



# The DENE B System for the Measurement of Radiated Emissions for Electro-Magnetic Compatibility

**DENE B DAN05C Antenna**



The DENE B System of measurement is a valid instrument for EMC measurements, with which your laboratory can be implemented, side by side with the radiated noise of the other close by apparatus. In this way it is possible to work on your hardware in all the various phases of development. The system is particularly suitable for EMC measurement on electronic PCBs.

## What does the system consist of:

- Hameg HM5014 Digital Spectrum Analyser (from 150KHz - 1050MHz with RS-232 interface);
- Deneb DAN05C Antenna designed for measurements at a distance of 0.5mt;
- DENE B DNB5014 Spectrum Analyser software for MS-Windows;
- RS-232 Serial Cable (with *optional* optical interface for connections of up to 30mt);

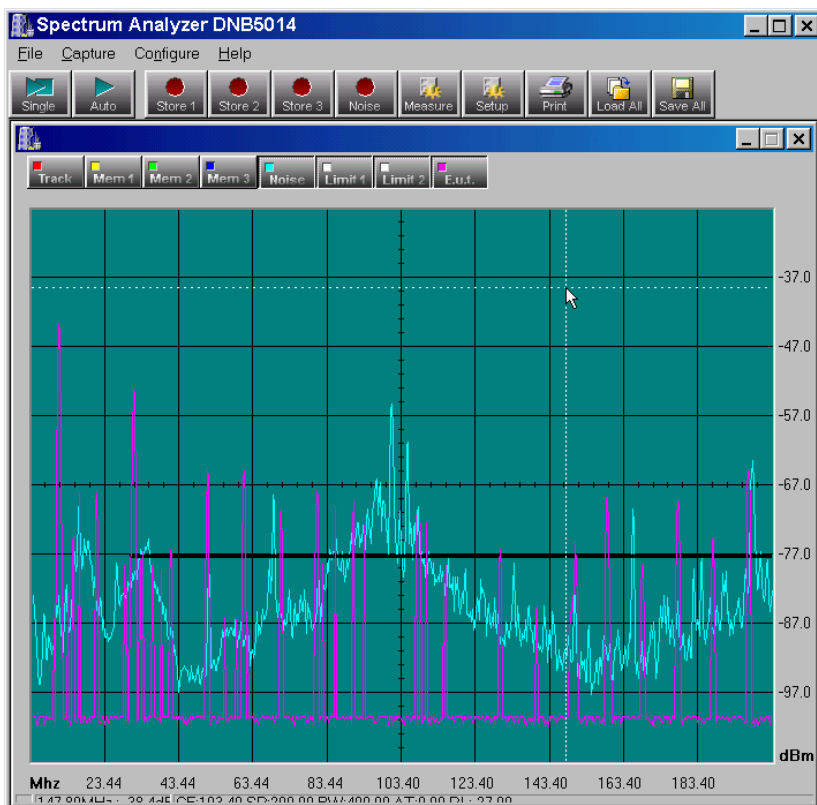


The DENE B DAN05C Antenna can be considered to fall between a SNIFFER (close-up field) and a FULL-Compliance Antenna (remote field). In fact, with the SNIFFER, there is the advantage of seeing all the radiated signals from the E.U.T., but you are not able to see what proportion of these signals remain at a distance. Effectively, to carry out a Full-Compliance measurement, an expensive semi-anechoic chamber or open site is needed. With the DENE B Antenna, the system is able to carry out an excellent "PRE-Compliance" measurement very close to a "FULL-Compliance" one because the margin of error is 4 - 6 dBm without the need for expensive anechoic chamber (semi-anechoic).

The Hameg HM5014 Digital Spectrum Analyser converts the analogue spectrum of the signal into a digital signal.

The system requirements are as follows: Personal Computer (minimum required: Pentium 100MHz, 32Mb RAM, MS-Window 95/98/NT/2000/ME). For portable EMC measurements a Notebook can be used.

To avoid ground loops and radiation from the cable, it is possible to use an RS-232 Optical Fibre Interface for distances of up to 30mt.



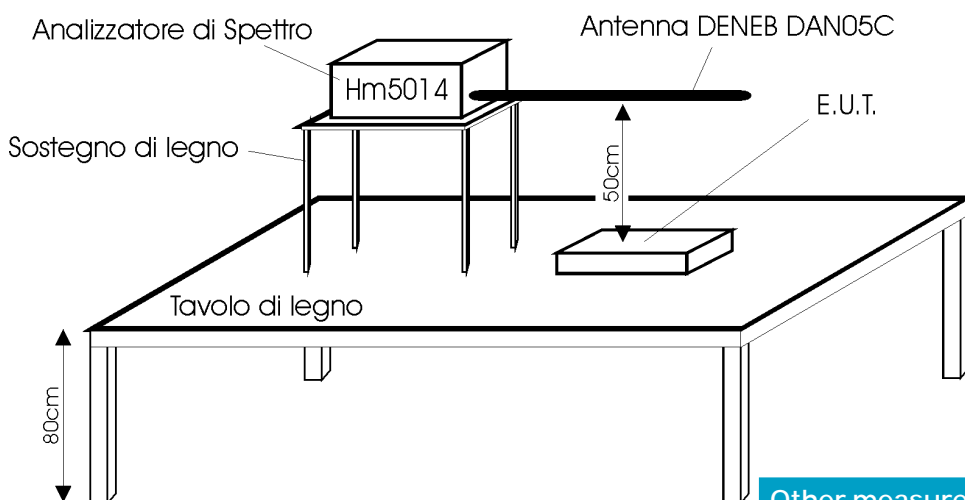
## Characteristics of the Deneb DAN05C Antenna

- K factors calculated specifically for measurements at 0.5mt;

- Bandpass from 30MHz - 1GHz (with adequate K factors from 400MHz - 1GHz);
- Omnidirectionality so that with the E.U.T. at 0.5mt it can receive the field in a uniform manner from all directions.
- Reduced sensitivity to attenuate all undesired signals from 2-3mt (that is those coming from the various laboratory instruments) and correctly receive the E.U.T signal that is set at 0.5mt;
- Can be directly connected to the analyser, eliminating the cost of antenna amplifiers and special cables.

#### How to carry out the measurement of the radiated emissions

The apparatus to be measured (E.U.T.) is placed on an 80 cm high wooden table; above this at a height of 50cm, on another wooden shelf, you should arrange the Hameg HM5014 Spectrum Analyser with the



DENEb DAN05C positioned parallel to the table (horizontal polarization). The spectrum analyser, transmits the measurement results to the PC, via the RS-232 interface every 200 ms.

#### What does measuring at 0.5mt instead of 3 - 10mt mean

At 0.5mt you manage to solve the problem of environment reflections. The radiation of the E.U.T, reflected from other objects in the laboratory, is negligible with respect to the direct reflection. Furthermore, as the E.U.T. is close to the antenna, the signal- to-noise ratio is greater, enabling more accurate measurement.

#### Characteristics of the DENEb DNB5014 Spectrum Analyser software

- Developed for use with MS-Windows 95/98/NT/2000/ME;
- Enables data transfer from the Spectrum Analyser to the PC via an RS-232 interface;
- Enables 'Real-Time' acquisition and grafically visualises the trace with 8 bit resolution and 4000 horizontal samples with a refresh of refresh of 200ms to 1000ms;

- Simultaneously visualises 8 traces in 8 different colours:

TRACK = spectrum analyser trace

MEM1 = memory trace for saving of the TRACK or EUT traces

MEM2 = memory trace for saving of the TRACK or EUT traces

MEM3 = memory trace for saving of the TRACK or EUT traces  
NOISE = trace for the memorizing of the maximum background noise of the environment

LIMIT1 = trace for the visualization of a normative level

LIMIT2 = trace for the visualization of a second normative level

E.U.T. = trace for the visualization of the results of the software calculations of the E.U.T signal at 10m

- Memorization in files of the traces and measurement settings;
- Remote Control of all the functions of the Hameg 5014 Spectrum Analyser;
- Printing, as files or on printer, of the measurement reports (to be attached to the final conformity certificate of the E.U.T.).

#### Software Elaboration:

- Average Function;
- MaxHold Function;
- Zeroing of the maximum environment background noise level (by comparing the acquired trace with the noise trace) ;
- Compensation of the acquired trace (by means of the K factors of the antenna and the distance between this and the E.U.T. to simulate a measurement at 10mt);
- Option of the almost peak calculation.

#### Other measurements capable with the DENEb system using "very low cost" apparatus:

- Emission measurements made by a L.I.S.N. (EN55022, EN55014)
- Emission measurements of network harmonics (EN61000-3-2, EN60555-2)
- Emission measurements of electrostatic discharges (EN61000-4-2)
- Measurements of high velocity transient immunity (Burst EN61000-4-4)
- Measurements of voltage impulse immunity (Surge EN61000-4-5)
- Measurements of immunity to voltage gaps and interruption (EN61000-4-11)
- Measurements of immunity to electromagnetic radiation fields (EN61000-4-3)

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