

Reference

[1] FCC publication 865664 SAR measurement 100 MHz to 6 GHz DR02-4116, 9/12/2012

Request for modification

In 3.3.1 add a sentence at the end of the paragraph: **If the data acquisition modules have been designed to be exchangeable without change of performance and this has been demonstrated and its linearization has been calibrated according to ISO 17025, additional linearization checks are not required.**

Rationale

The draft document [1] proposes more details for the SAR system validation and verification. These requirements can lead to an extensive amount of work in the laboratories depending on their hardware configuration with multiple probes and acquisition modules (DAE). On the other hand, if the test system has been designed such, then other pairing does not cause deviations exceeding the values used in the uncertainty budget.

The present draft wording in [1] covers the dynamic range with the SAR linearity and the axial isotropy:

- 3.3.1 says: "...**When SAR probes are used interchangeably among identical SAR systems**, after the probe has been fully validated on one system, it should be at least selectively verified on each of the other systems for the least desirable results (worst) obtained using the initial system. **Other interchangeable components, such as data acquisition modules**, should also be selectively verified collectively on other systems, in conjunction with the probe. ..."
- 3.3.1 1) requires validation of 1-g SAR near levels of 0.2, 1, 2, 4 (and ev. 8) W/kg with a CW signal.
- 3.3.1.2) evaluates SAR linearity using deviation by determining the deviation from the above results referenced to the net dipole power.
- 3.3.1 3) finally evaluates the axial isotropy near 1.6 W/kg (and ev. 4, 8, 20 W/kg).

Function of the DAE:

The data acquisition module of the DASY systems consist of the DAE (Data Acquisition Electronics) which incorporates a 3 channel 2 range voltmeter with 200 MOhm input resistance and optical isolation to the digital evaluation. The DAE has been designed to be exchangeable without additional factors involved and is calibrated traceable to independent standards.

If the DAE is exchanged (keeping the same field probe), the new (respective) DAE calibration factors are applied. The possible difference in load resistance can have a worst-case effect of < 0.02% on the measured voltage.

The linearity is given by the internal architecture and common to the DAE. The worst-case contribution to the SAR uncertainty budget has been determined to be < 1% (k=1) worst-case for the whole DAE. All DAE have a very similar behavior in linearity so the variation due to exchange of a DAE is even smaller. Therefore, the uncertainty for any pairing is well covered by accounting for a worst-case uncertainty of 1%.

Conclusion

The DASY DAE has been designed to be fully interchangeable when used with any DASY field probes. The influence of its non-linearity can be neglected. System validation or verification at a single power level in conjunction with a probe rotation check is sufficient to verify its full functionality. Swapped configurations do not give better confidence on the uncertainty.