



SRM-3006 Selective Radiation Meter



- ◆ Complete Solution for Selective Measurement of RF and Microwave Electromagnetic Fields
- ◆ Isotropic and Single-Axis Measurements from 9 kHz to 6 GHz
- ◆ Excellent Immunity for Operation in High Field Strengths
- ◆ Automatic Antenna and Cable Detection
- ◆ Results in V/m, A/m, Power Density, or Percentage of Permissible Limit
- ◆ Measures strength of single emitters in multiple emitter environments
- ◆ Ultra Wide Dynamic Range of 50 μ V/m to 200 V/m (E-Field)
- ◆ Determines 5% Boundaries for FCC Compliance
- ◆ Resolution Bandwidths (RBWs) up to 20 MHz for UMTS and W-CDMA, 32 MHz (Level Recorder and SCOPE Modes)
- ◆ Designed for Outdoor Use: rugged, splash proof ergonomic design. Equipped with GPS and voice recorder to simplify survey reports
- ◆ Optional SCOPE, UMTS and LTE Modes

Features

The Selective Radiation Meter (SRM-3006) is our second generation, hand-held system for performing narrowband analysis of electromagnetic fields. Unlike our NBM series (broadband), the SRM-3006 has the ability to give you results of individual emitters and also generate a total of all emitters. The SRM-3006 allows you to verify compliance with the US FCC's "5% Rule" as well as accurately detect fields well below domestic and international standards. The SRM-3006 also has the ability to measure fields more accurately than broadband equipment and maybe more importantly, it is able to give you more information than just the total – like exactly what emitter or emitters are generating the most of the power.



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No other measurement system gives you the information and accuracy that the SRM-3006 does. Narda Safety Test Solutions provides complete calibration information standard with every unit, just as you'd expect from the world leader.

The US version of the SRM-3006 consists of a basic unit (meter) and a 3-axis, E-field antenna. The meter is really an optimized spectrum analyzer covering 9 kHz to 6 GHz and modified to make accurate field strength readings with the help of our antennas. You can operate the meter with any type of antenna for special measurements (direction finding, DTV measurements, "Roberts' dipoles") but you'll be impressed by the performance of Narda's designs. We supply our SRM-3006 with a 3-axis design that covers 27 MHz to 3 GHz that is calibrated at 20 different frequencies and reliably works down to 200 µV/m. This portable, rugged and splash-proof system incorporates a highly readable color display, GPS receiver and microphone for voice recording. Also supplied is our full SRM-TS software package, a 1.5 meter cable to separate the antenna from the meter and charger, manual and other accessories inside a very protective carrying case.

Narda offers additional antennas that you'll find listed at the back of this data sheet. We have lower and higher frequency E-field antennas and some single axis designs that offer even higher accuracy. Narda can also supply single or 3-axis H-field antennas. Each antenna is individually calibrated and its factors are automatically accounted for as soon as the antenna is plugged in. We also offer longer cables for special measurement needs, non-metallic tripods, external or mobile battery chargers with extra battery packs, carrying pouches – basically everything you might need to get the survey done.

Every SRM-3006 has the ability to perform single or multiple measurements that can be averaged and/or stored in the meter for download to a computer. You can set-up the

SRM-3006 the way you like and store a complete configuration for later use or repeated uses. You can set up parameters for time controlled storing that only logs the data you want above a certain threshold level. Each system has an embedded GPS receiver and microphone, so every stored reading is supplied with GPS coordinates and can have an audio description added.

Applications

The SRM-3006 has some special capabilities when it comes to RF safety measurements. In addition we have added some other operational modes (UMTS P-CPICH) for common engineering measurements. But if you simply want to perform safety measurements – the SRM-3006 makes it simple.

SAFETY EVALUATION MODE

Have you ever made a broadband measurement and wish you really knew what all the emissions all around you were really adding? The Safety Evaluation Mode is a very popular method to make a reading that simply separates emitters the way you would like them displayed. We include multiple sample tables in the meter we deliver to you that you can use as is, or modify for your own geographical area or interest. It's easy to make your own tables that quickly and cleanly show the total level of individual emitters or bands. You can display the results in common field strength or equivalent power density, or the easily understood "% of standard" units shown below. You can easily modify these tables and identify each frequency band or emitter by the name that you choose. You can add or remove entities as you see fit, thereby customizing the display for your area or need. We even offer two different displays, a common tabular listing as well as a bar graph listing, making evaluation of data quick and accurate.

This is a very powerful way to display multiple emitter data in a way that even non-technical persons understand and technical persons can appreciate.

Battery: 29.01.10 18:48:07 GPS: --- Ant: 3AX 50M-3G SrvTbl: USA FCC STD
--- Cable: SRM 1.5 m Strnd: RPS3 GP

Table View: Detailed

Index	Service	Fmin	Fmax	Act
1	TV Ch. 2-6	54.000 MHz	88.000 MHz	0.000 14 %
2	FM Radio	88.000 MHz	108.000 MHz	0.000 10 %
3	Paging	152.000 MHz	159.000 MHz	0.000 01 %
4	TV Ch. 7-13	174.000 MHz	216.000 MHz	0.000 03 %
5	TV Ch. 14-69	470.000 MHz	806.000 MHz	0.000 05 %
6	SMR Tx	806.000 MHz	821.000 MHz	0.000 00 %
7	Privat Ind mob	821.000 MHz	824.000 MHz	0.000 00 %
8	Cellular AMPS	824.000 MHz	849.000 MHz	0.000 00 %
9	ESMR/Land mob.	849.000 MHz	869.000 MHz	0.000 00 %
	Others			0.000 22 %
	Total			0.000 56 %

Isotropic

Safety Evaluation

MR: 0.1 % RBW: 200 kHz (Auto) Noise Suppr.: Off No. of Runs: 9
AVG: 4

Sweep Time: 4.274 s Progress:

Overview with Safety Evaluation: The services to be checked are recorded in editable tables. There's no complicated evaluation needed in Safety Evaluation Mode. The numerical result shows the individual contributions of the services as well as the overall level in terms of the permitted limit value.

Battery: 01/29/10 11:57:13 AM GPS: 40°47'48.1" N Ant: 3AX 50M-3G SrvTbl: USA FCC STD
73°27'48.8" W Cable: SRM 1.5 m Strnd: FCC GP

Marker A: Service: Total Freq: --- Max Val: 0.015 %
Service: FM Freq: --- Max Val: 0.002 00 %
Marker B-A: Δf: --- B/A: 13.46 %

Isotropic

Safety Evaluation • Marker

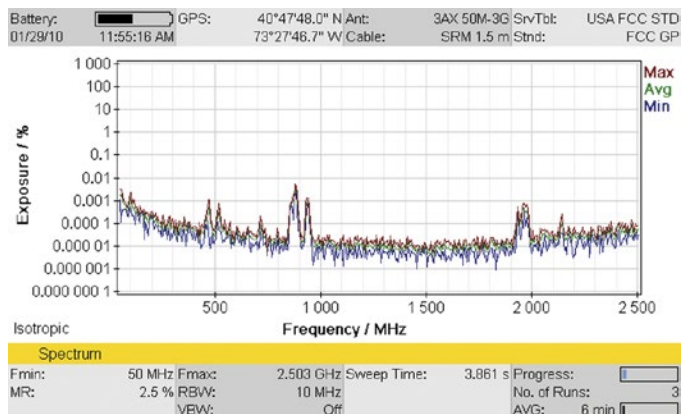
MR: 2.5 % RBW: 200 kHz (Auto) Noise Suppr.: Off No. of Runs: 7
AVG: 6 min

Sweep Time: 5.203 s Progress:

Safety Table Entries can also be displayed as bars on a graph, quickly identifying what service (or frequency) is providing the most power to your selected safety table.



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Classic Spectrum Analysis: Result evaluation using markers and delta markers. For example, the integration function can be used to determine the channel power level. Special feature: Service Identification by means of pre-recorded service values.

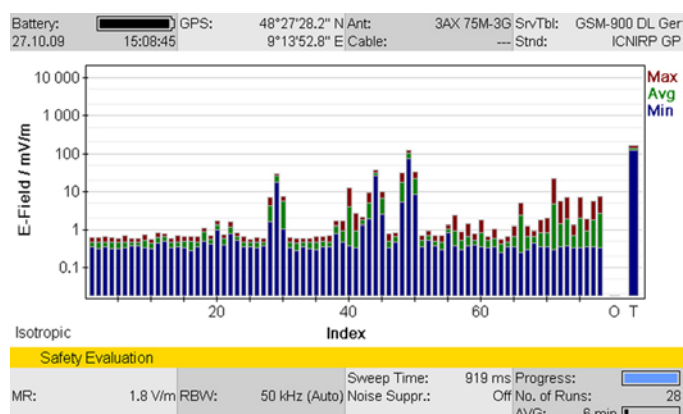
SPECTRUM ANALYSIS MODE

Spectrum Analysis Mode makes finding "hidden" or "intermittent" emitters easy. Perhaps you didn't expect a certain frequency to be used in your area, but in this mode that emitter can be quickly and easily identified by the frequency and level it's operating at. This gives you the real story of what is happening right now – when and where you are performing the measurement. The SRM-3006 allows easy settings of frequencies and resolution bandwidths with a powerful "marker" function that lets you see each significant signal, set a marker on it and zoom to it in a rapid manner. When it comes time to save a spectrum view the SRM saves the entire dataset rather than just a picture. With the supplied SRM-TS software you are able to even post-process information thereby enhancing detected data for your survey reports.

When using the SRM-3006 to "direction find" or search out "cable leakage" the Spectrum Analysis Mode with our overall system design makes it a simple, portable task. First is the SRM's capability to add antennas into its memory. You can easily import calibration data of your existing antennas and/or cables and have the SRM account for them in its display.

SPATIAL AVERAGING

FCC license holders will find the built-in spatial averaging feature very powerful. Broadcasters can employ the 1.5m cable along with optional antenna holders and a non-metallic tripod to make accurate and repeatable measurements at their transmitter sites. GPS logs exactly where the measurement was taken and the narrowband performance means you just survey your emissions. Cellular operators can also use the fast time averaging for a quick vertical spatial average sweep, again logging just your emission out and beyond the "5%" distance.



Safety Evaluation in the UMTS Range: The individual channels with their channel numbers are shown next to each other in the bar graph display, just like a textbook. The "T" bar on the extreme right shows the total power density. The "O" bar shows the contributions from the frequency gaps (others) between the services

LEVEL RECORDER MODE

Level Recorder Mode allows you to particularly watch one signal or band over a long time period. The display is optimized to give you four results, Maximum Peak, Actual Peak (present reading), Maximum RMS and RMS. RMS Actual is an average over a time that you choose from 0.48 seconds to 30 minutes. This makes long term monitoring of an emitter easy and supplies all the data you might need to fully evaluate its contribution to the overall site levels.

TIME CONTROLLED STORING

The SRM can store measurements under timer control by specifying the start date, start time, measurement duration, and other parameters.

Options

UMTS P-CPICH DEMODULATION

This option is useful for cellular phone companies and their consultants. The SRM-3006 automatically identifies every site and sector that it received a UMTS scrambling code from. The SRM-3006 can then measure the field strength (or power density) of the associated pilot channel (P-CPICH) at the same time. The SRM-3006 also shows the sum of all P-CPICH levels as an overall value (Total). The Analog measured value for the frequency channel is also shown for comparison. You can also set a factor that the SRM can use to extrapolate the field strength that would result if all channels were fully loaded. Therefore, instead of guessing what the UMTS signal is (at measurement time) and how it relates to the maximum possible signal strength that the site could generate, now you can measure and estimate with confidence.



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SCOPE MODE

The Scope Mode incorporates a high speed oscilloscope that displays pulse modulated signals down to a resolution of 31.25 ns. This allows high speed characterization of WiMax signals along with any other pulsed signal below 6 GHz. This mode allows the communications engineer and technician an extended and powerful capability in a system that they needed already.

LONG TERM EVOLUTION (LTE) / 4G

LTE, also generally but less correctly known as 4G (4th generation wireless), can be utilized in the frequency ranges 700 MHz, 900 MHz, 1.8 GHz, 2.1 GHz and 2.6 GHz.

As with UMTS, LTE uses individual cells, which are differentiated by their cell numbers (cell ID, 0 to 503). Each cell can also use one, two or four antennas (multiple input – multiple output, MIMO).

LTE uses a special method of modulation called orthogonal frequency domain modulation access (OFDMA). This distributes the information across many sub-carriers spaced at intervals of 15 kHz, each of which is modulated by QPSK, 16 QAM or 64 QAM. Frequency division duplex (FDD) is generally used to separate the uplink and downlink directions (from the subscriber to the base station and vice versa), although time division duplex (TDD) is also possible.

The LTE option equips users for all the crucial measurement tasks on LTE systems with FDD. The SRM 3006:

- supports all LTE channel bandwidths from 1.4 MHz to 20 MHz
- automatically determines the cell ID and number of antennas used
- measures the average power values of the PSS and SSS
- measures the average power values of the Reference Signal, separately for each antenna, or as average power of all antennas used, or as maximum power of all antennas used
- offers automatic extrapolation using factors up to 10,000

All the usual SRM 3006 result types are available (see list, right), which users can select individually. Combined with the cell-specific power values, this gives up to 54 columns of results.

Battery:	Ext. Power:	GPS:	48.458 60 Ant:	---	SrvTbt:	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						
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

Result of an LTE measurement with four cell-specific power values. The SRM 3006 shows the individual values obtained by demodulation and their total in the bottom line (Total) as well as the analog measured values (Analog) – similar to the UMTS option.

Display of cell-specific power values:

PSS

Primary sync signal; average power

SSS

Secondary sync signal; average power

RS Avg

Reference signal; average power of all antennas used

RS Sum

Reference signal; sum power of all antennas used

RS Max

Reference signal; maximum power of all antennas used

RS 0, RS 1, RS 2, RS 3

Reference signal; average power of the individual antennas

Result types available:

- Actual, Act
- Maximum, Max
- Maximum Average, MxA
- Average, Avg
- Minimum Average, MnA
- Minimum, Min



Measurement Functions

Detection of Narda Measurement Antennas	<p>Automatic consideration of antenna parameters after antenna is plugged in: antenna type, serial number, calibration date, and antenna factors (see below)</p> <p>Automatic limitation of the frequency range according to the frequency range of the connected antenna.</p>
Antenna Factors	<p>Used for display in field strength units</p> <p>Saved in all Narda antennas during calibration</p> <p>Antenna factor lists for antennas from other manufacturers can be saved (these lists defined using the PC configuration software <i>SRM Tools</i> or <i>SRM TS</i>)</p>
Detection of Narda Cables	<p>Automatic consideration of cable parameters after cable is plugged in: cable type, serial number, calibration date, and loss factors (see below)</p> <p>Automatic limitation of the frequency range according to the frequency range of the connected cable</p>
Cable Loss Factors	<p>Used for compensation of the power level display</p> <p>Saved in all Narda cables during calibration</p> <p>Cable loss lists for cables from other manufacturers can be saved (these lists defined using the PC configuration software <i>SRM Tools</i> included in delivery)</p>
Units	<p>with antenna % of the standard, V/m, A/m, W/m², mW/cm², dBVm, dBmV/m, dBA/m, dBμV/m</p> <p>without antenna dBV/m, dBmV/m, dBμV/m, dBm</p>
Isotropic Measurements	<p>Automatic switching of the antenna axes, when using Narda's triaxial measurement antenna, followed by computation of the isotropic result</p> <p>Sequential measurements, using single-axis antennas with subsequent computation of the isotropic result are supported</p> <p>Both results are directly displayed as a spectrum curve or as numerical values</p>
Weighted Display	<p>In % of the standard for the following human safety standards: ICNIRP, IEEE, FCC, BGV B11, BImSchV, Safety Code 6</p> <p>Updating for new human safety standards can be made using the PC configuration software "SRM tools" included in delivery</p>
Correlation of Results with Telecom Services	<p>Definition and editing of service tables in the PC configuration software <i>SRM Tools</i> or <i>SRM TS</i> i.e., lists of frequency bands (upper and lower limit frequency, name for defined frequency band)</p> <p>Storage of service tables in the basic unit</p> <p>Use of the service tables for automatic correlation of measurement results with defined services based on frequency (marker functions, peak table evaluation function, Safety Evaluation mode)</p>
Setups	<p>Complete device configurations can be saved in the basic unit; up- and downloadable using <i>SRM Tools</i> or <i>SRM TS</i> Software</p>
Memory Modes	<p>Result stored as: SPECTRUM in Spectrum Analysis mode (SPEC), TABLE in Safety Evaluation mode (SAFETY), VALUES for Level Recorder (LEVEL) and Scope (SCOPE)</p>
Memory Capacity	128 MB
Hold	"Freezes" the display; the measurement continues in the background



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Specifications

Basic Unit SRM-3006		
Frequency Range	9 kHz to 6 GHz	
Modes	Spectrum Analysis Level Recorder Safety Evaluation SCOPE UMTS P-CPICH Demodulation	
RF FEATURES		
Frequency	Resolution Bandwidths (RBW)	See specifications for each mode
	Phase Noise (SSB)	10 kHz carrier spacing < -70 dBc (1 Hz) 300 kHz carrier spacing < -100 dBc (1 Hz)
	Reference Frequency	Initial Deviation < 1.0 ppm Aging < 5.0 ppm over 15 years Thermal Drift < 1.5 ppm (within specified operating temperature range)
Amplitude	Measurement Range Setting (MR)	-30 dBm to +20 dBm (in steps of 1 dB)
	Display Range	1 dB above the measurement range
	Maximum RF Power Level	+27 dBm
	Maximum DC Voltage	50 V
	Intrinsic Noise	<MR -100 dB for RBW = 1 kHz and f ≤ 30 MHz <MR -96 dB for RBW = 1 kHz and f ≤ 2 GHz <MR -95 dB for RBW = 1 kHz and f ≤ 4 GHz <MR -90 dB for RBW = 1 kHz and f ≤ 6 GHz
	RF Attenuation	0 to 50 dB in steps of 1 dB (coupled with measurement range)
	2nd Order Intermodulation Products	≤ -40 dBc for two signals of level 6 dB below MR and a spectral line spacing of more than 1 MHz
	3rd Order Intermodulation Products	≤ -60 dBc for two signals of level 6 dB below MR and a spectral line spacing of more than 1 MHz
	Extended Level Measurement Uncertainty	< 1.1 dB for the entire frequency band (within the temperature range from 15°C to 30°C) < ±1.2 dB SA and SE Modes only
	Spurious Responses (input-related)	< -60 dBc or MR -60 dB (whichever is worse)
RF Input	Type	N Connector, 50 Ω
	Return Loss	>12 dB for 1 kHz RBW, f ≤ 4.5 GHz and MR ≥ -28 dBm >10 dB for 1 kHz RBW, f > 4.5 GHz and MR ≥ -28 dBm



GENERAL SPECIFICATIONS		
Operating Temperature Range		-10°C to +50°C during normal operation 0°C to +40°C when charging
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	1M2 (IEC 60721-3)
	Transport	2M3 (IEC 60721-3)
	Operating	7M3 (IEC 60721-3)
	ESD and EMC	EN 61326-1 : 2006
	Safety	EN 61010-1 : 2004
EU Guidelines		2003/11/EG 06.02.2003 (PBDE and OBDE) 2002/95/EG 27.01.2003 (RoHS) 2002/96/EG 27.01.2003 (WEEE)
CE (European Community)		Yes
Air Humidity (Operating Range)		<29 g/m ³ (<93% at +30°C)
Weight		6.2 lbs. (2.8 kg) including rechargeable cell
Dimensions		11.7 x 8.4 x 3.1 inches (297 x 213 x 77 mm)
Display	Type	Color Display, TFT-LCD
	Size, Resolution	7 inch, (152 x 91 mm), 800 x 480 pixels
Interface		Optical 115.2 kbaud USB (2.0), Earphone
Power Supply	Rechargeable Cell	Lithium-Ion rechargeable battery - typical 2.5 hour operating time Charged using external power supply
	External Power Supply (12 V DC / 2.5 A)	AC/DC adapter (DIN 45323) Input: 9-15V
Recommended Calibration Interval		24 months
LEVEL RECORDER MODE		
Measurement Principle		Selective level measurement at a fixed frequency setting
Detection		Peak
		RMS (integration time = 480 ms), observation time selectable from, 480 ms up to 30 minutes
Filter Type		Steep cutoff channel filter
Resolution Bandwidth RBW (-6 dB)		40 kHz to 32 MHz (10 steps per decade)
Video Bandwidth (VBW)		4 Hz to 32 MHz (depending on the selected RBW)
Measurement Range Setting (MR)		Set individually from a list or using the "MR Search" function for determining the optimal measurement range at a given time
Result Type		Peak ACT: Displays the current (actual) value Peak MAX: Maximum hold function RMS ACT: Average over a defined time (0.48 seconds to 30 minutes) RMS MAX: Maximum hold function for the averaged values – with RMS detector only SAVG: Spatial averaging (option) in Value display mode
Time Averaging		Selectable from 0.96 seconds up to 30 minutes (0.96 s; 1.2 s; 2.4 s; 3.6 s; 6 s; 12 s; 18 s; 30 s; 1 min; 2 min; 3 min; 5 min; 6 min; 10 min; 15 min; 20 min; 30 min)
Axis		Measurement in the direction of the X, Y, and Z axis (separate measurement in one direction using an isotropic / three-axis measuring antenna)
Noise Suppression		Identifies whether measured values are above the device noise floor by setting a threshold (selectable at 0, 3, 6, 10, 15, or 20 dB relative to device noise floor). Measurement values below the threshold are shown as the absolute threshold value marked with "<" (less than threshold). Only applies to the numerical result display (Value)



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SPECTRUM ANALYSIS MODE

Measurement Principle	Spectrum analysis
Resolution Bandwidths (-3 dB)	10 Hz to 20 MHz (in steps of 1, 2, 3, 5, 10) List of available RBWs depends on selected sweep SPAN
Measurement Range Setting (MR Range)	Set individually from a list or using the "MR Search" function for determining the optimum measurement range at a given time
Video Bandwidth	0.2 Hz to 2 MHz (depending on the selected RBW)
Filter Type	Gaussian
Shape Factor (-3 dB / -60 dB)	< 3.8 (for RBW ≤ 100 kHz)
Result Type	ACT: Displays current spectrum MIN: Minimum Hold function MAX: Maximum Hold function AVG: Average over a selectable number of spectra (4 to 256) or a selectable time period (1-30 min) MAX AVG: Maximum Hold function after averaging over the defined number of spectra MIN AVG: Minimum Hold function after averaging over the defined number of spectra STANDARD: Displays limit line of the selected safety standard
Marker Functions	Delta marker on one Result Type or for displaying the difference between two Result Types Highest peak, peak right, peak left, higher peak, lower peak Marker field (frequency, level and service name from selected service table)
Evaluation Functions	Peak Table (list of 50 highest peaks) Integration over a user-specified frequency range
Axis	Isotropic measurement (isotropic result displayed directly) Measurement of X-, Y- or Z- axis (separate measurement of a single axis using the isotropic / three-axis antenna)
Display Functions	Y-scale range 20, 40, 60, 80, 100 or 120 dB Y-scale reference MR -100 dB to MR +20 dB (-130 dB to +40 dB) Screen Arrangement (enlarges the graph window to fill the entire screen area)
Zoom Functions	Zoom Min: Sets the lower frequency limit of the zoom window Zoom Max: Sets the upper frequency limit of the zoom window Zoom Cent: Moves the zoom window along the frequency axis Zoom Span: Changes the scale of the zoom window Execute Zoom: Sets the zoom window limits to the selected frequency values

SAFETY EVALUATION MODE

Measurement Principle	Spectrum analysis, followed by integration over user-defined frequency bands ("services")
Resolution Bandwidths (-3 dB)	Automatic (Auto), depending on the narrowest user-defined service bandwidth, or user-defined (Manual) for all services, or separately defined for each individual service (individual)
Measurement Range Setting (MR Range)	Set individually from a list or using the "MR Search" function for determining the optimum measurement range at a given time
Filter	See <i>Spectrum Analysis</i> mode
Detection	RMS (integration time $\approx \frac{1}{\text{RBW}}$)
Result Type	See <i>Spectrum Analysis</i> mode
Axis	Isotropic measurement (for direct display of the isotropic result) Measurement in the direction of the X, Y, and Z axis (separate measurement in one direction using an isotropic / three-axis measuring antenna)
Display	Table view showing service names, field strengths and the corresponding frequency band (up to three columns) Individual Screen Arrangement Sort Function according to various criteria Bar graph of services showing contribution of different Result Types
Noise Suppression	Identifies whether measured values are above the device noise floor by setting a threshold (selectable at 0, 3, 6, 10, 15, or 20 dB relative to device noise floor). Measurement values below the threshold are shown as the absolute threshold value marked with "<" (less than threshold)
Others On/Off	Measurement of services and gaps in the Service Table (Others On) or Measurement of services in the Service Table excluding gaps (Others Off)



UMTS P-CPICH DEMODULATION MODE (OPTION)	
Measurement Principle	Demodulation of the P-CPICH (Primary Common Pilot Channel) as the basis for automatic assignment of measured field strength values to the individual UMTS radio cells (defined as cell name tables)
UMTS Channel Selection	By entering the center frequency (Fcent) By entering the channel number (Chann)
Resolution Bandwidth (-3 dB)	3.84 MHz (fixed)
Measurement Range Setting (MR Range)	Set individually from a list or using the "MR Search" function for determining the optimum measurement range at a given time
Frequency Setting Resolution	100 kHz (for Fcent frequency entry) 0.5 x channel number (for channel entry)
Detection	RMS (integration time = 10 ms)
Filter Type	Root-Raised Cosine (RRC)
Roll-Off Factor	$\alpha = 0.22$
Demodulation Algorithms	FAST SENSITIVE
Result Types	ACT: Displays the instantaneous value combined with the maximum value MAX (maximum hold function) which occurred since the last reset AVG: Averages over a selectable number of results (4 to 64) or over a specified time period (1 to 30 minutes) combined with Max AVR (maximum hold function of the average values)
Marker Functions (in Hold mode only) (Bar graph, Mixed and Graph display)	Marker, highest peak, next peak right, next peak left, next highest peak, next lowest peak Display switchable between Value and Max Value
Evaluation Functions	Extrapolation factor settable from 0 to 100 in steps of 0.001
Received / Demodulated Signal	P-CPICH
Axis	Isotropic measurement (for direct display of the isotropic result) Measurement in the direction of the X, Y, and Z axis (separate measurement in one direction using an isotropic / three-axis measuring antenna)
Display	Up to 16 scrambling codes simultaneously Value (instantaneous) and MAX Value (maximum) channel power User-defines cell names (using cell name tables) Number of sweeps since the last reset Selection of individual scrambling codes Extrapolation factor settable from 0 to 100 in steps of 0.001
	Normal Table Table format: Index, Scrambling Code, Value, Max. Value, Cell Name Total of all ACT (Value) and MAX (Max Value) values (Total)
	Table Ratio Analog measurement result (Analog) Table format: Index, Scrambling Code, Value, Max. Value, Ratio of Value to Analog Total of all ACT (Value) and MAX (Max Value) values (Total)
	Bar Graph Analog measurement result (Analog) Bar graph display of selected scrambling codes, with the Total value and the Analog measurement result with maximum values indicated in each case
	Mixed Total of selected scrambling codes: Value and Max Value shown in enlarged numerical format with graphical display of the history for the last 1 to 60 minutes
	Value Total of selected scrambling codes Value and Max Value shown in enlarged numerical format
	Graph Total of selected scrambling codes Graphical display of the history for the last 1 to 60 minutes
	Noise Suppression Identifies whether measured values are above the device noise floor by setting a threshold (selectable at 0, 3, 6, 10, 15, or 20 dB relative to device noise floor). Measurement values below the threshold are shown as the absolute threshold value marked with "<" (less than threshold)



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SCOPE MODE (OPTION)																						
Measurement Principle	Selective level measurement at a fixed frequency																					
Filter Type	Steep cutoff channel filter																					
Time Span	500 ns to 24 h																					
Time Resolution	Selectable from 31.25 ns up to 90 minutes (0.96 s; 1.2 s; 2.4 s; 3.6 s; 6 s; 12 s; 18 s; 30 s; 1 min; 2 min; 3 min; 5 min; 6 min; 10 min; 15 min; 20 min; 30 min)																					
Resolution Bandwidth RBW (-6 dB)	40 kHz to 32 MHz (10 steps per decade)																					
Measurement Range Setting (MR Range)	Set individually from a list or using the "MR Search" function for determining the optimum measurement range at a given time.																					
Video Bandwidth (VBW)	4 Hz to 32 MHz (depending on the selected RBW)																					
Result Type - Depends on Detector	ACT: Displays the current (actual) value STANDARD: Displays the selected safety standard OR																					
	MAX: Maximum value within the time resolution interval (corresponds to peak detector) AVG: Average value within the time resolution interval (corresponds to RMS detector) MIN: Minimum value within the time resolution interval STANDARD: Displays the selected safety standard																					
LTE MODE (OPTION)																						
Measurement Principle	Power level measurement of the cell specific and traffic independent signals PSS (Primary Sync Signal), SSS (Secondary Sync Signal) and RS (Reference Signal) of LTE cells (support for FDD networks only)																					
LTE Channel Selection	By entering the center frequency (Fcent)																					
Frequency Setting Resolution	100 kHz (for Fcent frequency entry)																					
Channel Bandwidth CBW (-6 dB nom.)	Can be set to the following values:																					
	<table border="1"> <thead> <tr> <th>No. of subcarriers</th> <th>72</th> <th>180</th> <th>300</th> <th>600</th> <th>900</th> <th>1200</th> </tr> </thead> <tbody> <tr> <td>TBW (MHz)</td> <td>1.08</td> <td>2.7</td> <td>4.5</td> <td>9.0</td> <td>13.5</td> <td>18</td> </tr> <tr> <td>CBW (MHz)</td> <td>1.4</td> <td>3</td> <td>5</td> <td>10</td> <td>15</td> <td>20</td> </tr> </tbody> </table>	No. of subcarriers	72	180	300	600	900	1200	TBW (MHz)	1.08	2.7	4.5	9.0	13.5	18	CBW (MHz)	1.4	3	5	10	15	20
	No. of subcarriers	72	180	300	600	900	1200															
TBW (MHz)	1.08	2.7	4.5	9.0	13.5	18																
CBW (MHz)	1.4	3	5	10	15	20																
Transmit Bandwidth (TBW) is the occupied bandwidth of all subcarriers																						
Detection	Root mean square value (RMS), integration time = 10 ms (5 ms at CBW 15 MHz, 20 MHz)																					
Filter: Type / Roll-off factor	Steep cut-off channel filter (app. Raised-Cosine) / $\alpha = 1 - (TBW/CBW)$																					
Cell Specific Signals (Signal) (Display of the average power level per Resource Element out of all elements of the considered signal)	Individually selectable for: 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)																					
Result Types (applicable to all cell specific signals)	Individually selectable for: ACT: Displays the instantaneous (actual) value MAX: Maximum Hold function AVG: Average over a selectable number of measurements (4 to 256) or a selectable time period (1-30 min) MAX AVG: Maximum Hold function after averaging MIN: Minimum Hold function MIN AVG: Minimum Hold function after averaging Standard: Display of the selected safety standard																					
Axis	X, Y, Z axis selection for single-axis measurements using a Narda Three-Axis Antenna or selection of isotropic measurements																					
Extrapolation Function	Extrapolation factor adjustable from 1 to 10,000 in steps of 0.001																					
Results Display	Displayed Items	Selection of individual Cell ID's, Number of measurement runs since last reset																				
	Table Layout	Up to 16 Cell ID's simultaneously Table format: Index, Cell ID, No. Ant. (number of antennas), selected signals shown for each selected result type (up to 54 columns + Standard) Total: Total power of all listed Cell ID's Analog: Analog measurement result for the selected LTE frequency channel (no extrapolation)																				
Setting Parameters	Synchronization (Cell Sync): Sync/ No Sync Cyclic Prefix Length (CP Length): Normal/Extended																					
Noise Threshold	In case of "Analog" results: values are displayed only if they are above the typical noise floor when activated. The threshold is selectable (0, 3, 6, 10, 15, or 20 dB relative to the typical DANL). Measurement values below the threshold are shown as the absolute threshold value marked with "<" (less than threshold).																					
Extras (transfer of parameters)	"Go to: mode" changes the operating mode with automatic parameter transfer for Fcent and CBW. "Select Service" allows easy frequency settings by means of predefined service tables																					



Antenna Specifications

ANTENNA	Three Axis E-Field (supplied)	Three Axis E-Field 3502/01	Three Axis H-Field 3581/02	Single Axis E-Field 3531/01	Single Axis E-Field 3531/04	Single Axis H-Field 3551/02
Frequency Range ^a	27 MHz to 3 GHz	420 MHz to 6 GHz	9 kHz to 250 MHz	27 MHz to 3 GHz	9 kHz to 300 MHz	9 kHz to 300 MHz
Antenna Type	E-Field	E-Field	H-Field	E-Field	E-Field	H-Field
Sensor Type	Triaxial design with scanned axes	Triaxial design with scanned axes	Triaxial active magnetic loop design with scanned axes	Single axis passive wide band dipole	Single axis active broadband dipole	Single axis active magnetic loop
Dynamic Range ^b	0.25 mV/m to 200 V/m	0.14 mV/m to 160 V/m	2.5 μA/m to 560 mA/m	90 μV/m to 80 V/m	70 μV/m to 36 V/m	0.4 μA/m to 71 mA/m
CW Damage Level	435 V/m or 50 mW/cm ²	435 V/m or 50 mW/cm ²	250 A/m / f[MHz]	> 300 V/m or 25 mW/cm ²	> 1000 V/m	> 2.65 A/m above 1 MHz
RF Connector ^c	N connector, 50 Ω					
Operating Temperature Range	-10° C to 50° C (same as SRM basic unit)					
Compliance	Climatic					
	Storage ^d					
	Transport					
	Operating					
	Mechanical					
	Storage					
	Transport					
	Operating					
	ESD and EMC					
	Safety					
CE (European Community)	Yes					
Air Humidity	< 29 g/m ³ (< 93% at +30°C)					
Weight	450 g	400 g	470 g	450 g	550 g	450 g
Dimensions	450 mm length, 120 mm antenna head diameter	450 mm length, 120 mm antenna head diameter	450 mm length, 120 mm antenna head diameter	460 mm length, 135 x 90 mm antenna head dimension	460 mm length, 135 x 90 mm antenna head dimension	460 mm length; 43 x 100 mm antenna head dimension
Calibration	20 reference points ^e	21 reference points ^e	178 reference points ^e	24 reference points ^e	183 reference points ^e	183 reference points ^e
The SRM applies linear interpolation between 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	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		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		
Calibration Interval	24 months (recommended)					

NOTES:

^a The correction factors determined individually during calibration are stored in an EEPROM and are applied automatically when used in conjunction with the SRM basic unit.

^b Typical measurement dynamic range for 10 dB signal to noise ratio (RBW = 1 kHz)

^c Typical Values

^d Extended to -10°C to +50°C

^e The SRM basic unit applies linear interpolation between reference points



SRM-3006 Selective Radiation Meter

Antenna Uncertainty^a

THREE AXIS E-FIELD ANTENNA (supplied antenna)			
Intrinsic Noise Display in conjunction with the SRM basic unit (separate measurement of a single axis) ^{a, b}	25 µV/m at 900 MHz with 1 kHz resolution bandwidth (RBW) 40 µV/m at 2.1 GHz with 1 kHz resolution bandwidth (RBW)		
Intrinsic Noise Display in conjunction with the SRM basic unit (for isotropic result) ^a	40 µV/m at 900 MHz with 1 kHz resolution bandwidth (RBW) 70 µV/m at 2.1 GHz with 1 kHz resolution bandwidth (RBW)		
Measurement Range Limit (for single CW signal)	300 V/m, 1000 V/m for $f \leq 110$ MHz		
Max. Measurement Range (in conjunction with the SRM basic unit) ^a	200 V/m (without restrictions for total span of 27 MHz to 3 GHz)		
Damage / Overload Level	≥ 1000 V/m		
Extended Measurement Uncertainty ^b (in conjunction with SRM basic unit and 1.5 m RF cable)	Frequency Range	Single Axis Measurement with Isotropic Antenna	Isotropic Measurement
	27-85 MHz	+2.4 / -3.3 dB	+3.2 / -4.7 dB
	85-900 MHz	+2.4 / -3.4 dB	+2.5 / -3.6 dB
	900-1400 MHz	+2.3 / -3.1 dB	+2.5 / -3.4 dB
	1400-1600 MHz	+2.3 / -3.1 dB	+2.6 / -3.8 dB
	1600-1800 MHz	+1.8 / -2.3 dB	+2.2 / -3.0 dB
	1800-2200 MHz	+1.8 / -2.3 dB	+2.4 / -3.3 dB
	2200-2700 MHz	+1.9 / -2.4 dB	+2.7 / -3.8 dB
2700-3000 MHz	+1.9 / -2.4 dB	+3.3 / -5.3 dB	
Calibration Uncertainty	< 1.5 dB		
THREE AXIS E-FIELD ANTENNA 3502/01			
Intrinsic Noise Display in conjunction with the SRM basic unit (separate measurement of a single axis) ^a	33 µV/m at 900 MHz with 1 kHz resolution bandwidth (RBW) 25 µV/m at 2.1 GHz with 1 kHz resolution bandwidth (RBW)		
Intrinsic Noise Display in conjunction with the SRM basic unit (for isotropic result) ^a	60 µV/m at 900 MHz with 1 kHz resolution bandwidth (RBW) 43 µV/m at 2.1 GHz with 1 kHz resolution bandwidth (RBW)		
Measurement Range Limit (for single CW signal)	200 V/m		
Max. Measurement Range (in conjunction with the SRM basic unit) ^a	160 V/m (without restrictions for total span of 420 MHz to 6 GHz)		
Extended Measurement Uncertainty ^b (in conjunction with SRM basic unit and 1.5 m RF cable)	Frequency Range	Single Axis Measurement with Isotropic Antenna	Isotropic Measurement
	420-750 MHz	+2.1 / -2.9 dB	+2.6 / -3.8 dB
	> 750-1600 MHz	+2.0 / -2.7 dB	+2.2 / -2.9 dB
	> 1600-2000 MHz	+1.7 / -2.2 dB	+1.9 / -2.4 dB
	> 2000-4000 MHz	+1.7 / -2.2 dB	+2.0 / -2.6 dB
	> 4000-4500 MHz	+1.8 / -2.3 dB	+2.2 / -3.0 dB
	> 4500-5000 MHz	+1.9 / -2.5 dB	+2.5 / -3.5 dB
	> 5000-6000 MHz	+1.9 / -2.5 dB	+2.9 / -4.3 dB
Calibration Uncertainty	< 1.5 dB		
THREE AXIS H-FIELD ANTENNA 3581/02			
Intrinsic Noise Display in conjunction with the SRM basic unit (separate measurement of a single axis) ^a	0.3 µA/m with 1 kHz resolution bandwidth (RBW)		
Intrinsic Noise Display in conjunction with the SRM basic unit (for isotropic result) ^a	0.8 µA/m with 1 kHz resolution bandwidth (RBW)		
Extended Measurement Uncertainty ^{a, b}	Frequency Range	Single Axis Measurement with Isotropic Antenna	Isotropic Measurement
	0.3-30 MHz	2.1 dB	2.4 dB
	30-60 MHz	2.2 dB	2.5 dB
	60-250 MHz	2.3 dB	3.2 dB
Calibration Uncertainty	< 1.5 dB		



Antenna Uncertainty^a con't.

SINGLE AXIS E-FIELD ANTENNA 3531/01		
Intrinsic Noise Display in conjunction with the SRM basic unit ^{a, c}	30 $\mu\text{V}/\text{m}$ from 100 MHz to 2.1 GHz with 1 kHz resolution bandwidth (RBW)	
Measurement Range Limit (for single CW signal) ^a	160 V/m	
Extended Measurement Uncertainty ^{a, b} (in conjunction with SRM basic unit and 1.5m RF cable)	Frequency Range	Single Axis Measurement
	27-300 MHz	2.1 dB
	300-433 MHz	2.4 dB
	433-1600 MHz	2.2 dB
1600-3000 MHz	1.9 dB	
Calibration Uncertainty	< 1.5 dB	
SINGLE AXIS E-FIELD ANTENNA 3531/04		
Intrinsic Noise Display in conjunction with the SRM basic unit ^a	20 $\mu\text{V}/\text{m}$ in the range from 100 MHz to 300 MHz with 1 kHz resolution bandwidth (RBW)	
Measurement Range Limit (for single CW signal) ^a	50 V/m	
Extended Measurement Uncertainty ^{a, b} (in conjunction with SRM basic unit and 1.5 m RF cable)	Frequency Range	Single Axis Measurement
	0.1-300 MHz	2.0 dB
Calibration Uncertainty	< 1.2 dB	
SINGLE AXIS H-FIELD ANTENNA 3551/02		
Intrinsic Noise Display in conjunction with the SRM basic unit ^a	0.12 $\mu\text{A}/\text{m}$ for each frequency > 10 MHz with 1 kHz resolution bandwidth (RBW)	
Measurement Range Limit (for single CW signal) ^a	100 mA/m	
Extended Measurement Uncertainty ^{a, b} (in conjunction with SRM basic unit and 1.5 m RF cable)	Frequency Range	Single Axis Measurement
	0.1-300 MHz	2.0 dB
Calibration Uncertainty	< 1.2 dB	

NOTES:

^a Typical Values

^b Typical value k=2 (k=extrapolation or correction factor for determining the assessment value); +15°C to +30°C

^c Intrinsic noise increases by 0.5 dB per 100 MHz above 2 GHz





SRM-3006 Selective Radiation Meter

Ordering Information

SRM-3006	ORDER NUMBER
Set comprising: Selective Radiation Meter SRM3006, basic unit, calibrated Triaxial antenna, E-field, 27 MHz to 3 GHz, calibrated 1.5 meter SRM RF cable, 9 kHz to 6 GHz, 50 Ω Carrying strap for SRM-3006 (basic unit) Operating manual Power supply 12.0 VDC, 100 – 240 VAC, universal AC line connector SRM-3006TS - Configuration, Evaluation and Remote Control Software USB 2.0 Cable - Master/Slave, 3 m DB9 / DB9 Cable for serial interface, 3 m Transport Hard Case	3006/127/USA
OPTIONS	
UMTS P-CPICH Demodulation	3701/04
SCOPE	3701/05
LTE (for LTE FDD networks)	3701/06
OPTIONAL ANTENNAS	
Three-axis E-Field Antenna, 420 MHz to 6 GHz	3502/01
Three-axis H Field Antenna, 9 kHz to 250 MHz	3581/02
Single-axis E-Field Antenna, 27 MHz to 3 GHz	3531/01
Single-axis E-Field Antenna, 9 kHz to 300 MHz	3531/04
Single-axis H-Field Antenna, 9 kHz to 300 MHz	3551/02
OPTIONAL ACCESSORIES	
5 meter SRM RF cable, 9 kHz to 6 GHz, 50 Ω	3602/02
Antenna holder for single axis and triaxial antennas	3501/90.01
Antenna holder for triaxial antennas (horizontal/vertical)	3501/90.02
Additional battery pack, rechargeable, 7.4 V / 4 A/h	3001/90.15
External charger set for SRM battery pack	3001/90.07
Tripod, non conductive, 1.65 m, with carrying bag	2244/90.31
Softcase with wheels	3001/90.05
O/E converter, RP-02/USB	2260/90.07
Cable, Fiber Optic Duplex, RP-02, 2 m	2260/91.02
Cable, Fiber Optic Duplex, RP-02, 20 m	2260/91.03

