

SRM – When Safety Counts



SRM-3006

SRM-3006 Selective Radiation Meter
for electromagnetic fields up to 29,5 GHz



Make Safety obvious by measurement

Radio, television, cellular telephony, wireless... Electromagnetic fields are used wherever and whenever wireless communications operate. These fields affect the whole environment, including the people moving about in them. Complete coverage would be impossible otherwise. National and international bodies have set limits to prevent harmful effects. These usually allow higher field strengths for the workplace environment than for the general public. This is because people who routinely work in electromagnetic fields are normally professionally trained and aware of the risks, so they know what to do or they have been given instructions to limit their exposure time, for example. The operators of transmitting equipment and the responsible authorities are legally accountable for proving safety. To do this, they can make use of the services offered by institutes or private measurement providers. There is really only one way you can prove safety: Measure it!

Narda gives safety

Narda Safety Test Solutions is the world leader in the development and production of measuring instruments for electric, magnetic, and electromagnetic fields. Our competence is based on the know how gained from many years of experience in the high frequency and microwave sectors – and from more than 95% of all the published patents for measuring these fields. The result is a range of high quality measurement solutions tailored to each application, with the long-term security provided by our management system that covers all areas and meets the requirements of the ISO 9001 and ISO/IEC 17025 standards.



Measuring with SRM

Wideband meters give blanket coverage of large frequency ranges, such as from broadcast radio to cellular telephone frequencies and beyond. Equipped with special probes, they deliver results that are automatically referred to the applicable permitted limit values. They are generally easy to use.

Selective measuring devices such as spectrum analyzers break down the fields into their individual frequency components, allowing detailed analysis. They are more difficult to use, and result evaluation requires a higher level of specialist knowledge.

The Selective Radiation Meter SRM-3006 from Narda Safety Test Solutions combines the analysis features of a spectrum analyzer with the simplicity of a wideband measuring set. It was specially developed for assessing safety in electromagnetic fields. In contrast to a "repurposed" spectrum analyzer, it offers users application based operating modes for measuring individual transmission channels, and separate services such as analog or digital broadcasting (TV, DVB-T, DAB), mobile telephony (GSM, UMTS, LTE, 5G NR), or wireless (WLAN, WiMAX). The results are shown in a table as separate values and as a total value. The display is in field strength, power density, or directly weighted as a percentage of the permitted limit value. You don't need to be a spectrum analysis specialist to be able to use the SRM.



The new antenna extends the range of the SRM-3006 up to 5G NR frequency range 2 (FR 2). It is available with either directional horn or omnidirectional characteristics: The uniaxial E field antenna for 24.25 GHz to 29.5 GHz



The results can be displayed in physical units, e.g. electric field strength in V/m, magnetic field strength in A/m, power density in W/cm², or directly as a percentage of the limit value specified by the standard, e.g. ICNIRP. Importantly, the SRM can retrospectively convert the results to percent, physical units, or logarithmic units.

Narda Safety Test Solutions has developed a well thought-out range of measuring antennas. They turn the SRM into a universal measuring instrument for electric and magnetic fields, from long wave right up to the latest generation of mobile technology.

Isotropic – omnidirectional – uniaxial

Fast and reliable because they are non-directional: The isotropic antennas capture the field strength in three mutually perpendicular directions, and the SRM automatically calculates the resulting field strength. However, you can also make isotropic measurements with the single axis antennas if you use a tripod with antenna holder and measure in three mutually perpendicular directions successively. The SRM supports this procedure by saving the result for each of the three positions and then calculating the resulting field strength – all without a PC.

All antennas and antenna cables are interchangeable without compromising accuracy: The individual calibration data are stored in each antenna and cable itself and are automatically applied by the SRM Basic Unit. At the same time, the SRM blocks out the frequency ranges for which the antenna is not calibrated. This avoids incorrect measurements.

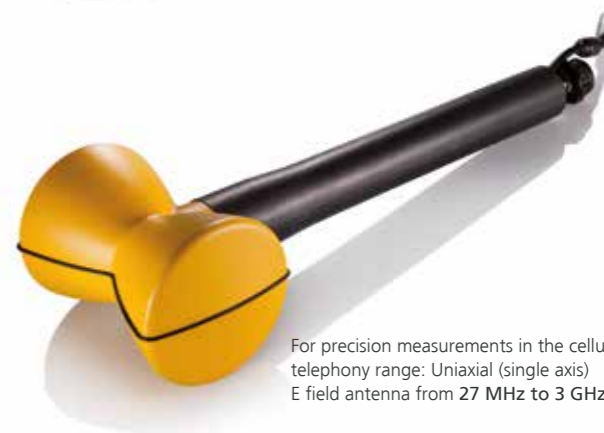
The Selective Radiation Meter and its measuring antennas are matched to each other. Any antenna can be used with any Basic Unit to form a handy complete package. Just plug and play.

The measuring antennas can be attached to the SRM directly or using a cable. An auxiliary control cable is used to automatically read out the antenna and cable data.

Other antennas for the SRM-3006:

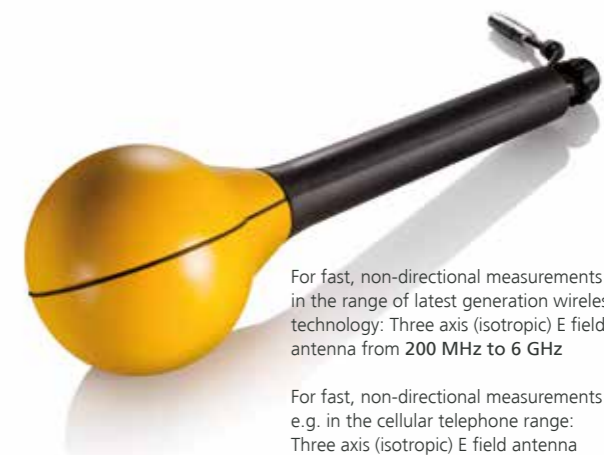


For precision near field magnetic field measurements on radio / TV transmitters and industrial plant: Single axis H field antenna from 9 kHz to 300 MHz



For precision measurements in the cellular telephony range: Uniaxial (single axis) E field antenna from 27 MHz to 3 GHz

For precision electric field measurements on radio / TV transmitters and industrial plant: Single axis E field antenna from 9 kHz to 300 MHz



For fast, non-directional measurements in the range of latest generation wireless technology: Three axis (isotropic) E field antenna from 200 MHz to 6 GHz

For fast, non-directional measurements e.g. in the cellular telephone range: Three axis (isotropic) E field antenna from 27 MHz to 3 GHz

For fast, non-directional near field magnetic field measurements on radio / TV transmitters and industrial plant: Three axis (isotropic) H field antenna from 9 kHz to 250 MHz

Get reliable measurement results

Results that are trustworthy and that will stand up in a court of law can only be obtained when certain conditions are met: The measuring device must be calibrated, and must measure in compliance with the applicable standard, and the measurement must be expertly done. The SRM from Narda Safety Test Solutions is calibrated – traceable to national and international standards. It also meets the requirements of all the current human safety standards. And, it makes expert measurement easier.

For example: Timed averaging over the standard six minute period or spatial averaging over several measuring points. Using the isotropic measuring antennas for the SRM, you don't need to think about the direction of the field radiation, because the instrument picks up everything. And the storable measurement routines let you set up test sequences in advance. That way you get reproducible results and avoid making wrong settings.

The SRM creates measurement reports on site, so errors in transmission are avoided. The instrument includes the underlying standards, records the date, time and GPS coordinates, and saves written or spoken comments e.g. about events occurring during the measurement or concerning environmental conditions. The result: Data you can rely on and trust. It's not just our products that meet the highest standards;

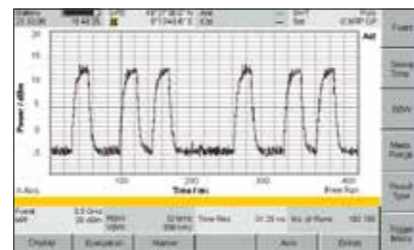
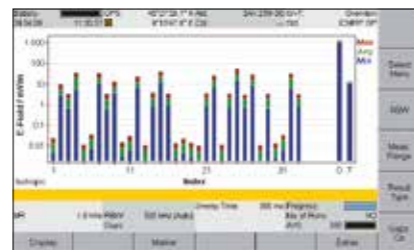
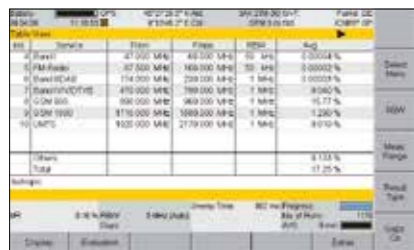
Not only do our products meet the highest standards, our calibration service does too. This is significant for devices that measure human and environmental field exposure levels, so Narda runs an accredited calibration laboratory at their Pfullingen site in Germany that is accredited according to DIN EN ISO/IEC 17025 by DAKKS. This accreditation applies only to the accreditation scope detailed in the certificate annex D-K-17726-01-00. Accredited calibration is available on request for a range of instruments.



SRM – for more detail

Broadcasting, cellular radio, industrial plant: Which source is contributing what to the field exposure level? Answering this question is as important to the relevant authorities and safety representatives as much as to the service providers. They often also need to know which installation, which channel or which radio cell is transmitting at what field strength. That is because whoever has exceeded the limit value will have to reduce their output power. In contrast, it is the overall exposure level that is important when it comes to protecting people and the environment.

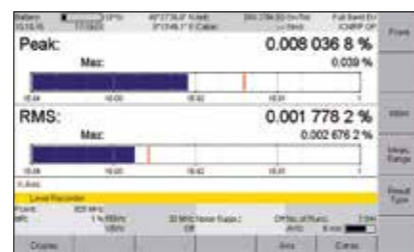
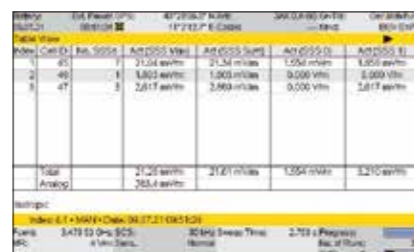
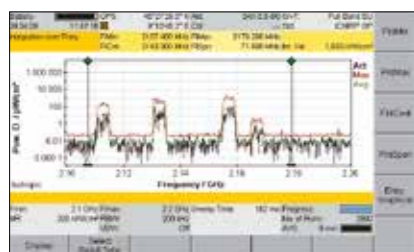
The Selective Radiation Meter SRM is predestined for such investigations thanks to its application oriented operating modes. For example, 'Safety Evaluation' with automatic evaluation of individual services such as analog TV, digital broadcasting (DVB-T, DAB), mobile telephony (GSM, UMTS, LTE, 5G NR), and wireless (WLAN, WiMAX), as well as aggregation of the results into a total value. Or: 'Level Recorder' mode, which allows even pulsed radar signals to be recorded numerically. Or: 'Scope', with its display of field characteristic versus time. The resolution bandwidths are also tailored to the application. The SRM can select one narrow GSM channel or record the entire width of a DVB-T channel with this feature.



Overview using 'Safety Evaluation': The services to be measured are recorded in editable tables. 'Safety Evaluation' needs no complicated evaluation: The numerical result shows the contributions of the individual services as well as the total exposure level referred to the permitted limit value.

Which channels are occupied? The bar graph display in 'Safety Evaluation' shows the maximum, average, and minimum values at the same time, so it is easy to see just what's going on.

Pulsed signals directly visible in 'Scope' mode: The time domain display can be set to cover 24 hours or resolved right down to the microsecond range.



Classic spectrum analysis: Result evaluation using markers and delta markers. The integration function allows determination of channel power, for example. Special feature: Services can be identified using the stored service tables.

5G NR demodulation in FR1: As with 3G/UMTS and 4G/LTE demodulation. The SRM automatically identifies each cell received and measures the field strength or power density of the associated pilot channel. This is the Secondary Synchronization Signal SSS in the case of 5G NR. It can also display the total value and the maximum value of all SSS. These results form the basis for the extrapolation to the maximum possible exposure level.

Use 'Level Recorder' mode to easily measure pulsed signals: The SRM supplements the numerical display of maximum and average values with 'thermometer' bar graphs that keep a marker at the maximum level reached.

Code selective measurement in FR1



SRM – for long term monitoring

It only takes a moment to measure the current field exposure level. But, how does it change over the next few seconds, minutes, hours, or even days?

The SRM-3006 in 'Scope' mode records individual radio channels in real time and with microsecond resolution, which is necessary for capturing radar impulses. Conversely, the instrument can also be used for long term measurements, such as for a 'Safety Evaluation'. The flood of data still has to be kept manageable, however. The start of the measurement and the measurement sequence can be timer controlled or triggered when thresholds are exceeded. The SRM collects the data together into an understandable display.

A particularly convenient feature is that the SRM determines the current, average, maximum, and minimum values at the same time.

The SRM can carry on measuring for up to 3 hours on one battery charge when no AC line power is available. The batteries can also be swapped very quickly on site, saving you the bother of looking for the nearest AC power outlet.



Long term monitoring at the workplace. The WLAN link to the notebook PCs and the cordless office telephone also contribute to the field exposure level. The SRM can be operated here for hours or days at a time from an AC power adapter.

Everyday Measurements

Every measurement location has a different field situation, but the measurement situations repeat themselves. That's why Narda Safety Test Solutions has equipped the SRM-3006 with programmable measurement routines. The SRM calls up specific setups and runs them one after the other. This saves time, avoids incorrect settings, and makes it possible to compare and reproduce results from different locations.

The SRM can do lots of things completely automatically if you want, such as setting the appropriate measurement range and selecting the matching resolution bandwidth. In contrast, you can easily perform measurement steps manually, like switching from the FM broadcasting band to the DVB-T range or from the GSM-900 cell phone band to GSM-1800.

There's also intelligence in switching between operating modes. If, for example, the center frequency of an LTE frequency channel has been determined by spectrum analysis, the SRM will continue measurement at exactly this frequency when it is switched to 'LTE Demodulation', 'Scope' or 'Level Recorder' mode.

Making meaningful measurements is a process that starts with configuring the instrument and ends with the evaluation, documentation, and management of the measurement data. Both these parts are conveniently managed using the SRM-3006 TS PC software. This PC software lets you link instrument setups together into measurement routines and upload them to the SRM. Conversely, you can download the results from the SRM, further process, document, and discuss them, without having to spend hours reworking them on a PC.



Different measurement situations – data is recorded...



...evaluated, managed, processed, and documented quickly and reliably.



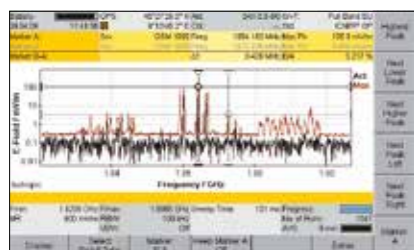
Insight – overview

A single spectrum recorded using the SRM contains thousands of measurement points. The SRM will save many such spectrums and other results over the course of a working day. Which of this information is important, and what is significant for safety assessment?

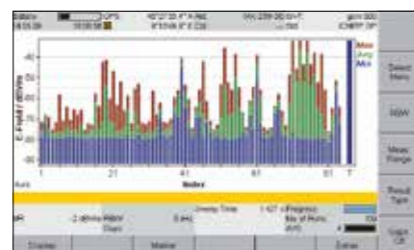
You don't need to be a spectrum analysis expert to use the SRM. Nevertheless, experts can set all the parameters for spectrum analysis separately, and evaluate the details manually if they want to. For example, you can zoom in on individual spectral components, compare parts of the spectrum using the delta marker, or read off the maximum and minimum values at a particular frequency. As with a laboratory spectrum analyzer, you can select a video bandwidth to smooth the trace. The original resolution is still retained in the background.

The selective measurement in the time domain is unique. Pulsed signals can be shown directly in 'Scope' mode – with time intervals ranging from hours right down to microseconds. In 'Level Recorder' mode, the SRM-3006 displays the peak values and the RMS values, both the instantaneous and maximum values that occur during the measurement period. And, with a resolution bandwidth of up to 32 MHz, the SRM-3006 is also geared up for the latest generation of mobile communications systems.

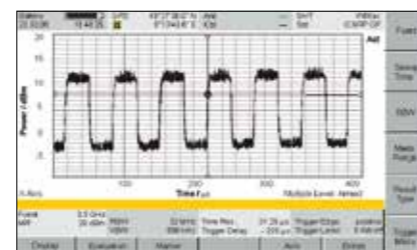
It's convenient for experts, too: The SRM automatically generates a list from even the most detailed spectrum. This 'Peak Table' gives you access to important detail information.



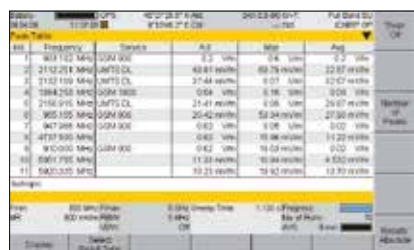
Detailed evaluation of a 'Spectrum Analysis' in the 1800 MHz cell phone range (GSM-1800). Using the delta markers, you can compare spectral components or read off the maximum and minimum at a particular frequency.



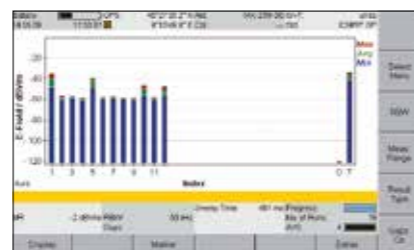
'Safety Evaluation' with bar graph display. Simultaneous display of maximum, average, and minimum values allows experts to see the difference between traffic channels (TCHs) and control channels (BCCHs) straight away.



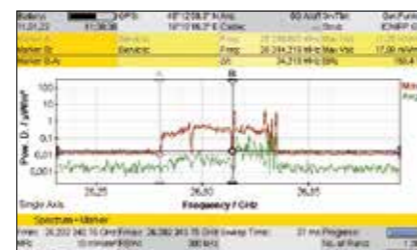
Pulsed fields in 'Scope' mode. Pulse lengths and period durations can be measured just as with an oscilloscope. And, you can also set triggers as with an oscilloscope: Trigger a single measurement when a threshold is exceeded, or a measurement each time a threshold is exceeded, or timer controlled triggering.



You can keep it simple, though: Evaluating a 'Spectrum Analysis' using the 'Peak Table'. The list of the highest field strengths shown with their associated frequencies, service names, and provider names where applicable and if saved in service tables, is very convenient. Table entries can be sorted according to various criteria.



'Safety Evaluation' over the UMTS range. The individual channels with their channel numbers are shown textbook style next to each other in the bar graph display. The bar marked "T" (Total) on the far right shows the total power density, and the bar marked "O" (Others) indicates the contribution made by the frequency gaps between the services.



Frequency selective measurement in FR2. The 5G FR2 antenna extends the frequency range of the SRM-3006 by the frequencies from 24.25 to 29.5 GHz. With it, frequency selective measurements using the Safety Evaluation, Spectrum, Level Recorder and Scope display and evaluation functions are possible.



On site and in the lab – perfect for everywhere

Handy enough for on-site use, but with technically superior specifications for laboratory applications – that's what the SRM offers.

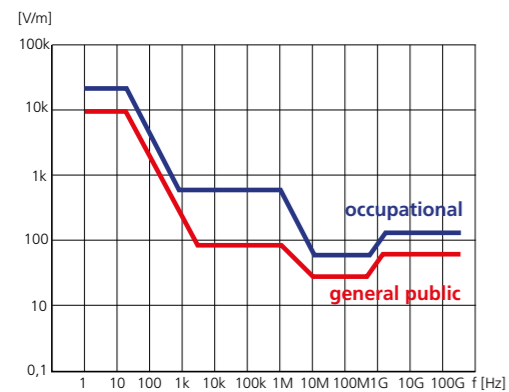
The Basic Unit has a footprint the size of a sheet of note paper, yet it can be combined with a measuring antenna to form a package tough enough to be taken to the top of any mast.

This combination is ergonomically designed, mechanically robust and splash proof. The casing is radiation proof up to electric field strengths of 200 V/m. This means that you can still measure field strengths in areas where conventional instruments would no longer work.

Many of the SRM's features are really useful in difficult environments: The Voice Recorder so you can record spoken comments, the rough underside for reliable grip, and the large buttons that can still be operated when you are wearing gloves.



Even so, the specifications of the SRM-3006 are good enough for it to be used as a laboratory instrument, with its remarkably high maximum bandwidth of 32 MHz, a signal to noise ratio that is excellent for a hand held device, and the standard N connector that allows antennas and cables from other manufacturers to be used with it.



The advantage of a specialist instrument: If required, the SRM directly evaluates results according to safety standards.





Leaders in EMF Measurement

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