

Appendix B: Tissue Stimulating Liquids, System Checks and System Validation

B.1. SAR System Check

Prior to SAR assessment, the system is verified to $\pm 10\%$ of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. SAR System Validation was performed and complies with requirements per IEC/IEEE 62209-1528.

Table 1 System Check Results (SAR)

System	Frequency (MHz)	Tissue Type	Date	Amb. Temp. (°C)	Tissue Temp (°C)	Input Power (dBm)	Verification Source SN	Probe SN	DAE SN	Measured 1g SAR (W/Kg)	1W Target 1g SAR (W/Kg)	1W Normalized 1g SAR (W/Kg)	1g SAR Deviation	Measured 10g SAR (W/Kg)	1W Target 10g SAR (W/Kg)	1W Normalized 10g SAR (W/Kg)	10g SAR Deviation
Beta	2450	Head	06/20/2025	22.9	21.9	17	1112	7859	1905	2.470	50.600	49.283	-2.60%	1.160	23.700	23.145	-2.34%
Beta	2450	Head	06/25/2025	22.9	22.6	17	1112	7859	1905	2.500	50.600	49.882	-1.42%	1.180	23.700	23.544	-0.66%
Beta	2450	Head	06/29/2025	23.1	22.9	17	1112	7859	1905	2.430	50.600	48.485	-4.18%	1.140	23.700	22.746	-4.03%

B.2. Dielectric Parameters of the TSL

Table 2 SAR Tissue Dielectric Parameters

Date	Tissue Type	Liquid Temp (°C)	Frequency (MHz)	Conductivity Measured (σ)	Conductivity Target (σ)	Deviation	Permittivity measured (ϵ_r)	Permittivity Target (ϵ_r)	Deviation
6/20/2025	Head	21.9	2400	1.78	1.76	1.24%	38.9	39.3	-1.03%
6/20/2025	Head	21.9	2450	1.82	1.80	0.88%	38.8	39.2	-1.00%
6/20/2025	Head	21.9	2480	1.84	1.83	0.42%	38.7	39.2	-1.05%
6/20/2025	Head	21.9	2500	1.86	1.85	0.09%	38.7	39.1	-1.08%
6/20/2025	Head	21.9	2550	1.89	1.91	-0.76%	38.6	39.1	-1.12%
6/20/2025	Head	21.9	2600	1.94	1.96	-1.31%	38.6	39.0	-1.14%
6/20/2025	Head	21.9	2650	1.98	2.02	-2.01%	38.5	38.9	-1.24%
6/20/2025	Head	21.9	2680	2.00	2.05	-2.14%	38.4	38.9	-1.24%
6/20/2025	Head	21.9	2700	2.02	2.07	-2.50%	38.4	38.9	-1.30%
6/25/2025	Head	22.6	2300	1.72	1.67	3.06%	38.9	39.5	-1.34%
6/25/2025	Head	22.6	2350	1.75	1.71	2.46%	38.9	39.4	-1.26%
6/25/2025	Head	22.6	2400	1.79	1.76	2.01%	38.8	39.3	-1.25%
6/25/2025	Head	22.6	2450	1.83	1.80	1.49%	38.7	39.2	-1.22%
6/25/2025	Head	22.6	2480	1.85	1.83	0.94%	38.7	39.2	-1.27%
6/25/2025	Head	22.6	2500	1.87	1.85	0.57%	38.6	39.1	-1.28%
6/25/2025	Head	22.6	2550	1.90	1.91	-0.36%	38.6	39.1	-1.32%
6/25/2025	Head	22.6	2600	1.94	1.96	-1.01%	38.5	39.0	-1.34%
6/29/2025	Head	22.9	2300	1.68	1.67	0.61%	37.6	39.5	-4.83%
6/29/2025	Head	22.9	2350	1.71	1.71	-0.09%	37.5	39.4	-4.75%
6/29/2025	Head	22.9	2400	1.75	1.76	-0.55%	37.4	39.3	-4.76%
6/29/2025	Head	22.9	2450	1.78	1.80	-1.17%	37.3	39.2	-4.73%
6/29/2025	Head	22.9	2480	1.80	1.83	-1.75%	37.3	39.2	-4.80%
6/29/2025	Head	22.9	2500	1.81	1.85	-2.15%	37.3	39.1	-4.82%
6/29/2025	Head	22.9	2550	1.85	1.91	-3.14%	37.2	39.1	-4.86%
6/29/2025	Head	22.9	2600	1.89	1.96	-3.87%	37.1	39.0	-4.89%

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

The SAR values were compensated for deviations between the measured and required tissue dielectric properties, as described in IEEE 1528-2013. The SAR values were applied to only scale up the measured SAR values, and not downward, per KDB Publication 865664 D01v04r04.

B.3. FCC System Validation

Per FCC KDB Publication 865664 D02 Section 2.3 a) states “SAR system validation status and system verification results should be documented in a separate section of the SAR report, or as an attachment, to confirm measurement accuracy.”

The SAR systems used for evaluating this device were validated against its performance specifications prior to the SAR measurements.

Reference dipoles were used with the required tissue-equivalent media for system validation, according to the procedures outlined in FCC KDB Publication 865664 D01 and IEEE 1528-2013. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point.

Per FCC KDB 865664 D02, “the validation status should be documented according to the validation date(s), measurement frequencies, SAR probes, calibrated signal type(s) and tissue dielectric parameters.” A tabulated summary of the system validation status is provided accordingly:

Table 3 System Validation

System	Frequency (MHz)	Date	Probe	DAE	Probe CalF		Cond. (σ)	Perm (ϵ_r)	CW Validation			Mod Validation		
					Freq (MHz)	Tissue Type			Sensitivity	Probe Linearity	Probe Isotropy	Mod Type	Duty Factor	PAR
Beta	2450	05/21/2025	7859	1905	2450	Head	1.72	37.8	PASS	PASS	PASS	OFDM	N/A	PASS

NOTE: The probes have been calibrated for both CW and modulated signals. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01 for scenarios when CW probe calibrations are used with other signal types.

SAR systems were additionally validated for modulated signals with a periodic duty cycle or with a high PAR (peak to average ratio) >5 dB, such as OFDM according to FCC KDB Publication 865664 D01 v01r04.

B.4. Sample TSL Compositions

TSL recipes are proprietary to SPEAG. Since the composition is approximate to the actual liquids utilized, the manufacturer data sheets are provided below.

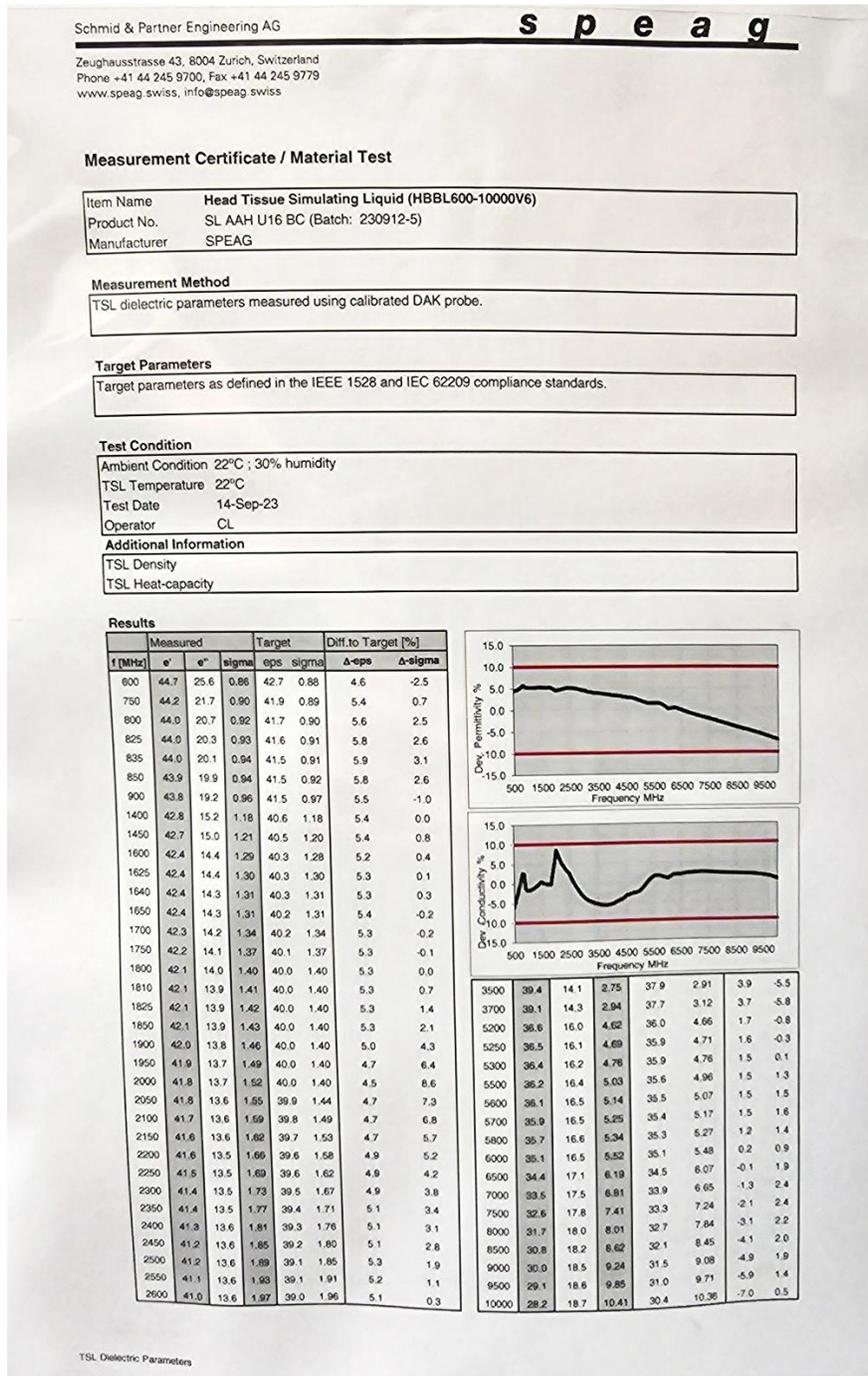


Figure 1 - Head TSL Calibration Certificate Example (600 – 10000 MHz)