

## Head Tissue Simulating Liquids

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

## Body Tissue Simulating Liquids

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

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## Measurement Certificate / Material Test

Item Name **Head Tissue Simulating Liquid (HSL750V2)**  
 Product No. SL AAH 075 AA (Charge: 140903-3)  
 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.

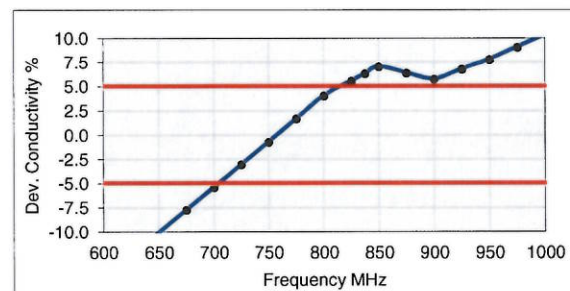
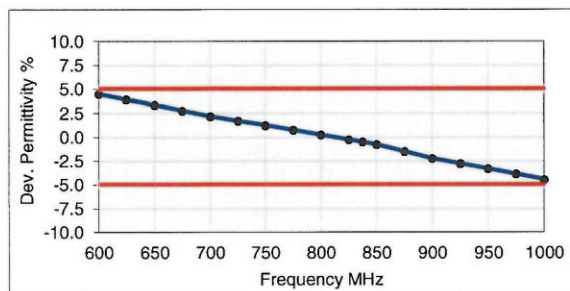
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 10-Sep-14  
 Operator CL

### Additional Information

TSL Density 1.284 g/cm<sup>3</sup>  
 TSL Heat-capacity 2.701 kJ/(kg\*K)

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |                 |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
|         | HP-e'    | HP-e'' | sigma | eps    | sigma | $\Delta$ -eps      | $\Delta$ -sigma |
| 600     | 44.6     | 22.48  | 0.75  | 42.7   | 0.88  | 4.5                | -14.9           |
| 625     | 44.3     | 22.25  | 0.77  | 42.6   | 0.88  | 3.9                | -12.5           |
| 650     | 43.9     | 22.03  | 0.80  | 42.5   | 0.89  | 3.4                | -10.1           |
| 675     | 43.5     | 21.82  | 0.82  | 42.3   | 0.89  | 2.8                | -7.7            |
| 700     | 43.1     | 21.61  | 0.84  | 42.2   | 0.89  | 2.2                | -5.4            |
| 725     | 42.8     | 21.43  | 0.86  | 42.1   | 0.89  | 1.7                | -3.0            |
| 750     | 42.5     | 21.26  | 0.89  | 41.9   | 0.89  | 1.3                | -0.7            |
| 775     | 42.1     | 21.12  | 0.91  | 41.8   | 0.90  | 0.8                | 1.7             |
| 800     | 41.8     | 20.98  | 0.93  | 41.7   | 0.90  | 0.3                | 4.0             |
| 825     | 41.5     | 20.86  | 0.96  | 41.6   | 0.91  | -0.2               | 5.6             |
| 838     | 41.3     | 20.80  | 0.97  | 41.5   | 0.91  | -0.5               | 6.3             |
| 850     | 41.2     | 20.74  | 0.98  | 41.5   | 0.92  | -0.7               | 7.0             |
| 875     | 40.9     | 20.61  | 1.00  | 41.5   | 0.94  | -1.5               | 6.4             |
| 900     | 40.6     | 20.49  | 1.03  | 41.5   | 0.97  | -2.2               | 5.8             |
| 925     | 40.3     | 20.39  | 1.05  | 41.5   | 0.98  | -2.8               | 6.8             |
| 950     | 40.1     | 20.28  | 1.07  | 41.4   | 0.99  | -3.3               | 7.8             |
| 975     | 39.8     | 20.20  | 1.10  | 41.4   | 1.00  | -3.9               | 9.1             |
| 1000    | 39.5     | 20.13  | 1.12  | 41.3   | 1.01  | -4.5               | 10.3            |



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## Measurement Certificate / Material Test

Item Name **Head Tissue Simulating Liquid (HSL900V2)**  
 Product No. SL AAH 090 BB (Charge: 140818-1)  
 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.

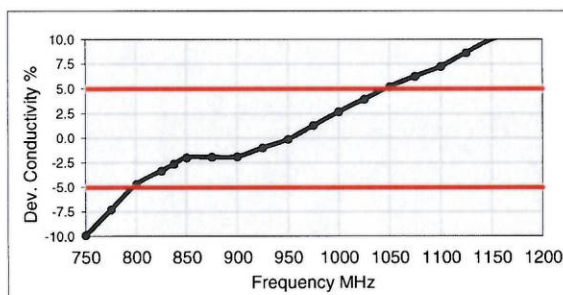
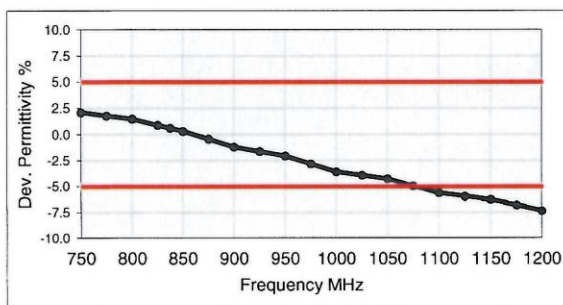
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 20-Aug-14  
 Operator IEN

### Additional Information

TSL Density 1.280 g/cm<sup>3</sup>  
 TSL Heat-capacity 2.942 kJ/(kg\*K)

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |                 |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
|         | HP-e'    | HP-e'' | sigma | eps    | sigma | $\Delta$ -eps      | $\Delta$ -sigma |
| 700     | 43.7     | 19.64  | 0.76  | 42.2   | 0.89  | 3.5                | -14.0           |
| 725     | 43.3     | 19.47  | 0.78  | 42.1   | 0.89  | 2.8                | -11.9           |
| 750     | 42.8     | 19.30  | 0.81  | 41.9   | 0.89  | 2.1                | -9.9            |
| 775     | 42.6     | 19.26  | 0.83  | 41.8   | 0.90  | 1.8                | -7.3            |
| 800     | 42.3     | 19.21  | 0.86  | 41.7   | 0.90  | 1.5                | -4.7            |
| 825     | 42.0     | 19.10  | 0.88  | 41.6   | 0.91  | 0.9                | -3.3            |
| 838     | 41.8     | 19.05  | 0.89  | 41.5   | 0.91  | 0.6                | -2.6            |
| 850     | 41.6     | 18.99  | 0.90  | 41.5   | 0.92  | 0.3                | -2.0            |
| 875     | 41.3     | 19.00  | 0.92  | 41.5   | 0.94  | -0.4               | -1.9            |
| 900     | 41.0     | 19.01  | 0.95  | 41.5   | 0.97  | -1.2               | -1.9            |
| 925     | 40.8     | 18.90  | 0.97  | 41.5   | 0.98  | -1.6               | -1.0            |
| 950     | 40.6     | 18.79  | 0.99  | 41.4   | 0.99  | -2.1               | -0.1            |
| 975     | 40.2     | 18.76  | 1.02  | 41.4   | 1.00  | -2.8               | 1.3             |
| 1000    | 39.9     | 18.74  | 1.04  | 41.3   | 1.01  | -3.6               | 2.7             |
| 1025    | 39.7     | 18.69  | 1.07  | 41.3   | 1.03  | -3.9               | 4.0             |
| 1050    | 39.5     | 18.65  | 1.09  | 41.2   | 1.04  | -4.3               | 5.2             |
| 1075    | 39.2     | 18.58  | 1.11  | 41.2   | 1.05  | -4.9               | 6.2             |
| 1100    | 38.8     | 18.51  | 1.13  | 41.2   | 1.06  | -5.6               | 7.3             |
| 1125    | 38.7     | 18.51  | 1.16  | 41.1   | 1.07  | -5.9               | 8.6             |
| 1150    | 38.5     | 18.51  | 1.18  | 41.1   | 1.08  | -6.3               | 10.0            |
| 1175    | 38.2     | 18.40  | 1.20  | 41.0   | 1.09  | -6.8               | 10.7            |
| 1200    | 38.0     | 18.29  | 1.22  | 41.0   | 1.10  | -7.3               | 11.3            |



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## Measurement Certificate / Material Test

Item Name **Head Tissue Simulating Liquid (HBBL1550-1950V3)**  
 Product No. SL AAH 181 AA (Charge: 140916-1)  
 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.

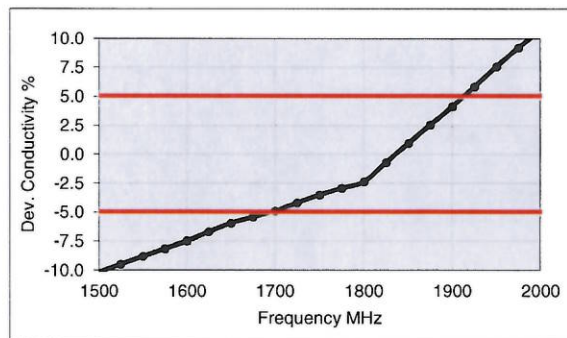
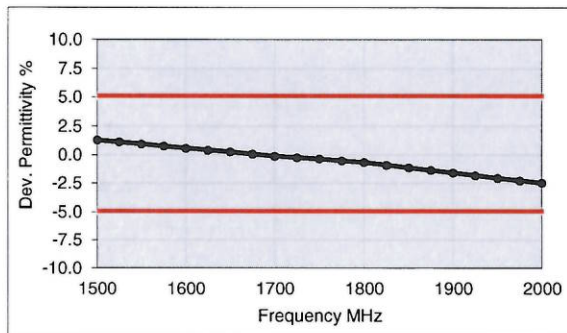
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 17-Sep-14  
 Operator IEN

### Additional Information

TSL Density 1.052 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.322 kJ/(kg\*K)

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |                 |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
|         | HP-e'    | HP-e'' | sigma | eps    | sigma | $\Delta$ -eps      | $\Delta$ -sigma |
| 1500    | 41.0     | 13.22  | 1.10  | 40.4   | 1.23  | 1.3                | -10.2           |
| 1525    | 40.9     | 13.26  | 1.12  | 40.4   | 1.24  | 1.1                | -9.5            |
| 1550    | 40.8     | 13.29  | 1.15  | 40.4   | 1.26  | 1.0                | -8.8            |
| 1575    | 40.7     | 13.32  | 1.17  | 40.3   | 1.27  | 0.8                | -8.1            |
| 1600    | 40.6     | 13.35  | 1.19  | 40.3   | 1.28  | 0.6                | -7.5            |
| 1625    | 40.4     | 13.40  | 1.21  | 40.3   | 1.30  | 0.4                | -6.7            |
| 1650    | 40.3     | 13.46  | 1.24  | 40.2   | 1.31  | 0.3                | -5.9            |
| 1675    | 40.2     | 13.48  | 1.26  | 40.2   | 1.33  | 0.1                | -5.4            |
| 1700    | 40.1     | 13.50  | 1.28  | 40.2   | 1.34  | -0.1               | -4.9            |
| 1725    | 40.0     | 13.55  | 1.30  | 40.1   | 1.36  | -0.2               | -4.2            |
| 1750    | 39.9     | 13.59  | 1.32  | 40.1   | 1.37  | -0.3               | -3.5            |
| 1775    | 39.8     | 13.62  | 1.35  | 40.0   | 1.39  | -0.5               | -2.9            |
| 1800    | 39.7     | 13.65  | 1.37  | 40.0   | 1.40  | -0.6               | -2.4            |
| 1825    | 39.6     | 13.69  | 1.39  | 40.0   | 1.40  | -0.9               | -0.7            |
| 1850    | 39.6     | 13.74  | 1.41  | 40.0   | 1.40  | -1.1               | 1.0             |
| 1875    | 39.5     | 13.77  | 1.44  | 40.0   | 1.40  | -1.3               | 2.6             |
| 1900    | 39.4     | 13.79  | 1.46  | 40.0   | 1.40  | -1.6               | 4.1             |
| 1925    | 39.3     | 13.84  | 1.48  | 40.0   | 1.40  | -1.8               | 5.9             |
| 1950    | 39.2     | 13.88  | 1.51  | 40.0   | 1.40  | -2.0               | 7.6             |
| 1975    | 39.1     | 13.91  | 1.53  | 40.0   | 1.40  | -2.3               | 9.2             |
| 2000    | 39.0     | 13.94  | 1.55  | 40.0   | 1.40  | -2.5               | 10.8            |



## Measurement Certificate / Material Test

|              |                                           |
|--------------|-------------------------------------------|
| Item Name    | Head Tissue Simulating Liquid (HSL1900V2) |
| Product No.  | SL AAH 190 AA (Charge: 150114-3)          |
| 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

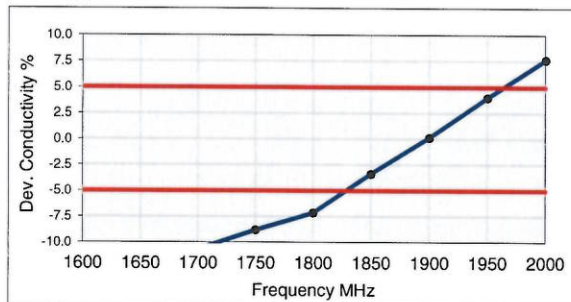
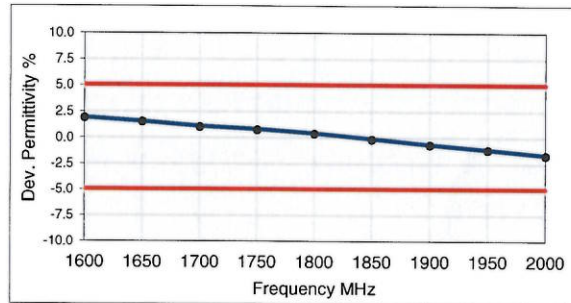
Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

### Test Condition

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| Ambient         | Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%. |
| TSL Temperature | 22°C                                                        |
| Test Date       | 21-Jan-15                                                   |
| Operator        | IEN                                                         |

|                   |                         |
|-------------------|-------------------------|
| TSL Density       | 0.985 g/cm <sup>3</sup> |
| TSL Heat-capacity | 3.710 kJ/(kg*K)         |

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |                 |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
|         | HP-e'    | HP-e'' | sigma | eps    | sigma | $\Delta$ -eps      | $\Delta$ -sigma |
| 1600    | 41.1     | 12.36  | 1.10  | 40.3   | 1.28  | 2.0                | -14.4           |
| 1613    | 41.1     | 12.41  | 1.12  | 40.3   | 1.29  | 2.0                | -13.3           |
| 1625    | 41.0     | 12.45  | 1.13  | 40.3   | 1.30  | 1.8                | -13.0           |
| 1638    | 41.0     | 12.49  | 1.14  | 40.3   | 1.31  | 1.8                | -12.7           |
| 1650    | 40.9     | 12.53  | 1.15  | 40.2   | 1.31  | 1.6                | -12.4           |
| 1663    | 40.9     | 12.57  | 1.17  | 40.2   | 1.32  | 1.7                | -11.4           |
| 1675    | 40.8     | 12.61  | 1.18  | 40.2   | 1.33  | 1.5                | -11.1           |
| 1688    | 40.7     | 12.65  | 1.19  | 40.2   | 1.33  | 1.3                | -10.9           |
| 1700    | 40.6     | 12.68  | 1.20  | 40.2   | 1.34  | 1.1                | -10.6           |
| 1713    | 40.6     | 12.72  | 1.22  | 40.1   | 1.35  | 1.2                | -9.6            |
| 1725    | 40.5     | 12.76  | 1.23  | 40.1   | 1.36  | 1.0                | -9.3            |
| 1738    | 40.5     | 12.80  | 1.24  | 40.1   | 1.36  | 1.0                | -9.1            |
| 1750    | 40.4     | 12.84  | 1.25  | 40.1   | 1.37  | 0.8                | -8.8            |
| 1763    | 40.4     | 12.88  | 1.27  | 40.1   | 1.38  | 0.9                | -7.9            |
| 1775    | 40.3     | 12.92  | 1.28  | 40.0   | 1.39  | 0.7                | -7.6            |
| 1788    | 40.3     | 12.96  | 1.29  | 40.0   | 1.39  | 0.7                | -7.4            |
| 1800    | 40.2     | 12.99  | 1.30  | 40.0   | 1.40  | 0.5                | -7.1            |
| 1813    | 40.2     | 13.03  | 1.32  | 40.0   | 1.40  | 0.5                | -5.7            |
| 1825    | 40.1     | 13.07  | 1.33  | 40.0   | 1.40  | 0.2                | -5.0            |
| 1838    | 40.1     | 13.11  | 1.34  | 40.0   | 1.40  | 0.2                | -4.3            |
| 1850    | 40.0     | 13.15  | 1.35  | 40.0   | 1.40  | 0.0                | -3.6            |
| 1863    | 40.0     | 13.18  | 1.37  | 40.0   | 1.40  | 0.0                | -2.1            |
| 1875    | 39.9     | 13.21  | 1.38  | 40.0   | 1.40  | -0.3               | -1.4            |
| 1888    | 39.8     | 13.24  | 1.39  | 40.0   | 1.40  | -0.5               | -0.7            |
| 1900    | 39.7     | 13.26  | 1.40  | 40.0   | 1.40  | -0.7               | 0.0             |
| 1913    | 39.7     | 13.30  | 1.42  | 40.0   | 1.40  | -0.7               | 1.4             |
| 1925    | 39.6     | 13.34  | 1.43  | 40.0   | 1.40  | -1.0               | 2.1             |
| 1938    | 39.6     | 13.38  | 1.45  | 40.0   | 1.40  | -1.0               | 3.6             |
| 1950    | 39.5     | 13.42  | 1.46  | 40.0   | 1.40  | -1.3               | 4.3             |
| 1975    | 39.4     | 13.48  | 1.49  | 40.0   | 1.40  | -1.5               | 6.4             |
| 2000    | 39.3     | 13.54  | 1.51  | 40.0   | 1.40  | -1.8               | 7.9             |



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## Measurement Certificate / Material Test

Item Name **Head Tissue Simulating Liquid (HBBL1900-3800V3)**  
 Product No. SL AAH 196 AB (Charge: 140729-2)  
 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.

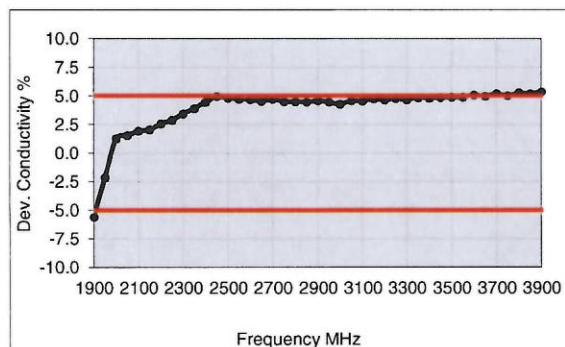
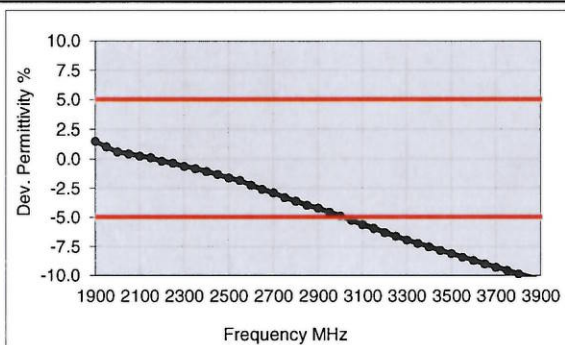
### Test Condition

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

### Additional Information

TSL Density 1.054 g/cm<sup>3</sup>  
 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    | 40.6     | 12.5   | 1.3   | 40.0   | 1.4   | 1.5                | -5.6    |
| 1950    | 40.4     | 12.6   | 1.4   | 40.0   | 1.4   | 1.1                | -2.1    |
| 2000    | 40.3     | 12.7   | 1.4   | 40.0   | 1.4   | 0.6                | 1.3     |
| 2050    | 40.1     | 12.9   | 1.5   | 39.9   | 1.4   | 0.5                | 1.6     |
| 2100    | 39.9     | 13.0   | 1.5   | 39.8   | 1.5   | 0.3                | 1.9     |
| 2150    | 39.8     | 13.1   | 1.6   | 39.7   | 1.5   | 0.1                | 2.0     |
| 2200    | 39.6     | 13.2   | 1.6   | 39.6   | 1.6   | -0.2               | 2.6     |
| 2250    | 39.4     | 13.3   | 1.7   | 39.6   | 1.6   | -0.3               | 2.9     |
| 2300    | 39.2     | 13.5   | 1.7   | 39.5   | 1.7   | -0.6               | 3.4     |
| 2350    | 39.1     | 13.6   | 1.8   | 39.4   | 1.7   | -0.8               | 3.9     |
| 2400    | 38.9     | 13.7   | 1.8   | 39.3   | 1.8   | -1.0               | 4.5     |
| 2450    | 38.7     | 13.9   | 1.9   | 39.2   | 1.8   | -1.3               | 4.9     |
| 2500    | 38.5     | 14.0   | 1.9   | 39.1   | 1.9   | -1.6               | 4.8     |
| 2550    | 38.4     | 14.1   | 2.0   | 39.1   | 1.9   | -1.8               | 4.8     |
| 2600    | 38.1     | 14.2   | 2.1   | 39.0   | 2.0   | -2.2               | 4.7     |
| 2650    | 37.9     | 14.3   | 2.1   | 38.9   | 2.0   | -2.6               | 4.6     |
| 2700    | 37.8     | 14.5   | 2.2   | 38.9   | 2.1   | -2.9               | 4.7     |
| 2750    | 37.5     | 14.5   | 2.2   | 38.8   | 2.1   | -3.3               | 4.5     |
| 2800    | 37.4     | 14.6   | 2.3   | 38.8   | 2.2   | -3.6               | 4.5     |
| 2850    | 37.2     | 14.7   | 2.3   | 38.7   | 2.2   | -3.9               | 4.5     |
| 2900    | 37.0     | 14.9   | 2.4   | 38.6   | 2.3   | -4.2               | 4.6     |
| 2950    | 36.8     | 14.9   | 2.5   | 38.6   | 2.3   | -4.5               | 4.5     |
| 3000    | 36.6     | 15.0   | 2.5   | 38.5   | 2.4   | -4.9               | 4.3     |
| 3050    | 36.4     | 15.1   | 2.6   | 38.4   | 2.5   | -5.2               | 4.6     |
| 3100    | 36.2     | 15.2   | 2.6   | 38.4   | 2.5   | -5.6               | 4.6     |
| 3150    | 36.1     | 15.3   | 2.7   | 38.3   | 2.6   | -5.9               | 4.8     |
| 3200    | 35.9     | 15.3   | 2.7   | 38.3   | 2.6   | -6.3               | 4.7     |
| 3250    | 35.7     | 15.4   | 2.8   | 38.2   | 2.7   | -6.6               | 4.8     |
| 3300    | 35.5     | 15.4   | 2.8   | 38.2   | 2.7   | -6.9               | 4.7     |
| 3350    | 35.4     | 15.5   | 2.9   | 38.1   | 2.8   | -7.2               | 4.9     |
| 3400    | 35.2     | 15.6   | 2.9   | 38.0   | 2.8   | -7.5               | 4.8     |
| 3450    | 35.0     | 15.6   | 3.0   | 38.0   | 2.9   | -7.8               | 4.9     |
| 3500    | 34.9     | 15.7   | 3.1   | 37.9   | 2.9   | -8.1               | 4.9     |
| 3550    | 34.7     | 15.7   | 3.1   | 37.9   | 3.0   | -8.4               | 4.9     |
| 3600    | 34.5     | 15.8   | 3.2   | 37.8   | 3.0   | -8.7               | 5.1     |
| 3650    | 34.4     | 15.9   | 3.2   | 37.8   | 3.1   | -9.0               | 5.0     |
| 3700    | 34.2     | 15.9   | 3.3   | 37.7   | 3.1   | -9.3               | 5.2     |
| 3750    | 34.0     | 16.0   | 3.3   | 37.6   | 3.2   | -9.6               | 5.0     |
| 3800    | 33.9     | 16.0   | 3.4   | 37.6   | 3.2   | -9.9               | 5.3     |
| 3850    | 33.7     | 16.1   | 3.4   | 37.5   | 3.3   | -10.1              | 5.2     |



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## Measurement Certificate / Material Test

Item Name **Head Tissue Simulating Liquid (HSL2450V2)**  
 Product No. SL AAH 245 BA (Charge: 150121-3)  
 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.

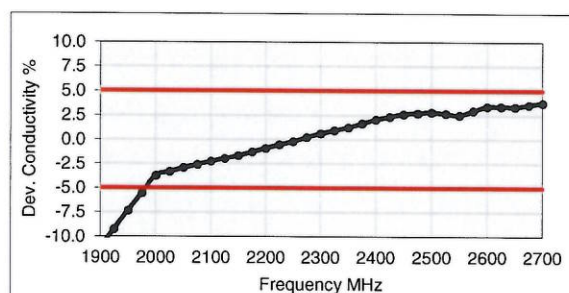
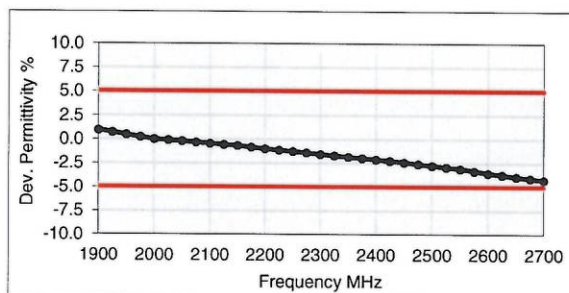
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature **23°C**  
 Test Date 21-Jan-15  
 Operator IEN

### Additional Information

TSL Density 0.988 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.680 kJ/(kg\*K)

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |                 |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
|         | HP-e'    | HP-e'' | sigma | eps    | sigma | $\Delta$ -eps      | $\Delta$ -sigma |
| 1900    | 40.4     | 11.77  | 1.24  | 40.0   | 1.40  | 1.0                | -11.1           |
| 1925    | 40.3     | 11.87  | 1.27  | 40.0   | 1.40  | 0.8                | -9.2            |
| 1950    | 40.2     | 11.96  | 1.30  | 40.0   | 1.40  | 0.5                | -7.3            |
| 1975    | 40.1     | 12.04  | 1.32  | 40.0   | 1.40  | 0.3                | -5.5            |
| 2000    | 40.0     | 12.12  | 1.35  | 40.0   | 1.40  | 0.0                | -3.7            |
| 2025    | 39.9     | 12.21  | 1.38  | 40.0   | 1.42  | -0.1               | -3.3            |
| 2050    | 39.8     | 12.30  | 1.40  | 39.9   | 1.44  | -0.2               | -2.9            |
| 2075    | 39.7     | 12.38  | 1.43  | 39.9   | 1.47  | -0.3               | -2.6            |
| 2100    | 39.7     | 12.46  | 1.46  | 39.8   | 1.49  | -0.4               | -2.2            |
| 2125    | 39.6     | 12.53  | 1.48  | 39.8   | 1.51  | -0.5               | -1.9            |
| 2150    | 39.5     | 12.61  | 1.51  | 39.7   | 1.53  | -0.6               | -1.7            |
| 2175    | 39.4     | 12.69  | 1.54  | 39.7   | 1.56  | -0.8               | -1.3            |
| 2200    | 39.3     | 12.78  | 1.56  | 39.6   | 1.58  | -1.0               | -0.9            |
| 2225    | 39.2     | 12.86  | 1.59  | 39.6   | 1.60  | -1.1               | -0.5            |
| 2250    | 39.1     | 12.94  | 1.62  | 39.6   | 1.62  | -1.2               | -0.2            |
| 2275    | 39.0     | 13.02  | 1.65  | 39.5   | 1.64  | -1.4               | 0.2             |
| 2300    | 38.9     | 13.11  | 1.68  | 39.5   | 1.67  | -1.5               | 0.6             |
| 2325    | 38.8     | 13.18  | 1.71  | 39.4   | 1.69  | -1.7               | 1.0             |
| 2350    | 38.7     | 13.25  | 1.73  | 39.4   | 1.71  | -1.8               | 1.3             |
| 2375    | 38.6     | 13.34  | 1.76  | 39.3   | 1.73  | -2.0               | 1.7             |
| 2400    | 38.5     | 13.42  | 1.79  | 39.3   | 1.76  | -2.1               | 2.1             |
| 2425    | 38.4     | 13.49  | 1.82  | 39.2   | 1.78  | -2.2               | 2.4             |
| 2450    | 38.3     | 13.56  | 1.85  | 39.2   | 1.80  | -2.4               | 2.7             |
| 2475    | 38.2     | 13.64  | 1.88  | 39.2   | 1.83  | -2.5               | 2.8             |
| 2500    | 38.1     | 13.71  | 1.91  | 39.1   | 1.85  | -2.7               | 2.8             |
| 2525    | 38.0     | 13.76  | 1.93  | 39.1   | 1.88  | -2.9               | 2.7             |
| 2550    | 37.9     | 13.80  | 1.96  | 39.1   | 1.91  | -3.0               | 2.5             |
| 2575    | 37.8     | 13.92  | 1.99  | 39.0   | 1.94  | -3.3               | 3.0             |
| 2600    | 37.6     | 14.04  | 2.03  | 39.0   | 1.96  | -3.5               | 3.4             |
| 2625    | 37.5     | 14.10  | 2.06  | 39.0   | 1.99  | -3.7               | 3.4             |
| 2650    | 37.4     | 14.16  | 2.09  | 38.9   | 2.02  | -3.9               | 3.4             |
| 2675    | 37.3     | 14.24  | 2.12  | 38.9   | 2.05  | -4.1               | 3.6             |
| 2700    | 37.2     | 14.32  | 2.15  | 38.9   | 2.07  | -4.2               | 3.8             |



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## Measurement Certificate / Material Test

|              |                                                 |
|--------------|-------------------------------------------------|
| Item Name    | Head Tissue Simulating Liquid (HBBL3500-5800V5) |
| Product No.  | SL AAH 502 AE (Charge: 140617-1)                |
| 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.

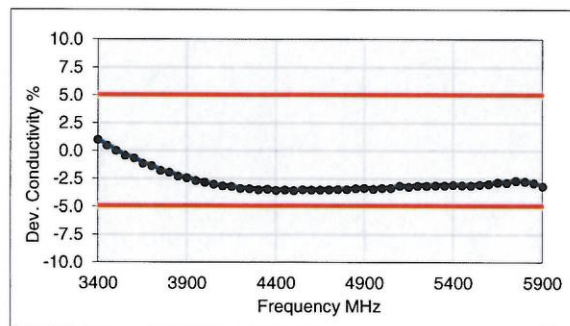
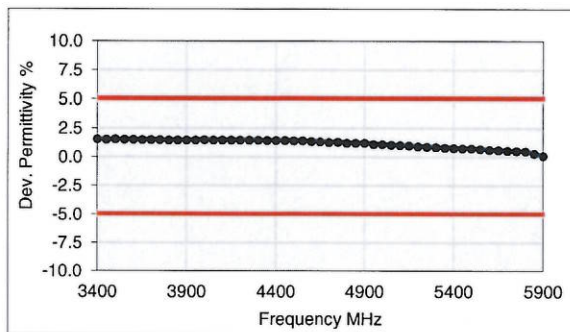
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 18-Jun-14  
 Operator IEN

### Additional Information

TSL Density 0.985 g/cm<sup>3</sup>  
 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    | 38.6     | 15.01  | 2.84  | 38.0   | 2.81  | 1.5                | 1.1     |
| 3500    | 38.5     | 14.97  | 2.91  | 37.9   | 2.91  | 1.5                | -0.1    |
| 3600    | 38.4     | 14.96  | 3.00  | 37.8   | 3.02  | 1.5                | -0.5    |
| 3700    | 38.3     | 14.95  | 3.08  | 37.7   | 3.12  | 1.6                | -1.2    |
| 3800    | 38.1     | 14.94  | 3.16  | 37.6   | 3.22  | 1.4                | -1.9    |
| 3900    | 38.0     | 14.95  | 3.24  | 37.5   | 3.32  | 1.4                | -2.5    |
| 4000    | 37.9     | 14.96  | 3.33  | 37.4   | 3.43  | 1.5                | -2.8    |
| 4100    | 37.8     | 14.98  | 3.42  | 37.2   | 3.53  | 1.5                | -3.0    |
| 4200    | 37.7     | 15.02  | 3.51  | 37.1   | 3.63  | 1.5                | -3.3    |
| 4300    | 37.6     | 15.06  | 3.60  | 37.0   | 3.73  | 1.6                | -3.5    |
| 4400    | 37.4     | 15.12  | 3.70  | 36.9   | 3.84  | 1.4                | -3.5    |
| 4500    | 37.3     | 15.17  | 3.80  | 36.8   | 3.94  | 1.4                | -3.5    |
| 4600    | 37.2     | 15.23  | 3.90  | 36.7   | 4.04  | 1.4                | -3.5    |
| 4700    | 37.0     | 15.29  | 4.00  | 36.6   | 4.14  | 1.2                | -3.4    |
| 4800    | 36.9     | 15.35  | 4.10  | 36.4   | 4.25  | 1.3                | -3.4    |
| 4850    | 36.8     | 15.39  | 4.15  | 36.4   | 4.30  | 1.1                | -3.4    |
| 4900    | 36.8     | 15.42  | 4.20  | 36.3   | 4.35  | 1.3                | -3.4    |
| 4950    | 36.7     | 15.43  | 4.25  | 36.3   | 4.40  | 1.2                | -3.4    |
| 5000    | 36.6     | 15.47  | 4.30  | 36.2   | 4.45  | 1.1                | -3.4    |
| 5050    | 36.5     | 15.49  | 4.35  | 36.2   | 4.50  | 0.9                | -3.4    |
| 5100    | 36.5     | 15.54  | 4.41  | 36.1   | 4.55  | 1.1                | -3.1    |
| 5150    | 36.4     | 15.55  | 4.46  | 36.0   | 4.60  | 1.0                | -3.1    |
| 5200    | 36.3     | 15.59  | 4.51  | 36.0   | 4.66  | 0.9                | -3.1    |
| 5250    | 36.3     | 15.61  | 4.56  | 35.9   | 4.71  | 1.0                | -3.1    |
| 5300    | 36.2     | 15.63  | 4.61  | 35.9   | 4.76  | 0.9                | -3.1    |
| 5350    | 36.1     | 15.65  | 4.66  | 35.8   | 4.81  | 0.8                | -3.1    |
| 5400    | 36.0     | 15.68  | 4.71  | 35.8   | 4.86  | 0.7                | -3.1    |
| 5450    | 36.0     | 15.70  | 4.76  | 35.7   | 4.91  | 0.8                | -3.1    |
| 5500    | 35.9     | 15.72  | 4.81  | 35.6   | 4.96  | 0.7                | -3.1    |
| 5550    | 35.8     | 15.75  | 4.86  | 35.6   | 5.01  | 0.6                | -3.1    |
| 5600    | 35.8     | 15.78  | 4.91  | 35.5   | 5.07  | 0.8                | -3.1    |
| 5650    | 35.7     | 15.82  | 4.97  | 35.5   | 5.12  | 0.6                | -2.9    |
| 5700    | 35.6     | 15.83  | 5.02  | 35.4   | 5.17  | 0.5                | -2.9    |
| 5750    | 35.5     | 15.88  | 5.08  | 35.4   | 5.22  | 0.4                | -2.7    |
| 5800    | 35.5     | 15.89  | 5.13  | 35.3   | 5.27  | 0.6                | -2.7    |
| 5850    | 35.4     | 15.92  | 5.18  | 35.3   | 5.34  | 0.3                | -2.9    |
| 5900    | 35.3     | 15.93  | 5.23  | 35.3   | 5.40  | 0.0                | -3.1    |



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## Measurement Certificate / Material Test

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

### Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

### Setup Validation

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

### Target Parameters

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

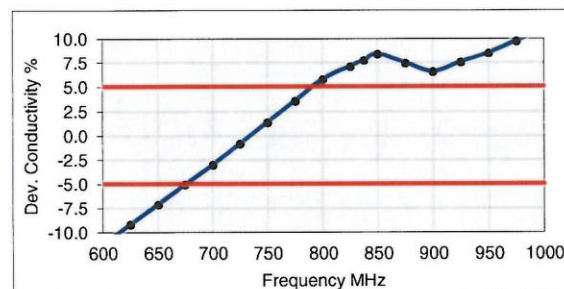
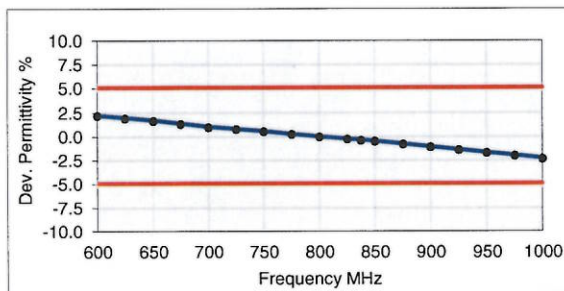
### Test Condition

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

### Additional Information

TSL Density 1.212 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.006 kJ/(kg\*K)

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



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## Measurement Certificate / Material Test

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

### Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

### Setup Validation

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

### Target Parameters

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

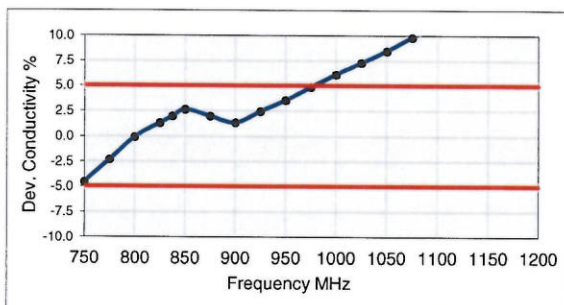
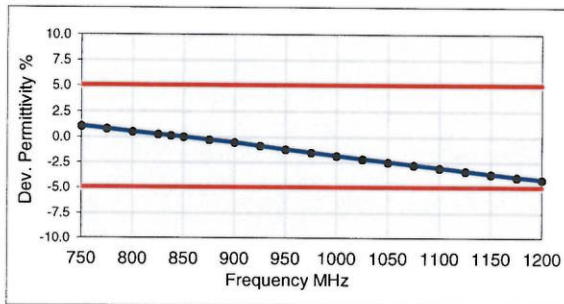
### Test Condition

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

### Additional Information

TSL Density 1.208 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.113 kJ/(kg·K)

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



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## Measurement Certificate / Material Test

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

### Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

### Setup Validation

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

### Target Parameters

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

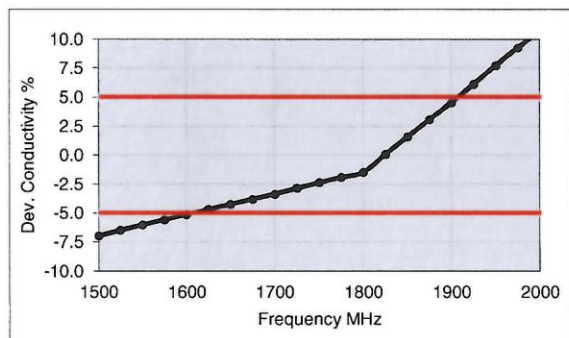
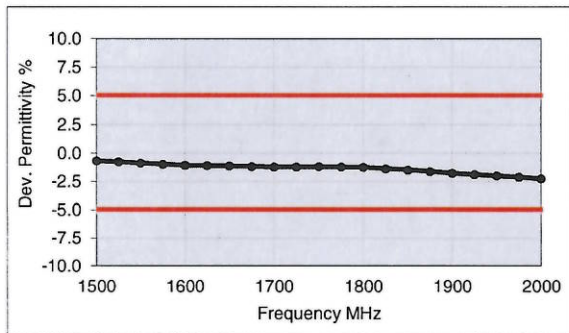
### Test Condition

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

### Additional Information

TSL Density 1.042 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.475 kJ/(kg\*K)

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



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## Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MSL1900V2)**  
 Product No. SL AAM 190 AA (Charge: 150120-4)  
 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.

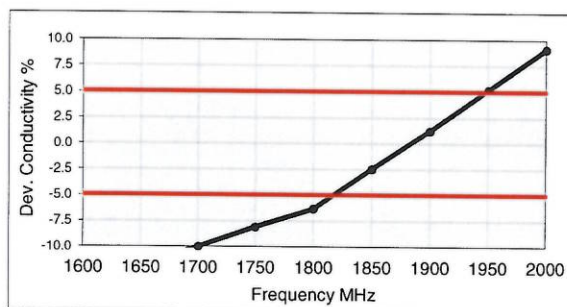
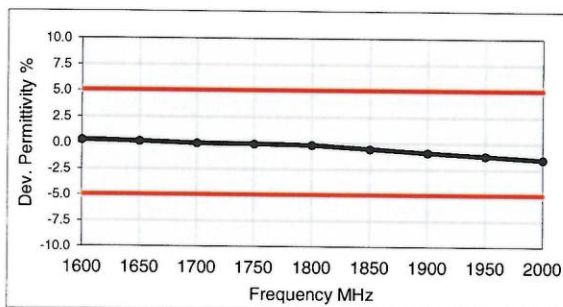
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 21-Jan-15  
 Operator IEN

### Additional Information

TSL Density 0.996 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.947 kJ/(kg\*K)

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |       |
|---------|----------|--------|-------|--------|-------|--------------------|-------|
|         | HP-e'    | HP-e'' | sigma | eps    | sigma |                    |       |
| 1600    | 54.0     | 13.51  | 1.20  | 53.8   | 1.39  | 0.3                | -13.9 |
| 1613    | 54.0     | 13.56  | 1.22  | 53.8   | 1.40  | 0.4                | -13.0 |
| 1625    | 53.9     | 13.61  | 1.23  | 53.8   | 1.41  | 0.3                | -12.7 |
| 1638    | 53.9     | 13.66  | 1.25  | 53.7   | 1.42  | 0.3                | -11.8 |
| 1650    | 53.8     | 13.71  | 1.26  | 53.7   | 1.43  | 0.2                | -11.6 |
| 1663    | 53.8     | 13.75  | 1.28  | 53.7   | 1.43  | 0.3                | -10.7 |
| 1675    | 53.7     | 13.79  | 1.29  | 53.6   | 1.44  | 0.1                | -10.5 |
| 1688    | 53.7     | 13.83  | 1.30  | 53.6   | 1.45  | 0.2                | -10.3 |
| 1700    | 53.6     | 13.86  | 1.31  | 53.6   | 1.46  | 0.1                | -10.1 |
| 1713    | 53.6     | 13.91  | 1.33  | 53.5   | 1.46  | 0.1                | -9.2  |
| 1725    | 53.5     | 13.96  | 1.34  | 53.5   | 1.47  | 0.0                | -9.0  |
| 1738    | 53.5     | 14.01  | 1.36  | 53.5   | 1.48  | 0.1                | -8.1  |
| 1750    | 53.4     | 14.06  | 1.37  | 53.4   | 1.49  | -0.1               | -8.0  |
| 1763    | 53.4     | 14.10  | 1.39  | 53.4   | 1.50  | 0.0                | -7.1  |
| 1775    | 53.3     | 14.14  | 1.40  | 53.4   | 1.50  | -0.1               | -6.9  |
| 1788    | 53.3     | 14.18  | 1.41  | 53.3   | 1.51  | -0.1               | -6.8  |
| 1800    | 53.2     | 14.22  | 1.42  | 53.3   | 1.52  | -0.2               | -6.6  |
| 1813    | 53.2     | 14.27  | 1.44  | 53.3   | 1.52  | -0.2               | -5.3  |
| 1825    | 53.1     | 14.32  | 1.45  | 53.3   | 1.52  | -0.4               | -4.6  |
| 1838    | 53.1     | 14.37  | 1.47  | 53.3   | 1.52  | -0.4               | -3.3  |
| 1850    | 53.0     | 14.41  | 1.48  | 53.3   | 1.52  | -0.6               | -2.6  |
| 1863    | 53.0     | 14.45  | 1.50  | 53.3   | 1.52  | -0.6               | -1.3  |
| 1875    | 52.9     | 14.49  | 1.51  | 53.3   | 1.52  | -0.8               | -0.7  |
| 1888    | 52.9     | 14.53  | 1.53  | 53.3   | 1.52  | -0.8               | 0.7   |
| 1900    | 52.8     | 14.56  | 1.54  | 53.3   | 1.52  | -0.9               | 1.3   |
| 1913    | 52.8     | 14.61  | 1.56  | 53.3   | 1.52  | -0.9               | 2.6   |
| 1925    | 52.8     | 14.65  | 1.57  | 53.3   | 1.52  | -0.9               | 3.3   |
| 1938    | 52.8     | 14.70  | 1.59  | 53.3   | 1.52  | -0.9               | 4.6   |
| 1950    | 52.7     | 14.74  | 1.60  | 53.3   | 1.52  | -1.1               | 5.3   |
| 1975    | 52.6     | 14.83  | 1.63  | 53.3   | 1.52  | -1.3               | 7.2   |
| 2000    | 52.5     | 14.91  | 1.66  | 53.3   | 1.52  | -1.5               | 9.2   |



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## Measurement Certificate / Material Test

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

### Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

### Setup Validation

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

### Target Parameters

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

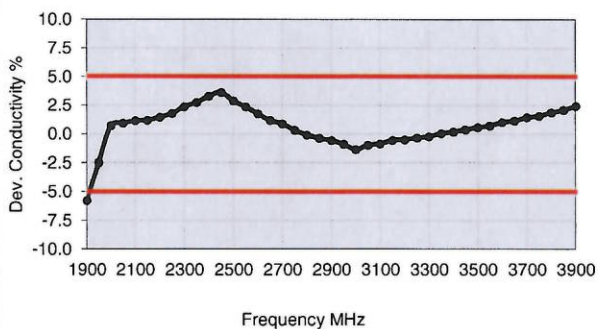
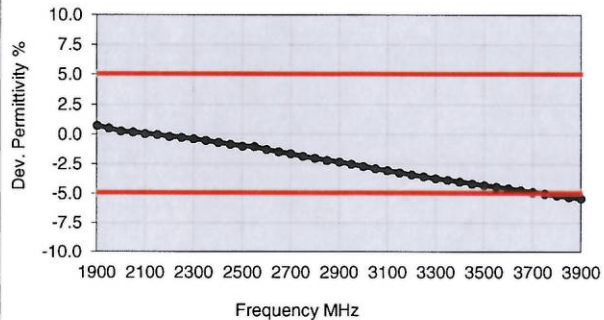
### Test Condition

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

### Additional Information

TSL Density 1.036 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.508 kJ/(kg\*K)

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



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## Measurement Certificate / Material Test

Item Name **Body Tissue Simulating Liquid (MSL2450V2)**  
 Product No. SL AAM 245 BA (Charge: 141010-3)  
 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.

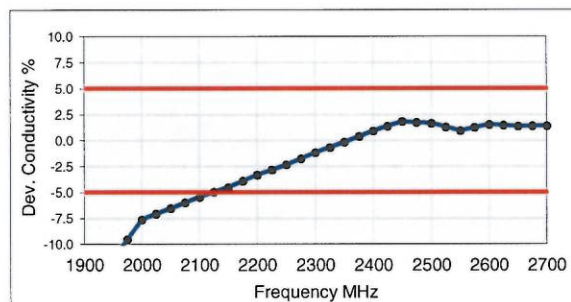
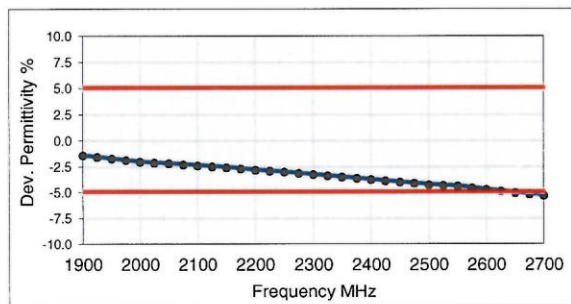
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 15-Oct-14  
 Operator IEN

### Additional Information

TSL Density 0.996 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.987 kJ/(kg\*K)

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |                 |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
|         | HP-e'    | HP-e'' | sigma | eps    | sigma | $\Delta$ -eps      | $\Delta$ -sigma |
| 1900    | 52.6     | 12.19  | 1.29  | 53.3   | 1.52  | -1.4               | -15.3           |
| 1925    | 52.5     | 12.30  | 1.32  | 53.3   | 1.52  | -1.6               | -13.3           |
| 1950    | 52.4     | 12.41  | 1.35  | 53.3   | 1.52  | -1.7               | -11.4           |
| 1975    | 52.3     | 12.52  | 1.38  | 53.3   | 1.52  | -1.9               | -9.5            |
| 2000    | 52.2     | 12.62  | 1.40  | 53.3   | 1.52  | -2.0               | -7.6            |
| 2025    | 52.1     | 12.74  | 1.44  | 53.3   | 1.54  | -2.1               | -7.0            |
| 2050    | 52.1     | 12.85  | 1.47  | 53.2   | 1.57  | -2.2               | -6.5            |
| 2075    | 52.0     | 12.97  | 1.50  | 53.2   | 1.59  | -2.3               | -6.0            |
| 2100    | 51.9     | 13.08  | 1.53  | 53.2   | 1.62  | -2.4               | -5.4            |
| 2125    | 51.8     | 13.18  | 1.56  | 53.1   | 1.64  | -2.5               | -4.9            |
| 2150    | 51.7     | 13.28  | 1.59  | 53.1   | 1.66  | -2.6               | -4.5            |
| 2175    | 51.6     | 13.40  | 1.62  | 53.1   | 1.69  | -2.7               | -3.9            |
| 2200    | 51.5     | 13.52  | 1.65  | 53.0   | 1.71  | -2.8               | -3.3            |
| 2225    | 51.5     | 13.62  | 1.69  | 53.0   | 1.74  | -2.9               | -2.8            |
| 2250    | 51.4     | 13.72  | 1.72  | 53.0   | 1.76  | -3.0               | -2.3            |
| 2275    | 51.3     | 13.84  | 1.75  | 52.9   | 1.78  | -3.1               | -1.7            |
| 2300    | 51.2     | 13.96  | 1.79  | 52.9   | 1.81  | -3.3               | -1.2            |
| 2325    | 51.1     | 14.06  | 1.82  | 52.9   | 1.83  | -3.4               | -0.7            |
| 2350    | 51.0     | 14.16  | 1.85  | 52.8   | 1.85  | -3.5               | -0.2            |
| 2375    | 50.9     | 14.27  | 1.89  | 52.8   | 1.88  | -3.6               | 0.4             |
| 2400    | 50.8     | 14.38  | 1.92  | 52.8   | 1.90  | -3.7               | 1.0             |
| 2425    | 50.7     | 14.48  | 1.95  | 52.7   | 1.93  | -3.9               | 1.4             |
| 2450    | 50.6     | 14.57  | 1.99  | 52.7   | 1.95  | -4.0               | 1.9             |
| 2475    | 50.5     | 14.67  | 2.02  | 52.7   | 1.99  | -4.1               | 1.8             |
| 2500    | 50.4     | 14.78  | 2.05  | 52.6   | 2.02  | -4.2               | 1.7             |
| 2525    | 50.3     | 14.83  | 2.08  | 52.6   | 2.06  | -4.3               | 1.3             |
| 2550    | 50.3     | 14.89  | 2.11  | 52.6   | 2.09  | -4.4               | 1.0             |
| 2575    | 50.1     | 15.04  | 2.15  | 52.5   | 2.13  | -4.6               | 1.3             |
| 2600    | 50.0     | 15.19  | 2.20  | 52.5   | 2.16  | -4.7               | 1.6             |
| 2625    | 49.9     | 15.27  | 2.23  | 52.5   | 2.20  | -4.9               | 1.5             |
| 2650    | 49.8     | 15.36  | 2.26  | 52.4   | 2.23  | -5.0               | 1.4             |
| 2675    | 49.7     | 15.46  | 2.30  | 52.4   | 2.27  | -5.2               | 1.4             |
| 2700    | 49.6     | 15.56  | 2.34  | 52.4   | 2.30  | -5.3               | 1.4             |



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## Measurement Certificate / Material Test

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

### Measurement Method

TSL dielectric parameters measured using calibrated OCP probe.

### Setup Validation

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

### Target Parameters

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

### Test Condition

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

### Additional Information

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

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

