

Appendix E. Tissue & System Verification

The measuring results for tissue simulating liquid and system check are shown as below.

Note:

1. For Section 4.3, the dielectric properties of the tissue simulating liquid have been measured within 24 hours before the SAR testing and within $\pm 10\%$ of the target values. Liquid temperature during the SAR testing has kept within $\pm 2^\circ\text{C}$.
2. For Section 4.4, The SAR measurement system was validated according to procedures in KDB 865664 D01. The validation status in tabulated summary is as below.
3. For Section 4.5, Comparing to the reference SAR value provided by SPEAG in dipole calibration certificate, the deviation of system check results is within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots please refer to Appendix A of this report.

Tissue Verification									Validation for CW			Validation for Modulation				System Validation					Note		
Plot No.	Frequency (MHz)	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (εr)	Targeted Conductivity (σ)	Targeted Permittivity (εr)	Deviation Conductivity (σ)	Deviation Permittivity (εr)	Sensitivity Range	Probe Linearity	Probe Isotropy	Modulation Type	Duty Factor	PAR	Date	Frequency (MHz)	Targeted 1g SAR (W/kg)	Measured 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
S01	835	23.2	0.906	40.795	0.9	41.5	0.67	-1.70	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	835	9.52	0.503	10.06	5.67	4d121	7555	1589
S02	1900	23.1	1.455	38.007	1.4	40	3.93	-4.98	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	1900	40.40	2.21	44.20	9.41	5d036	3650	1277
S03	1900	23.1	1.455	38.007	1.4	40	3.93	-4.98	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	1900	40.40	2.21	44.20	9.41	5d036	3650	1277
S04	835	23.1	0.917	42.924	0.9	41.5	1.89	3.43	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	835	9.52	0.485	9.70	1.89	4d121	3650	1277
S06	1750	23.2	1.323	39.022	1.37	40.1	-3.43	-2.69	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	1750	36.00	1.82	36.40	1.11	1055	7555	1589
S07	835	23.3	0.906	40.795	0.9	41.5	0.67	-1.70	Pass	Pass	Pass	N/A	N/A	N/A	July 6, 2021	835	9.52	0.503	10.06	5.67	4d121	7555	1589
S08	2600	23.3	2.045	37.845	1.96	39	4.34	-2.96	Pass	Pass	Pass	N/A	N/A	N/A	July 6, 2021	2600	55.50	2.77	55.40	-0.18	1020	7555	1589
S09	750	23.3	0.883	42.517	0.89	41.9	-0.79	1.47	Pass	Pass	Pass	N/A	N/A	N/A	July 6, 2021	750	8.48	0.433	8.66	2.12	1013	7555	1589
S10	750	23.3	0.883	42.517	0.89	41.9	-0.79	1.47	Pass	Pass	Pass	N/A	N/A	N/A	July 6, 2021	750	8.48	0.433	8.66	2.12	1013	7555	1589
S11	1900	23.3	1.458	38.53	1.4	40	4.14	-3.68	Pass	Pass	Pass	N/A	N/A	N/A	July 6, 2021	1900	40.40	2.05	41.00	1.49	5d036	7555	1589
S12	2450	23.3	1.887	37.709	1.8	39.2	4.83	-3.80	Pass	Pass	Pass	OFDM	N/A	Pass	July 6, 2021	2450	51.60	2.78	55.60	7.75	737	7554	1590
S13	5250	23.1	4.659	37.116	4.71	35.9	-1.08	3.39	Pass	Pass	Pass	OFDM	N/A	Pass	July 14, 2021	5250	80.60	4.03	80.60	0.00	1019	7555	1589
S15	5600	23.1	4.993	36.672	5.07	35.5	-1.52	3.30	Pass	Pass	Pass	OFDM	N/A	Pass	July 14, 2021	5600	82.40	4.53	90.60	9.95	1019	7555	1589
S16	5750	23.1	5.14	36.454	5.22	35.4	-1.53	2.98	Pass	Pass	Pass	OFDM	N/A	Pass	July 14, 2021	5750	79.40	3.96	79.20	-0.25	1019	7555	1589
S17	2450	23.3	1.887	37.709	1.8	39.2	4.83	-3.80	Pass	Pass	Pass	OFDM	N/A	Pass	July 6, 2021	2450	51.60	2.78	55.60	7.75	737	7554	1590
S18	835	23.2	0.906	40.795	0.9	41.5	0.67	-1.70	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	835	9.52	0.503	10.06	5.67	4d121	7555	1589
S19	1900	23.1	1.455	38.007	1.4	40	3.93	-4.98	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	1900	40.40	2.21	44.20	9.41	5d036	3650	1277
S20	1900	23.1	1.455	38.007	1.4	40	3.93	-4.98	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	1900	40.40	2.21	44.20	9.41	5d036	3650	1277
S21	835	23.1	0.917	42.924	0.9	41.5	1.89	3.43	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	835	9.52	0.485	9.70	1.89	4d121	3650	1277
S23	1750	23.3	1.333	38.7	1.37	40.1	-2.70	-3.49	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	1750	36.00	1.78	35.60	-1.11	1055	7554	1590
S24	835	23.3	0.907	40.942	0.9	41.5	0.78	-1.34	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	835	9.52	0.485	9.70	1.89	4d121	7554	1590
S25	2600	23.3	2.012	38.257	1.96	39	2.65	-1.91	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	2600	55.50	2.88	57.60	3.78	1020	7554	1590
S26	750	23.3	0.89	43.198	0.89	41.9	0.00	3.10	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	750	8.48	0.434	8.68	2.36	1013	7554	1590
S27	750	23.3	0.89	43.198	0.89	41.9	0.00	3.10	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	750	8.48	0.434	8.68	2.36	1013	7554	1590
S28	1900	23.3	1.464	38.131	1.4	40	4.57	-4.67	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	1900	40.40	1.93	38.60	-4.46	5d036	7554	1590
S29	2450	23.2	1.87	39.027	1.8	39.2	3.89	-0.44	Pass	Pass	Pass	OFDM	N/A	Pass	July 9, 2021	2450	51.60	2.64	52.80	2.33	737	7555	1589
S30	5250	23.2	4.794	34.835	4.71	35.9	1.78	-2.97	Pass	Pass	Pass	OFDM	N/A	Pass	July 13, 2021	5250	80.60	4.09	81.80	1.49	1019	7555	1589
S32	5600	23.2	5.122	34.338	5.07	35.5	1.03	-3.27	Pass	Pass	Pass	OFDM	N/A	Pass	July 15, 2021	5600	82.40	4.51	90.20	9.47	1019	7555	1589
S33	5750	23.2	5.267	34.124	5.22	35.4	0.90	-3.60	Pass	Pass	Pass	OFDM	N/A	Pass	July 15, 2021	5750	79.40	4.01	80.20	1.01	1019	7555	1589
S34	835	23.2	0.906	40.795	0.9	41.5	0.67	-1.70	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	835	9.52	0.503	10.06	5.67	4d121	7555	1589
S35	1900	23.1	1.455	38.007	1.4	40	3.93	-4.98	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	1900	40.40	2.21	44.20	9.41	5d036	3650	1277
S36	1900	23.1	1.455	38.007	1.4	40	3.93	-4.98	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	1900	40.40	2.21	44.20	9.41	5d036	3650	1277
S37	835	23.1	0.917	42.924	0.9	41.5	1.89	3.43	Pass	Pass	Pass	N/A	N/A	N/A	July 8, 2021	835	9.52	0.485	9.70	1.89	4d121	3650	1277
S39	1750	23.3	1.333	38.7	1.37	40.1	-2.70	-3.49	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	1750	36.00	1.78	35.60	-1.11	1055	7554	1590
S40	835	23.3	0.907	40.942	0.9	41.5	0.78	-1.34	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	835	9.52	0.485	9.70	1.89	4d121	7554	1590
S41	2600	23.3	2.012	38.257	1.96	39	2.65	-1.91	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	2600	55.50	2.88	57.60	3.78	1020	7554	1590
S42	750	23.3	0.89	43.198	0.89	41.9	0.00	3.10	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	750	8.48	0.434	8.68	2.36	1013	7554	1590
S43	750	23.3	0.89	43.198	0.89	41.9	0.00	3.10	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	750	8.48	0.434	8.68	2.36	1013	7554	1590
S44	1900	23.3	1.464	38.131	1.4	40	4.57	-4.67	Pass	Pass	Pass	N/A	N/A	N/A	July 7, 2021	1900	40.40	1.93	38.60	-4.46	5d036	7554	1590
S45	2450	23.2	1.87	39.027	1.8	39.2	3.89	-0.44	Pass	Pass	Pass	OFDM	N/A	Pass	July 9, 2021	2450	51.60	2.64	52.80	2.33	737	7555	1589
S46	5250	23.2	4.794	34.835	4.71	35.9	1.78	-2.97	Pass	Pass	Pass	OFDM	N/A	Pass	July 13, 2021	5250	80.60	4.09	81.80	1.49	1019	7555	1589
S48	5750	23.2	5.267	34.124	5.22	35.4	0.90	-3.60	Pass	Pass	Pass	OFDM	N/A	Pass	July 15, 2021	5750	79.40	4.01	80.20	1.01	1019	7555	1589
S49	2450	23.1	1.875	38.898	1.8	39.2	4.17	-0.77	Pass	Pass	Pass	OFDM	N/A	Pass	July 11, 2021	2450	51.60	2.64	52.80	2.33	737	7555	1589

Tissue Verification									Validation for CW			Validation for Modulation				System Validation					Note		
Plot No.	Frequency (MHz)	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Targeted Conductivity (σ)	Targeted Permittivity (ϵ_r)	Deviation Conductivity (σ)	Deviation Permittivity (ϵ_r)	Sensitivity Range	Probe Linearity	Probe Isotropy	Modulation Type	Duty Factor	PAR	Date	Frequency (MHz)	Targeted 10g SAR (W/kg)	Measured 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
S50	5250	23.2	4.794	34.835	4.71	35.9	1.78	-2.97	Pass	Pass	Pass	OFDM	N/A	Pass	Jul. 13, 2021	5250	23.00	1.22	24.40	6.09	1019	7555	1589
S52	5600	23.2	5.122	34.338	5.07	35.5	1.03	-3.27	Pass	Pass	Pass	OFDM	N/A	Pass	Jul. 15, 2021	5600	23.30	1.13	22.60	-3.00	1019	7555	1589