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Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MSL750V2)**
 Product No. SL AAM 075 AA (Charge: 140729-3)
 Manufacturer SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

Setup Validation

Validation results were within $\pm 2.5\%$ towards the target values of Methanol.

Target Parameters

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

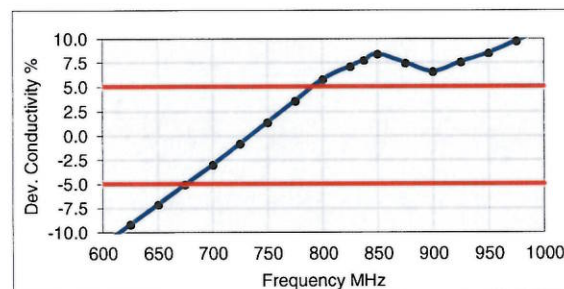
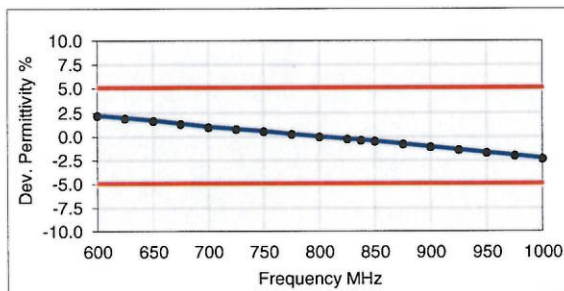
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 30-Jul-14
 Operator CL

Additional Information

TSL Density 1.212 g/cm³
 TSL Heat-capacity 3.006 kJ/(kg*K)

f [MHz]	Measured			Target		Diff.to Target [%]	
	HP-e'	HP-e''	sigma	eps	sigma	Δ -eps	Δ -sigma
600	57.4	25.30	0.84	56.1	0.95	2.2	-11.3
625	57.1	24.93	0.87	56.0	0.95	2.0	-9.2
650	56.9	24.55	0.89	55.9	0.96	1.7	-7.1
675	56.6	24.23	0.91	55.8	0.96	1.4	-5.0
700	56.3	23.90	0.93	55.7	0.96	1.0	-3.0
725	56.1	23.66	0.95	55.6	0.96	0.8	-0.8
750	55.8	23.41	0.98	55.5	0.96	0.6	1.4
775	55.6	23.20	1.00	55.4	0.97	0.3	3.6
800	55.3	22.99	1.02	55.3	0.97	0.0	5.8
825	55.1	22.83	1.05	55.2	0.98	-0.2	7.1
838	55.0	22.74	1.06	55.2	0.98	-0.4	7.8
850	54.9	22.66	1.07	55.2	0.99	-0.5	8.4
875	54.7	22.51	1.10	55.1	1.02	-0.8	7.5
900	54.4	22.35	1.12	55.0	1.05	-1.1	6.6
925	54.2	22.22	1.14	55.0	1.06	-1.4	7.6
950	54.0	22.09	1.17	54.9	1.08	-1.7	8.5
975	53.8	21.99	1.19	54.9	1.09	-2.0	9.7
1000	53.6	21.90	1.22	54.8	1.10	-2.3	11.0



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Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MSL900V2)**
 Product No. SL AAM 090 CA (Charge: 140710-1)
 Manufacturer SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

Setup Validation

Validation results were within $\pm 2.5\%$ towards the target values of Methanol.

Target Parameters

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

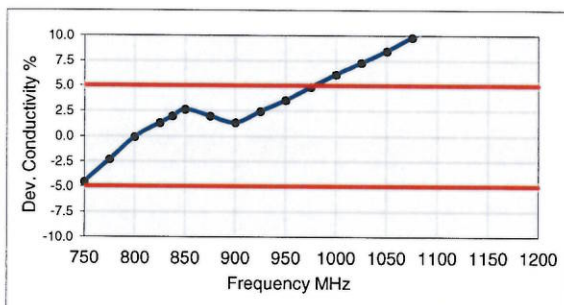
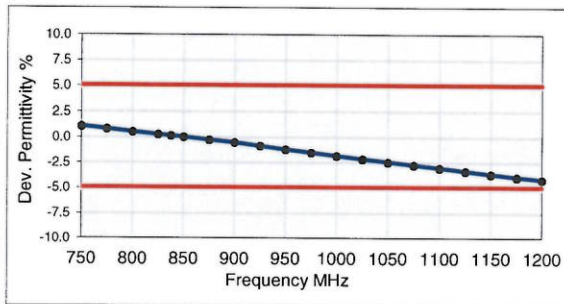
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 16-Jul-14
 Operator IEN

Additional Information

TSL Density 1.208 g/cm³
 TSL Heat-capacity 3.113 kJ/(kg·K)

f [MHz]	Measured			Target		Diff.to Target [%]	
	HP-e'	HP-e''	sigma	eps	sigma	Δ-eps	Δ-sigma
700	56.6	22.41	0.87	55.7	0.96	1.6	-9.0
725	56.4	22.23	0.90	55.6	0.96	1.3	-6.8
750	56.1	22.04	0.92	55.5	0.96	1.1	-4.5
775	55.9	21.88	0.94	55.4	0.97	0.8	-2.3
800	55.6	21.72	0.97	55.3	0.97	0.5	-0.1
825	55.4	21.59	0.99	55.2	0.98	0.3	1.3
838	55.3	21.52	1.00	55.2	0.98	0.2	2.0
850	55.2	21.46	1.01	55.2	0.99	0.0	2.6
875	54.9	21.35	1.04	55.1	1.02	-0.2	2.0
900	54.7	21.25	1.06	55.0	1.05	-0.5	1.3
925	54.5	21.17	1.09	55.0	1.06	-0.9	2.5
950	54.3	21.08	1.11	54.9	1.08	-1.2	3.6
975	54.1	21.01	1.14	54.9	1.09	-1.5	4.9
1000	53.8	20.95	1.17	54.8	1.10	-1.8	6.1
1025	53.6	20.88	1.19	54.8	1.11	-2.1	7.3
1050	53.4	20.81	1.22	54.7	1.12	-2.4	8.5
1075	53.2	20.79	1.24	54.7	1.13	-2.7	9.8
1100	53.0	20.76	1.27	54.7	1.14	-3.0	11.2
1125	52.8	20.71	1.30	54.6	1.15	-3.3	12.3
1150	52.6	20.66	1.32	54.6	1.17	-3.7	13.4
1175	52.4	20.64	1.35	54.5	1.18	-3.9	14.7
1200	52.2	20.63	1.38	54.5	1.19	-4.2	15.9



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Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MBBL1550-1950V3)**
 Product No. SL AAM 181 AA (Charge: 140826-1)
 Manufacturer SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

Setup Validation

Validation results were within $\pm 2.5\%$ towards the target values of Methanol.

Target Parameters

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

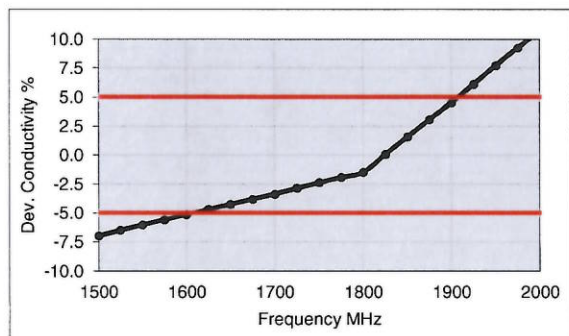
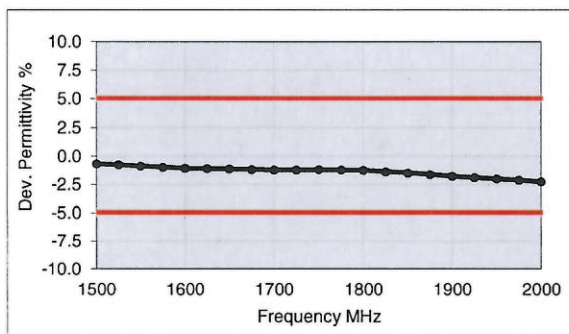
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 27-Aug-14
 Operator IEN

Additional Information

TSL Density 1.042 g/cm³
 TSL Heat-capacity 3.475 kJ/(kg*K)

f [MHz]	Measured			Target		Diff.to Target [%]	
	HP-e'	HP-e''	sigma	eps	sigma	Δ -eps	Δ -sigma
1500	53.6	14.84	1.24	53.9	1.33	-0.7	-7.0
1525	53.5	14.85	1.26	53.9	1.35	-0.8	-6.5
1550	53.4	14.85	1.28	53.9	1.36	-0.9	-6.0
1575	53.3	14.85	1.30	53.8	1.38	-1.0	-5.6
1600	53.2	14.85	1.32	53.8	1.39	-1.1	-5.1
1625	53.2	14.86	1.34	53.8	1.41	-1.1	-4.7
1650	53.1	14.87	1.36	53.7	1.43	-1.1	-4.2
1675	53.0	14.88	1.39	53.6	1.44	-1.2	-3.8
1700	52.9	14.89	1.41	53.6	1.46	-1.2	-3.3
1725	52.9	14.91	1.43	53.5	1.47	-1.2	-2.8
1750	52.8	14.93	1.45	53.4	1.49	-1.2	-2.3
1775	52.7	14.94	1.48	53.4	1.50	-1.2	-1.9
1800	52.6	14.96	1.50	53.3	1.52	-1.2	-1.5
1825	52.6	14.98	1.52	53.3	1.52	-1.4	0.1
1850	52.5	15.01	1.54	53.3	1.52	-1.5	1.6
1875	52.4	15.02	1.57	53.3	1.52	-1.6	3.1
1900	52.4	15.03	1.59	53.3	1.52	-1.8	4.5
1925	52.3	15.06	1.61	53.3	1.52	-1.9	6.1
1950	52.2	15.09	1.64	53.3	1.52	-2.0	7.7
1975	52.2	15.11	1.66	53.3	1.52	-2.1	9.2
2000	52.1	15.13	1.68	53.3	1.52	-2.2	10.7



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Measurement Certificate / Material Test

Item Name	Body Tissue Simulating Liquid (MBBL1900-3800V3)
Product No.	SL AAM 196 AB (Charge: 140903-2)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

Setup Validation

Validation results were within $\pm 2.5\%$ towards the target values of Methanol.

Target Parameters

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

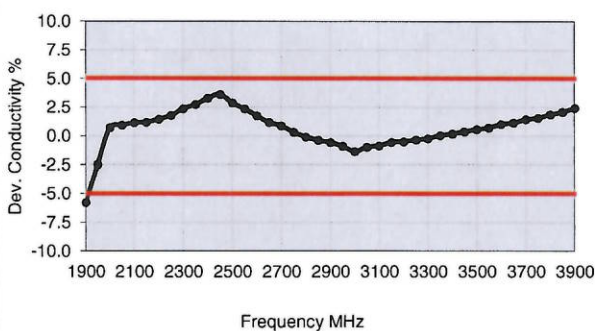
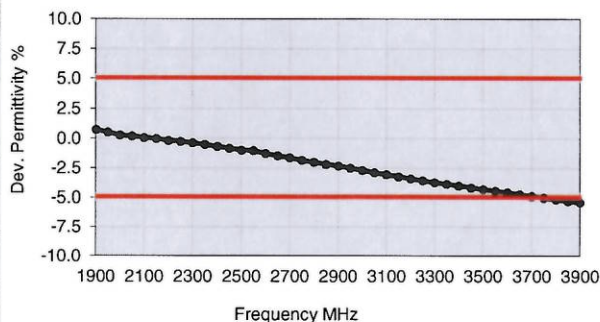
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 3-Sep-14
 Operator CL

Additional Information

TSL Density 1.036 g/cm³
 TSL Heat-capacity 3.508 kJ/(kg*K)

	Measured			Target		Diff.to Target [%]	
f [MHz]	HP-e'	HP-e''	sigma	eps	sigma	Δ-eps	Δ-sigma
1900	53.7	13.5	1.43	53.3	1.52	0.8	-5.8
1950	53.6	13.7	1.48	53.3	1.52	0.5	-2.5
2000	53.4	13.8	1.53	53.3	1.52	0.3	0.7
2050	53.3	13.9	1.58	53.2	1.57	0.2	0.9
2100	53.2	14.0	1.63	53.2	1.62	0.1	1.1
2150	53.1	14.1	1.68	53.1	1.66	0.0	1.2
2200	52.9	14.2	1.74	53.0	1.71	-0.2	1.5
2250	52.8	14.3	1.79	53.0	1.76	-0.2	1.8
2300	52.7	14.5	1.85	52.9	1.81	-0.4	2.4
2350	52.6	14.6	1.91	52.8	1.85	-0.5	2.8
2400	52.4	14.7	1.97	52.8	1.90	-0.7	3.3
2450	52.3	14.8	2.02	52.7	1.95	-0.8	3.6
2500	52.1	15.0	2.08	52.6	2.02	-1.0	2.9
2550	52.0	15.1	2.14	52.6	2.09	-1.0	2.4
2600	51.9	15.2	2.20	52.5	2.16	-1.3	1.8
2650	51.7	15.3	2.26	52.4	2.23	-1.4	1.2
2700	51.5	15.5	2.33	52.4	2.30	-1.6	0.9
2750	51.4	15.6	2.38	52.3	2.38	-1.8	0.3
2800	51.2	15.7	2.44	52.3	2.45	-2.0	-0.1
2850	51.1	15.8	2.51	52.2	2.52	-2.2	-0.4
2900	50.9	16.0	2.57	52.1	2.59	-2.3	-0.6
2950	50.8	16.1	2.64	52.1	2.66	-2.5	-0.9
3000	50.6	16.1	2.69	52.0	2.73	-2.7	-1.3
3050	50.4	16.3	2.76	51.9	2.79	-2.9	-1.0
3100	50.3	16.4	2.82	51.9	2.85	-3.0	-0.9
3150	50.1	16.5	2.89	51.8	2.91	-3.2	-0.5
3200	50.0	16.6	2.95	51.7	2.96	-3.4	-0.5
3250	49.8	16.7	3.01	51.7	3.02	-3.5	-0.3
3300	49.7	16.7	3.07	51.6	3.08	-3.7	-0.2
3350	49.5	16.9	3.14	51.5	3.14	-3.9	0.1
3400	49.4	16.9	3.20	51.5	3.20	-4.0	0.2
3450	49.2	17.0	3.27	51.4	3.26	-4.2	0.4
3500	49.1	17.1	3.33	51.3	3.31	-4.3	0.6
3550	49.0	17.2	3.40	51.3	3.37	-4.5	0.7
3600	48.8	17.3	3.47	51.2	3.43	-4.6	1.0
3650	48.7	17.4	3.53	51.1	3.49	-4.7	1.1
3700	48.6	17.5	3.60	51.1	3.55	-4.9	1.5
3750	48.4	17.6	3.66	51.0	3.61	-5.0	1.6
3800	48.3	17.7	3.73	50.9	3.66	-5.2	1.9
3850	48.2	17.7	3.80	50.8	3.72	-5.3	2.1



Measurement Certificate / Material Test

Item Name	Body Tissue Simulating Liquid (MBBL3500-5800V5)
Product No.	SL AAM 501 EA (Charge: 140709-2)
Manufacturer	SPEAG

Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

Setup Validation

Validation results were within $\pm 2.5\%$ towards the target values of Methanol.

Target Parameters

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

Test Condition

Ambient	Environment temperatur (22 ± 3)°C and humidity < 70%.
TSL Temperature	22°C
Test Date	9-Jul-14
Operator	IEN

Additional Information

TSL Density	0.996 g/cm ³
TSL Heat-capacity	3.765 kJ/(kg*K)

f [MHz]	Measured			Target		Diff.to Target [%]	
	HP-e'	HP-e''	sigma	eps	sigma	Δ -eps	Δ -sigma
3400	52.0	16.61	3.14	51.5	3.20	1.1	-1.8
3500	51.9	16.64	3.24	51.3	3.31	1.1	-2.2
3600	51.8	16.71	3.35	51.2	3.43	1.2	-2.4
3700	51.6	16.79	3.46	51.1	3.55	1.1	-2.5
3800	51.5	16.86	3.57	50.9	3.66	1.2	-2.6
3900	51.4	16.96	3.68	50.8	3.78	1.2	-2.7
4000	51.2	17.06	3.80	50.6	3.90	1.1	-2.5
4100	51.1	17.17	3.92	50.5	4.01	1.2	-2.4
4200	51.0	17.30	4.04	50.4	4.13	1.2	-2.2
4300	50.8	17.43	4.17	50.2	4.25	1.1	-1.8
4400	50.6	17.56	4.30	50.1	4.37	1.0	-1.5
4500	50.5	17.70	4.43	50.0	4.48	1.1	-1.2
4600	50.3	17.84	4.57	49.8	4.60	0.9	-0.6
4700	50.1	17.98	4.70	49.7	4.72	0.8	-0.3
4800	50.0	18.10	4.83	49.6	4.83	0.9	0.0
4850	49.9	18.17	4.90	49.5	4.89	0.8	0.2
4900	49.8	18.23	4.97	49.4	4.95	0.8	0.4
4950	49.7	18.28	5.04	49.4	5.01	0.7	0.7
5000	49.6	18.35	5.10	49.3	5.07	0.6	0.7
5050	49.5	18.41	5.17	49.2	5.12	0.6	0.9
5100	49.4	18.48	5.24	49.2	5.18	0.5	1.1
5150	49.3	18.53	5.31	49.1	5.24	0.4	1.3
5200	49.2	18.59	5.38	49.0	5.30	0.4	1.5
5250	49.2	18.65	5.45	48.9	5.36	0.5	1.7
5300	49.1	18.70	5.51	48.9	5.42	0.5	1.7
5350	49.0	18.75	5.58	48.8	5.47	0.4	1.9
5400	48.9	18.81	5.65	48.7	5.53	0.3	2.1
5450	48.8	18.85	5.72	48.7	5.59	0.3	2.3
5500	48.7	18.90	5.78	48.6	5.65	0.2	2.3
5550	48.6	18.97	5.86	48.5	5.71	0.1	2.7
5600	48.5	19.02	5.93	48.5	5.77	0.1	2.8
5650	48.5	19.09	6.00	48.4	5.82	0.2	3.0
5700	48.4	19.14	6.07	48.3	5.88	0.1	3.2
5750	48.3	19.22	6.15	48.3	5.94	0.1	3.5
5800	48.2	19.25	6.21	48.2	6.00	0.0	3.5
5850	48.1	19.32	6.29	48.1	6.06	-0.1	3.8
5900	48.1	19.36	6.36	48.1	6.12	0.1	4.0

