

## Head Tissue Simulating Liquids

Head Tissue	Parameters according to IEEE Std 1528-2013 / IEC 62209 / FCC KDB 865664 D01		
<b>Narrow-Band Solutions (±5% tolerance)</b>	<b>Product</b>	<b>Test Frequency (MHz)</b>	<b>Main Ingredients</b>
	HSL300V2	300	Water, Sugar
	HSL450V2	450	Water, Sugar
	HSL750V2	750	Water, Sugar
	HSL900V2	835, 900	Water, Sugar
	HSL1450V2	1450, 1500, 1640	Water, DGBE
	HSL1750V2	1750	Water, DGBE
	HSL1800V2	1800, 1900	Water, DGBE
	HSL1900V2	1900	Water, DGBE
	HSL1950V2	1950, 2000	Water, DGBE
HSL2450V2	2450, 2600	Water, DGBE	
<b>Broad-Band Solutions (±5% tolerance)</b>	<b>Product</b>	<b>Test Frequency (MHz)</b>	<b>Main Ingredients</b>
	HBBL30-250V3	30-250	Water, Tween
	HBBL1350-1850V3	1400-1800	Water, Tween
	HBBL1550-1950V3	1750-1900	Water, Tween
	HBBL1900-3800V3	1950-3000	Water, Tween
HBBL3500-5800V5	3500-5800	Water, Oil	

## Body Tissue Simulating Liquids

Body Tissue (Muscle)	Parameters according to FCC KDB 865664 D01		
<b>Narrow-Band Solutions (±5% tolerance)</b>	<b>Product</b>	<b>Test Frequency (MHz)</b>	<b>Main Ingredients</b>
	MSL300V2	300	Water, Sugar
	MSL450V2	400, 450	Water, Sugar
	MSL750V2	750	Water, Sugar
	MSL900V2	835, 900	Water, Sugar
	MSL1450V2	1450, 1500, 1640	Water, DGBE
	MSL1750V2	1750	Water, DGBE
	MSL1800V2	1800, 1900	Water, DGBE
	MSL1900V2	1900	Water, DGBE
	MSL1950V2	1950, 2100	Water, DGBE
MSL2450V2	2450, 2600	Water, DGBE	
<b>Broad-Band Solutions (±5% tolerance)</b>	<b>Product</b>	<b>Test Frequency (MHz)</b>	<b>Main Ingredients</b>
	MBBL130-250V3	130-250	Water, Tween
	MBBL1350-1850V3	1350-1800	Water, Tween
	MBBL1550-1950V3	1550-1850	Water, Tween
	MBBL1900-3800V3	1950-3800	Water, Tween
MBBL3500-5800V5	3500-5800	Water, Oil	

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	<b>Head Tissue Simulating Liquid (HBBL600-10000V6)</b>
Product No.	SL AAH U16 BC (Batch: 181106-1)
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**

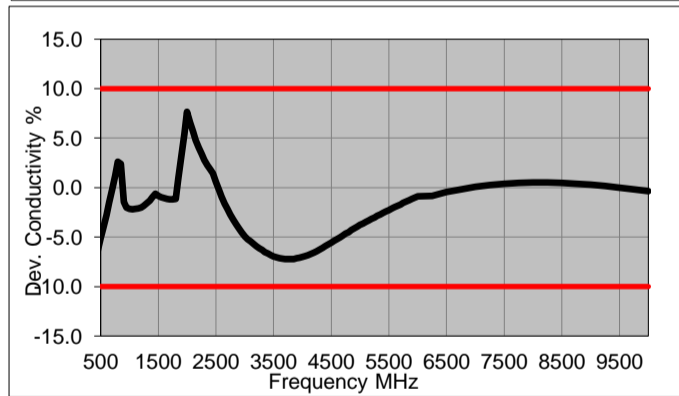
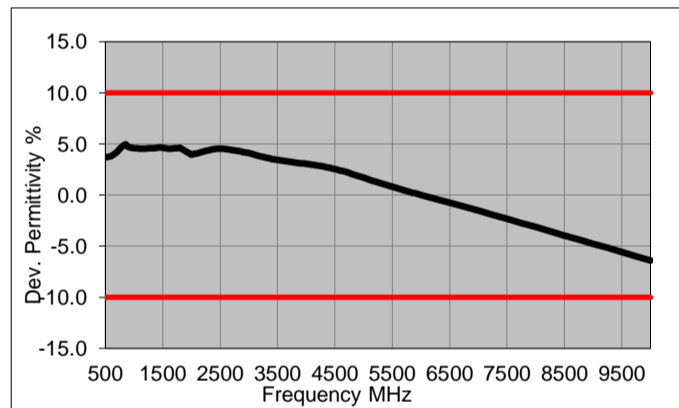
Ambient Condition 22°C ; 30% humidity  
 TSL Temperature 22°C  
 Test Date 7-Nov-18  
 Operator CL

**Additional Information**

TSL Density  
 TSL Heat-capacity

**Results**

f [MHz]	Measured			Target		Diff.to Target [%]	
	e'	e"	sigma	eps	sigma	D-eps	D-sigma
800	43.7	20.7	0.92	41.7	0.90	4.8	2.5
825	43.7	20.3	0.93	41.6	0.91	5.1	2.6
835	43.7	20.1	0.94	41.5	0.91	5.2	3.1
850	43.6	19.8	0.94	41.5	0.92	5.1	2.6
900	43.5	19.1	0.96	41.5	0.97	4.8	-1.0
1400	42.5	15.0	1.17	40.6	1.18	4.7	-0.8
1450	42.4	14.8	1.19	40.5	1.20	4.7	-0.8
1600	42.1	14.3	1.27	40.3	1.28	4.4	-1.1
1625	42.1	14.2	1.29	40.3	1.30	4.5	-0.7
1640	42.1	14.2	1.30	40.3	1.31	4.6	-0.5
1650	42.1	14.1	1.30	40.2	1.31	4.6	-1.0
1700	42.0	14.0	1.33	40.2	1.34	4.6	-0.9
1750	41.9	13.9	1.35	40.1	1.37	4.5	-1.5
1800	41.8	13.8	1.38	40.0	1.40	4.5	-1.4
1810	41.8	13.8	1.39	40.0	1.40	4.5	-0.7
1825	41.8	13.8	1.40	40.0	1.40	4.5	0.0
1850	41.8	13.7	1.41	40.0	1.40	4.5	0.7
1900	41.7	13.7	1.44	40.0	1.40	4.3	2.9
1950	41.6	13.6	1.48	40.0	1.40	4.0	5.7
2000	41.6	13.6	1.51	40.0	1.40	4.0	7.9
2050	41.5	13.5	1.54	39.9	1.44	4.0	6.6
2100	41.5	13.5	1.57	39.8	1.49	4.2	5.4
2150	41.4	13.4	1.61	39.7	1.53	4.2	5.0
2200	41.3	13.4	1.64	39.6	1.58	4.2	3.9
2250	41.3	13.4	1.68	39.6	1.62	4.4	3.6
2300	41.2	13.4	1.71	39.5	1.67	4.4	2.6
2350	41.1	13.4	1.75	39.4	1.71	4.4	2.3
2400	41.1	13.4	1.79	39.3	1.76	4.6	2.0
2450	41.0	13.4	1.83	39.2	1.80	4.6	1.7
2500	40.9	13.4	1.86	39.1	1.85	4.5	0.3
2550	40.8	13.4	1.90	39.1	1.91	4.4	-0.5
2600	40.8	13.5	1.95	39.0	1.96	4.6	-0.7
3500	39.2	13.9	2.71	37.9	2.91	3.4	-6.9
3700	38.9	14.1	2.89	37.7	3.12	3.3	-7.2



5200	36.5	15.6	4.51	36.0	4.66	1.3	-3.2
5250	36.4	15.6	4.56	35.9	4.71	1.2	-3.0
5300	36.3	15.7	4.62	35.9	4.76	1.1	-2.9
5500	35.9	15.9	4.85	35.6	4.96	0.8	-2.3
5600	35.8	15.9	4.96	35.5	5.07	0.6	-2.0
5700	35.6	16.0	5.08	35.4	5.17	0.5	-1.7
5800	35.4	16.1	5.20	35.3	5.27	0.3	-1.4
6000	35.1	16.3	5.43	35.1	5.48	0.0	-0.9
6500	34.2	16.7	6.04	34.5	6.07	-0.7	-0.5
7000	33.4	17.1	6.66	33.9	6.65	-1.5	0.1
7500	32.5	17.4	7.27	33.3	7.24	-2.3	0.4
8000	31.7	17.7	7.88	32.7	7.84	-3.1	0.5
8500	30.9	18.0	8.49	32.1	8.45	-4.0	0.5
9000	30.0	18.2	9.10	31.5	9.08	-4.8	0.3
9500	29.2	18.4	9.71	31.0	9.71	-5.6	0.0
10000	28.4	18.5	10.32	30.4	10.36	-6.4	-0.4