

RF Synthesisers for immunity testing

RF3000
RF6000

Matched to the requirements of IEC61000-4-3 up to 6GHz.

PC controlled signal sources fully meeting all requirements for IEC61000-4-3 and featuring automatic scanning to pre-programmed schedules.

- ⇒ Simple to use via PC Windows software
- ⇒ Easy USB interface.
- ⇒ Field probe input for automatic level control.
- ⇒ Suitable for use with any Power Amplifier and antenna/cell/chamber combination
- ⇒ Standard IEC61000-4-3 tests pre-programmed.



EUT MONITORING Real time monitoring and logging of EUT status facilitates accurate recording of test progress and reporting. Flexible EUT status response modes allow unattended testing for greatest productivity.

RESULTS The frequency, field strength and EUT status can be plotted in real time on screen to show how the product is performing. At the end of the sweep, the plot can be saved and printed as part of the results documentation.

AUTOMATION. These synthesisers can automatically perform standard IEC61000-4-3 scans. In addition the user can enter custom sweeps with flexible step size, dwell time, modulation and field strength.

CONTROLLABILITY. The software also provides a powerful tool for specific product investigations. The single frequency mode can search out any weakness with automatic field strength ramping and fine control of frequency.

LAPLACE INSTRUMENTS LTD



RF Synthesiser..... Does the work for you.

The Laplace range of synthesisers are designed to take the hassle out of testing to IEC61000-4-3. All aspects of the testing process are controlled by an 'intelligent' Windows software program, included with the hardware.

The **RF3000** and **RF6000** immunity test synthesisers and controllers include a signal generator matched to the RFI immunity requirements of IEC61000-4-3. Features such as sine wave and pulsed modulation, programmable start and stop frequencies, frequency step, and dwell time are provided as standard.

The **RF3000** covers the range 30MHz to 3GHz.

The **RF6000** covers the range 80MHz to 6GHz.

Both include powerful Windows **RFSynth3** control software with USB port interface.

When used with the **LaplaCell** range of test cells, these synthesisers provide full automatic control of field level and all that is needed to provide an automated radiated RF immunity test facility. Advanced features such as pre-scanning, display of EUT status against applied field level and full Windows compatibility are standard.

These synthesisers also have all the facilities required for test chamber applications, with an optional serial port specifically provided for remote RF sensor connection. Fully compatible with industry standard isotropic RF field probes and sensors, including Holaday, Narda and Radisense.

The synthesiser generates a signal at the required frequency, modulation and level which can be fed to the cell or antenna via a fixed gain Power Amplifier such as the Laplace RF1100 and RF1300 or RF1600.

Frequency and modulation are values set by the PC software but the amplitude is automatically controlled via a field strength sensor feedback loop. The user specifies the level set point in terms of V/m and the system provides the necessary output level (i.e. to take account of cell and sensor characteristics).

Two modes are available: real time feedback or pre-programmed level. The latter mode is the preferred mode according to IEC61000-4-3. However, for investigative tasks, the former mode allows direct control and manual adjustment of frequency and level. A single frequency mode is available in which the cell is effectively controlled directly by the operator from the PC, enabling specific weaknesses in the EUT to be investigated.

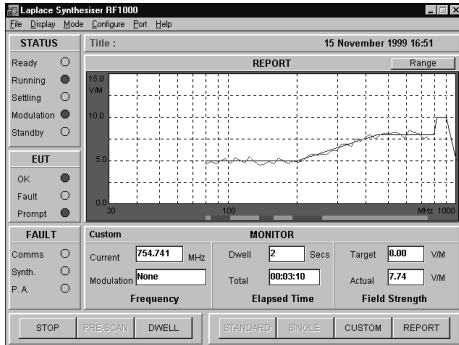
The synthesiser also acts as an interface to the EUT with a status input connector and a 'prompt' output to exercise the product at each frequency step.

IEC61000-4-3 The Standard

*IEC61000-4-3 immunity testing requires that the EUT (equipment under test) operates satisfactorily when subject to a strong electromagnetic field.
This requires a scan at a certain fixed level (specified by the standard) of field strength. The scan will comprise a series of 'steps' in frequency. Each step is specified as a percentage of current frequency value.
This percentage is variable from 0.5% to 5%.
At each step, the frequency is held, the level adjusted to achieve the required field strength as measured by the field sensor, a prescribed modulation mode is initiated and then the conditions held for a 'dwell' time. The EUT should be monitored to detect faulty operation during the test.*

System components

- Synthesiser** The RF3000/RF6000 is linked to PC via USB port. Generates the required signals and controls the amplitude to produce required field strength. Also interfaces simple EUT status signal back to PC and generates simple 'prompt' signal to EUT under PC control.



- Software.** The included **software package** provides the user interface and main control for the system. This application will run under any current version of Windows from XP onwards. The software not only enables all test settings to be entered, but will plot the target and actual field strength results, together with EUT status indication. Advanced features include custom scan (as shown) in which the stress level can be programmed to vary during the sweep, and single frequency mode for detailed investigations of particular EUT behaviour.

- Test cell or chamber.** The LaplaCell provides an ideal test environment which includes feedback sensor. These cells are fully calibrated using techniques defined by IEC61000-4-20. The Synthesisers can alternatively be used in conjunction with standard field sensors in a chamber or GTEM cell.



Field sensor. Provides a feedback signal for closed cycle control of field level. This is only required when the system is used in a chamber or GTEM cell. Most standard field sensors can be used with the Synthesiser. Note that the LaplaCell includes this sensor as standard. Separate sensors can be supplied with the synthesiser. Laplace can supply battery powered or laser powered types. In any case, the serial interface option (RF3000-RX or RF6000-RX) must be specified.



- Power Amplifiers** A range of power amplifiers are available to cover the whole frequency range to 6GHz. RF output power ratings from 8W to several kW will provide the necessary drive to obtain meet the field strength requirements for all standard stress levels in either test cells or anechoic chambers.

- RF switching system** For systems specified to operate above 1GHz, two power amplifiers will be required together with an automatic switching unit to switch between these amplifiers. The LETIS provides this function.



Synthesiser Specification summary

Output signal

Frequency range:
RF3000 30MHz—3GHz
RF6000 80MHz—6GHz
Frequency step: 0.25% to 9% of current value
Output Level : (CW) -60dBm to 0dBm
Indication: Bargraph indication of output level.
THD (worst case): 10%
Modulation modes: off,
1KHz sine, 80% AM modulation
200Hz, 20Hz & 1Hz pulsed. 100% level
Output connector: N type

Level control

External feedback probe:
• LaplaCell: 0-2.7V. Calibration via PC software.
Connector: 8 pin circular DIN
• Anechoic chamber: Field sensor probe compatible with industry standard probes via fibre optic interface. Synthesiser option (-RX) provides the required serial interface. Associated probe must be specified at time of order. Compatible probes are Holaday, EP-600 series and Radisense.
Control Mode: Open loop (pre-scan) as preferred by the standard, or closed loop. (Software selectable)
P.A. interlock: Contact closure enforces standby mode.
Connector: 4 pin circular DIN.

EUT interface

EUT status monitoring: Volt-free contact closure input
Fault modes: Stop, pause, continue.
Connector: 3 pin circular DIN
EUT prompt: 4 pole c/o volt free contacts.
Modes: Pulsed, Continuous, off
Connector: 15 pin Dee type

Software:

Environment: From supplied PC software via standard USB serial port.
Any current Windows OS from Win98 and later.
Main control: Start test (RUN)
Stop test (STOP)
Pause at frequency (Dwell)
Single frequency mode
Setup screen: Enables all parameters of a test sweep and EUT details to be programmed.
Parameters: Start and end frequencies
Frequency step (% of current value)
Field strength
Dwell time (1 - 99 seconds)
Modulation mode.
Single freq. Screen: Manually or automatically ramp the field strength at one frequency.
Report screen: Plot all details of the test including setup parameters, actual vs. target settings and EUT status.
Status window: Real time indication of operating mode, EUT status and P.A. status.

Menus

File: All standard Windows facilities, including printer output and file Save, Save As and Open commands.
Mode: Setup config, results and pre-scan data can be saved and recalled.
Select operating mode and test sequence.
Standard IEC tests pre-programmed.
Config: Enter cell characteristics, Probe calibration
Indication: Mains power
Output signal level (bargraph)
P.A. status, EUT status, EUT prompt

General

Supply: 110V or 230V, factory set 50 or 60Hz
Size: 120 x 64 x 188mm
Weight: 4.5kg

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