

**2020-02-24 SystemPerformanceCheck-D2450V2 SN 963**

Frequency: 2450 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.888$  S/m;  $\epsilon_r = 39.484$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1434; Calibrated: 11/15/2019
- Probe: EX3DV4 - SN3749; ConvF(6.83, 6.83, 6.83) @ 2450 MHz; Calibrated: 1/23/2020
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI B v5.0; Type: QD OVA 002 AA; Serial: 1196

**Head/Pin=100 mW/Area Scan (8x8x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 6.12 W/kg

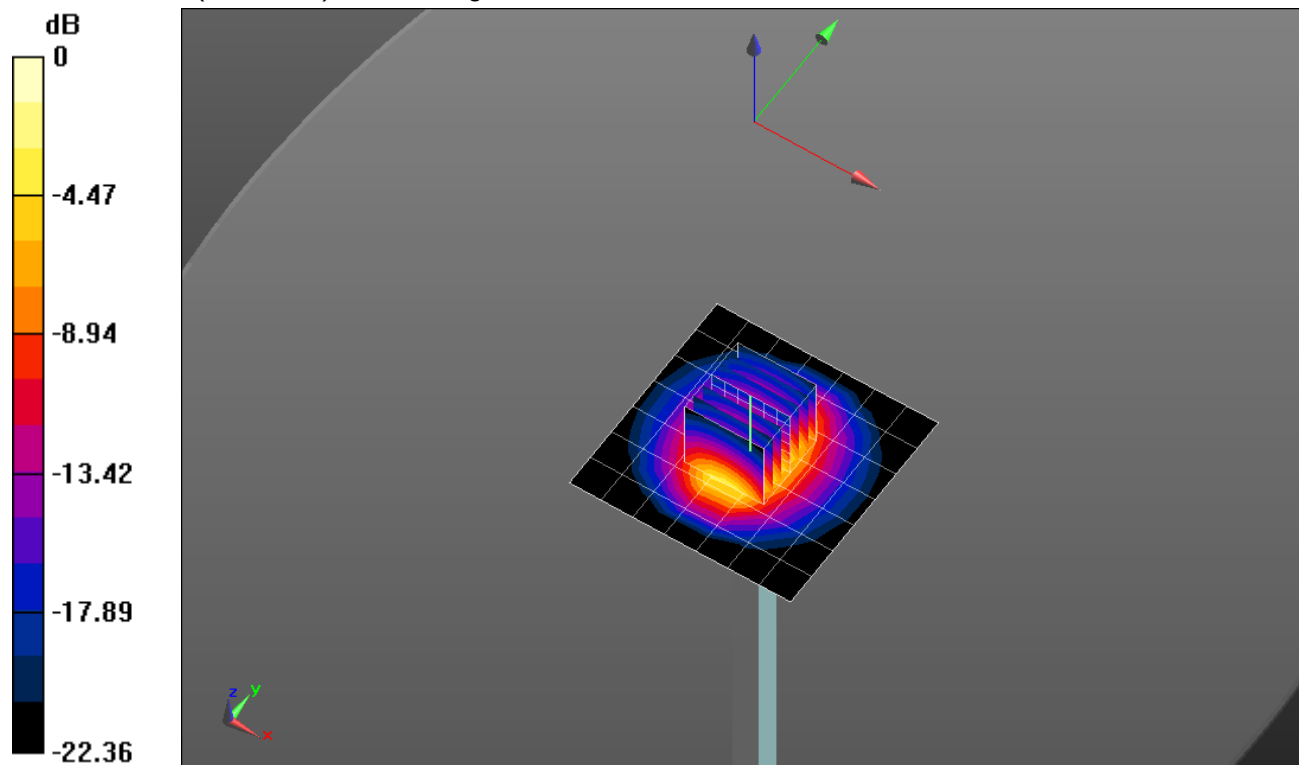
**Head/Pin=100 mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 65.77 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 11.9 W/kg

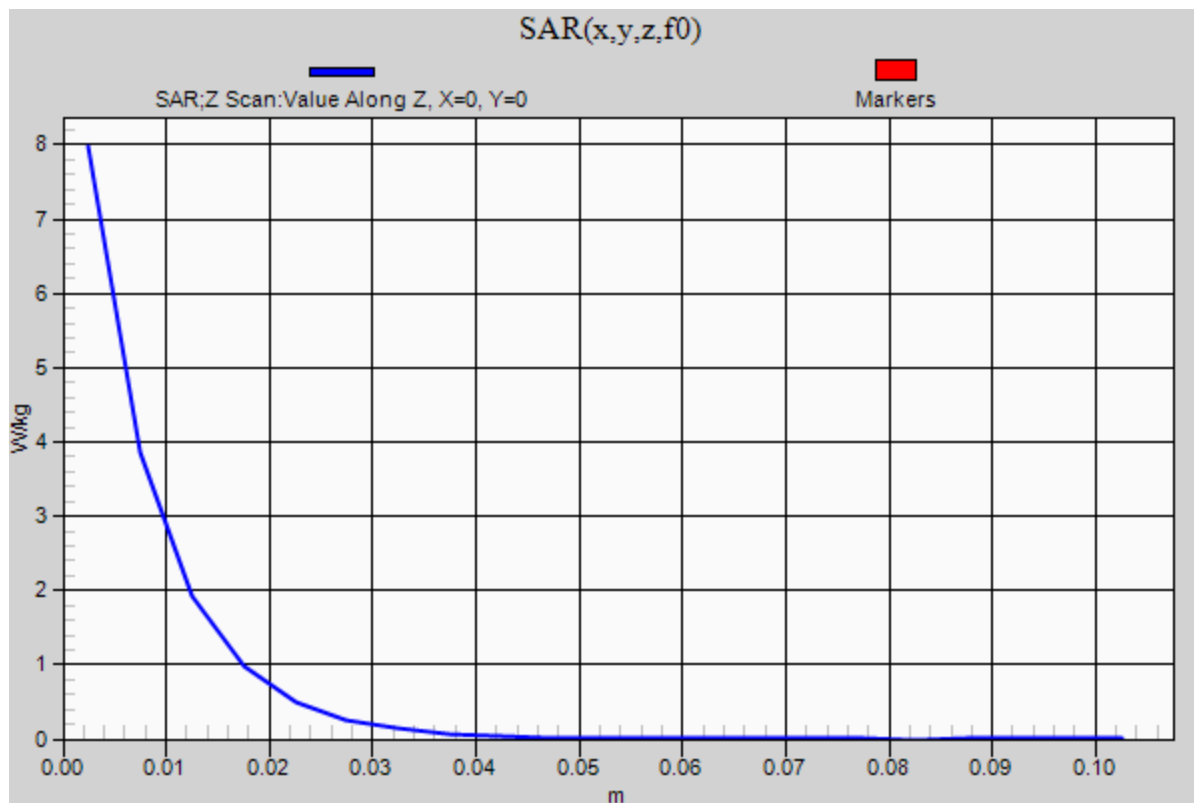
**SAR(1 g) = 5.63 W/kg; SAR(10 g) = 2.59 W/kg**

Maximum value of SAR (measured) = 8.04 W/kg



**2020-02-24 SystemPerformanceCheck-D2450V2 SN 963**

Frequency: 2450 MHz; Duty Cycle: 1:1

**Head/Pin=100 mW/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 7.98 W/kg

**2020-03-23 SystemPerformanceCheck-D5GHzV2 SN 1213**

Frequency: 5250 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used:  $f = 5250$  MHz;  $\sigma = 4.596$  S/m;  $\epsilon_r = 34.984$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1434; Calibrated: 11/15/2019
- Probe: EX3DV4 - SN7335; ConvF(5.36, 5.36, 5.36); Calibrated: 2/21/2020;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI B v5.0; Type: QD OVA 002 AA; Serial: 1196

**Head/5.2 GHz, Pin=100mW/Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 20.0 W/kg

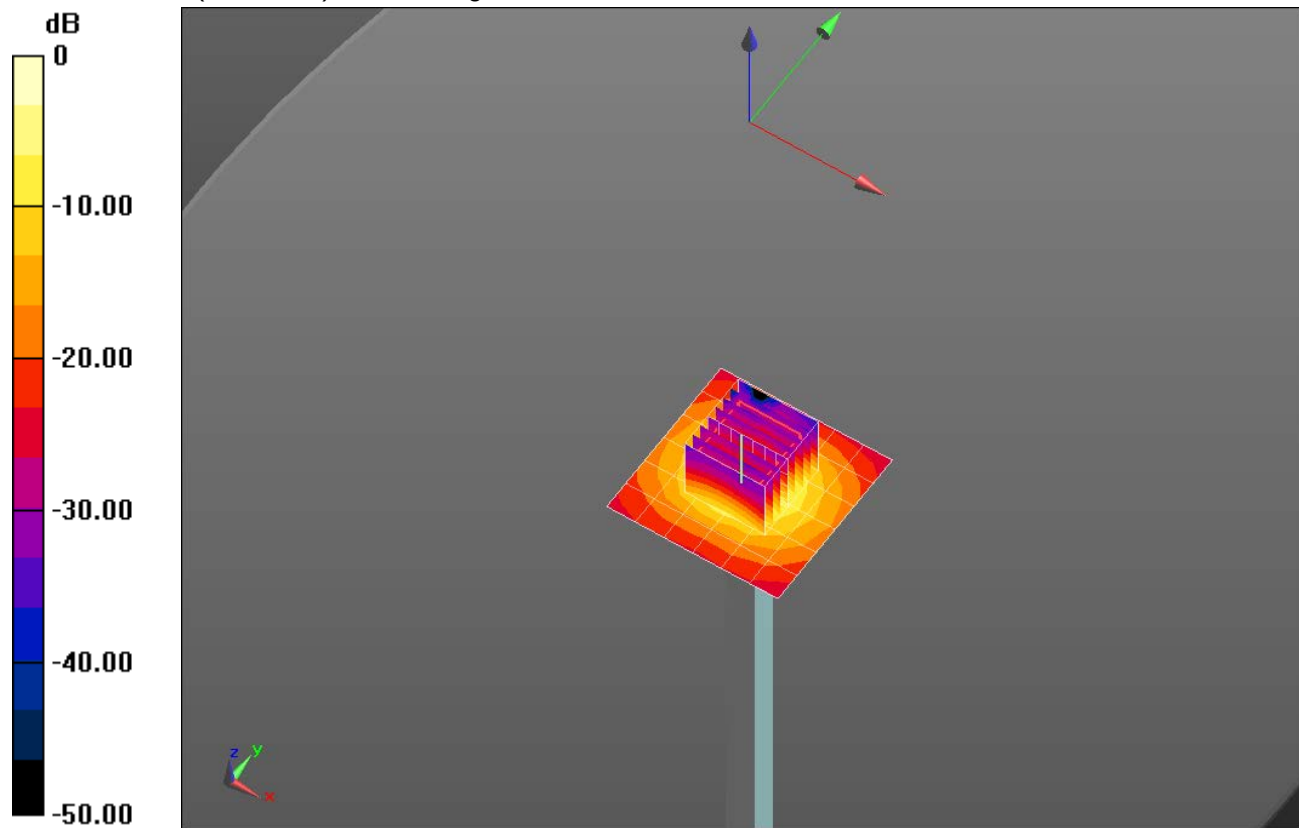
**Head/5.2 GHz, Pin=100mW/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 58.952 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 31.7 W/kg

**SAR(1 g) = 7.98 W/kg; SAR(10 g) = 2.32 W/kg**

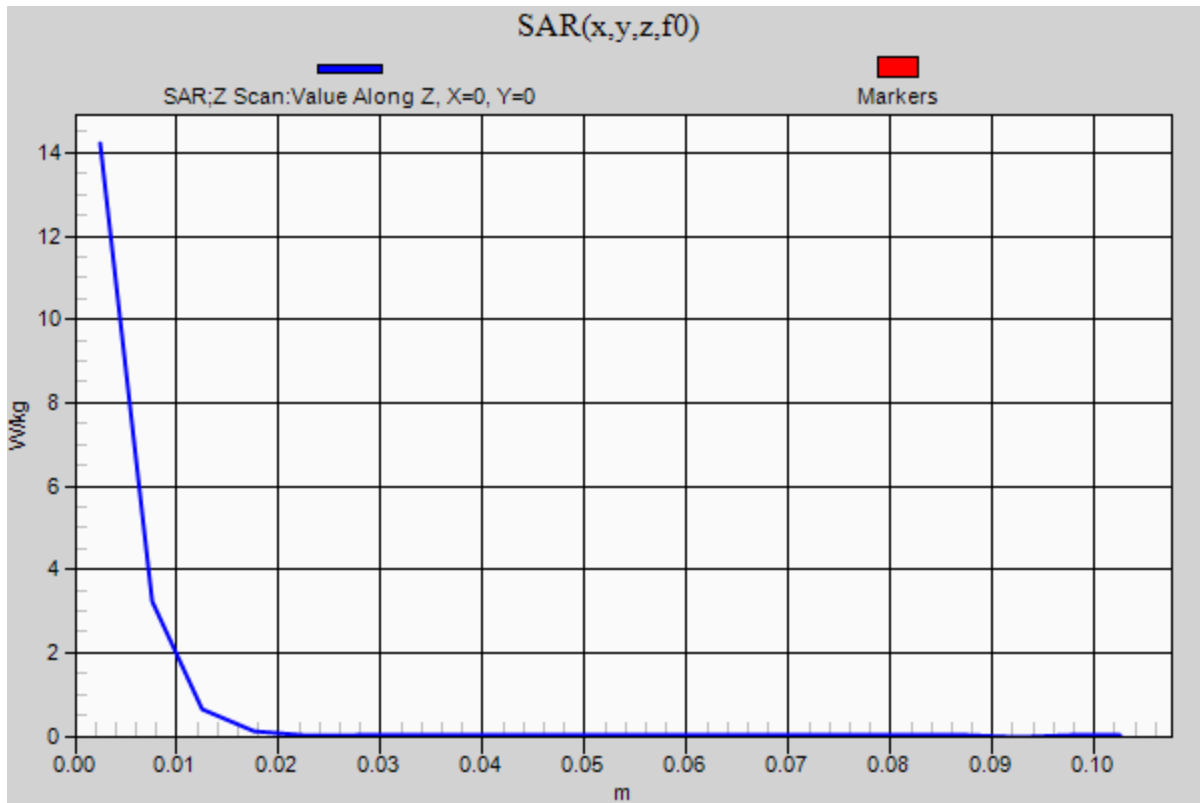
Maximum value of SAR (measured) = 18.8 W/kg



0 dB = 18.8 W/kg = 12.74 dBW/kg

**2020-03-23 SystemPerformanceCheck-D5GHzV2 SN 1213**

Frequency: 5250 MHz; Duty Cycle: 1:1

**Head/5.2 GHz, Pin=100mW/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 14.2 W/kg

**2020-03-23 SystemPerformanceCheck-D5GHzV2 SN 1213**

Frequency: 5600 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 4.938$  S/m;  $\epsilon_r = 34.668$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1434; Calibrated: 11/15/2019
- Probe: EX3DV4 - SN7335; ConvF(4.9, 4.9, 4.9); Calibrated: 2/21/2020;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI B v5.0; Type: QD OVA 002 AA; Serial: 1196

**Head/5.6 GHz, Pin=100mW/Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 22.2 W/kg

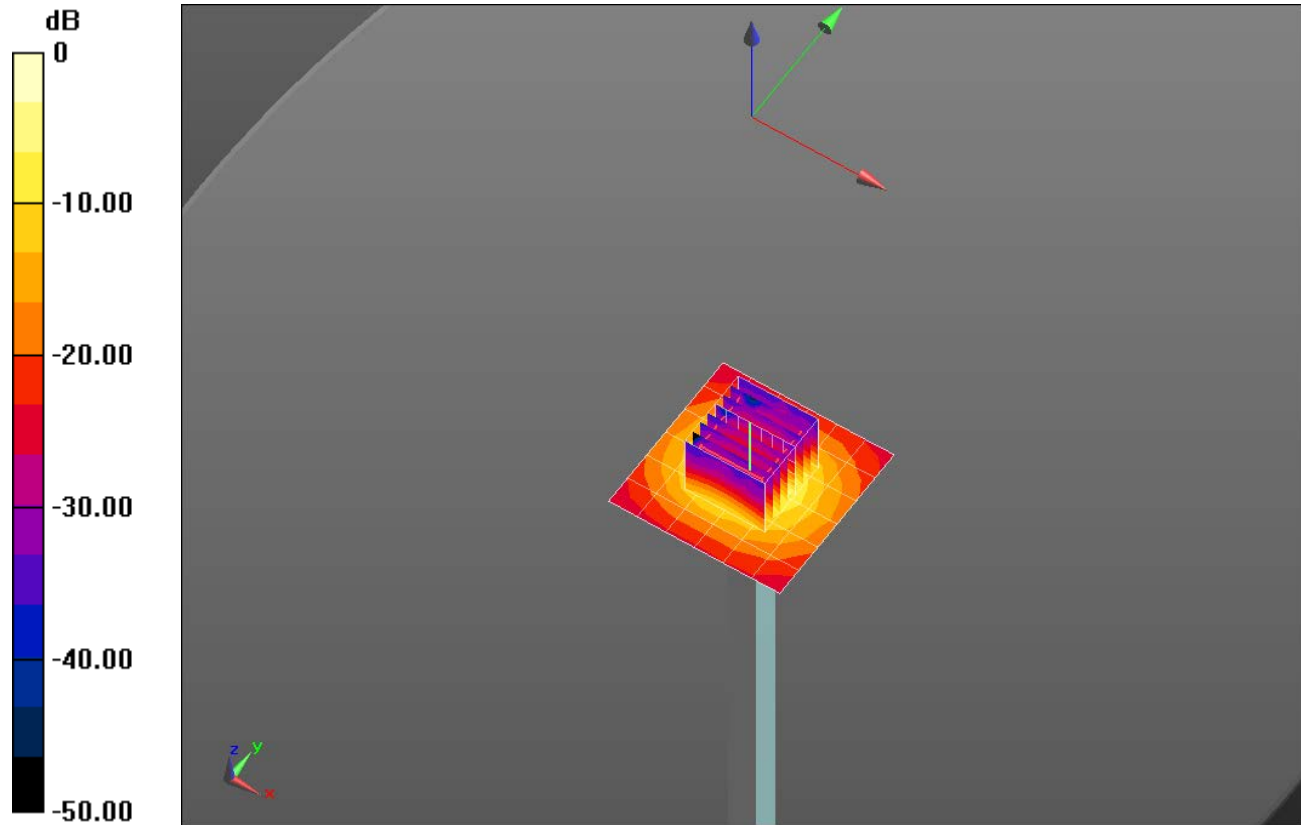
**Head/5.6 GHz, Pin=100mW/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 58.700 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 36.1 W/kg

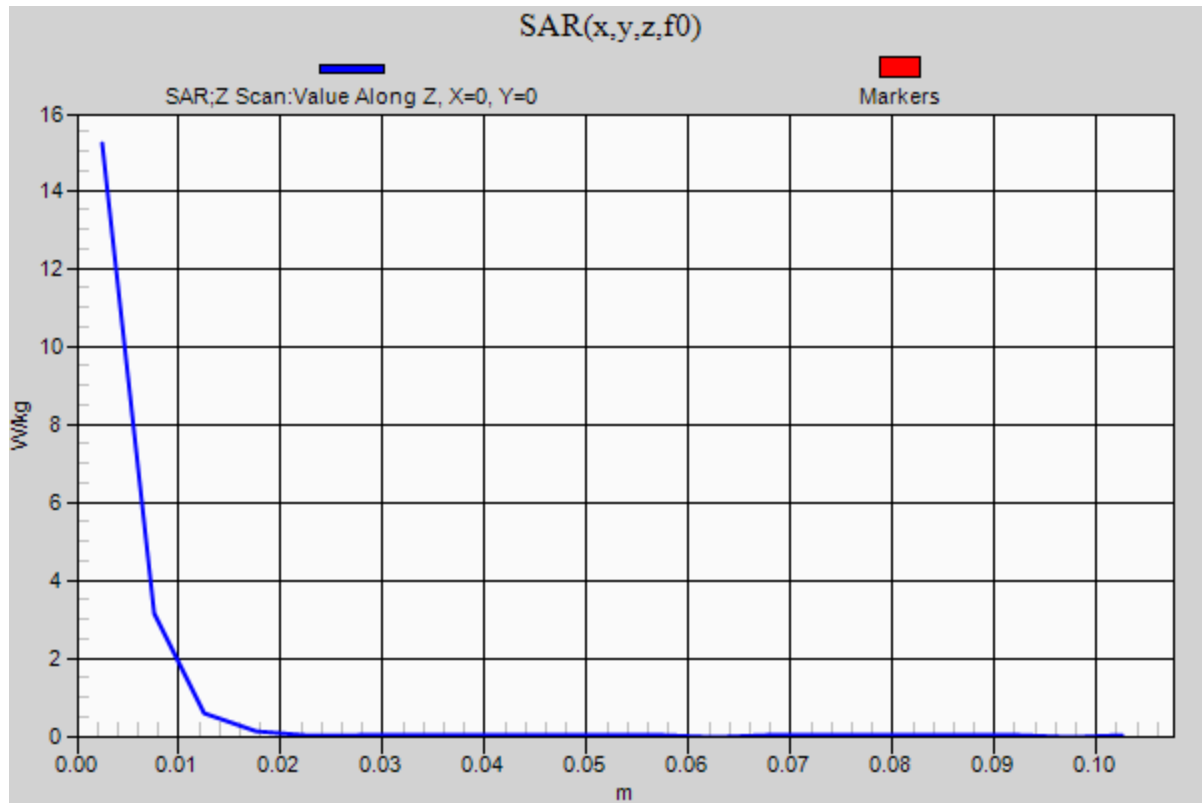
**SAR(1 g) = 8.56 W/kg; SAR(10 g) = 2.47 W/kg**

Maximum value of SAR (measured) = 20.6 W/kg



**2020-03-23 SystemPerformanceCheck-D5GHzV2 SN 1213**

Frequency: 5600 MHz; Duty Cycle: 1:1

**Head/5.6 GHz, Pin=100mW/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 15.2 W/kg

**2020-03-23 SystemPerformanceCheck-D5GHzV2 SN 1213**

Frequency: 5750 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used:  $f = 5750$  MHz;  $\sigma = 5.142$  S/m;  $\epsilon_r = 34.359$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1434; Calibrated: 11/15/2019
- Probe: EX3DV4 - SN7335; ConvF(5.08, 5.08, 5.08); Calibrated: 2/21/2020;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI B v5.0; Type: QD OVA 002 AA; Serial: 1196

**Head/5.8 GHz, Pin=100mW/Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 20.7 W/kg

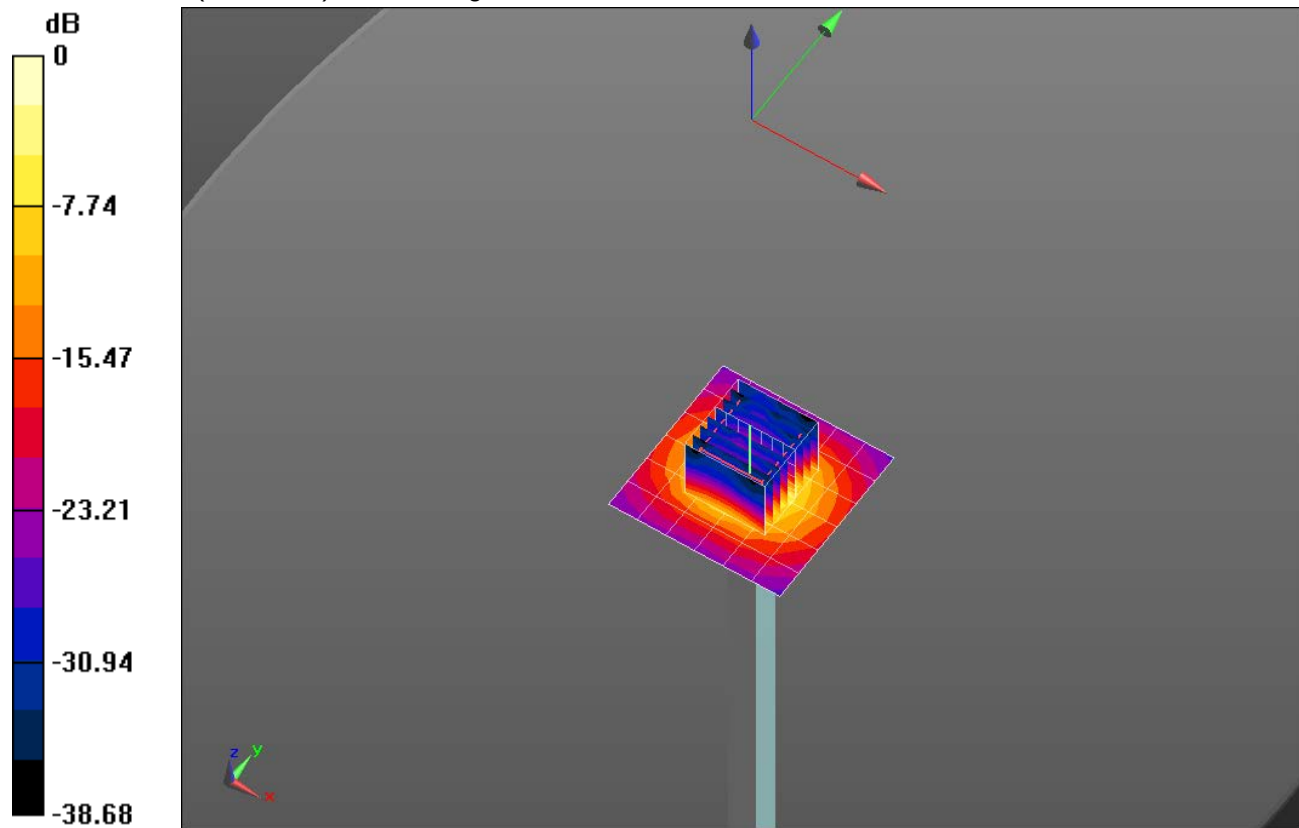
**Head/5.8 GHz, Pin=100mW/Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 54.808 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 35.0 W/kg

**SAR(1 g) = 7.84 W/kg; SAR(10 g) = 2.26 W/kg**

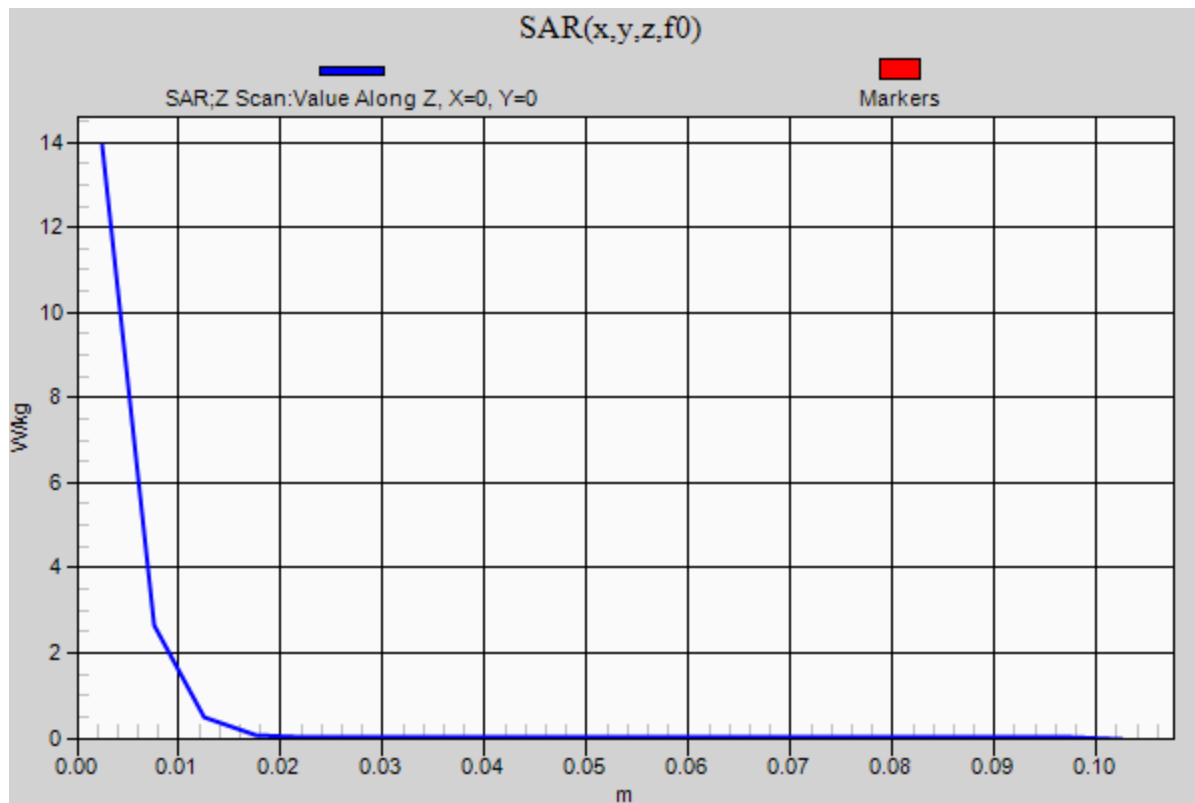
Maximum value of SAR (measured) = 18.8 W/kg



0 dB = 18.8 W/kg = 12.74 dBW/kg

**2020-03-23 SystemPerformanceCheck-D5GHzV2 SN 1213**

Frequency: 5750 MHz; Duty Cycle: 1:1

**Head/5.8 GHz, Pin=100mW/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 13.9 W/kg



**2020-03-25 SystemPerformanceCheck-D2450V2 SN 963**

Frequency: 2450 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.878$  S/m;  $\epsilon_r = 39.007$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1434; Calibrated: 11/15/2019
- Probe: EX3DV4 - SN7335; ConvF(7.75, 7.75, 7.75); Calibrated: 2/21/2020;
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Phantom: ELI A v5.0; Type: QD OVA 002 AA; Serial: 1194

**Head/Pin=100 mW/Area Scan (8x8x1):** Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 5.85 W/kg

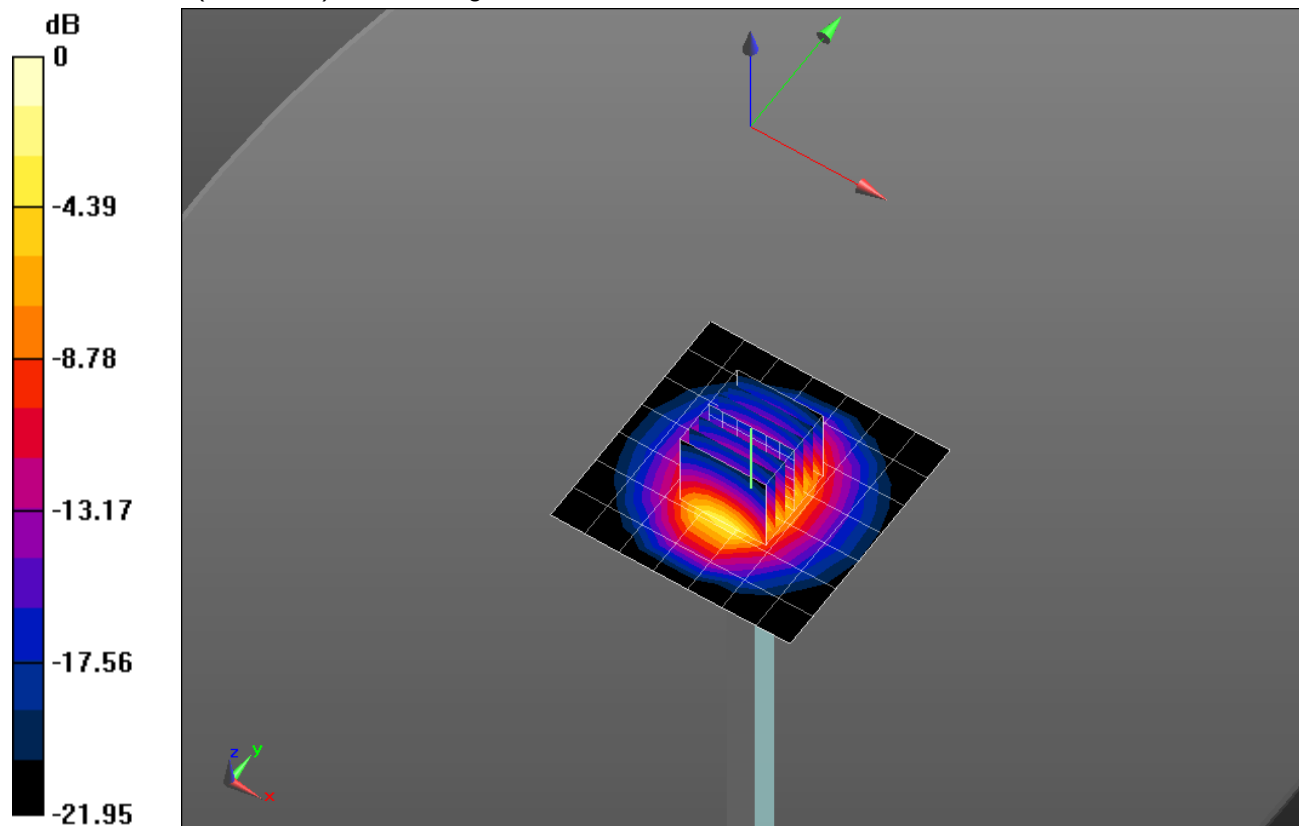
**Head/Pin=100 mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 64.663 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 11.2 W/kg

**SAR(1 g) = 5.36 W/kg; SAR(10 g) = 2.48 W/kg**

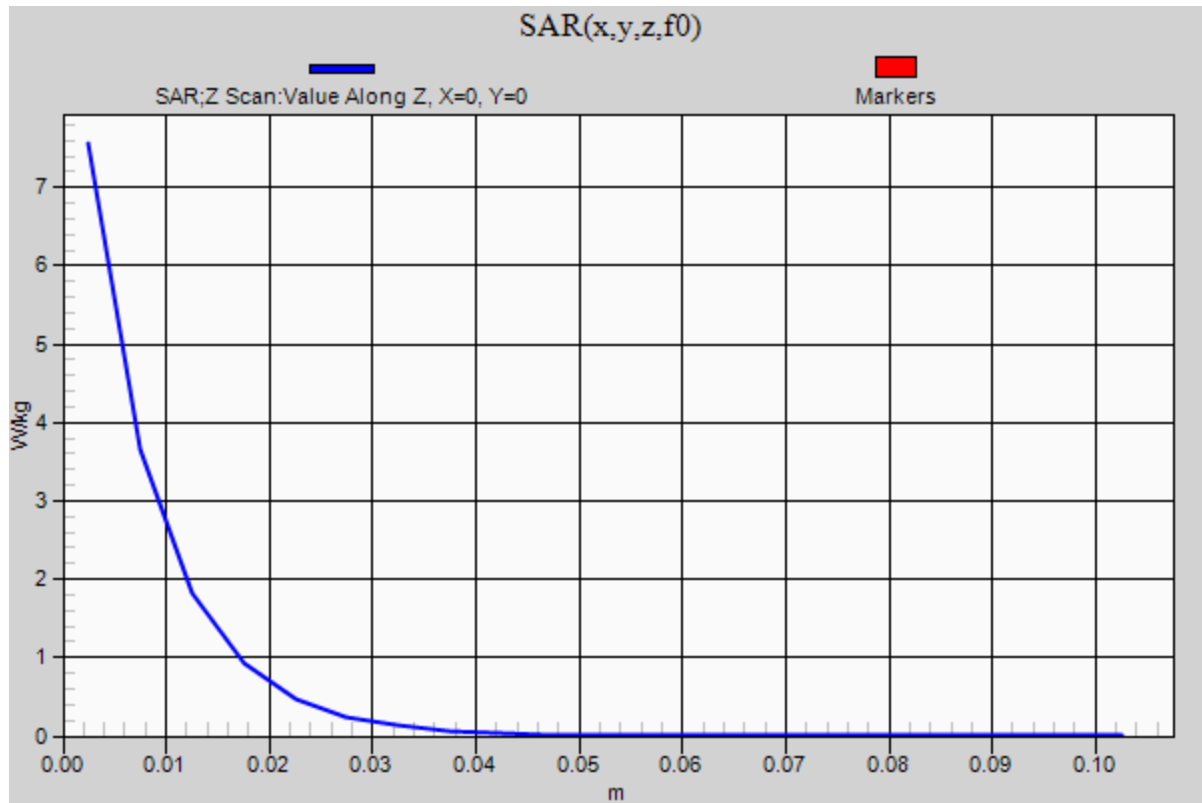
Maximum value of SAR (measured) = 7.64 W/kg



0 dB = 7.64 W/kg = 8.83 dBW/kg

**2020-03-25 SystemPerformanceCheck-D2450V2 SN 963**

Frequency: 2450 MHz; Duty Cycle: 1:1

**Head/Pin=100 mW/Z Scan (1x1x21):** Measurement grid: dx=20mm, dy=20mm, dz=5mm  
Maximum value of SAR (measured) = 7.56 W/kg

## PACE Footboard Wi-Fi 2.4GHz FCC

Frequency: 2462 MHz; Duty Cycle: 1:1.53886; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C  
Medium parameters used (interpolated):  $f = 2462$  MHz;  $\sigma = 1.901$  S/m;  $\epsilon_r = 39.435$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1434; Calibrated: 11/15/2019
- Probe: EX3DV4 - SN3749; ConvF(6.83, 6.83, 6.83); Calibrated: 1/23/2020;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI B v5.0; Type: QD OVA 002 AA; Serial: 1196

**Rear\_Extremity/802.11b\_ch 11 pwr 18/Area Scan (11x11x1):** Measurement grid: dx=12mm, dy=12mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 2.22 W/kg

**Rear\_Extremity /802.11b\_ch 11 pwr 18/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

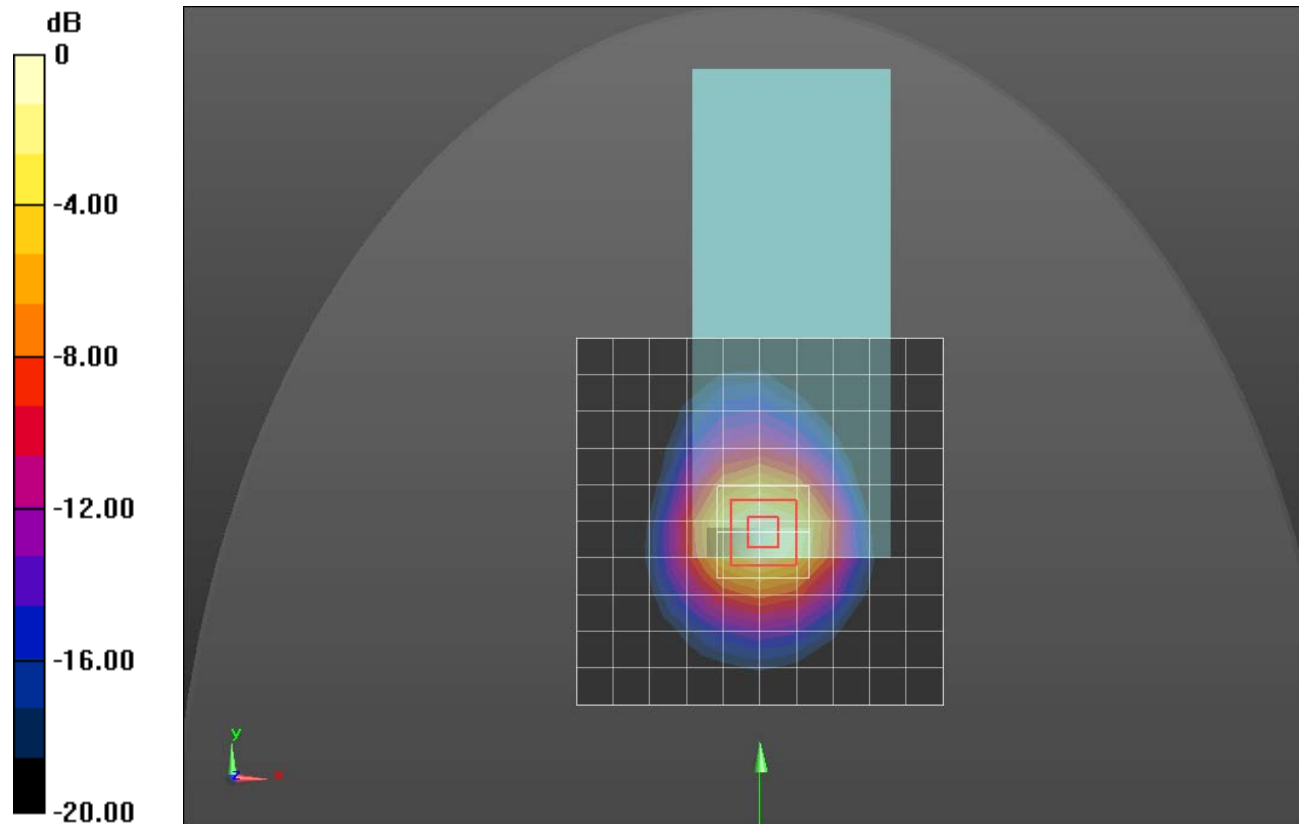
Reference Value = 31.474 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 2.96 W/kg

**SAR(1 g) = 1.45 W/kg; SAR(10 g) = 0.696 W/kg**

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 2.38 W/kg



## PACE Footboard Wi-Fi 5GHz FCC

Frequency: 5280 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used:  $f = 5280$  MHz;  $\sigma = 4.545$  S/m;  $\epsilon_r = 34.575$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1434; Calibrated: 11/15/2019
- Probe: EX3DV4 - SN7335; ConvF(5.36, 5.36, 5.36); Calibrated: 2/21/2020;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI B v5.0; Type: QD OVA 002 AA; Serial: 1196

**Rear\_Extremity /802.11nHT20\_Ch 56 pwr 12/Area Scan (13x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.734 W/kg

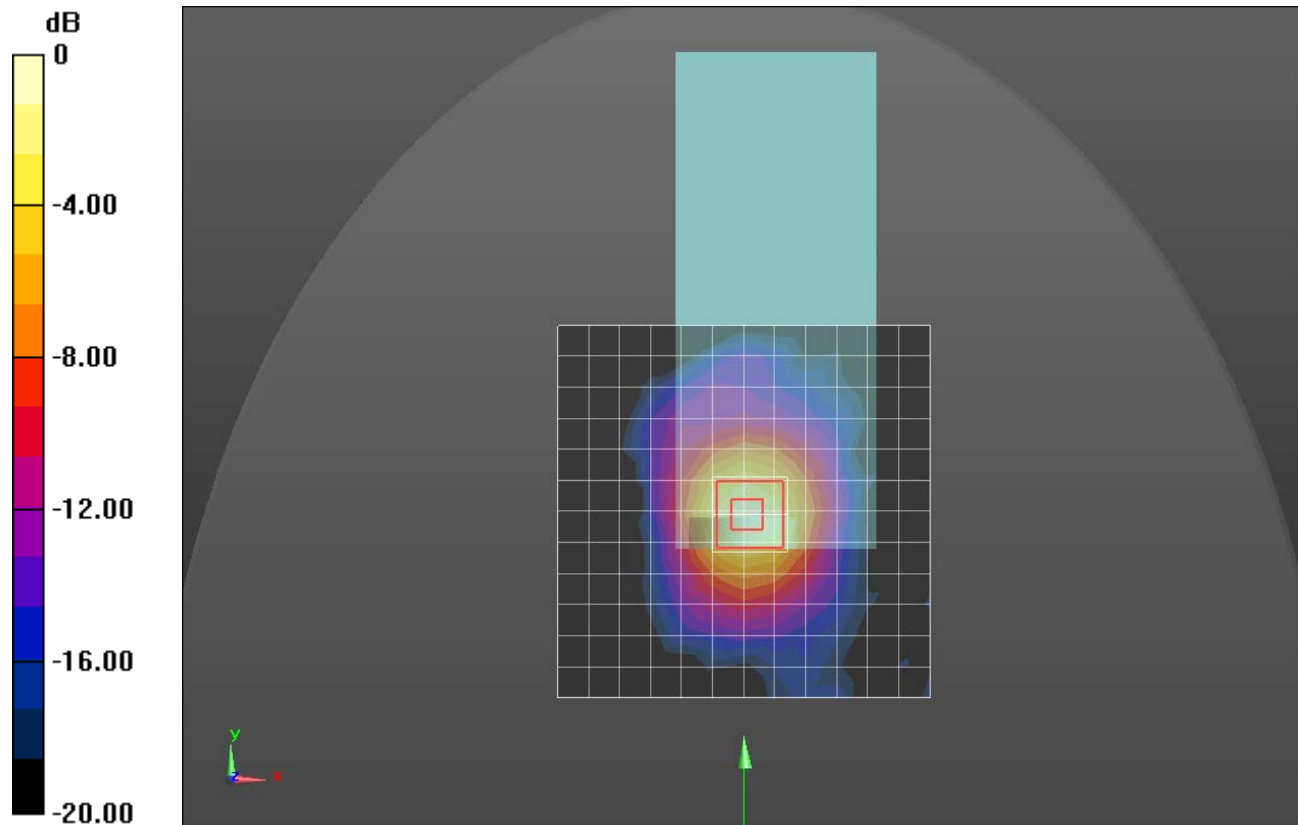
**Rear\_Extremity/802.11nHT20\_Ch 56 pwr 12/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 11.176 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.20 W/kg

**SAR(1 g) = 0.334 W/kg; SAR(10 g) = 0.125 W/kg**

Maximum value of SAR (measured) = 0.744 W/kg



0 dB = 0.744 W/kg = -1.28 dBW/kg

## PACE Footboard Wi-Fi 5GHz FCC

Frequency: 5580 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 4.848$  S/m;  $\epsilon_r = 34.377$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1434; Calibrated: 11/15/2019
- Probe: EX3DV4 - SN7335; ConvF(4.9, 4.9, 4.9); Calibrated: 2/21/2020;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI B v5.0; Type: QD OVA 002 AA; Serial: 1196

**Rear\_Extremity/802.11nHT20\_Ch 116 pwr 12/Area Scan (13x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.646 W/kg

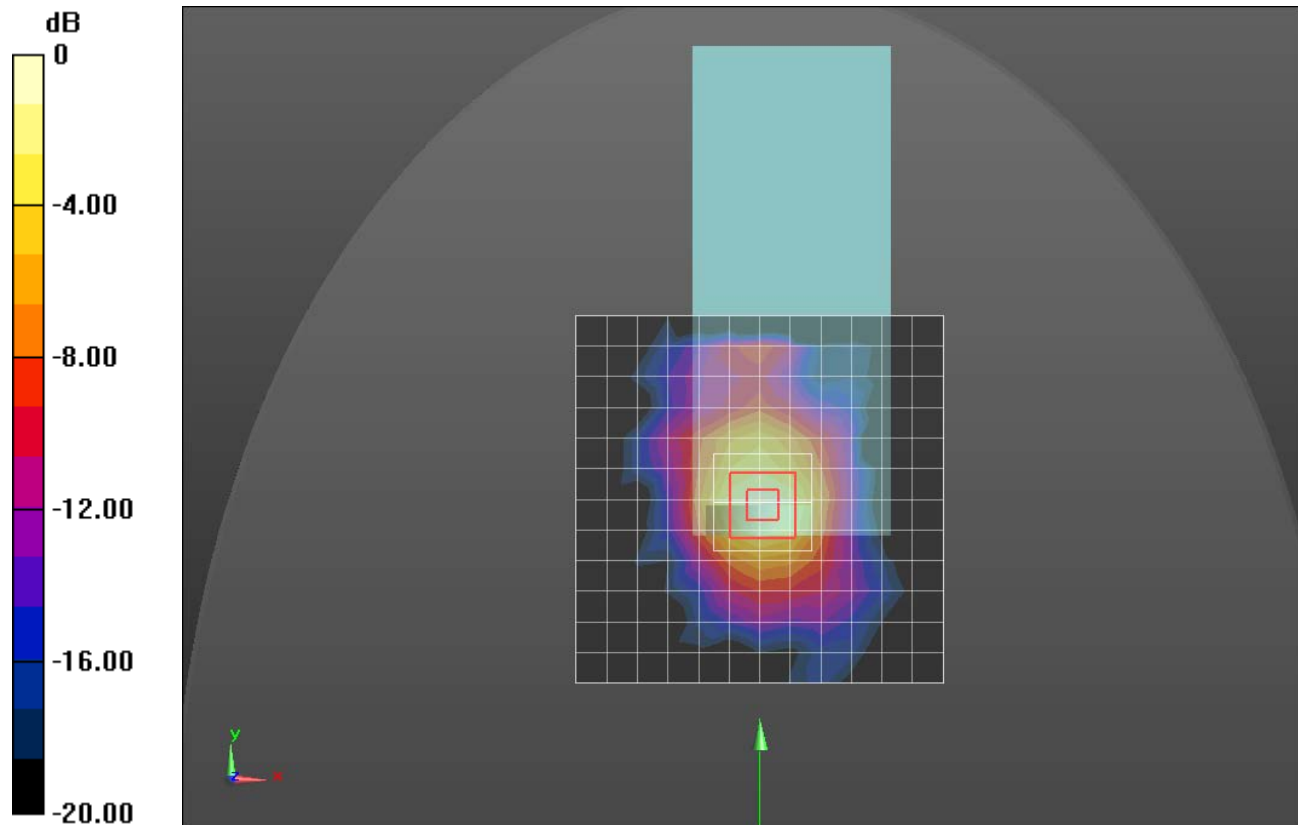
**Rear\_Extremity/802.11nHT20\_Ch 116 pwr 12/Zoom Scan (9x9x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 10.039 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.10 W/kg

**SAR(1 g) = 0.287 W/kg; SAR(10 g) = 0.105 W/kg**

Maximum value of SAR (measured) = 0.653 W/kg



## PACE Footboard Wi-Fi 5GHz FCC

Frequency: 5745 MHz; Duty Cycle: 1:1; Room Ambient Temperature: 24.0°C; Liquid Temperature: 23.0°C

Medium parameters used:  $f = 5745$  MHz;  $\sigma = 5.078$  S/m;  $\epsilon_r = 33.972$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY5 Configuration:

- Area Scan Setting: Find Secondary Maximum Within: 2.0 dB and with a peak SAR value greater than 0.0012W/kg
- Electronics: DAE4 Sn1434; Calibrated: 11/15/2019
- Probe: EX3DV4 - SN7335; ConvF(5.08, 5.08, 5.08); Calibrated: 2/21/2020;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Phantom: ELI B v5.0; Type: QD OVA 002 AA; Serial: 1196

**Rear\_Extremity/802.11nHT20\_Ch 149 pwr 11/Area Scan (13x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.591 W/kg

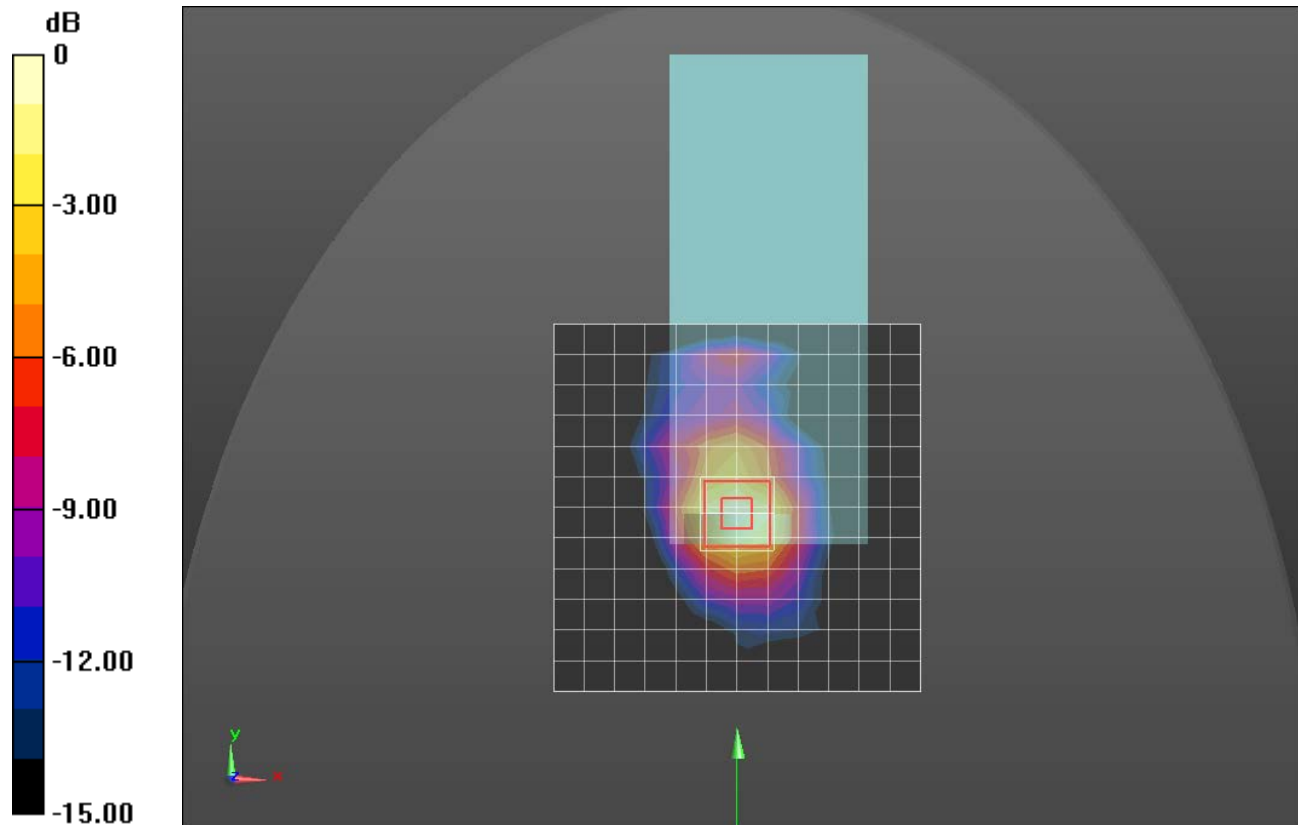
**Rear\_Extremity/802.11nHT20\_Ch 149 pwr 11/Zoom Scan (7x7x12)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 9.451 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.05 W/kg

**SAR(1 g) = 0.264 W/kg; SAR(10 g) = 0.100 W/kg**

Maximum value of SAR (measured) = 0.603 W/kg



0 dB = 0.603 W/kg = -2.20 dBW/kg

## 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              |

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.

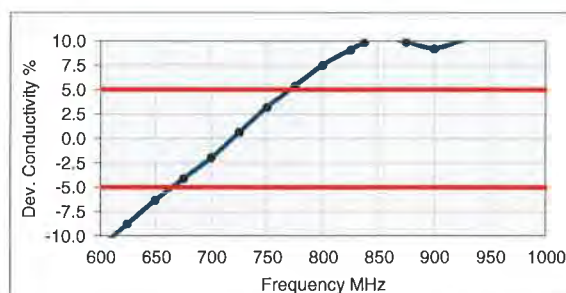
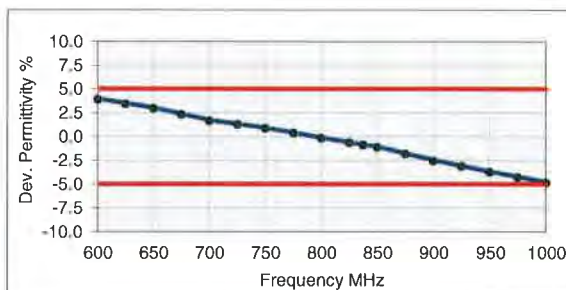
### Test Condition

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

### 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        | 44.4        | 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             |
| <b>750</b> | <b>42.3</b> | <b>22.10</b> | <b>0.92</b> | <b>41.9</b> | <b>0.89</b> | <b>0.9</b>         | <b>3.2</b>      |
| 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.

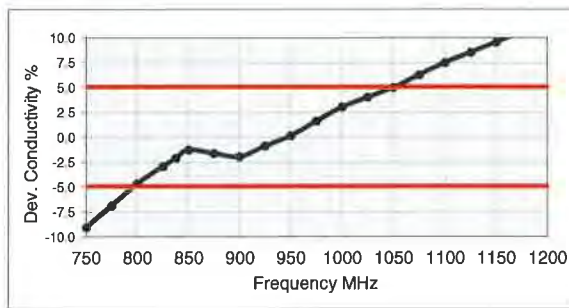
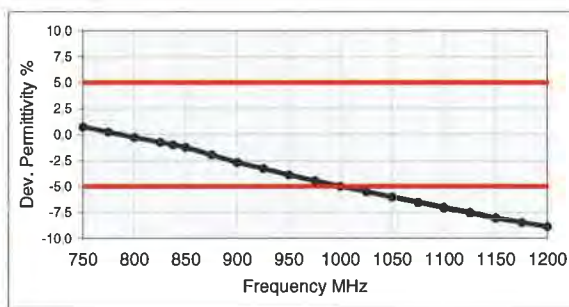
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 12-Feb-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-ε'    | HP-ε'' | 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    |



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 (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.

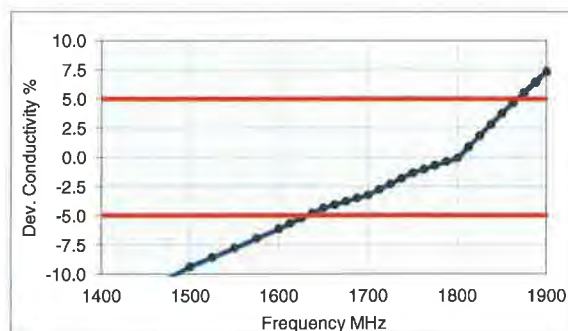
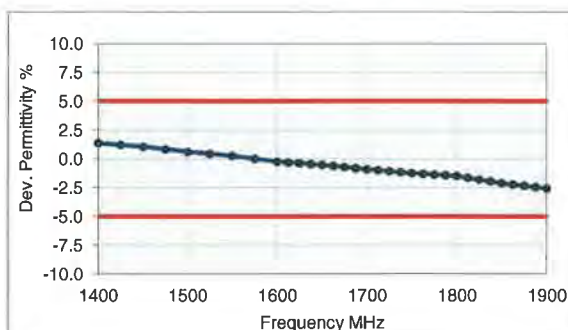
### Test Condition

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

### Additional Information

TSL Density 0.998 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.572 kJ/(kg\*K)

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |         |
|---------|----------|--------|-------|--------|-------|--------------------|---------|
|         | HP-ε'    | HP-ε'' | 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

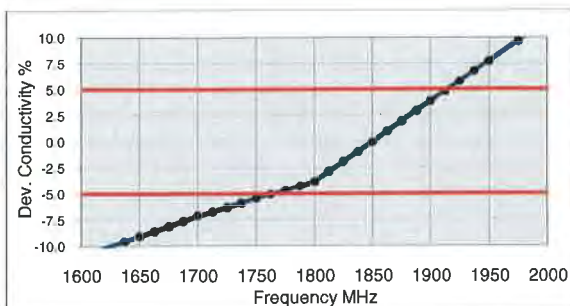
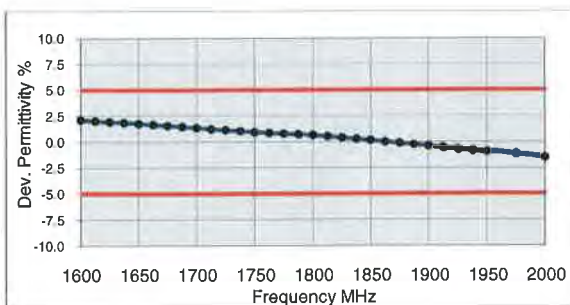
Ambient Condition 22°C ; 30% humidity  
 TSL Temperature 22°C  
 Test Date 18-Jan-12

### Additional Information

TSL Density 0.985 g/cm<sup>3</sup>  
 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

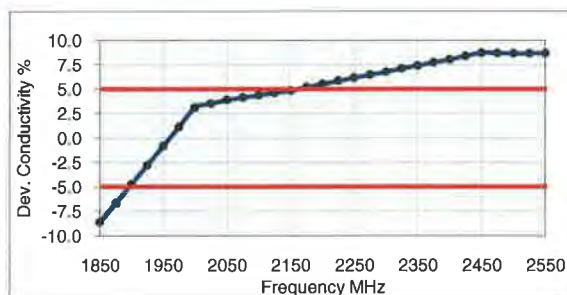
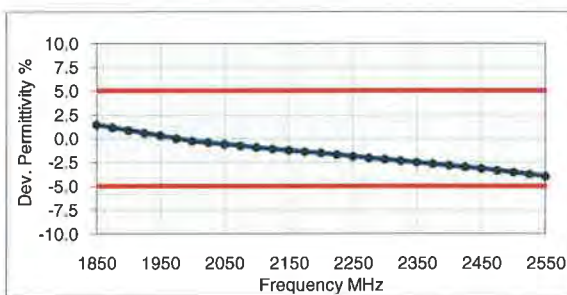
Target parameters as defined in the IEEE 1528 and IEC 62209 compliance standards.

### Test Condition

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

TSL Density 0.995 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.720 kJ/(kg\*K)

| f [MHz] | Measured |        |       | Target |       | Diff.to Target [%] |         |
|---------|----------|--------|-------|--------|-------|--------------------|---------|
|         | HP-ε'    | HP-ε'' | 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.

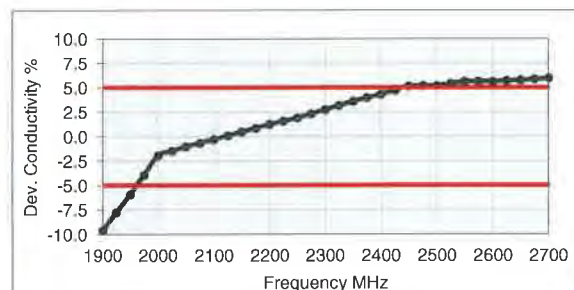
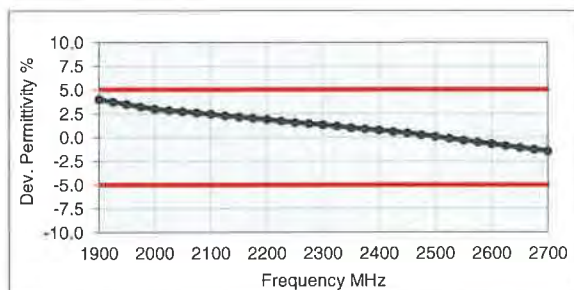
### Test Condition

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

### 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    | 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             |



## 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.

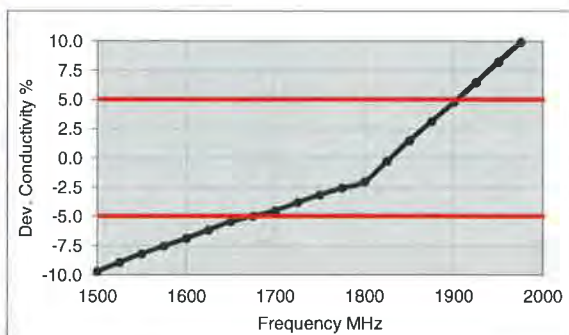
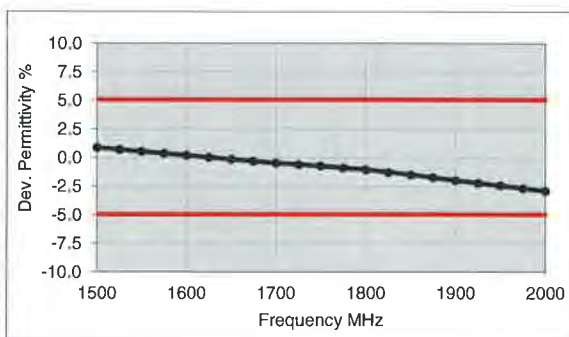
### Test Condition

|                 |                                                             |
|-----------------|-------------------------------------------------------------|
| Ambient         | Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%. |
| TSL Temperature | 22°C                                                        |
| Test Date       | 12-Feb-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    | 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.

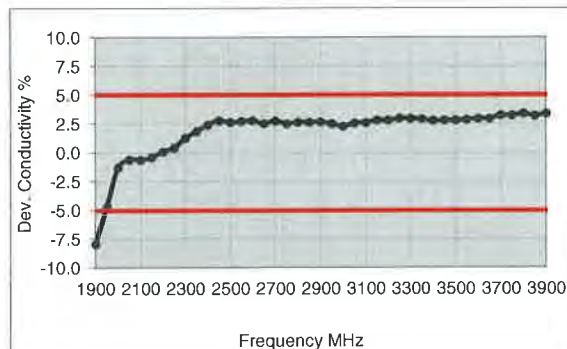
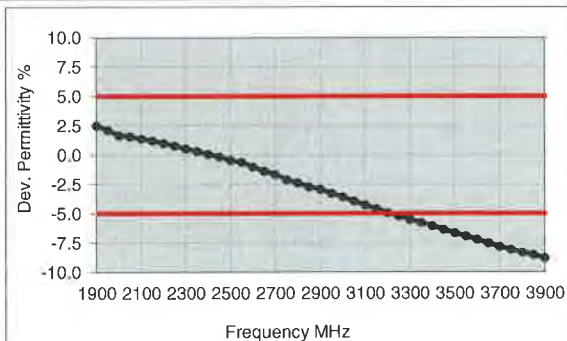
### Test Condition

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

### 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    | 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     |



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 (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.

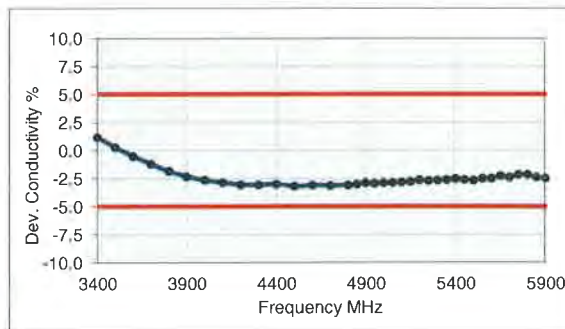
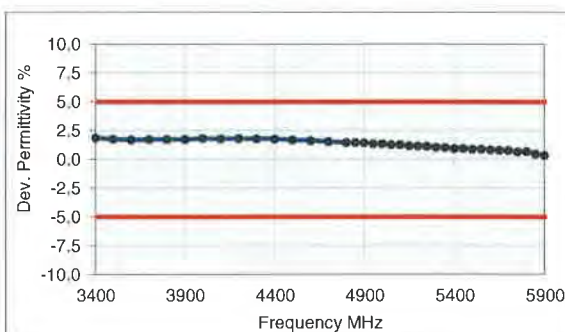
### Test Condition

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

### 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    | 38.8     | 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.

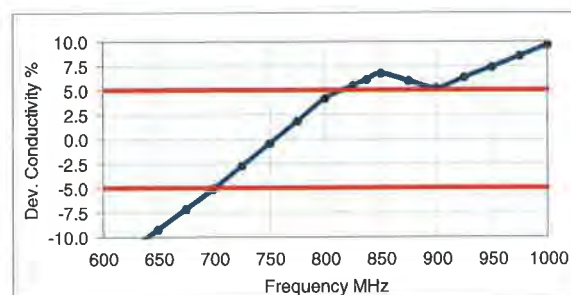
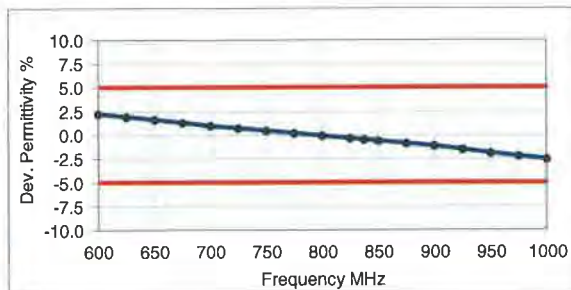
### Test Condition

Ambient: Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature: 22°C  
 Test Date: 5-Sep-12  
 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     | 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.

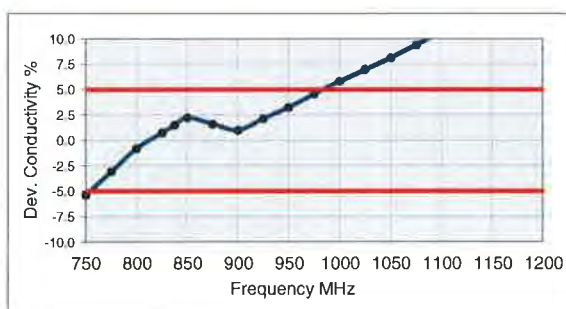
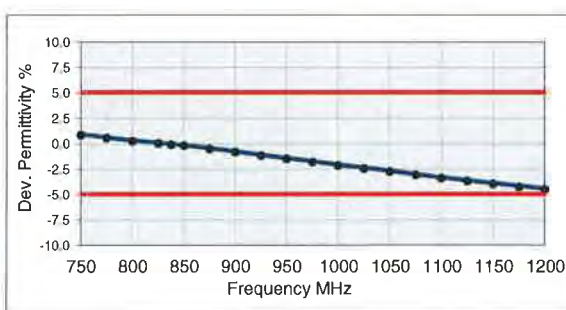
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 29-Jan-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       | $\Delta$ -eps      | $\Delta$ -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             |
| <b>838</b> | <b>55.2</b> | <b>21.42</b> | <b>1.00</b> | <b>55.2</b> | <b>0.98</b> | <b>-0.1</b>        | <b>1.5</b>      |
| 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             |
| <b>900</b> | <b>54.6</b> | <b>21.19</b> | <b>1.06</b> | <b>55.0</b> | <b>1.05</b> | <b>-0.8</b>        | <b>1.0</b>      |
| 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            |



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 (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.

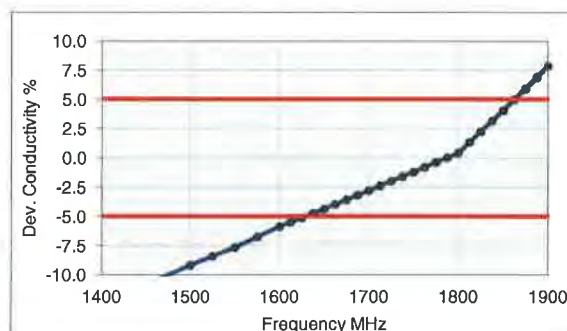
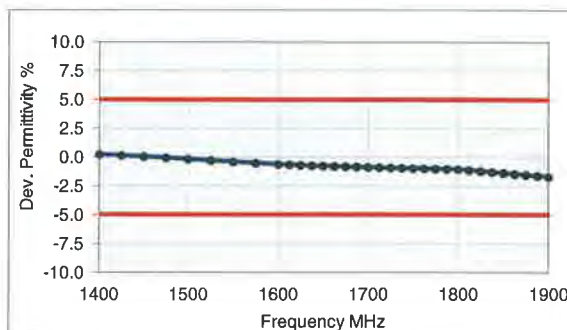
### Test Condition

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

### Additional Information

TSL Density 0.998 g/cm<sup>3</sup>  
 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     |





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 (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.

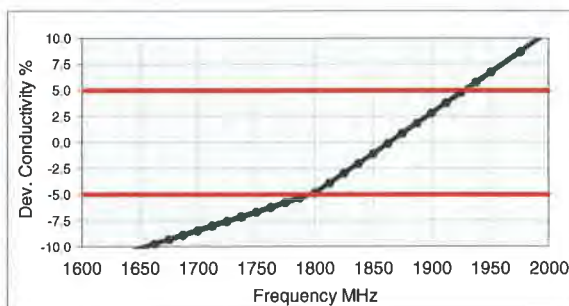
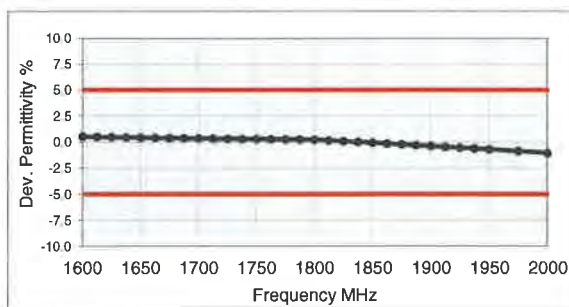
### Test Condition

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

### 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 | 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    |



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 (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.

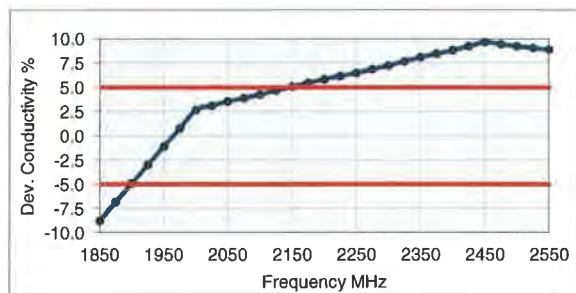
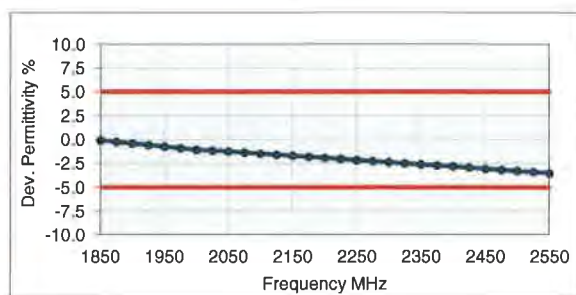
### Test Condition

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

### Additional Information

TSL Density 0.997 g/cm<sup>3</sup>  
 TSL Heat-capacity 3.970 kJ/(kg\*K)

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



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 (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.

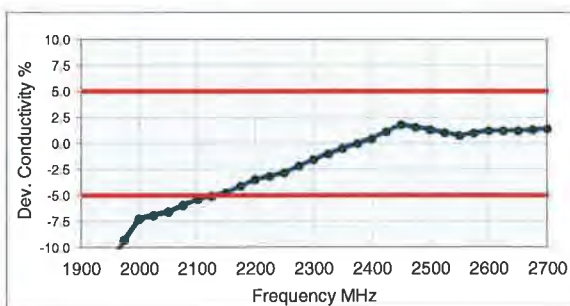
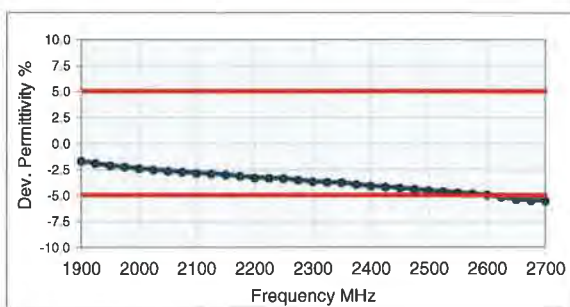
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 15-May-13  
 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 | 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               | 1.8     |
| 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     |





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 (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.

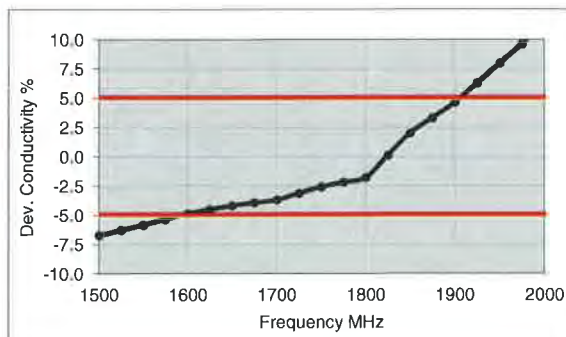
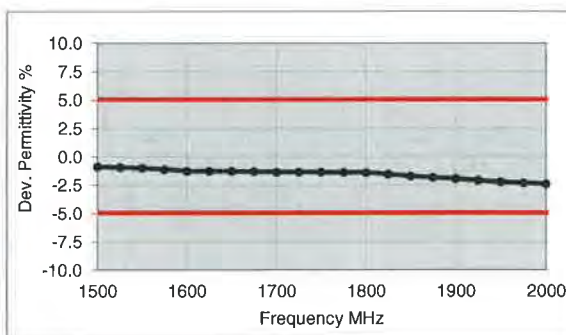
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°C and humidity < 70%.  
 TSL Temperature 22°C  
 Test Date 19-Feb-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-ε'    | HP-ε'' | elgma | 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    |



## 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.

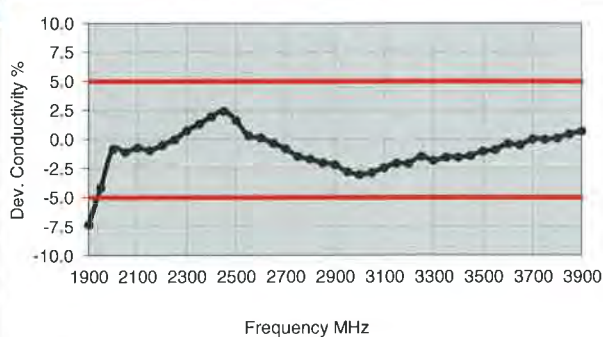
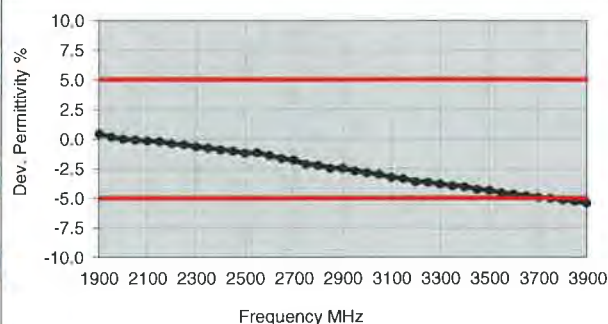
### Test Condition

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

### 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 | $\Delta$ -eps      | $\Delta$ -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.

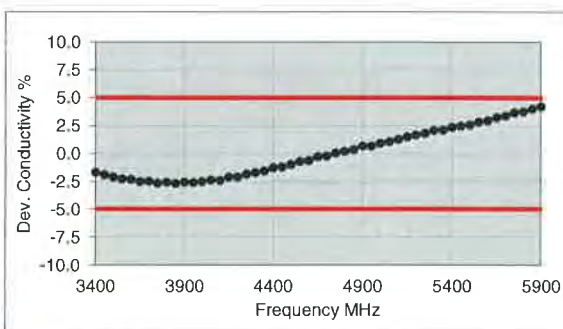
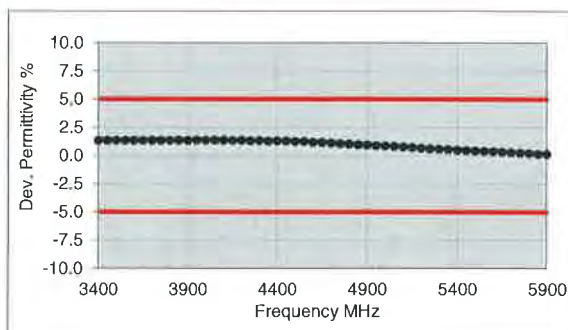
### Test Condition

Ambient Environment temperatur ( $22 \pm 3$ )°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     |





## Measurement Certificate / Material Test

|              |                                                 |
|--------------|-------------------------------------------------|
| Item Name    | Head Tissue Simulating Liquid (HBBL600-10000V6) |
| Product No.  | SL AAH U16 BD (Batch: 180208-1)                 |
| Manufacturer | SPEAG                                           |

### Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

### Target Parameters

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

### Test Condition

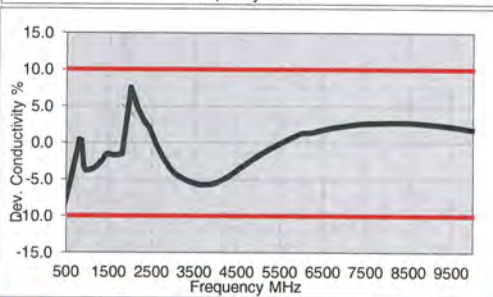
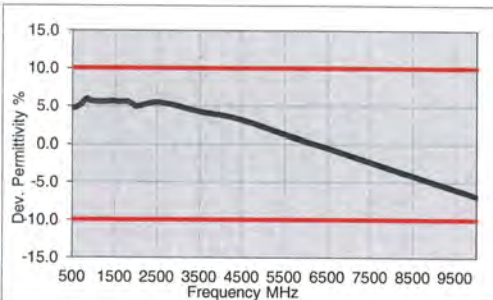
Ambient Condition 22°C ; 30% humidity  
 TSL Temperature 22°C  
 Test Date 8-Feb-18  
 Operator WM

### Additional Information

TSL Density  
 TSL Heat-capacity

### Results

| f [MHz] | Measured |      |       | Target |       | Diff.to Target [%] |         |
|---------|----------|------|-------|--------|-------|--------------------|---------|
|         | e'       | e''  | sigma | eps    | sigma | Δ-eps              | Δ-sigma |
| 800     | 44.1     | 20.3 | 0.90  | 41.7   | 0.90  | 5.8                | 0.3     |
| 825     | 44.1     | 19.9 | 0.91  | 41.6   | 0.91  | 6.0                | 0.4     |
| 835     | 44.1     | 19.7 | 0.92  | 41.5   | 0.91  | 6.1                | 0.9     |
| 850     | 44.0     | 19.4 | 0.92  | 41.5   | 0.92  | 6.0                | 0.4     |
| 900     | 43.9     | 18.7 | 0.94  | 41.5   | 0.97  | 5.8                | -3.1    |
| 1400    | 42.9     | 14.9 | 1.16  | 40.6   | 1.18  | 5.7                | -1.6    |
| 1450    | 42.8     | 14.7 | 1.18  | 40.5   | 1.20  | 5.7                | -1.7    |
| 1600    | 42.6     | 14.2 | 1.26  | 40.3   | 1.28  | 5.7                | -1.9    |
| 1625    | 42.6     | 14.1 | 1.28  | 40.3   | 1.30  | 5.8                | -1.4    |
| 1640    | 42.6     | 14.1 | 1.29  | 40.3   | 1.31  | 5.8                | -1.2    |
| 1650    | 42.5     | 14.1 | 1.29  | 40.2   | 1.31  | 5.6                | -1.8    |
| 1700    | 42.4     | 14.0 | 1.32  | 40.2   | 1.34  | 5.6                | -1.6    |
| 1750    | 42.3     | 13.9 | 1.35  | 40.1   | 1.37  | 5.5                | -1.5    |
| 1800    | 42.3     | 13.8 | 1.38  | 40.0   | 1.40  | 5.7                | -1.4    |
| 1810    | 42.3     | 13.8 | 1.39  | 40.0   | 1.40  | 5.7                | -0.7    |
| 1825    | 42.3     | 13.7 | 1.40  | 40.0   | 1.40  | 5.7                | 0.0     |
| 1850    | 42.2     | 13.7 | 1.41  | 40.0   | 1.40  | 5.5                | 0.7     |
| 1900    | 42.1     | 13.6 | 1.44  | 40.0   | 1.40  | 5.3                | 2.9     |
| 1950    | 42.0     | 13.6 | 1.47  | 40.0   | 1.40  | 5.0                | 5.0     |
| 2000    | 42.0     | 13.5 | 1.51  | 40.0   | 1.40  | 5.0                | 7.9     |
| 2050    | 41.9     | 13.5 | 1.54  | 39.9   | 1.44  | 5.0                | 6.6     |
| 2100    | 41.8     | 13.5 | 1.57  | 39.8   | 1.49  | 5.0                | 5.4     |
| 2150    | 41.8     | 13.5 | 1.61  | 39.7   | 1.53  | 5.2                | 5.0     |
| 2200    | 41.7     | 13.4 | 1.64  | 39.6   | 1.58  | 5.2                | 3.9     |
| 2250    | 41.6     | 13.4 | 1.68  | 39.6   | 1.62  | 5.2                | 3.6     |
| 2300    | 41.6     | 13.4 | 1.72  | 39.5   | 1.67  | 5.4                | 3.2     |
| 2350    | 41.5     | 13.4 | 1.76  | 39.4   | 1.71  | 5.4                | 2.9     |
| 2400    | 41.4     | 13.5 | 1.80  | 39.3   | 1.76  | 5.4                | 2.5     |
| 2450    | 41.4     | 13.5 | 1.84  | 39.2   | 1.80  | 5.6                | 2.2     |
| 2500    | 41.3     | 13.5 | 1.88  | 39.1   | 1.85  | 5.5                | 1.4     |
| 2550    | 41.2     | 13.5 | 1.92  | 39.1   | 1.91  | 5.4                | 0.6     |
| 2600    | 41.1     | 13.6 | 1.96  | 39.0   | 1.96  | 5.4                | -0.2    |
| 3500    | 39.6     | 14.1 | 2.75  | 37.9   | 2.91  | 4.3                | -5.5    |
| 3700    | 39.2     | 14.3 | 2.94  | 37.7   | 3.12  | 4.1                | -5.7    |



|       |      |      |       |      |       |      |      |
|-------|------|------|-------|------|-------|------|------|
| 5200  | 36.7 | 15.9 | 4.61  | 36.0 | 4.66  | 1.9  | -1.0 |
| 5250  | 36.6 | 16.0 | 4.67  | 35.9 | 4.71  | 1.8  | -0.9 |
| 5300  | 36.5 | 16.0 | 4.72  | 35.9 | 4.76  | 1.7  | -0.7 |
| 5500  | 36.1 | 16.2 | 4.96  | 35.6 | 4.96  | 1.3  | -0.1 |
| 5600  | 35.9 | 16.3 | 5.08  | 35.5 | 5.07  | 1.1  | 0.2  |
| 5700  | 35.7 | 16.4 | 5.19  | 35.4 | 5.17  | 0.9  | 0.5  |
| 5800  | 35.6 | 16.5 | 5.31  | 35.3 | 5.27  | 0.8  | 0.8  |
| 6000  | 35.2 | 16.6 | 5.55  | 35.1 | 5.48  | 0.4  | 1.3  |
| 6500  | 34.3 | 17.1 | 6.18  | 34.5 | 6.07  | -0.5 | 1.8  |
| 7000  | 33.4 | 17.5 | 6.81  | 33.9 | 6.65  | -1.4 | 2.3  |
| 7500  | 32.5 | 17.8 | 7.43  | 33.3 | 7.24  | -2.3 | 2.7  |
| 8000  | 31.7 | 18.1 | 8.06  | 32.7 | 7.84  | -3.2 | 2.8  |
| 8500  | 30.8 | 18.4 | 8.68  | 32.1 | 8.45  | -4.2 | 2.8  |
| 9000  | 30.0 | 18.6 | 9.31  | 31.5 | 9.08  | -5.1 | 2.6  |
| 9500  | 29.1 | 18.8 | 9.93  | 31.0 | 9.71  | -5.9 | 2.2  |
| 10000 | 28.3 | 19.0 | 10.55 | 30.4 | 10.36 | -6.9 | 1.8  |

## Measurement Certificate / Material Test

|              |                                                |
|--------------|------------------------------------------------|
| Item Name    | Body Tissue Simulating Liquid (MBBL600-6000V6) |
| Product No.  | SL AAM U16 BE (Batch: 180219-1)                |
| Manufacturer | SPEAG                                          |

### Measurement Method

TSL dielectric parameters measured using calibrated DAK probe.

### Target Parameters

Target parameters as defined in the KDB 865664 compliance standard.

### Test Condition

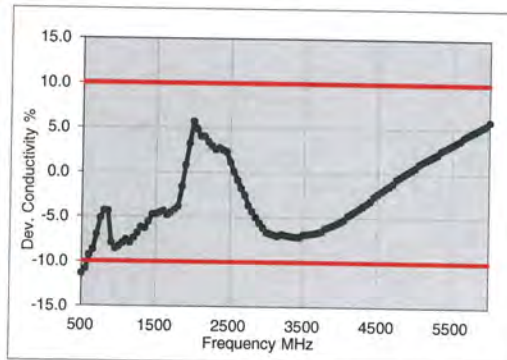
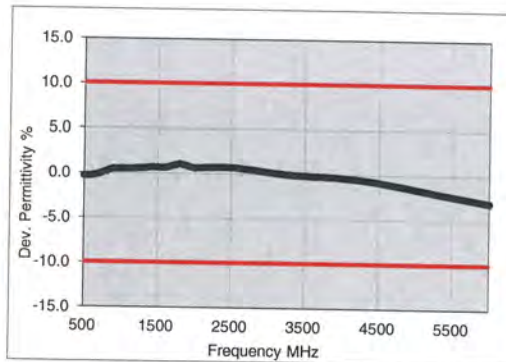
Ambient Condition 22°C ; 30% humidity  
 TSL Temperature 22°C  
 Test Date 21-Feb-18  
 Operator WM

### Additional Information

TSL Density  
 TSL Heat-capacity

### Results

| f [MHz] | Measured |      |       | Target |       |  | Diff.to Target [%] |                 |
|---------|----------|------|-------|--------|-------|--|--------------------|-----------------|
|         | e'       | e''  | sigma | eps    | sigma |  | $\Delta$ -eps      | $\Delta$ -sigma |
| 800     | 55.4     | 20.9 | 0.93  | 55.3   | 0.97  |  | 0.1                | -4.1            |
| 825     | 55.4     | 20.4 | 0.94  | 55.2   | 0.98  |  | 0.3                | -4.1            |
| 835     | 55.4     | 20.2 | 0.95  | 55.1   | 0.99  |  | 0.5                | -3.6            |
| 850     | 55.3     | 20.0 | 0.95  | 55.2   | 0.99  |  | 0.3                | -4.0            |
| 900     | 55.3     | 19.3 | 0.97  | 55.0   | 1.05  |  | 0.5                | -7.6            |
| 1400    | 54.4     | 15.5 | 1.21  | 54.1   | 1.28  |  | 0.6                | -5.5            |
| 1450    | 54.4     | 15.4 | 1.24  | 54.0   | 1.30  |  | 0.7                | -4.6            |
| 1500    | 54.3     | 15.2 | 1.27  | 53.9   | 1.33  |  | 0.7                | -4.5            |
| 1550    | 54.2     | 15.1 | 1.30  | 53.9   | 1.36  |  | 0.6                | -4.4            |
| 1600    | 54.1     | 14.9 | 1.33  | 53.8   | 1.39  |  | 0.5                | -4.3            |
| 1625    | 54.1     | 14.9 | 1.35  | 53.8   | 1.41  |  | 0.7                | -4.3            |
| 1640    | 54.1     | 14.9 | 1.36  | 53.7   | 1.42  |  | 0.7                | -4.2            |
| 1650    | 54.1     | 14.8 | 1.36  | 53.7   | 1.43  |  | 0.8                | -4.9            |
| 1700    | 54.0     | 14.7 | 1.39  | 53.6   | 1.46  |  | 0.8                | -4.8            |
| 1750    | 53.9     | 14.7 | 1.43  | 53.4   | 1.49  |  | 0.9                | -4.0            |
| 1800    | 53.9     | 14.6 | 1.46  | 53.3   | 1.52  |  | 1.1                | -3.9            |
| 1810    | 53.9     | 14.6 | 1.47  | 53.3   | 1.52  |  | 1.1                | -3.3            |
| 1825    | 53.9     | 14.6 | 1.48  | 53.3   | 1.52  |  | 1.1                | -2.6            |
| 1850    | 53.8     | 14.5 | 1.50  | 53.3   | 1.52  |  | 0.9                | -1.3            |
| 1900    | 53.7     | 14.5 | 1.53  | 53.3   | 1.52  |  | 0.8                | 0.7             |
| 1950    | 53.7     | 14.5 | 1.57  | 53.3   | 1.52  |  | 0.8                | 3.3             |
| 2000    | 53.6     | 14.4 | 1.61  | 53.3   | 1.52  |  | 0.6                | 5.9             |
| 2050    | 53.6     | 14.4 | 1.65  | 53.2   | 1.57  |  | 0.7                | 5.1             |
| 2100    | 53.5     | 14.4 | 1.69  | 53.2   | 1.62  |  | 0.6                | 4.3             |
| 2150    | 53.4     | 14.4 | 1.73  | 53.1   | 1.66  |  | 0.6                | 4.2             |
| 2200    | 53.4     | 14.5 | 1.77  | 53.0   | 1.71  |  | 0.7                | 3.5             |
| 2250    | 53.3     | 14.5 | 1.81  | 53.0   | 1.76  |  | 0.6                | 2.8             |
| 2300    | 53.3     | 14.5 | 1.86  | 52.9   | 1.81  |  | 0.8                | 2.8             |
| 2350    | 53.2     | 14.5 | 1.90  | 52.8   | 1.85  |  | 0.7                | 2.7             |
| 2400    | 53.1     | 14.6 | 1.95  | 52.8   | 1.90  |  | 0.6                | 2.6             |
| 2450    | 53.1     | 14.6 | 2.00  | 52.7   | 1.95  |  | 0.8                | 2.6             |
| 2500    | 53.0     | 14.7 | 2.04  | 52.6   | 2.02  |  | 0.7                | 1.0             |
| 2550    | 52.9     | 14.8 | 2.09  | 52.6   | 2.09  |  | 0.6                | 0.0             |
| 2600    | 52.8     | 14.8 | 2.14  | 52.5   | 2.16  |  | 0.6                | -0.9            |



|      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|
| 3500 | 51.2 | 15.8 | 3.08 | 51.3 | 3.31 | -0.2 | -6.9 |
| 3700 | 50.9 | 16.1 | 3.31 | 51.1 | 3.55 | -0.2 | -6.7 |
| 5200 | 48.1 | 18.6 | 5.39 | 49.0 | 5.30 | -1.9 | 1.8  |
| 5250 | 48.0 | 18.7 | 5.47 | 49.0 | 5.36 | -2.0 | 2.0  |
| 5300 | 47.9 | 18.8 | 5.54 | 48.9 | 5.42 | -2.0 | 2.2  |
| 5500 | 47.5 | 19.1 | 5.84 | 48.6 | 5.65 | -2.3 | 3.3  |
| 5600 | 47.3 | 19.2 | 5.99 | 48.5 | 5.77 | -2.5 | 3.7  |
| 5700 | 47.1 | 19.4 | 6.14 | 48.3 | 5.88 | -2.6 | 4.4  |
| 5800 | 46.9 | 19.5 | 6.29 | 48.2 | 6.00 | -2.8 | 4.8  |





Accredited by the Swiss Accreditation Service (SAS)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **UL USA**

Certificate No: **EX3-3749\_Jan20**

## CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3749**

Calibration procedure(s) **QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7  
Calibration procedure for dosimetric E-field probes**

Calibration date: **January 23, 2020**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID               | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|------------------|-----------------------------------|------------------------|
| Power meter NRP            | SN: 104778       | 03-Apr-19 (No. 217-02892/02893)   | Apr-20                 |
| Power sensor NRP-Z91       | SN: 103244       | 03-Apr-19 (No. 217-02892)         | Apr-20                 |
| Power sensor NRP-Z91       | SN: 103245       | 03-Apr-19 (No. 217-02893)         | Apr-20                 |
| Reference 20 dB Attenuator | SN: S5277 (20x)  | 04-Apr-19 (No. 217-02894)         | Apr-20                 |
| DAE4                       | SN: 660          | 27-Dec-19 (No. DAE4-660_Dec19)    | Dec-20                 |
| Reference Probe ES3DV2     | SN: 3013         | 31-Dec-19 (No. ES3-3013_Dec19)    | Dec-20                 |
| Secondary Standards        | ID               | Check Date (in house)             | Scheduled Check        |
| Power meter E4419B         | SN: GB41293874   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A        | SN: MY41498087   | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| Power sensor E4412A        | SN: 000110210    | 06-Apr-16 (in house check Jun-18) | In house check: Jun-20 |
| RF generator HP 8648C      | SN: US3642U01700 | 04-Aug-99 (in house check Jun-18) | In house check: Jun-20 |
| Network Analyzer E8358A    | SN: US41080477   | 31-Mar-14 (in house check Oct-19) | In house check: Oct-20 |

|                                                                                                                 | Name          | Function              | Signature |
|-----------------------------------------------------------------------------------------------------------------|---------------|-----------------------|-----------|
| Calibrated by:                                                                                                  | Michael Weber | Laboratory Technician |           |
| Approved by:                                                                                                    | Katja Pokovic | Technical Manager     |           |
| Issued: January 23, 2020                                                                                        |               |                       |           |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory. |               |                       |           |



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

### Glossary:

|                          |                                                                                                                                                         |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                      | tissue simulating liquid                                                                                                                                |
| NORM <sub>x,y,z</sub>    | sensitivity in free space                                                                                                                               |
| ConvF                    | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                              |
| DCP                      | diode compression point                                                                                                                                 |
| CF                       | crest factor (1/duty_cycle) of the RF signal                                                                                                            |
| A, B, C, D               | modulation dependent linearization parameters                                                                                                           |
| Polarization $\phi$      | $\phi$ rotation around probe axis                                                                                                                       |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center),<br>i.e., $\vartheta = 0$ is normal to probe axis |
| Connector Angle          | information used in DASY system to align probe sensor X to the robot coordinate system                                                                  |

### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not affect the E<sup>2</sup>-field uncertainty inside TSL (see below ConvF).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A<sub>x,y,z</sub>; B<sub>x,y,z</sub>; C<sub>x,y,z</sub>; D<sub>x,y,z</sub>; VR<sub>x,y,z</sub>**: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle**: The angle is assessed using the information gained by determining the NORM<sub>x</sub> (no uncertainty required).

# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3749

## Basic Calibration Parameters

|                                                           | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|-----------------------------------------------------------|----------|----------|----------|-----------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 0.48     | 0.45     | 0.41     | ± 10.1 %  |
| DCP (mV) <sup>B</sup>                                     | 100.5    | 106.1    | 103.0    |           |

## Calibration Results for Modulation Response

| UID           | Communication System Name   |   | A<br>dB | B<br>dB/μV | C     | D<br>dB | VR<br>mV | Max<br>dev. | Max<br>Unc <sup>E</sup><br>(k=2) |
|---------------|-----------------------------|---|---------|------------|-------|---------|----------|-------------|----------------------------------|
| 0             | CW                          | X | 0.00    | 0.00       | 1.00  | 0.00    | 134.4    | ± 3.5 %     | ± 4.7 %                          |
|               |                             | Y | 0.00    | 0.00       | 1.00  |         | 130.1    |             |                                  |
|               |                             | Z | 0.00    | 0.00       | 1.00  |         | 147.4    |             |                                  |
| 10352-<br>AAA | Pulse Waveform (200Hz, 10%) | X | 20.00   | 93.77      | 23.33 | 10.00   | 60.0     | ± 2.3 %     | ± 9.6 %                          |
|               |                             | Y | 20.00   | 89.63      | 20.91 |         | 60.0     |             |                                  |
|               |                             | Z | 20.00   | 92.20      | 22.37 |         | 60.0     |             |                                  |
| 10353-<br>AAA | Pulse Waveform (200Hz, 20%) | X | 20.00   | 94.43      | 22.51 | 6.99    | 80.0     | ± 1.0 %     | ± 9.6 %                          |
|               |                             | Y | 20.00   | 89.51      | 19.47 |         | 80.0     |             |                                  |
|               |                             | Z | 20.00   | 91.85      | 21.00 |         | 80.0     |             |                                  |
| 10354-<br>AAA | Pulse Waveform (200Hz, 40%) | X | 20.00   | 97.06      | 22.34 | 3.98    | 95.0     | ± 1.1 %     | ± 9.6 %                          |
|               |                             | Y | 20.00   | 88.84      | 17.50 |         | 95.0     |             |                                  |
|               |                             | Z | 20.00   | 94.41      | 20.80 |         | 95.0     |             |                                  |
| 10355-<br>AAA | Pulse Waveform (200Hz, 60%) | X | 20.00   | 102.07     | 23.34 | 2.22    | 120.0    | ± 1.1 %     | ± 9.6 %                          |
|               |                             | Y | 20.00   | 87.14      | 15.27 |         | 120.0    |             |                                  |
|               |                             | Z | 20.00   | 98.60      | 21.41 |         | 120.0    |             |                                  |
| 10387-<br>AAA | QPSK Waveform, 1 MHz        | X | 0.89    | 64.46      | 11.06 | 0.00    | 150.0    | ± 3.0 %     | ± 9.6 %                          |
|               |                             | Y | 0.57    | 60.48      | 7.72  |         | 150.0    |             |                                  |
|               |                             | Z | 0.74    | 62.81      | 9.81  |         | 150.0    |             |                                  |
| 10388-<br>AAA | QPSK Waveform, 10 MHz       | X | 2.44    | 69.77      | 16.63 | 0.00    | 150.0    | ± 1.1 %     | ± 9.6 %                          |
|               |                             | Y | 2.13    | 68.02      | 15.53 |         | 150.0    |             |                                  |
|               |                             | Z | 2.32    | 69.27      | 16.36 |         | 150.0    |             |                                  |
| 10396-<br>AAA | 64-QAM Waveform, 100 kHz    | X | 3.47    | 72.88      | 19.76 | 3.01    | 150.0    | ± 0.7 %     | ± 9.6 %                          |
|               |                             | Y | 3.14    | 70.65      | 18.58 |         | 150.0    |             |                                  |
|               |                             | Z | 3.74    | 74.46      | 20.27 |         | 150.0    |             |                                  |
| 10399-<br>AAA | 64-QAM Waveform, 40 MHz     | X | 3.51    | 67.40      | 15.95 | 0.00    | 150.0    | ± 2.1 %     | ± 9.6 %                          |
|               |                             | Y | 3.44    | 67.17      | 15.71 |         | 150.0    |             |                                  |
|               |                             | Z | 3.54    | 67.69      | 16.05 |         | 150.0    |             |                                  |
| 10414-<br>AAA | WLAN CCDF, 64-QAM, 40MHz    | X | 4.83    | 65.68      | 15.54 | 0.00    | 150.0    | ± 4.0 %     | ± 9.6 %                          |
|               |                             | Y | 4.82    | 65.77      | 15.56 |         | 150.0    |             |                                  |
|               |                             | Z | 4.86    | 65.99      | 15.67 |         | 150.0    |             |                                  |

Note: For details on UID parameters see Appendix

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

<sup>A</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.



## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3749

### Sensor Model Parameters

|   | C1<br>fF | C2<br>fF | $\alpha$<br>$V^{-1}$ | T1<br>$ms.V^{-2}$ | T2<br>$ms.V^{-1}$ | T3<br>ms | T4<br>$V^{-2}$ | T5<br>$V^{-1}$ | T6   |
|---|----------|----------|----------------------|-------------------|-------------------|----------|----------------|----------------|------|
| X | 46.7     | 340.02   | 34.08                | 21.91             | 0.76              | 5.09     | 1.08           | 0.36           | 1.01 |
| Y | 44.6     | 332.88   | 35.55                | 17.63             | 1.15              | 5.05     | 0.37           | 0.57           | 1.01 |
| Z | 44.4     | 322.21   | 33.84                | 21.74             | 0.87              | 5.07     | 1.84           | 0.25           | 1.01 |

### Other Probe Parameters

|                                               |            |
|-----------------------------------------------|------------|
| Sensor Arrangement                            | Triangular |
| Connector Angle (°)                           | 118.1      |
| Mechanical Surface Detection Mode             | enabled    |
| Optical Surface Detection Mode                | disabled   |
| Probe Overall Length                          | 337 mm     |
| Probe Body Diameter                           | 10 mm      |
| Tip Length                                    | 9 mm       |
| Tip Diameter                                  | 2.5 mm     |
| Probe Tip to Sensor X Calibration Point       | 1 mm       |
| Probe Tip to Sensor Y Calibration Point       | 1 mm       |
| Probe Tip to Sensor Z Calibration Point       | 1 mm       |
| Recommended Measurement Distance from Surface | 1.4 mm     |



## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3749

### Calibration Parameter Determined in Head Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-----------|
| 750                  | 41.9                               | 0.89                            | 9.48    | 9.48    | 9.48    | 0.44               | 0.90                    | ± 12.0 %  |
| 900                  | 41.5                               | 0.97                            | 8.91    | 8.91    | 8.91    | 0.47               | 0.80                    | ± 12.0 %  |
| 1750                 | 40.1                               | 1.37                            | 7.83    | 7.83    | 7.83    | 0.36               | 0.85                    | ± 12.0 %  |
| 1900                 | 40.0                               | 1.40                            | 7.60    | 7.60    | 7.60    | 0.34               | 0.85                    | ± 12.0 %  |
| 2300                 | 39.5                               | 1.67                            | 7.14    | 7.14    | 7.14    | 0.38               | 0.85                    | ± 12.0 %  |
| 2450                 | 39.2                               | 1.80                            | 6.83    | 6.83    | 6.83    | 0.40               | 0.85                    | ± 12.0 %  |
| 2600                 | 39.0                               | 1.96                            | 6.72    | 6.72    | 6.72    | 0.43               | 0.85                    | ± 12.0 %  |
| 5250                 | 35.9                               | 4.71                            | 4.70    | 4.70    | 4.70    | 0.40               | 1.80                    | ± 13.1 %  |
| 5600                 | 35.5                               | 5.07                            | 4.28    | 4.28    | 4.28    | 0.40               | 1.80                    | ± 13.1 %  |
| 5750                 | 35.4                               | 5.22                            | 4.40    | 4.40    | 4.40    | 0.40               | 1.80                    | ± 13.1 %  |

<sup>C</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

## DASY/EASY - Parameters of Probe: EX3DV4 - SN:3749

### Calibration Parameter Determined in Body Tissue Simulating Media

| f (MHz) <sup>C</sup> | Relative Permittivity <sup>F</sup> | Conductivity (S/m) <sup>F</sup> | ConvF X | ConvF Y | ConvF Z | Alpha <sup>G</sup> | Depth <sup>G</sup> (mm) | Unc (k=2) |
|----------------------|------------------------------------|---------------------------------|---------|---------|---------|--------------------|-------------------------|-----------|
| 750                  | 55.5                               | 0.96                            | 8.92    | 8.92    | 8.92    | 0.43               | 0.80                    | ± 12.0 %  |
| 900                  | 55.0                               | 1.05                            | 8.80    | 8.80    | 8.80    | 0.38               | 0.80                    | ± 12.0 %  |
| 1750                 | 53.4                               | 1.49                            | 7.28    | 7.28    | 7.28    | 0.38               | 0.85                    | ± 12.0 %  |
| 1900                 | 53.3                               | 1.52                            | 7.01    | 7.01    | 7.01    | 0.35               | 0.85                    | ± 12.0 %  |
| 2300                 | 52.9                               | 1.81                            | 6.89    | 6.89    | 6.89    | 0.34               | 0.85                    | ± 12.0 %  |
| 2450                 | 52.7                               | 1.95                            | 6.85    | 6.85    | 6.85    | 0.27               | 0.85                    | ± 12.0 %  |
| 2600                 | 52.5                               | 2.16                            | 6.67    | 6.67    | 6.67    | 0.38               | 0.95                    | ± 12.0 %  |
| 5250                 | 48.9                               | 5.36                            | 4.43    | 4.43    | 4.43    | 0.50               | 1.90                    | ± 13.1 %  |
| 5600                 | 48.5                               | 5.77                            | 3.94    | 3.94    | 3.94    | 0.50               | 1.90                    | ± 13.1 %  |
| 5750                 | 48.3                               | 5.94                            | 4.07    | 4.07    | 4.07    | 0.50               | 1.90                    | ± 13.1 %  |

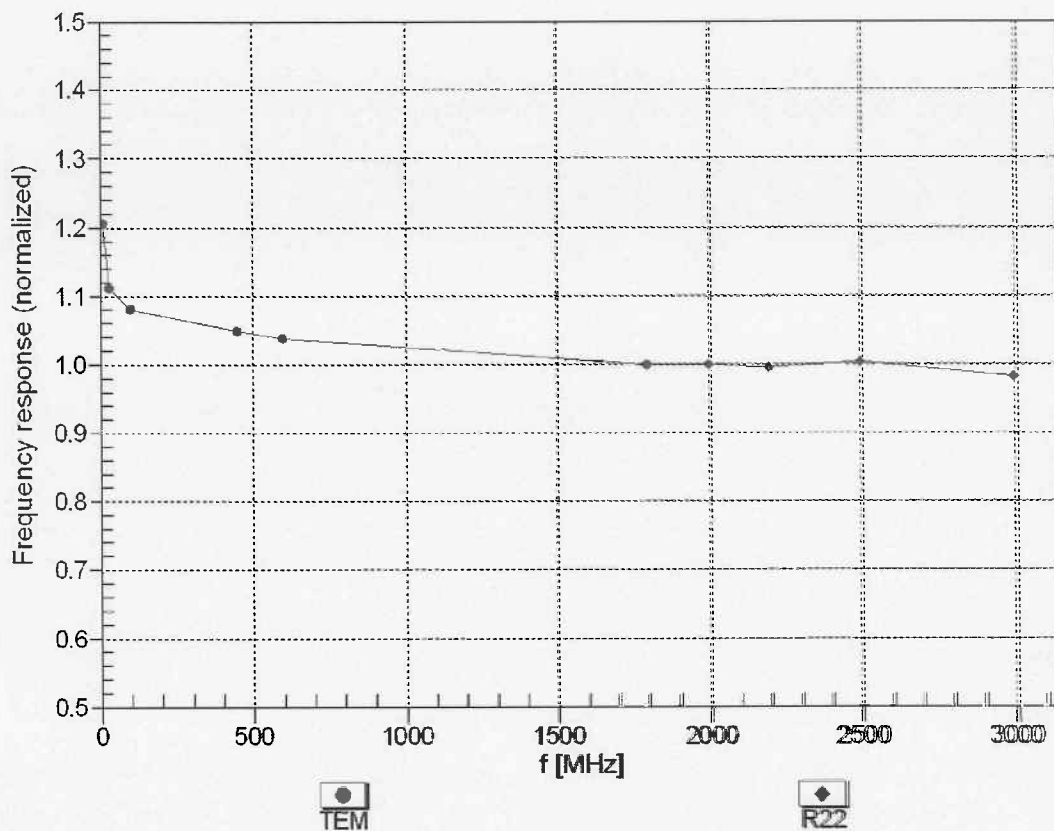
<sup>C</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

<sup>F</sup> At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

<sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

## Frequency Response of E-Field

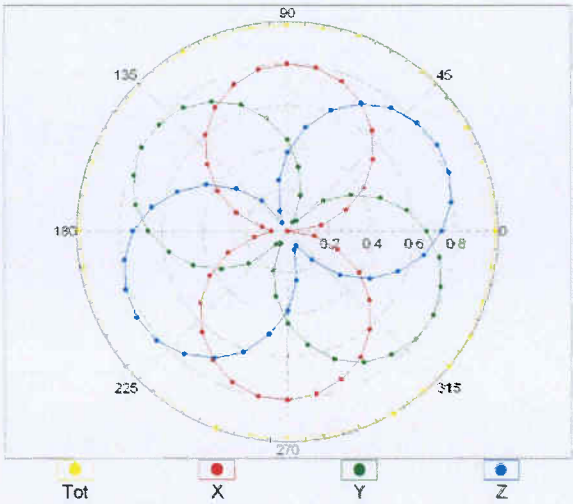
(TEM-Cell: ifi110 EXX, Waveguide: R22)



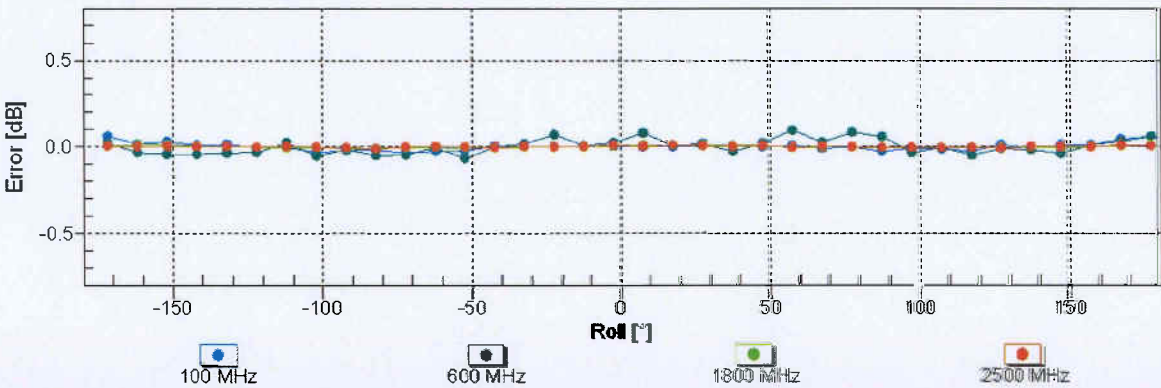
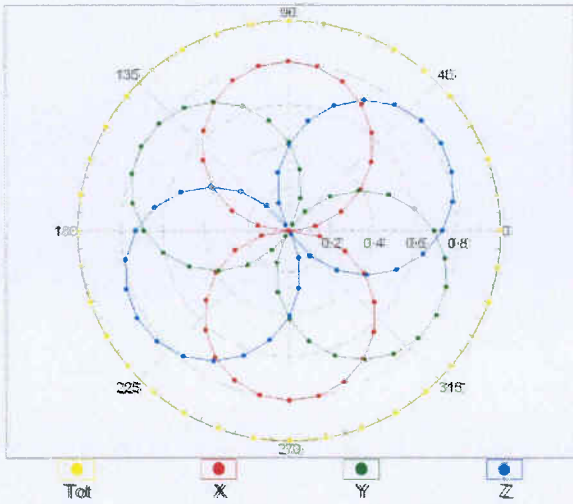
Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

Receiving Pattern ( $\phi$ ),  $\theta = 0^\circ$

f=600 MHz,TEM



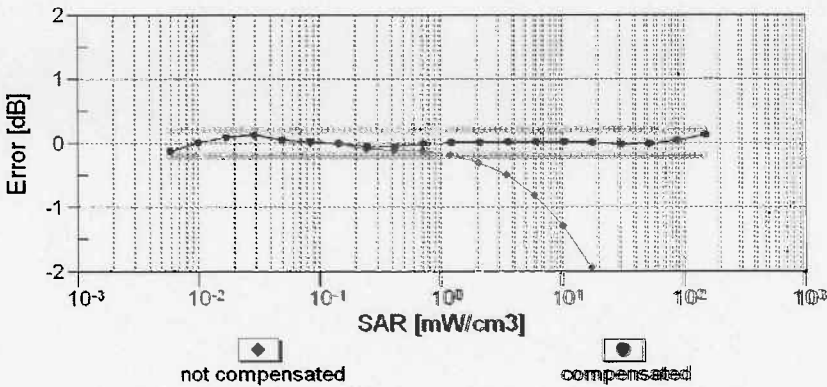
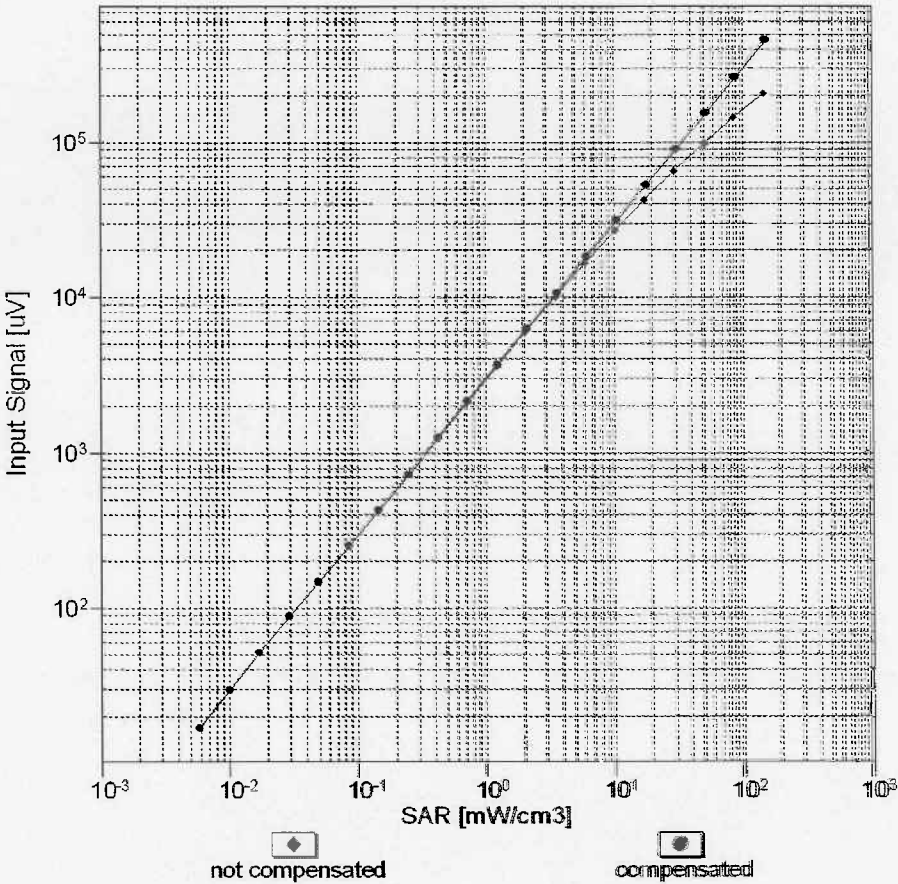
f=1800 MHz,R22



Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  (k=2)

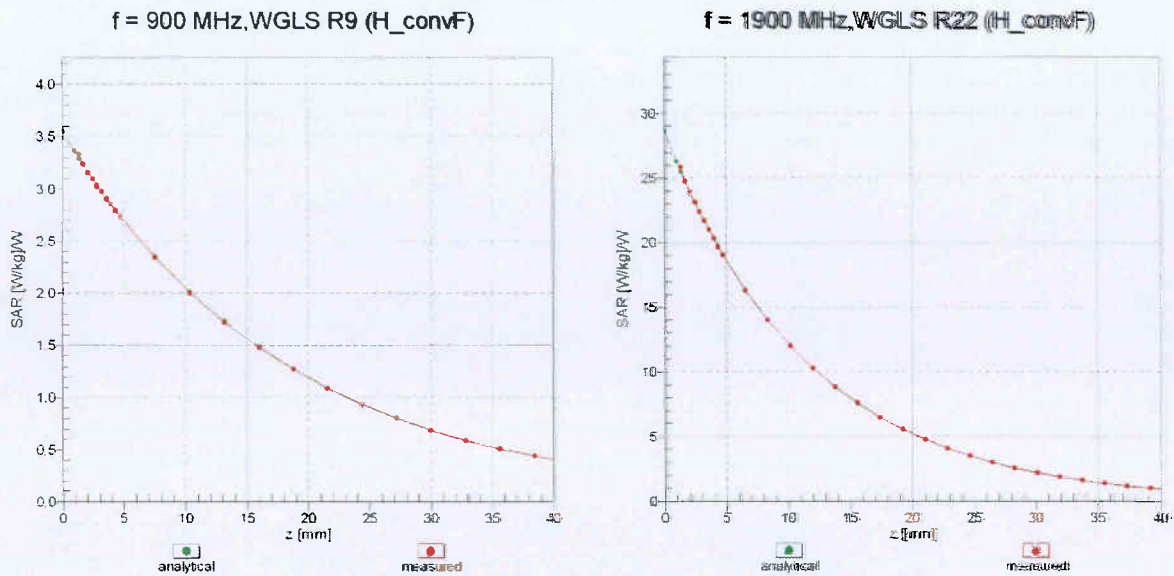


Dynamic Range f(SAR<sub>head</sub>)  
(TEM cell , f<sub>eval</sub>= 1900 MHz)



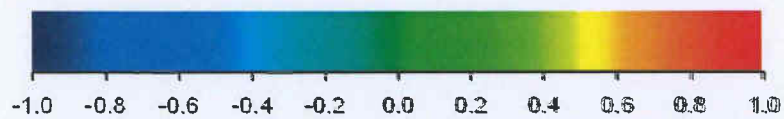
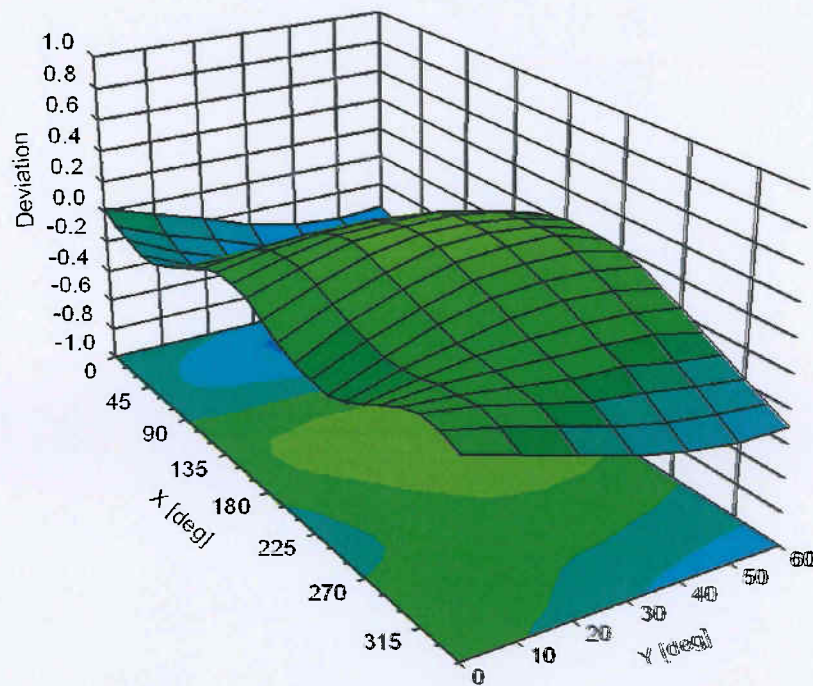
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

## Conversion Factor Assessment



## Deviation from Isotropy in Liquid

Error ( $\phi, \theta$ ),  $f = 900 \text{ MHz}$



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )



## Appendix: Modulation Calibration Parameters

| UID   | Rev | Communication System Name                           | Group     | PAR (dB) | Unc <sup>E</sup> (k=2) |
|-------|-----|-----------------------------------------------------|-----------|----------|------------------------|
| 0     |     | CW                                                  | CW        | 0.00     | ± 4.7 %                |
| 10010 | CAA | SAR Validation (Square, 100ms, 10ms)                | Test      | 10.00    | ± 9.6 %                |
| 10011 | CAB | UMTS-FDD (WCDMA)                                    | WCDMA     | 2.91     | ± 9.6 %                |
| 10012 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)            | WLAN      | 1.87     | ± 9.6 %                |
| 10013 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)       | WLAN      | 9.46     | ± 9.6 %                |
| 10021 | DAC | GSM-FDD (TDMA, GMSK)                                | GSM       | 9.39     | ± 9.6 %                |
| 10023 | DAC | GPRS-FDD (TDMA, GMSK, TN 0)                         | GSM       | 9.57     | ± 9.6 %                |
| 10024 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1)                       | GSM       | 6.56     | ± 9.6 %                |
| 10025 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0)                         | GSM       | 12.62    | ± 9.6 %                |
| 10026 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1)                       | GSM       | 9.55     | ± 9.6 %                |
| 10027 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2)                     | GSM       | 4.80     | ± 9.6 %                |
| 10028 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)                   | GSM       | 3.55     | ± 9.6 %                |
| 10029 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2)                     | GSM       | 7.78     | ± 9.6 %                |
| 10030 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH1)                 | Bluetooth | 5.30     | ± 9.6 %                |
| 10031 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH3)                 | Bluetooth | 1.87     | ± 9.6 %                |
| 10032 | CAA | IEEE 802.15.1 Bluetooth (GFSK, DH5)                 | Bluetooth | 1.16     | ± 9.6 %                |
| 10033 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)           | Bluetooth | 7.74     | ± 9.6 %                |
| 10034 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)           | Bluetooth | 4.53     | ± 9.6 %                |
| 10035 | CAA | IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)           | Bluetooth | 3.83     | ± 9.6 %                |
| 10036 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH1)               | Bluetooth | 8.01     | ± 9.6 %                |
| 10037 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH3)               | Bluetooth | 4.77     | ± 9.6 %                |
| 10038 | CAA | IEEE 802.15.1 Bluetooth (8-DPSK, DH5)               | Bluetooth | 4.10     | ± 9.6 %                |
| 10039 | CAB | CDMA2000 (1xRTT, RC1)                               | CDMA2000  | 4.57     | ± 9.6 %                |
| 10042 | CAB | IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate) | AMPS      | 7.78     | ± 9.6 %                |
| 10044 | CAA | IS-91/EIA/TIA-553 FDD (FDMA, FM)                    | AMPS      | 0.00     | ± 9.6 %                |
| 10048 | CAA | DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)           | DECT      | 13.80    | ± 9.6 %                |
| 10049 | CAA | DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)         | DECT      | 10.79    | ± 9.6 %                |
| 10056 | CAA | UMTS-TDD (TD-SCDMA, 1.28 Mcps)                      | TD-SCDMA  | 11.01    | ± 9.6 %                |
| 10058 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)                   | GSM       | 6.52     | ± 9.6 %                |
| 10059 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)            | WLAN      | 2.12     | ± 9.6 %                |
| 10060 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)          | WLAN      | 2.83     | ± 9.6 %                |
| 10061 | CAB | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)           | WLAN      | 3.60     | ± 9.6 %                |
| 10062 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)            | WLAN      | 8.68     | ± 9.6 %                |
| 10063 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)            | WLAN      | 8.63     | ± 9.6 %                |
| 10064 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)           | WLAN      | 9.09     | ± 9.6 %                |
| 10065 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)           | WLAN      | 9.00     | ± 9.6 %                |
| 10066 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)           | WLAN      | 9.38     | ± 9.6 %                |
| 10067 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)           | WLAN      | 10.12    | ± 9.6 %                |
| 10068 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)           | WLAN      | 10.24    | ± 9.6 %                |
| 10069 | CAC | IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)           | WLAN      | 10.56    | ± 9.6 %                |
| 10071 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)       | WLAN      | 9.83     | ± 9.6 %                |
| 10072 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)      | WLAN      | 9.62     | ± 9.6 %                |
| 10073 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)      | WLAN      | 9.94     | ± 9.6 %                |
| 10074 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)      | WLAN      | 10.30    | ± 9.6 %                |
| 10075 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)      | WLAN      | 10.77    | ± 9.6 %                |
| 10076 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)      | WLAN      | 10.94    | ± 9.6 %                |
| 10077 | CAB | IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)      | WLAN      | 11.00    | ± 9.6 %                |
| 10081 | CAB | CDMA2000 (1xRTT, RC3)                               | CDMA2000  | 3.97     | ± 9.6 %                |
| 10082 | CAB | IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate) | AMPS      | 4.77     | ± 9.6 %                |
| 10090 | DAC | GPRS-FDD (TDMA, GMSK, TN 0-4)                       | GSM       | 6.56     | ± 9.6 %                |
| 10097 | CAB | UMTS-FDD (HSDPA)                                    | WCDMA     | 3.98     | ± 9.6 %                |
| 10098 | CAB | UMTS-FDD (HSUPA, Subtest 2)                         | WCDMA     | 3.98     | ± 9.6 %                |
| 10099 | DAC | EDGE-FDD (TDMA, 8PSK, TN 0-4)                       | GSM       | 9.55     | ± 9.6 %                |
| 10100 | CAE | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)            | LTE-FDD   | 5.67     | ± 9.6 %                |
| 10101 | CAE | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)          | LTE-FDD   | 6.42     | ± 9.6 %                |
| 10102 | CAE | LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)          | LTE-FDD   | 6.60     | ± 9.6 %                |
| 10103 | CAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)            | LTE-TDD   | 9.29     | ± 9.6 %                |
| 10104 | CAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)          | LTE-TDD   | 9.97     | ± 9.6 %                |
| 10105 | CAG | LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)          | LTE-TDD   | 10.01    | ± 9.6 %                |
| 10108 | CAG | LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)            | LTE-FDD   | 5.80     | ± 9.6 %                |

|       |     |                                             |          |       |         |
|-------|-----|---------------------------------------------|----------|-------|---------|
| 10220 | CAC | IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)  | WLAN     | 8.13  | ± 9.6 % |
| 10221 | CAC | IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)  | WLAN     | 8.27  | ± 9.6 % |
| 10222 | CAC | IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)      | WLAN     | 8.06  | ± 9.6 % |
| 10223 | CAC | IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)    | WLAN     | 8.48  | ± 9.6 % |
| 10224 | CAC | IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)   | WLAN     | 8.08  | ± 9.6 % |
| 10225 | CAB | UMTS-FDD (HSPA+)                            | WCDMA    | 5.97  | ± 9.6 % |
| 10226 | CAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)    | LTE-TDD  | 9.49  | ± 9.6 % |
| 10227 | CAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)    | LTE-TDD  | 10.26 | ± 9.6 % |
| 10228 | CAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)      | LTE-TDD  | 9.22  | ± 9.6 % |
| 10229 | CAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)      | LTE-TDD  | 9.48  | ± 9.6 % |
| 10230 | CAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)      | LTE-TDD  | 10.25 | ± 9.6 % |
| 10231 | CAD | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)        | LTE-TDD  | 9.19  | ± 9.6 % |
| 10232 | CAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)      | LTE-TDD  | 9.48  | ± 9.6 % |
| 10233 | CAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)      | LTE-TDD  | 10.25 | ± 9.6 % |
| 10234 | CAG | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)        | LTE-TDD  | 9.21  | ± 9.6 % |
| 10235 | CAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)     | LTE-TDD  | 9.48  | ± 9.6 % |
| 10236 | CAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)     | LTE-TDD  | 10.25 | ± 9.6 % |
| 10237 | CAG | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)       | LTE-TDD  | 9.21  | ± 9.6 % |
| 10238 | CAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)     | LTE-TDD  | 9.48  | ± 9.6 % |
| 10239 | CAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)     | LTE-TDD  | 10.25 | ± 9.6 % |
| 10240 | CAF | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)       | LTE-TDD  | 9.21  | ± 9.6 % |
| 10241 | CAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)  | LTE-TDD  | 9.82  | ± 9.6 % |
| 10242 | CAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)  | LTE-TDD  | 9.86  | ± 9.6 % |
| 10243 | CAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)    | LTE-TDD  | 9.46  | ± 9.6 % |
| 10244 | CAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)    | LTE-TDD  | 10.06 | ± 9.6 % |
| 10245 | CAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)    | LTE-TDD  | 10.06 | ± 9.6 % |
| 10246 | CAD | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)      | LTE-TDD  | 9.30  | ± 9.6 % |
| 10247 | CAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)    | LTE-TDD  | 9.91  | ± 9.6 % |
| 10248 | CAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)    | LTE-TDD  | 10.09 | ± 9.6 % |
| 10249 | CAG | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)      | LTE-TDD  | 9.29  | ± 9.6 % |
| 10250 | CAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)   | LTE-TDD  | 9.81  | ± 9.6 % |
| 10251 | CAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)   | LTE-TDD  | 10.17 | ± 9.6 % |
| 10252 | CAG | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)     | LTE-TDD  | 9.24  | ± 9.6 % |
| 10253 | CAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)   | LTE-TDD  | 9.90  | ± 9.6 % |
| 10254 | CAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)   | LTE-TDD  | 10.14 | ± 9.6 % |
| 10255 | CAF | LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)     | LTE-TDD  | 9.20  | ± 9.6 % |
| 10256 | CAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM) | LTE-TDD  | 9.96  | ± 9.6 % |
| 10257 | CAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM) | LTE-TDD  | 10.08 | ± 9.6 % |
| 10258 | CAB | LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)   | LTE-TDD  | 9.34  | ± 9.6 % |
| 10259 | CAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)   | LTE-TDD  | 9.98  | ± 9.6 % |
| 10260 | CAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)   | LTE-TDD  | 9.97  | ± 9.6 % |
| 10261 | CAD | LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)     | LTE-TDD  | 9.24  | ± 9.6 % |
| 10262 | CAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)   | LTE-TDD  | 9.83  | ± 9.6 % |
| 10263 | CAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)   | LTE-TDD  | 10.16 | ± 9.6 % |
| 10264 | CAG | LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)     | LTE-TDD  | 9.23  | ± 9.6 % |
| 10265 | CAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)  | LTE-TDD  | 9.92  | ± 9.6 % |
| 10266 | CAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)  | LTE-TDD  | 10.07 | ± 9.6 % |
| 10267 | CAG | LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)    | LTE-TDD  | 9.30  | ± 9.6 % |
| 10268 | CAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)  | LTE-TDD  | 10.06 | ± 9.6 % |
| 10269 | CAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)  | LTE-TDD  | 10.13 | ± 9.6 % |
| 10270 | CAF | LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)    | LTE-TDD  | 9.58  | ± 9.6 % |
| 10274 | CAB | UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)   | WCDMA    | 4.87  | ± 9.6 % |
| 10275 | CAB | UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)    | WCDMA    | 3.96  | ± 9.6 % |
| 10277 | CAA | PHS (QPSK)                                  | PHS      | 11.81 | ± 9.6 % |
| 10278 | CAA | PHS (QPSK, BW 884MHz, Rolloff 0.5)          | PHS      | 11.81 | ± 9.6 % |
| 10279 | CAA | PHS (QPSK, BW 884MHz, Rolloff 0.38)         | PHS      | 12.18 | ± 9.6 % |
| 10290 | AAB | CDMA2000, RC1, SO55, Full Rate              | CDMA2000 | 3.91  | ± 9.6 % |
| 10291 | AAB | CDMA2000, RC3, SO55, Full Rate              | CDMA2000 | 3.46  | ± 9.6 % |
| 10292 | AAB | CDMA2000, RC3, SO32, Full Rate              | CDMA2000 | 3.39  | ± 9.6 % |
| 10293 | AAB | CDMA2000, RC3, SO3, Full Rate               | CDMA2000 | 3.50  | ± 9.6 % |
| 10295 | AAB | CDMA2000, RC1, SO3, 1/8th Rate 25 fr.       | CDMA2000 | 12.49 | ± 9.6 % |
| 10297 | AAD | LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)     | LTE-FDD  | 5.81  | ± 9.6 % |
| 10298 | AAD | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)      | LTE-FDD  | 5.72  | ± 9.6 % |
| 10299 | AAD | LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)    | LTE-FDD  | 6.39  | ± 9.6 % |



|       |     |                                                                        |          |       |         |
|-------|-----|------------------------------------------------------------------------|----------|-------|---------|
| 10451 | AAA | W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)                        | WCDMA    | 7.59  | ± 9.6 % |
| 10453 | AAD | Validation (Square, 10ms, 1ms)                                         | Test     | 10.00 | ± 9.6 % |
| 10456 | AAB | IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)                   | WLAN     | 8.63  | ± 9.6 % |
| 10457 | AAA | UMTS-FDD (DC-HSDPA)                                                    | WCDMA    | 6.62  | ± 9.6 % |
| 10458 | AAA | CDMA2000 (1xEV-DO, Rev. B, 2 carriers)                                 | CDMA2000 | 6.55  | ± 9.6 % |
| 10459 | AAA | CDMA2000 (1xEV-DO, Rev. B, 3 carriers)                                 | CDMA2000 | 8.25  | ± 9.6 % |
| 10460 | AAA | UMTS-FDD (WCDMA, AMR)                                                  | WCDMA    | 2.39  | ± 9.6 % |
| 10461 | AAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)     | LTE-TDD  | 7.82  | ± 9.6 % |
| 10462 | AAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD  | 8.30  | ± 9.6 % |
| 10463 | AAB | LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD  | 8.56  | ± 9.6 % |
| 10464 | AAC | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)       | LTE-TDD  | 7.82  | ± 9.6 % |
| 10465 | AAC | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)     | LTE-TDD  | 8.32  | ± 9.6 % |
| 10466 | AAC | LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)     | LTE-TDD  | 8.57  | ± 9.6 % |
| 10467 | AAF | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)       | LTE-TDD  | 7.82  | ± 9.6 % |
| 10468 | AAF | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)     | LTE-TDD  | 8.32  | ± 9.6 % |
| 10469 | AAF | LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)     | LTE-TDD  | 8.56  | ± 9.6 % |
| 10470 | AAF | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)      | LTE-TDD  | 7.82  | ± 9.6 % |
| 10471 | AAF | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)    | LTE-TDD  | 8.32  | ± 9.6 % |
| 10472 | AAF | LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)    | LTE-TDD  | 8.57  | ± 9.6 % |
| 10473 | AAE | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)      | LTE-TDD  | 7.82  | ± 9.6 % |
| 10474 | AAE | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)    | LTE-TDD  | 8.32  | ± 9.6 % |
| 10475 | AAE | LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)    | LTE-TDD  | 8.57  | ± 9.6 % |
| 10477 | AAF | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)    | LTE-TDD  | 8.32  | ± 9.6 % |
| 10478 | AAF | LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)    | LTE-TDD  | 8.57  | ± 9.6 % |
| 10479 | AAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD  | 7.74  | ± 9.6 % |
| 10480 | AAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9) | LTE-TDD  | 8.18  | ± 9.6 % |
| 10481 | AAB | LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9) | LTE-TDD  | 8.45  | ± 9.6 % |
| 10482 | AAC | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)     | LTE-TDD  | 7.71  | ± 9.6 % |
| 10483 | AAC | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD  | 8.39  | ± 9.6 % |
| 10484 | AAC | LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD  | 8.47  | ± 9.6 % |
| 10485 | AAF | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)     | LTE-TDD  | 7.59  | ± 9.6 % |
| 10486 | AAF | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD  | 8.38  | ± 9.6 % |
| 10487 | AAF | LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)   | LTE-TDD  | 8.60  | ± 9.6 % |
| 10488 | AAF | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL<br>Subframe=2,3,4,7,8,9)    | LTE-TDD  | 7.70  | ± 9.6 % |
| 10489 | AAF | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL<br>Subframe=2,3,4,7,8,9)  | LTE-TDD  | 8.31  | ± 9.6 % |
| 10490 | AAF | LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL<br>Subframe=2,3,4,7,8,9)  | LTE-TDD  | 8.54  | ± 9.6 % |

|       |     |                                                                 |      |      |         |
|-------|-----|-----------------------------------------------------------------|------|------|---------|
| 10534 | AAB | IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)               | WLAN | 8.45 | ± 9.6 % |
| 10535 | AAB | IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)               | WLAN | 8.45 | ± 9.6 % |
| 10536 | AAB | IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)               | WLAN | 8.32 | ± 9.6 % |
| 10537 | AAB | IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)               | WLAN | 8.44 | ± 9.6 % |
| 10538 | AAB | IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)               | WLAN | 8.54 | ± 9.6 % |
| 10540 | AAB | IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)               | WLAN | 8.39 | ± 9.6 % |
| 10541 | AAB | IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)               | WLAN | 8.46 | ± 9.6 % |
| 10542 | AAB | IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)               | WLAN | 8.65 | ± 9.6 % |
| 10543 | AAB | IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)               | WLAN | 8.65 | ± 9.6 % |
| 10544 | AAB | IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)               | WLAN | 8.47 | ± 9.6 % |
| 10545 | AAB | IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)               | WLAN | 8.55 | ± 9.6 % |
| 10546 | AAB | IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)               | WLAN | 8.35 | ± 9.6 % |
| 10547 | AAB | IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)               | WLAN | 8.49 | ± 9.6 % |
| 10548 | AAB | IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)               | WLAN | 8.37 | ± 9.6 % |
| 10550 | AAB | IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)               | WLAN | 8.38 | ± 9.6 % |
| 10551 | AAB | IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)               | WLAN | 8.50 | ± 9.6 % |
| 10552 | AAB | IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)               | WLAN | 8.42 | ± 9.6 % |
| 10553 | AAB | IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)               | WLAN | 8.45 | ± 9.6 % |
| 10554 | AAC | IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)              | WLAN | 8.48 | ± 9.6 % |
| 10555 | AAC | IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)              | WLAN | 8.47 | ± 9.6 % |
| 10556 | AAC | IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)              | WLAN | 8.50 | ± 9.6 % |
| 10557 | AAC | IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)              | WLAN | 8.52 | ± 9.6 % |
| 10558 | AAC | IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)              | WLAN | 8.61 | ± 9.6 % |
| 10560 | AAC | IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)              | WLAN | 8.73 | ± 9.6 % |
| 10561 | AAC | IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)              | WLAN | 8.56 | ± 9.6 % |
| 10562 | AAC | IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)              | WLAN | 8.69 | ± 9.6 % |
| 10563 | AAC | IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)              | WLAN | 8.77 | ± 9.6 % |
| 10564 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)  | WLAN | 8.25 | ± 9.6 % |
| 10565 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle) | WLAN | 8.45 | ± 9.6 % |
| 10566 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle) | WLAN | 8.13 | ± 9.6 % |
| 10567 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle) | WLAN | 8.00 | ± 9.6 % |
| 10568 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle) | WLAN | 8.37 | ± 9.6 % |
| 10569 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle) | WLAN | 8.10 | ± 9.6 % |
| 10570 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle) | WLAN | 8.30 | ± 9.6 % |
| 10571 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)       | WLAN | 1.99 | ± 9.6 % |
| 10572 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)       | WLAN | 1.99 | ± 9.6 % |
| 10573 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)     | WLAN | 1.98 | ± 9.6 % |
| 10574 | AAA | IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)      | WLAN | 1.98 | ± 9.6 % |
| 10575 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)  | WLAN | 8.59 | ± 9.6 % |
| 10576 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)  | WLAN | 8.60 | ± 9.6 % |
| 10577 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle) | WLAN | 8.70 | ± 9.6 % |
| 10578 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle) | WLAN | 8.49 | ± 9.6 % |
| 10579 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle) | WLAN | 8.36 | ± 9.6 % |
| 10580 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle) | WLAN | 8.76 | ± 9.6 % |
| 10581 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle) | WLAN | 8.35 | ± 9.6 % |
| 10582 | AAA | IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle) | WLAN | 8.67 | ± 9.6 % |
| 10583 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)       | WLAN | 8.59 | ± 9.6 % |
| 10584 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)       | WLAN | 8.60 | ± 9.6 % |
| 10585 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)      | WLAN | 8.70 | ± 9.6 % |
| 10586 | AAB | IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)      | WLAN | 8.49 | ± 9.6 % |



|       |     |                                                 |           |       |         |
|-------|-----|-------------------------------------------------|-----------|-------|---------|
| 10654 | AAD | LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%) | LTE-TDD   | 6.96  | ± 9.6 % |
| 10655 | AAE | LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%) | LTE-TDD   | 7.21  | ± 9.6 % |
| 10658 | AAA | Pulse Waveform (200Hz, 10%)                     | Test      | 10.00 | ± 9.6 % |
| 10659 | AAA | Pulse Waveform (200Hz, 20%)                     | Test      | 6.99  | ± 9.6 % |
| 10660 | AAA | Pulse Waveform (200Hz, 40%)                     | Test      | 3.98  | ± 9.6 % |
| 10661 | AAA | Pulse Waveform (200Hz, 60%)                     | Test      | 2.22  | ± 9.6 % |
| 10662 | AAA | Pulse Waveform (200Hz, 80%)                     | Test      | 0.97  | ± 9.6 % |
| 10670 | AAA | Bluetooth Low Energy                            | Bluetooth | 2.19  | ± 9.6 % |
| 10671 | AAA | IEEE 802.11ax (20MHz, MCS0, 90pc duty cycle)    | WLAN      | 9.09  | ± 9.6 % |
| 10672 | AAA | IEEE 802.11ax (20MHz, MCS1, 90pc duty cycle)    | WLAN      | 8.57  | ± 9.6 % |
| 10673 | AAA | IEEE 802.11ax (20MHz, MCS2, 90pc duty cycle)    | WLAN      | 8.78  | ± 9.6 % |
| 10674 | AAA | IEEE 802.11ax (20MHz, MCS3, 90pc duty cycle)    | WLAN      | 8.74  | ± 9.6 % |
| 10675 | AAA | IEEE 802.11ax (20MHz, MCS4, 90pc duty cycle)    | WLAN      | 8.90  | ± 9.6 % |
| 10676 | AAA | IEEE 802.11ax (20MHz, MCS5, 90pc duty cycle)    | WLAN      | 8.77  | ± 9.6 % |
| 10677 | AAA | IEEE 802.11ax (20MHz, MCS6, 90pc duty cycle)    | WLAN      | 8.73  | ± 9.6 % |
| 10678 | AAA | IEEE 802.11ax (20MHz, MCS7, 90pc duty cycle)    | WLAN      | 8.78  | ± 9.6 % |
| 10679 | AAA | IEEE 802.11ax (20MHz, MCS8, 90pc duty cycle)    | WLAN      | 8.89  | ± 9.6 % |
| 10680 | AAA | IEEE 802.11ax (20MHz, MCS9, 90pc duty cycle)    | WLAN      | 8.80  | ± 9.6 % |
| 10681 | AAA | IEEE 802.11ax (20MHz, MCS10, 90pc duty cycle)   | WLAN      | 8.62  | ± 9.6 % |
| 10682 | AAA | IEEE 802.11ax (20MHz, MCS11, 90pc duty cycle)   | WLAN      | 8.83  | ± 9.6 % |
| 10683 | AAA | IEEE 802.11ax (20MHz, MCS0, 99pc duty cycle)    | WLAN      | 8.42  | ± 9.6 % |
| 10684 | AAA | IEEE 802.11ax (20MHz, MCS1, 99pc duty cycle)    | WLAN      | 8.26  | ± 9.6 % |
| 10685 | AAA | IEEE 802.11ax (20MHz, MCS2, 99pc duty cycle)    | WLAN      | 8.33  | ± 9.6 % |
| 10686 | AAA | IEEE 802.11ax (20MHz, MCS3, 99pc duty cycle)    | WLAN      | 8.28  | ± 9.6 % |
| 10687 | AAA | IEEE 802.11ax (20MHz, MCS4, 99pc duty cycle)    | WLAN      | 8.45  | ± 9.6 % |
| 10688 | AAA | IEEE 802.11ax (20MHz, MCS5, 99pc duty cycle)    | WLAN      | 8.29  | ± 9.6 % |
| 10689 | AAA | IEEE 802.11ax (20MHz, MCS6, 99pc duty cycle)    | WLAN      | 8.55  | ± 9.6 % |
| 10690 | AAA | IEEE 802.11ax (20MHz, MCS7, 99pc duty cycle)    | WLAN      | 8.29  | ± 9.6 % |
| 10691 | AAA | IEEE 802.11ax (20MHz, MCS8, 99pc duty cycle)    | WLAN      | 8.25  | ± 9.6 % |
| 10692 | AAA | IEEE 802.11ax (20MHz, MCS9, 99pc duty cycle)    | WLAN      | 8.29  | ± 9.6 % |
| 10693 | AAA | IEEE 802.11ax (20MHz, MCS10, 99pc duty cycle)   | WLAN      | 8.25  | ± 9.6 % |
| 10694 | AAA | IEEE 802.11ax (20MHz, MCS11, 99pc duty cycle)   | WLAN      | 8.57  | ± 9.6 % |
| 10695 | AAA | IEEE 802.11ax (40MHz, MCS0, 90pc duty cycle)    | WLAN      | 8.78  | ± 9.6 % |
| 10696 | AAA | IEEE 802.11ax (40MHz, MCS1, 90pc duty cycle)    | WLAN      | 8.91  | ± 9.6 % |
| 10697 | AAA | IEEE 802.11ax (40MHz, MCS2, 90pc duty cycle)    | WLAN      | 8.61  | ± 9.6 % |
| 10698 | AAA | IEEE 802.11ax (40MHz, MCS3, 90pc duty cycle)    | WLAN      | 8.89  | ± 9.6 % |
| 10699 | AAA | IEEE 802.11ax (40MHz, MCS4, 90pc duty cycle)    | WLAN      | 8.82  | ± 9.6 % |
| 10700 | AAA | IEEE 802.11ax (40MHz, MCS5, 90pc duty cycle)    | WLAN      | 8.73  | ± 9.6 % |
| 10701 | AAA | IEEE 802.11ax (40MHz, MCS6, 90pc duty cycle)    | WLAN      | 8.86  | ± 9.6 % |
| 10702 | AAA | IEEE 802.11ax (40MHz, MCS7, 90pc duty cycle)    | WLAN      | 8.70  | ± 9.6 % |
| 10703 | AAA | IEEE 802.11ax (40MHz, MCS8, 90pc duty cycle)    | WLAN      | 8.82  | ± 9.6 % |
| 10704 | AAA | IEEE 802.11ax (40MHz, MCS9, 90pc duty cycle)    | WLAN      | 8.56  | ± 9.6 % |
| 10705 | AAA | IEEE 802.11ax (40MHz, MCS10, 90pc duty cycle)   | WLAN      | 8.69  | ± 9.6 % |
| 10706 | AAA | IEEE 802.11ax (40MHz, MCS11, 90pc duty cycle)   | WLAN      | 8.66  | ± 9.6 % |
| 10707 | AAA | IEEE 802.11ax (40MHz, MCS0, 99pc duty cycle)    | WLAN      | 8.32  | ± 9.6 % |
| 10708 | AAA | IEEE 802.11ax (40MHz, MCS1, 99pc duty cycle)    | WLAN      | 8.55  | ± 9.6 % |
| 10709 | AAA | IEEE 802.11ax (40MHz, MCS2, 99pc duty cycle)    | WLAN      | 8.33  | ± 9.6 % |
| 10710 | AAA | IEEE 802.11ax (40MHz, MCS3, 99pc duty cycle)    | WLAN      | 8.29  | ± 9.6 % |
| 10711 | AAA | IEEE 802.11ax (40MHz, MCS4, 99pc duty cycle)    | WLAN      | 8.39  | ± 9.6 % |
| 10712 | AAA | IEEE 802.11ax (40MHz, MCS5, 99pc duty cycle)    | WLAN      | 8.67  | ± 9.6 % |
| 10713 | AAA | IEEE 802.11ax (40MHz, MCS6, 99pc duty cycle)    | WLAN      | 8.33  | ± 9.6 % |
| 10714 | AAA | IEEE 802.11ax (40MHz, MCS7, 99pc duty cycle)    | WLAN      | 8.26  | ± 9.6 % |
| 10715 | AAA | IEEE 802.11ax (40MHz, MCS8, 99pc duty cycle)    | WLAN      | 8.45  | ± 9.6 % |
| 10716 | AAA | IEEE 802.11ax (40MHz, MCS9, 99pc duty cycle)    | WLAN      | 8.30  | ± 9.6 % |
| 10717 | AAA | IEEE 802.11ax (40MHz, MCS10, 99pc duty cycle)   | WLAN      | 8.48  | ± 9.6 % |
| 10718 | AAA | IEEE 802.11ax (40MHz, MCS11, 99pc duty cycle)   | WLAN      | 8.24  | ± 9.6 % |
| 10719 | AAA | IEEE 802.11ax (80MHz, MCS0, 90pc duty cycle)    | WLAN      | 8.81  | ± 9.6 % |
| 10720 | AAA | IEEE 802.11ax (80MHz, MCS1, 90pc duty cycle)    | WLAN      | 8.87  | ± 9.6 % |
| 10721 | AAA | IEEE 802.11ax (80MHz, MCS2, 90pc duty cycle)    | WLAN      | 8.76  | ± 9.6 % |
| 10722 | AAA | IEEE 802.11ax (80MHz, MCS3, 90pc duty cycle)    | WLAN      | 8.55  | ± 9.6 % |
| 10723 | AAA | IEEE 802.11ax (80MHz, MCS4, 90pc duty cycle)    | WLAN      | 8.70  | ± 9.6 % |
| 10724 | AAA | IEEE 802.11ax (80MHz, MCS5, 90pc duty cycle)    | WLAN      | 8.90  | ± 9.6 % |
| 10725 | AAA | IEEE 802.11ax (80MHz, MCS6, 90pc duty cycle)    | WLAN      | 8.74  | ± 9.6 % |
| 10726 | AAA | IEEE 802.11ax (80MHz, MCS7, 90pc duty cycle)    | WLAN      | 8.72  | ± 9.6 % |

|       |     |                                                |               |      |         |
|-------|-----|------------------------------------------------|---------------|------|---------|
| 10782 | AAB | 5G NR (CP-OFDM, 50% RB, 50 MHz, QPSK, 15 kHz)  | 5G NR FR1 TDD | 8.43 | ± 9.6 % |
| 10783 | AAB | 5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 15 kHz)  | 5G NR FR1 TDD | 8.31 | ± 9.6 % |
| 10784 | AAB | 5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.29 | ± 9.6 % |
| 10785 | AAB | 5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.40 | ± 9.6 % |
| 10786 | AAB | 5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.35 | ± 9.6 % |
| 10787 | AAB | 5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.44 | ± 9.6 % |
| 10788 | AAB | 5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.39 | ± 9.6 % |
| 10789 | AAB | 5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.37 | ± 9.6 % |
| 10790 | AAB | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 15 kHz) | 5G NR FR1 TDD | 8.39 | ± 9.6 % |
| 10791 | AAB | 5G NR (CP-OFDM, 1 RB, 5 MHz, QPSK, 30 kHz)     | 5G NR FR1 TDD | 7.83 | ± 9.6 % |
| 10792 | AAB | 5G NR (CP-OFDM, 1 RB, 10 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.92 | ± 9.6 % |
| 10793 | AAB | 5G NR (CP-OFDM, 1 RB, 15 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.95 | ± 9.6 % |
| 10794 | AAB | 5G NR (CP-OFDM, 1 RB, 20 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.82 | ± 9.6 % |
| 10795 | AAB | 5G NR (CP-OFDM, 1 RB, 25 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.84 | ± 9.6 % |
| 10796 | AAB | 5G NR (CP-OFDM, 1 RB, 30 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.82 | ± 9.6 % |
| 10797 | AAB | 5G NR (CP-OFDM, 1 RB, 40 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 8.01 | ± 9.6 % |
| 10798 | AAB | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.89 | ± 9.6 % |
| 10799 | AAB | 5G NR (CP-OFDM, 1 RB, 60 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.93 | ± 9.6 % |
| 10801 | AAB | 5G NR (CP-OFDM, 1 RB, 80 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.89 | ± 9.6 % |
| 10802 | AAB | 5G NR (CP-OFDM, 1 RB, 90 MHz, QPSK, 30 kHz)    | 5G NR FR1 TDD | 7.87 | ± 9.6 % |
| 10803 | AAB | 5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 30 kHz)   | 5G NR FR1 TDD | 7.93 | ± 9.6 % |
| 10805 | AAB | 5G NR (CP-OFDM, 50% RB, 10 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10806 | AAB | 5G NR (CP-OFDM, 50% RB, 15 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.37 | ± 9.6 % |
| 10809 | AAB | 5G NR (CP-OFDM, 50% RB, 30 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10810 | AAB | 5G NR (CP-OFDM, 50% RB, 40 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10812 | AAB | 5G NR (CP-OFDM, 50% RB, 60 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.35 | ± 9.6 % |
| 10817 | AAB | 5G NR (CP-OFDM, 100% RB, 5 MHz, QPSK, 30 kHz)  | 5G NR FR1 TDD | 8.35 | ± 9.6 % |
| 10818 | AAB | 5G NR (CP-OFDM, 100% RB, 10 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.34 | ± 9.6 % |
| 10819 | AAB | 5G NR (CP-OFDM, 100% RB, 15 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.33 | ± 9.6 % |
| 10820 | AAB | 5G NR (CP-OFDM, 100% RB, 20 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.30 | ± 9.6 % |
| 10821 | AAB | 5G NR (CP-OFDM, 100% RB, 25 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.41 | ± 9.6 % |
| 10822 | AAB | 5G NR (CP-OFDM, 100% RB, 30 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.41 | ± 9.6 % |
| 10823 | AAB | 5G NR (CP-OFDM, 100% RB, 40 MHz, QPSK, 30 kHz) | 5G NR FR1 TDD | 8.36 | ± 9.6 % |



|       |     |                                                      |               |      |         |
|-------|-----|------------------------------------------------------|---------------|------|---------|
| 10870 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)  | 5G NR FR2 TDD | 5.86 | ± 9.6 % |
| 10871 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)    | 5G NR FR2 TDD | 5.75 | ± 9.6 % |
| 10872 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz) | 5G NR FR2 TDD | 6.52 | ± 9.6 % |
| 10873 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)    | 5G NR FR2 TDD | 6.61 | ± 9.6 % |
| 10874 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz) | 5G NR FR2 TDD | 6.65 | ± 9.6 % |
| 10875 | AAC | 5G NR (CP-OFDM, 1 RB, 100 MHz, QPSK, 120 kHz)        | 5G NR FR2 TDD | 7.78 | ± 9.6 % |
| 10876 | AAC | 5G NR (CP-OFDM, 100% RB, 100 MHz, QPSK, 120 kHz)     | 5G NR FR2 TDD | 8.39 | ± 9.6 % |
| 10877 | AAC | 5G NR (CP-OFDM, 1 RB, 100 MHz, 16QAM, 120 kHz)       | 5G NR FR2 TDD | 7.95 | ± 9.6 % |
| 10878 | AAC | 5G NR (CP-OFDM, 100% RB, 100 MHz, 16QAM, 120 kHz)    | 5G NR FR2 TDD | 8.41 | ± 9.6 % |
| 10879 | AAC | 5G NR (CP-OFDM, 1 RB, 100 MHz, 64QAM, 120 kHz)       | 5G NR FR2 TDD | 8.12 | ± 9.6 % |
| 10880 | AAC | 5G NR (CP-OFDM, 100% RB, 100 MHz, 64QAM, 120 kHz)    | 5G NR FR2 TDD | 8.38 | ± 9.6 % |
| 10881 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)      | 5G NR FR2 TDD | 5.75 | ± 9.6 % |
| 10882 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)   | 5G NR FR2 TDD | 5.96 | ± 9.6 % |
| 10883 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)     | 5G NR FR2 TDD | 6.57 | ± 9.6 % |
| 10884 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)  | 5G NR FR2 TDD | 6.53 | ± 9.6 % |
| 10885 | AAC | 5G NR (DFT-s-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)     | 5G NR FR2 TDD | 6.61 | ± 9.6 % |
| 10886 | AAC | 5G NR (DFT-s-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)  | 5G NR FR2 TDD | 6.65 | ± 9.6 % |
| 10887 | AAC | 5G NR (CP-OFDM, 1 RB, 50 MHz, QPSK, 120 kHz)         | 5G NR FR2 TDD | 7.78 | ± 9.6 % |
| 10888 | AAC | 5G NR (CP-OFDM, 100% RB, 50 MHz, QPSK, 120 kHz)      | 5G NR FR2 TDD | 8.35 | ± 9.6 % |
| 10889 | AAC | 5G NR (CP-OFDM, 1 RB, 50 MHz, 16QAM, 120 kHz)        | 5G NR FR2 TDD | 8.02 | ± 9.6 % |
| 10890 | AAC | 5G NR (CP-OFDM, 100% RB, 50 MHz, 16QAM, 120 kHz)     | 5G NR FR2 TDD | 8.40 | ± 9.6 % |
| 10891 | AAC | 5G NR (CP-OFDM, 1 RB, 50 MHz, 64QAM, 120 kHz)        | 5G NR FR2 TDD | 8.13 | ± 9.6 % |
| 10892 | AAC | 5G NR (CP-OFDM, 100% RB, 50 MHz, 64QAM, 120 kHz)     | 5G NR FR2 TDD | 8.41 | ± 9.6 % |

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.