

Nulling Card to effectively detect impedance changes

Compact and Integrated Solution · Robust · Flexible

DARE!! Instruments has extended the range of test capabilities of the RadiCentre modular test system towards the RF test market. With the RadiBalance plug-in card NUL1001A changes of the input impedance (S11) of the Device Under Test (DUT) can be detected.

The application

The best available solution for the detection of multipactor events. The operation of the nulling card is based on adding two signals of equal amplitude and opposite phase, resulting in a 100% cancellation of the signal. For any small change in amplitude and/or phase, the cancellation is reduced. The appearance of a signal effectively indicates a change in impedance. The two input signals of the nulling plug-in card are derived from forward and reflected power measurements by means of a dual directional coupler.

Integrated Solution

DARE!! Instruments offers an ultra-compact and operator friendly solution for test campaigns where nulling detection is needed to observe High Power RF effects in DUT's. In classic set-ups the nulling detection is achieved with a number of variable attenuators, phase shifters, combiners and interconnecting cables. These are



now all be replaced by one single RadiCentre fitted with the NUL1001A plug-in card, providing a direct output to the observing measurement instrument (spectrum analyser or receiver).

Full Control

To offer a large degree of flexibility to the operator, the NUL1001A plug-in card can control amplitude AND phase in both branches. When one of the branches is reaching the limit of its control span, the nulling can be regained by changing the setting in the other branch.

Smart User Interface

A conventional nulling system, set-up from separate components, does not provide any indication with regard to the direction the operator has to perform any adjustment. In contrary the NUL1001A equipped RadiCentre provides a user interface with the following information and indicators:

- Control range of attenuator and phase shifters
- Programmed test frequency
- Power bars (RFL and FWD) at the display indicate internal power balance at the summing point
- A nulling bar showing the direction of the nulling optimum, without the need to monitor the Spectrum Analyzer or Receiver



Control Interface

To control attenuator and phase shifter, up and down buttons are available on the RadiCentre color touch screen. An alternative control is obtained with the Human Interface Device (HID1001A) four dial interface. By connecting the HID to the RadiCentre each of the four rotary dials is assigned to one of the parameters. The rotation speed of the dials adjusts the step speed, thus efficiently obtaining target values.



RadiBalance card	NUL2001A
FORWARD RF-input port	
Frequency range	1 – 6 GHz
Input power level range	-30 to +20 dBm
Connector type	SMA female 50 Ω
FORWARD RF-output port	
Frequency range	1 – 6 GHz
Response to input	-3 dB relative to forward input
Frequency response	± 1 dB over frequency range
Connector type	2.4 mm female 50 Ω
REFLECTED RF-input port	
Frequency range	1 – 6 GHz
Input power level range	-50 to +10 dBm
Connector type	SMA Female 50 Ω
REFLECTED RF-output port	
Frequency range	1 – 6 GHz
Response to input	-3 dB relative to reflected input
Frequency response	± 1 dB over frequency range
Connector type	3.5 mm female 50 Ω
NULLING output port	
Frequency range	1 – 6 GHz
Connector type	SMA Female 50 Ω
Nulling depth	-70 dBm min.
F-Monitor output	
Frequency range	1 – 6 GHz
Sample of the	Forward RF input port signal
Connector type	BNC-female 50 Ω
Response to input	-10 dB relative to forward input
Frequency ranges	
Band 1	1.0 - 1.5 GHz
Band	1.5 - 3.0 GHz

For more information contact DARE!! Instruments at:

T: +31 348 416 592 M: instruments@dare.eu W: www.dare.eu/instruments