

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 | |

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Measurement Certificate / Material Test

| | |
|--------------|---|
| Item Name | Head Tissue Simulating Liquid (HSL750V2) |
| Product No. | SL AAH 075 AA (Charge: 140210-5) |
| 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.

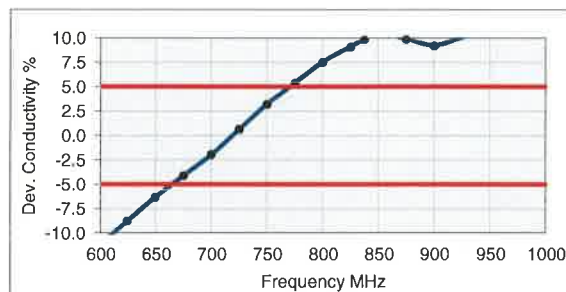
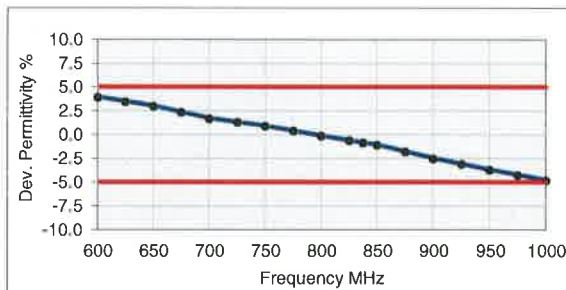
Test Condition

| | |
|-----------------|---|
| Ambient | Environment temperatur (22 ± 3)°C and humidity < 70%. |
| TSL Temperature | 22°C |
| Test Date | 12-Feb-14 |
| Operator | IEN |

Additional Information

| | |
|-------------------|-------------------------|
| TSL Density | 1.284 g/cm ³ |
| TSL Heat-capacity | 2.701 kJ/(kg*K) |

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|------------|-------------|--------------|-------------|-------------|-------------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 600 | 44.4 | 23.49 | 0.78 | 42.7 | 0.88 | 3.9 | -11.1 |
| 625 | 44.1 | 23.23 | 0.81 | 42.6 | 0.88 | 3.5 | -8.6 |
| 650 | 43.7 | 22.96 | 0.83 | 42.5 | 0.89 | 3.0 | -6.2 |
| 675 | 43.3 | 22.68 | 0.85 | 42.3 | 0.89 | 2.4 | -4.1 |
| 700 | 42.9 | 22.40 | 0.87 | 42.2 | 0.89 | 1.7 | -1.9 |
| 725 | 42.6 | 22.25 | 0.90 | 42.1 | 0.89 | 1.3 | 0.7 |
| 750 | 42.3 | 22.10 | 0.92 | 41.9 | 0.89 | 0.9 | 3.2 |
| 775 | 42.0 | 21.89 | 0.94 | 41.8 | 0.90 | 0.4 | 5.4 |
| 800 | 41.6 | 21.67 | 0.96 | 41.7 | 0.90 | -0.1 | 7.5 |
| 825 | 41.3 | 21.55 | 0.99 | 41.6 | 0.91 | -0.6 | 9.0 |
| 838 | 41.2 | 21.49 | 1.00 | 41.5 | 0.91 | -0.8 | 9.8 |
| 850 | 41.1 | 21.42 | 1.01 | 41.5 | 0.92 | -1.1 | 10.6 |
| 875 | 40.8 | 21.29 | 1.04 | 41.5 | 0.94 | -1.8 | 9.9 |
| 900 | 40.5 | 21.15 | 1.06 | 41.5 | 0.97 | -2.5 | 9.2 |
| 925 | 40.2 | 21.01 | 1.08 | 41.5 | 0.98 | -3.1 | 10.0 |
| 950 | 39.9 | 20.87 | 1.10 | 41.4 | 0.99 | -3.7 | 10.9 |
| 975 | 39.6 | 20.79 | 1.13 | 41.4 | 1.00 | -4.3 | 12.2 |
| 1000 | 39.4 | 20.71 | 1.15 | 41.3 | 1.01 | -4.8 | 13.5 |



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Measurement Certificate / Material Test

| | |
|--------------|---|
| Item Name | Head Tissue Simulating Liquid (HSL900V2) |
| Product No. | SL AAH 090 BB (Charge: 140205-4) |
| 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.

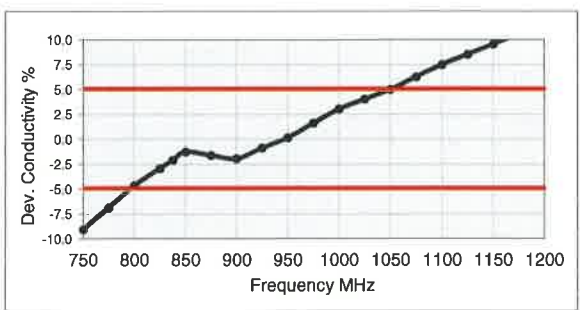
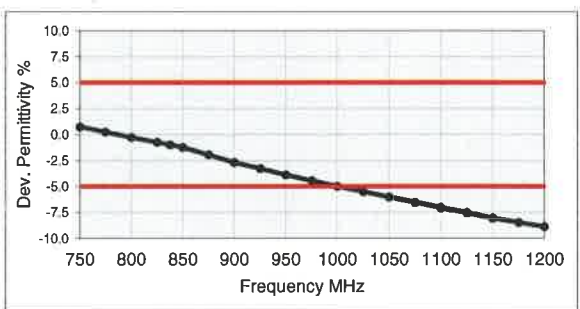
Test Condition

| | |
|-----------------|---|
| Ambient | Environment temperatur (22 ± 3)°C and humidity < 70%. |
| TSL Temperature | 22°C |
| Test Date | 12-Feb-14 |
| Operator | IEN |

Additional Information

| | |
|-------------------|-------------------------|
| TSL Density | 1.280 g/cm ³ |
| TSL Heat-capacity | 2.942 kJ/(kg*K) |

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|------------|-------------|--------------|-------------|-------------|-------------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 700 | 42.9 | 19.58 | 0.76 | 42.2 | 0.89 | 1.6 | -14.3 |
| 725 | 42.6 | 19.52 | 0.79 | 42.1 | 0.89 | 1.2 | -11.7 |
| 750 | 42.3 | 19.47 | 0.81 | 41.9 | 0.89 | 0.8 | -9.1 |
| 775 | 41.9 | 19.35 | 0.83 | 41.8 | 0.90 | 0.3 | -6.8 |
| 800 | 41.6 | 19.23 | 0.86 | 41.7 | 0.90 | -0.3 | -4.6 |
| 825 | 41.3 | 19.18 | 0.88 | 41.6 | 0.91 | -0.7 | -2.9 |
| 838 | 41.1 | 19.16 | 0.89 | 41.5 | 0.91 | -1.0 | -2.1 |
| 850 | 41.0 | 19.13 | 0.90 | 41.5 | 0.92 | -1.2 | -1.2 |
| 875 | 40.7 | 19.07 | 0.93 | 41.5 | 0.94 | -1.9 | -1.6 |
| 900 | 40.4 | 19.00 | 0.95 | 41.5 | 0.97 | -2.7 | -1.9 |
| 925 | 40.1 | 18.92 | 0.97 | 41.5 | 0.98 | -3.3 | -0.9 |
| 950 | 39.8 | 18.85 | 1.00 | 41.4 | 0.99 | -3.9 | 0.2 |
| 975 | 39.6 | 18.82 | 1.02 | 41.4 | 1.00 | -4.4 | 1.6 |
| 1000 | 39.3 | 18.80 | 1.05 | 41.3 | 1.01 | -5.0 | 3.0 |
| 1025 | 39.0 | 18.71 | 1.07 | 41.3 | 1.03 | -5.5 | 4.0 |
| 1050 | 38.8 | 18.62 | 1.09 | 41.2 | 1.04 | -6.0 | 5.0 |
| 1075 | 38.5 | 18.59 | 1.11 | 41.2 | 1.05 | -6.5 | 6.3 |
| 1100 | 38.3 | 18.55 | 1.14 | 41.2 | 1.06 | -7.0 | 7.5 |
| 1125 | 38.0 | 18.50 | 1.16 | 41.1 | 1.07 | -7.5 | 8.5 |
| 1150 | 37.8 | 18.44 | 1.18 | 41.1 | 1.08 | -8.0 | 9.6 |
| 1175 | 37.5 | 18.39 | 1.20 | 41.0 | 1.09 | -8.4 | 10.6 |
| 1200 | 37.3 | 18.35 | 1.22 | 41.0 | 1.10 | -8.9 | 11.6 |



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Measurement Certificate / Material Test

Item Name **Head Tissue Simulating Liquid (HBBL1550-1950V3)**
 Product No. SL AAH 181 AA (Charge: 140206-3)
 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.

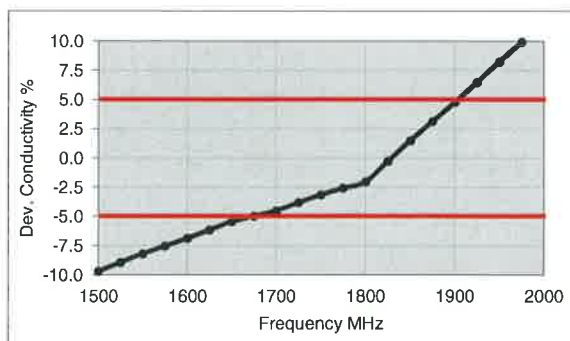
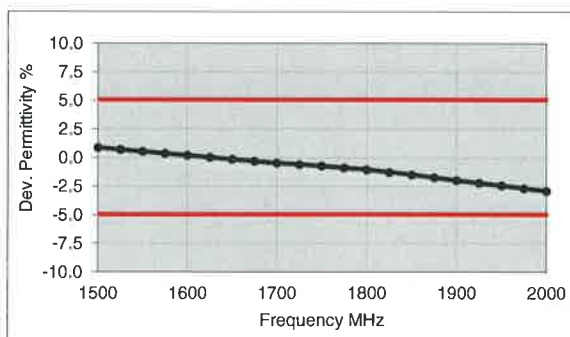
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 12-Feb-14
 Operator IEN

Additional Information

TSL Density 1.052 g/cm³
 TSL Heat-capacity 3.322 kJ/(kg*K)

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 1500 | 40.8 | 13.29 | 1.11 | 40.4 | 1.23 | 0.9 | -9.7 |
| 1525 | 40.7 | 13.34 | 1.13 | 40.4 | 1.24 | 0.7 | -8.9 |
| 1550 | 40.6 | 13.38 | 1.15 | 40.4 | 1.26 | 0.6 | -8.2 |
| 1575 | 40.5 | 13.41 | 1.17 | 40.3 | 1.27 | 0.4 | -7.5 |
| 1600 | 40.4 | 13.44 | 1.20 | 40.3 | 1.28 | 0.2 | -6.9 |
| 1625 | 40.3 | 13.48 | 1.22 | 40.3 | 1.30 | 0.1 | -6.2 |
| 1650 | 40.2 | 13.53 | 1.24 | 40.2 | 1.31 | -0.1 | -5.4 |
| 1675 | 40.1 | 13.54 | 1.26 | 40.2 | 1.33 | -0.3 | -5.0 |
| 1700 | 40.0 | 13.55 | 1.28 | 40.2 | 1.34 | -0.4 | -4.5 |
| 1725 | 39.9 | 13.60 | 1.30 | 40.1 | 1.36 | -0.6 | -3.8 |
| 1750 | 39.8 | 13.64 | 1.33 | 40.1 | 1.37 | -0.7 | -3.1 |
| 1775 | 39.7 | 13.67 | 1.35 | 40.0 | 1.39 | -0.9 | -2.6 |
| 1800 | 39.6 | 13.70 | 1.37 | 40.0 | 1.40 | -1.0 | -2.0 |
| 1825 | 39.5 | 13.75 | 1.40 | 40.0 | 1.40 | -1.2 | -0.3 |
| 1850 | 39.4 | 13.81 | 1.42 | 40.0 | 1.40 | -1.5 | 1.5 |
| 1875 | 39.3 | 13.84 | 1.44 | 40.0 | 1.40 | -1.7 | 3.1 |
| 1900 | 39.2 | 13.88 | 1.47 | 40.0 | 1.40 | -2.0 | 4.8 |
| 1925 | 39.1 | 13.92 | 1.49 | 40.0 | 1.40 | -2.2 | 6.5 |
| 1950 | 39.0 | 13.97 | 1.52 | 40.0 | 1.40 | -2.4 | 8.3 |
| 1975 | 38.9 | 14.01 | 1.54 | 40.0 | 1.40 | -2.6 | 10.0 |
| 2000 | 38.8 | 14.05 | 1.56 | 40.0 | 1.40 | -2.9 | 11.6 |



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Measurement Certificate / Material Test

Item Name **Head Tissue Simulating Liquid (HBBL1900-3800V3)**
 Product No. SL AAH 196 AB (Charge: 131212-1)
 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.

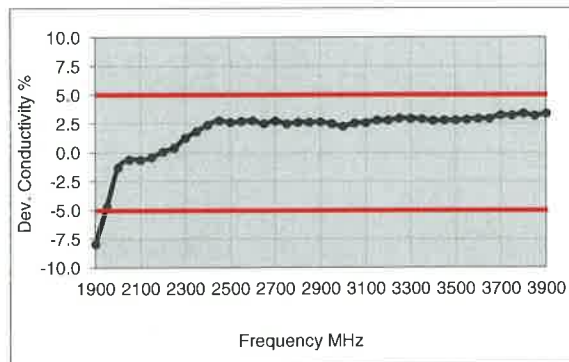
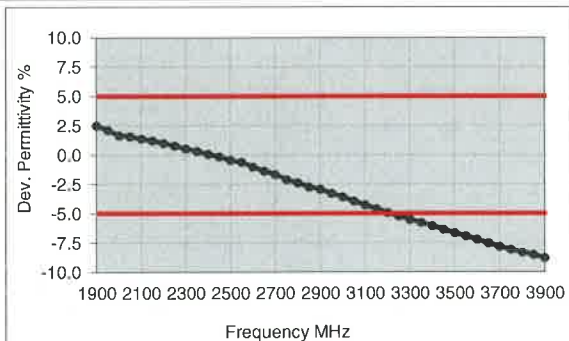
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 18-Dec-13
 Operator IEN

Additional Information

TSL Density 1.054 g/cm³
 TSL Heat-capacity 3.389 kJ/(kg*K)

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 1900 | 41.0 | 12.2 | 1.3 | 40.0 | 1.4 | 2.5 | -7.9 |
| 1950 | 40.8 | 12.3 | 1.3 | 40.0 | 1.4 | 2.1 | -4.7 |
| 2000 | 40.7 | 12.4 | 1.4 | 40.0 | 1.4 | 1.7 | -1.3 |
| 2050 | 40.5 | 12.6 | 1.4 | 39.9 | 1.4 | 1.6 | -0.6 |
| 2100 | 40.4 | 12.7 | 1.5 | 39.8 | 1.5 | 1.4 | -0.6 |
| 2150 | 40.2 | 12.8 | 1.5 | 39.7 | 1.5 | 1.2 | -0.4 |
| 2200 | 40.0 | 12.9 | 1.6 | 39.6 | 1.6 | 1.0 | 0.1 |
| 2250 | 39.9 | 13.0 | 1.6 | 39.6 | 1.6 | 0.8 | 0.4 |
| 2300 | 39.7 | 13.2 | 1.7 | 39.5 | 1.7 | 0.5 | 1.3 |
| 2350 | 39.5 | 13.3 | 1.7 | 39.4 | 1.7 | 0.3 | 1.8 |
| 2400 | 39.3 | 13.5 | 1.8 | 39.3 | 1.8 | 0.1 | 2.4 |
| 2450 | 39.1 | 13.6 | 1.9 | 39.2 | 1.8 | -0.1 | 2.8 |
| 2500 | 39.0 | 13.7 | 1.9 | 39.1 | 1.9 | -0.4 | 2.6 |
| 2550 | 38.8 | 13.8 | 2.0 | 39.1 | 1.9 | -0.6 | 2.7 |
| 2600 | 38.6 | 14.0 | 2.0 | 39.0 | 2.0 | -1.0 | 2.8 |
| 2650 | 38.4 | 14.0 | 2.1 | 38.9 | 2.0 | -1.4 | 2.5 |
| 2700 | 38.2 | 14.2 | 2.1 | 38.9 | 2.1 | -1.7 | 2.7 |
| 2750 | 38.0 | 14.3 | 2.2 | 38.8 | 2.1 | -2.1 | 2.5 |
| 2800 | 37.8 | 14.4 | 2.2 | 38.8 | 2.2 | -2.4 | 2.6 |
| 2850 | 37.6 | 14.5 | 2.3 | 38.7 | 2.2 | -2.7 | 2.6 |
| 2900 | 37.5 | 14.6 | 2.4 | 38.6 | 2.3 | -2.9 | 2.6 |
| 2950 | 37.3 | 14.6 | 2.4 | 38.6 | 2.3 | -3.3 | 2.5 |
| 3000 | 37.1 | 14.7 | 2.5 | 38.5 | 2.4 | -3.6 | 2.3 |
| 3050 | 36.9 | 14.8 | 2.5 | 38.4 | 2.5 | -3.9 | 2.6 |
| 3100 | 36.7 | 14.9 | 2.6 | 38.4 | 2.5 | -4.3 | 2.6 |
| 3150 | 36.6 | 15.0 | 2.6 | 38.3 | 2.6 | -4.6 | 2.8 |
| 3200 | 36.4 | 15.0 | 2.7 | 38.3 | 2.6 | -4.9 | 2.8 |
| 3250 | 36.2 | 15.1 | 2.7 | 38.2 | 2.7 | -5.2 | 3.0 |
| 3300 | 36.1 | 15.2 | 2.8 | 38.2 | 2.7 | -5.5 | 3.0 |
| 3350 | 35.9 | 15.2 | 2.8 | 38.1 | 2.8 | -5.8 | 2.9 |
| 3400 | 35.7 | 15.3 | 2.9 | 38.0 | 2.8 | -6.0 | 2.8 |
| 3450 | 35.6 | 15.3 | 2.9 | 38.0 | 2.9 | -6.3 | 2.8 |
| 3500 | 35.4 | 15.4 | 3.0 | 37.9 | 2.9 | -6.6 | 2.8 |
| 3550 | 35.3 | 15.4 | 3.0 | 37.9 | 3.0 | -6.9 | 2.9 |
| 3600 | 35.1 | 15.5 | 3.1 | 37.8 | 3.0 | -7.2 | 2.9 |
| 3650 | 34.9 | 15.5 | 3.2 | 37.8 | 3.1 | -7.5 | 2.9 |
| 3700 | 34.7 | 15.6 | 3.2 | 37.7 | 3.1 | -7.8 | 3.2 |
| 3750 | 34.6 | 15.7 | 3.3 | 37.6 | 3.2 | -8.1 | 3.2 |
| 3800 | 34.5 | 15.7 | 3.3 | 37.6 | 3.2 | -8.3 | 3.4 |
| 3850 | 34.3 | 15.8 | 3.4 | 37.5 | 3.3 | -8.5 | 3.2 |



Measurement Certificate / Material Test

| | |
|--------------|---|
| Item Name | Head Tissue Simulating Liquid (HBBL3500-5800V5) |
| Product No. | SL AAH 502 AB (Charge: 130123-1) |
| 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.

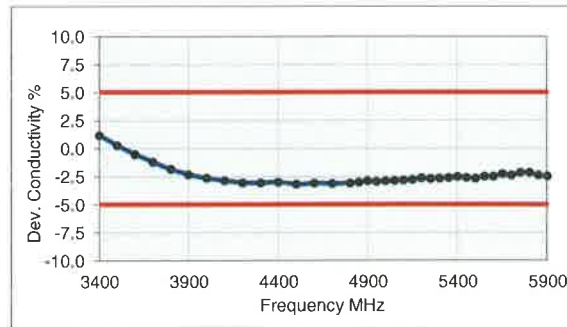
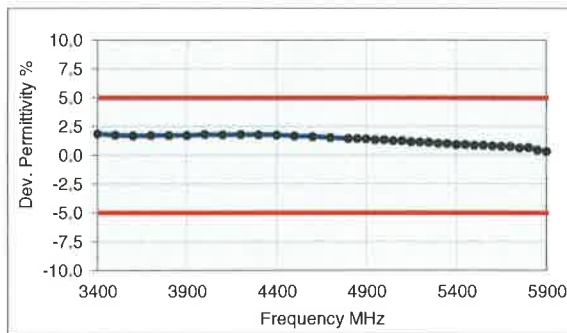
Test Condition

| | |
|-----------------|---|
| Ambient | Environment temperatur (22 ± 3)°C and humidity < 70%. |
| TSL Temperature | 22°C |
| Test Date | 23-Jan-13 |
| Operator | DI |

Additional Information

| | |
|-------------------|-------------------------|
| TSL Density | 0.985 g/cm ³ |
| TSL Heat-capacity | 3.383 kJ/(kg*K) |

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|-------------|-------------|--------------|-------------|-------------|-------------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 3400 | 38.8 | 15.03 | 2.84 | 38.0 | 2.81 | 1.9 | 1.2 |
| 3500 | 38.6 | 15.00 | 2.92 | 37.9 | 2.91 | 1.8 | 0.3 |
| 3600 | 38.5 | 14.98 | 3.00 | 37.8 | 3.02 | 1.7 | -0.5 |
| 3700 | 38.4 | 14.97 | 3.08 | 37.7 | 3.12 | 1.7 | -1.2 |
| 3800 | 38.2 | 14.95 | 3.16 | 37.6 | 3.22 | 1.7 | -1.8 |
| 3900 | 38.1 | 14.96 | 3.25 | 37.5 | 3.32 | 1.7 | -2.3 |
| 4000 | 38.0 | 14.99 | 3.34 | 37.4 | 3.43 | 1.8 | -2.6 |
| 4100 | 37.9 | 15.03 | 3.43 | 37.2 | 3.53 | 1.8 | -2.8 |
| 4200 | 37.8 | 15.06 | 3.52 | 37.1 | 3.63 | 1.8 | -3.0 |
| 4300 | 37.7 | 15.13 | 3.62 | 37.0 | 3.73 | 1.8 | -3.1 |
| 4400 | 37.6 | 15.20 | 3.72 | 36.9 | 3.84 | 1.8 | -3.0 |
| 4500 | 37.4 | 15.23 | 3.81 | 36.8 | 3.94 | 1.7 | -3.2 |
| 4600 | 37.3 | 15.30 | 3.92 | 36.7 | 4.04 | 1.6 | -3.1 |
| 4700 | 37.1 | 15.35 | 4.01 | 36.6 | 4.14 | 1.5 | -3.1 |
| 4800 | 37.0 | 15.41 | 4.11 | 36.4 | 4.25 | 1.5 | -3.1 |
| 4850 | 36.9 | 15.45 | 4.17 | 36.4 | 4.30 | 1.5 | -3.0 |
| 4900 | 36.8 | 15.49 | 4.22 | 36.3 | 4.35 | 1.4 | -2.9 |
| 4950 | 36.8 | 15.51 | 4.27 | 36.3 | 4.40 | 1.4 | -2.9 |
| 5000 | 36.7 | 15.54 | 4.32 | 36.2 | 4.45 | 1.4 | -2.9 |
| 5050 | 36.6 | 15.57 | 4.37 | 36.2 | 4.50 | 1.3 | -2.8 |
| 5100 | 36.6 | 15.60 | 4.42 | 36.1 | 4.55 | 1.3 | -2.8 |
| 5150 | 36.5 | 15.63 | 4.48 | 36.0 | 4.60 | 1.2 | -2.7 |
| 5200 | 36.4 | 15.67 | 4.53 | 36.0 | 4.66 | 1.2 | -2.6 |
| 5250 | 36.3 | 15.68 | 4.58 | 35.9 | 4.71 | 1.1 | -2.7 |
| 5300 | 36.2 | 15.71 | 4.63 | 35.9 | 4.76 | 1.0 | -2.6 |
| 5350 | 36.2 | 15.74 | 4.68 | 35.8 | 4.81 | 1.0 | -2.6 |
| 5400 | 36.1 | 15.78 | 4.74 | 35.8 | 4.86 | 0.9 | -2.5 |
| 5450 | 36.0 | 15.78 | 4.78 | 35.7 | 4.91 | 0.9 | -2.6 |
| 5500 | 36.0 | 15.79 | 4.83 | 35.6 | 4.96 | 0.9 | -2.6 |
| 5550 | 35.9 | 15.84 | 4.89 | 35.6 | 5.01 | 0.9 | -2.5 |
| 5600 | 35.8 | 15.86 | 4.94 | 35.5 | 5.07 | 0.8 | -2.5 |
| 5650 | 35.8 | 15.91 | 5.00 | 35.5 | 5.12 | 0.8 | -2.2 |
| 5700 | 35.7 | 15.91 | 5.05 | 35.4 | 5.17 | 0.8 | -2.4 |
| 5750 | 35.6 | 15.97 | 5.11 | 35.4 | 5.22 | 0.7 | -2.1 |
| 5800 | 35.5 | 15.98 | 5.16 | 35.3 | 5.27 | 0.7 | -2.1 |
| 5850 | 35.5 | 16.01 | 5.21 | 35.3 | 5.34 | 0.5 | -2.4 |
| 5900 | 35.4 | 16.05 | 5.27 | 35.3 | 5.40 | 0.3 | -2.4 |



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Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MSL750V2)**
 Product No. SL AAM 075 (Charge: 120831-2)
 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.

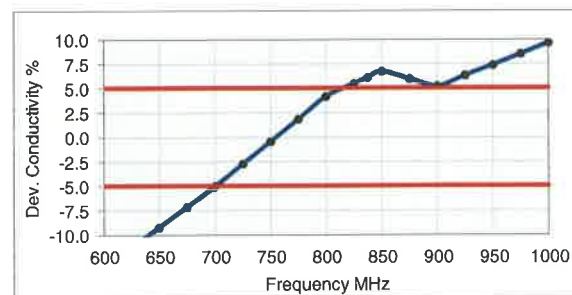
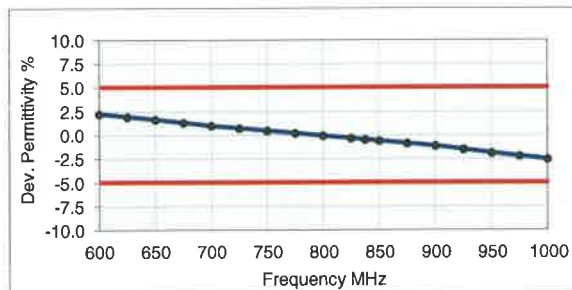
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 5-Sep-12
 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 | 24.67 | 0.82 | 56.1 | 0.95 | 2.2 | -13.5 |
| 625 | 57.1 | 24.34 | 0.85 | 56.0 | 0.95 | 1.9 | -11.3 |
| 650 | 56.8 | 24.01 | 0.87 | 55.9 | 0.96 | 1.6 | -9.1 |
| 675 | 56.6 | 23.71 | 0.89 | 55.8 | 0.96 | 1.3 | -7.1 |
| 700 | 56.3 | 23.41 | 0.91 | 55.7 | 0.96 | 1.0 | -5.0 |
| 725 | 56.0 | 23.20 | 0.94 | 55.6 | 0.96 | 0.7 | -2.7 |
| 750 | 55.8 | 22.99 | 0.96 | 55.5 | 0.96 | 0.5 | -0.4 |
| 775 | 55.5 | 22.81 | 0.98 | 55.4 | 0.97 | 0.2 | 1.9 |
| 800 | 55.3 | 22.64 | 1.01 | 55.3 | 0.97 | -0.1 | 4.2 |
| 825 | 55.1 | 22.47 | 1.03 | 55.2 | 0.98 | -0.3 | 5.5 |
| 838 | 54.9 | 22.39 | 1.04 | 55.2 | 0.98 | -0.5 | 6.1 |
| 850 | 54.8 | 22.31 | 1.05 | 55.2 | 0.99 | -0.6 | 6.7 |
| 875 | 54.6 | 22.19 | 1.08 | 55.1 | 1.02 | -0.9 | 6.0 |
| 900 | 54.4 | 22.07 | 1.10 | 55.0 | 1.05 | -1.1 | 5.2 |
| 925 | 54.1 | 21.96 | 1.13 | 55.0 | 1.06 | -1.5 | 6.3 |
| 950 | 53.9 | 21.85 | 1.15 | 54.9 | 1.08 | -1.9 | 7.4 |
| 975 | 53.7 | 21.75 | 1.18 | 54.9 | 1.09 | -2.2 | 8.5 |
| 1000 | 53.5 | 21.64 | 1.20 | 54.8 | 1.10 | -2.5 | 9.6 |



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Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MSL900V2)**
 Product No. SL AAM 090 CA (Charge: 140124-1)
 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.

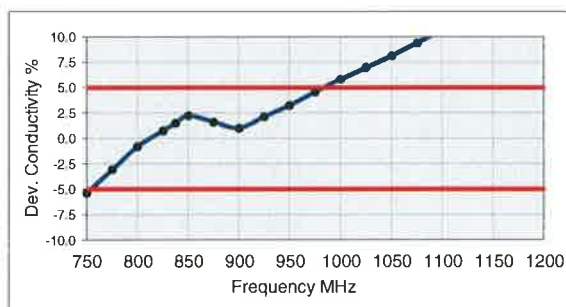
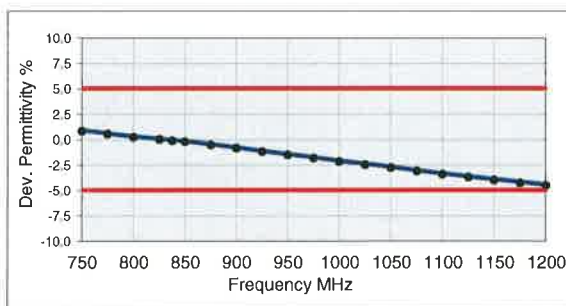
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 29-Jan-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 | 56.5 | 22.21 | 0.86 | 55.7 | 0.96 | 1.4 | -9.9 |
| 725 | 56.3 | 22.03 | 0.89 | 55.6 | 0.96 | 1.1 | -7.6 |
| 750 | 56.0 | 21.85 | 0.91 | 55.5 | 0.96 | 0.9 | -5.4 |
| 775 | 55.8 | 21.71 | 0.94 | 55.4 | 0.97 | 0.6 | -3.1 |
| 800 | 55.5 | 21.57 | 0.96 | 55.3 | 0.97 | 0.3 | -0.8 |
| 825 | 55.3 | 21.47 | 0.99 | 55.2 | 0.98 | 0.1 | 0.8 |
| 838 | 55.2 | 21.42 | 1.00 | 55.2 | 0.98 | -0.1 | 1.5 |
| 850 | 55.1 | 21.37 | 1.01 | 55.2 | 0.99 | -0.2 | 2.2 |
| 875 | 54.8 | 21.28 | 1.04 | 55.1 | 1.02 | -0.5 | 1.6 |
| 900 | 54.6 | 21.19 | 1.06 | 55.0 | 1.05 | -0.8 | 1.0 |
| 925 | 54.3 | 21.10 | 1.09 | 55.0 | 1.06 | -1.1 | 2.1 |
| 950 | 54.1 | 21.01 | 1.11 | 54.9 | 1.08 | -1.5 | 3.2 |
| 975 | 53.9 | 20.96 | 1.14 | 54.9 | 1.09 | -1.8 | 4.6 |
| 1000 | 53.7 | 20.90 | 1.16 | 54.8 | 1.10 | -2.1 | 5.9 |
| 1025 | 53.5 | 20.82 | 1.19 | 54.8 | 1.11 | -2.4 | 7.0 |
| 1050 | 53.3 | 20.75 | 1.21 | 54.7 | 1.12 | -2.7 | 8.1 |
| 1075 | 53.0 | 20.70 | 1.24 | 54.7 | 1.13 | -3.0 | 9.4 |
| 1100 | 52.8 | 20.66 | 1.26 | 54.7 | 1.14 | -3.4 | 10.6 |
| 1125 | 52.6 | 20.57 | 1.29 | 54.6 | 1.15 | -3.7 | 11.5 |
| 1150 | 52.4 | 20.48 | 1.31 | 54.6 | 1.17 | -3.9 | 12.4 |
| 1175 | 52.2 | 20.47 | 1.34 | 54.5 | 1.18 | -4.2 | 13.7 |
| 1200 | 52.0 | 20.46 | 1.37 | 54.5 | 1.19 | -4.5 | 15.0 |



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Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MBBL1550-1950V3)**
 Product No. SL AAM 181 AA (Charge: 140218-3)
 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.

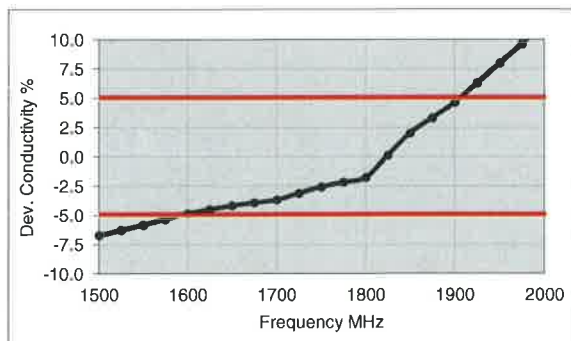
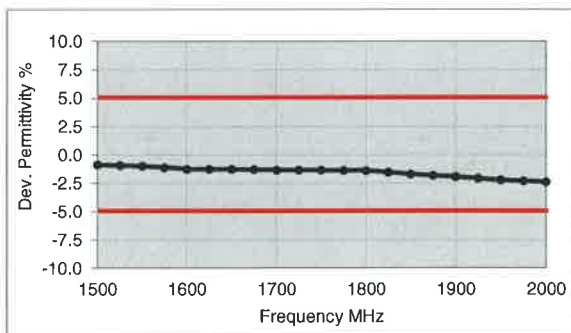
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 19-Feb-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-ε' | HP-ε'' | σ | eps | sigma | Δ-eps | Δ-σ |
| 1500 | 53.5 | 14.88 | 1.24 | 53.9 | 1.33 | -0.9 | -6.7 |
| 1525 | 53.4 | 14.88 | 1.26 | 53.9 | 1.35 | -0.9 | -6.2 |
| 1550 | 53.4 | 14.89 | 1.28 | 53.9 | 1.36 | -1.0 | -5.8 |
| 1575 | 53.2 | 14.89 | 1.30 | 53.8 | 1.38 | -1.1 | -5.3 |
| 1600 | 53.1 | 14.90 | 1.33 | 53.8 | 1.39 | -1.2 | -4.8 |
| 1625 | 53.1 | 14.89 | 1.35 | 53.8 | 1.41 | -1.2 | -4.5 |
| 1650 | 53.0 | 14.88 | 1.37 | 53.7 | 1.43 | -1.3 | -4.2 |
| 1675 | 52.9 | 14.86 | 1.38 | 53.6 | 1.44 | -1.3 | -3.9 |
| 1700 | 52.9 | 14.84 | 1.40 | 53.6 | 1.46 | -1.3 | -3.7 |
| 1725 | 52.8 | 14.87 | 1.43 | 53.5 | 1.47 | -1.3 | -3.1 |
| 1750 | 52.7 | 14.90 | 1.45 | 53.4 | 1.49 | -1.4 | -2.6 |
| 1775 | 52.6 | 14.90 | 1.47 | 53.4 | 1.50 | -1.4 | -2.2 |
| 1800 | 52.8 | 14.91 | 1.49 | 53.3 | 1.52 | -1.4 | -1.8 |
| 1825 | 52.5 | 14.99 | 1.52 | 53.3 | 1.52 | -1.5 | 0.1 |
| 1850 | 52.4 | 15.07 | 1.55 | 53.3 | 1.52 | -1.7 | 2.0 |
| 1875 | 52.3 | 15.06 | 1.57 | 53.3 | 1.52 | -1.8 | 3.3 |
| 1900 | 52.3 | 15.05 | 1.59 | 53.3 | 1.52 | -1.9 | 4.6 |
| 1925 | 52.2 | 15.09 | 1.62 | 53.3 | 1.52 | -2.1 | 6.3 |
| 1950 | 52.1 | 15.13 | 1.64 | 53.3 | 1.52 | -2.2 | 8.0 |
| 1975 | 52.1 | 15.17 | 1.67 | 53.3 | 1.52 | -2.3 | 9.7 |
| 2000 | 52.0 | 15.21 | 1.69 | 53.3 | 1.52 | -2.4 | 11.3 |



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Measurement Certificate / Material Test

| | |
|--------------|---|
| Item Name | Body Tissue Simulating Liquid (MBBL1900-3800V3) |
| Product No. | SL AAM 196 AB (Charge: 140219-3) |
| 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

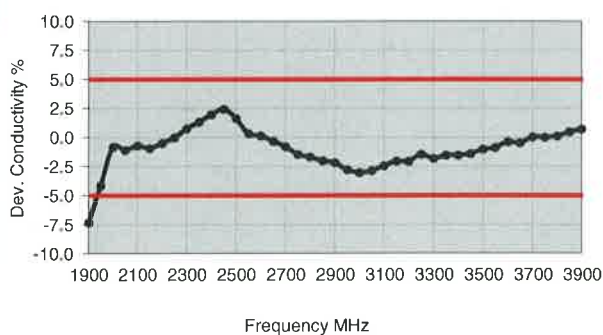
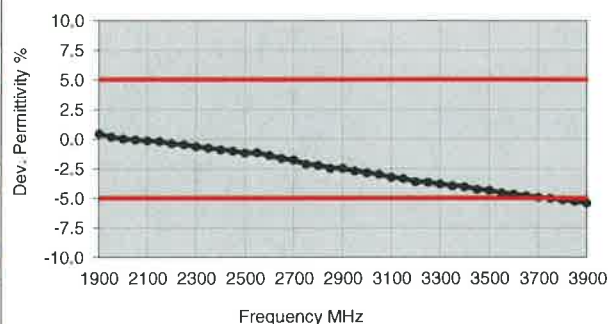
| | |
|-----------------|---|
| Ambient | Environment temperatur (22 ± 3)°C and humidity < 70%. |
| TSL Temperature | 22°C |
| Test Date | 19-Feb-14 |
| Operator | IEN |

Additional Information

TSL Density 1.036 g/cm³

TSL Heat-capacity 3.508 kJ/(kg*K)

| f [MHz] | Measured | | | Target | | Diff. to Target [%] | |
|---------|----------|--------|-------|--------|-------|---------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 1900 | 53.5 | 13.3 | 1.41 | 53.3 | 1.52 | 0.5 | -7.3 |
| 1950 | 53.4 | 13.4 | 1.46 | 53.3 | 1.52 | 0.2 | -4.1 |
| 2000 | 53.3 | 13.5 | 1.51 | 53.3 | 1.52 | 0.0 | -0.8 |
| 2050 | 53.2 | 13.6 | 1.55 | 53.2 | 1.57 | 0.0 | -1.1 |
| 2100 | 53.1 | 13.7 | 1.60 | 53.2 | 1.62 | -0.1 | -0.7 |
| 2150 | 53.0 | 13.8 | 1.65 | 53.1 | 1.66 | -0.2 | -0.9 |
| 2200 | 52.8 | 13.9 | 1.70 | 53.0 | 1.71 | -0.4 | -0.5 |
| 2250 | 52.7 | 14.0 | 1.76 | 53.0 | 1.76 | -0.4 | 0.0 |
| 2300 | 52.6 | 14.2 | 1.82 | 52.9 | 1.81 | -0.6 | 0.7 |
| 2350 | 52.4 | 14.4 | 1.88 | 52.8 | 1.85 | -0.7 | 1.3 |
| 2400 | 52.3 | 14.5 | 1.94 | 52.8 | 1.90 | -0.9 | 2.0 |
| 2450 | 52.2 | 14.7 | 2.00 | 52.7 | 1.95 | -1.0 | 2.4 |
| 2500 | 52.0 | 14.8 | 2.05 | 52.6 | 2.02 | -1.1 | 1.6 |
| 2550 | 52.0 | 14.8 | 2.10 | 52.6 | 2.09 | -1.1 | 0.3 |
| 2600 | 51.8 | 15.0 | 2.17 | 52.5 | 2.16 | -1.4 | 0.1 |
| 2650 | 51.6 | 15.1 | 2.23 | 52.4 | 2.23 | -1.6 | -0.3 |
| 2700 | 51.5 | 15.2 | 2.29 | 52.4 | 2.30 | -1.8 | -0.8 |
| 2750 | 51.2 | 15.3 | 2.34 | 52.3 | 2.38 | -2.1 | -1.5 |
| 2800 | 51.1 | 15.4 | 2.40 | 52.3 | 2.45 | -2.2 | -1.7 |
| 2850 | 50.9 | 15.6 | 2.47 | 52.2 | 2.52 | -2.4 | -2.0 |
| 2900 | 50.8 | 15.7 | 2.53 | 52.1 | 2.59 | -2.5 | -2.2 |
| 2950 | 50.7 | 15.8 | 2.59 | 52.1 | 2.66 | -2.7 | -2.8 |
| 3000 | 50.5 | 15.9 | 2.65 | 52.0 | 2.73 | -2.8 | -3.0 |
| 3050 | 50.4 | 16.0 | 2.71 | 51.9 | 2.79 | -3.0 | -2.9 |
| 3100 | 50.2 | 16.1 | 2.78 | 51.9 | 2.85 | -3.2 | -2.4 |
| 3150 | 50.1 | 16.2 | 2.85 | 51.8 | 2.91 | -3.3 | -2.0 |
| 3200 | 49.9 | 16.3 | 2.90 | 51.7 | 2.96 | -3.6 | -2.1 |
| 3250 | 49.8 | 16.5 | 2.98 | 51.7 | 3.02 | -3.6 | -1.5 |
| 3300 | 49.6 | 16.5 | 3.02 | 51.6 | 3.08 | -3.8 | -1.8 |
| 3350 | 49.5 | 16.6 | 3.09 | 51.5 | 3.14 | -3.9 | -1.5 |
| 3400 | 49.4 | 16.6 | 3.15 | 51.5 | 3.20 | -4.0 | -1.5 |
| 3450 | 49.2 | 16.7 | 3.21 | 51.4 | 3.26 | -4.2 | -1.4 |
| 3500 | 49.1 | 16.8 | 3.28 | 51.3 | 3.31 | -4.3 | -1.0 |
| 3550 | 48.9 | 16.9 | 3.34 | 51.3 | 3.37 | -4.5 | -0.9 |
| 3600 | 48.8 | 17.1 | 3.42 | 51.2 | 3.43 | -4.6 | -0.4 |
| 3650 | 48.7 | 17.1 | 3.47 | 51.1 | 3.49 | -4.8 | -0.5 |
| 3700 | 48.5 | 17.2 | 3.55 | 51.1 | 3.55 | -4.9 | 0.0 |
| 3750 | 48.4 | 17.3 | 3.61 | 51.0 | 3.61 | -5.0 | 0.0 |
| 3800 | 48.3 | 17.4 | 3.67 | 50.9 | 3.66 | -5.1 | 0.1 |
| 3850 | 48.2 | 17.5 | 3.74 | 50.8 | 3.72 | -5.2 | 0.5 |



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Measurement Certificate / Material Test

| | |
|--------------|--|
| Item Name | Body Tissue Simulating Liquid (MBBL3500-5800V5) |
| Product No. | SL AAM 501 EA (Charge: 140114-1) |
| 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 | 15-Jan-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 | 52.2 | 16.63 | 3.14 | 51.5 | 3.20 | 1.4 | -1.8 |
| 3500 | 52.0 | 16.67 | 3.25 | 51.3 | 3.31 | 1.3 | -1.9 |
| 3600 | 51.9 | 16.74 | 3.35 | 51.2 | 3.43 | 1.4 | -2.4 |
| 3700 | 51.7 | 16.81 | 3.46 | 51.1 | 3.55 | 1.3 | -2.5 |
| 3800 | 51.6 | 16.90 | 3.57 | 50.9 | 3.66 | 1.3 | -2.6 |
| 3900 | 51.5 | 16.99 | 3.69 | 50.8 | 3.78 | 1.4 | -2.4 |
| 4000 | 51.3 | 17.08 | 3.80 | 50.6 | 3.90 | 1.3 | -2.5 |
| 4100 | 51.2 | 17.18 | 3.92 | 50.5 | 4.01 | 1.4 | -2.4 |
| 4200 | 51.1 | 17.32 | 4.05 | 50.4 | 4.13 | 1.4 | -2.0 |
| 4300 | 50.9 | 17.47 | 4.18 | 50.2 | 4.25 | 1.3 | -1.6 |
| 4400 | 50.8 | 17.61 | 4.31 | 50.1 | 4.37 | 1.4 | -1.3 |
| 4500 | 50.6 | 17.73 | 4.44 | 50.0 | 4.48 | 1.3 | -0.9 |
| 4600 | 50.4 | 17.86 | 4.57 | 49.8 | 4.60 | 1.1 | -0.6 |
| 4700 | 50.3 | 18.00 | 4.71 | 49.7 | 4.72 | 1.2 | -0.1 |
| 4800 | 50.1 | 18.14 | 4.84 | 49.6 | 4.83 | 1.1 | 0.2 |
| 4850 | 50.0 | 18.20 | 4.91 | 49.5 | 4.89 | 1.0 | 0.4 |
| 4900 | 49.9 | 18.28 | 4.98 | 49.4 | 4.95 | 1.0 | 0.6 |
| 4950 | 49.8 | 18.31 | 5.04 | 49.4 | 5.01 | 0.9 | 0.7 |
| 5000 | 49.7 | 18.38 | 5.11 | 49.3 | 5.07 | 0.8 | 0.9 |
| 5050 | 49.6 | 18.44 | 5.18 | 49.2 | 5.12 | 0.8 | 1.1 |
| 5100 | 49.5 | 18.50 | 5.25 | 49.2 | 5.18 | 0.7 | 1.3 |
| 5150 | 49.4 | 18.57 | 5.32 | 49.1 | 5.24 | 0.6 | 1.5 |
| 5200 | 49.4 | 18.63 | 5.39 | 49.0 | 5.30 | 0.8 | 1.7 |
| 5250 | 49.3 | 18.68 | 5.46 | 48.9 | 5.36 | 0.7 | 1.9 |
| 5300 | 49.2 | 18.75 | 5.53 | 48.9 | 5.42 | 0.7 | 2.1 |
| 5350 | 49.1 | 18.79 | 5.59 | 48.8 | 5.47 | 0.6 | 2.1 |
| 5400 | 49.0 | 18.86 | 5.66 | 48.7 | 5.53 | 0.5 | 2.3 |
| 5450 | 48.9 | 18.90 | 5.73 | 48.7 | 5.59 | 0.5 | 2.5 |
| 5500 | 48.8 | 18.94 | 5.80 | 48.6 | 5.65 | 0.4 | 2.7 |
| 5550 | 48.7 | 19.01 | 5.87 | 48.5 | 5.71 | 0.3 | 2.8 |
| 5600 | 48.7 | 19.06 | 5.94 | 48.5 | 5.77 | 0.5 | 3.0 |
| 5650 | 48.6 | 19.13 | 6.01 | 48.4 | 5.82 | 0.4 | 3.2 |
| 5700 | 48.5 | 19.18 | 6.08 | 48.3 | 5.88 | 0.3 | 3.3 |
| 5750 | 48.4 | 19.26 | 6.16 | 48.3 | 5.94 | 0.3 | 3.7 |
| 5800 | 48.3 | 19.30 | 6.23 | 48.2 | 6.00 | 0.2 | 3.8 |
| 5850 | 48.2 | 19.37 | 6.30 | 48.1 | 6.06 | 0.1 | 4.0 |
| 5900 | 48.1 | 19.43 | 6.38 | 48.1 | 6.12 | 0.1 | 4.3 |

