

# Percentage results

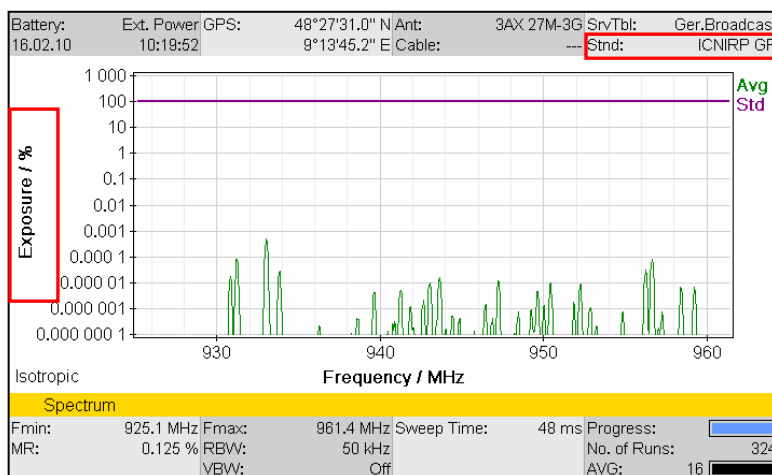


The SRM-3006 makes spectrum analysis easy. Displays showing the results in percent are a great help here. How do they relate to one another? How do they differ? The following summary should answer these questions.

## Display in percentage of limit value

Using this unit makes it easy to quickly assess the overall situation. It can be selected in all operating modes using *Unit = %*. The SRM-3006 then shows all results as a percentage of the selected standard value, e.g. as a percentage of the permitted limit value according to ICNIRP general public. This applies to all result types: *Act*, *Max*, and so on. So, you can see at a glance what's going on at a particular location, i.e. if any field strengths relevant to safety are present.

Special feature: The result type *Std* corresponds to the permitted limit value. If you select *Unit = %* here, *Std* will show correctly as a straight line at 100%.



*The Selective Radiation Meter SRM-3006 from Narda Safety Test Solutions has been specially developed for environmental and safety measurements in electromagnetic fields. Using isotropic measuring antennas, the instrument covers the entire frequency range from 9 kHz to 6 GHz. It can therefore be used equally well to investigate safety in the near field region of long wave transmitters, make measurements on radio and TV broadcast transmitters, and determine exposure levels caused by the latest generation of mobile telecommunications services.*

**Figure 1: Result of a spectrum analysis in the GSM-900 mobile phone band. All average values are well below the limit values permitted by ICNIRP general public.**

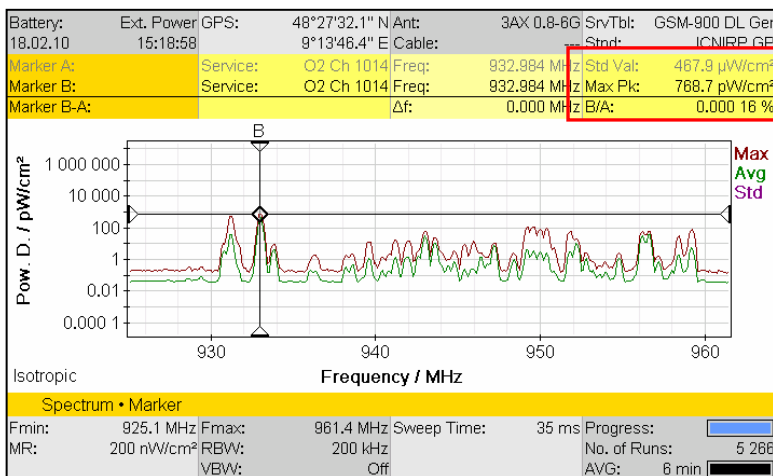
## ▲ Percentage ratio of B to A

You can use the Delta Marker for convenient evaluation of details in

- *Spectrum Analysis* mode,
- *Safety Evaluation* mode using the *Bar Graph* display setting,
- *Scope* mode.

Marker setting: *Single, Delta B-A active.*

Instead of the difference B-A, the SRM-3006 will show the ratio of B to A in percent.



**Figure 2: Example: Unit =  $W/cm^2$ , so the results are shown as power densities. Nevertheless, you can use the Marker B-A function to read out the individual results as percentages of the limit value by setting Marker A to result type Std and Marker B to result type Max Pk.**

## ▲ Percentage ratios of one result type to another

The *Peak Table* view in *Spectrum Analysis* mode allows you to display several Result Types next to each other in separate columns. A special feature here is the *Relative* setting, which lets you display one Result Type as a percentage of another Result Type, e.g. the instantaneous value (Act) in relation to the maximum value or the maximum value in relation to the average value.

Index	Frequency	Service	Avg	Max
1	933.001 020 MHz	O2 Ch 1014	524.2 pW/cm <sup>2</sup>	146.1 %
2	931.204 373 MHz	O2 Ch 1005	52.5 pW/cm <sup>2</sup>	1 108 %
3	956.610 034 MHz	Vodafone Ch 108	40.24 pW/cm <sup>2</sup>	158.2 %
4	956.206 778 MHz	Vodafone Ch 106	34.05 pW/cm <sup>2</sup>	181.1 %
5	943.006 068 MHz	T-Mobile Ch 40	32.08 pW/cm <sup>2</sup>	178.9 %
6	952.203 092 MHz	T-Mobile Ch 86	11.38 pW/cm <sup>2</sup>	166.1 %
7	943.608 887 MHz	T-Mobile Ch 43	11.35 pW/cm <sup>2</sup>	220.4 %

Isotropic

Spectrum • Peak Table

Fmin:	925.1 MHz	Fmax:	961.4 MHz	Sweep Time:	35 ms	Progress:	<div style="width: 100%; height: 10px; background-color: blue;"></div>
MR:	200 nW/cm <sup>2</sup>	RBW:	200 kHz			No. of Runs:	3 139
		VBW:	Off			AVG:	6 min <div style="width: 100%; height: 10px; background-color: black;"></div>

**Figure 3: GSM measurement.** In the example shown, the ratio of Max to Avg immediately indicates the properties of the GSM channels: Results where the Avg value is close to the Max value are characteristic of pilot channels (BCCH), higher values are typical of traffic channels (TCH). The extreme value of more than 1000% indicates a traffic channel that is only in use very occasionally.

## Distribution

This evaluation mode is found in *Safety Evaluation* mode using the *Distribution* setting. The SRM-3006 displays the measured values and the percentage proportions of the services making up the overall exposure level in shared sites, for example.

Battery:	Ext. Power:	GPS:	48°27'29.9" N Ant:	3AX 27M-3G SrvTbt:	Ger.Mobilfunk:
16.02.10	10:29:18	9°13'48.8" E Cable:	---	Std:	ICNIRP GP
<b>Distribution: Condensed</b>					
Index	Service	Max	Distribution		
1	Vodafone	6.219 mV/m	0.097 %		
2	T-Mobile	66.96 mV/m	11.22 %		
3	O2	40.36 mV/m	4.078 %		
4	E-Plus	30.65 mV/m	2.351 %		
5	Group	106.2 mV/m	28.26 %		
6	Mobilcom	1.813 mV/m	0.008 23 %		
Total		199.9 mV/m	100.0 %		
Isotropic					
<b>Safety Evaluation • Distribution</b>					
MR:	1.8 V/m	RBW:	100 kHz (Auto)	Sweep Time:	2.818 s
				Noise Thrsh.:	0 dB
				No. of Runs:	5
				AVG:	16

**Figure 4:** In the example shown, *Others*, which is the contribution made by unassigned bandwidth, has been blanked out. Nevertheless, it is included in the overall result, *Total = 100%*.

## Technical Notes from Narda Safety Test Solutions

These notes report, in no particular order, on the possible applications of Narda measuring equipment. Typical applications for the Selective Radiation Meter SRM-3006 are safety measurements on

- **Radio and TV transmitters (AM, FM, DAB, DVB-T)**
- **Mobile phone stations (GSM-900, GSM-1800, UMTS, CDMA, W-CDMA, LTE)**
- **Wireless communications networks (WiFi, WLAN, WiMAX, DECT, ZigBee, Bluetooth)**
- **Radio controls using ISM frequencies**

The Technical Notes are found on [www.narda-sts.de](http://www.narda-sts.de) under Literature ► High Frequency

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