

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. Full system validation status and result summary can be found in Section B.4.

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	Measured APD 4 cm ² (W/m ²)	1W target APD 4cm ² (W/m ²)	1W Normalized APD 4cm ² (W/m ²)	APD 4cm ² Deviation
Beta	6500	Head	7/7/2026	23.1	22.6	10	1104	7857	1838	2.790	298.000	279.000	-6.38%	0.516	55.000	51.600	-6.18%	12.5	1340	1250	-6.72%

B.2. Power Density System Check

The system was verified to be within ± 0.66 dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources.

The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes.

Table 2 System Check Results (Power Density)

Date	Probe SN	Frequency (MHz)	Source SN	Prad (mW)	Measured Normal psPD (W/m ²)	Target Normal psPD (W/m ²)	Deviation Normal psPD (dB)	Measured Total psPD (W/m ²)	Target Total psPD (W/m ²)	Deviation Total psPD (dB)
6/29/2026	9690	10000.0	1074	74.13	37.300	36.300	0.12	37.500	36.500	0.12

B.3. Dielectric Parameters of the TSL

Table 3 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
7/7/2026	Head	23	5910	5.23	5.39	-2.96%	36.1	35.2	2.52%
7/7/2026	Head	23	5950	5.27	5.43	-2.82%	36.0	35.2	2.42%
7/7/2026	Head	23	6000	5.33	5.48	-2.76%	35.9	35.1	2.41%
7/7/2026	Head	23	6050	5.39	5.54	-2.67%	35.8	35.0	2.25%
7/7/2026	Head	23	6100	5.45	5.60	-2.66%	35.8	35.0	2.25%
7/7/2026	Head	23	6150	5.52	5.66	-2.47%	35.7	34.9	2.15%
7/7/2026	Head	23	6200	5.57	5.72	-2.54%	35.6	34.9	2.11%
7/7/2026	Head	23	6250	5.64	5.78	-2.34%	35.5	34.8	2.05%
7/7/2026	Head	23	6500	5.93	6.07	-2.34%	35.1	34.5	1.78%
7/7/2026	Head	23	6750	6.23	6.36	-2.02%	34.7	34.2	1.46%
7/7/2026	Head	23	7000	6.52	6.65	-1.96%	34.4	33.9	1.40%
7/7/2026	Head	23	7250	6.84	6.95	-1.45%	33.9	33.6	0.88%
7/7/2026	Head	23	7950	7.70	7.78	-1.03%	32.8	32.8	0.22%
7/7/2026	Head	23	8000	7.75	7.84	-1.17%	32.8	32.7	0.32%

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.4. 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 4 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	6500	01/29/2026	7857	1838	6500	Head	6.04	32.7	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.

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

