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**Test Procedure for Measuring Relative Shielding Properties of
Active and Passive Coaxial Cable Devices Using Agilent Magnetic
Close Field Probe**

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1.0 SCOPE/DISCLAIMER

Hewlett-Packard® is a registered trademark of AGILENT Corp.

This document is intended to outline the use of the Agilent 10940A/10941A Close Field probes (or similar devices) in determining the Relative Shielding Effectiveness of various cable telecommunication system devices. Throughout this document are details, paraphrasing, formulae and procedures derived from various Hewlett-Packard printed documents, used with their permission, but with no acknowledgement or responsibility as to their accuracy or suitability with regards their applicability to the intended measurement result. All procedures and conclusions are those of the authors of this document.

This document outlines the procedures for determining the relative Shielding Effectiveness of cable telecommunication system devices employing a combination of Close Field probes and various Scalar Test equipment packages, through the use of defined, repeatable test practices.

For clarity, the various models of close field probes are hereinafter referred to as the “probe”. Figure 1

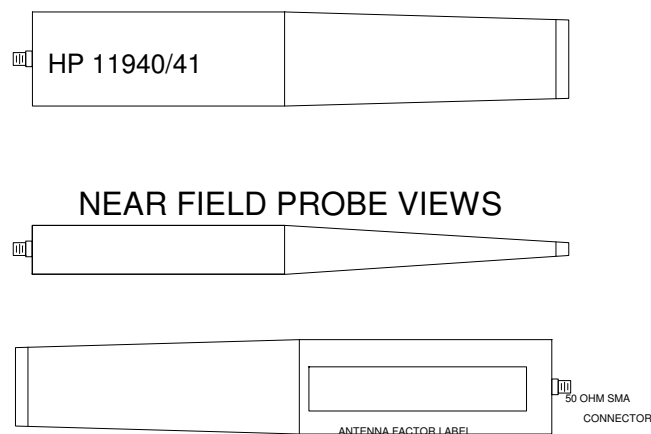


Figure 1

FIGURE 1: Near Field Probe Views

2.0 CAUTION AND WARNINGS

- 2.1 The tests proposed in this document involve the use of RF Signal levels which could be damaging or destructive to some cable telecommunication system equipment. Read all procedures completely before beginning any testing. After testing, restore test equipment settings to safe levels to avoid inadvertent problems with future tests. If in doubt, consult the equipment manufacturer for approval prior to testing.
- 2.2 This procedure may suggest the direct interconnection of 50 Ω and 75 Ω devices. RF implications aside, such interconnections must only be performed with a universally mechanically compatible connector type, such as "BNC". Under no circumstances may 50 Ω and 75 Ω type "N" connectors be interconnected.

Connecting a 75 Ω type "N" Male connector to a 50 Ω type "N" Female connector results in no contact.

Connecting a 50 Ω type "N" Male connector to a 75 Ω type "N" Female connector results in the destruction of the female type "N" connector.

3.0 THE "PROBE"

The Probe is a Balanced Magnetic Field sensor, which delivers an output voltage dependent on the Magnetic or "H" field present. The Probe senses magnetic fields through two printed circuit loops at the probe tip. Maximum sensitivity is orthogonal to the long edge of the Probe tip as shown in Figure 2.

Available probe types are employed depending on the frequency range to be tested. Usually Probes are classified as High or Low Frequency 30 MHz to 1 GHz and 5-30 MHz.

Most available probes are 50 Ω devices, which can present some operational difficulties when employed with conventional cable telecommunication system 75 Ω test equipment. Adaptation of these devices to 75 Ω systems is detailed in the "Set-up and Calibration" section 7.1.

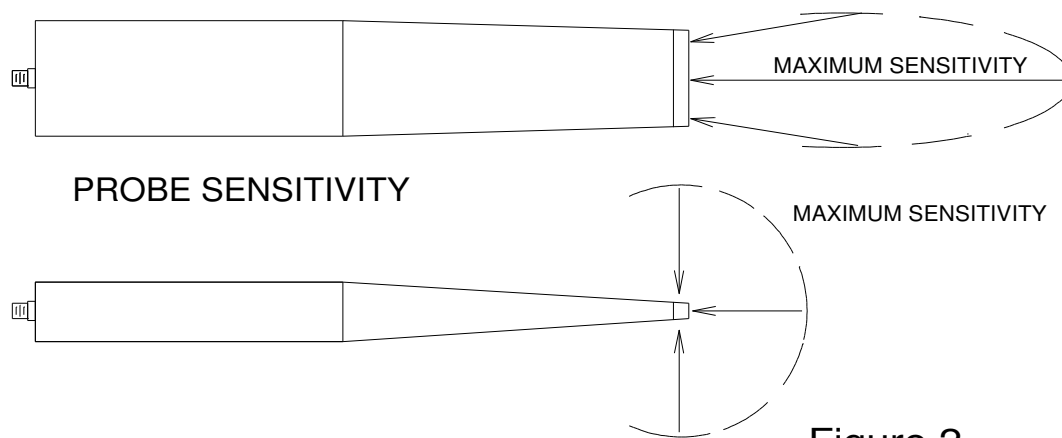


Figure 2

FIGURE 2: Probe Sensitivity

4.0 THEORY OF OPERATION

Theoretically, every source of Electromagnetic Radiation must be comprised of both a Magnetic (or "H") field, and an Electric (or "E") Field.

While the absolute correlation between the magnitude of the Magnetic field detected, and the absolute magnitude of the radiated Electromagnetic field is dependent on many factors, there is a direct Relative relationship between the two. Any improvement in suppression of the "H" field results in a corresponding reduction in the Open Air Electromagnetic radiated field strength.

For purposes of this document, most cable telecommunication system operators have accepted that Near Field measurement capabilities of at least 100 dB lower than the highest internal signal level are required, and this procedure is intended to allow measurements in excess of 120 dB.

5.0 EQUIPMENT REQUIRED

5.1 Scalar Signal Level Measurement test setup having the following capabilities:

A signal transmitter, operating over the desired frequency range, with an output capability of 2 mW (+51.75 dBmV).

A signal detector, capable of receiving signals lower in level than 2 pW (-40 dBmV).

For convenience, a swept test system is recommended, although a tunable single frequency setup can be employed.

Some typical swept equipment configurations are: