

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 | |

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 | 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.

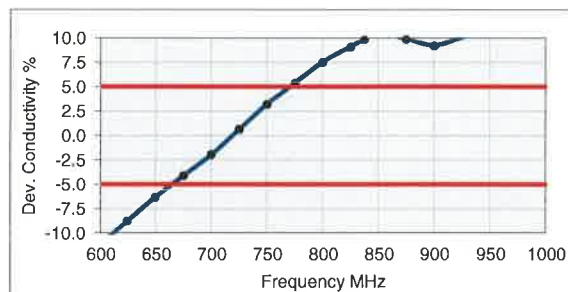
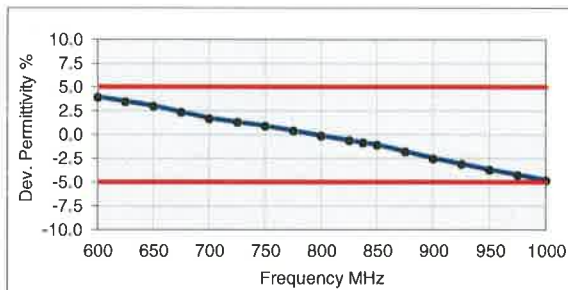
Test Condition

| | |
|-----------------|---|
| 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 |



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 | 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.

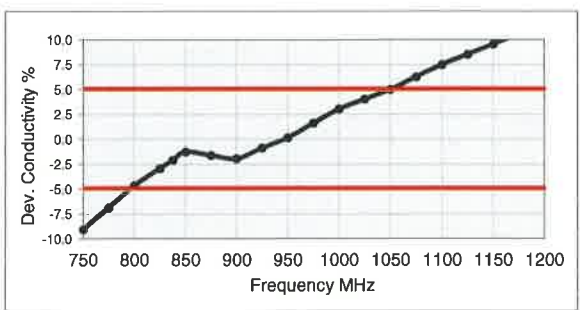
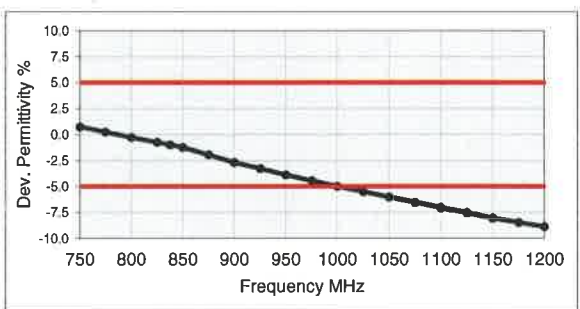
Test Condition

| | |
|-----------------|---|
| 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 |



Measurement Certificate / Material Test

| | |
|--------------|---|
| Item Name | Head Tissue Simulating Liquid (HSL1750V2) |
| Product No. | SL AAH 175 (Charge: 120907-2) |
| 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.

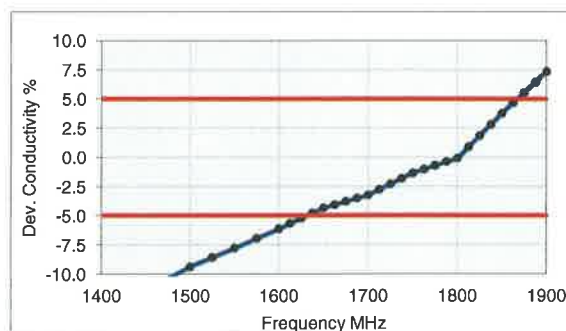
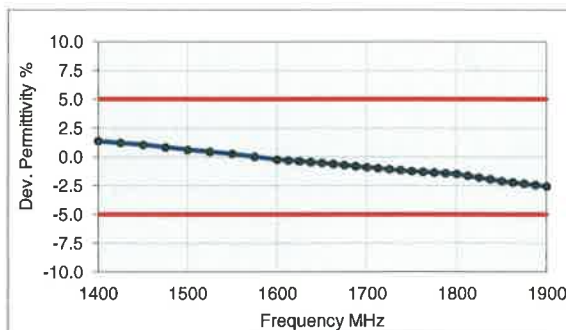
Test Condition

| | |
|-----------------|---|
| Ambient | Environment temperatur (22 ± 3)°C and humidity < 70%. |
| TSL Temperature | 22°C |
| Test Date | 13-Sep-12 |
| Operator | CL |

Additional Information

| | |
|-------------------|-------------------------|
| TSL Density | 0.998 g/cm ³ |
| TSL Heat-capacity | 3.572 kJ/(kg*K) |

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 1400 | 41.2 | 13.09 | 1.02 | 40.6 | 1.18 | 1.4 | -13.6 |
| 1425 | 41.0 | 13.14 | 1.04 | 40.5 | 1.19 | 1.2 | -12.4 |
| 1450 | 40.9 | 13.19 | 1.06 | 40.5 | 1.20 | 1.1 | -11.3 |
| 1475 | 40.8 | 13.26 | 1.09 | 40.5 | 1.21 | 0.8 | -10.3 |
| 1500 | 40.7 | 13.34 | 1.11 | 40.4 | 1.23 | 0.6 | -9.4 |
| 1525 | 40.6 | 13.39 | 1.14 | 40.4 | 1.24 | 0.4 | -8.6 |
| 1550 | 40.5 | 13.44 | 1.16 | 40.4 | 1.26 | 0.3 | -7.8 |
| 1575 | 40.3 | 13.49 | 1.18 | 40.3 | 1.27 | 0.0 | -6.9 |
| 1600 | 40.2 | 13.55 | 1.21 | 40.3 | 1.28 | -0.2 | -6.1 |
| 1613 | 40.2 | 13.58 | 1.22 | 40.3 | 1.29 | -0.3 | -5.7 |
| 1625 | 40.1 | 13.62 | 1.23 | 40.3 | 1.30 | -0.4 | -5.2 |
| 1638 | 40.1 | 13.65 | 1.24 | 40.3 | 1.31 | -0.5 | -4.8 |
| 1650 | 40.0 | 13.68 | 1.26 | 40.2 | 1.31 | -0.5 | -4.3 |
| 1663 | 40.0 | 13.70 | 1.27 | 40.2 | 1.32 | -0.6 | -4.1 |
| 1675 | 39.9 | 13.71 | 1.28 | 40.2 | 1.33 | -0.7 | -3.8 |
| 1688 | 39.8 | 13.72 | 1.29 | 40.2 | 1.33 | -0.8 | -3.5 |
| 1700 | 39.8 | 13.73 | 1.30 | 40.2 | 1.34 | -0.9 | -3.2 |
| 1713 | 39.7 | 13.77 | 1.31 | 40.1 | 1.35 | -1.0 | -2.7 |
| 1725 | 39.7 | 13.81 | 1.33 | 40.1 | 1.36 | -1.1 | -2.3 |
| 1738 | 39.6 | 13.85 | 1.34 | 40.1 | 1.36 | -1.2 | -1.8 |
| 1750 | 39.6 | 13.89 | 1.35 | 40.1 | 1.37 | -1.3 | -1.4 |
| 1763 | 39.5 | 13.91 | 1.36 | 40.1 | 1.38 | -1.3 | -1.0 |
| 1775 | 39.5 | 13.93 | 1.38 | 40.0 | 1.39 | -1.4 | -0.7 |
| 1788 | 39.4 | 13.95 | 1.39 | 40.0 | 1.39 | -1.4 | -0.4 |
| 1800 | 39.4 | 13.97 | 1.40 | 40.0 | 1.40 | -1.5 | -0.1 |
| 1813 | 39.3 | 14.01 | 1.41 | 40.0 | 1.40 | -1.7 | 0.9 |
| 1825 | 39.3 | 14.04 | 1.43 | 40.0 | 1.40 | -1.8 | 1.8 |
| 1838 | 39.2 | 14.08 | 1.44 | 40.0 | 1.40 | -2.0 | 2.8 |
| 1850 | 39.2 | 14.11 | 1.45 | 40.0 | 1.40 | -2.1 | 3.8 |
| 1863 | 39.1 | 14.14 | 1.47 | 40.0 | 1.40 | -2.2 | 4.7 |
| 1875 | 39.1 | 14.17 | 1.48 | 40.0 | 1.40 | -2.3 | 5.6 |
| 1888 | 39.0 | 14.19 | 1.49 | 40.0 | 1.40 | -2.5 | 6.5 |
| 1900 | 39.0 | 14.22 | 1.50 | 40.0 | 1.40 | -2.6 | 7.4 |



Measurement Certificate / Material Test

| | |
|--------------|---|
| Item Name | Head Tissue Simulating Liquid (HSL 1900) |
| Product No. | SL AAH 190 AA (Charge: 120112-1) |
| Manufacturer | SPEAG |

Measurement Method

TSL dielectric parameters measured using calibrated OCP probe (type DAK).

Target Parameters

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

Test Condition

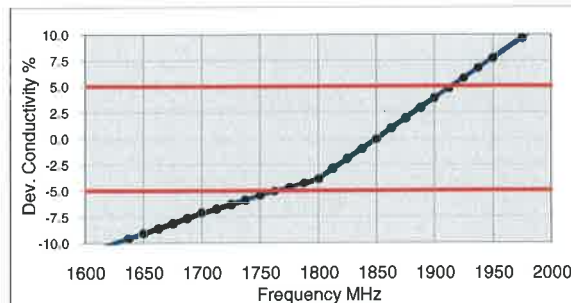
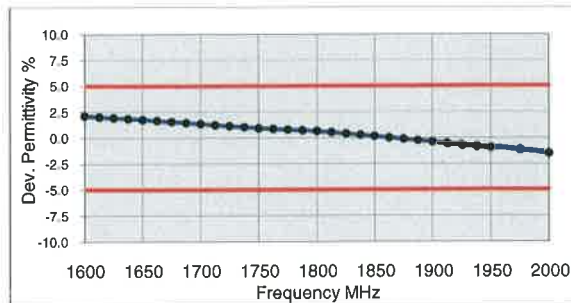
Ambient Condition 22°C ; 30% humidity
 TSL Temperature 22°C
 Test Date 18-Jan-12

Additional Information

TSL Density 0.985 g/cm³
 TSL Heat-capacity 3.710 kJ/(kg*K)

Results

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|-------------|-------------|--------------|-------------|-------------|-------------|--------------------|-------------|
| | HP-ε' | HP-ε'' | sigma | eps | sigma | Δ-eps | Δ-sigma |
| 1600 | 41.2 | 12.84 | 1.14 | 40.3 | 1.28 | 2.1 | -11.0 |
| 1613 | 41.1 | 12.88 | 1.16 | 40.3 | 1.29 | 2.0 | -10.5 |
| 1625 | 41.1 | 12.93 | 1.17 | 40.3 | 1.30 | 1.9 | -10.0 |
| 1638 | 41.0 | 12.97 | 1.18 | 40.3 | 1.31 | 1.8 | -9.5 |
| 1650 | 40.9 | 13.01 | 1.19 | 40.2 | 1.31 | 1.8 | -9.1 |
| 1663 | 40.9 | 13.05 | 1.21 | 40.2 | 1.32 | 1.7 | -8.6 |
| 1675 | 40.8 | 13.10 | 1.22 | 40.2 | 1.33 | 1.6 | -8.1 |
| 1688 | 40.8 | 13.14 | 1.23 | 40.2 | 1.33 | 1.4 | -7.6 |
| 1700 | 40.7 | 13.18 | 1.25 | 40.2 | 1.34 | 1.3 | -7.1 |
| 1713 | 40.6 | 13.22 | 1.26 | 40.1 | 1.35 | 1.2 | -6.7 |
| 1725 | 40.6 | 13.25 | 1.27 | 40.1 | 1.36 | 1.1 | -6.3 |
| 1738 | 40.5 | 13.28 | 1.28 | 40.1 | 1.36 | 1.0 | -5.9 |
| 1750 | 40.5 | 13.31 | 1.30 | 40.1 | 1.37 | 0.9 | -5.5 |
| 1763 | 40.4 | 13.35 | 1.31 | 40.1 | 1.38 | 0.9 | -5.1 |
| 1775 | 40.4 | 13.38 | 1.32 | 40.0 | 1.39 | 0.8 | -4.7 |
| 1788 | 40.3 | 13.41 | 1.33 | 40.0 | 1.39 | 0.7 | -4.3 |
| 1800 | 40.3 | 13.44 | 1.35 | 40.0 | 1.40 | 0.6 | -3.9 |
| 1813 | 40.2 | 13.48 | 1.36 | 40.0 | 1.40 | 0.5 | -2.9 |
| 1825 | 40.2 | 13.52 | 1.37 | 40.0 | 1.40 | 0.4 | -2.0 |
| 1838 | 40.1 | 13.55 | 1.39 | 40.0 | 1.40 | 0.3 | -1.0 |
| 1850 | 40.1 | 13.59 | 1.40 | 40.0 | 1.40 | 0.1 | -0.1 |
| 1863 | 40.0 | 13.63 | 1.41 | 40.0 | 1.40 | 0.0 | 0.9 |
| 1875 | 39.9 | 13.67 | 1.43 | 40.0 | 1.40 | -0.1 | 1.9 |
| 1888 | 39.9 | 13.71 | 1.44 | 40.0 | 1.40 | -0.3 | 2.9 |
| 1900 | 39.8 | 13.75 | 1.45 | 40.0 | 1.40 | -0.4 | 3.8 |
| 1913 | 39.8 | 13.79 | 1.47 | 40.0 | 1.40 | -0.5 | 4.8 |
| 1925 | 39.7 | 13.83 | 1.48 | 40.0 | 1.40 | -0.7 | 5.8 |
| 1938 | 39.7 | 13.86 | 1.49 | 40.0 | 1.40 | -0.8 | 6.7 |
| 1950 | 39.6 | 13.90 | 1.51 | 40.0 | 1.40 | -0.9 | 7.7 |
| 1975 | 39.5 | 13.97 | 1.53 | 40.0 | 1.40 | -1.2 | 9.6 |
| 2000 | 39.4 | 14.04 | 1.56 | 40.0 | 1.40 | -1.5 | 11.6 |



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 **Head Tissue Simulating Liquid (HSL1950V2)**
 Product No. SL AAH 195 CA (Charge: 120717-3)
 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

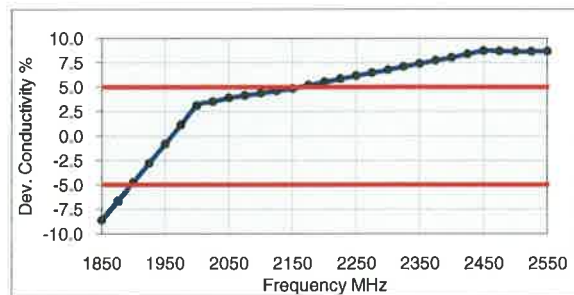
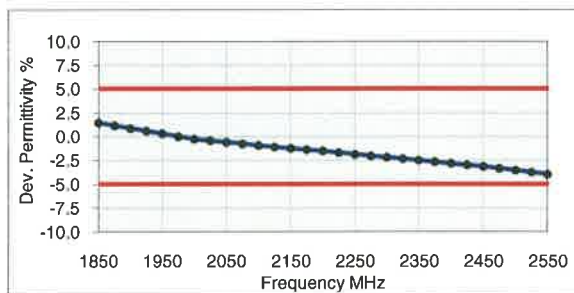
Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 18-Jul-12
 Operator DI

TSL Density 0.995 g/cm³
 TSL Heat-capacity 3.720 kJ/(kg*K)

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|---------|----------|--------|-------|--------|-------|--------------------|---------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ-eps | Δ-sigma |
| 1850 | 40.6 | 12.43 | 1.28 | 40.0 | 1.40 | 1.5 | -8.6 |
| 1875 | 40.5 | 12.53 | 1.31 | 40.0 | 1.40 | 1.2 | -6.7 |
| 1900 | 40.3 | 12.62 | 1.33 | 40.0 | 1.40 | 0.9 | -4.7 |
| 1925 | 40.2 | 12.71 | 1.36 | 40.0 | 1.40 | 0.6 | -2.8 |
| 1950 | 40.1 | 12.80 | 1.39 | 40.0 | 1.40 | 0.3 | -0.8 |
| 1975 | 40.0 | 12.89 | 1.42 | 40.0 | 1.40 | 0.0 | 1.1 |
| 2000 | 39.9 | 12.98 | 1.44 | 40.0 | 1.40 | -0.3 | 3.1 |
| 2025 | 39.8 | 13.07 | 1.47 | 40.0 | 1.42 | -0.4 | 3.5 |
| 2050 | 39.7 | 13.16 | 1.50 | 39.9 | 1.44 | -0.6 | 3.9 |
| 2075 | 39.6 | 13.23 | 1.53 | 39.9 | 1.47 | -0.8 | 4.2 |
| 2100 | 39.5 | 13.30 | 1.55 | 39.8 | 1.49 | -0.9 | 4.4 |
| 2125 | 39.3 | 13.37 | 1.58 | 39.8 | 1.51 | -1.1 | 4.6 |
| 2150 | 39.2 | 13.44 | 1.61 | 39.7 | 1.53 | -1.2 | 4.9 |
| 2175 | 39.1 | 13.52 | 1.64 | 39.7 | 1.56 | -1.4 | 5.2 |
| 2200 | 39.1 | 13.61 | 1.67 | 39.6 | 1.58 | -1.5 | 5.5 |
| 2225 | 38.9 | 13.68 | 1.69 | 39.6 | 1.60 | -1.7 | 5.9 |
| 2250 | 38.8 | 13.76 | 1.72 | 39.6 | 1.62 | -1.9 | 6.2 |
| 2275 | 38.7 | 13.83 | 1.75 | 39.5 | 1.64 | -2.0 | 6.5 |
| 2300 | 38.6 | 13.91 | 1.78 | 39.5 | 1.67 | -2.2 | 6.8 |
| 2325 | 38.5 | 13.98 | 1.81 | 39.4 | 1.69 | -2.3 | 7.1 |
| 2350 | 38.4 | 14.06 | 1.84 | 39.4 | 1.71 | -2.5 | 7.4 |
| 2375 | 38.3 | 14.13 | 1.87 | 39.3 | 1.73 | -2.7 | 7.7 |
| 2400 | 38.2 | 14.21 | 1.90 | 39.3 | 1.76 | -2.8 | 8.0 |
| 2425 | 38.1 | 14.28 | 1.93 | 39.2 | 1.78 | -3.0 | 8.4 |
| 2450 | 38.0 | 14.36 | 1.96 | 39.2 | 1.80 | -3.1 | 8.7 |
| 2475 | 37.9 | 14.42 | 1.99 | 39.2 | 1.83 | -3.3 | 8.7 |
| 2500 | 37.8 | 14.49 | 2.02 | 39.1 | 1.85 | -3.5 | 8.7 |
| 2525 | 37.6 | 14.56 | 2.04 | 39.1 | 1.88 | -3.7 | 8.7 |
| 2550 | 37.5 | 14.62 | 2.07 | 39.1 | 1.91 | -3.9 | 8.7 |
| 2575 | 37.4 | 14.69 | 2.10 | 39.0 | 1.94 | -4.1 | 8.7 |
| 2600 | 37.3 | 14.76 | 2.13 | 39.0 | 1.96 | -4.3 | 8.7 |



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 | Head Tissue Simulating Liquid (HSL2450V2) |
| Product No. | SL AAH 245 BA (Charge: 130430-3) |
| 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.

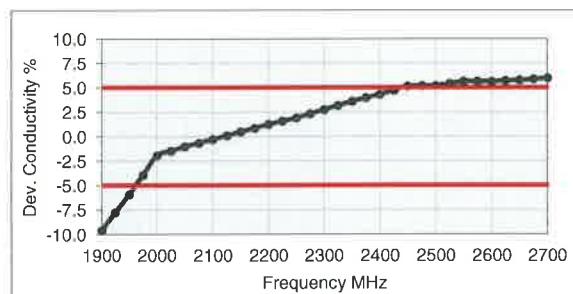
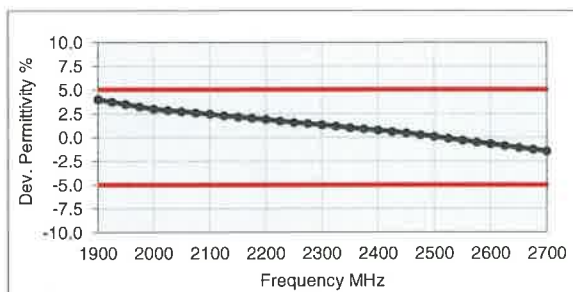
Test Condition

| | |
|-----------------|---|
| Ambient | Environment temperatur (22 ± 3)°C and humidity < 70%. |
| TSL Temperature | 23°C |
| Test Date | 2-May-13 |
| Operator | CL |

Additional Information

| | |
|-------------------|-------------------------|
| TSL Density | 0.988 g/cm ³ |
| TSL Heat-capacity | 3.680 kJ/(kg*K) |

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|-------------|-------------|--------------|-------------|-------------|-------------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 1900 | 41.6 | 11.98 | 1.27 | 40.0 | 1.40 | 4.0 | -9.6 |
| 1925 | 41.5 | 12.06 | 1.29 | 40.0 | 1.40 | 3.8 | -7.7 |
| 1950 | 41.4 | 12.15 | 1.32 | 40.0 | 1.40 | 3.5 | -5.9 |
| 1975 | 41.3 | 12.24 | 1.35 | 40.0 | 1.40 | 3.3 | -3.9 |
| 2000 | 41.2 | 12.34 | 1.37 | 40.0 | 1.40 | 3.0 | -1.9 |
| 2025 | 41.1 | 12.44 | 1.40 | 40.0 | 1.42 | 2.9 | -1.5 |
| 2050 | 41.0 | 12.54 | 1.43 | 39.9 | 1.44 | 2.8 | -1.0 |
| 2075 | 40.9 | 12.62 | 1.46 | 39.9 | 1.47 | 2.6 | -0.6 |
| 2100 | 40.8 | 12.71 | 1.48 | 39.8 | 1.49 | 2.5 | -0.3 |
| 2125 | 40.7 | 12.80 | 1.51 | 39.8 | 1.51 | 2.3 | 0.1 |
| 2150 | 40.6 | 12.88 | 1.54 | 39.7 | 1.53 | 2.2 | 0.5 |
| 2175 | 40.5 | 12.97 | 1.57 | 39.7 | 1.56 | 2.0 | 0.9 |
| 2200 | 40.4 | 13.05 | 1.60 | 39.6 | 1.58 | 1.9 | 1.3 |
| 2225 | 40.3 | 13.13 | 1.63 | 39.6 | 1.60 | 1.7 | 1.6 |
| 2250 | 40.2 | 13.21 | 1.65 | 39.6 | 1.62 | 1.6 | 1.9 |
| 2275 | 40.1 | 13.30 | 1.68 | 39.5 | 1.64 | 1.5 | 2.4 |
| 2300 | 40.0 | 13.39 | 1.71 | 39.5 | 1.67 | 1.3 | 2.8 |
| 2325 | 39.9 | 13.48 | 1.74 | 39.4 | 1.69 | 1.2 | 3.2 |
| 2350 | 39.8 | 13.56 | 1.77 | 39.4 | 1.71 | 1.0 | 3.6 |
| 2375 | 39.7 | 13.64 | 1.80 | 39.3 | 1.73 | 0.9 | 4.0 |
| 2400 | 39.6 | 13.72 | 1.83 | 39.3 | 1.76 | 0.8 | 4.3 |
| 2425 | 39.5 | 13.80 | 1.86 | 39.2 | 1.78 | 0.6 | 4.8 |
| 2450 | 39.4 | 13.89 | 1.89 | 39.2 | 1.80 | 0.5 | 5.2 |
| 2475 | 39.3 | 13.96 | 1.92 | 39.2 | 1.83 | 0.3 | 5.2 |
| 2500 | 39.2 | 14.03 | 1.95 | 39.1 | 1.85 | 0.1 | 5.2 |
| 2525 | 39.1 | 14.12 | 1.98 | 39.1 | 1.88 | -0.1 | 5.4 |
| 2550 | 39.0 | 14.22 | 2.02 | 39.1 | 1.91 | -0.3 | 5.6 |
| 2575 | 38.9 | 14.28 | 2.05 | 39.0 | 1.94 | -0.5 | 5.6 |
| 2600 | 38.7 | 14.34 | 2.07 | 39.0 | 1.96 | -0.7 | 5.6 |
| 2625 | 38.6 | 14.41 | 2.10 | 39.0 | 1.99 | -0.9 | 5.7 |
| 2650 | 38.5 | 14.48 | 2.13 | 38.9 | 2.02 | -1.1 | 5.8 |
| 2675 | 38.4 | 14.55 | 2.17 | 38.9 | 2.05 | -1.3 | 5.9 |
| 2700 | 38.3 | 14.62 | 2.20 | 38.9 | 2.07 | -1.4 | 6.0 |



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 **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.

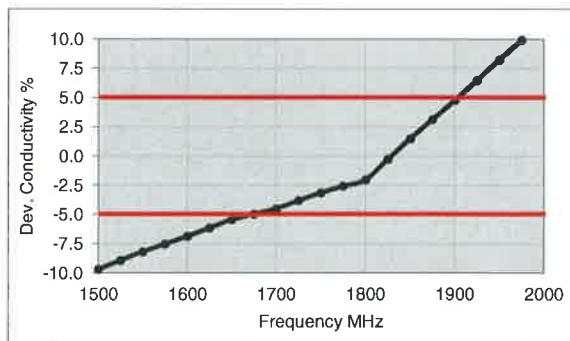
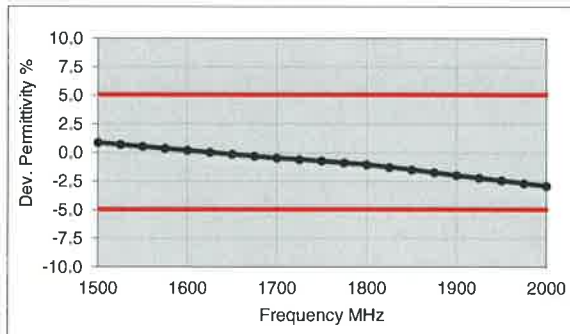
Test Condition

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 |



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 **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.

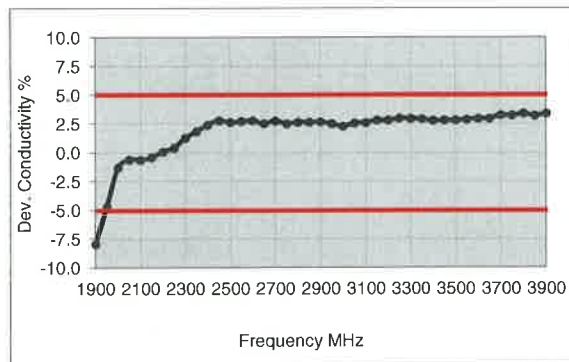
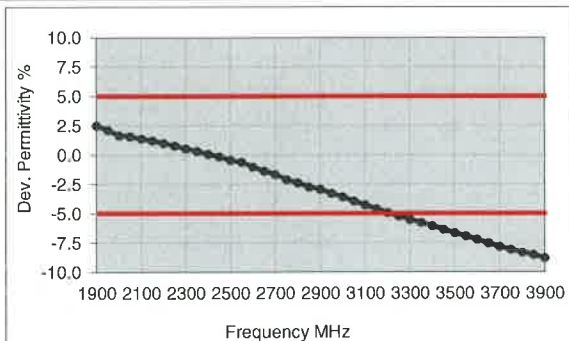
Test Condition

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.

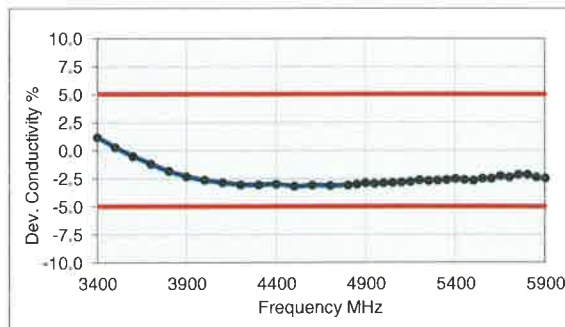
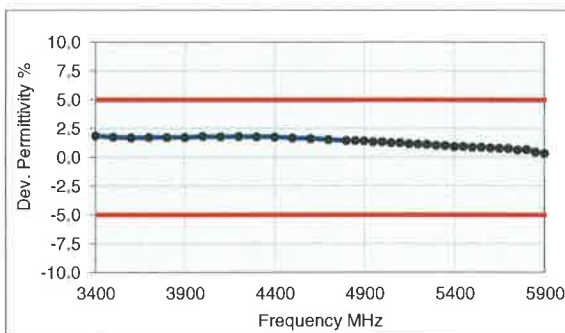
Test Condition

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/cm³
 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 |



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 **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.

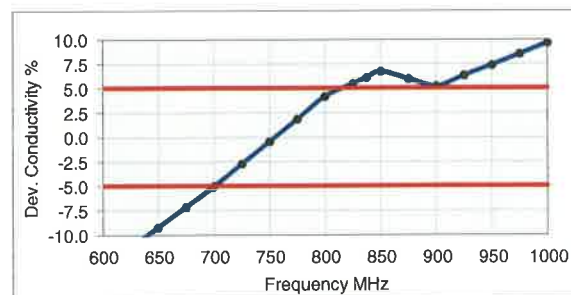
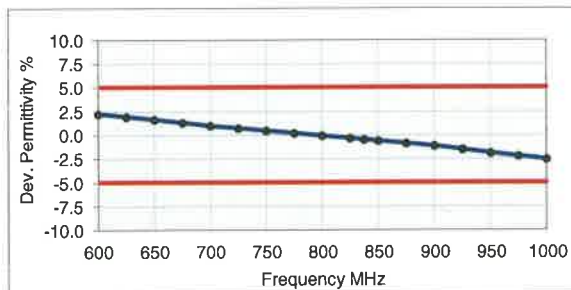
Test Condition

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 |



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 **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.

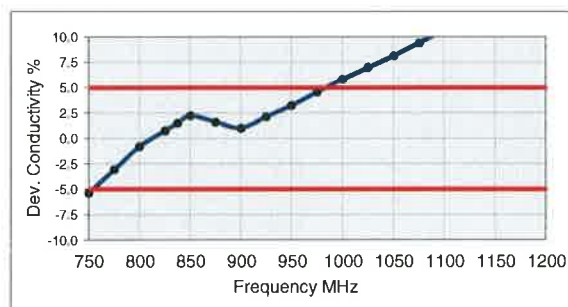
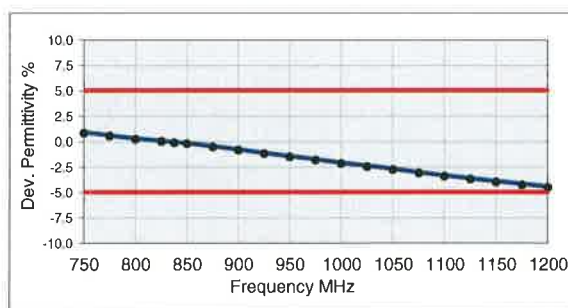
Test Condition

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 (MSL1750V2)**
 Product No. SL AAM 175 (Charge: 120919-3)
 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.

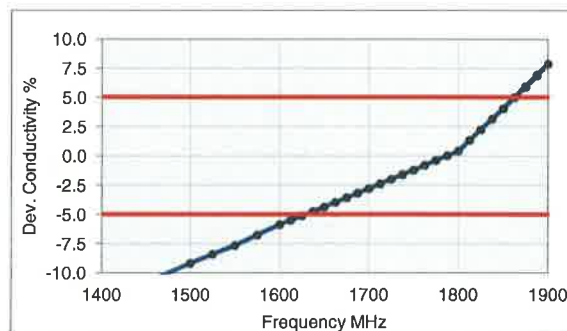
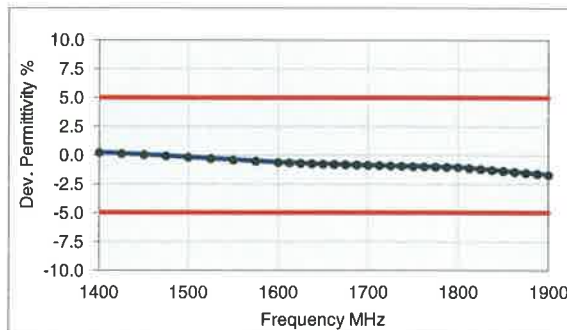
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 20-Sep-12
 Operator CL

Additional Information

TSL Density 0.998 g/cm³
 TSL Heat-capacity 3.893 kJ/(kg*K)

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|---------|----------|--------|-------|--------|-------|--------------------|---------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ-eps | Δ-sigma |
| 1400 | 54.2 | 14.23 | 1.11 | 54.1 | 1.28 | 0.2 | -13.2 |
| 1425 | 54.1 | 14.30 | 1.13 | 54.0 | 1.29 | 0.1 | -12.1 |
| 1450 | 54.0 | 14.36 | 1.16 | 54.0 | 1.30 | 0.0 | -10.9 |
| 1475 | 53.9 | 14.42 | 1.18 | 54.0 | 1.32 | -0.1 | -10.0 |
| 1500 | 53.8 | 14.49 | 1.21 | 53.9 | 1.33 | -0.2 | -9.2 |
| 1525 | 53.7 | 14.54 | 1.23 | 53.9 | 1.35 | -0.3 | -8.4 |
| 1550 | 53.7 | 14.59 | 1.26 | 53.9 | 1.36 | -0.4 | -7.7 |
| 1575 | 53.6 | 14.67 | 1.29 | 53.8 | 1.38 | -0.5 | -6.8 |
| 1600 | 53.5 | 14.74 | 1.31 | 53.8 | 1.39 | -0.6 | -5.9 |
| 1613 | 53.4 | 14.77 | 1.32 | 53.8 | 1.40 | -0.7 | -5.5 |
| 1625 | 53.4 | 14.79 | 1.34 | 53.8 | 1.41 | -0.7 | -5.1 |
| 1638 | 53.3 | 14.82 | 1.35 | 53.7 | 1.42 | -0.7 | -4.7 |
| 1650 | 53.3 | 14.85 | 1.36 | 53.7 | 1.43 | -0.8 | -4.4 |
| 1663 | 53.2 | 14.88 | 1.38 | 53.7 | 1.43 | -0.8 | -4.0 |
| 1675 | 53.2 | 14.91 | 1.39 | 53.6 | 1.44 | -0.8 | -3.6 |
| 1688 | 53.1 | 14.94 | 1.40 | 53.6 | 1.45 | -0.8 | -3.2 |
| 1700 | 53.1 | 14.97 | 1.42 | 53.6 | 1.46 | -0.9 | -2.8 |
| 1713 | 53.1 | 15.01 | 1.43 | 53.5 | 1.46 | -0.9 | -2.4 |
| 1725 | 53.0 | 15.04 | 1.44 | 53.5 | 1.47 | -0.9 | -2.0 |
| 1738 | 53.0 | 15.07 | 1.46 | 53.5 | 1.48 | -1.0 | -1.6 |
| 1750 | 52.9 | 15.10 | 1.47 | 53.4 | 1.49 | -1.0 | -1.2 |
| 1763 | 52.9 | 15.14 | 1.48 | 53.4 | 1.50 | -1.0 | -0.8 |
| 1775 | 52.8 | 15.17 | 1.50 | 53.4 | 1.50 | -1.0 | -0.4 |
| 1788 | 52.8 | 15.21 | 1.51 | 53.3 | 1.51 | -1.0 | 0.0 |
| 1800 | 52.7 | 15.24 | 1.53 | 53.3 | 1.52 | -1.1 | 0.4 |
| 1813 | 52.7 | 15.27 | 1.54 | 53.3 | 1.52 | -1.1 | 1.3 |
| 1825 | 52.7 | 15.30 | 1.55 | 53.3 | 1.52 | -1.2 | 2.2 |
| 1838 | 52.6 | 15.33 | 1.57 | 53.3 | 1.52 | -1.3 | 3.1 |
| 1850 | 52.6 | 15.37 | 1.58 | 53.3 | 1.52 | -1.4 | 4.0 |
| 1863 | 52.5 | 15.40 | 1.60 | 53.3 | 1.52 | -1.5 | 5.0 |
| 1875 | 52.5 | 15.44 | 1.61 | 53.3 | 1.52 | -1.5 | 6.0 |
| 1888 | 52.4 | 15.48 | 1.63 | 53.3 | 1.52 | -1.6 | 6.9 |
| 1900 | 52.4 | 15.51 | 1.64 | 53.3 | 1.52 | -1.7 | 7.9 |



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Measurement Certificate / Material Test

| | |
|--------------|--|
| Item Name | Body Tissue Simulating Liquid (MSL1900V2) |
| Product No. | SL AAM 190 (Charge: 120913-1) |
| 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.

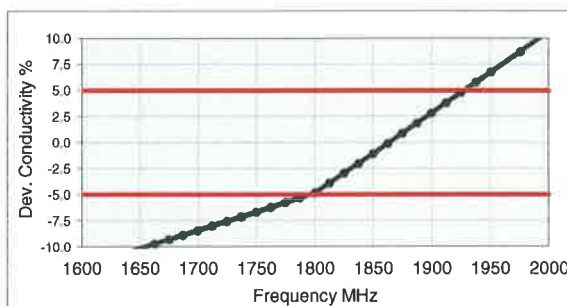
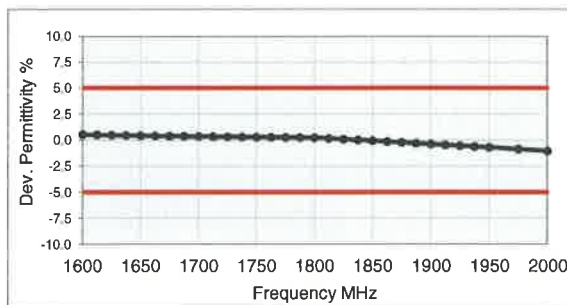
Test Condition

| | |
|-----------------|---|
| Ambient | Environment temperatur (22 ± 3)°C and humidity < 70%. |
| TSL Temperature | 22°C |
| Test Date | 20-Sep-12 |
| Operator | CL |

Additional Information

| | |
|-------------------|-------------------------|
| TSL Density | 0.996 g/cm ³ |
| TSL Heat-capacity | 3.947 kJ/(kg*K) |

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|-------------|-------------|--------------|-------------|-------------|-------------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 1600 | 54.1 | 13.80 | 1.23 | 53.8 | 1.39 | 0.5 | -11.8 |
| 1613 | 54.1 | 13.84 | 1.24 | 53.8 | 1.40 | 0.5 | -11.4 |
| 1625 | 54.0 | 13.87 | 1.25 | 53.8 | 1.41 | 0.5 | -11.0 |
| 1638 | 54.0 | 13.91 | 1.27 | 53.7 | 1.42 | 0.5 | -10.6 |
| 1650 | 53.9 | 13.95 | 1.28 | 53.7 | 1.43 | 0.4 | -10.2 |
| 1663 | 53.9 | 13.99 | 1.29 | 53.7 | 1.43 | 0.4 | -9.7 |
| 1675 | 53.8 | 14.02 | 1.31 | 53.6 | 1.44 | 0.4 | -9.3 |
| 1688 | 53.8 | 14.06 | 1.32 | 53.6 | 1.45 | 0.4 | -8.9 |
| 1700 | 53.8 | 14.10 | 1.33 | 53.6 | 1.46 | 0.4 | -8.4 |
| 1713 | 53.7 | 14.14 | 1.35 | 53.5 | 1.46 | 0.3 | -8.0 |
| 1725 | 53.7 | 14.19 | 1.36 | 53.5 | 1.47 | 0.3 | -7.6 |
| 1738 | 53.6 | 14.23 | 1.38 | 53.5 | 1.48 | 0.3 | -7.1 |
| 1750 | 53.6 | 14.27 | 1.39 | 53.4 | 1.49 | 0.3 | -6.7 |
| 1763 | 53.5 | 14.31 | 1.40 | 53.4 | 1.50 | 0.3 | -6.2 |
| 1775 | 53.5 | 14.35 | 1.42 | 53.4 | 1.50 | 0.3 | -5.8 |
| 1788 | 53.5 | 14.40 | 1.43 | 53.3 | 1.51 | 0.2 | -5.3 |
| 1800 | 53.4 | 14.44 | 1.45 | 53.3 | 1.52 | 0.2 | -4.9 |
| 1813 | 53.4 | 14.48 | 1.46 | 53.3 | 1.52 | 0.2 | -3.9 |
| 1825 | 53.3 | 14.52 | 1.47 | 53.3 | 1.52 | 0.1 | -3.0 |
| 1838 | 53.3 | 14.56 | 1.49 | 53.3 | 1.52 | 0.0 | -2.0 |
| 1850 | 53.3 | 14.61 | 1.50 | 53.3 | 1.52 | -0.1 | -1.1 |
| 1863 | 53.2 | 14.65 | 1.52 | 53.3 | 1.52 | -0.1 | -0.1 |
| 1875 | 53.2 | 14.69 | 1.53 | 53.3 | 1.52 | -0.2 | 0.8 |
| 1888 | 53.1 | 14.74 | 1.55 | 53.3 | 1.52 | -0.3 | 1.8 |
| 1900 | 53.1 | 14.78 | 1.56 | 53.3 | 1.52 | -0.4 | 2.8 |
| 1913 | 53.0 | 14.83 | 1.58 | 53.3 | 1.52 | -0.5 | 3.8 |
| 1925 | 53.0 | 14.87 | 1.59 | 53.3 | 1.52 | -0.5 | 4.8 |
| 1938 | 53.0 | 14.91 | 1.61 | 53.3 | 1.52 | -0.6 | 5.7 |
| 1950 | 52.9 | 14.95 | 1.62 | 53.3 | 1.52 | -0.7 | 6.7 |
| 1975 | 52.8 | 15.03 | 1.65 | 53.3 | 1.52 | -0.9 | 8.7 |
| 2000 | 52.7 | 15.11 | 1.68 | 53.3 | 1.52 | -1.0 | 10.6 |



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Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MSL1950V2)**
 Product No. SL AAM 195 (Charge: 120919-2)
 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.

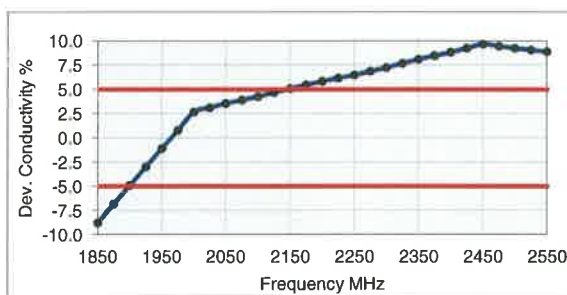
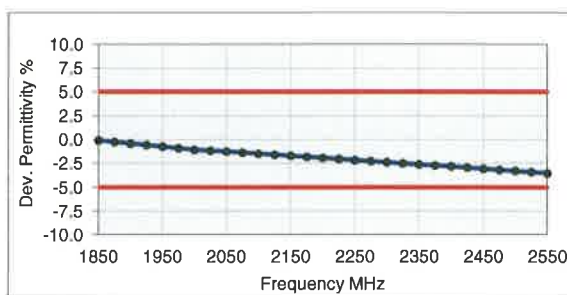
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 20-Sep-12
 Operator CL

Additional Information

TSL Density 0.997 g/cm³
 TSL Heat-capacity 3.970 kJ/(kg*K)

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 1850 | 53.3 | 13.47 | 1.39 | 53.3 | 1.52 | -0.1 | -8.8 |
| 1875 | 53.2 | 13.58 | 1.42 | 53.3 | 1.52 | -0.2 | -6.8 |
| 1900 | 53.1 | 13.68 | 1.45 | 53.3 | 1.52 | -0.4 | -4.9 |
| 1925 | 53.0 | 13.77 | 1.47 | 53.3 | 1.52 | -0.6 | -3.0 |
| 1950 | 52.9 | 13.86 | 1.50 | 53.3 | 1.52 | -0.7 | -1.1 |
| 1975 | 52.8 | 13.94 | 1.53 | 53.3 | 1.52 | -0.9 | 0.8 |
| 2000 | 52.7 | 14.03 | 1.56 | 53.3 | 1.52 | -1.1 | 2.7 |
| 2025 | 52.6 | 14.13 | 1.59 | 53.3 | 1.54 | -1.2 | 3.1 |
| 2050 | 52.6 | 14.23 | 1.62 | 53.2 | 1.57 | -1.3 | 3.5 |
| 2075 | 52.5 | 14.32 | 1.65 | 53.2 | 1.59 | -1.4 | 3.9 |
| 2100 | 52.4 | 14.41 | 1.68 | 53.2 | 1.62 | -1.5 | 4.2 |
| 2125 | 52.3 | 14.51 | 1.72 | 53.1 | 1.64 | -1.6 | 4.7 |
| 2150 | 52.2 | 14.61 | 1.75 | 53.1 | 1.66 | -1.7 | 5.1 |
| 2175 | 52.1 | 14.70 | 1.78 | 53.1 | 1.69 | -1.8 | 5.5 |
| 2200 | 52.0 | 14.79 | 1.81 | 53.0 | 1.71 | -1.9 | 5.8 |
| 2225 | 51.9 | 14.88 | 1.84 | 53.0 | 1.74 | -2.0 | 6.1 |
| 2250 | 51.8 | 14.96 | 1.87 | 53.0 | 1.76 | -2.2 | 6.5 |
| 2275 | 51.7 | 15.05 | 1.91 | 52.9 | 1.78 | -2.3 | 6.9 |
| 2300 | 51.6 | 15.14 | 1.94 | 52.9 | 1.81 | -2.4 | 7.2 |
| 2325 | 51.5 | 15.24 | 1.97 | 52.9 | 1.83 | -2.5 | 7.7 |
| 2350 | 51.4 | 15.33 | 2.00 | 52.8 | 1.85 | -2.6 | 8.1 |
| 2375 | 51.4 | 15.42 | 2.04 | 52.8 | 1.88 | -2.7 | 8.5 |
| 2400 | 51.3 | 15.50 | 2.07 | 52.8 | 1.90 | -2.8 | 8.8 |
| 2425 | 51.2 | 15.60 | 2.10 | 52.7 | 1.93 | -2.9 | 9.2 |
| 2450 | 51.1 | 15.69 | 2.14 | 52.7 | 1.95 | -3.1 | 9.7 |
| 2475 | 51.0 | 15.78 | 2.17 | 52.7 | 1.99 | -3.2 | 9.4 |
| 2500 | 50.9 | 15.87 | 2.21 | 52.6 | 2.02 | -3.3 | 9.2 |
| 2525 | 50.8 | 15.96 | 2.24 | 52.6 | 2.06 | -3.4 | 9.1 |
| 2550 | 50.7 | 16.06 | 2.28 | 52.6 | 2.09 | -3.5 | 8.9 |
| 2575 | 50.6 | 16.14 | 2.31 | 52.5 | 2.13 | -3.7 | 8.7 |
| 2600 | 50.5 | 16.23 | 2.35 | 52.5 | 2.16 | -3.9 | 8.6 |



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Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MSL2450V2)**
 Product No. SL AAM 245 BA (Charge: 130510-2)
 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.

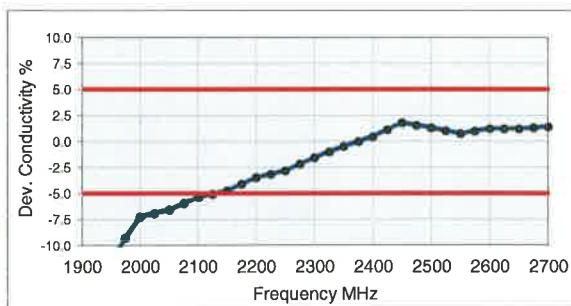
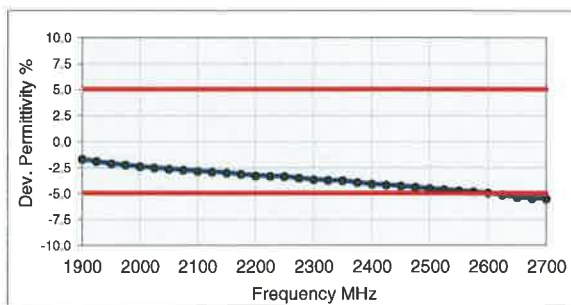
Test Condition

Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 15-May-13
 Operator IEN

Additional Information

TSL Density 0.996 g/cm³
 TSL Heat-capacity 3.987 kJ/(kg*K)

| f [MHz] | Measured | | | Target | | Diff.to Target [%] | |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
| | HP-e' | HP-e'' | sigma | eps | sigma | Δ -eps | Δ -sigma |
| 1900 | 52.4 | 12.21 | 1.29 | 53.3 | 1.52 | -1.7 | -15.1 |
| 1925 | 52.3 | 12.32 | 1.32 | 53.3 | 1.52 | -1.9 | -13.2 |
| 1950 | 52.2 | 12.43 | 1.35 | 53.3 | 1.52 | -2.1 | -11.3 |
| 1975 | 52.1 | 12.55 | 1.38 | 53.3 | 1.52 | -2.2 | -9.3 |
| 2000 | 52.0 | 12.67 | 1.41 | 53.3 | 1.52 | -2.4 | -7.3 |
| 2025 | 51.9 | 12.75 | 1.44 | 53.3 | 1.54 | -2.5 | -6.9 |
| 2050 | 51.8 | 12.84 | 1.46 | 53.2 | 1.57 | -2.6 | -6.6 |
| 2075 | 51.7 | 12.96 | 1.50 | 53.2 | 1.59 | -2.7 | -6.0 |
| 2100 | 51.7 | 13.09 | 1.53 | 53.2 | 1.62 | -2.8 | -5.4 |
| 2125 | 51.6 | 13.17 | 1.56 | 53.1 | 1.64 | -2.9 | -5.0 |
| 2150 | 51.5 | 13.25 | 1.58 | 53.1 | 1.66 | -3.0 | -4.7 |
| 2175 | 51.4 | 13.37 | 1.62 | 53.1 | 1.69 | -3.1 | -4.1 |
| 2200 | 51.3 | 13.50 | 1.65 | 53.0 | 1.71 | -3.3 | -3.5 |
| 2225 | 51.2 | 13.58 | 1.68 | 53.0 | 1.74 | -3.3 | -3.1 |
| 2250 | 51.2 | 13.65 | 1.71 | 53.0 | 1.76 | -3.3 | -2.8 |
| 2275 | 51.1 | 13.78 | 1.74 | 52.9 | 1.78 | -3.5 | -2.2 |
| 2300 | 51.0 | 13.90 | 1.78 | 52.9 | 1.81 | -3.6 | -1.5 |
| 2325 | 50.9 | 14.01 | 1.81 | 52.9 | 1.83 | -3.7 | -1.0 |
| 2350 | 50.9 | 14.12 | 1.85 | 52.8 | 1.85 | -3.8 | -0.5 |
| 2375 | 50.7 | 14.21 | 1.88 | 52.8 | 1.88 | -3.9 | 0.0 |
| 2400 | 50.6 | 14.31 | 1.91 | 52.8 | 1.90 | -4.1 | 0.5 |
| 2425 | 50.5 | 14.44 | 1.95 | 52.7 | 1.93 | -4.2 | 1.1 |
| 2450 | 50.5 | 14.56 | 1.99 | 52.7 | 1.95 | -4.3 | 1.9 |
| 2475 | 50.4 | 14.64 | 2.02 | 52.7 | 1.99 | -4.4 | 1.6 |
| 2500 | 50.3 | 14.72 | 2.05 | 52.6 | 2.02 | -4.5 | 1.3 |
| 2525 | 50.2 | 14.79 | 2.08 | 52.6 | 2.06 | -4.6 | 1.0 |
| 2550 | 50.1 | 14.86 | 2.11 | 52.6 | 2.09 | -4.7 | 0.7 |
| 2575 | 50.0 | 15.00 | 2.15 | 52.5 | 2.13 | -4.8 | 1.0 |
| 2600 | 49.9 | 15.14 | 2.19 | 52.5 | 2.16 | -4.9 | 1.2 |
| 2625 | 49.8 | 15.23 | 2.22 | 52.5 | 2.20 | -5.1 | 1.2 |
| 2650 | 49.6 | 15.33 | 2.26 | 52.4 | 2.23 | -5.3 | 1.2 |
| 2675 | 49.6 | 15.45 | 2.30 | 52.4 | 2.27 | -5.4 | 1.3 |
| 2700 | 49.5 | 15.56 | 2.34 | 52.4 | 2.30 | -5.5 | 1.4 |



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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.

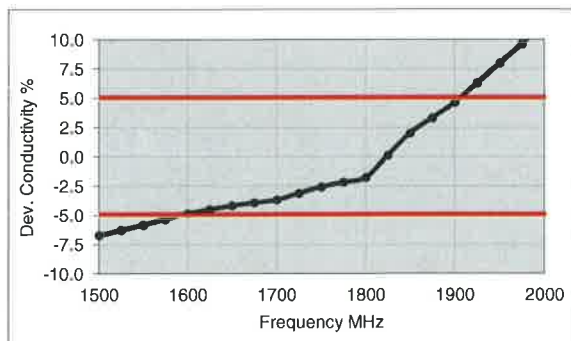
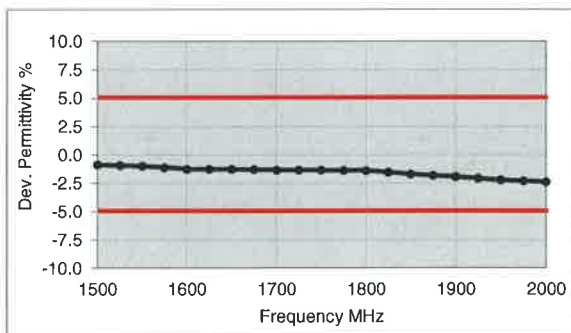
Test Condition

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'' | sigma | eps | sigma | Δ-eps | Δ-sigma |
| 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 |



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 **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

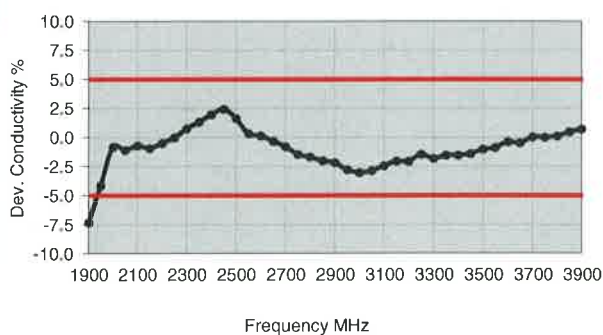
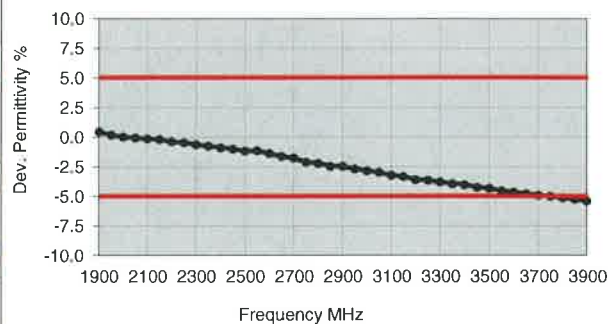
Ambient Environment temperatur (22 ± 3)°C and humidity < 70%.
 TSL Temperature 22°C
 Test Date 19-Feb-14
 Operator IEN

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 |



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 **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/cm³
 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 |

