NARDA BROADBAND FIELD METER SRM-3006

Technical Note 09

Defining standards with SRM-3006 Tools PC software

The SRM-3006 Tools PC software is an elegant application for modifying assessment standards or creating your own in-house standards. The basic procedure for this is outlined in the online help (Manage configuration data > Creating and editing measurement standards). This Technical Note gives some additional information.

⚠ Creating a user-defined standard

To do this,

1. Click on the *Standard* tab.
2. Mark any item in the *Configuration* or *Library* window. This activates the corresponding window.
3. Select the Create function. This generates a new (empty) standard ("USR_New Standard").

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.

Full SRM-3006 Tools screen display.
The first standard in the "Library" window has been selected.

Principles: An evaluation standard contains mandatory, often legally binding limit values, such as those specified by ICNIRP, and cannot be modified for this reason. The names of user-defined standards always start with "USR_" to protect the configuration of the "fixed" standards and avoid confusion. The subsequent part of the name can be edited as required but the "USR_" prefix cannot be altered.

⚠ Entering values

It is a good idea to first of all enter in the *Standard Information* window the start frequency from which the standard definition is to begin. We have selected 10 kHz for the E-field in the example below:

Standard Information	
Short name	U_Standard
Long name	USR_New Standard
Start Frequency E-Field	10000 Hz
Start Frequency H-Field	1 Hz

Left: "Standard Information" window.
The default start frequency value is set to 1 Hz.

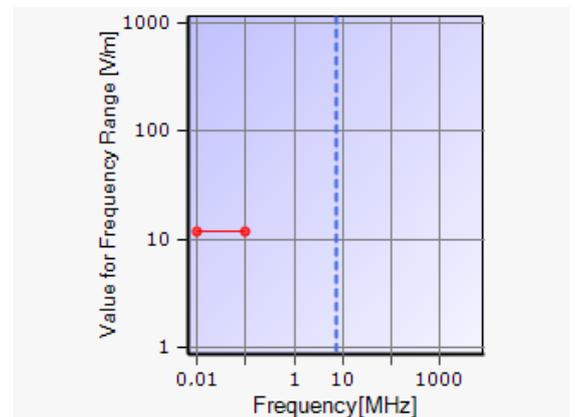All the remaining values can be entered in the *E-Field* window:

Graphical view in the right-hand section of the SRM-3006 Tools user interface. The constant limit shows as a horizontal line.

The value entered always applies from the section already defined up to the upper frequency you enter, i.e. from the start frequency 10 kHz (0.01 MHz) up to 0.1 MHz here. The value for this frequency range is a constant 12 V/m.

The basic setting of the PC and not SRM-3006 Tools determines whether you enter a period or a comma to indicate a decimal point.

⚠ Using expressions

What's behind the use of expressions or formulas? To explain this by means of a simple example (not one to be used in practice), let us define the standard we have just started as follows:

Frequency range in MHz	Value in V/m	Explanation
0.01 – 0.1	12	Constant (as entered above)
0.1 – 1	120 f	Rises proportional to the frequency
1 – 10	120	Constant
10 – 100	$380 / f^{1/2}$	Falls proportional to the square root of the frequency
100 – 1000	38	Constant

For the part up to the upper frequency 1 MHz, select the value 120 V/m and the expression ***f^** where **^ = 1**.
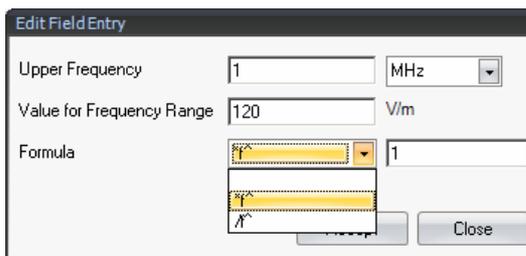
Next, you can enter the upper frequency 10 MHz and the value 120 V/m, leaving the formula box empty.

For the next section up to 100 MHz, select the value 380 V/m and the expression (formula) **/f^** with **^ = 0.5**. You could also use the formula ***f^** with **^ = -0.5** – the SRM-3006 Tools software is smart enough to read this correctly.

The last entry shows how smart the software is: 38 V/m up to 1 GHz. Here, let's enter the unnecessary formula ***f^** with the exponent **^ = 0**. This has no effect, since $f^0 = 1$.

Each straight line in the limit value diagram can be defined by a starting value V_0 and a slope S according to the following relationship:

$$V = V_0 * f^{\,S}$$

In each case, the limit value tables specify the starting value V_0, the slope S and the frequency range to which these values apply. In this way, the theoretically infinitely long straight lines are reduced to segments in the limit value diagram. The corresponding intermediate values for any frequency can be calculated using the formula above. Some examples of slopes:
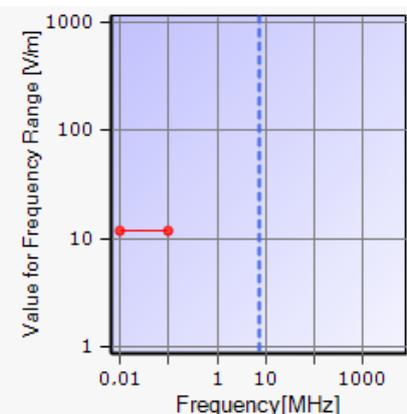
S = 0   Value is constant
S = 1   Value rises proportional to the frequency
S = -1   Value falls proportional to the frequency
S = 0.5   Value rises proportional to the square root of the frequency
S = -0.5   Value falls proportional to the square root of the frequency, etc.

Remember:

$$f^{1/2} = f^{0.5} = \sqrt{f}$$
$$f^{-1} = \frac{1}{f}$$
$$f^{-1/2} = f^{-0.5} = \frac{1}{\sqrt{f}}$$

The graphical view of the standard lets you see your entries immediately so you can check them visually.

Lower Frequency	Upper Frequency	Value for Frequency Range [V/m]	Formula	Value
0.01 MHz	0.1 MHz	12		0
0.1 MHz	1 MHz	120	*f^	1
1 MHz	10 MHz	120		0
10 MHz	100 MHz	380	/f^	0.5
100 MHz	1000 MHz	38	*f^	0

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 under Literature ► High Frequency