Test Antenna ULTRALOG HL562

No tiresome changing of antennas: universal and broadband EMC measurements

International EMC standards stipulate measurement of emissions and immunity to interference over increasingly wider frequency bands. The use of narrowband antennas takes considerably more time since each measurement has to be interrupted to change the antennas required. To avoid these costs, which should not be underestimated, test antennas covering a wide frequency range are needed. ULTRALOG HL562 is tailored to meet these requirements. It is suitable for both interference field strength measurements and susceptibility measurements. Thanks to its compact design and low weight it is at the same time easy to handle.

Wide frequency range, yet compact design

Test Antenna ULTRALOG HL562 (FIG 1) is in fact an antenna system: it combines a biconical dipole with a log-periodic antenna. This makes for a wide frequency range from 30 MHz to 3000 MHz, which is covered by the broadband dipole up to about 200 MHz and above this by the log-periodic directional antenna.

Current standards for interference field strength stipulate measurements in the frequency range 30 MHz to 1000 MHz, some US specifications up to 2 GHz and even higher. A CISPR/G resolution concerning ITE (information technology equipment) provides for measurements up to 2.7 GHz. ULTRALOG with its wide specified frequency range is a highly attractive solution as it enables emission measurements to be performed with just one antenna.

For immunity to interference measurements, standards do not define a precise lower frequency limit below 80 MHz. Featuring a lower operating frequency of 30 MHz, ULTRALOG covers the range relevant for practical use. At the request of many customers, the dimensions of the biconical dipoles were reduced to what is physically feasible and meaningful, thus considerably simplifying antenna handling. For frequencies from 600 MHz, the V con-
figuration of the directional antenna makes for increased gain despite the small dimensions of the antenna (FIG 2). Gain enhancement compensates for the reduction in system sensitivity that would otherwise make itself clearly felt because of the cable attenuation, which increases with frequency (see FIG 2, typical characteristic of antenna factor).

Attractive features make for versatile use

ULTRALOG’s wide frequency range and its capability of performing field strength measurements plus immunity measurements at field strengths up to 10 V/m make for highly versatile use of this compact test antenna. But HL562 has further qualities: the V configuration of the dipoles not only results in improved antenna gain but also yields largely rotationally symmetrical and congruent directional patterns in the E plane and the H plane above 200 MHz. This may eliminate the need for a second measurement, which is defined in some test specifications if polarization is not symmetrical.

CISPR 16-1 stipulates polarization isolation of at least 20 dB to keep measurement uncertainties to a minimum (in this case, an error lower than approx. 1 dB is obtained). ULTRALOG complies with this stipulation of course. Products with polarization isolation of only 14 dB have an additional error of 2 dB, which is unacceptable for many measurement tasks.

Another innovative feature of HL562 is its construction. There are no loose dipoles because the complete log-periodic antenna is made of one piece. The longer dipoles are interconnected by means of transverse braces, ensuring high mechanical stability despite the compact and lightweight design.

Calibration of course

ULTRALOG HL562 is factory-calibrated prior to delivery. Calibration is performed to ANSI C63.5 in the frequency range 30 MHz to 150 MHz above conductive plane, and to DIN 45003 in the remaining frequency range in free space. In both cases the three-antenna method is used and a tolerance analysis carried out. Calibration data are supplied with the antenna as hardcopy and on disk to ensure simple transfer of the specific antenna data to the test system.

Klaus Fischer; Dr Christof Rohner

Condensed data of Test Antenna ULTRALOG HL562

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency range</td>
<td>30 MHz to 3000 MHz</td>
</tr>
<tr>
<td>Polarization</td>
<td>linear</td>
</tr>
<tr>
<td>Cross-polarization suppression</td>
<td>20 dB</td>
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<tr>
<td>Gain</td>
<td>typ. 8 dB</td>
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</tbody>
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