) and the USB port (Mini B type) are located on the left hand side panel of the device.

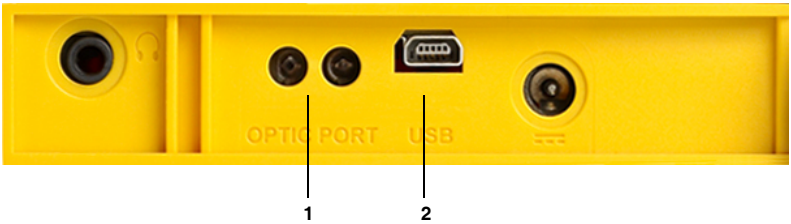


Figure 46: Optical interface (1) and USB port (2)

The following types of connection between the SRM-3006 and the PC are possible (cables and adapters are shown in the table below):

- **USB – USB:** The fastest and most used type of connection. The electrical signals transmitted can affect the field being measured.
- **Optical – USB:** Slower transmission speed than USB – USB. However, the field being measured is unaffected by the optical signals transmitted.
- **Optical – Serial:** The only connection possible for systems not equipped with USB ports or if COM1of the PC must be used.

The following cables and adapters are needed for these connection types:

SRM-3006 connector	Link	PC connector
USB	**USB**[1)]	**USB**
Optical	**SRM Fiber Optic**[2)] **OE Converter RPO2 to USB**[2)]	**USB**
Optical	**SRM Fiber Optic**[2)] **OE Converter RPO2 to serial**[2)]	**Serial**

1) Included with the device
2) Available as an option

To make a connection:

1. Connect the SRM-3006 and PC together using one of the connection types shown above.
2. Set the appropriate interface on the SRM-3006:
   – Open the **Settings** menu (Main Menu • Settings), select the **Remote Interface** command and press **OK** to confirm.
   – Use the rotary control to select the interface being used on the SRM-3006: Optical if you are using the optical cable, USB if you are using a USB cable.
   – Press **OK** to confirm the setting.

17.3 Working with the PC software

Detailed information on how to use the PC software is provided in the online Help function in each version of the PC software.

18 Remote Control

This chapter gives some basic information about remote control of the SRM-3006 from a PC. Remote controlled operation of the SRM-3006 is only necessary for very specific applications. All other applications can be handled comfortably using the PC software applications SRM-3006 Tools or SRM-3006 TS.

18.1 About remote control (page 208)

18.2 Connecting to the PC (page 208)

18.3 Activating / deactivating remote control (page 209)

18.4 Syntax rules for remote control commands (page 209)

18.1 About remote control

Remote control of the SRM-3006 is possible using a suitable program (e.g. standard terminal emulators such as **Hyperterminal**) and is therefore an alternative to operation using the Narda PC software applications. Since all device functions can be remote-controlled, the full potential of the SRM-3006 can also be realized in remote operation.

NOTE: Because the software for the SRM-3006 is being constantly developed and updated, there is a separate document that covers remote control. This contains the individual remote control commands and some example programs along with other information. The latest version of the document in PDF format can be obtained from www.narda-sts.com.

18.2 Connecting to the PC

Notes on connecting the SRM-3006 to the PC are found under *Connecting to the PC* on page 205.

To make the connection:

1. Connect the SRM-3006 and the PC together using one of the options described.
2. Start the application for controlling and managing the PC interface and set the following interface parameters:

Parameter	Setting
COM Port	Optical or USB, as selected by connection made (item 1 above)
Baud rate	115200 Baud
Start bits	1
Data bits	8
Stop bits	1
Parity	None
Handshake	None (the SRM-3006 does not support any software handshake)

3. Switch on the SRM-3006, open the **Main Menu / Device Settings** and set **Remote Interface** to **Optical** or **USB** as appropriate.

18.3 Activating / deactivating remote control

To activate remote control:

⇒ Transmit the command **REMOTE ON;**
- ↳ The SRM-3006 switches to remote controlled operation.
- ↳ The screen display switches off.
- ↳ The keypad is disabled.

To deactivate remote control:

⇒ Transmit the command **REMOTE OFF;**
- ↳ Remote control is deactivated.
- ↳ The screen display switches on.
- ↳ The keypad is enabled.

18.3.1 Solving problems

If the SRM-3006 does not switch to remote controlled operation, check the following items:

- Has you used the correct remote control cable (zero modem cable) and is the cable OK?
- Do the interface parameters on the PC and the SRM-3006 match?
- Was the command **REMOTE ON;** transmitted correctly (Response = **0**)?
- Is the SRM-3006 set to the correct interface?
  (**Main Menu / Device Settings: Remote Interface**)

18.4 Syntax rules for remote control commands

18.4.1 Commands to the SRM-3006

The following types of command can be transmitted to the SRM-3006:

- **GET command**: gets information about the actual settings of the SRM-3006
- **SET command**: changes a setting on the SRM-3006

Remote control syntax is based on ASCII strings. The command interpreter does not distinguish between upper and lower case characters (**Command [Parameter_1]; = COMMAND [Parameter_1];**). For clarity, some commands contain underline characters (e.g. **F_MIN**, **BI_VALUE**).

Rules for GET commands

- Each GET command comprises a command string and a question mark: **Command?;**
- No distinction is made between upper and lower case characters: **Command?;** = **COMMAND?;**
- Each GET command must end with a **semicolon (;)**.

Rules for SET commands

- Each SET command comprises a command string and a specific number of parameters: **Command [Parameter_1],...,[Parameter_n];**
- The command must be separated from the parameters by one or more **spaces**.
- Parameters must be separated from each other by a **comma**.
- **/LF** can be used optionally as a separator between parameters.
- The command string must **not** contain a **question mark (?)**. Also, the command string must not contain the characters **/DC1** and **/DC3** for sequence control.
- The command must end with a **semicolon (;)**.

18.4.2 SRM-3006 responses

- The SRM-3006 initially responds to a GET command with **/CR** followed by the value of the requested parameter and an error code:
  – 0 = transmission correct
  – xxx (error code) = transmission error

  The value and code are separated by a comma, and the response ends with a semicolon (;): **[Value],0;**
- The SRM-3006 inserts **/CR** after a certain number of commas in long responses in order to force a new line.
- The SRM-3006 also responds to a SET command with **/CR** and an error code (normally "0"). The response ends with a semicolon (;). In this way you can also check if the communication is working properly with SET commands.

18.4.3 Example of a command sequence

Command (PC)	Response (SRM-3006)	Explanation
Remote ON;		Activate remote control
	0;	No error
Remote?;		Query: is remote control activated?
	ON,0;	Remote control is activated, no error
Mode SPECTRUM;		Set operating mode to SPECTRUM
	0;	No error
Mode?;		
	SPECTRUM,0;	Operating mode is SPECTRUM, no error

19 Specifications

The basic specifications of the SRM-3006 Basic Unit and the available E/H-field antennas are listed in this chapter.

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.

19.1 Definitions and conditions (page 214)

19.2 SRM-3006 (page 215)

19.3 Three axis E-field antenna 3501/03 (page 217)

19.4 Three axis E-field antenna 3502/01 (page 218)

19.5 Three axis H-field antenna 3581/02 (page 219)

19.6 Single axis E-field antenna 3531/01 (page 220)

19.7 Single axis E-field antenna 3531/04 (page 221)

19.8 Single axis H-field antenna 3551/02 (page 222)

19.9 Declaration of Conformity (page 223)

19.1 Definitions and conditions

Conditions

Unless otherwise noted, specifications apply after 30 minutes warm-up time within the specified environmental conditions. The product is within the recommended calibration cycle.

Specifications with limits

These describe product performance for the given parameter covered by warranty. Specifications with limits (marked as <, ≤, >, ≥, ±, max., min.) apply under the given conditions for the product and are tested during production taking measurement uncertainty into account.

Specifications without limits

These describe product performance for the given parameter covered by warranty. Specifications without limits represent values with negligible deviations which are ensured by design (e.g. dimensions or resolution of a setting parameter).

Typical values (typ.)

These characterize product performance for the given parameter that is not covered by warranty. When stated as a range or as a limit (marked as <, ≤, >, ≥, ±, max., min.), they represent the performance met by approximately 80 % of the instruments. Otherwise, they represent the mean value. The measurement uncertainty is not taken into account.

Nominal values (nom.)

These characterize expected product performance for the given parameter that is not covered by warranty. Nominal values are verified during product development but are not tested during production.

Uncertainties

These characterize an interval for a given measurand estimated to have a level of confidence of approximately 95 percent. Uncertainty is stated as the standard uncertainty multiplied by the coverage factor k = 2 based on the normal distribution. The evaluation has been carried out in accordance with the rules of the “Guide of the Expression of Uncertainty in Measurement” (GUM).

19.2 SRM-3006

19.2.1 General specifications

Operating temperature range	• -10 °C to +50 °C (battery operation) • 0 °C to +40 °C (operation with external AC/DC adapter)
RF Immunity	200 V/m
Air humidity (operating range) RF	< 29 g/m^3 (< 93 % at +30 °C)

Compliance

Climatic	Storage	1K3 (IEC 60721-3), extended to-10 °C to +50 °C
	Transport	2K4 (IEC 60721-3), restricted to -30 °C to +70 °C due to display
	Operating	7K2 (IEC 60721-3), extended to -10 °C to +50 °C
Mechanical	Storage	1M3 (IEC 60721-3)
	Transport	2M3 (IEC 60721-3)
	Operating	7M3 (IEC 60721-3)
Ingress protection	IP 52 (with antenna attached and interface protector closed)	
EMC	• Complies with EMC Directive 2014/30/EU and EN 61326-1: 2013 • Immunity: EN: 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11 • Emissions: EN: 61000-3-2, 61000-3-3, EN 55011 (CISPR 11) Class B	
Safety	Complies with European Low Voltage Directive 2014/35/EU and EN 61010-1: 2010	
Material	Complies with European RoHS Directive 2011/65/EU	
Country of origin	Germany	

Dimensions and weight

Dimensions (H x W x D)	213 mm x 297 mm x 77 mm (8.4” x 11.7” x 3.0”)
Weight	2.8 kg / 6.2 lbs (basic unit including battery)

Interface

USB	mini B (USB 2.0)
Optical / RS232	Baud rate: 115200
Earphone	3.5 mm TRS

Power supply

Battery	• Lithium-Ion rechargeable battery pack • Operating time: 2.5 hours (nom.) • Charging time: 4.5 hours (nom.)
External power supply	• Input: 9 to 15 V_{DC} • Adapter 100-240 V_{AC} / 12 V_{DC} , 2.5 A (plug DIN 45323)

Calibration interval

Recommended calibration interval	24 months

19.3 Three axis E-field antenna 3501/03

19.3.1 General specifications

Operating temperature range	-10 °C to +50 °C (same as SRM-3006 basic unit)
Air humidity	< 29 g/m^3 (< 93 % at +30 °C)

Compliance

Climatic	Storage	1K3 (IEC 60721-3), extended to-10 °C to +50 °C
	Transport	2K4 (IEC 60721-3)
	Operating	7K2 (IEC 60721-3)
Mechanical	Storage	1M3 (IEC 60721-3)
	Transport	2M3 (IEC 60721-3)
	Operating	7M3 (IEC 60721-3)
Ingress protection	IP 52 (antenna connected)	
EMC	• Complies with EMC Directive 2014/30/EU and EN 61326-1: 2013 • Immunity: EN: 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11 • Emissions: EN: 61000-3-2, 61000-3-3, EN 55011 (CISPR 11) Class B	
Safety	Complies with European Low Voltage Directive 2014/35/EU and EN 61010-1: 2010	
Material	Complies with European RoHS Directive 2011/65/EU	
Country of origin	Germany	

Dimensions and weight

Dimensions	• Length: 450 mm • Antenna head diameter: 120 mm
Weight	450 g

Calibration

Calibration	20 reference points: (26, 45, 75, 100, 200, 300, 433, 600, 750, 900) MHz, (1, 1.2, 1.4, 1.6, 1.8, 2, 2.2, 2.45, 2.7, 3) GHz The SRM-3006 basic unit applies linear interpolation between reference points
Recommended calibration interval	24 months

19.4 Three axis E-field antenna 3502/01

19.4.1 General specifications

Operating temperature range	-10 °C to +50 °C (same as SRM-3006 basic unit)
Air humidity	< 29 g/m^3 (< 93 % at +30 °C)

Compliance

Climatic	Storage	1K3 (IEC 60721-3), extended to -10 °C to +50 °C
	Transport	2K4 (IEC 60721-3)
	Operation	7K2 (IEC 60721-3)
Mechanical	Storage	1M3 (IEC 60721-3)
	Transport	2M3 (IEC 60721-3)
	Operation	7M3 (IEC 60721-3)
Ingress protection	IP 52 (antenna connected)	
EMC	• Complies with EMC Directive 2014/30/EU and EN 61326-1: 2013 • Immunity: EN: 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11 • Emissions: EN: 61000-3-2, 61000-3-3, EN 55011 (CISPR 11) Class B	
Safety	Complies with European Low Voltage Directive 2014/35/EU and EN 61010-1: 2010	
Material	Complies with European RoHS Directive 2011/65/EU	
Country of origin	Germany	

Dimensions and weight

Dimensions	• Length: 450 mm • Antenna head diameter: 120 mm
Weight	400 g

Calibration

Calibration	21 reference points: (420, 600, 750, 900) MHz, (1, 1.2, 1.4, 1.6, 1.8, 2, 2.2, 2.45, 2.7, 3, 3.5, 4, 4.5, 5, 5.5, 5.8, 6) GHz. The SRM-3006 basic unit applies linear interpolation between reference points.
Recommended calibration interval	24 months

19.5 Three axis H-field antenna 3581/02

19.5.1 General specifications

Operating temperature range	-10 °C to +50 °C (same as SRM-3006 basic unit)
Air humidity	< 29 g/m^3 (< 93 % at +30 °C)

Compliance

Climatic	Storage	1K3 (IEC 60721-3), extended to -10 °C to +50 °C
	Transport	2K4 (IEC 60721-3)
	Operating	7K2 (IEC 60721-3)
Mechanical	Storage	1M3 (IEC 60721-3)
	Transport	2M3 (IEC 60721-3)
	Operating	7M3 (IEC 60721-3)
Ingress protection	IP 52 (antenna connected)	
EMC	• Complies with EMC Directive 2014/30/EU and EN 61326-1: 2013 • Immunity: EN: 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11 • Emissions: EN: 61000-3-2, 61000-3-3, EN 55011 (CISPR 11) Class B	
Safety	Complies with European Low Voltage Directive 2014/35/EU and EN 61010-1: 2010	
Material	Complies with European RoHS Directive 2011/65/EU	
Country of origin	Germany	

Dimensions and weight

Dimensions	• Length: 450 mm • Antenna head diameter: 120 mm
Weight	470 g

Calibration

Calibration	178 reference points The SRM-3006 basic unit applies linear interpolation between reference points
Recommended calibration interval	24 months

19.6 Single axis E-field antenna 3531/01

19.6.1 General specifications

Operating temperature range	-10 °C to +50 °C (same as SRM-3006 basic unit)
Air humidity	< 29 g/m^3 (< 93% at +30 °C)

Compliance

Climatic	Storage	1K3 (IEC 60721-3), extended to -10 °C to +50 °C
	Transport	2K4 (IEC 60721-3)
	Operating	7K2 (IEC 60721-3)
Mechanical	Storage	1M3 (IEC 60721-3)
	Transport	2M3 (IEC 60721-3)
	Operating	7M3 (IEC 60721-3)
Ingress protection	IP 52 (antenna connected)	
EMC	• Complies with EMC Directive 2014/30/EU and EN 61326-1: 2013 • Immunity: EN: 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11 • Emissions: EN: 61000-3-2, 61000-3-3, EN 55011 (CISPR 11) Class B	
Safety	Complies with European Low Voltage Directive 2014/35/EU and EN 61010-1: 2010	
Material	Complies with European RoHS Directive 2011/65/EU	
Country of origin	Germany	

Dimensions and weight

Dimensions	• Length: 460 mm • Antenna head dimensions: 135 x 90 mm
Weight	450 g

Calibration

Calibration	24 reference points: (26, 30, 40, 50, 60, 75, 100, 200, 300, 433, 600, 750, 900) MHz; (1, 1.2, 1.4, 1.6, 1.8, 2, 2.2, 2.45, 2.6, 2.8 , 3) GHz The SRM-3006 applies linear interpolation between reference points.
Recommended calibration interval	24 months

19.7 Single axis E-field antenna 3531/04

19.7.1 General specifications

Operating temperature range	-10 °C to +50 °C (same as SRM-3006 basic unit)
Air humidity	< 29 g/m^3 (< 93 % at +30 °C)

Compliance

Climatic	Storage	1K3 (IEC 60721-3), extended to -10 °C to +50 °C
	Transport	2K4 (IEC 60721-3)
	Operating	7K2 (IEC 60721-3)
Mechanical	Storage	1M3 (IEC 60721-3)
	Transport	2M3 (IEC 60721-3)
	Operating	7M3 (IEC 60721-3)
Ingress protection	IP 52 (antenna connected)	
EMC	• Complies with EMC Directive 2014/30/EU and EN 61326-1: 2013 • Immunity: EN: 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11 • Emissions: EN: 61000-3-2, 61000-3-3, EN 55011 (CISPR 11) Class B	
Safety	Complies with European Low Voltage Directive 2014/35/EU and EN 61010-1: 2010	
Material	Complies with European RoHS Directive 2011/65/EU	
Country of origin	Germany	

Dimensions and weight

Dimensions	• Length: 460 mm • Antenna head dimension: 135 mm x 90 mm
Weight	550 g

Calibration

Calibration	183 reference points The SRM-3006 applies linear interpolation between reference points.
Recommended calibration interval	24 months

19.8 Single axis H-field antenna 3551/02

19.8.1 General specifications

Operating temperature range	-10 °C to +50 °C (same as SRM-3006 basic unit)
Air humidity	< 29 g/m^3 (< 93 % at +30 °C)

Compliance

Climatic	Storage	1K3 (IEC 60721-3), extended to -10 °C to +50 °C
	Transport	2K4 (IEC 60721-3)
	Operating	7K2 (IEC 60721-3)
Mechanical	Storage	1M3 (IEC 60721-3)
	Transport	2M3 (IEC 60721-3)
	Operating	7M3 (IEC 60721-3)
Ingress protection	IP 52 (antenna connected)	
EMC	• Complies with EMC Directive 2014/30/EU and EN 61326 -1: 2013 • Immunity: EN: 61000-4-2, 61000-4-3, 61000-4-4, 61000-4-5, 61000-4-6, 61000-4-8, 61000-4-11 • Emissions: EN: 61000-3-2, 61000-3-3, EN 55011 (CISPR 11) Class B	
Safety	Complies with European Low Voltage Directive 2014/35/EU and EN 61010-1: 2010	
Material	Complies with European RoHS Directive 2011/65/EU	
Country of origin	Germany	

Dimensions and weight

Dimensions	• Length: 460 mm • Antenna head dimension: 43 mm x 100 mm
Weight	450 g

Calibration

Calibration	183 reference points The SRM-3006 applies linear interpolation between reference points.
Recommended calibration interval	24 months

19.9 Declaration of Conformity

Hereby, Narda STS declares that this equipment is in compliance with the directives 2014/30/EU, EN61326-1:2013, 2014/35/EU, EN61010-1:2010, and 2011/65/EU.

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

20 Annex A

This chapter contains general information about making measurements.

20.1 Pendulum method (page 226)

20.2 Matrix method (precision measurement) (page 228)

20.1 Pendulum method

Measurement setup

The antenna is mounted directly on the instrument or the antenna is connected to the Basic Unit via a short cable.

Information about connecting an antenna is found under *Fitting a Narda antenna directly on the Basic Unit* on page 32 and *Connecting a Narda antenna to the Basic Unit using a Narda cable* on page 33.

Procedure

During the measurement, the user traverses the space being measured. The entire volume of space to be measured is sampled slowly by means of the hand-held antenna, which is moved up and down on a wave-shaped path (i.e. swung, like a pendulum) through the room, changing the direction of the main lobe and the direction of polarization at the same time.

During this process, regardless of the selected operating mode, the SRM should be set to result type **MAX** (**Maximum hold**).

Experience has shown that a few minutes are usually sufficient time for determining the maximum field strength occurring within a specific measurement volume such as a room in a house or an office.

Advantages of this method

- Immediate determination of the maximum emission value for the room being measured
- Takes only a short time
- Minimal disturbance to the use of the rooms affected
- No special preparation for the measurement needed (e.g. moving furniture, etc.)

Useful application

- Rapid determination of the maximum field strength in a room
- Searching for maximum values in areas where tolerance to disruption is low (e.g. offices)
- Searching for maximum values at locations where a high degree of mobility is needed (e.g. on platforms, roofs)
- Sufficient experience is necessary

Disadvantages of this method

- Non-reproducible measurement
- No possibility of subsequently determining the location in the measured volume where the maximum values occurred
- Requires a degree of experience in order to obtain meaningful results
- Measurement uncertainty is non-quantifiable: If a dipole-type antenna is used, only those field components parallel to the dipole axis of the antenna will be detected. If the antenna is not correctly oriented in the field, there is a danger that only low emission levels or even no emission will be detected, despite the presence of strong fields.

Limitations

- Spatial averaging of emissions not possible (see Chapter 14 *Spatial Averaging* starting on page 175 for more information).
- Underestimates the emissions in the presence of strongly elliptical polarization.
- Non-definable measurement uncertainty: Measurement using a single axis antenna only records the field components that are parallel to the antenna axis. If the antenna is not correctly oriented in the field, there is a danger that only low emission levels or even no emission will be detected, despite the presence of strong fields.

20.2 Matrix method (precision measurement)

Measurement setup

The antenna is fitted to a tripod and connected to the Basic Unit via a long cable (see *Fitting a Narda antenna on a tripod* on page 36).

Defining the matrix

For this measurement, the volume to be measured is sampled at fixed points arranged in a matrix.

Assuming that the emission affects the whole body evenly, the volume to be measured could be defined as being e.g. a cylinder of height approximately 2 m and diameter approximately 1 m, corresponding roughly to the size of the human body.

Various measurement heights are specified within this cylinder volume. The resulting field strength is determined at each height. The spacing of the measurement points should reflect the sensitivity of the corresponding body parts and organs to radiation.

Antenna positioning

The antenna is mounted on a tripod so that it can be positioned exactly in the matrix of measurement points.

Only one component of the field strength can be determined at a time using a single axis antenna. For this reason, the antenna must be rotated to each of the three orthogonal directions at every measurement point and the result determined for each direction. The equivalent field strength used for the assessment is derived from the vector sum of the three orthogonal field strength values. The SRM supports this type of sequential measurement.

To ensure precise orthogonal alignment of the antenna axis, an antenna positioning device is available in addition to the tripod for making measurements with a single axis antenna.

Procedure

1. Fit the antenna with the antenna holder on the tripod.
2. Place the tripod at the first position to be measured.
3. Set the tripod to the first height to be measured.
4. Perform the sequential measurement at this position.
5. Save the isotropic result that is determined for this position.
6. Repeat steps 2 through 5 for each further measurement height.

Advantages of this method

- Good measurement reproducibility
- Allows spatial averaging of emissions (required by some standards)
- Local maxima can be located using a few measurement points.

Useful application

- Exact measurement of a defined space with the aid of a tripod
- Spatial averaging of emissions desirable (required by some standards)
- Location of local maxima

Disadvantages of this method

- The signal to be measured must remain constant for the measurement time to record the three spatial components
- Time-consuming: the already quite complex task of measuring the defined measurement volume must be repeated at different points in the room for the entire room to be surveyed.
- Relatively high degree of disruption for the affected rooms: no conducting objects or persons should move within the defined measurement volume during the measurement. A minimum distance between the antenna and interfering objects or elements (e.g. furniture, walls) must be maintained to prevent any adverse effect on the receiving characteristics of the antenna.

Limitations

- Maximum values cannot be determined quickly because a large number of measurement points must be recorded
- The signal does not remain constant over the entire period of the measurement
- Searching for maximum values in locations where there is low tolerance to disruption (e.g. offices)
- Searching for maximum values in locations where a high degree of mobility is required (e.g. platforms, roofs)
- Locations where a tripod cannot be used (e.g. platforms, roofs)

21 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.

22 Glossary

The meanings of terms and abbreviations are explained in this chapter.

Term or Abbreviation	Meaning	Explanation
5G NR	**5**th **G**eneration **N**ew **R**adio	5th generation wireless communications standard (with a new radio interface and radio access technology for cellular networks)
AM	**A**mplitude **m**odulation	Modulation method (used for radio broadcasting, for example)
Avg	Average	The measured values are averaged over a certain number of measurements or over a specific time period. The resulting value (also called the RMS value) is displayed.
BOS	**B**ehörden und **O**rganisationen mit **S**icherheitsaufgaben (Security authorities and organizations)	BOS radio is a non-public mobile UHF terrestrial radio service used in Germany by police, customs, fire brigades, rescue services and other emergency services. Tetra is a subgroup of BOS.
DVB-T	**D**igital **V**ideo **B**roadcasting **T**errestrial	Terrestrial digital transmission of television signals.
Fcent	Center frequency	Center frequency in a frequency range.
FDD	**F**requency **D**ivision **D**uplex	Frequency division duplex is a method of frequency multiplexing for duplex connections. The wireless channels for the uplink and downlink between the receiving and the base station occupy two different frequency ranges.
FM	**F**requency **m**odulation	Modulation method.
Fmax	Upper limit frequency	Highest frequency in a frequency range.
Fmin	Lower limit frequency	Lowest frequency in a frequency range.
Fspan	Frequency span	Frequency band centered about the center frequency **Fcent**.
Full Span	Full bandwidth	All frequency values set using **Fmin**, **Fmax**, **Fcent** or **Fspan** are reset to the maximum possible frequency range that is defined by the antenna connected, by the cable used, or by the SRM-3006 itself.
GPRS	**G**eneral **P**acket **R**adio **S**ervice	Packet-switched service used for data communications in GSM networks.
GSM	**G**lobal **S**ystem for **M**obile Communications	Standard for fully digital mobile telecommunications networks; mainly used for telephony but also used for circuit- and packet-switched data communications.

Term or Abbreviation	Meaning	Explanation
ICNIRP	**I**nternational **C**ommission on **N**on-**I**onizing **R**adiation **P**rotection)	Independent international group of scientists researching the effects of non-ionizing radiation on human health.
Isotropic measurement		Measurement of radiation uniformly radiated in all directions of 3-dimensional space.
LTE	**L**ong **T**erm **E**volution	Fourth generation (4G) wireless communications standard
Max	Maximum	Maximum value of all measurement values.
Max Avg	Maximum Average	Maximum value of all averaged measurement values.
Min	Minimum	Minimum value of all measurement values.
Min Avg	Minimum Average	Minimum value of all averaged measurement values.
MR	**M**easurement **R**ange	Parameter setting that affects the drive range and sensitivity of the measuring device. This sets the input attenuator, among other things. Signals below the Measurement Range can be measured without saturating the device. Lower MR levels reduce the intrinsic noise and provide increased sensitivity.
P-CPICH	**P**rimary **C**ommon **Pi**lot **Ch**annel	UMTS control channel.
PSS	**P**rimary **S**ync **S**ignal	Signal for synchronization to the system in LTE. Also contains the Sector ID.
RBW	**R**esolution **b**and**w**idth	Signal selectivity. Only signals having a frequency spacing that is greater than the defined resolution bandwidth can be distinguished from one another. The RBW selected for measuring signals having very close frequency spacing must be correspondingly small. A larger resolution bandwidth can be used for measuring wideband signals. • The indicated level will be too low if the RBW is too small. • Individual signals cannot be separated from one another if the RBW is too big.
Result Type		Defines the way in which the measured values are evaluated.
SSS	**S**econdary **S**ync **S**ignal	Signal for synchronization to the system in LTE. Also contains the Cell ID.

Term or Abbreviation	Meaning	Explanation
TDD	**T**ime **D**ivision **D**uplex	Time division duplex is a method of time multiplexing for wireless transmissions. In TDD, the wireless channels for the uplink and downlink between the receiving and the base station use the same transmission frequency in contrast with FDD but are separated in time multiplex by periodically switching between them.
Tetra	**Te**rrestrial **t**runked **ra**dio	Standard for digital trunked radio as a universal platform for widely differing mobile communications services for users with special security requirements, e.g. BOS, industry, public transport, airports, military, etc.
UMTS	**U**niversal **M**obile **T**elecommunications **S**ystem	Third-generation mobile telecommunications standard (3G)
VBW	**V**ideo **B**and **W**idth	The VBW is used to smooth the signals, particularly to reduce the noise. The selected VBW influences the sweep time. The smaller the VBW selected, the more the noise will be smoothed but the longer the sweep time will be. If you are measuring unknown signals, the VBW should be reduced step by step from the largest VBW to the smallest VBW.
WiMax	**W**orldwide **I**nteroperability for **M**icrowave **Ac**cess	Radio system conforming to IEEE Standard 802.16 for fixed systems (e.g. radio links) as well as for use with portable devices.
WLAN	**W**ireless **L**ocal **A**rea **N**etwork	Wireless local area network conforming to the IEEE-802.11 standard.

Index

Numerics

5G NR
- About *166*
- Analog *169*
- SCS *170*
- Sensitivity *172*
- SSS *171*
- Total *168*

A

AC adapter / charger
- Maintenance *201*
- Operation from *32*

Activating options *202*
Analog (5G NR) *169*
Antenna
- Connecting with a cable *33*
- Connectors *28*
- Displaying and selecting available *64*
- Displaying information *61*
- Fitting on a tripod *36*
- Fitting on the Basic Unit *32*
- Using other products *36*

Axis (Y) adjustment *94*
Axis mode, selecting *89*

B

Bar Graph view *111*
Basic settings *41*
Battery
- Changing pack *200*
- Compartment *28*
- Handling *31*
- Operation from *30*

Beeper
- Level Recorder *128*
- Safety Evaluation *104*

C

Cable
- Connecting the device and antenna *33*
- Connectors *28*
- Displaying and selecting available *65*
- Displaying information *61*
- Using other products *36*

CBW (LTE) *158*
Center frequency
- LTE *158*
- UMTS *149*

Changing
- Device settings *59*
- Language, date, time *58*

Channel bandwidth (LTE) *158*
Charging socket *29*
Checking the display *63*
Cleaning *200*
Commands, remote control *209*
Comment mode, changing *198*
Conditional storing *194*
Conformity, declaration *225*
Connecting the device to a PC *205*
Connector
- Multi-pin *28*
- N *28*

Connectors
- antenna and cable *28*
- external *29*

Continuous (Spatial AVG)
- Description *178*
- Use *181*

Coverage measurement *152*
Creating service tables *66*

D

Data sets, viewing *191*
Date, changing *58*

Declaration of conformity *225*
DECT, Scope example *137*
Device
  changing settings *59*
  Cleaning *200*
  Diagnosis *63*
  Displaying information *60*
  Overview *27*
  Reset settings *62*
Difference, determine with marker *85*
Discrete (Spatial AVG)
  Description *179*
  Use *183*
Discrete Axis (Spatial AVG)
  Description *180*
  Use *185*
Display
  LCD screen elements *44*
  Test *63*
Display mode, selecting *104*
Displaying
  Antenna information *61*
  Available antennas *64*
  Available cables *65*
  Cable information *61*
  Device information *60*
  GPS information *62*
  Safety standards *65*
  Service tables *66*
Disposal *22*
Distribution *110*
Duty Cycle *144*

E

Earphone socket *29*
Entering text *53*
Evaluation
  Scope *144*
  Spectrum Analysis *117*
External connectors *29*
Extrapolation factor
  LTE *161*
  UMTS *151*

F

Fcent
  LTE *158*
  UMTS *149*
Free Run *141*
Frequency range, changing *115*
Functions, overview *56*

G

Glossary *233*
GPS, displaying information *62*
GSM, Scope example *137*

I

Improper use *15*
Info bar, activating / deactivating *47*
Integrating measured values *120*
ISM band, Scope example *140*
Isotropic measurement
  Single axis antenna *93*
  Three axis antenna *91*

K

Keys *42*

L

Language, changing *58*
LCD screen *44*
List
  Extended *51*
  Selecting items *50*
  Simple *50*
LTE
  CBW *158*
  Fcent *158*
  General information *154*
  Overview *155*
  Signal selection *160*
  TDD *163*
  Up-/downlink configuration *164*

M

Main menu *55*
Manual Start, trigger *143*

Marker
Determine a difference *85*
Function *82*
Using separately *83*
Zoom to *88*
Matrix method *228*
Measurement data, evaluation *117*
Measurement input, overdriven *79*
Measurement methods
Matrix *228*
Pendulum *226*
Measurement range
Automatic search *79*
Manual selection *78*
Measurement routines *68*
Memory menu *190*
Menu navigation *48*
MR Search *79*
Multi-pin connector *28*
Multiple, trigger *141*

N

N connector *28*
Navigating in the menus *48*
Navigator bar *47*
Noise suppression *96*
Noise Threshold *96*
Numerical values, changing *52*

O

Operating modes, overview *56*
Optical connector *29*
Ordering information *231*
Others *107*
Overload of measurement input *79*
Overview, functions and operating modes *56*

P

Parameters, keeping when changing operating mode *98*
PC software *203*
About *204*
Working with *206*
PC, connecting to *205*
Peak Table, displaying values *118*
Pendulum method *226*
Percentage display *109*
Percentage field strength, displaying *110*
Pilot / Analog Ratio *152*
Power on behavior, changing *72*
Power supply
AC adapter / charger *32*
Battery pack *30*
Proper use *14*

R

Ratio Pilot / Analog *152*
RBW
General *76*
Safety Evaluation *105*
Remote control *207*
About *208*
Activation / deactivation *209*
Commands *209*
Resetting the device settings *62*
Resolution bandwidth
General *76*
Safety Evaluation *105*
Result type, selecting *80*
Rotary control *42*

S

Safety instructions *13*
Safety standards, displaying and selecting *65*
Scrambling codes *149*
Screen *44*
Screenshot
Creating *54*
Viewing *193*
SCS (5G NR) *170*
Sensitivity (5G NR) *172*
Service tables, displaying and creating *66*
Services, showing / hiding
Safety Evaluation *105*
UMTS *150*

Settings, displaying and editing *57*
Setup
  Editing the list *70*
  Saving and loading *69*
  Switch on behavior *72*
Shortcuts *100*
Signal selection (LTE) *160*
Single axis antenna, using a *92*
Single, trigger *141*
Software update *202*
Spatial averaging
  Continuous *181*
  Discrete *183*
  Discrete Axis *185*
Specifications *213*
SRM-3006 Tools *204*
SRM-3006 TS *204*
SSS (5G NR) *171*
Status bar
  Activating / deactivating *47*
  Lower *46*
  Upper *45*
Storing
  Conditional *194*
  Time controlled *196*
Switch on behavior, changing *72*
Switching on / off *43*
Symbols and characters *12*

T

Table type, changing *108*
Table view *107*
TDD (LTE) *163*
Text, entering *53*
Three axis antenna, using a *90*
Time controlled storing *196*
Time Controlled, Trigger *144*
Time, changing *58*
Total (5G NR) *168*
Trigger
  Free Run *141*
  Manual start *143*
  Single, Multiple *141*
  Time Controlled *144*
Trigger function *141*

U

Units, changing *95*
Unpacking the device *26*
Up-/downlink configuration, LTE *164*
Update *202*
Updating device software *202*
USB port *29*

V

Values, changing *52*
VBW *76*
Video bandwidth, setting *76*
View
  Bar Graph *111*
  Table *107*

W

WLAN, Scope example *138*

Y

Y axis adjustment *94*

Z

Zoom to marker *88*
Zoom, function *122*

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