

## APPENDIX E: 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  $\epsilon'$  can be calculated from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\epsilon_r\epsilon_0}{[\ln(b/a)]^2} \int_a^b \int_a^b \int_0^\pi \cos\phi' \frac{\exp[-j\omega r(\mu_0\epsilon_r\epsilon_0)^{1/2}]}{r} d\phi'd\rho'd\rho$$

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:**

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

**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 E-4**

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: A3LSMS918U            | FCC URS (UNINTENTIONAL RADIATOR RF SOURCES)<br>RF EXPOSURE EVALUATION | Approved by:<br>Technical Manager |
| DUT Type:<br>Portable Handset |   | APPENDIX E<br>Page 1 of 2         |

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**Measurement Certificate / Material Test**

|              |  |
|--------------|--|
| Item Name    | Body Tissue Simulating Liquid (MBBL600-6000V6) |
| Product No.  | SL AAM U16 BC (Batch: 210621-3)                |
| Manufacturer | SPEAG  |

**Measurement Method**

TSL dielectric parameters measured using calibrated DAK probe.

**Target Parameters**

Target parameters as defined in the KDB 865664 compliance standard.

**Test Condition**

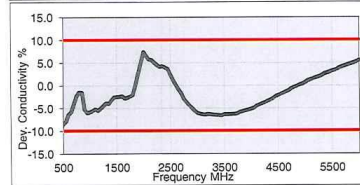
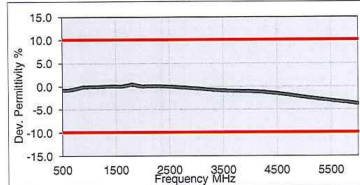
Ambient Condition 22°C ; 30% humidity  
 TSL Temperature 22°C  
 Test Date 23-Jun-21  
 Operator WM

**Additional Information**

TSL Density  
 TSL Heat-capacity

**Results**

| f [MHz] | Measured |      |       | Target |       | Diff.to Target [%] |         |
|---------|----------|------|-------|--------|-------|--------------------|---------|
|         | e'       | e''  | sigma | eps    | sigma | Δ-eps              | Δ-sigma |
| 600     | 55.7     | 26.7 | 0.89  | 56.1   | 0.95  | -0.7               | -6.3    |
| 750     | 55.3     | 22.5 | 0.94  | 55.5   | 0.96  | -0.4               | -2.1    |
| 800     | 55.1     | 21.5 | 0.96  | 55.3   | 0.97  | -0.4               | -1.0    |
| 825     | 55.1     | 21.1 | 0.97  | 55.2   | 0.98  | -0.3               | -1.0    |
| 835     | 55.1     | 20.8 | 0.97  | 55.1   | 0.99  | 0.0                | -1.5    |
| 850     | 55.0     | 20.6 | 0.97  | 55.2   | 0.99  | -0.3               | -2.0    |
| 900     | 54.9     | 19.9 | 0.99  | 55.0   | 1.05  | -0.2               | -5.7    |
| 1400    | 54.1     | 15.9 | 1.24  | 54.1   | 1.28  | 0.0                | -3.1    |
| 1450    | 54.0     | 15.7 | 1.27  | 54.0   | 1.30  | 0.0                | -2.3    |
| 1600    | 53.8     | 15.3 | 1.36  | 53.8   | 1.39  | 0.0                | -2.2    |
| 1625    | 53.8     | 15.2 | 1.38  | 53.8   | 1.41  | 0.1                | -2.1    |
| 1640    | 53.8     | 15.2 | 1.39  | 53.7   | 1.42  | 0.1                | -2.1    |
| 1650    | 53.7     | 15.1 | 1.39  | 53.7   | 1.43  | 0.0                | -2.8    |
| 1700    | 53.7     | 15.0 | 1.42  | 53.6   | 1.46  | 0.3                | -2.7    |
| 1750    | 53.6     | 14.9 | 1.45  | 53.4   | 1.49  | 0.3                | -2.7    |
| 1800    | 53.5     | 14.9 | 1.49  | 53.3   | 1.52  | 0.4                | -2.0    |
| 1810    | 53.5     | 14.9 | 1.50  | 53.3   | 1.52  | 0.4                | -1.3    |
| 1825    | 53.5     | 14.8 | 1.51  | 53.3   | 1.52  | 0.4                | -0.7    |
| 1850    | 53.5     | 14.8 | 1.52  | 53.3   | 1.52  | 0.4                | 0.0     |
| 1900    | 53.4     | 14.8 | 1.56  | 53.3   | 1.52  | 0.2                | 2.6     |
| 1950    | 53.4     | 14.7 | 1.60  | 53.3   | 1.52  | 0.2                | 5.3     |
| 2000    | 53.3     | 14.7 | 1.63  | 53.3   | 1.52  | 0.0                | 7.2     |
| 2050    | 53.3     | 14.7 | 1.67  | 53.2   | 1.57  | 0.1                | 6.4     |
| 2100    | 53.2     | 14.7 | 1.71  | 53.2   | 1.62  | 0.1                | 5.6     |
| 2150    | 53.1     | 14.7 | 1.75  | 53.1   | 1.66  | 0.0                | 5.4     |
| 2200    | 53.1     | 14.7 | 1.80  | 53.0   | 1.71  | 0.1                | 5.3     |
| 2250    | 53.0     | 14.7 | 1.84  | 53.0   | 1.76  | 0.1                | 4.5     |
| 2300    | 52.9     | 14.7 | 1.88  | 52.9   | 1.81  | 0.0                | 3.9     |
| 2350    | 52.9     | 14.8 | 1.93  | 52.8   | 1.85  | 0.1                | 4.3     |
| 2400    | 52.8     | 14.8 | 1.98  | 52.8   | 1.90  | 0.1                | 4.2     |
| 2450    | 52.7     | 14.8 | 2.02  | 52.7   | 1.95  | 0.0                | 3.6     |
| 2500    | 52.6     | 14.9 | 2.07  | 52.6   | 2.02  | -0.1               | 2.5     |
| 2550    | 52.5     | 14.9 | 2.12  | 52.6   | 2.09  | -0.1               | 1.4     |
| 2600    | 52.5     | 15.0 | 2.16  | 52.5   | 2.16  | 0.0                | 0.0     |



|       |      |      |      |      |      |      |      |
|-------|------|------|------|------|------|------|------|
| 3500  | 50.9 | 15.9 | 3.10 | 51.3 | 3.31 | -0.9 | -6.3 |
| 3700  | 50.6 | 16.2 | 3.33 | 51.1 | 3.55 | -1.0 | -6.2 |
| 5200  | 47.7 | 18.6 | 5.39 | 49.0 | 5.30 | -2.6 | 1.7  |
| 5250  | 47.6 | 18.7 | 5.46 | 49.0 | 5.36 | -2.7 | 1.9  |
| 5300  | 47.5 | 18.8 | 5.54 | 48.9 | 5.42 | -2.8 | 2.2  |
| 5500  | 47.1 | 19.1 | 5.83 | 48.6 | 5.65 | -3.0 | 3.2  |
| 5600  | 46.9 | 19.2 | 5.98 | 48.5 | 5.77 | -3.2 | 3.6  |
| 5700  | 46.7 | 19.3 | 6.13 | 48.3 | 5.88 | -3.3 | 4.2  |
| 5800  | 46.5 | 19.4 | 6.27 | 48.2 | 6.00 | -3.5 | 4.6  |
| 6000  | 46.1 | 19.7 | 6.57 | 47.9 | 6.23 | -3.7 | 5.5  |
| 6500  |      |      |      |      |      |      |      |
| 7000  |      |      |      |      |      |      |      |
| 7500  |      |      |      |      |      |      |      |
| 8000  |      |      |      |      |      |      |      |
| 8500  |      |      |      |      |      |      |      |
| 9000  |      |      |      |      |      |      |      |
| 9500  |      |      |      |      |      |      |      |
| 10000 |      |      |      |      |      |      |      |

**Figure E-2: Body Tissue Equivalent Matter**

|                               |   |                                   |
|-------------------------------|---|-----------------------------------|
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| DUT Type:<br>Portable Handset |   | APPENDIX E<br>Page 2 of 2         |