

**Application Report**

# Mobile phone signal exposure measurement

Example: Lilienthal (Bremen)

**Task:**

**Determination and interpretation of the maximum exposure level values for the mobile phone transmitters in Lilienthal:**

- Determination of measurement values
- Interpretation / processing of measurement results

**Equipment:**

- SRM-3000 with isotropic antenna 75 MHz – 3 GHz
- Optional single-axis E-field antenna 27 MHz – 3 GHz
- 1.5 m cable
- SRM carrying strap
- Laptop if service tables need to be processed

**Recommendation:**

Human exposure to radiation is regulated in Germany by several laws, including the Federal Immission Protection Law, and laws governing workplace safety, radio transmission and telecommunications terminal equipment, and equipment and product safety. Additional directives, health and safety regulations, guidelines, and standards control specific details. The same is true in many other countries. The main thrust of such legislation and supplementary documents is that the instantaneous measured value does not give the true picture when measuring mobile phone field exposure; rather, it is necessary to extrapolate to obtain the maximum exposure level value. In most areas, then, it is a good idea to first make on-site measurements and then use SRM-TS to process the results to comply with the applicable local regulations.

It is important to always have a direct line of sight to the mast during the measurement and to move the SRM-3000 System slowly so that the local maxima can be detected.



*Using the SRM-3000 to measure emissions from a mobile phone repeater in a residential area*

## Method:

First of all, an overview measurement is performed at each measurement location in the vicinity to examine the exposure level. This ensures that the test equipment is not overloaded and gives an idea of the electromagnetic fields in the area. The measurement range should be chosen according to the peak value occurring within the entire frequency range of the SRM-3000. The result type MAX AVG was selected for all measurements.

### Test equipment settings for measuring GSM 900 or GSM 1800:

- Operating mode: **Spectrum Analysis** as in figure 1  
Alternatively: Safety Evaluation with a prepared service table
- Span: **920 MHz – 960 MHz or 1805 MHz -1880 MHz**
- Resolution bandwidth RBW: **200 kHz**

### Test equipment settings for measuring the UMTS band:

- Operating mode: **Spectrum Analysis** as in figure 2  
Alternatively: Safety Evaluation with a prepared service table
- Span: **2.1 GHz – 2.19 GHz**
- Resolution bandwidth RBW: **5 MHz**

### Test equipment settings for measuring single transmission frequencies:

- Operating mode: **UMTS P-CPICH Demodulation** (Option) as in figure 3
- Fcent: in this case, 2.1672 GHz
- Resolution bandwidth RBW: **Automatic**

## Interpretation and evaluation:

Evaluation and interpretation of the measurement revealed that the legal requirements were met at all measurement locations. Even when the measured immission levels were extrapolated to the maximum permitted loading for the installation, the radiation levels were still well below the limit values. In many locations, the exposure levels to fields generated by mobile phone signals are of the same order of magnitude.

For further Application Notes and references visit:

<http://www.narda-sts.de/1/content.php?pit=01-06-XX-060007&change=Go%21>

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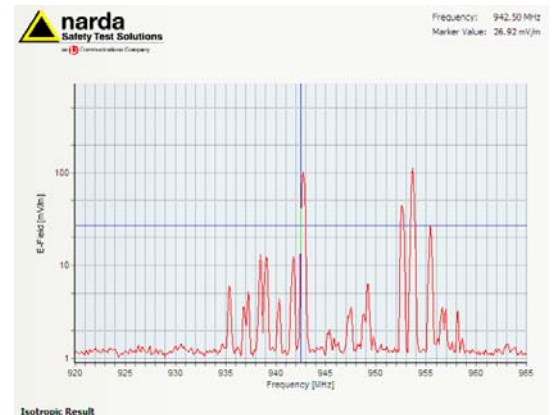


Figure 1: GSM-900 band overview measurement

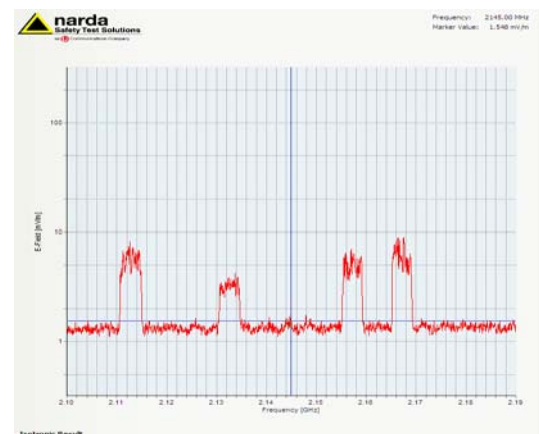


Figure 2: UMTS overview measurement

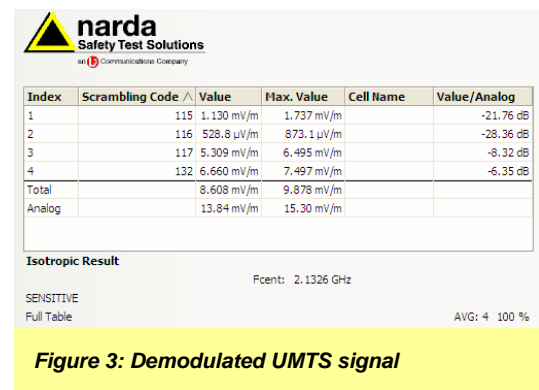


Figure 3: Demodulated UMTS signal