The TDEMI 40G system covers the frequency range 10 Hz to 40 GHz in its standard configuration and is ready for measurements in civil applications and especially for testing in military applications and also avionics. All IF bandwidths according to MIL461 and DO160 are available in the preselected spectrogram mode of the instrument also. The fully gapless real-time analysis bandwidth of 162.5 MHz of the spectrogram mode up to 40 GHz makes the TDEMI 40G unique in the instrumentation market and provides an ideal tool for real-time EMC debugging up to 40 GHz. It supports the user in detecting, localizing, observing and analyzing emissions and in finding solutions for reduction EMI of components and systems for military and avionic industry.

The receiver mode of the TDEMI 40G system can be used for full compliance 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 superheterodyne based receivers. A fast measurement at all frequencies and with higher frequency selectivities at the same time can be performed yielding in a 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 are measured at all frequencies all the data can be stored and documented. Thus, it is easily possible to reduce the measurement uncertainty even further by increasing the dwell time, which means a longer observation time at each frequency point. But not only broadband, also single frequencies can be measured in the same way. For a higher sensitivity in the upper frequency range the instrument comes with a broadband preselected low noise amplifier already integrated in its standard configuration.

![Fig. 32 - Measurement of a switched power supply according to DO160. Measured emissions above limit line for peak detector in band B.](image-url)
**TDEMI 40G Specifications**

### FREQUENCY RANGE
- 10 Hz - 40 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 < 65 dBμV Sinus):
  - < 0 dBµV (typ. -19 dBµV)
- Measurement at 4096 Frequencies in parallel
- Frequency Step < 400 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 1024 Frequencies in parallel
- Frequency Step < 800 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 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 - 40 GHz)**
- IF Filter: Gaussian Shaped Filter, Bandwidth Deviation < 10 %
- Detector Modes: Peak, Average, RMS
- Displayed Average Noise Floor typ.:
  - < 17 dBµV (1 MHz - 1 GHz)

**IF Bandwidth 100kHz (150 kHz - 40 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 - 40 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)
  - < 20 dBµV (6 GHz - 40 GHz)

### WEIGHTED REAL-TIME SPECTROGRAM
- Weighted Spectrogram Mode: Peak, Average, RMS
- Time-domain: Fully gapless
- Frequency Step: 158 kHz for 120 kHz
  1.2 kHz 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
- IF Bandwidths MIL/DO: 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, 1 MHz
- Minimum Time Step: 50 ms

### TIME-DOMAIN ANALYSIS (RF)
- Bandwidth: 1 GHz
- Sampling Rate: 2.6 GSa/s
- Acquisition Memory: 32000 Samples

### ABSOLUTE MAXIMUM RATINGS (ATTENUATION 0 dB)
- Maximum DC Input Level, Pulse: 0 V
- RF-CW Signal: 120 dBµV

### ATTENUATOR
- 0 - 70 dB, 10 dB Steps

### INTERMODULATION NONLINEARITIES
- CW Signals, Two Tone:
  - < -40 dBµV (typ. -53 dBµV)
- Harmonics (> 40 dBµV, > 1 MHz):
  - < -40 dBµV (typ. -50 dBµV)
- Inherent Reception Points:
  - < -40 dBµV (typ. -50 dBµV)
- 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: > 140 dB

### RF INPUT
- 50 Ohm
- VSWR < 3.0 typ., 1 GHz - 40 GHz
- VSWR < 1.2 typ., 10 Hz - 1 GHz

### 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 INTERFACES
- 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. 25 kg

### MAIN OPTIONS
- PSE - UG: Preselection Band A
- SW - UG: Preselection Band B
- LSN - UG: Controller for Measuring Accessories (TTL, SV)
- LSN/Cable - UG: Customized Control Cabel for Accessories, e.g. LSN
- TG - UG: Carrying Handle
- PC - UG: Powerful multiverse 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: DA/Ak calibration with Certificate
- CLICK - UG: Click Rate Analyzer, fully integrated
- SLIDE - UG: Software for Disturbance Power Measurements