

# APPENDIX D: SAR TISSUE SPECIFICATIONS

## Measurement Procedure for Tissue verification:

- 1) The network analyzer and probe system was configured and calibrated.
- The probe was immersed in the tissue. The tissue was placed in a nonmetallic container. 2) Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
- 3) The complex admittance with respect to the probe aperture was measured
- 4) The complex relative permittivity ɛ can be calculated from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{\left[\ln(b/a)\right]^2} \int_a^b \int_0^a \int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively,  $r^2 = \rho^2 + {\rho'}^2 - 2\rho\rho' \cos \phi'$ ,  $\omega$  is the angular frequency, and  $j = \sqrt{-1}$ .

#### 3 Composition / Information on ingredients

3.2 Mixtures Description: Aqueous solution with surfactants and inhibitors Declarable, or hazardous components:

beclarable, or nazarabas components.									
CAS: 107-21-1	Ethanediol	>1.0-4.9%							
EINECS: 203-473-3	STOT RE 2, H373;								
Reg.nr.: 01-2119456816-28-0000	Acute Tox. 4, H302								
CAS: 68608-26-4	Sodium petroleum sulfonate	< 2.9%							
EINECS: 271-781-5	Eye Irrit. 2, H319								
Reg.nr.: 01-2119527859-22-0000									
CAS: 107-41-5	Hexylene Glycol / 2-Methyl-pentane-2,4-diol	< 2.9%							
EINECS: 203-489-0	Skin Irrit. 2, H315; Eye Irrit. 2, H319								
Reg.nr.: 01-2119539582-35-0000									
CAS: 68920-66-1	Alkoxylated alcohol, > C <sub>16</sub>	< 2.0%							
NLP: 500-236-9	Aquatic Chronic 2, H411;								
Reg.nr.: 01-2119489407-26-0000	Skin Irrit. 2, H315; Eye Irrit. 2, H319								

Additional information: For the wording of the listed risk phrases refer to section 16.

Not mentioned CAS-, EINECS- or registration numbers are to be regarded as Proprietary/Confidential. The specific chemical identity and/or exact percentage concentration of proprietary components is withheld as a trade secret.

### Figure D-1

Note: Liquid recipes are proprietary SPEAG. Since the composition is approximate to the actual liquids utilized, the manufacturer tissue-equivalent liquid data sheets are provided below.

<b>DUT</b> : 7591-04	SAR EVALUATION REPORT	Approved by:		
		Technical Manager		
<b>DUT Type/Apparatus/</b> Portable Sensor	vice:	APPENDIX D: Page 1 of 2		



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#### Measurement Certificate / Material Test

Item Name	Head Tissue Simulating Liquid (HBBL600-10000V6)	
Product No.	SL AAH U16 BC (Batch: 210629-3)	
Manufacturer	SPEAG	

#### Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

#### Target Parameters

Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

#### Test Condition

n 22°C ; 30% humidity	
22°C	
1-Jul-21	
WM	
nation	
/	
	22°C 1-Jul-21

#### Results

	Measured			Target Diff.to Target [%]			15.0							_	
f [MHz]	e'	0"	sigma	eps	sigma		∆-sigma	10.0	1.8-1			Red as	151		
600	44.7	25.5	0.85	42.7	0.88	4.6	-3.6			1.31		The second	E		1
750	44.1	21.6	0.90	41.9	0.89	5.1	0.7				-				
800	44.0	20.6	0.92	41.7	0.90	5.6	2.5	0.0 III				-	-		
825	44.0	20.2	0.93	41.6	0.91	5.8	2.6	Permittivity 0.0					1 1	-	-
835	44.0	20.0	0.93	41.5	0.91	5.9	2.0	3-10.0 -15.0							1.0
850	43.9	19.8	0.93	41.5	0.92	5.8	1.5			_	1	- 1 - 1	- Artes	a para	
900	43.8	19.0	0.95	41.5	0.97	5.5	-2.1	5	500 150	0 2500	3500 45 Frequen		500 7500	8500 9	500
1400	42.8	15.1	1.18	40.6	1.18	5.4	0.0					.,			-
1450	42.7	14.9	1.20	40.5	1.20	5.4	0.0	15.0	Sec. 1			15450	1		1
1600	42.4	14.4	1.28	40.3	1.28	5.2	-0.3	10.0	1000	A	1201			1.16	
1625	42.4	14.3	1.30	40.3	1.30	5.3	0.1	5.0 A		1					
1640	42.4	14.3	1.31	40.3	1.31	5.3	0.3	0.0 ret	N	1				2 20	
1650	42.3	14.3	1.31	40.2	1.31	5.1	-0.2	5.0 0.0 0.0 0.0 0.0	1	100	-				
1700	42.3	14.2	1.34	40.2	1.34	5.3	-0.2	010.0 015.0	1000	1.000	1	1000	and the second		
1750	42.2	14.1	1.37	40.1	1.37	5.3	-0.1		00 150	0 2500 3	3500 450	0 5500 6	500 7500	8500 95	:00
1800	42.1	14.0	1.40	40.0	1.40	5.3	0.0			0 2000 1		ncy MHz		0000 00	~~~
1810	42.1	13.9	1.41	40.0	1.40	5.3	0.7	3500	39.4	14.2	2.77	37.9	2.91	3.8	
1825	42.1	13.9	1.42	40.0	1.40	5.3	1.4	3700	39.0	14.4	2.96	37.7	3.12	3.6	
1850	42.0	13.9	1.43	40.0	1.40	5.0	2.1	5200	36.4	16.0	4.62	36.0	4.66	1.2	
1900	42.0	13.8	1.46	40.0	1.40	5.0	4.3	5250	36.3	16.0	4.68	35.9	4.71	1.1	÷
1950	41.9	13.8	1.49	40.0	1.40	4.7	6.4	5300	36.2	16.1	4.73	35.9	4.76	1.0	
2000	41.8	13.7	1.53	40.0	1.40	4.5	9.3	5500	35.9	16.2	4.96	35.6	4.96	0.6	1
2050	41.8	13.7	1.56	39.9	1.44	4.7	8.0	5600	35.7	16.3	5.08	35.5	5.07	0.4	3
2100	41.7	13.7	1.59	39.8	1.49	4.7	6.8	5700	35.5	16.4	5.20	35.4	5.17	0.2	3
2150	41.6	13.6	1.63	39.7	1.53	4.7	6.3	5800	35.3	16.5	5.31	35.3	5.27	0.0	1
2200	41.6	13.6	1.67	39.6	1.58	4.9	5.8	6000	34.9	16.6	5.55	35.1	5.48	-0.4	
2250	41.5	13.6	1.70	39.6	1.62	4.9	4.8	6500	34.0	17.1	6.17	34.5	6.07	-1.3	
2300	41.4	13.6	1.74	39.5	1.67	4.9	4.4	7000	33.1	17.4	6.78	33.9	6.65	-2.2	1
2350	41.3	13.6	1.78	39.4	1.71	4.9	4.0	7500	32.3	17.7	7.40	33.3	7.24	-3.1	
2400	41.3	13.6	1.82	39.3	1.76	5.1	3.7	8000	31.4	18.0	8.01	32.7	7.84	-4.1	1
2450	41.2	13.6	1.86	39.2	1.80	5.1	3.3	8500	30.5	18.2	8.62	32.1	8.45	-5.0	-
2500	41.1	13.6	1.90	39.1	1.85	5.0	2.5	9000	29.7	18.4	9.22	31.5	9.08	-5.9	
0000	41.0	13.7	1.94	39.1	1.91	4.9	1.6	9500	28.9	18.6	9.82	31.0	9.71	-6.7	
2550															

## Figure D-2 600 – 6000 MHz Head Tissue Equivalent Matter

<b>DUT</b> : 7591-04	SAR EVALUATION REPORT	Approved by: Technical Manager
DUT Type/Apparatus/Device: Portable Sensor		APPENDIX D: Page 2 of 2