PRELIMINARY

TDEMI 40G

- 162.5 MHz full real-time analysis bandwidth up to 40 GHz
- Measurement according to MIL and DO standards starting from 10 Hz
- 4000x faster than conventional EMI receivers

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 superheterodyn 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.

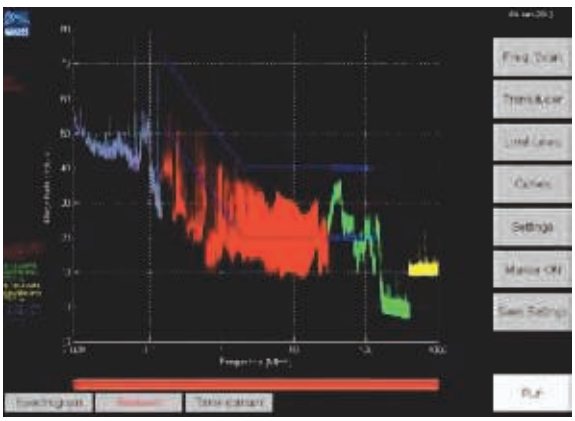

Fig. 32 – **Measurement of a switched power supply according to DO160. Measured emissions above limit line for peak detector in band B.**

PRELIMINARY

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 < 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
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 100 kHz (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
< t.b.d. 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 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
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 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

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 - 40 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. 35 kg

MAIN OPTIONS

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, 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