# TDEMI 26G

- 4000x faster than conventional EMI receivers
- Measurement according to MIL and DO standards starting from 10 Hz
- Real-time analysis of single events


The TDEMI 26G system covers the frequency range 10 Hz to 26.5 GHz in its standard configuration and is ready for measurements in civil applications and especially for test ing in military applications and also avionics. It can be used for EMC tests according to CISPR, MIL461 and DO160 standard. The huge computation power of the digital signal processing unit of the TDEMI allows to reduce test time up to a factor of 4000 in comparison to traditional superheterodyn based receivers. A fast measurement at all frequencies and with higher frequency selectivities at the same time can be performed yielding in a even further reduced measurement uncertainty.

Especially in the lower frequency range up to several hundred MHz a large number of frequency points have to be measured. The parallel digital implementation of several thousand receivers using the short-term fast Fourier transform (STFFT) allows the TDEMI to reduce the overall testing time significantly. Especially for longer dwell times the scan time remains very short compared to superheterodyne EMI receivers and right after the results measured at all frequencies can be stored and documented.

The availability of the IF bandwidths according to MIL461 and DO160 are also in the weighted spectrogram modeand its real-time analysis bandwidth of up to 162.5 MHz makes it an ideal tool for EMC debugging. It supports the user in detecting, localizing and analyzing emissions and in finding solutions for reduction EMI of components and systems for military and avionic industry.

The noise floor of a TDEMI 26G in the Frequency 1.15 GHz up to 6 GHz is typically below 3 dBµV (1 MHz IF bandwidth, average detector) which is significantly lower than of a conventional EMI receiver. In the frequency range of 6 GHz - 26.5 GHz by an additional low-noise preamplifier the sensitivity of the TDEMI can be further improved. The recommended option LN-UG lowers the noise floor in the frequency range 6 GHz - 26.5 GHz below 22 dBµV.

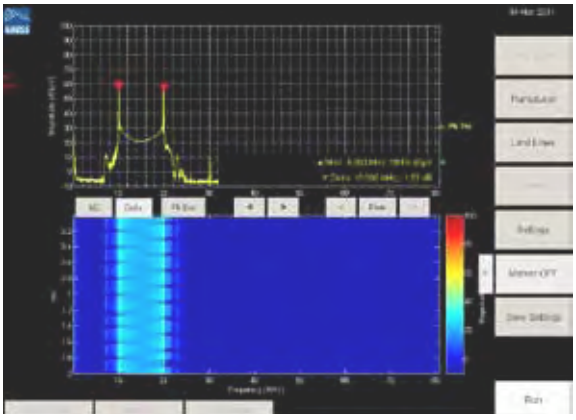

Fig. 31 – **Measurement of a frequency hopping signal at 10 MHz and 20 MHz respectivley.**

# TDEMI 26G Specifications

## FREQUENCY RANGE

10 Hz – 26.5 GHz

## REFERENCE (OCXO)

| | | |
|---|---|---|
| Aging | < ± 3.5 ppm / 15 years | |
| Temperature Drift (0 .. 60° C) | ± 1 x 10e-8 | |
| SSB Phase Noise (1 Hz BW) | 1 Hz | -95 dBc/Hz |
| (typ. @ 12.8 MHz) | 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 1 MHz – 1 GHz
< 8 dBµV 1 GHz – 1.15 GHz
< 3 dBµV 1.15 GHz – 6 GHz
< 15 dBµV 6 GHz - 18 GHz (with LN - UG26G)
Measurement at 128 Frequencies in parallel
Frequency Step < 800 Hz

## RECEIVER MODE (MIL/DO Standard)

**IF Bandwidth 10 Hz (10 Hz - 10 kHz)**

IF Filter: Gaussian Shaped Filter, Bandwidth Deviation < 10 %
Detector Modes: Peak, Average, RMS
Displayed Average Noise Floor typ.: < 40 dBµV (10 Hz - 500 Hz)
< 25 dBµV (500 Hz - 1 kHz)

**IF Bandwidth 100 Hz (1 kHz - 150 kHz)**

IF Filter: Gaussian Shaped Filter, Bandwidth Deviation < 10 %
Detector Modes: Peak, Average, RMS
Displayed Average Noise Floor typ.: < 30 dBµV

**IF Bandwidth 1 kHz (10 kHz - 30 MHz)**

IF Filter: Gaussian Shaped Filter, Bandwidth Deviation < 10 %
Detector Modes: Peak, Average, RMS
Displayed Average Noise Floor typ.: < 5 dBµV (10 kHz - 150 kHz)
< -27 dBµV > 1 MHz

**IF Bandwidth 10 kHz (150 kHz - 26.5 GHz)**

IF Filter: Gaussian Shaped Filter, Bandwidth Deviation < 10 %
Detector Modes: Peak, Average, RMS
Displayed Average Noise Floor typ.: < -17 dBµV > 1 MHz

**IF Bandwidth 100 kHz (150 kHz - 26.5 GHz)**

IF Filter: Gaussian Shaped Filter, Bandwidth Deviation < 10 %
Detector Modes: Peak, Average, RMS
Displayed Average Noise Floor typ.: < -5 dBµV (1 MHz - 1 GHz)

**IF Bandwidth 1 MHz (150 kHz - 26.5 GHz)**

IF Filter: Gaussian Shaped Filter, Bandwidth Deviation < 10 %
Detector Modes: Peak, Average, RMS
Displayed Average Noise Floor typ.: < 6 dBµV 1 MHz - 1 GHz
< 8 dBµV 1 GHz - 1.15 GHz
< 3 dBµV 1.15 GHz - 6 GHz
< 22 dBµV 6 GHz - 26.5 GHz

## WEIGHTED REAL-TIME SPECTROGRAM

| | |
|---|---|
| Weighted Spectrogram Mode | Peak, Average, RMS |
| Time-domain | Fully gapless |
| Frequency Step | 158 kHz for 120 kHz<br>1.2 MHz for 1 MHz |
| Frequency Step Interpolation | 40 kHz for 120 kHz<br>300 kHz for 1 MHz |
| Frequency Span | > 150 MHz |
| IF Bandwidths CISPR | 200 Hz, 9 kHz, 120 kHz, 1 MHz |
| IF Bandwidths MIL/DO | 10 Hz, 100 Hz, 1 kHz,<br>10 kHz, 100 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 - 55 dB, 5 dB Steps

## 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 ms – 60 s (Average, RMS)
1 ms – infinite (Peak, Quasi-Peak)

## MEASUREMENT ACCURACY

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

## RF INPUT

50 Ohm
VSWR < 3.0 typ., 1 GHz - 26.5 GHz
VSWR < 1.2 typ., 10 Hz - 1 GHz, with 10 dB Attenuation

## REMOTE CONTROL

Ethernet (LAN), Commands according to SCPI Standard

## DISPLAY

XGA 8,4" 800 x 600 True Color
Touchscreen

## PC

Intel Celeron M 1.86 GHz, 1 GB RAM, 160 GB Hard Disk
Interface: USB, Ethernet, VGA, serial, IEEE 1394, Audio
Windows XP

## POWER SUPPLY

230 V, 50 Hz or 110 V, 60 Hz

## WEIGHT

ca. 30 kg

## MAIN OPTIONS

| | |
|---|---|
| LN - UG26G | Low-noise Preamplifier (6 GHz - 26.5 GHz) |
| PRE - UG | Preselection Band A |
| SW - UG | Preselection Band B |
| LISN - UG | Controller for Measuring Accessories (TTL, 5V) |
| LISNCable - UG | Customized Control Cabel for Accessories, e.g. LISN |
| TG - UG | Carrying Handle |
| PC - UG | Intel Core 2 Duo, 2.16 GHz,<br>2 GB RAM, 320 GB Hard Disk |
| KB - UG | Compact Keyboard incl. Touchpad |
| RG - UG | Report Generator |
| CAL - UG | Manufacturer Calibration with Certificate |
| CALD - UG | DKD Calibration with Certificate |
| CLICK - UG | Click Rate Analyzer, fully integrated |
| SLIDE - UG | Software for Disturbance Power Measurements |