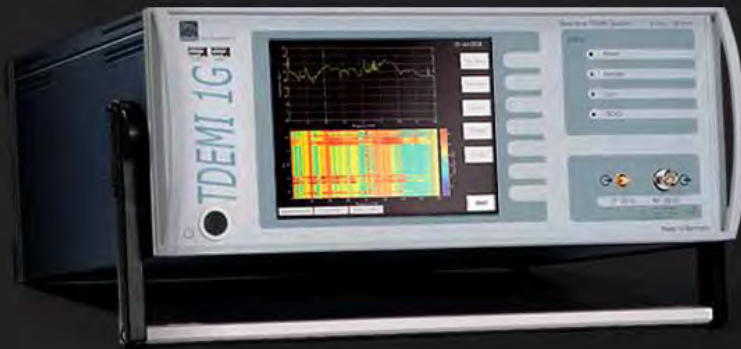


# TDEMI 1G

- 4000x faster than conventional EMI receivers
- Measurement of conducted emissions
- Radiated emission measurements
- Measurement with CDN and absorbing clamp



The TDEMI 1G was the first instrument commercially available providing totally novel methods and leading-edge technology enabling fully gapless real-time measurements. It was the result of several years of research and development to make the instrument suitable and usable for daily EMC testing at the customer's site. It enables conducted emission measurements, radiated emission measurements as well as the measurement of disturbance power in the frequency range from 9 kHz to 1 GHz. The measurement system can be used for preinvestigations as well as measurements for certification according to CISPR/EN standards.

The TDEMI 1G allows the user to carry out EMI measurements in so far unknown measurement speed. By an ultra high-speed floating-point ADC unit and real-time signal processing the TDEMI system is by a factor of 4000 faster than traditional EMI receivers.

In contrast to a traditional superheterodyne receiver that performs the scan by a sequential measurements at several thousand frequencies the TDEMI Measurements System uses a baseband bandwidth of 1 GHz. The signal is digitized and the spectrum is calculated by the short-time Fast Fourier Transform (STFFT) which corresponds to a bank of IF filters. By this way the total test time is reduced by orders of magnitude. The total test time for a single measurement in the full frequency range up to 1 GHz in the quasi-peak

detector mode is less than two minutes while the measurement is performed at all frequencies.

By a multi-resolution ultra high-speed analog-to-digital converter system the required dynamic range for pulses according to CISPR 16-1-1 is achieved. An autorange attenuator and optional features like preselection band A and band B enhance the dynamic range up to 140 dB. An automated measurement, generation of test reports for conducted and radiated measurements and also for the measurement of disturbance power is performed by the measurement software of the TDEMI or as well as by an external automation software. The automated evaluation and documentation according to CISPR 16-2-1 and CISPR 16-2-2 is done by a report generator. The instrument can be operated via a touchscreen or remotely via TCP/IP.

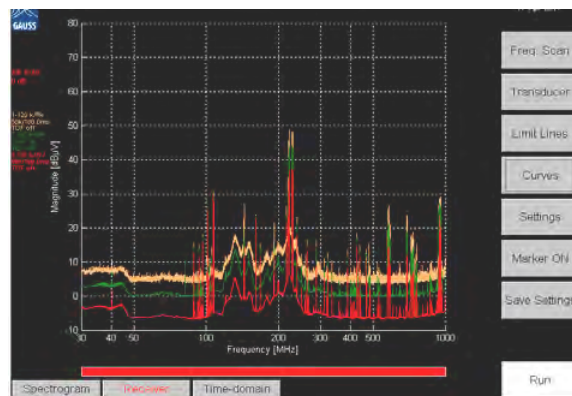


Fig. 23 – Measurement of ambient noise in the frequency range from 30 MHz to 1 GHz.

# TDEMI 1G Specifications

## FREQUENCY RANGE

150 kHz – 1 GHz, 9 kHz – 1 GHz (with Option LF - UG1G)

## REFERENCE (OCXO)

Aging	< ± 3.5 ppm / 15 years
Temperature Drift (0 .. 60° C)	± 1 x 10e-8
SSB Phase Noise (1 Hz BW) (typ. @ 12.8 MHz)	1 Hz -95 dBc/Hz
	10 Hz -120 dBc/Hz
	100 Hz -140 dBc/Hz
	1 kHz -145 dBc/Hz

## RECEIVER MODE (CISPR Standard)

### IF Bandwidth 200 Hz Band A

IF Filter: Gaussian Shaped Filter, Specifications according to CISPR 16-1-1, Bandwidth Deviation < 10 %  
 Detector Modes: Peak, Quasi-Peak, Average, RMS, CISPR-AV  
 Displayed Average Noise Level (Input Level < 85 dBµV Sinus):  
 < 0 dBµV (typ. -3 dBµV)  
 Measurement at about 700 Frequencies in parallel  
 Frequency Step < 100 Hz

### IF Bandwidth 9 kHz

IF Filter: Gaussian Shaped Filter, Specifications according to CISPR 16-1-1, Bandwidth Deviation < 10 %  
 Detector Modes: Peak, Quasi-Peak, Average, RMS, CISPR-AV  
 Displayed Average Noise Level (Input Level < 65 dBµV Sinus):  
 < -15 dBµV (typ. -19 dBµV)  
 Measurement at 4096 Frequencies in parallel  
 Frequency Step < 400 Hz

### IF Bandwidth 120 kHz

IF Filter: Gaussian Shaped Filter, Specifications according to CISPR 16-1-1, Bandwidth Deviation < 10 %  
 Detector Modes: Peak, Quasi-Peak, Average, RMS, CISPR-AV  
 Displayed Average Noise Level (Input Level < 65 dBµV Sinus):  
 < -3 dBµV (typ. -6 dBµV)  
 Measurement at 1024 Frequencies in parallel  
 Frequency Step < 800 Hz

### IF Bandwidth 1 MHz

IF Filter: Gaussian Shaped Filter, Specifications according to CISPR 16-1-1, Bandwidth Deviation < 10 %  
 Detector Modes: Peak, Average, RMS, CISPR-AV  
 Displayed Average Noise Level (Input Level < 65 dBµV Sinus):  
 < 6 dBµV (typ. 2 dBµV) 1 MHz – 1 GHz  
 Messung an 128 Frequenzen gleichzeitig  
 Frequenzschrittweite < 800 Hz

## WEIGHTED REAL-TIME SPECTROGRAM

Weighted Spectrogram Mode	Peak, Average, RMS
Time-domain	Fully gapless
Frequency Step	158 kHz for 120 kHz 1.2 MHz for 1 MHz
Frequency Step Interpolation	40 kHz for 120 kHz 300 kHz for 1 MHz
Frequency Span	> 150 MHz
IF Bandwidths CISPR	200 Hz, 9 kHz, 120 kHz, 1 MHz
Minimum Time Step	50 ms

## TIME-DOMAIN ANALYSIS (RF)

Bandwidth	1 GHz
Sampling Rate	2.6 GS/s
Acquisition Memory	32000 Samples

## ABSOLUTE MAXIMUM RATINGS (ATTENUATION 0 dB)

Maximum DC Input Level, Pulse	6 V
RF-CW Signal	120 dBµV

## INDICATION (ATTENUATION 0 dB)

Maximum DC Input Level, Pulse	5 V
RF-CW Signal	65 dBµV

## ATTENUATOR

0 - 70 dB, 10 dB Steps, Auto Attenuation  
 max. Input Power for Attenuation > 15 dB: 1 W CW

## INTERMODULATION, NONLINEARITIES

CW Signals: Two Tone	< -40 dB (typ. -53 dB)
Harmonics (> 40 dBµV, > 1 MHz)	< -40 dB (typ. <-50 dB)
Inherent Reception Points	< -40 dB (typ. <-50 dB)
Total Dynamic Range (120 kHz IF Bandwidth)	> 140 dB

## INHERENT RECEPTION POINTS (ATTENUATION 0 dB)

Inherent Reception Point 1/4 ADC Sampling Rate:  
 << 25 dBµV (using Multi-sampling < -15 dBµV)  
 Further Inherent Reception Points  
 << 5 dBµV (using Multi-sampling < -15 dBµV)

## MEASUREMENT TIME

1 µs – 60 s (Average, RMS)  
 1 µs – infinite (Peak, Quasi-Peak, CISPR-Average, CISPR-RMS-AV (Option))

## MEASUREMENT ACCURACY

Sinusoidal Signals (9 kHz - 1 GHz) ± 1 dB  
 Pulses according to CISPR 16-1-1

## RF INPUT

50 Ohm  
 VSWR < 2.0 (typ. 1.3)  
 VSWR < 1.2 typ., with 10 dB Attenuation

## REMOTE CONTROL, INTERFACES

Remote control command set according to SCPI Standard  
 Ethernet/LAN, USB, RS232, GPIB (Option GPIB-UG), PS/2, VGA, HDMI, Audio

## DISPLAY, USER INTERFACE

Resolution 800 x 600 pixels, 8.4", True Color (16.78 Mio. colors)  
 Touchscreen

## PC

Intel Core i, 2 GB RAM, 120 GB Hard Disk or higher  
 Operating system: Windows XP or Windows 7

## POWER SUPPLY

230 V +/-20%, 50 Hz or 110 V +/-10%, 60 Hz

## WEIGHT

ca. 20 kg

## MAIN OPTIONS

AT - UG1G	Attenuator 0 - 75 dB, 5 dB Steps, low Noise Figure
LF - UG1G	Frequency Extension down to 9 kHz (9 kHz - 150 kHz), IF Bandwidth 200 Hz, Quasi-Peak Band A
PRE - UG	Preselection Band A
MIL/DO - UG	Frequency Extension down to 10 Hz, IF Bandwidths 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz
LISN - UG	Controller for Measuring Accessories (TTL, 5V)
LISNCable - UG	Customized Control Cable for Accessories, e.g. LISN
TG - UG	Carrying Handle
PC - UG	Powerful multicore processor (Intel Core i or comparable) for advanced computing power, doubled hard disk capacity, doubled RAM size
KB - UG	Compact Keyboard incl. Touchpad
RG - UG	Report Generator
CAL - UG	Manufacturer Calibration with Certificate
CALD - UG	DAKs Calibration with Certificate
CLICK - UG	Click Rate Analyzer, fully integrated
SLIDE - UG	Software for Disturbance Power Measurements