

iCCMT 18100-IBL

A High Reflection, Low Insertion Loss Solution for On-Wafer Load Pull at 10-18 GHz

Abstract – A high VSWR, low insertion loss programmable tuner is used for on-wafer load pull testing of low-impedance high-power transistors in X and Ku-bands. An integrated low-loss coaxial bendline allows a reduction of power loss at high source Γ , thus providing for device saturation using available solid-state driver amplifiers.

Introduction - As larger devices emerge on the market, we are often faced with load pull requirements that were unheard of even five years ago. Specifically, some large devices need to be input-matched near 1Ω , a feat which would be nearly impossible or would increase tuner losses to an unacceptable level. Focus Microwaves was tasked with developing a source tuner to be used at very low impedances with reduced losses at 10 GHz, a process which has led to the development of the iCCMT-18100-IBL.

When considering tuning range, the most important components in our load pull setup are the tuner, the probe, and the transition between tuner and probe. In order to maximize tuning range, we need to minimize losses in the tuner, the probe, and the transition. Focus has achieved this by creating a new tuner, the iCCMT-18100-IBL, a 10-18 GHz wideband tuner with an integrated coaxial bendline. The tuner has been designed with a compact form factor thereby minimizing the losses associated with the transmission line within the tuner.



Figure 1: iCCMT 18100-IBL

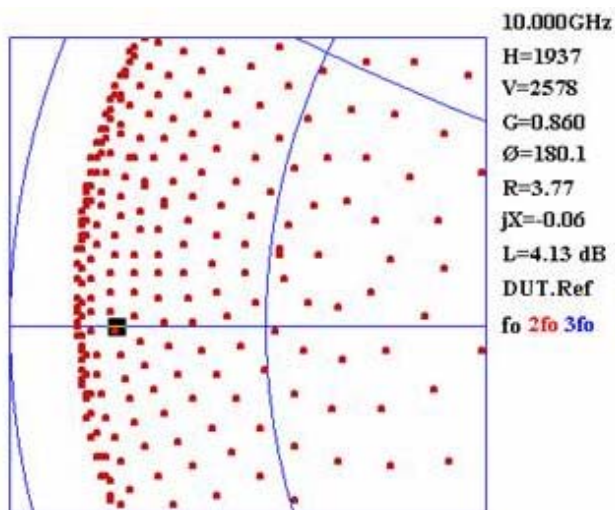


Figure 2: Tunable Range of iCCMT-18100-IBL at 10 GHz at DUT Reference Plane (including wafer probe)

Figure 2 is a screenshot of WinPower™ which demonstrates the tuning range of the iCCMT-18100-IBL including GGB 40M 50 Ω probes. We are able to achieve $\Gamma=0.86$ ($R=3.77 \Omega$) with 4 dB loss or $\Gamma=0.9$ ($R=2.6 \Omega$) with 6 dB loss. A comparable setup using a Focus iCCMT-1808 with 4" cable and identical probes yields $\Gamma=0.7$ with 4 dB loss.

The effects of this setup are twofold. First, tuning range is increased by lowering the losses of the system. Second, less power needs to be supplied by the driver amplifier in order to compress the device to P1dB or further.

General Product Information - The iCCMT-18100-IBL allows for full and accurate characterization of on-wafer transistors. The iCCMT-18100-IBL makes use of Focus' proprietary TCP/IP capable iTuner technology with built in microprocessor and command language, allowing tuning to any interpolated impedance within the tuning range with a typical accuracy of 50dB or better. As such, the iCCMT-18100-IBL can be used with Focus' software or independently by using the Focus ActiveX control. iTuner allows for full customization and integration with popular software applications such as Agilent VEE™ and LabView™.