APPENDIX B: SAR TISSUE SPECIFICATIONS

Measurement Procedure for Tissue verification:

- 1) The network analyzer and probe system was configured and calibrated.
- 2) The probe was immersed in the tissue. The tissue was placed in a nonmetallic container. 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 ε can be calculated from the below equation (Pournaropoulos and Misra):

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

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, $r^2 = \rho^2 + {\rho'}^2 - 2\rho\rho' \cos\phi'$, ω 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 compone	ents:	
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 ₁₆	< 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:		

dditional 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 B -15-1

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.

	FCC ID: A3LSMS711B	PART 2 RF EXPOSURE EVALUATION REPORT	Approved by: Technical Manager
	DUT Type:		APPENDIX B:
	Portable Handset		Page 1 of 2
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Schmid & Partner Engineering AG	S	p	е	а	a
Zeughausstrasse 43, 8004 Zurich, Switzerland Phone +41 44 245 9700, Fax +41 44 245 9779 info@speag.com, http://www.speag.com					

Measurement Certificate / Material Test

Item Name	Head Tissue Simulating Liquid (HBBL600-10000V6)
Product No.	SL AAH U16 BC (Batch: 181031-2)
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		
Ambient Condition	22°C ; 30% humidity	
TSL Temperature		
Test Date	31-Oct-18	
Operator	CL	
Additional Inform	ation	
TSL Density		
TSL Heat-capacity		

Results

	Meas	ured		Targe	et	Diff.to Targ	get [%]	15.0							
f [MHz]	e'	0"	sigma	eps	sigma	∆-eps	∆-sigma	15.0		11352		1000	a tast		
800	43.8	20.5	0.91	41.7	0.90	5.1	1.4	10.0	0				- 11		
825	43.8	20.1	0.92	41.6	0.91	5.3	1.5	× 5.0		-					
835	43.8	19.9	0.93	41.5	0.91	5.4	2.0	itivit,				~			
850	43.7	19.7	0.93	41.5	0.92	5.3	1.5	E	210						
900	43.5	18.9	0.95	41.5	0.97	4.8	-2.1								-
1400	42.5	15.0	1.17	40.6	1.18	4.7	-0.8	Å 0-10.0)						
1450	42.5	14.8	1.19	40.5	1.20	4.9	-0.8	-15.0		13.512	1	1			1
1600	42.2	14.3	1.27	40.3	1.28	4.7	-1.1		500 15	00 2500	3500 4 Freque	500 5500 ancy MHz	6500 750	0 8500 9	9500
1625	42.2	14.2	1.29	40.3	1.30	4.8	-0.7	15.0				,			
1640	42.2	14.2	1.30	40.3	1.31	4.8	-0.5				40.00			1	
1650	42.1	14.2	1.30	40.2	1.31	4.6	-1.0	10.0	1000						
1700	42.1	14.0	1.33	40.2	1.34	4.8	-0.9		1000	Λ					
1750	42.0	13.9	1.36	40.1	1.37	4.8	-0.8	0.0 Incti-	1	11		-	-	-	_
1800	41.9	13.9	1.39	40.0	1.40	4.7	-0.7	0.0 0.0 0.0 0.0 0.0	P	- /		/			
									10000		~				
1810	41.9	13.8	1.40	40.0	1.40	4.7	0.0	8	1000						1967
1825	41.9 41.9	13.8 13.8	1.40 1.41	40.0	1.40 1.40	4.7	0.0	a10.0							
					1.11		12,000	-15.0	E00. 160	0.0500	0500.45				
1825	41.9	13.8	1.41	40.0	1.40	4.7	0.7	-15.0	500 150	00 2500	3500 45 Freque	500 5500 6 ency MHz	3500 7500	8500 9	500
1825 1850	41.9 41.8	13.8 13.8	1.41 1.42	40.0 40.0	1.40 1.40	4.7 4.5	0.7 1.4	-15.0	500 150	00 2500	3500 45 Freque	00 5500 e ency MHz 36.0	3500 7500	8500 9	
1825 1850 1900 1950	41.9 41.8 41.8	13.8 13.8 13.7	1.41 1.42 1.45	40.0 40.0 40.0	1.40 1.40 1.40	4.7 4.5 4.5	0.7 1.4 3.6	-15.0	-		Frequ	ency MHz		0.9	-1
1825 1850 1900 1950 2000	41.9 41.8 41.8 41.7	13.8 13.8 13.7 13.7	1.41 1.42 1.45 1.48	40.0 40.0 40.0 40.0	1.40 1.40 1.40 1.40	4.7 4.5 4.5 4.3	0.7 1.4 3.6 5.7	-15.0 5200	36.3	15.8	4.57	ancy MHz 36.0	4.66		-1 -1
1825 1850 1900 1950 2000 2050	41.9 41.8 41.8 41.7 41.6	13.8 13.8 13.7 13.7 13.6	1.41 1.42 1.45 1.48 1.51	40.0 40.0 40.0 40.0 40.0	1.40 1.40 1.40 1.40 1.40	4.7 4.5 4.3 4.0	0.7 1.4 3.6 5.7 7.9	-15.0 5200 5250	36.3 36.2	15.8 15.9	4.57 4.63	36.0 35.9	4.66 4.71	0.9 0.8	-1 -1 -1
1825 1850 1900 1950 2000 2050 2100	41.9 41.8 41.8 41.7 41.6 41.6	13.8 13.8 13.7 13.7 13.6 13.6	1.41 1.42 1.45 1.48 1.51 1.55	40.0 40.0 40.0 40.0 40.0 39.9	1.40 1.40 1.40 1.40 1.40 1.44	4.7 4.5 4.3 4.0 4.2	0.7 1.4 3.6 5.7 7.9 7.3	-15.0 5200 5250 5300	36.3 36.2 36.1	15.8 15.9 15.9	4.57 4.63 4.69	36.0 35.9 35.9	4.66 4.71 4.76 4.96	0.9 0.8 0.7 0.3	500 -1 -1. -1. -0. -0.
1825 1850 1900 1950 2000 2050 2100 2150	41.9 41.8 41.7 41.6 41.6 41.5	13.8 13.8 13.7 13.7 13.6 13.6 13.5	1.41 1.42 1.45 1.48 1.51 1.55 1.58	40.0 40.0 40.0 40.0 39.9 39.8	1.40 1.40 1.40 1.40 1.40 1.44 1.49	4.7 4.5 4.3 4.0 4.2 4.2	0.7 1.4 3.6 5.7 7.9 7.3 6.1	-15.0 5200 5250 5300 5500	36.3 36.2 36.1 35.8	15.8 15.9 15.9 16.1	4.57 4.63 4.69 4.92	36.0 35.9 35.9 35.6	4.66 4.71 4.76	0.9 0.8 0.7	-1 -1. -1. -0.
1825 1850 1900 2000 2050 2100 2150 2200	41.9 41.8 41.8 41.7 41.6 41.6 41.5 41.4	13.8 13.8 13.7 13.7 13.6 13.6 13.5 13.5	1.41 1.42 1.45 1.48 1.51 1.55 1.58 1.62	40.0 40.0 40.0 40.0 39.9 39.8 39.7	1.40 1.40 1.40 1.40 1.40 1.44 1.49 1.53	4.7 4.5 4.3 4.0 4.2 4.2 4.2 4.2	0.7 1.4 3.6 5.7 7.9 7.3 6.1 5.7	-15.0 5200 5250 5300 5500 5600	36.3 36.2 36.1 35.8 35.6	15.8 15.9 15.9 16.1 16.2	4.57 4.63 4.69 4.92 5.04	36.0 35.9 35.9 35.6 35.5	4.66 4.71 4.76 4.96 5.07	0.9 0.8 0.7 0.3 0.1	-1 -1 -1. -0.
1825 1850 1900	41.9 41.8 41.7 41.6 41.6 41.5 41.4 41.4	13.8 13.8 13.7 13.7 13.6 13.6 13.5 13.5 13.5	1.41 1.42 1.45 1.48 1.51 1.55 1.58 1.62 1.65	40.0 40.0 40.0 40.0 39.9 39.8 39.7 39.6	1.40 1.40 1.40 1.40 1.40 1.44 1.49 1.53 1.58	4.7 4.5 4.3 4.0 4.2 4.2 4.2 4.2 4.2 4.4	0.7 1.4 3.6 5.7 7.9 7.3 6.1 5.7 4.6	-15.0 5200 5250 5300 5500 5600 5700	36.3 36.2 36.1 35.8 35.6 35.4	15.8 15.9 15.9 16.1 16.2 16.2	4.57 4.63 4.69 4.92 5.04 5.15	36.0 35.9 35.9 35.6 35.5 35.4	4.66 4.71 4.76 4.96 5.07 5.17	0.9 0.8 0.7 0.3 0.1 0.0	-1 -1 -1 -0 -0 -0
1825 1850 1900 2000 2050 2100 2150 2200 2250 2300 2300	41.9 41.8 41.7 41.6 41.6 41.5 41.4 41.4 41.3	13.8 13.8 13.7 13.7 13.6 13.6 13.5 13.5 13.5 13.5	1.41 1.42 1.45 1.48 1.51 1.55 1.58 1.62 1.65 1.69	40.0 40.0 40.0 39.9 39.8 39.7 39.6 39.6	1.40 1.40 1.40 1.40 1.40 1.44 1.49 1.53 1.58 1.62	4.7 4.5 4.3 4.0 4.2 4.2 4.2 4.2 4.2 4.2 4.4 4.4	0.7 1.4 3.6 5.7 7.9 7.3 6.1 5.7 4.6 4.2	-15.0 5200 5250 5300 5500 5600 5700 5800	36.3 36.2 36.1 35.8 35.6 35.4 35.2	15.8 15.9 15.9 16.1 16.2 16.2 16.3	Freque 4.57 4.63 4.69 4.92 5.04 5.15 5.27	36.0 35.9 35.9 35.6 35.5 35.4 35.3	4.66 4.71 4.76 4.96 5.07 5.17 5.27	0.9 0.8 0.7 0.3 0.1 0.0 -0.2	-1 -1 -0 -0 -0 0. 0.
1825 1850 1900 2000 2050 2100 2150 2200 2250 2300 2300	41.9 41.8 41.7 41.6 41.6 41.5 41.4 41.4 41.3 41.2	13.8 13.8 13.7 13.7 13.6 13.6 13.5 13.5 13.5 13.5 13.5	1.41 1.42 1.45 1.48 1.51 1.55 1.58 1.62 1.65 1.69 1.72 1.76	40.0 40.0 40.0 39.9 39.8 39.7 39.6 39.6 39.5	1.40 1.40 1.40 1.40 1.40 1.44 1.49 1.53 1.58 1.62 1.67	4.7 4.5 4.3 4.0 4.2 4.2 4.2 4.2 4.2 4.4 4.4 4.4	0.7 1.4 3.6 5.7 7.9 7.3 6.1 5.7 4.6 4.2 3.2	-15.0 5200 5250 5300 5500 5600 5700 5800 6000	36.3 36.2 36.1 35.8 35.6 35.4 35.2 34.9	15.8 15.9 15.9 16.1 16.2 16.2 16.3 16.5	4.57 4.63 4.69 4.92 5.04 5.15 5.27 5.50	36.0 35.9 35.9 35.6 35.5 35.4 35.3 35.1	4.66 4.71 4.76 4.96 5.07 5.17 5.27 5.48	0.9 0.8 0.7 0.3 0.1 0.0 -0.2 -0.6	-1 -1 -0 -0 -0 0. 0. 0.
1825 1850 1900 2000 2050 2150 2250 2250 2350 2350 2400	41.9 41.8 41.7 41.6 41.6 41.6 41.5 41.4 41.4 41.3 41.2 41.1	13.8 13.7 13.7 13.6 13.6 13.5 13.5 13.5 13.5 13.5 13.5 13.5	1.41 1.42 1.45 1.48 1.51 1.55 1.58 1.62 1.65 1.69 1.72 1.76 1.80	40.0 40.0 40.0 39.9 39.8 39.7 39.6 39.6 39.5 39.4	1.40 1.40 1.40 1.40 1.44 1.49 1.53 1.58 1.62 1.67 1.71	4.7 4.5 4.3 4.0 4.2 4.2 4.2 4.2 4.2 4.4 4.4 4.4 4.4	0.7 1.4 3.6 5.7 7.9 7.3 6.1 5.7 4.6 4.2 3.2 2.9	-15.0 5200 5250 5300 5500 5600 5700 5800 6000 6500	36.3 36.2 36.1 35.8 35.6 35.4 35.2 34.9 34.0	15.8 15.9 15.9 16.1 16.2 16.2 16.3 16.5 16.9	4.57 4.63 4.69 4.92 5.04 5.15 5.27 5.50 6.12	36.0 35.9 35.9 35.6 35.5 35.4 35.3 35.1 34.5	4.66 4.71 4.76 4.96 5.07 5.17 5.27 5.48 6.07	0.9 0.8 0.7 0.3 0.1 0.0 -0.2 -0.6 -1.4	-1 -1 -0 -0 -0 0. 0. 0. 0. 1.
1825 1850 1900 2000 2050 2100 2150 2200 2250 2350 2400 2450 2500	41.9 41.8 41.7 41.6 41.6 41.5 41.4 41.4 41.4 41.3 41.2 41.1 41.1	13.8 13.7 13.7 13.6 13.6 13.5 13.5 13.5 13.5 13.5 13.5 13.5 13.5	1.41 1.42 1.45 1.48 1.51 1.55 1.58 1.62 1.65 1.69 1.72 1.76 1.80 1.80	40.0 40.0 40.0 39.9 39.8 39.7 39.6 39.6 39.6 39.5 39.4 39.3	1.40 1.40 1.40 1.40 1.44 1.49 1.53 1.58 1.62 1.67 1.71 1.76	4.7 4.5 4.3 4.0 4.2 4.2 4.2 4.2 4.4 4.4 4.4 4.4 4.6	0.7 1.4 3.6 5.7 7.9 7.3 6.1 5.7 4.6 4.2 3.2 2.9 2.5	-15.0 5200 5250 5300 5500 5600 5700 5800 6000 6500 7000	36.3 36.2 36.1 35.8 35.6 35.4 35.2 34.9 34.0 33.1	15.8 15.9 16.1 16.2 16.3 16.5 16.9	Freque 4.57 4.63 4.69 4.92 5.04 5.15 5.27 5.50 6.12 6.74	ancy MHz 36.0 35.9 35.9 35.6 35.5 35.4 35.3 35.1 34.5 33.9	4.66 4.71 4.76 4.96 5.07 5.17 5.27 5.48 6.07 6.65	0.9 0.8 0.7 0.3 0.1 0.0 -0.2 -0.6 -1.4 -2.3	-1 -1 -0 -0 -0 -0 .0 .0 .0 .1 .1 .1
1825 1850 1900 2000 2000 2100 2100 22200 22200 22200 23300 23300 23500 24500	41.9 41.8 41.7 41.6 41.6 41.5 41.4 41.4 41.3 41.2 41.1 41.1 41.1 41.0	13.8 13.7 13.7 13.6 13.6 13.5 13.5 13.5 13.5 13.5 13.5 13.5 13.5	1.41 1.42 1.45 1.51 1.55 1.58 1.65 1.69 1.72 1.76 1.80 1.88	40.0 40.0 40.0 39.9 39.8 39.7 39.6 39.6 39.6 39.5 39.4 39.3 39.3	1.40 1.40 1.40 1.40 1.44 1.49 1.53 1.58 1.62 1.67 1.71 1.76 1.80	4.7 4.5 4.3 4.0 4.2 4.2 4.2 4.2 4.2 4.2 4.4 4.4 4.4 4.4	0.7 1.4 3.6 5.7 7.9 7.3 6.1 5.7 4.6 4.2 3.2 2.9 2.5 2.2	-15.0 5200 5250 5300 5500 5500 5700 5800 6000 6500 7000 7500	36.3 36.2 36.1 35.8 35.6 35.4 35.2 34.9 34.0 33.1 32.2	15.8 15.9 16.1 16.2 16.3 16.5 16.9 17.3 17.6	Freque 4.57 4.63 4.69 4.92 5.04 5.15 5.27 5.50 6.12 6.74 7.36	acy MHz 36.0 35.9 35.6 35.5 35.4 35.3 35.1 34.5 33.9 33.3	4.66 4.71 4.76 5.07 5.17 5.27 5.48 6.07 6.65 7.24	0.9 0.8 0.7 0.3 0.1 0.0 -0.2 -0.6 -1.4 -2.3 -3.2	-1 -1 -0 -0 -0 -0 0. 0. 0. 1. 1. 1. 1.
1825 1850 1900 2000 2010 2100 2100 2200 2300 2300 2400 2500	41.9 41.8 41.7 41.6 41.6 41.5 41.4 41.4 41.3 41.2 41.1 41.1 41.0 40.9	13.8 13.7 13.7 13.6 13.6 13.5 13.5 13.5 13.5 13.5 13.5 13.5 13.5	1.41 1.42 1.45 1.48 1.51 1.55 1.58 1.62 1.65 1.69 1.72 1.76 1.80 1.84 1.88 1.92	40.0 40.0 40.0 40.0 39.9 39.8 39.7 39.6 39.6 39.5 39.4 39.3 39.2 39.2	1.40 1.40 1.40 1.40 1.44 1.49 1.53 1.58 1.62 1.67 1.71 1.76 1.80 1.85	4.7 4.5 4.3 4.0 4.2 4.2 4.2 4.2 4.2 4.4 4.4 4.4 4.4 4.4	0.7 1.4 3.6 5.7 7.9 7.3 6.1 5.7 4.6 4.2 3.2 2.9 2.5 2.2 2.2 1.4	-15.0 5200 5250 5300 5500 5500 5700 5800 6000 6500 7000 7500 8000	36.3 36.2 36.1 35.8 35.6 35.4 35.2 34.9 34.0 33.1 32.2 31.4	15.8 15.9 15.9 16.1 16.2 16.2 16.3 16.5 16.9 17.3 17.6 17.9	Freque 4.57 4.63 4.69 4.92 5.04 5.15 5.27 5.50 6.12 6.74 7.36 7.97	acy MHz 36.0 35.9 35.6 35.5 35.4 35.3 35.1 34.5 33.3 32.7	4.66 4.71 4.76 5.07 5.17 5.27 5.48 6.07 6.65 7.24 7.84	0.9 0.8 0.7 0.3 0.1 0.0 -0.2 -0.6 -1.4 -2.3 -3.2 -4.1	-1 -1 -0 -0 -0 0. 0. 1. 1. 1. 1. 1. 1.
1825 1850 1900 2000 2050 2100 2150 2200 2250	41.9 41.8 41.7 41.6 41.6 41.5 41.4 41.4 41.3 41.2 41.1 41.0 40.9 40.8	13.8 13.7 13.7 13.6 13.6 13.5 13.5 13.5 13.5 13.5 13.5 13.5 13.5	1.41 1.42 1.43 1.41 1.42 1.43 1.51 1.55 1.58 1.62 1.65 1.69 1.72 1.76 1.84 1.84 1.92 1.96	40.0 40.0 40.0 40.0 39.9 39.8 39.7 39.6 39.7 39.6 39.5 39.4 39.3 39.2 39.2 39.2	1.40 1.40 1.40 1.40 1.44 1.49 1.53 1.58 1.62 1.67 1.71 1.76 1.80 1.85 1.91	4.7 4.5 4.3 4.0 4.2 4.2 4.2 4.2 4.2 4.4 4.4 4.4 4.4 4.4	0.7 1.4 3.6 5.7 7.9 7.3 6.1 5.7 4.6 4.2 3.2 2.9 2.9 2.2 1.4 0.6	-15.0 5200 5300 5300 5500 5500 5500 6000 6500 7000 7500 8000 8500	36.3 36.2 36.1 35.8 35.6 35.4 35.2 34.9 34.0 33.1 32.2 31.4 30.5	15.8 15.9 15.9 16.1 16.2 16.2 16.3 16.5 16.9 17.3 17.6 17.9 18.2	Freque 4.57 4.63 4.92 5.04 5.15 5.27 5.50 6.12 6.74 7.36 7.97 8.59	36.0 35.9 35.9 35.6 35.5 35.4 35.1 34.5 33.9 33.3 32.7 32.1	4.66 4.71 4.76 4.96 5.07 5.17 5.27 5.48 6.07 6.65 7.24 7.84 8.45	0.9 0.8 0.7 0.3 0.1 0.0 -0.2 -0.6 -1.4 -2.3 -3.2 -4.1 -5.0	-1 -1 -0 -0 -0 0.

TSL Dielectric Parameters

Figure B-15-2 600 – 5800 MHz Head Tissue Equivalent Matter

FCC ID: A3LSMS711B	PART 2 RF EXPOSURE EVALUATION REPORT	Approved by:
FCC ID. ASLSING/TTD	FART 2 RF EAFOSORE EVALUATION REPORT	Technical Manager
DUT Type:		APPENDIX B:
Portable Handset		Page 2 of 2
023 Element		REV 1.0 04/06/2020