100 Series EMC Probes

Description

The 100 series EMC probes are designed for identifying and fixing EMC problems. The 100A, 100B, and 100C are loop probes, and are sensitive to magnetic fields. The 100D is a stub probe, and is sensitive to electric fields.

The loop probes have integrated electrostatic shields, providing isolation from common-mode signals. As a result, these probes deliver excellent repeatability. The different loop sizes allow the user to select the optimum probe for a given frequency, providing the optimum sensitivity and spatial resolution.

The 100D stub probe, with its narrow tip, offers the highest spatial resolution. It is ideally suited to tasks such as tracking EMC sources down to the individual pins of an IC.

Because of the planar construction of the probes, even the large loops are only 0.11” thick, allowing the probe to be inserted into narrow seams and gaps.

Features

- An integrated electrostatic shield in the loop probes eliminates common-mode pickup.
- Multiple loop sizes offer optimum sensitivity and spatial resolution at different frequencies.
- Probe dimensions optimized for access to tight spaces.
- Calibrated sensitivity up to 3 GHz, depending on model. Usable to beyond 6 GHz.
- Can be driven by a signal source to generate fields for electromagnetic susceptibility testing.

Applications

- Finding sources of EMC emissions problems.
- Injecting fields into circuits to identify those which are EMC-susceptible.
- Noninvasive probing of RF circuits. The probes can be used to measure the signals present on an operational PC board. For example, using a preamplifier, the probes can measure the characteristics of an oscillator, such as frequency, sidebands, and phase noise.

Specifications

Dimensions:

Length, excluding connector: 6.35”
Probe tip thickness: 0.11”

Table 1

Model Number	Tip Diameter (in)	Loop Diameter (in)
100C (large loop)	1.0	0.85
100A (medium loop)	0.5	0.4
100B (small loop)	0.25	0.15
100D (stub)	.08	N/A

Sensitivity:

100 A/B/C Loop Probes

The probe output power into a 50 ohm load and the magnetic flux density are related by the following equation:

Pout = X + 20*log10(B) + 20*log10(F) , or alternatively,
20*log10(B) = Pout – X - 20*log10(F)
Where

B is the magnetic flux density, in tesla
F is the frequency of the received signal, in megahertz
Pout is the probe output power into 50 ohms, in dBm
X is a scale factor from the table below:

Table 2

Model Number	X	3 dB Frequency (MHz)	First Resonance (MHz)
100C (large loop)	85.1	50	500
100A (medium loop)	65.2	1000	2600
100B (small loop)	42.2	3100	>6000

100D Stub Probe

The probe output power into a 50 ohm load and the electric field strength are related by the following equation:

Pout = -113.2 + 20*log10(E) + 20*log10(F), or alternatively,
20*log10(E) = Pout + 113.2 - 20*log10(F)
Where

E is the electric field strength, in volts/meter
F is the frequency of the received signal, in Megahertz
Pout is the probe output power into 50 ohms, in dBm

Frequency Response:

100 A/B/C Loop Probes

The above equation is accurate within 3 dB from DC to the 3 dB point indicated in table 2. The probes are usable at higher frequencies, but the sensitivity is uncalibrated. The first notch in the frequency response of the probes occurs at the first resonance listed in the table. Figure 1 shows the response of the probes vs. frequency.

100D Stub Probe

Stub probes tend to be less repeatable than shielded loop probes, due to the presence of common-mode currents flowing on the outer surface of the probe or attached cable. As signals are measured, it is common to see a few dB of variation in output power as the user changes their grip on the probe or the attached cable. Because of this, the sensitivity of the 100D is not guaranteed. Typical sensitivity of the probe is shown in figure 2.

RF Connector:

SMB male, 50 ohms

Warranty

1 year warranty
30 day unconditional return policy

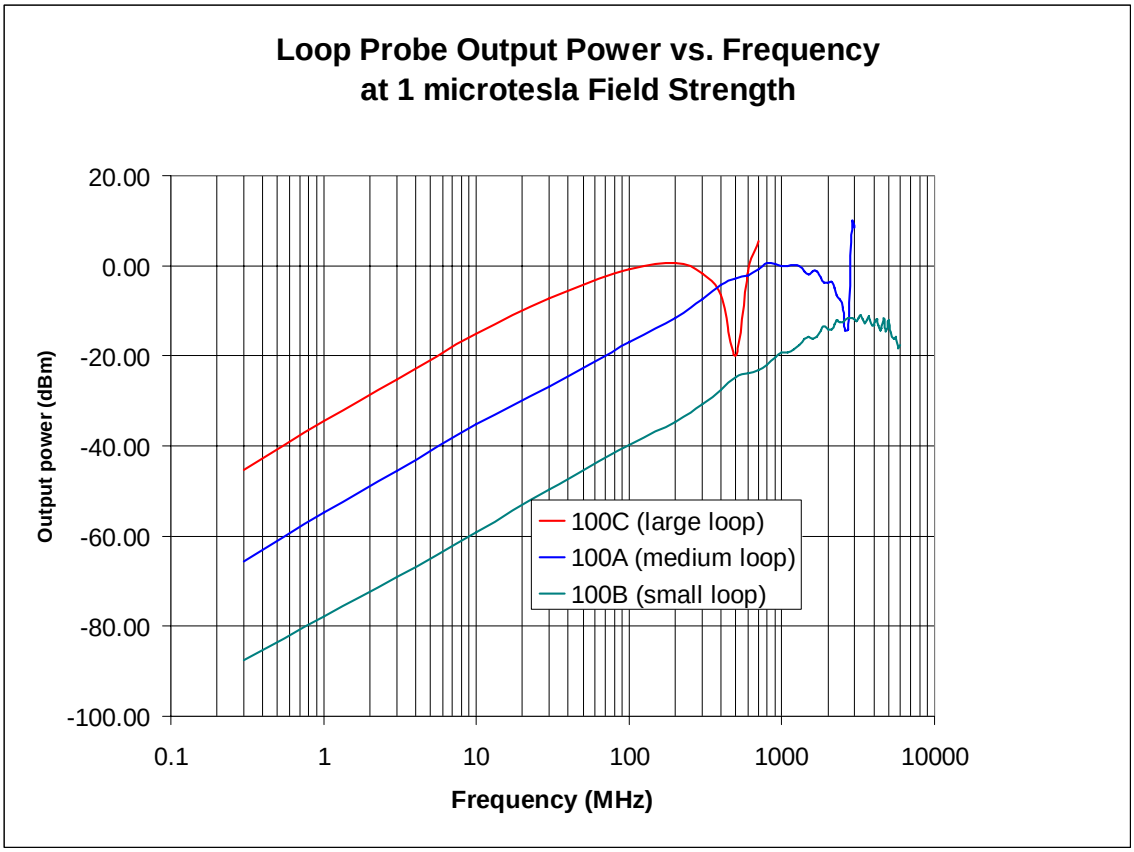

Figure 1

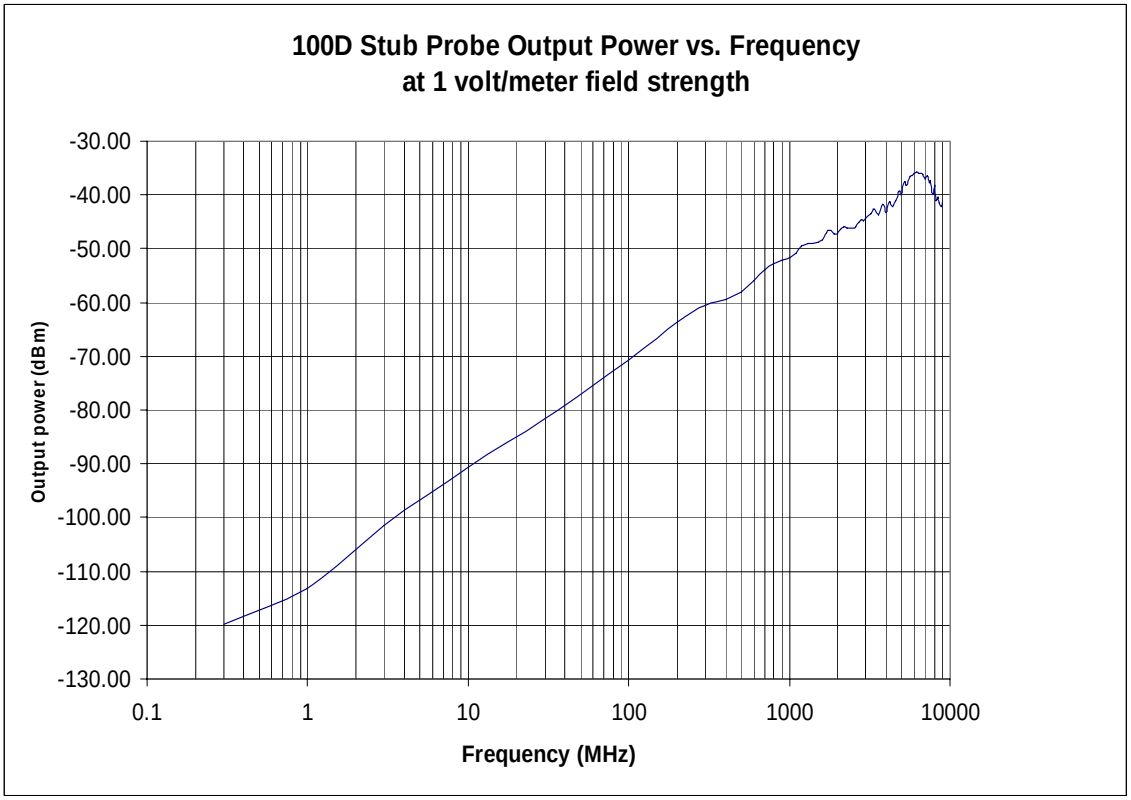

Figure 2