

# CERTIFICATE OF CALIBRATION

ISSUED BY **UL VS LTD**

DATE OF ISSUE: 08/Jun/2018

CERTIFICATE NUMBER : 12134282JD01B



**5248**

UL VS LTD  
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**APPROVED SIGNATORY**

A handwritten signature in black ink, appearing to read 'N. Mirza'.

.....  
Naseer Mirza

## Customer :

UL VS Inc  
47173 Benicia Street  
Fremont, CA 94538, USA

## Equipment Details:

|                    |                                       |                  |             |
|--------------------|---------------------------------------|------------------|-------------|
| Description:       | Dipole Validation Kit                 | Date of Receipt: | 14/May/2018 |
| Manufacturer:      | Speag                                 |                  |             |
| Type/Model Number: | D835V2                                |                  |             |
| Serial Number:     | 4d117                                 |                  |             |
| Calibration Date:  | 16/May/2018                           |                  |             |
| Calibrated By:     | Chanthu Thevarajah<br>Senior Engineer |                  |             |

Signature:

A handwritten signature in black ink, appearing to be a stylized 'C' followed by 'T'.

.....

All Calibration have been conducted in the closed laboratory facility: Lab Temperature (22±3) °C and humidity < 70%

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The calibration methods and procedures used were as detailed in:

1. **IEC 62209-1:2016:** Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)
2. **IEC 62209-2:2010:** 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)
3. **IEEE 1528: 2013:** IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communication Devices: Measurement Techniques
4. FCC KDB Publication Number: **“KDB865664 D01 SAR Measurement 100 MHz to 6 GHz”**
5. **SPEAG DASY4/ DASY5 System Handbook**

The measuring equipment used to perform the calibration, documented in this certificate has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

| UL No.     | Instrument                   | Manufacturer         | Type No.      | Serial No. | Date Last Calibrated  | Cal. Interval (Months) |
|------------|------------------------------|----------------------|---------------|------------|-----------------------|------------------------|
| PRE0178316 | Data Acquisition Electronics | SPEAG                | DAE4          | 1542       | 06 Mar 2018           | 12                     |
| A2544      | Probe                        | SPEAG                | EX3DV4        | 3994       | 19 Mar 2018           | 12                     |
| A2545      | Probe                        | SPEAG                | EX3DV4        | 3995       | 24 Apr 2018           | 12                     |
| A2115      | Dipole                       | SPEAG                | D835V2        | 438        | 28 Apr 2018           | 12                     |
| PRE0151451 | Power Monitoring Kit         | Art-Fi               | ART 100850-01 | 0001       | Cal as part of System | 12                     |
| M1855      | Power Sensor                 | Rhode & Schwarz      | NRP-Z51       | 103246     | 08 Nov 2017           | 12                     |
| M1015      | Network Analyser             | Agilent Technologies | 8753ES        | US39172406 | 10 Oct 2017           | 12                     |
| PRE0151154 | Network Analyser             | Rhode & Schwarz      | ZND8          | 100151     | 14 Dec 2017           | 12                     |
| PRE0151877 | Calibration Kit              | Rhode & Schwarz      | Z135          | 102947     | 27 April 2018         | 12                     |
| M1838      | Signal Generator             | Rhode & Schwarz      | SME06         | 831377/005 | 22 Mar 2018           | 12                     |

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### SAR System Specification

|                          |                                            |
|--------------------------|--------------------------------------------|
| Robot System Positioner: | Stäubli Unimation Corp. Robot Model: TX60L |
| Robot Serial Number:     | F17/5ENYG1/C/01                            |
| DASY Version:            | DASY 52 (v52.8.8.1258)                     |
| Phantom:                 | Flat section of SAM Twin Phantom           |
| Distance Dipole Centre:  | 15 mm (with spacer)                        |
| Frequency:               | 835 MHz                                    |

### Dielectric Property Measurements – Head Simulating Liquid (HSL)

| Simulant Liquid | Frequency (MHz) | Room Temp |         | Liquid Temp |        | Parameters   | Target Value | Measured Value | Uncertainty (%) |
|-----------------|-----------------|-----------|---------|-------------|--------|--------------|--------------|----------------|-----------------|
|                 |                 | Start     | End     | Start       | End    |              |              |                |                 |
| Head            | 835             | 21.4 °C   | 21.0 °C | 20.9°C      | 21.0°C | $\epsilon_r$ | 41.50        | 39.89          | ± 5%            |
|                 |                 |           |         |             |        | $\sigma$     | 0.90         | 0.94           | ± 5%            |

### SAR Results – Head Simulating Liquid (HSL)

| Simulant Liquid | SAR Measured          | 250 mW input Power | Normalised to 1.00 W | Uncertainty (%) |
|-----------------|-----------------------|--------------------|----------------------|-----------------|
| Head            | SAR averaged over 1g  | 2.48 W/Kg          | <b>9.87 W/Kg</b>     | ± 17.57%        |
|                 | SAR averaged over 10g | 1.61 W/Kg          | <b>6.40 W/Kg</b>     | ± 17.32%        |

### Antenna Parameters – Head Simulating Liquid (HSL)

| Simulant Liquid | Parameter   | Measured Level                 | Uncertainty (%)                    |
|-----------------|-------------|--------------------------------|------------------------------------|
| Head            | Impedance   | 46.016 $\Omega$ .98 j $\Omega$ | ± 0.28 $\Omega$ ± 0.044 j $\Omega$ |
|                 | Return Loss | 27.61                          | ± 2.03 dB                          |

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### Dielectric Property Measurements – Body Simulating Liquid (MSL)

| Simulant Liquid | Frequency (MHz) | Room Temp |         | Liquid Temp |        | Parameters   | Target Value | Measured Value | Uncertainty (%) |
|-----------------|-----------------|-----------|---------|-------------|--------|--------------|--------------|----------------|-----------------|
|                 |                 | Start     | End     | Start       | End    |              |              |                |                 |
| Body            | 835             | 22.0 °C   | 21.0 °C | 21.2°C      | 21.0°C | $\epsilon_r$ | 55.20        | 55.65          | ± 5%            |
|                 |                 |           |         |             |        | $\sigma$     | 0.97         | 0.98           | ± 5%            |

### SAR Results – Body Simulating Liquid (MSL)

| Simulant Liquid | SAR Measured          | 250 mW input Power | Normalised to 1.00 W | Uncertainty (%) |
|-----------------|-----------------------|--------------------|----------------------|-----------------|
| Body            | SAR averaged over 1g  | 2.59 W/Kg          | <b>10.31 W/Kg</b>    | ± 18.06%        |
|                 | SAR averaged over 10g | 1.72 W/Kg          | <b>6.84 W/Kg</b>     | ± 17.44%        |

### Antenna Parameters – Body Simulating Liquid (MSL)

| Simulant Liquid | Parameter   | Measured Level                 | Uncertainty (%)                    |
|-----------------|-------------|--------------------------------|------------------------------------|
| Body            | Impedance   | 45.10 $\Omega$ 5.69 j $\Omega$ | ± 0.28 $\Omega$ ± 0.044 j $\Omega$ |
|                 | Return Loss | 23.07                          | ± 2.03 dB                          |

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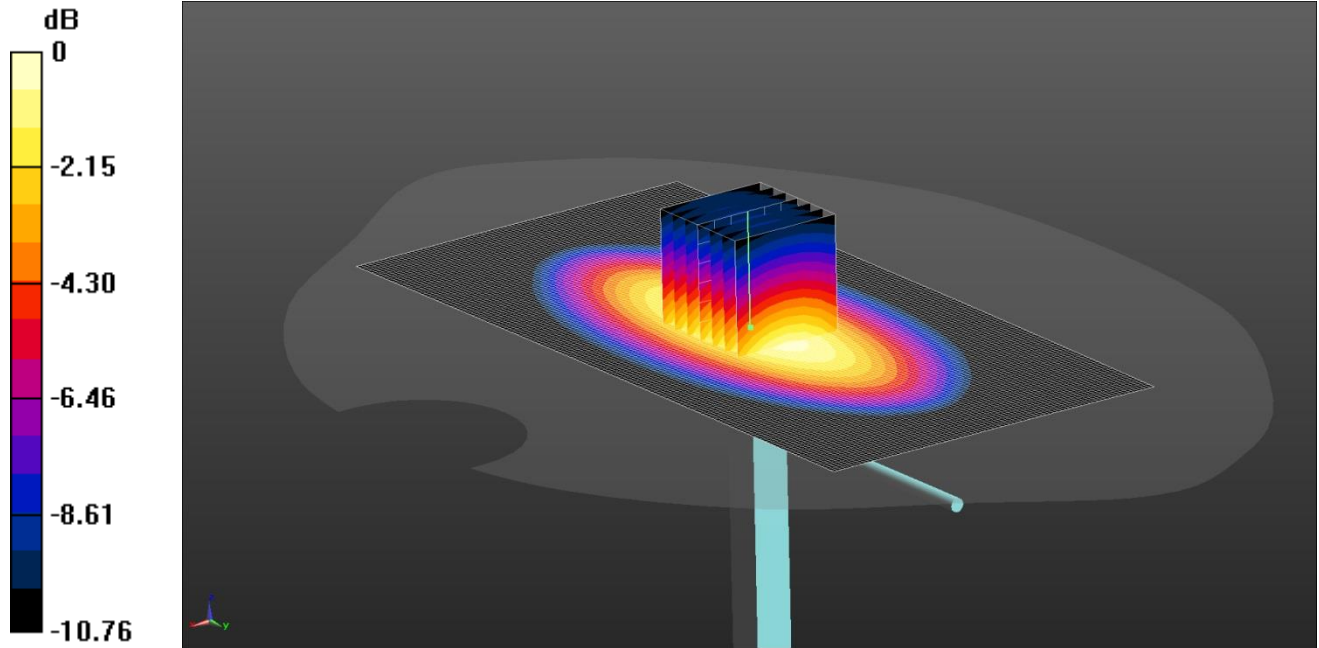
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### DASY Validation Scan for Head Stimulating Liquid (HSL)

DUT: D835V2 - SN4d117; Type: D835V2; Serial: SN4d117



0 dB = 2.92 W/kg = 4.65 dBW/kg

Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 750 835 900 MHz HSL Medium parameters used (interpolated):  $f = 835$  MHz;  $\sigma = 0.941$  S/m;  $\epsilon_r = 39.893$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3994; ConvF(10.05, 10.05, 10.05); Calibrated: 19/03/2018;

- Sensor-Surface: 3mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn1542; Calibrated: 06/03/2018

- Phantom: Twin-SAM V8.0 (20deg probe tilt); Type: QD 000 P41 Ax; Serial: xxxx

- ; SEMCAD X Version 14.6.10 (7417)

**Configuration/d=15mm, Pin=250mW/Area Scan (81x161x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 2.91 W/kg

**Configuration/d=15mm, Pin=250mW/Zoom Scan (5x5x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.09 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 3.76 W/kg

**SAR(1 g) = 2.48 W/kg; SAR(10 g) = 1.61 W/kg**

Maximum value of SAR (measured) = 2.92 W/kg

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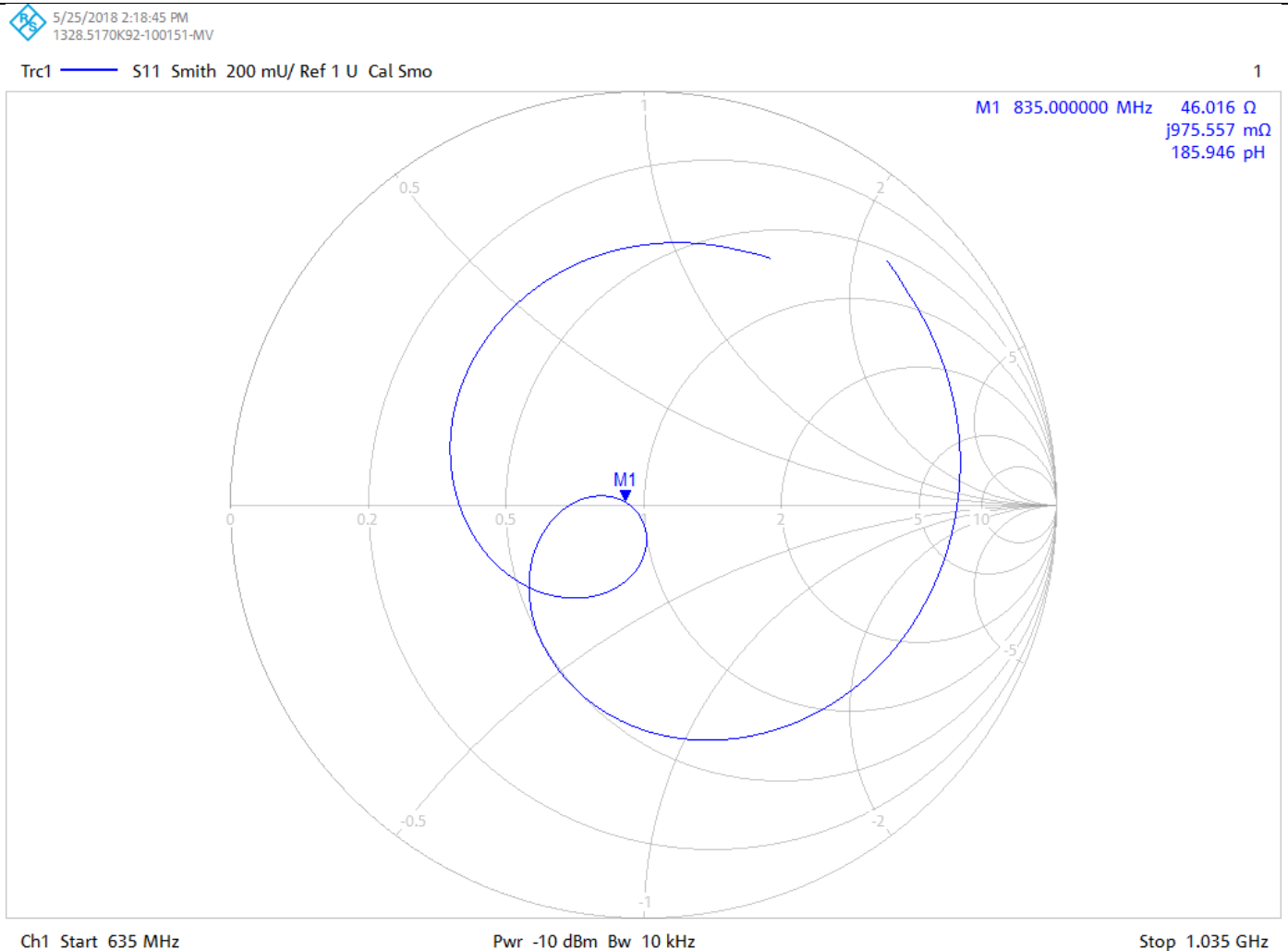
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### Impedance Measurement Plot for Head Stimulating Liquid (HSL)



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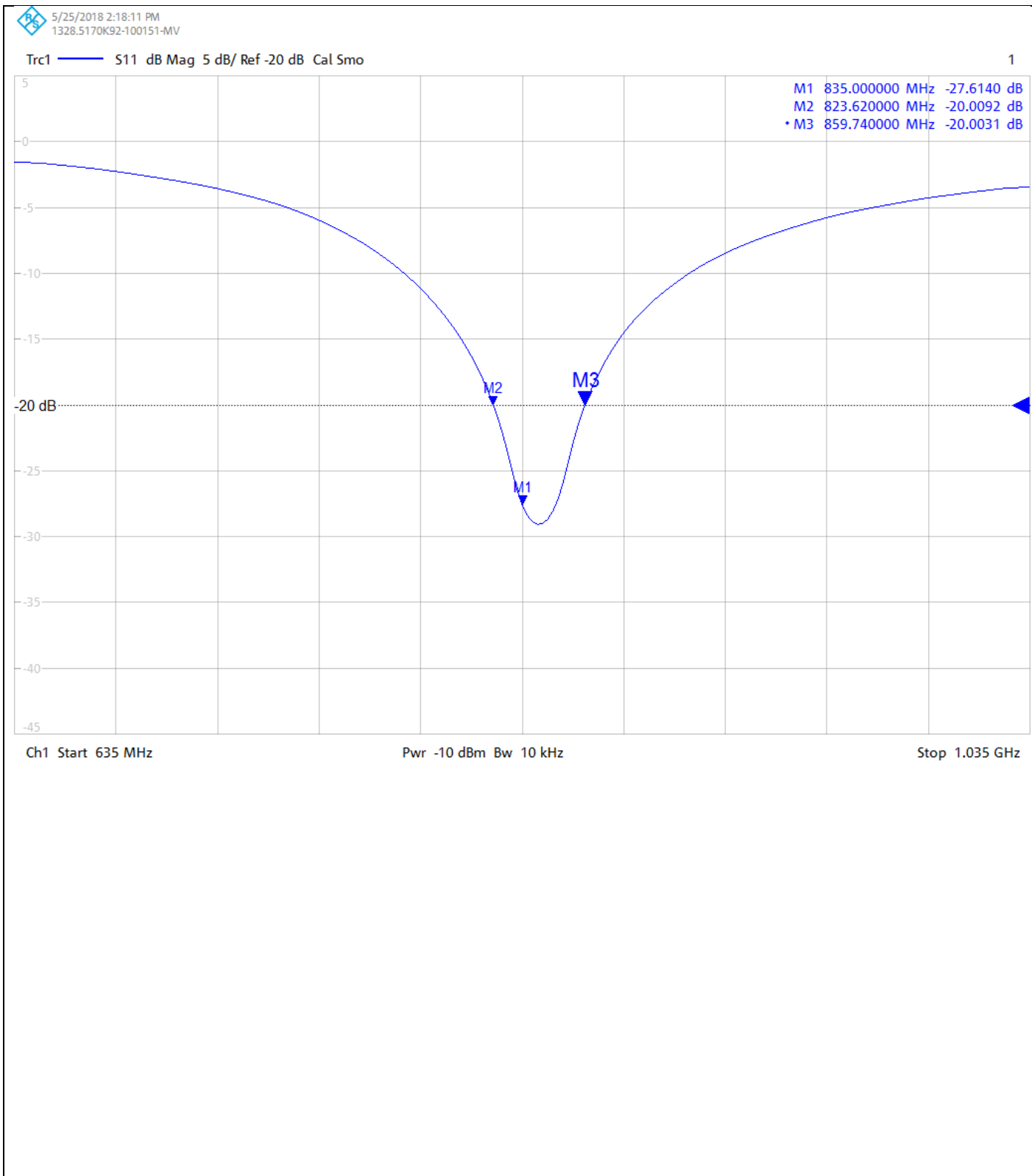
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### Return Loss Measurement Plot for Head Stimulating Liquid (HSL)



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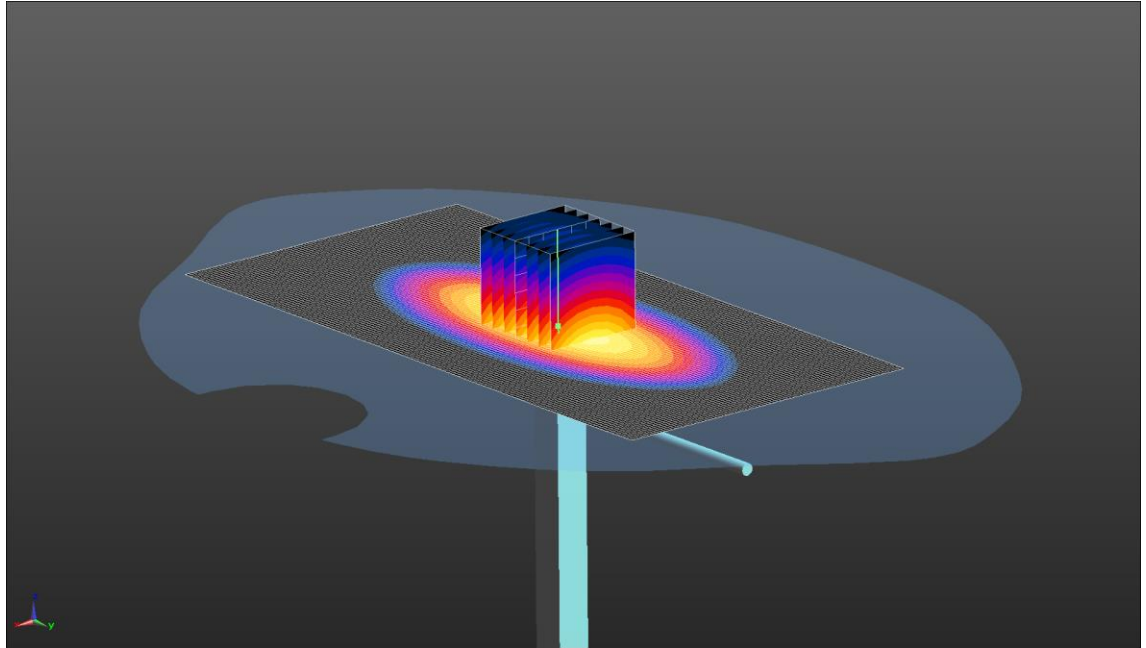
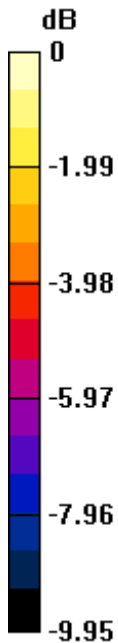
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### DASY Validation Scan for Body Stimulating Liquid (MSL)

DUT: D835V2 - SN4d117; Type: D835V2; Serial: SN4d117



0 dB = 3.27 W/kg = 5.15 dBW/kg

Communication System: UID 0, CW (0); Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 MHz MSL Medium parameters used (interpolated):  $f = 835 \text{ MHz}$ ;  $\sigma = 0.985 \text{ S/m}$ ;  $\epsilon_r = 55.65$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3995; ConvF(10.04, 10.04, 10.04); Calibrated: 24/04/2018;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1542; Calibrated: 06/03/2018
- Phantom: Twin SAM A (Site 65); Type: SAM 4.0; Serial: TP:1020
- ; SEMCAD X Version 14.6.10 (7417)

**Configuration/d=15mm, Pin=250mW/Area Scan (81x161x1):** Interpolated grid:  $dx=1.200 \text{ mm}$ ,  $dy=1.200 \text{ mm}$

Maximum value of SAR (interpolated) = 2.79 W/kg

**Configuration/d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 52.96 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.84 W/kg

**SAR(1 g) = 2.59 W/kg; SAR(10 g) = 1.72 W/kg**

Maximum value of SAR (measured) = 3.27 W/kg



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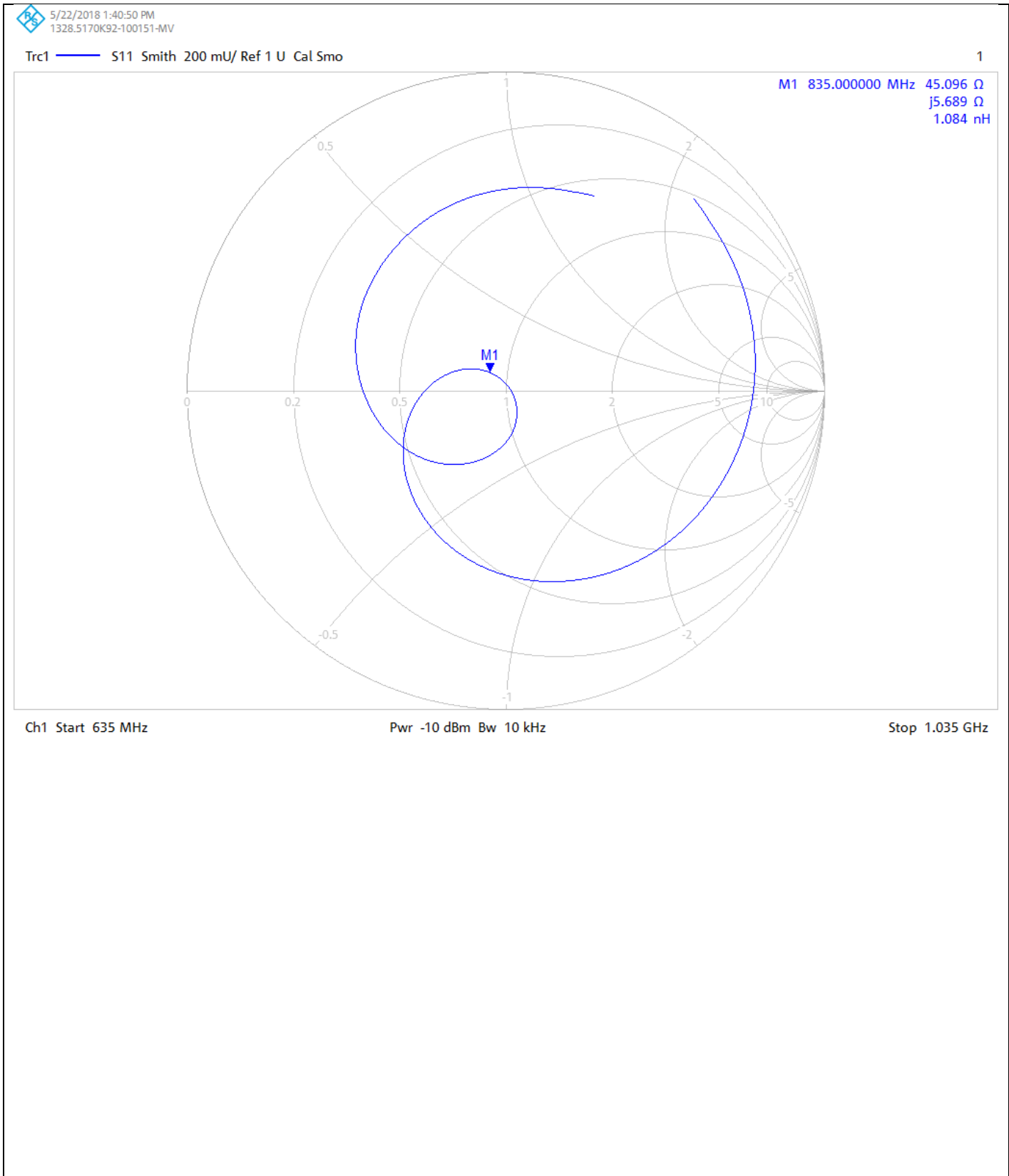
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### Impedance Measurement Plot for Body Stimulating Liquid (MSL)



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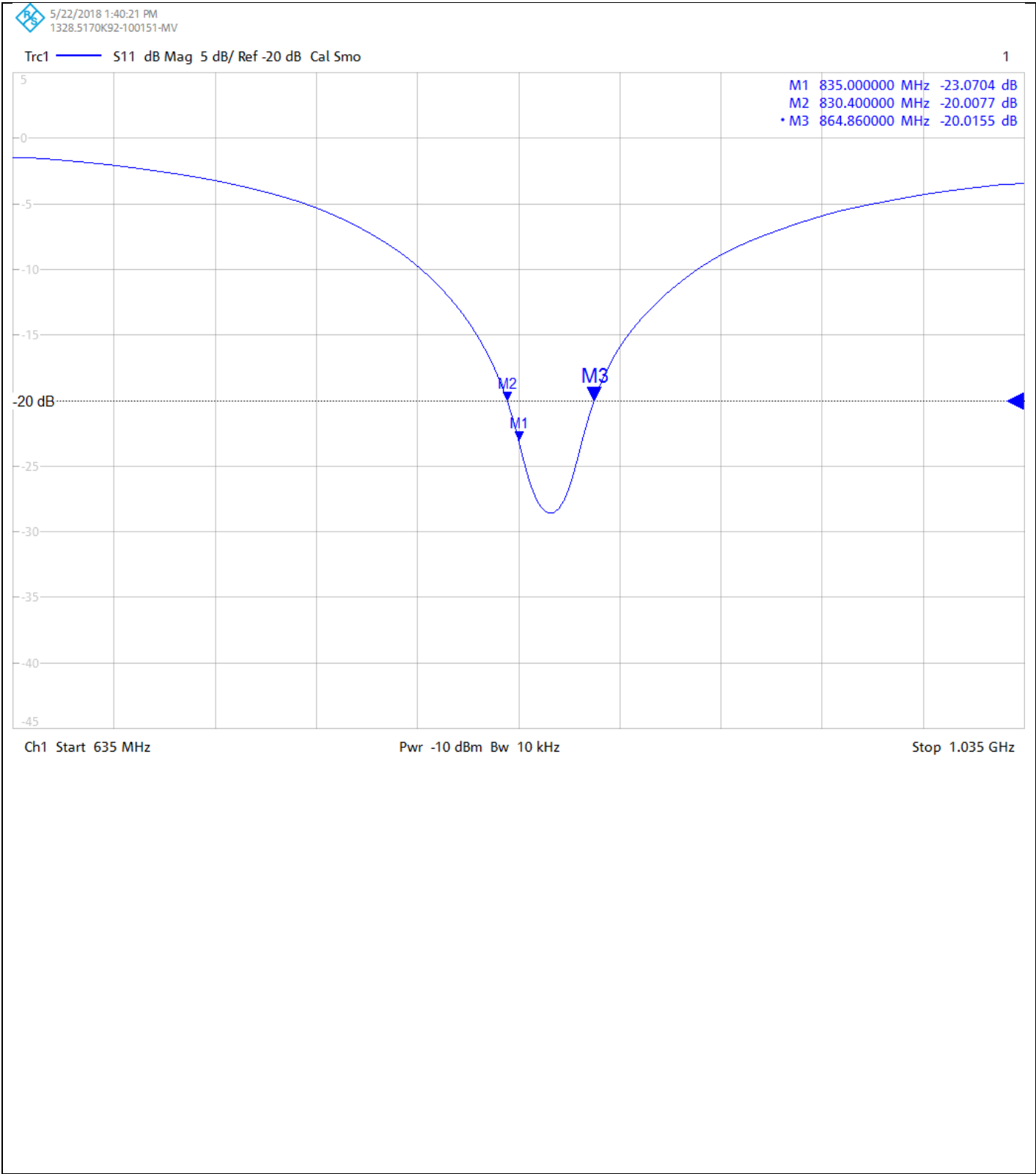
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### Return Loss Measurement Plot for Body Stimulating Liquid (MSL)



**Calibration Certificate Label:**

|                                                                                                                        |                                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>UKAS<br/>CALIBRATION<br/>5248</p> | <p><b>UL VS LTD - Tel: +44 (0) 1256312000</b></p> <p>Certificate Number: 12134282JD01B</p> <p>Instrument ID: 4d117</p> <p>Calibration Date: 08/Jun/2018</p> <p>Calibration Due Date:</p> |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                        |                                                                                                                                                                                          |
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|  <p>UKAS<br/>CALIBRATION<br/>5248</p> | <p><b>UL VS LTD - Tel: +44 (0) 1256312000</b></p> <p>Certificate Number: 12134282JD01B</p> <p>Instrument ID: 4d117</p> <p>Calibration Date: 08/Jun/2018</p> <p>Calibration Due Date:</p> |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                                          |                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p>UKAS<br/>CALIBRATION<br/>5248</p> | <p><b>UL VS LTD - Tel: +44 (0) 1256312000</b></p> <p>Certificate Number: 12134282JD01B</p> <p>Instrument ID: 4d117</p> <p>Calibration Date: 08/Jun/2018</p> <p>Calibration Due Date:</p> |
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# CERTIFICATE OF CALIBRATION

ISSUED BY **UL VS LTD**

DATE OF ISSUE: 10/Oct/2017

CERTIFICATE NUMBER : 11903941JD01D



5248

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**APPROVED SIGNATORY**

Naseer Mirza

**Customer :**

UL VS Ltd  
Pavilion A, Ashwood Park, Ashwood Way  
Basingstoke, RG23 8BG, England

**Equipment Details:**

|                    |                                           |                  |             |
|--------------------|-------------------------------------------|------------------|-------------|
| Description:       | Dipole Validation Kit                     | Date of Receipt: | 29/Sep/2017 |
| Manufacturer:      | Speag                                     |                  |             |
| Type/Model Number: | D1900V2                                   |                  |             |
| Serial Number:     | 5d163                                     |                  |             |
| Calibration Date:  | 05/Oct/2017                               |                  |             |
| Calibrated By:     | Chanthu Thevarajah<br>Laboratory Engineer |                  |             |

Signature:

All Calibration have been conducted in the closed laboratory facility: Lab Temperature (22±3) °C and humidity < 70%

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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The calibration methods and procedures used were as detailed in:

1. **IEC 62209-1:2005**: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)
2. **IEC 62209-2:2010**: 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)
3. **IEEE 1528: 2013**: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communication Devices: Measurement Techniques
4. FCC KDB Publication Number: "KDB865664 D01 SAR Measurement 100 MHz to 6 GHz"
5. **SPEAG DASY4/ DASY5 System Handbook**

The measuring equipment used to perform the calibration, documented in this certificate has been calibrated in accordance with the manufacturers' recommendations, and is traceable to recognized national standards.

| UL No.     | Instrument                   | Manufacturer         | Type No.      | Serial No.  | Date Last Calibrated  | Cal. Interval (Months) |
|------------|------------------------------|----------------------|---------------|-------------|-----------------------|------------------------|
| A2546      | Data Acquisition Electronics | SPEAG                | DAE4          | 1435        | 10 Feb 2017           | 12                     |
| A2587      | Probe                        | SPEAG                | ES3DV3        | 3341        | 14 Aug 2017           | 12                     |
| A2200      | Dipole                       | SPEAG                | D1900V2       | 537         | 09 Feb 2017           | 12                     |
| PRE0151451 | Power Monitoring Kit         | Art-Fi               | ART 100850-01 | 0001        | Cal as part of System | 12                     |
| PRE0151441 | Power Sensor                 | Rhode & Schwarz      | NRP8S         | 102481      | 16 Nov 2016           | 12                     |
| M1015      | Network Analyser             | Agilent Technologies | 8753ES        | US39172406  | 26 Sept 2016          | 12                     |
| PRE0151154 | Network Analyser             | Rhode & Schwarz      | ZND8          | 100151      | 22 Nov 2016           | 12                     |
| PRE0151877 | Calibration Kit              | Rhode & Schwarz      | Z135          | 102947-Bt   | 02 Dec 2016           | 12                     |
| M1908      | Signal Generator             | Rhode & Schwarz      | SMIQ 03B      | 1125.555.03 | 08 Nov 2016           | 12                     |

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### SAR System Specification

|                          |                                            |
|--------------------------|--------------------------------------------|
| Robot System Positioner: | Stäubli Unimation Corp. Robot Model: TX60L |
| Robot Serial Number:     | F14/5T5ZA1/A/01                            |
| DASY Version:            | DASY 52 (v52.8.8.1258)                     |
| Phantom:                 | Flat section of SAM Twin Phantom           |
| Distance Dipole Centre:  | 10 mm (with spacer)                        |
| Frequency:               | 1900 MHz                                   |

### Dielectric Property Measurements – Head Simulating Liquid (HSL)

| Simulant Liquid | Frequency (MHz) | Room Temp |         | Liquid Temp |         | Parameters   | Target Value | Measured Value | Uncertainty (%) |
|-----------------|-----------------|-----------|---------|-------------|---------|--------------|--------------|----------------|-----------------|
|                 |                 | Start     | End     | Start       | End     |              |              |                |                 |
| Head            | 1900            | 23.0 °C   | 22.0 °C | 21.0 °C     | 22.0 °C | $\epsilon_r$ | 40.00        | 39.71          | ± 5%            |
|                 |                 |           |         |             |         | $\sigma$     | 1.40         | 1.36           | ± 5%            |

### SAR Results – Head Simulating Liquid (HSL)

| Simulant Liquid | SAR Measured          | 250 mW input Power | Normalised to 1.00 W | Uncertainty (%) |
|-----------------|-----------------------|--------------------|----------------------|-----------------|
| Head            | SAR averaged over 1g  | 9.74 W/Kg          | 38.77 W/Kg           | ± 17.57%        |
|                 | SAR averaged over 10g | 5.05 W/Kg          | 20.10 W/Kg           | ± 17.32%        |

### Antenna Parameters – Head Simulating Liquid (HSL)

| Simulant Liquid | Parameter   | Measured Level                   | Uncertainty (%)                    |
|-----------------|-------------|----------------------------------|------------------------------------|
| Head            | Impedance   | 50.143 $\Omega$ -3.33 j $\Omega$ | ± 0.28 $\Omega$ ± 0.044 j $\Omega$ |
|                 | Return Loss | 29.77                            | ± 2.03 dB                          |

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### Dielectric Property Measurements – Body Simulating Liquid (MSL)

| Simulant Liquid | Frequency (MHz) | Room Temp |         | Liquid Temp |        | Parameters   | Target Value | Measured Value | Uncertainty (%) |
|-----------------|-----------------|-----------|---------|-------------|--------|--------------|--------------|----------------|-----------------|
|                 |                 | Start     | End     | Start       | End    |              |              |                |                 |
| Body            | 1900            | 22.0 °C   | 22.0 °C | 22.0°C      | 22.0°C | $\epsilon_r$ | 53.30        | 52.22          | ± 5%            |
|                 |                 |           |         |             |        | $\sigma$     | 1.52         | 1.57           | ± 5%            |

### SAR Results – Body Simulating Liquid (MSL)

| Simulant Liquid | SAR Measured          | 250 mW input Power | Normalised to 1.00 W | Uncertainty (%) |
|-----------------|-----------------------|--------------------|----------------------|-----------------|
| Body            | SAR averaged over 1g  | 10.80 W/Kg         | 42.99 W/Kg           | ± 18.06%        |
|                 | SAR averaged over 10g | 5.52 W/Kg          | 21.97 W/Kg           | ± 17.44%        |

### Antenna Parameters – Body Simulating Liquid (MSL)

| Simulant Liquid | Parameter   | Measured Level                  | Uncertainty (%)                    |
|-----------------|-------------|---------------------------------|------------------------------------|
| Body            | Impedance   | 52.90 $\Omega$ -5.74 j $\Omega$ | ± 0.28 $\Omega$ ± 0.044 j $\Omega$ |
|                 | Return Loss | 24.03                           | ± 2.03 dB                          |



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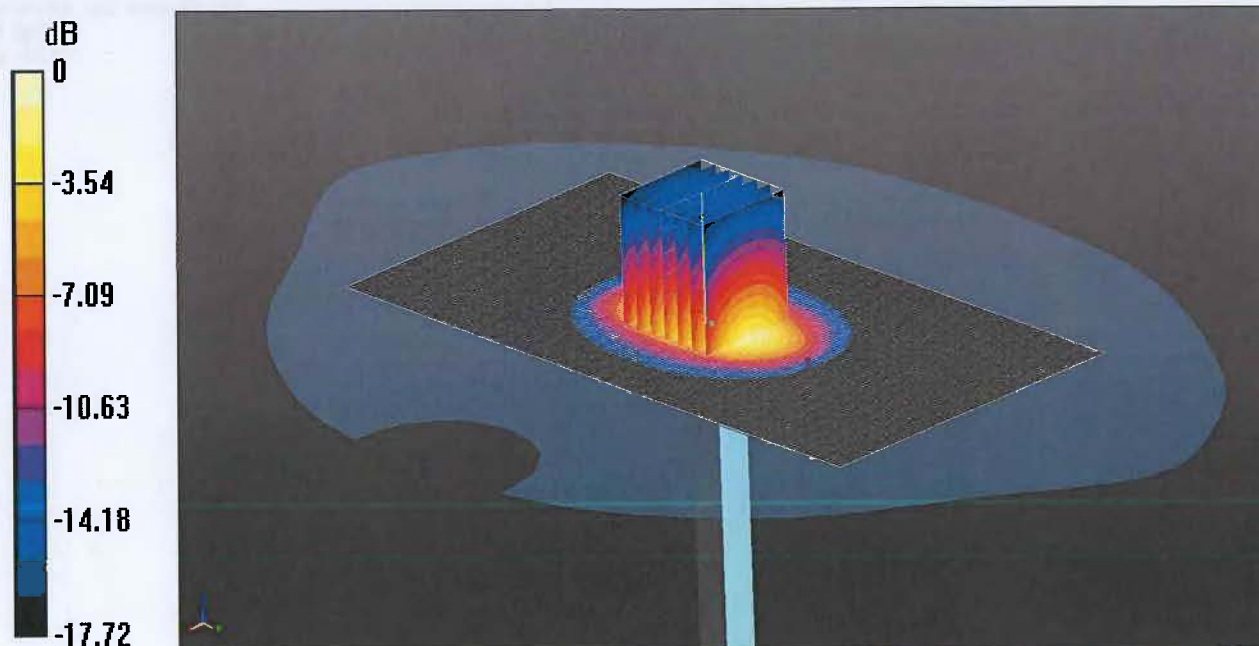
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### DASY Validation Scan for Head Stimulating Liquid (HSL)

DUT: D1900V2 - SN5d163; Type: D1900V2; Serial: SN5d163



Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 MHz HSL Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.36$  S/m;  $\epsilon_r = 39.711$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3341; ConvF(5.28, 5.28, 5.28); Calibrated: 14/08/2017;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1435; Calibrated: 10/02/2017
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:xxxx
- ; SEMCAD X Version 14.6.10 (7372)

**Configuration/d=10mm, Pin=250mW 2/Area Scan (81x151x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 12.7 W/kg

**Configuration/d=10mm, Pin=250mW 2/Zoom Scan (5x5x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.37 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 17.9 W/kg

**SAR(1 g) = 9.74 W/kg; SAR(10 g) = 5.05 W/kg**

Maximum value of SAR (measured) = 12.3 W/kg



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### Impedance Measurement Plot for Head Stimulating Liquid (HSL)



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### Return Loss Measurement Plot for Head Stimulating Liquid (HSL)

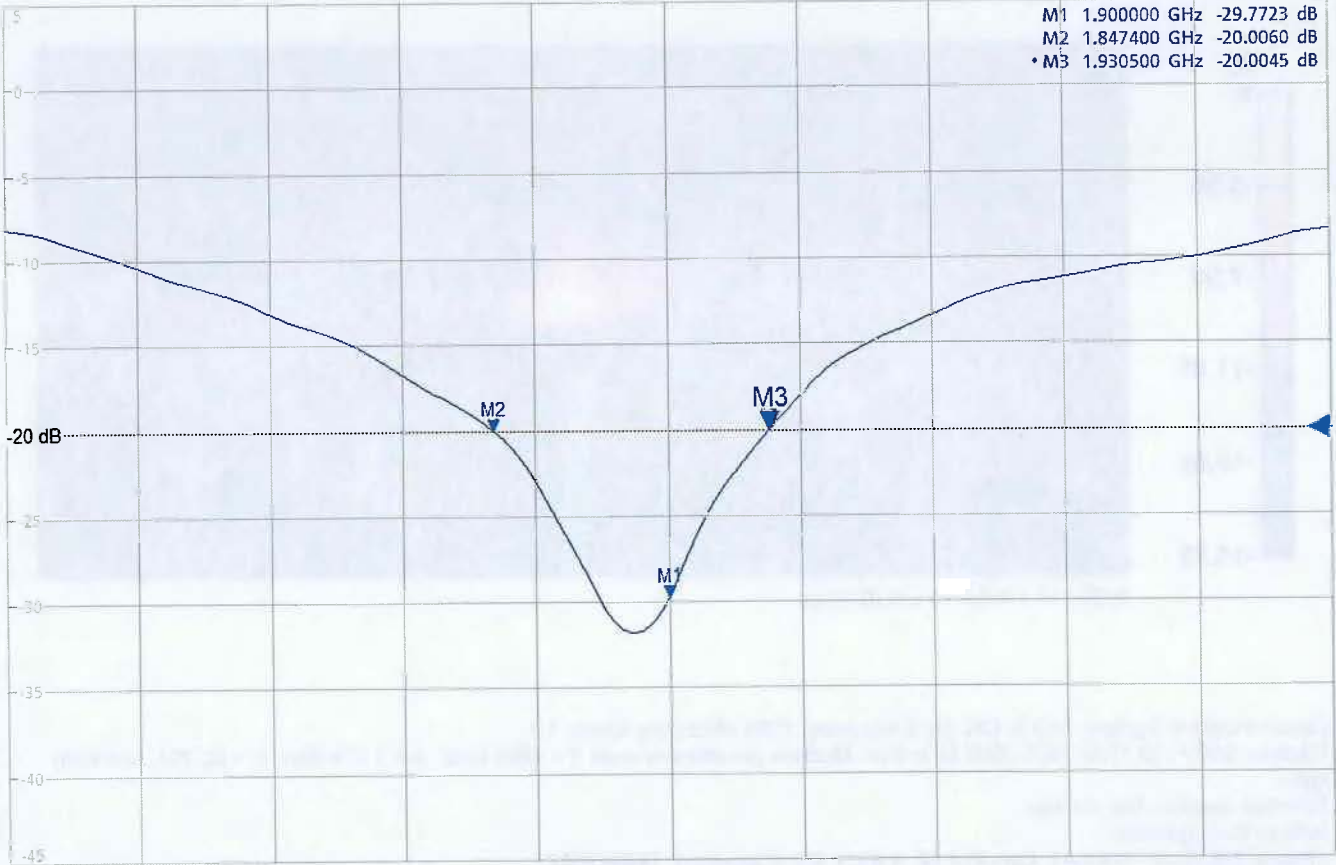


10/10/2017 12:59:05 PM  
1328.5170K92-100151-MV

Trc1 — 511 dB Mag 5 dB/ Ref -20 dB Cal Smo

1

|    |              |             |
|----|--------------|-------------|
| M1 | 1.900000 GHz | -29.7723 dB |
| M2 | 1.847400 GHz | -20.0060 dB |
| M3 | 1.930500 GHz | -20.0045 dB |



# CERTIFICATE OF CALIBRATION

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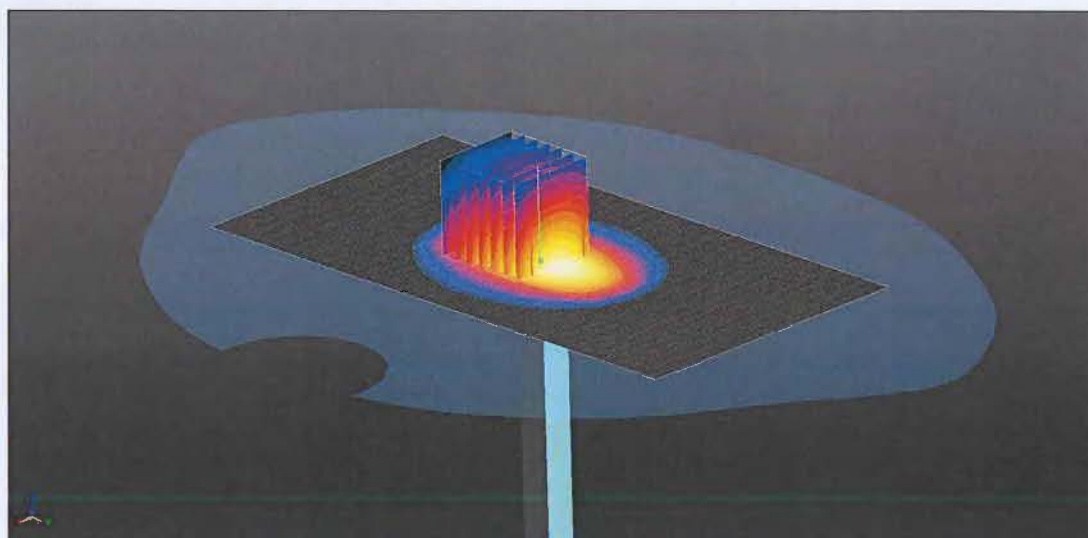
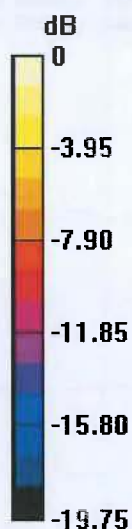
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11903941JD01D

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### DASY Validation Scan for Body Stimulating Liquid (MSL)

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN5d163



0 dB = 13.5 W/kg = 11.30 dBW/kg

Communication System: UID 0, CW (0); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 900,1750,1800,1900,2600 MHz MSL Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.576$  S/m;  $\epsilon_r = 52.221$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3341; ConvF(4.92, 4.92, 4.92); Calibrated: 14/08/2017;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1435; Calibrated: 10/02/2017
- Phantom: SAM (30deg probe tilt) with CRP v5.0; Type: QD000P40CD; Serial: TP:xxxx
- ; SEMCAD X Version 14.6.10 (7372)

**SAR/d=10mm, Pin=250mW 2/Area Scan (81x151x1):** Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 14.3 W/kg

**SAR/d=10mm, Pin=250mW 2/Zoom Scan (5x5x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.36 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 19.5 W/kg

**SAR(1 g) = 10.8 W/kg; SAR(10 g) = 5.52 W/kg**

Maximum value of SAR (measured) = 13.5 W/kg

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### Impedance Measurement Plot for Body Stimulating Liquid (MSL)

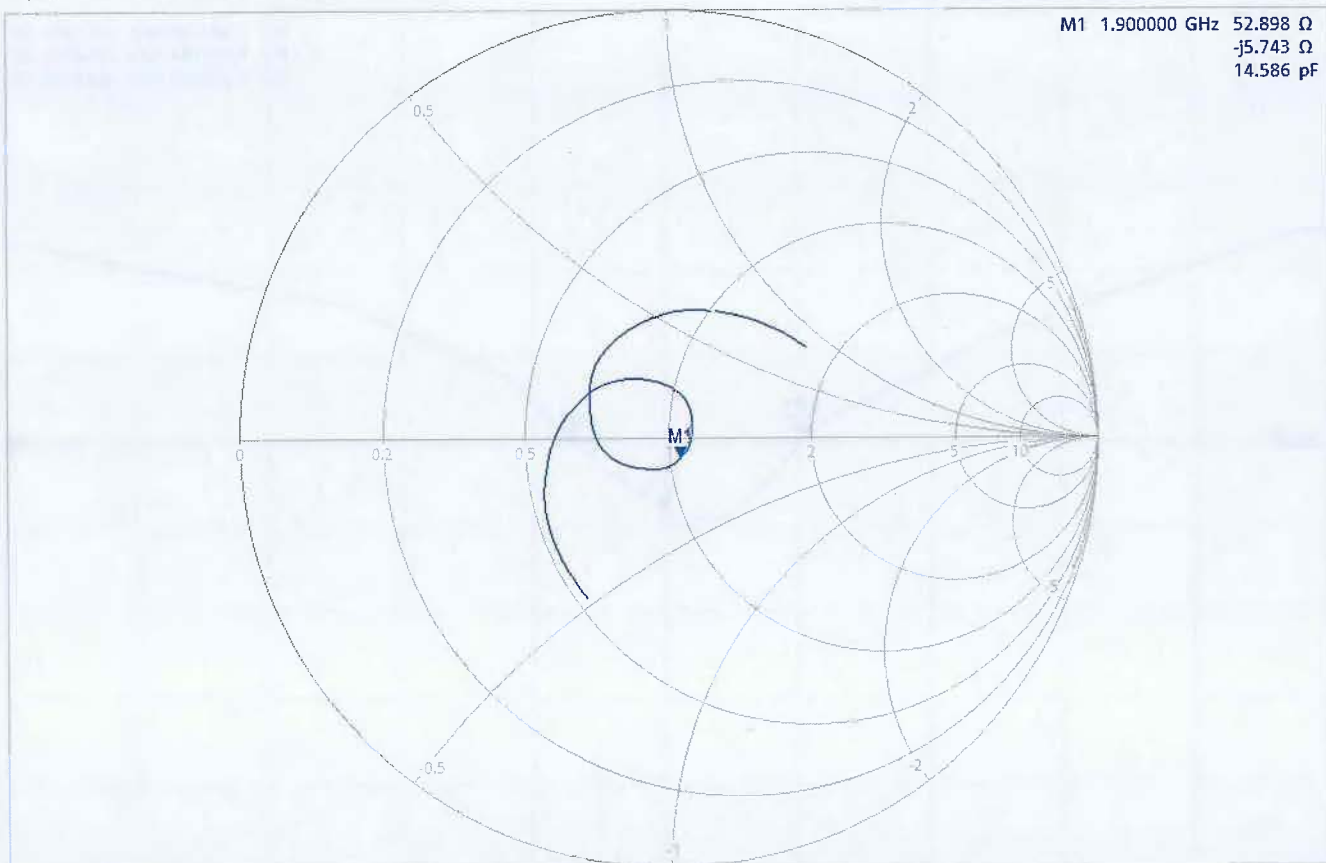


10/9/2017 2:01:07 PM  
1326.5170K92-100151-MV

Trc1 — S11 Smith 200 mU/ Ref 1 U Cal Smo

1

M1 1.900000 GHz 52.898  $\Omega$   
-j5.743  $\Omega$   
14.586 pF



Ch1 Start 1.7 GHz

Pwr -10 dBm Bw 10 kHz

Stop 2.1 GHz



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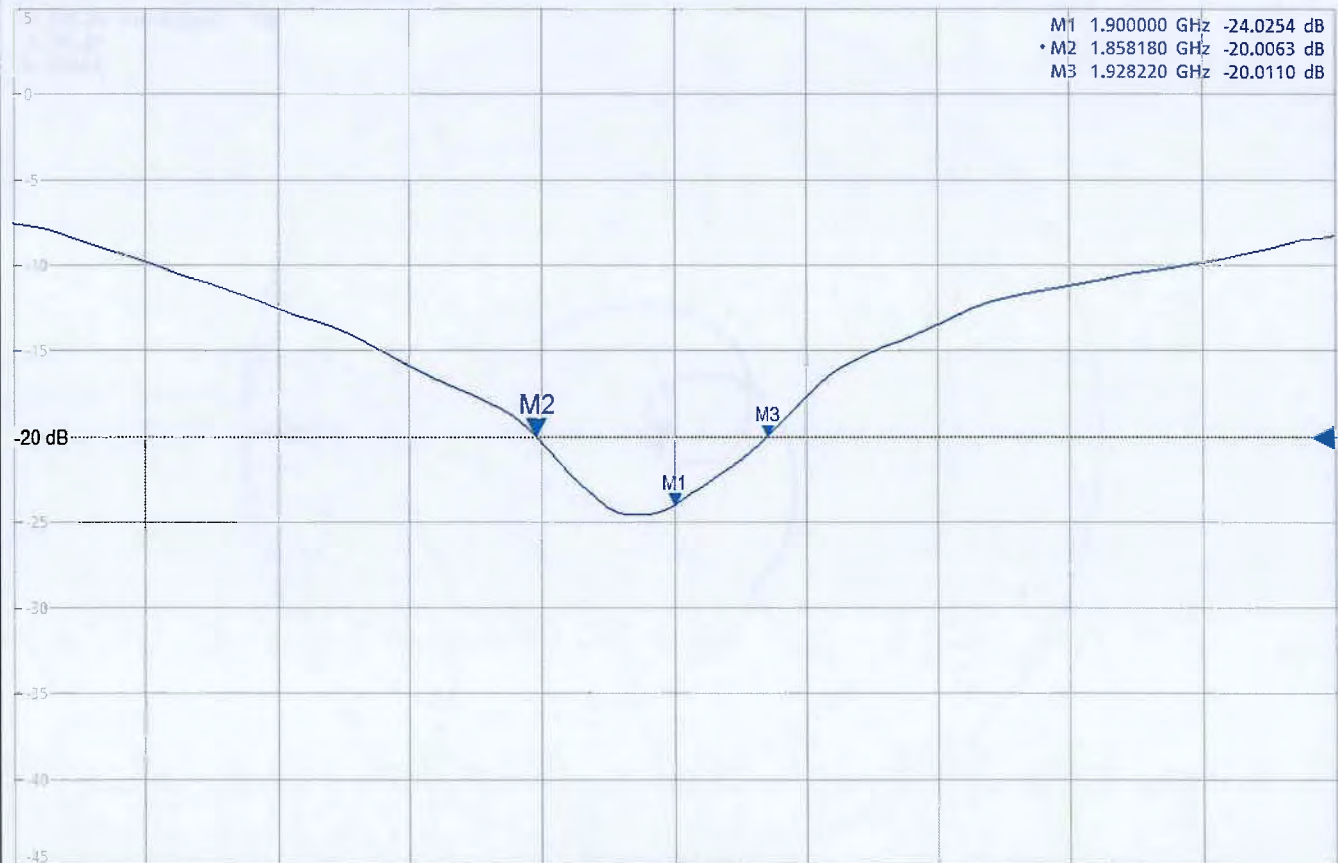
### Return Loss Measurement Plot for Body Stimulating Liquid (MSL)



10/9/2017 1:59:36 PM  
1328.5170K92-100151-MV

Trc1 — S11 dB Mag 5 dB/ Ref -20 dB Cal Smo

1



Ch1 Start 1.7 GHz

Pwr -10 dBm Bw 10 kHz

Stop 2.1 GHz

**Calibration Certificate Label:**

|                                                                                   |                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>UL VS LTD - Tel: +44 (0) 1256312000</b></p> <p>Certificate Number: 11903941JD01D</p> <p>Instrument ID: 5d163</p> <p>Calibration Date: 05/Oct/2017</p> <p>Calibration Due Date:</p> |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                   |                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>UL VS LTD - Tel: +44 (0) 1256312000</b></p> <p>Certificate Number: 11903941JD01D</p> <p>Instrument ID: 5d163</p> <p>Calibration Date: 05/Oct/2017</p> <p>Calibration Due Date:</p> |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                    |                                                                                                                                                                                          |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>UL VS LTD - Tel: +44 (0) 1256312000</b></p> <p>Certificate Number: 11903941JD01D</p> <p>Instrument ID: 5d163</p> <p>Calibration Date: 05/Oct/2017</p> <p>Calibration Due Date:</p> |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

