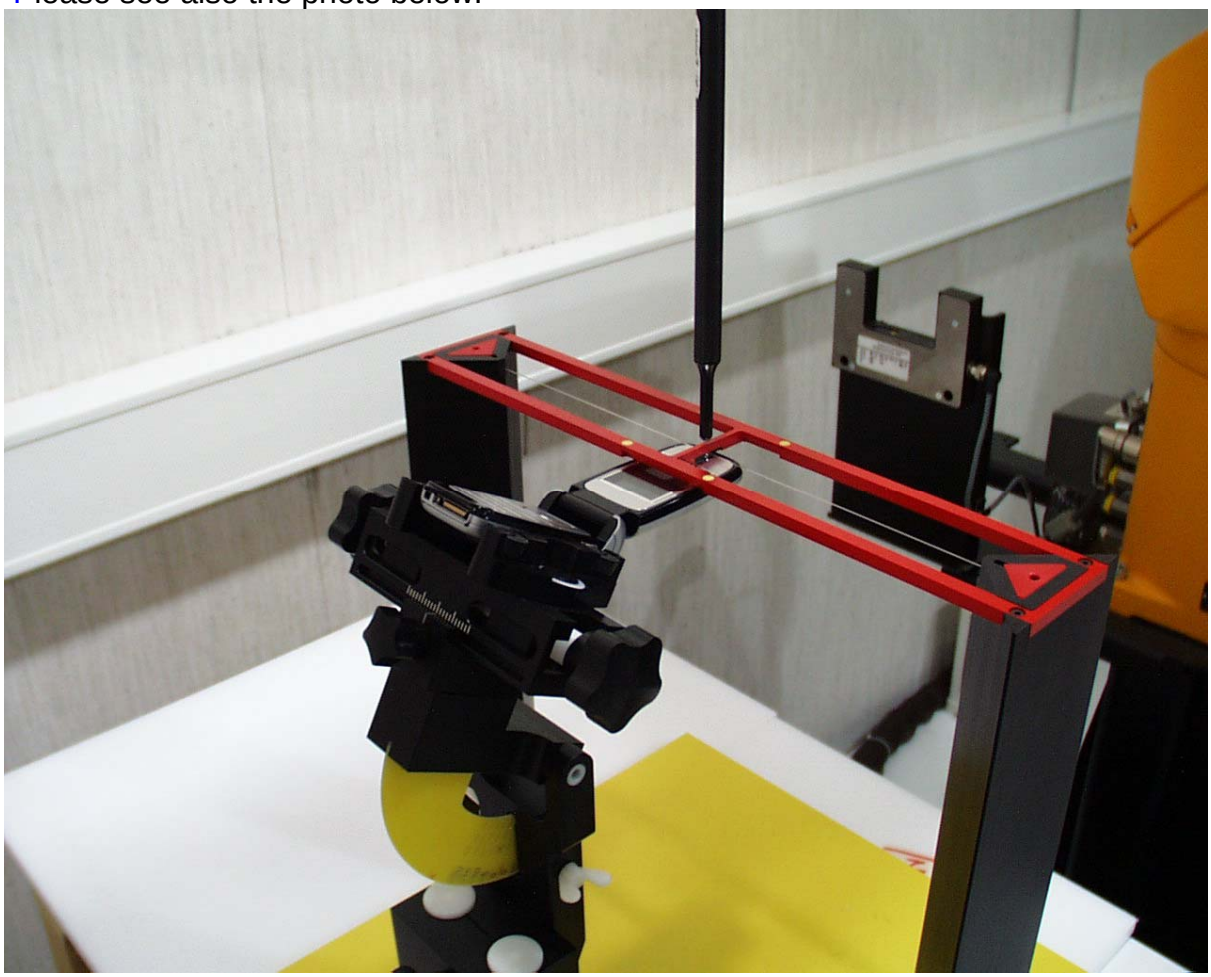
30-Sept-2005

Reply to ATCB comments

Reference from ATCB:
e-mail dated September 29, 2005
Subject: QTLRH-74_ATCB002798

1) Regarding HAC information in the users guide, please refer to the uploaded document “RH-74_HAC_6061_Add_29Sep05.pdf”. M rating was added.

2) We are using Hearing Aid Compatibility measurement software and instrumentation of SPEAG (Schmid & Partner Engineering AG). The specially designed Test Arch allows a high precision positioning of both the device and any of the calibration dipoles. In the SPEAG Manual and in the SPEAG software the Test Arch is named "Test Arch phantom" or only "Phantom". This may be misleading, because HAC measurement is not done in a phantom (or in a liquid and in a phantom, as it is in a case of SAR measurement). HAC measurement is done in air and Test Arch is used only for positioning WD or dipole. Test Arch itself is positioned on a stable surface (e.g. on a table). For improved user friendliness a predifined configuration file of the Test Arch is provided by SPEAG.
Please see also the photo below:



- Test Arch has yellow bottom plate, red top frames (two parallel frames with yellow markings, and one middle bar), and the dielectric wire, which is parallel with longer red top frames and perpendicular to the red middle bar.
- Yellow markings on the red top frames are the reference points. The reference points define the 5 by 5 cm area with respect to the x- and y-axis with the origin in the center. The reference points are taught to the probe.
- The z-coordinate of this plane is located at the known nominal height above the yellow base plate of the Test Arch.
- WD is mounted in so, that íts accoustic output is coinciding with the center point of the area formed by the dielectric wire and the middle bar of the Test Arch's red top frame.
- Based on the certain position of the WD in respect to the Test Arch and on the known reference points of the Test Arch, the accurate distance between WD and probe's measuring element can be defined and used during HAC measurements.

3) In our response we considered uncertainty as uncertainty on field, not on power. However, the Standard is seeing HAC RF measurement as RF emission measurement. So, Expanded Uncertainty on Power is 29.4%. At this moment we are willing to use an uncertainty calculation based on the manufacturer's and software owner's recommendations. Later we are going to review it by using our own experiments. The first repeated measurements are planned to start this autumn.

4) SPEAG recommends measuring step size of 5mm. Please, see their arguments below:

"We have performed multiple comparison measurements with different resolutions of 5mm and 2mm in the context of dipole and calibration measurements.. DASY4 HAC field results are INTERPOLATED based on the field components on the measurement grid. We were not able to find any difference in the evaluation (3 digit results) , i.e. the influence of a finer resolution was neglectable.

Wireless devices use different antennas. The RF wavelength and measurement distance is however not principally different from the dipole, so we do not expect field variations stronger than with a dipole antenna for the field MAXIMA.

For field minima, the resolution might be a limiting factor, but these are not relevant. For these, also the resolution of the single probe sensors with their displacement in the order of magnitude above 1mm has a similar influence. The uncertainty due to the sensor displacement for the maxima is considered and included in the uncertainty budget.

Consequently, we do not expect any negative influence using the our recommended step size of 5mm."

30-Sept-2005

From: ext Dward ATCB [mailto:dward@atcb.com]
Sent: Thursday, September 29, 2005 11:37 AM
To: Binder Robert (Nokia-TP/Tokyo)
Cc: 'William H. Graff (E-mail)'
Subject: QTLRH-74_ATCB002798

Hi Robert
Please note the following in regards to your responses.

1 The HAC insert does give some information on what HAC is all about, but it does not state what the Mating of the particular device is. The insert should state/indicate the device is an M3 rated device.
2 Please note that HAC is an in air measurement and a phantom is not used in HAC testing and therefore is not an appropriate uncertainty consideration.
3 Please note that you list the Combined Standard Uncertainty as 14.7%. This however is the uncertainty before the K factor producing the expanded uncertainty is introduced. In typical expanded uncertainties used in the EMC industry the K factor is 2, thus the expanded uncertainty would be 29.4% or about 2.3dB (a little higher than the FCC wants to see). Please explain why the combined uncertainty was used in your response and why the expanded uncertainty was not used.
4 Please consider that the FCC will most likely have questions about the 5mm step size and will most likely require a 2mm step size be done. Please note that this is what the FCC appears to be doing and is doing on at least one other Nokia HAC submittal.

Thanks

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