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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.

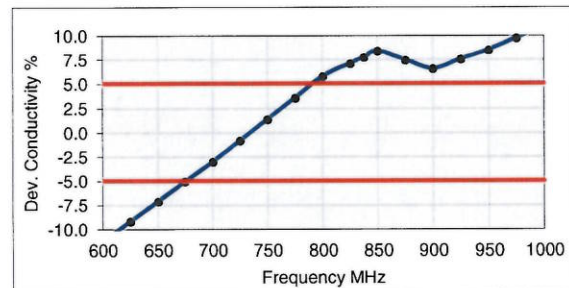
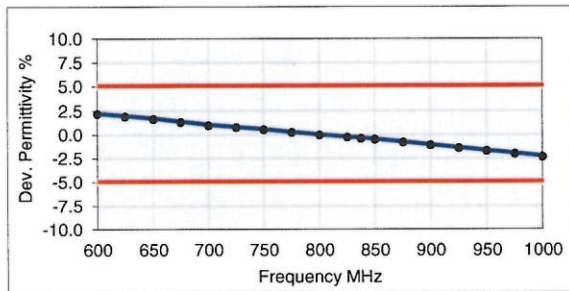
### Test Condition

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



## 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.

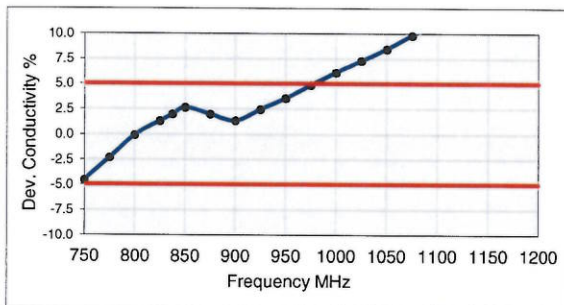
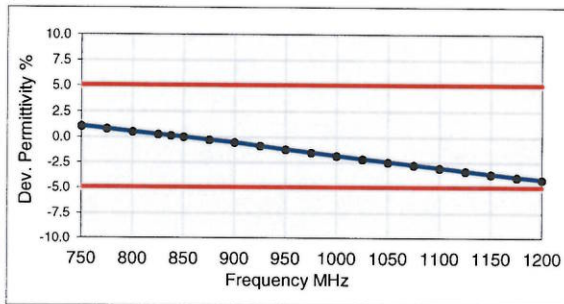
### Test Condition

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/cm3  
 TSL Heat-capacity 3.113 kJ/(kg\*K)

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |                 |
|---------|----------|--------|-------|--------|-------|--------------------|-----------------|
|         | HP-e'    | HP-e'' | sigma | eps    | sigma | $\Delta$ -eps      | $\Delta$ -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.

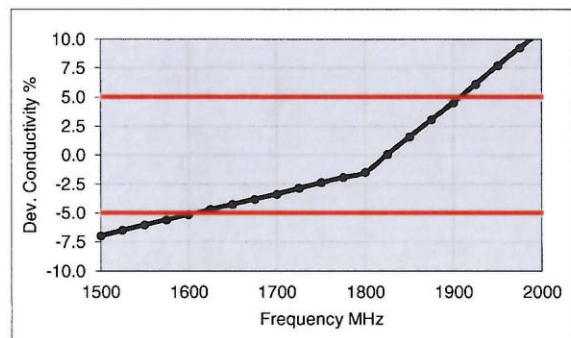
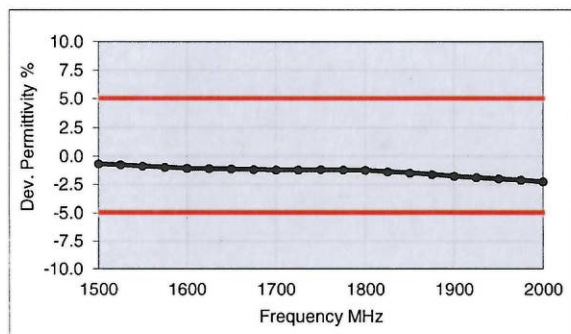
### Test Condition

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    | <b>Body Tissue Simulating Liquid (MBBL1900-3800V3)</b> |
| 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 ± 2.5% towards the target values of Methanol.

**Target Parameters**

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

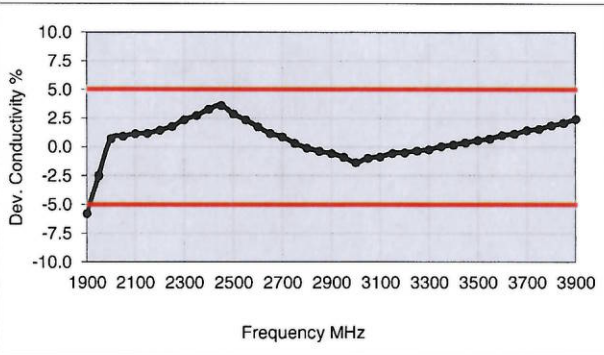
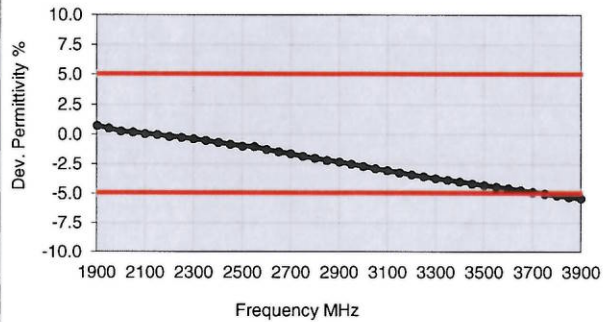
**Test Condition**

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

**Additional Information**

|                   |                         |
|-------------------|-------------------------|
| TSL Density       | 1.036 g/cm <sup>3</sup> |
| 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    | 53.7     | 13.5   | 1.43  | 53.3   | 1.52  | 0.8                | -5.8    |
| 1950    | 53.6     | 13.7   | 1.48  | 53.3   | 1.52  | 0.5                | -2.5    |
| 2000    | 53.4     | 13.8   | 1.53  | 53.3   | 1.52  | 0.3                | 0.7     |
| 2050    | 53.3     | 13.9   | 1.58  | 53.2   | 1.57  | 0.2                | 0.9     |
| 2100    | 53.2     | 14.0   | 1.63  | 53.2   | 1.62  | 0.1                | 1.1     |
| 2150    | 53.1     | 14.1   | 1.68  | 53.1   | 1.66  | 0.0                | 1.2     |
| 2200    | 52.9     | 14.2   | 1.74  | 53.0   | 1.71  | -0.2               | 1.5     |
| 2250    | 52.8     | 14.3   | 1.79  | 53.0   | 1.76  | -0.2               | 1.8     |
| 2300    | 52.7     | 14.5   | 1.85  | 52.9   | 1.81  | -0.4               | 2.4     |
| 2350    | 52.6     | 14.6   | 1.91  | 52.8   | 1.85  | -0.5               | 2.8     |
| 2400    | 52.4     | 14.7   | 1.97  | 52.8   | 1.90  | -0.7               | 3.3     |
| 2450    | 52.3     | 14.8   | 2.02  | 52.7   | 1.95  | -0.8               | 3.6     |
| 2500    | 52.1     | 15.0   | 2.08  | 52.6   | 2.02  | -1.0               | 2.9     |
| 2550    | 52.0     | 15.1   | 2.14  | 52.6   | 2.09  | -1.0               | 2.4     |
| 2600    | 51.9     | 15.2   | 2.20  | 52.5   | 2.16  | -1.3               | 1.8     |
| 2650    | 51.7     | 15.3   | 2.26  | 52.4   | 2.23  | -1.4               | 1.2     |
| 2700    | 51.5     | 15.5   | 2.33  | 52.4   | 2.30  | -1.6               | 0.9     |
| 2750    | 51.4     | 15.6   | 2.38  | 52.3   | 2.38  | -1.8               | 0.3     |
| 2800    | 51.2     | 15.7   | 2.44  | 52.3   | 2.45  | -2.0               | -0.1    |
| 2850    | 51.1     | 15.8   | 2.51  | 52.2   | 2.52  | -2.2               | -0.4    |
| 2900    | 50.9     | 16.0   | 2.57  | 52.1   | 2.59  | -2.3               | -0.6    |
| 2950    | 50.8     | 16.1   | 2.64  | 52.1   | 2.66  | -2.5               | -0.9    |
| 3000    | 50.6     | 16.1   | 2.69  | 52.0   | 2.73  | -2.7               | -1.3    |
| 3050    | 50.4     | 16.3   | 2.76  | 51.9   | 2.79  | -2.9               | -1.0    |
| 3100    | 50.3     | 16.4   | 2.82  | 51.9   | 2.85  | -3.0               | -0.9    |
| 3150    | 50.1     | 16.5   | 2.89  | 51.8   | 2.91  | -3.2               | -0.5    |
| 3200    | 50.0     | 16.6   | 2.95  | 51.7   | 2.96  | -3.4               | -0.5    |
| 3250    | 49.8     | 16.7   | 3.01  | 51.7   | 3.02  | -3.5               | -0.3    |
| 3300    | 49.7     | 16.7   | 3.07  | 51.6   | 3.08  | -3.7               | -0.2    |
| 3350    | 49.5     | 16.9   | 3.14  | 51.5   | 3.14  | -3.9               | 0.1     |
| 3400    | 49.4     | 16.9   | 3.20  | 51.5   | 3.20  | -4.0               | 0.2     |
| 3450    | 49.2     | 17.0   | 3.27  | 51.4   | 3.26  | -4.2               | 0.4     |
| 3500    | 49.1     | 17.1   | 3.33  | 51.3   | 3.31  | -4.3               | 0.6     |
| 3550    | 49.0     | 17.2   | 3.40  | 51.3   | 3.37  | -4.5               | 0.7     |
| 3600    | 48.8     | 17.3   | 3.47  | 51.2   | 3.43  | -4.6               | 1.0     |
| 3650    | 48.7     | 17.4   | 3.53  | 51.1   | 3.49  | -4.7               | 1.1     |
| 3700    | 48.6     | 17.5   | 3.60  | 51.1   | 3.55  | -4.9               | 1.5     |
| 3750    | 48.4     | 17.6   | 3.66  | 51.0   | 3.61  | -5.0               | 1.6     |
| 3800    | 48.3     | 17.7   | 3.73  | 50.9   | 3.66  | -5.2               | 1.9     |
| 3850    | 48.2     | 17.7   | 3.80  | 50.8   | 3.72  | -5.3               | 2.1     |



## Measurement Certificate / Material Test

|              |  |
|--------------|--|
| Item Name    | <b>Body Tissue Simulating Liquid (MBBL3500-5800V5)</b> |
| 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 | $\Delta$ -eps      | $\Delta$ -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             |

