

Head Tissue Simulating Liquids

Head Tissue	Parameters according to IEEE Std 1528-2013 / IEC 62209 / FCC KDB 865664 D01		
Narrow-Band Solutions (±5% tolerance)	Product	Test Frequency (MHz)	Main Ingredients
	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	
Broad-Band Solutions (±5% tolerance)	Product	Test Frequency (MHz)	Main Ingredients
	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		
Narrow-Band Solutions (±5% tolerance)	Product	Test Frequency (MHz)	Main Ingredients
	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	
Broad-Band Solutions (±5% tolerance)	Product	Test Frequency (MHz)	Main Ingredients
	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	

Measurement Certificate / Material Test

Item Name	Head Tissue Simulating Liquid (HBBL600-10000V6)
Product No.	SL AAH U16 BD (Batch: 180208-1)
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

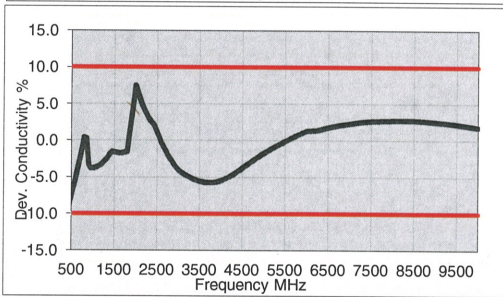
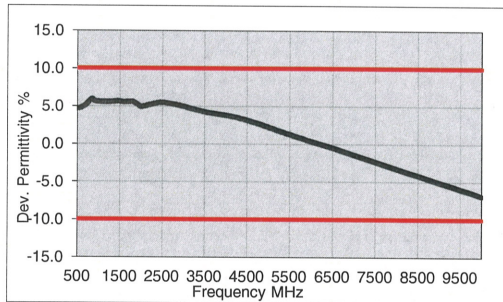
Ambient Condition 22°C ; 30% humidity
 TSL Temperature 22°C
 Test Date 8-Feb-18
 Operator WM

Additional Information

TSL Density
 TSL Heat-capacity

Results

f [MHz]	Measured			Target		Diff.to Target [%]	
	e'	e''	sigma	eps	sigma	Δ-eps	Δ-sigma
800	44.1	20.3	0.90	41.7	0.90	5.8	0.3
825	44.1	19.9	0.91	41.6	0.91	6.0	0.4
835	44.1	19.7	0.92	41.5	0.91	6.1	0.9
850	44.0	19.4	0.92	41.5	0.92	6.0	0.4
900	43.9	18.7	0.94	41.5	0.97	5.8	-3.1
1400	42.9	14.9	1.16	40.6	1.18	5.7	-1.6
1450	42.8	14.7	1.18	40.5	1.20	5.7	-1.7
1600	42.6	14.2	1.26	40.3	1.28	5.7	-1.9
1625	42.6	14.1	1.28	40.3	1.30	5.8	-1.4
1640	42.6	14.1	1.29	40.3	1.31	5.8	-1.2
1650	42.5	14.1	1.29	40.2	1.31	5.6	-1.8
1700	42.4	14.0	1.32	40.2	1.34	5.6	-1.6
1750	42.3	13.9	1.35	40.1	1.37	5.5	-1.5
1800	42.3	13.8	1.38	40.0	1.40	5.7	-1.4
1810	42.3	13.8	1.39	40.0	1.40	5.7	-0.7
1825	42.3	13.7	1.40	40.0	1.40	5.7	0.0
1850	42.2	13.7	1.41	40.0	1.40	5.5	0.7
1900	42.1	13.6	1.44	40.0	1.40	5.3	2.9
1950	42.0	13.6	1.47	40.0	1.40	5.0	5.0
2000	42.0	13.5	1.51	40.0	1.40	5.0	7.9
2050	41.9	13.5	1.54	39.9	1.44	5.0	6.6
2100	41.8	13.5	1.57	39.8	1.49	5.0	5.4
2150	41.8	13.5	1.61	39.7	1.53	5.2	5.0
2200	41.7	13.4	1.64	39.6	1.58	5.2	3.9
2250	41.6	13.4	1.68	39.6	1.62	5.2	3.6
2300	41.6	13.4	1.72	39.5	1.67	5.4	3.2
2350	41.5	13.4	1.76	39.4	1.71	5.4	2.9
2400	41.4	13.5	1.80	39.3	1.76	5.4	2.5
2450	41.4	13.5	1.84	39.2	1.80	5.6	2.2
2500	41.3	13.5	1.88	39.1	1.85	5.5	1.4
2550	41.2	13.5	1.92	39.1	1.91	5.4	0.6
2600	41.1	13.6	1.96	39.0	1.96	5.4	-0.2
3500	39.6	14.1	2.75	37.9	2.91	4.3	-5.5
3700	39.2	14.3	2.94	37.7	3.12	4.1	-5.7



5200	36.7	15.9	4.61	36.0	4.66	1.9	-1.0
5250	36.6	16.0	4.67	35.9	4.71	1.8	-0.9
5300	36.5	16.0	4.72	35.9	4.76	1.7	-0.7
5500	36.1	16.2	4.96	35.6	4.96	1.3	-0.1
5600	35.9	16.3	5.08	35.5	5.07	1.1	0.2
5700	35.7	16.4	5.19	35.4	5.17	0.9	0.5
5800	35.6	16.5	5.31	35.3	5.27	0.8	0.8
6000	35.2	16.6	5.55	35.1	5.48	0.4	1.3
6500	34.3	17.1	6.18	34.5	6.07	-0.5	1.8
7000	33.4	17.5	6.81	33.9	6.65	-1.4	2.3
7500	32.5	17.8	7.43	33.3	7.24	-2.3	2.7
8000	31.7	18.1	8.06	32.7	7.84	-3.2	2.8
8500	30.8	18.4	8.68	32.1	8.45	-4.2	2.8
9000	30.0	18.6	9.31	31.5	9.08	-5.1	2.6
9500	29.1	18.8	9.93	31.0	9.71	-5.9	2.2
10000	28.3	19.0	10.55	30.4	10.36	-6.9	1.8

Measurement Certificate / Material Test

Item Name	Body Tissue Simulating Liquid (MABL600-6000V6)
Product No.	SL AAM U16 BE (Batch: 180219-1)
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

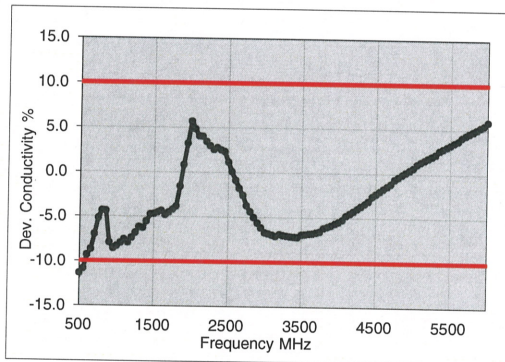
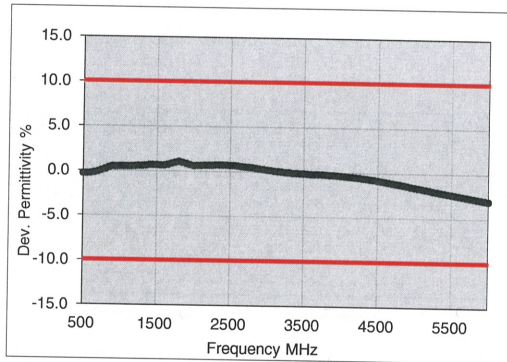
Ambient Condition 22°C ; 30% humidity
 TSL Temperature 22°C
 Test Date 21-Feb-18
 Operator WM

Additional Information

TSL Density
 TSL Heat-capacity

Results

f [MHz]	Measured			Target			Diff.to Target [%]	
	e'	e''	sigma	eps	sigma	Δ-eps	Δ-sigma	
800	55.4	20.9	0.93	55.3	0.97	0.1	-4.1	
825	55.4	20.4	0.94	55.2	0.98	0.3	-4.1	
835	55.4	20.2	0.95	55.1	0.99	0.5	-3.6	
850	55.3	20.0	0.95	55.2	0.99	0.3	-4.0	
900	55.3	19.3	0.97	55.0	1.05	0.5	-7.6	
1400	54.4	15.5	1.21	54.1	1.28	0.6	-5.5	
1450	54.4	15.4	1.24	54.0	1.30	0.7	-4.6	
1500	54.3	15.2	1.27	53.9	1.33	0.7	-4.5	
1550	54.2	15.1	1.30	53.9	1.36	0.6	-4.4	
1600	54.1	14.9	1.33	53.8	1.39	0.5	-4.3	
1625	54.1	14.9	1.35	53.8	1.41	0.7	-4.3	
1640	54.1	14.9	1.36	53.7	1.42	0.7	-4.2	
1650	54.1	14.8	1.36	53.7	1.43	0.8	-4.9	
1700	54.0	14.7	1.39	53.6	1.46	0.8	-4.8	
1750	53.9	14.7	1.43	53.4	1.49	0.9	-4.0	
1800	53.9	14.6	1.46	53.3	1.52	1.1	-3.9	
1810	53.9	14.6	1.47	53.3	1.52	1.1	-3.3	
1825	53.9	14.6	1.48	53.3	1.52	1.1	-2.6	
1850	53.8	14.5	1.50	53.3	1.52	0.9	-1.3	
1900	53.7	14.5	1.53	53.3	1.52	0.8	0.7	
1950	53.7	14.5	1.57	53.3	1.52	0.8	3.3	
2000	53.6	14.4	1.61	53.3	1.52	0.6	5.9	
2050	53.6	14.4	1.65	53.2	1.57	0.7	5.1	
2100	53.5	14.4	1.69	53.2	1.62	0.6	4.3	
2150	53.4	14.4	1.73	53.1	1.66	0.6	4.2	
2200	53.4	14.5	1.77	53.0	1.71	0.7	3.5	
2250	53.3	14.5	1.81	53.0	1.76	0.6	2.8	
2300	53.3	14.5	1.86	52.9	1.81	0.8	2.8	
2350	53.2	14.5	1.90	52.8	1.85	0.7	2.7	
2400	53.1	14.6	1.95	52.8	1.90	0.6	2.6	
2450	53.1	14.6	2.00	52.7	1.95	0.8	2.6	
2500	53.0	14.7	2.04	52.6	2.02	0.7	1.0	
2550	52.9	14.8	2.09	52.6	2.09	0.6	0.0	
2600	52.8	14.8	2.14	52.5	2.16	0.6	-0.9	



3500	51.2	15.8	3.08	51.3	3.31	-0.2	-6.9
3700	50.9	16.1	3.31	51.1	3.55	-0.2	-6.7
5200	48.1	18.6	5.39	49.0	5.30	-1.9	1.8
5250	48.0	18.7	5.47	49.0	5.36	-2.0	2.0
5300	47.9	18.8	5.54	48.9	5.42	-2.0	2.2
5500	47.5	19.1	5.84	48.6	5.65	-2.3	3.3
5600	47.3	19.2	5.99	48.5	5.77	-2.5	3.7
5700	47.1	19.4	6.14	48.3	5.88	-2.6	4.4
5800	46.9	19.5	6.29	48.2	6.00	-2.8	4.8