Uncertainty, online at: http://www.wmwr.com/Articles/ArticleI/15284/15284.htm

The sidebar that you mentioned in your letter does appear on the Microwaves & RF website. It was cut
article in its entirety.

Envisioned it as a two-part series. Another article dropped out of the issue, so we had room to run your
Ediors' Note: We mistakenly referred to your article as "the first portion" because we had originally

Teddington, Middlesex, UK
Electromagnetics Team National Physical Laboratory
Principal Research Scientist
Nick M. Rider

Apart from the above three points, I think the article looks really good.

3. The subjecting to the article reads: "The first portion of this two-part article..." We were not planning a second part, so this is not correct.
2. Throughout the article, the mathematical symbols used to represent various sections in the text (e.g., SFR, RF, etc.) is inconsistent.
1. In the section on calculating reliability, several equations and calculations in the article are missing from the text. This is most unfortunate as equations are missing.

are three points I would like to bring to your attention regarding the article as published:

V8/NS was published in the January 2007 issue of Microwaves & RF (p. 55); as planned. However, there
I was pleased to see that my article (written along with Nils Nazoa), "Evaluate Accuracy Of Portable

Nick Rider
ED Online 10-15284 | April 2007
Calculating Return-Loss Uncertainty

For reflection measurements, the uncertainty in magnitude VRC, \( U(|\Gamma|) \) can be converted to the equivalent return loss uncertainty, \( U(RL) \), using Eq. 3:

\[
U(RL) = 8.686 \times \frac{U(|\Gamma|)}{|\Gamma|} \quad (3)
\]

where:
* \( * \) is the measured VRC.

Calculating phase uncertainty:
For a given S-parameter, \( S_{ij} (i = 1, 2; j = 1, 2) \), the uncertainty in phase, \( U(\phi) \), can be estimated using Eq. 4:

\[
U(\phi) = \sin^{-1} \left( \frac{U(|S_{ij}|)}{|S_{ij}|} \right) \quad (4)
\]

where:
- \( U(|S_{ij}|) \) is the uncertainty in \( |S_{ij}| \).

When calculating the uncertainty in transmission phase, it is first necessary to determine the uncertainty in the magnitude of the linear transmission coefficient (i.e. \( U(|S_{21}|) \) or \( U(|S_{12}|) \)). This can be derived from the measured attenuation, \( A \), and the uncertainty in the measured attenuation, \( U(A) \), using Eq. 5:

\[
U(|S_{ij}|) = \frac{1}{8.686} \times 10^{-\frac{\sqrt{20} \times U(A)}{}} \quad (5)
\]