

From: oetech@fccsun34w.fcc.gov  
Date: Wed, 3 Jul 2002 12:02:21 -0400 (EDT)  
To: rscodell@qcpi.com  
Subject: SAR Issues  
X-BigFish: cs-1v

To: Robert Scodellaro, Kyocera Wireless Corp  
From: Steve Dayhoff  
sdayhoff@fcc.gov  
FCC Application Processing Branch  
Re: FCC ID OVFKWC-7135  
Applicant: Kyocera Wireless Corp  
Correspondence Reference Number: 23298  
731 Confirmation Number: EA132940

(Q1). Uncertainty budget does not include component for device holder perturbation. However, several SAR plots show peak near middle of device outline, which appears to be proximate to device holder. Please repeat the max SAR configuration with previous and revised holder position, and/or adjust measurement uncertainty estimates.

(A1). I spoke with Schmid & Partner Engineering AG about the measurement uncertainty associated with the device holder. Schmid and Partner sent Kyocera Wireless a new measurement uncertainty table that included a value for the device holder uncertainty for the Dasy 3 and 4 systems. This value for the device holder uncertainty has been included on a revised measurement uncertainty table for the 7135 phone on the following page. Also included is the measurement uncertainty table from Schmid and Partner.

Sincerely,

Bob Scodellaro

The extrapolation is based on least square algorithm [W. Gander, Computermathematik, p. 168-180]. Through the points in the first 30mm in all z-axis, polynomials of order four are calculated. This polynomial is then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1mm from one another.

## 5 MEASUREMENT UNCERTAINTY

Description of individual measurement uncertainty

Uncert. description	Uncert. Value %	Probability distribution	Divisor	$C_i^1$ 1g	Stand. Uncert (1g) %	$V_i^2$ or $V_{eff}$
<b>Measurement system</b>						
Probe calibration	$\pm 4.4$	normal	1	1	$\pm 4.4$	$\infty$
Axial isotropy of the probe	$\pm 4.7$	rectangular	$\sqrt{3}$	$(1-C_p)^{1/2}$	$\pm 1.9$	$\infty$
Sph. Isotropy of the probe	$\pm 9.6$	rectangular	$\sqrt{3}$	$(C_p)^{1/2}$	$\pm 3.9$	$\infty$
Spatial resolution	$\pm 0.0$	rectangular	$\sqrt{3}$	1	$\pm 0.0$	$\infty$
Boundary effects	$\pm 5.5$	rectangular	$\sqrt{3}$	1	$\pm 3.2$	$\infty$
Probe linearity	$\pm 4.7$	rectangular	$\sqrt{3}$	1	$\pm 2.7$	$\infty$
Detection limit	$\pm 1.0$	rectangular	$\sqrt{3}$	1	$\pm 0.6$	$\infty$
Readout electronics	$\pm 1.0$	normal	1	1	$\pm 1.0$	$\infty$
Response time	$\pm 0.8$	rectangular	$\sqrt{3}$	1	$\pm 0.5$	$\infty$
Integration time	$\pm 1.4$	rectangular	$\sqrt{3}$	1	$\pm 0.8$	$\infty$
RF ambient conditions	$\pm 3.0$	rectangular	$\sqrt{3}$	1	$\pm 1.7$	$\infty$
Mech. Constrains of robot	$\pm 0.4$	rectangular	$\sqrt{3}$	1	$\pm 0.2$	$\infty$
Probe positioning	$\pm 2.9$	rectangular	$\sqrt{3}$	1	$\pm 1.7$	$\infty$
Extrap. and integration	$\pm 3.9$	rectangular	$\sqrt{3}$	1	$\pm 2.3$	$\infty$
<b>Test Sample Related</b>						
Device positioning	$\pm 3.0$	normal	$\sqrt{3}$	1	$\pm 1.7$	$\infty$
Device holder uncertainty	$\pm 5.0$	normal	1	1	$\pm 5.0$	7
Power drift	$\pm 5.0$	normal	$\sqrt{3}$	1	$\pm 2.9$	$\infty$
<b>Phantom and setup</b>						
Phantom uncertainty	$\pm 4.0$	rectangular	1	1	$\pm 2.3$	$\infty$
Liquid conductivity (target)	$\pm 5.0$	rectangular	$\sqrt{3}$	0.6	$\pm 1.7$	$\infty$
Liquid conductivity (meas.)	$\pm 10.0$	rectangular	$\sqrt{3}$	0.6	$\pm 3.5$	$\infty$
Liquid permittivity (target)	$\pm 5.0$	rectangular	$\sqrt{3}$	0.6	$\pm 1.7$	$\infty$
Liquid permittivity (meas.)	$\pm 5.0$	rectangular	$\sqrt{3}$	0.6	$\pm 1.7$	$\infty$
<b>Combined Standard Uncertainty</b>					$\pm 11.47$	
<b>Extended Standard Uncertainty (k=2)</b>					$\pm 22.94$	

## Uncertainty – IEEE P1528

<b>Error Description</b>	<b>Uncertainty value <math>\pm\%</math></b>	<b>Probability distribution</b>	<b>divisor</b>	<b><math>c_i</math> <b>1g</b></b>	<b>Standard unc. (1g) <math>\pm\%</math></b>	<b><math>v_i</math> or <math>v_{eff}</math></b>
<b>Measurement System</b>						
Probe calibration	$\pm 4.8$	normal	1	1	$\pm 4.8$	$\infty$
Axial isotropy of the probe	$\pm 4.7$	rectangular	$\sqrt{3}$	$(1-c_p)^{1/2}$	$\pm 1.9$	$\infty$
Sph. isotropy of the probe	$\pm 9.6$	rectangular	$\sqrt{3}$	$(c_p)^{1/2}$	$\pm 3.9$	$\infty$
Probe linearity	$\pm 4.7$	rectangular	$\sqrt{3}$	1	$\pm 2.7$	$\infty$
Detection limit	$\pm 1.0$	rectangular	$\sqrt{3}$	1	$\pm 0.6$	$\infty$
Boundary effects	$\pm 8.3$	rectangular	$\sqrt{3}$	1	$\pm 4.8$	$\infty$
Readout electronics	$\pm 1.0$	normal	1	1	$\pm 1.0$	$\infty$
Response time	$\pm 0.8$	rectangular	$\sqrt{3}$	1	$\pm 0.5$	$\infty$
Integration time	$\pm 1.4$	rectangular	$\sqrt{3}$	1	$\pm 0.8$	$\infty$
Mech. constrains of robot	$\pm 0.4$	rectangular	$\sqrt{3}$	1	$\pm 0.2$	$\infty$
Probe positioning	$\pm 2.9$	rectangular	$\sqrt{3}$	1	$\pm 1.7$	$\infty$
Extrap. and integration	$\pm 3.9$	rectangular	$\sqrt{3}$	1	$\pm 2.3$	$\infty$
RF ambient conditions	$\pm 3.0$	rectangular	$\sqrt{3}$	1	$\pm 1.7$	$\infty$
<b>Test Sample Related</b>						
Device positioning	$\pm 6.0$	normal	1	1	$\pm 6.0$	11
Device holder uncertainty	$\pm 5.0$	normal	1	1	$\pm 5.0$	7
Power drift	$\pm 5.0$	rectangular	$\sqrt{3}$	1	$\pm 2.9$	$\infty$
<b>Phantom and Setup</b>						
Phantom uncertainty	$\pm 4.0$	rectangular	$\sqrt{3}$	1	$\pm 2.3$	$\infty$
Liquid conductivity (target)	$\pm 5.0$	rectangular	$\sqrt{3}$	0.6	$\pm 1.7$	$\infty$
Liquid conductivity (meas.)	$\pm 10.0$	rectangular	$\sqrt{3}$	0.6	$\pm 3.5$	$\infty$
Liquid permittivity (target)	$\pm 5.0$	rectangular	$\sqrt{3}$	0.6	$\pm 1.7$	$\infty$
Liquid permittivity (meas.)	$\pm 5.0$	rectangular	$\sqrt{3}$	0.6	$\pm 1.7$	$\infty$
Combined Standard Uncertainty					$\pm 13.4$	158
<b>Coverage Factor for 95%</b>		<b><math>k_p = 2</math></b>				
<b>Expanded Standard Uncertainty</b>					<b><math>\pm 26.9</math></b>	