

**Calibration Laboratory of
Schmid & Partner
Engineering AG**
Zeughausstrasse 43, 8004 Zurich, Switzerland



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Accreditation No.: **SCS 0108**

| | | | |
|--------|--------------------------------|-----------------|--------------------------|
| Client | Sporton Kunshan City | Certificate No. | D750V3-1087_Mar25 |
|--------|--------------------------------|-----------------|--------------------------|

CALIBRATION CERTIFICATE

| | |
|--------------------------|---|
| Object | D750V3 - SN: 1087 |
| Calibration procedure(s) | QA CAL-05.v12 Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz |
| Calibration date | March 12, 2025 |

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID | Cal Date (Certificate No.) | Scheduled Cal |
|--|------------|---------------------------------------|---------------|
| Power Sensor R&S NRP-33T | SN: 100967 | 28-Mar-24 (No. 217-04038) | Mar-25 |
| Power Sensor R&S NRP18A | SN: 101859 | 06-Feb-25 (No. 4030A315009541) | Feb-26 |
| Spectrum Analyzer R&S FSV40 | SN: 101832 | 29-Jan-25 (No. 4030A315009658) | Jan-26 |
| Mismatch; Short [S4188] Attenuator [S4423] | SN: 1152 | 28-Mar-24 (No. 217-04050) | Mar-25 |
| OCP DAK-12 | SN: 1016 | 24-Sep-24 (No. OCP-DAK12-1016_Sep24) | Sep-25 |
| OCP DAK-3.5 | SN: 1249 | 23-Sep-24 (No. OCP-DAK3.5-1249_Sep24) | Sep-25 |
| Reference Probe EX3DV4 | SN: 7349 | 10-Jan-25 (No. EX3-7349_Jan25) | Jan-26 |
| DAE4ip | SN: 1836 | 28-Oct-24 (No. DAE4ip-1836_Oct24) | Oct-25 |

| Secondary Standards | ID | Check Date (in house) | Scheduled Check |
|------------------------------|------------|--|-----------------|
| ACAD Source Box | SN: 1000 | 28-May-24 (No. 675-ACAD_Source_Box-240528) | May-25 |
| Signal Generator R&S SMB100A | SN: 182081 | 28-May-24 (No. 675-CAL16-S4588-240528) | May-25 |
| Mismatch; SMA | SN: 1102 | 22-May-24 (No. 675-Mismatch_SMA-240522) | May-25 |

| | | | |
|---------------|------------------|-----------------------|-----------|
| | Name | Function | Signature |
| Calibrated by | Krešimir Franjić | Laboratory Technician | |
| Approved by | Sven Kühn | Technical Manager | |

Issued: March 12, 2025

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Accreditation No.: SCS 0108

Glossary

TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

Calibration is Performed According to the Following Standards

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions*: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL*: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss*: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay*: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured*: SAR measured at the stated antenna input power.
- *SAR normalized*: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters*: The measured TSL parameters are used to calculate the nominal SAR result.

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%.

D750V3 - SN: 1087

March 12, 2025

Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|-------------------------------------|--------------------------|-------------------------------------|
| DASY Version | DASY8 Module SAR | 16.4.0 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom | |
| Distance Dipole Center - TSL | 15 mm | with spacer |
| Zoom Scan Resolution | dx, dy = 6mm, dz = 1.5mm | Graded Ratio = 1.5 mm (Z direction) |
| Frequency | 750MHz \pm 1MHz | |

HSL parameters at 750 MHz

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|--------------------|---------------|----------------------|
| Nominal HSL parameters | 22.0 °C | 41.9 | 0.890 mho/m |
| Measured HSL parameters | (22.0 \pm 0.2)°C | 42.7 \pm 6% | 0.890 mho/m \pm 6% |
| HSL temperature change during test | < 0.5 °C | | |

SAR result with HSL at 750 MHz

| SAR averaged over 1 cm³ (1 g) of HSL | Condition | |
|--|--------------------|-------------------------------|
| SAR for nominal HSL parameters | 24 dBm input power | 2.18 W/kg |
| SAR for nominal HSL parameters | normalized to 1W | 8.68 W/kg \pm 17.0% (k = 2) |

| SAR averaged over 10 cm³ (10 g) of HSL | Condition | |
|--|--------------------|-------------------------------|
| SAR for nominal HSL parameters | 24 dBm input power | 1.41 W/kg |
| SAR for nominal HSL parameters | normalized to 1W | 5.61 W/kg \pm 16.5% (k = 2) |

D750V3 - SN: 1087

March 12, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 750 MHz

| | |
|-------------|-----------------|
| Impedance | 51.6 Ω – 3.4 jΩ |
| Return Loss | -28.7 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.034 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured. The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

| | |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|

D750V3 - SN: 1087

March 12, 2025

System Performance Check Report

Summary

| Dipole | Frequency [MHz] | TSL | Power [dBm] |
|-----------------|-----------------|-----|-------------|
| D750V3 - SN1087 | 750 | HSL | 24 |

Exposure Conditions

| Phantom Section, TSL | Test Distance [mm] | Band | Group, UID | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
|----------------------|--------------------|------|------------|---------------------------------|-------------------|------------------------|------------------|
| Flat | 15 | | CW, 0-- | 750, 0 | 9.55 | 0.89 | 42.7 |

Hardware Setup

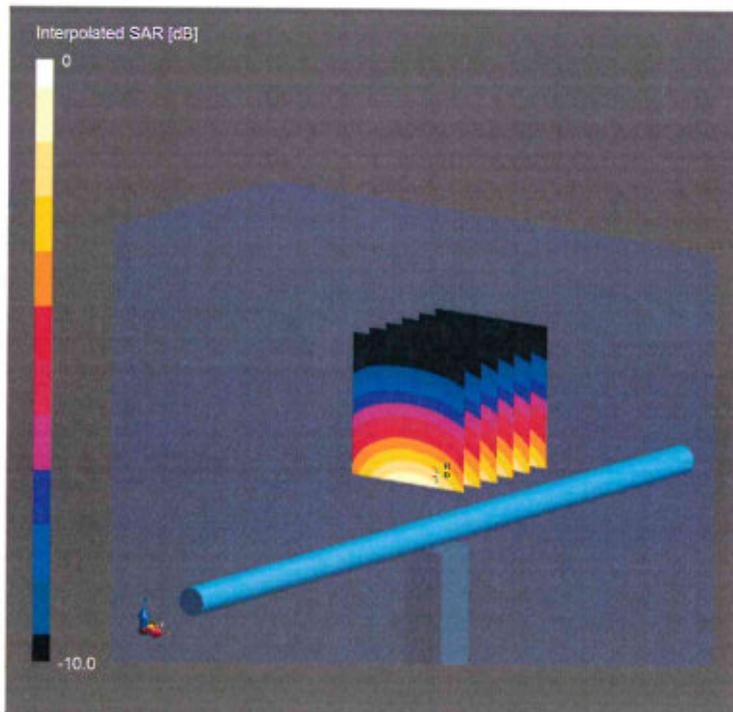
| Phantom | TSL, Measured Date | Probe, Calibration Date | DAE, Calibration Date |
|---------------|--------------------|-----------------------------|---------------------------|
| Flat V4.9 mod | HSL, 2025-03-12 | EX3DV4 - SN7349, 2025-01-10 | DAE4ip Sn1836, 2024-10-28 |

Scans Setup

| | Zoom Scan |
|---------------------|-----------------|
| Grid Extents [mm] | 30 x 30 x 30 |
| Grid Steps [mm] | 6.0 x 6.0 x 1.5 |
| Sensor Surface [mm] | 1.4 |
| Graded Grid | Yes |
| Grading Ratio | 1.5 |
| MAIA | N/A |
| Surface Detection | VMS + 6p |
| Scan Method | Measured |

Measurement Results

| | Zoom Scan |
|---------------------|---------------------|
| Date | 2025-03-12 |
| psSAR1g [W/Kg] | 2.18 |
| psSAR10g [W/Kg] | 1.41 |
| Power Drift [dB] | 0.02 |
| Power Scaling | Disabled |
| Scaling Factor [dB] | |
| TSL Correction | Positive / Negative |

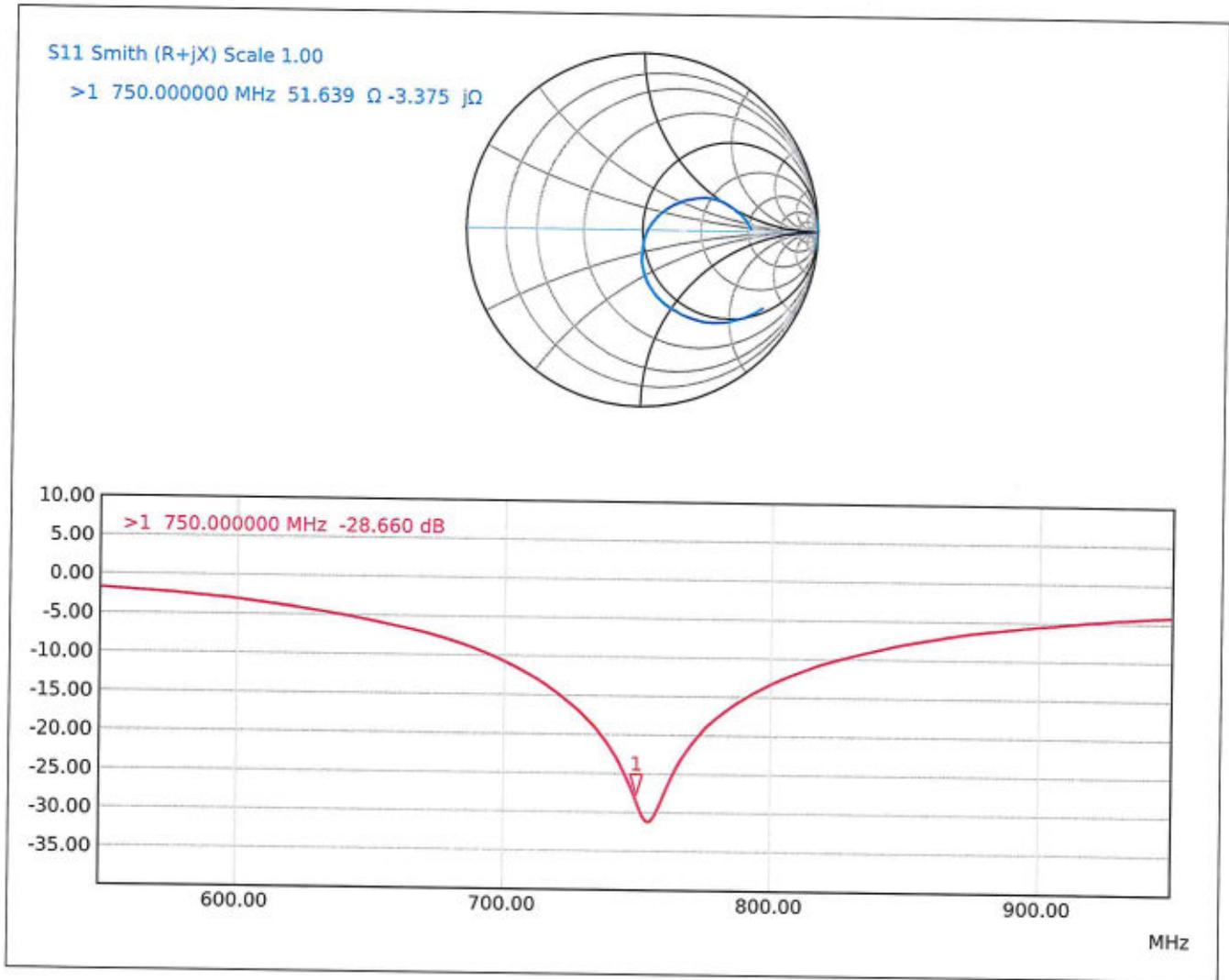


0 dB = 3.41 W/Kg

D750V3 - SN: 1087

March 12, 2025

Impedance Measurement Plot for HSL



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Client **Sporton**
Kunshan City

Certificate No. **D835V2-4d298_Jan24**

CALIBRATION CERTIFICATE

Object **D835V2 - SN:4d298**

Calibration procedure(s) **QA CAL-05.v12
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz**

Calibration date: **January 26, 2024**

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|-----------------------------|--------------------|---------------------------------|-----------------------|
| Power meter NRP2 | SN: 104778 | 30-Mar-23 (No. 217-03804/03805) | Mar-24 |
| Power sensor NRP-Z91 | SN: 103244 | 30-Mar-23 (No. 217-03804) | Mar-24 |
| Power sensor NRP-Z91 | SN: 103245 | 30-Mar-23 (No. 217-03805) | Mar-24 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 30-Mar-23 (No. 217-03809) | Mar-24 |
| Type-N mismatch combination | SN: 310982 / 06327 | 30-Mar-23 (No. 217-03810) | Mar-24 |
| Reference Probe EX3DV4 | SN: 7349 | 03-Nov-23 (No. EX3-7349_Nov23) | Nov-24 |
| DAE4 | SN: 601 | 30-Jan-24 (No. DAE4-601_Jan24) | Jan-25 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---------------------------------|----------------|-----------------------------------|------------------------|
| Power meter E4419B | SN: GB39512475 | 30-Oct-14 (in house check Oct-22) | In house check: Oct-24 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-22) | In house check: Oct-24 |
| Power sensor HP 8481A | SN: MY41093315 | 07-Oct-15 (in house check Oct-22) | In house check: Oct-24 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-22) | In house check: Oct-24 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-22) | In house check: Oct-24 |

| | | | |
|----------------|------------|-----------------------|-----------|
| | Name | Function | Signature |
| Calibrated by: | Paulo Pina | Laboratory Technician | |
| Approved by: | Sven Kühn | Technical Manager | |

Issued: January 31, 2024

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Multilateral Agreement for the recognition of calibration certificates

Glossary:

| | |
|-------|---------------------------------|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | not applicable or not measured |

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:* SAR measured at the stated antenna input power.
- SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|------------------------------|------------------------|-------------|
| DASY Version | DASY52 | V52.10.4 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom | |
| Distance Dipole Center - TSL | 15 mm | with Spacer |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 835 MHz \pm 1 MHz | |

Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---------------------|----------------|----------------------|
| Nominal Head TSL parameters | 22.0 °C | 41.5 | 0.90 mho/m |
| Measured Head TSL parameters | (22.0 \pm 0.2) °C | 42.6 \pm 6 % | 0.91 mho/m \pm 6 % |
| Head TSL temperature change during test | < 0.5 °C | ---- | ---- |

SAR result with Head TSL

| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
|---|--------------------|--|
| SAR measured | 250 mW input power | 2.48 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | 9.89 W/kg \pm 17.0 % (k=2) |

| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
|---|--------------------|--|
| SAR measured | 250 mW input power | 1.62 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | 6.45 W/kg \pm 16.5 % (k=2) |

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

| | |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 48.6 Ω - 2.6 j Ω |
| Return Loss | - 30.5 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.393 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

| | |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|

DASY5 Validation Report for Head TSL

Date: 26.01.2024

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d298

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.91$ S/m; $\epsilon_r = 42.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.69, 9.69, 9.69) @ 835 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.10.2023
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/ $P_{in}=250$ mW, $d=15$ mm/Zoom Scan (7x7x7)/Cube 0:Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 64.40 V/m; Power Drift = -0.02 dB

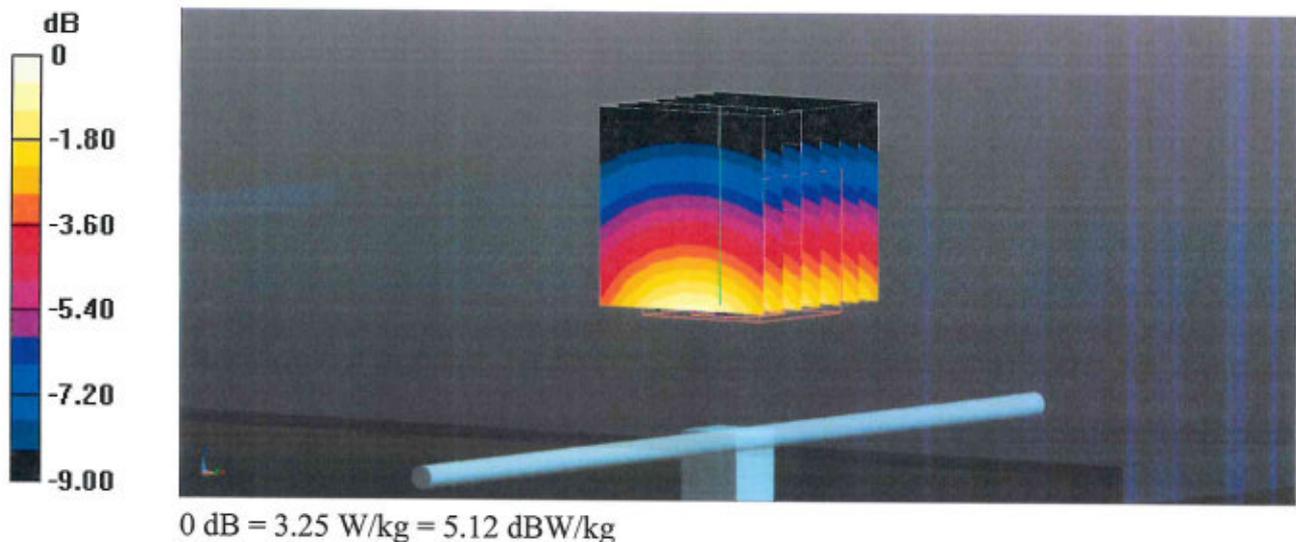
Peak SAR (extrapolated) = 3.68 W/kg

SAR(1 g) = 2.48 W/kg; SAR(10 g) = 1.62 W/kg

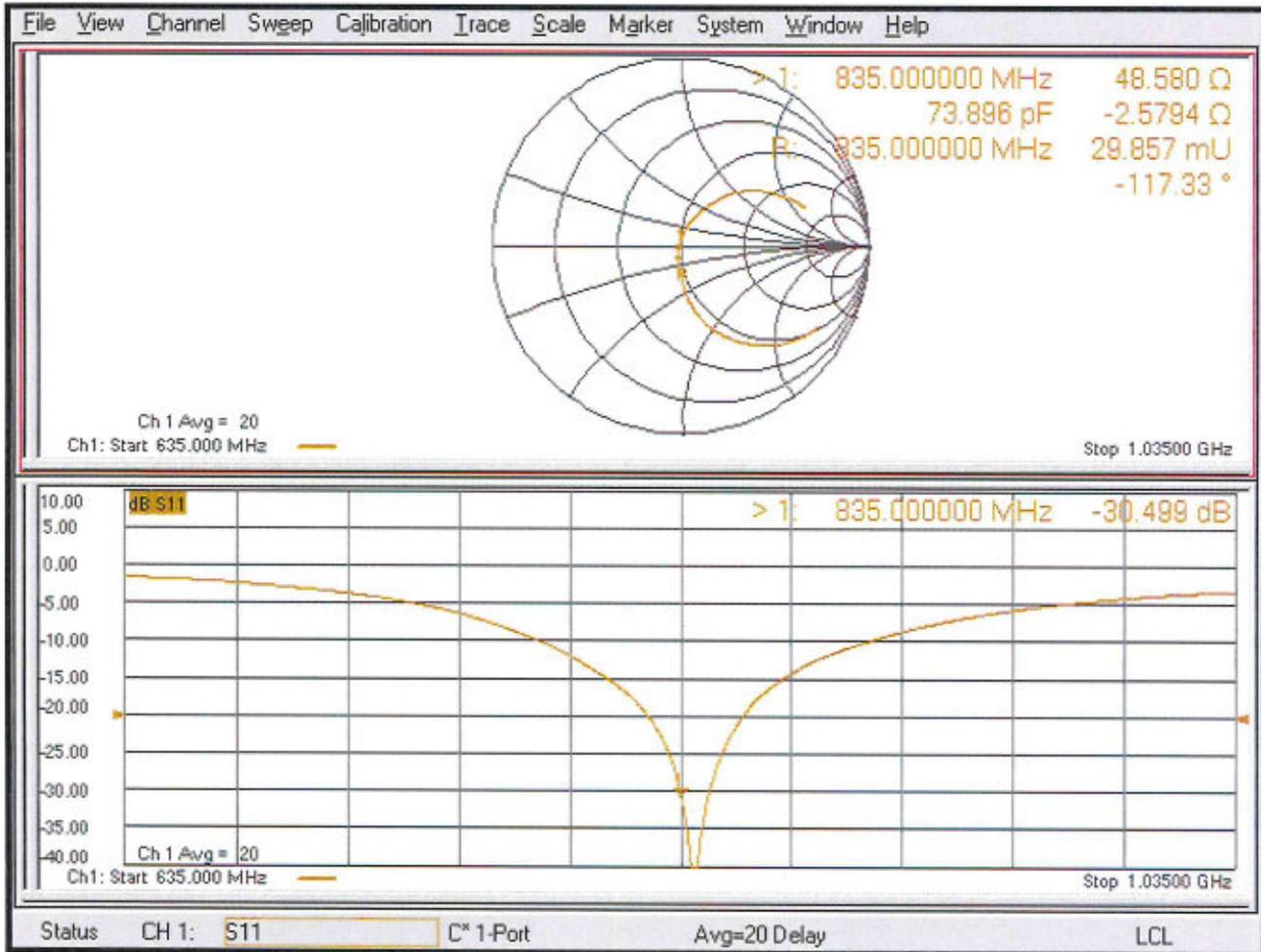
Smallest distance from peaks to all points 3 dB below = 17 mm

Ratio of SAR at M2 to SAR at M1 = 67%

Maximum value of SAR (measured) = 3.25 W/kg



Impedance Measurement Plot for Head TSL



Appendix: Transfer Calibration at Four Validation Locations on SAM Head¹

Evaluation Condition

| | | |
|---------|------------------|-----------------------------|
| Phantom | SAM Head Phantom | For usage with cSAR3DV2-R/L |
|---------|------------------|-----------------------------|

SAR result with SAM Head (Top \cong C0)

| | | |
|---|------------------|------------------------------|
| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 9.40 W/kg \pm 17.5 % (k=2) |

| | | |
|---|------------------|------------------------------|
| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 6.23 W/kg \pm 16.9 % (k=2) |

SAR result with SAM Head (Mouth \cong F90)

| | | |
|---|------------------|------------------------------|
| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 9.87 W/kg \pm 17.5 % (k=2) |

| | | |
|---|------------------|------------------------------|
| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 6.64 W/kg \pm 16.9 % (k=2) |

SAR result with SAM Head (Neck \cong H0)

| | | |
|---|------------------|------------------------------|
| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 9.38 W/kg \pm 17.5 % (k=2) |

| | | |
|---|------------------|------------------------------|
| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 6.35 W/kg \pm 16.9 % (k=2) |

SAR result with SAM Head (Ear \cong D90)

| | | |
|---|------------------|------------------------------|
| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 8.06 W/kg \pm 17.5 % (k=2) |

| | | |
|---|------------------|------------------------------|
| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 5.44 W/kg \pm 16.9 % (k=2) |

¹ Additional assessments outside the current scope of SCS 0108



D835V2, Serial No. 4d298 Extended Dipole Calibrations

If dipoles are verified in return loss (<-20dB, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

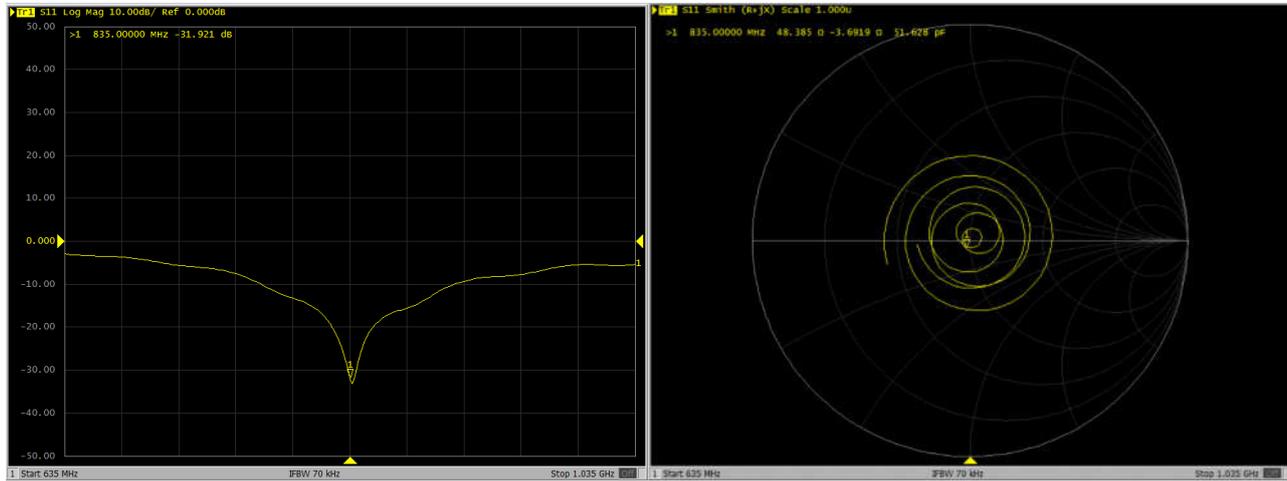
| D835V2 – serial no. 4d298 | | | | | | |
|---------------------------|------------------|-----------|----------------------|-------------|---------------------------|-------------|
| 835 Head | | | | | | |
| Date of Measurement | Return-Loss (dB) | Delta (%) | Real Impedance (ohm) | Delta (ohm) | Imaginary Impedance (ohm) | Delta (ohm) |
| 2024.1.26 | -30.5 | | 48.6 | | -2.6 | |
| 2025.1.25 | -31.9 | 4.6% | 48.4 | 0.2 | -3.7 | 1.1 |
| | | | | | | |

<Justification of the extended calibration>

The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data> 835V2, serial no. 4d298

835MHz - Head---2025.1.25



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Accreditation No.: **SCS 0108**

Client **Sporton**
Kunshan City

Certificate No. **D1750V2-1090_Mar25**

CALIBRATION CERTIFICATE

Object **D1750V2 - SN: 1090**

Calibration procedure(s) **QA CAL-05.v12
Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz**

Calibration date **March 12, 2025**

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.

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Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID | Cal Date (Certificate No.) | Scheduled Cal |
|--|------------|---------------------------------------|---------------|
| Power Sensor R&S NRP-33T | SN: 100967 | 28-Mar-24 (No. 217-04038) | Mar-25 |
| Power Sensor R&S NRP18A | SN: 101859 | 06-Feb-25 (No. 4030A315009541) | Feb-26 |
| Spectrum Analyzer R&S FSV40 | SN: 101832 | 29-Jan-25 (No. 4030A315009658) | Jan-26 |
| Mismatch; Short [S4188] Attenuator [S4423] | SN: 1152 | 28-Mar-24 (No. 217-04050) | Mar-25 |
| OCP DAK-12 | SN: 1016 | 24-Sep-24 (No. OCP-DAK12-1016_Sep24) | Sep-25 |
| OCP DAK-3.5 | SN: 1249 | 23-Sep-24 (No. OCP-DAK3.5-1249_Sep24) | Sep-25 |
| Reference Probe EX3DV4 | SN: 7349 | 10-Jan-25 (No. EX3-7349_Jan25) | Jan-26 |
| DAE4ip | SN: 1836 | 28-Oct-24 (No. DAE4ip-1836_Oct24) | Oct-25 |

| Secondary Standards | ID | Check Date (in house) | Scheduled Check |
|------------------------------|------------|--|-----------------|
| ACAD Source Box | SN: 1000 | 28-May-24 (No. 675-ACAD_Source_Box-240528) | May-25 |
| Signal Generator R&S SMB100A | SN: 182081 | 28-May-24 (No. 675-CAL16-S4588-240528) | May-25 |
| Mismatch; SMA | SN: 1102 | 22-May-24 (No. 675-Mismatch_SMA-240522) | May-25 |

| | Name | Function | Signature |
|---------------|------------------|-----------------------|-----------|
| Calibrated by | Krešimir Franjić | Laboratory Technician | |
| Approved by | Sven Kühn | Technical Manager | |

Issued: March 13, 2025

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Accreditation No.: SCS 0108

Glossary

TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

Calibration is Performed According to the Following Standards

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions*: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL*: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss*: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay*: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured*: SAR measured at the stated antenna input power.
- *SAR normalized*: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters*: The measured TSL parameters are used to calculate the nominal SAR result.

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%.

D1750V2 - SN: 1090

March 12, 2025

Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|-------------------------------------|--------------------------|-------------------------------------|
| DASY Version | DASY8 Module SAR | 16.4.0 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom | |
| Distance Dipole Center - TSL | 10 mm | with spacer |
| Zoom Scan Resolution | dx, dy = 6mm, dz = 1.5mm | Graded Ratio = 1.5 mm (Z direction) |
| Frequency | 1750MHz \pm 1MHz | |

HSL parameters at 1750 MHz

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|--------------------|---------------|---------------------|
| Nominal HSL parameters | 22.0 °C | 40.1 | 1.37 mho/m |
| Measured HSL parameters | (22.0 \pm 0.2)°C | 40.7 \pm 6% | 1.35 mho/m \pm 6% |
| HSL temperature change during test | < 0.5 °C | | |

SAR result with HSL at 1750 MHz

| SAR averaged over 1 cm³ (1 g) of HSL | Condition | |
|--|--------------------|-------------------------------|
| SAR for nominal HSL parameters | 24 dBm input power | 9.20 W/kg |
| SAR for nominal HSL parameters | normalized to 1W | 36.6 W/kg \pm 17.0% (k = 2) |

| SAR averaged over 10 cm³ (10 g) of HSL | Condition | |
|--|--------------------|-------------------------------|
| SAR for nominal HSL parameters | 24 dBm input power | 4.90 W/kg |
| SAR for nominal HSL parameters | normalized to 1W | 19.5 W/kg \pm 16.5% (k = 2) |

D1750V2 - SN: 1090

March 12, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 1750 MHz

| | |
|-------------|-----------------|
| Impedance | 48.0 Ω – 2.4 jΩ |
| Return Loss | -29.9 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.221 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured. The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

| | |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|

D1750V2 - SN: 1090

March 12, 2025

System Performance Check Report

Summary

| Dipole | Frequency [MHz] | TSL | Power [dBm] |
|------------------|-----------------|-----|-------------|
| D1750V2 - SN1090 | 1750 | HSL | 24 |

Exposure Conditions

| Phantom Section, TSL | Test Distance [mm] | Band | Group, UID | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
|----------------------|--------------------|---------|------------|---------------------------------|-------------------|------------------------|------------------|
| Flat | 10 | CW, 0-- | | 1750, 0 | 7.96 | 1.35 | 40.7 |

Hardware Setup

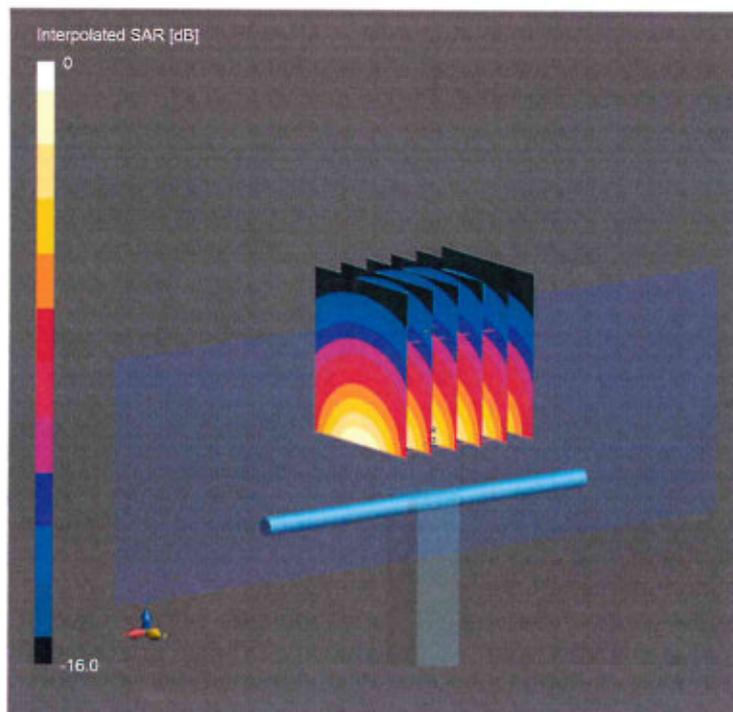
| Phantom | TSL, Measured Date | Probe, Calibration Date | DAE, Calibration Date |
|-----------------|--------------------|-----------------------------|---------------------------|
| MFP V8.0 Center | HSL, 2025-03-12 | EX3DV4 - SN7349, 2025-01-10 | DAE4ip Sn1836, 2024-10-28 |

Scans Setup

| | Zoom Scan |
|---------------------|-----------------|
| Grid Extents [mm] | 30 x 30 x 30 |
| Grid Steps [mm] | 6.0 x 6.0 x 1.5 |
| Sensor Surface [mm] | 1.4 |
| Graded Grid | Yes |
| Grading Ratio | 1.5 |
| MAIA | N/A |
| Surface Detection | VMS + 6p |
| Scan Method | Measured |

Measurement Results

| | Zoom Scan |
|---------------------|---------------------|
| Date | 2025-03-12 |
| psSAR1g [W/Kg] | 9.20 |
| psSAR10g [W/Kg] | 4.90 |
| Power Drift [dB] | -0.02 |
| Power Scaling | Disabled |
| Scaling Factor [dB] | |
| TSL Correction | Positive / Negative |

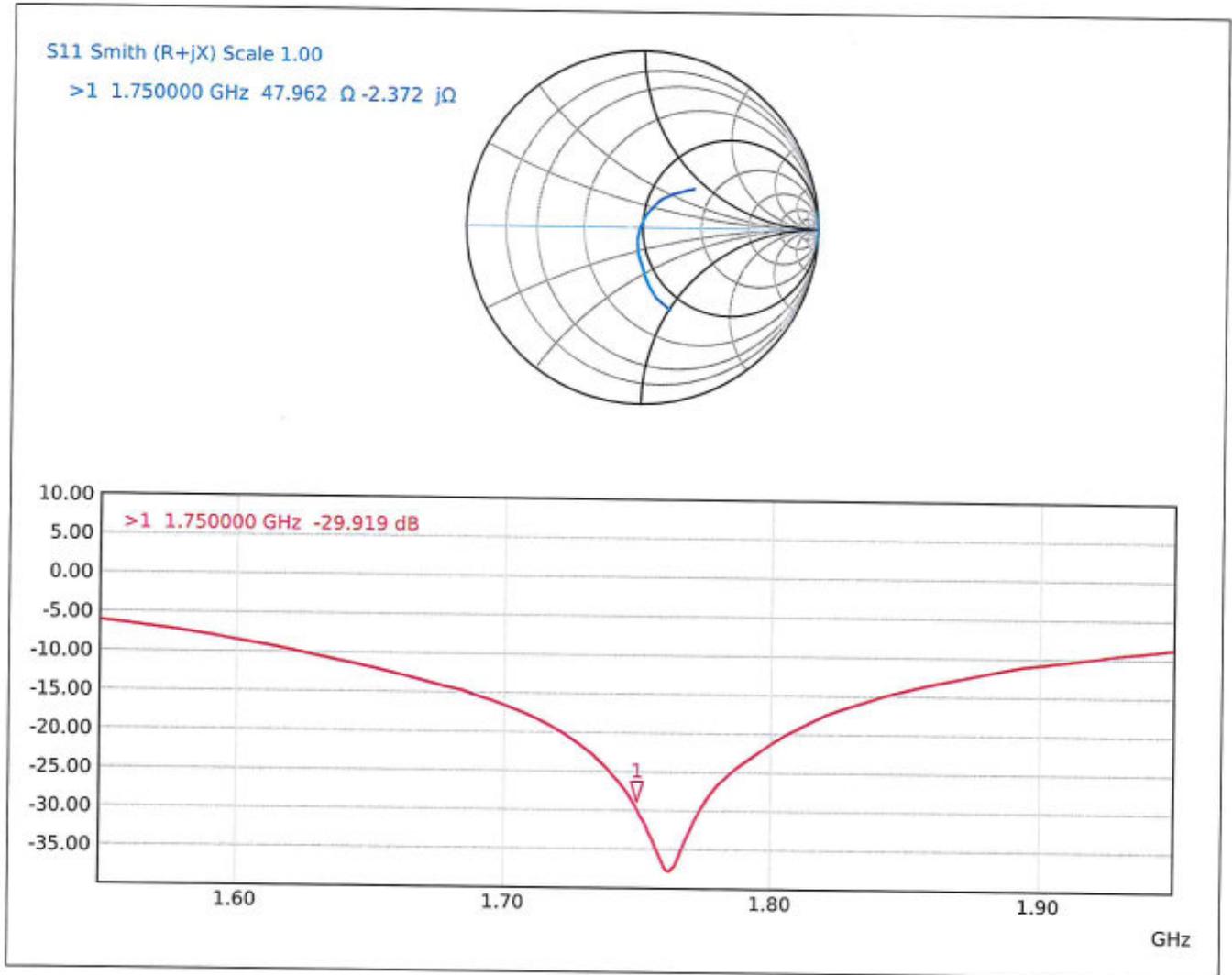


0 dB = 16.1 W/Kg

D1750V2 - SN: 1090

March 12, 2025

Impedance Measurement Plot for HSL



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Accreditation No.: **SCS 0108**

Client

Sporton
Kunshan City

Certificate No.

D1900V2-5d170_Mar25

CALIBRATION CERTIFICATE

Object

D1900V2 - SN: 5d170

Calibration procedure(s)

QA CAL-05.v12
Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date

March 13, 2025

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 Cal |
|--|------------|---------------------------------------|---------------|
| Power Sensor R&S NRP-33T | SN: 100967 | 28-Mar-24 (No. 217-04038) | Mar-25 |
| Power Sensor R&S NRP18A | SN: 101859 | 06-Feb-25 (No. 4030A315009541) | Feb-26 |
| Spectrum Analyzer R&S FSV40 | SN: 101832 | 29-Jan-25 (No. 4030A315009658) | Jan-26 |
| Mismatch; Short [S4188] Attenuator [S4423] | SN: 1152 | 28-Mar-24 (No. 217-04050) | Mar-25 |
| OCP DAK-12 | SN: 1016 | 24-Sep-24 (No. OCP-DAK12-1016_Sep24) | Sep-25 |
| OCP DAK-3.5 | SN: 1249 | 23-Sep-24 (No. OCP-DAK3.5-1249_Sep24) | Sep-25 |
| Reference Probe EX3DV4 | SN: 7349 | 10-Jan-25 (No. EX3-7349_Jan25) | Jan-26 |
| DAE4ip | SN: 1836 | 28-Oct-24 (No. DAE4ip-1836_Oct24) | Oct-25 |

| Secondary Standards | ID | Check Date (in house) | Scheduled Check |
|------------------------------|------------|--|-----------------|
| ACAD Source Box | SN: 1000 | 28-May-24 (No. 675-ACAD_Source_Box-240528) | May-25 |
| Signal Generator R&S SMB100A | SN: 182081 | 28-May-24 (No. 675-CAL16-S4588-240528) | May-25 |
| Mismatch; SMA | SN: 1102 | 22-May-24 (No. 675-Mismatch_SMA-240522) | May-25 |

| | Name | Function | Signature |
|---------------|------------------|-----------------------|-----------|
| Calibrated by | Krešimir Franjić | Laboratory Technician | |
| Approved by | Sven Kühn | Technical Manager | |

Issued: March 13, 2025

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Accreditation No.: SCS 0108

Glossary

TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

Calibration is Performed According to the Following Standards

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation

- DASY System Handbook

Methods Applied and Interpretation of Parameters

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|-------------------------------------|--------------------------|-------------------------------------|
| DASY Version | DASY8 Module SAR | 16.4.0 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom | |
| Distance Dipole Center - TSL | 10 mm | with spacer |
| Zoom Scan Resolution | dx, dy = 6mm, dz = 1.5mm | Graded Ratio = 1.5 mm (Z direction) |
| Frequency | 1900MHz ±1MHz | |

HSL parameters at 1900 MHz

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|--------------------|---------------------|---------------------|
| Nominal HSL parameters | 22.0 °C | 40.0 | 1.40 mho/m |
| Measured HSL parameters | (22.0 ±0.2)°C | 40.2 ±6% | 1.41 mho/m ±6% |
| HSL temperature change during test | < 0.5 °C | | |

SAR result with HSL at 1900 MHz

| SAR averaged over 1 cm³ (1 g) of HSL | Condition | |
|--|--------------------|--------------------------|
| SAR for nominal HSL parameters | 24 dBm input power | 9.83 W/kg |
| SAR for nominal HSL parameters | normalized to 1W | 39.1 W/kg ±17.0% (k = 2) |

| SAR averaged over 10 cm³ (10 g) of HSL | Condition | |
|--|--------------------|--------------------------|
| SAR for nominal HSL parameters | 24 dBm input power | 5.18 W/kg |
| SAR for nominal HSL parameters | normalized to 1W | 20.6 W/kg ±16.5% (k = 2) |

D1900V2 - SN: 5d170

March 13, 2025

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with HSL at 1900 MHz

| | |
|-------------|-----------------|
| Impedance | 52.5 Ω + 6.5 jΩ |
| Return Loss | -23.4 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.201 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured. The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard. No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

| | |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|

D1900V2 - SN: 5d170

March 13, 2025

System Performance Check Report

Summary

| Dipole | Frequency [MHz] | TSL | Power [dBm] |
|-------------------|-----------------|-----|-------------|
| D1900V2 - SN5d170 | 1900 | HSL | 24 |

Exposure Conditions

| Phantom Section, TSL | Test Distance [mm] | Band | Group, UID | Frequency [MHz], Channel Number | Conversion Factor | TSL Conductivity [S/m] | TSL Permittivity |
|----------------------|--------------------|------|------------|---------------------------------|-------------------|------------------------|------------------|
| Flat | 10 | | CW, 0-- | 1900, 0 | 7.68 | 1.41 | 40.2 |

Hardware Setup

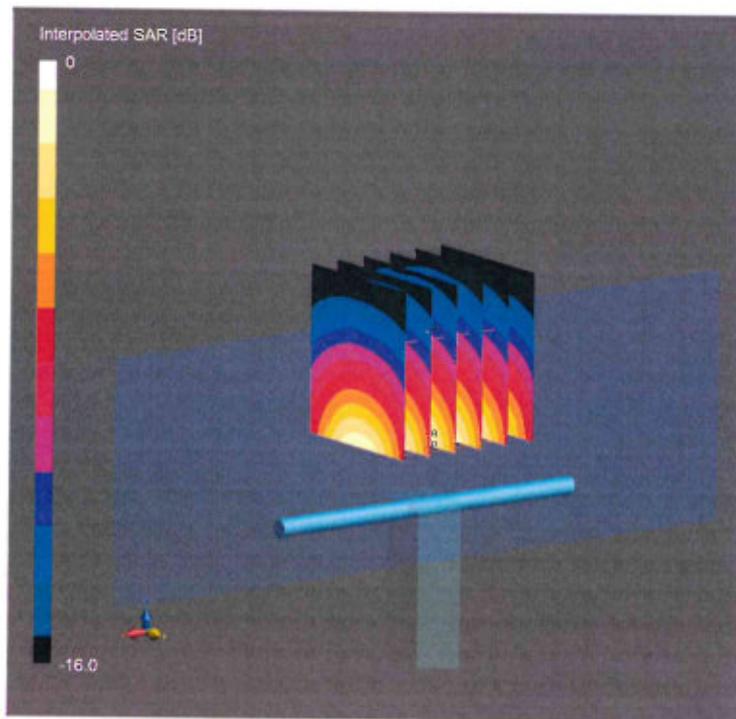
| Phantom | TSL, Measured Date | Probe, Calibration Date | DAE, Calibration Date |
|-----------------|--------------------|-----------------------------|---------------------------|
| MFP V8.0 Center | HSL, 2025-03-13 | EX3DV4 - SN7349, 2025-01-10 | DAE4ip Sn1836, 2024-10-28 |

Scans Setup

| | Zoom Scan |
|---------------------|-----------------|
| Grid Extents [mm] | 30 x 30 x 30 |
| Grid Steps [mm] | 6.0 x 6.0 x 1.5 |
| Sensor Surface [mm] | 1.4 |
| Graded Grid | Yes |
| Grading Ratio | 1.5 |
| MAIA | N/A |
| Surface Detection | VMS + 6p |
| Scan Method | Measured |

Measurement Results

| | Zoom Scan |
|---------------------|---------------------|
| Date | 2025-03-13 |
| psSAR1g [W/Kg] | 9.83 |
| psSAR10g [W/Kg] | 5.18 |
| Power Drift [dB] | 0.00 |
| Power Scaling | Disabled |
| Scaling Factor [dB] | |
| TSL Correction | Positive / Negative |

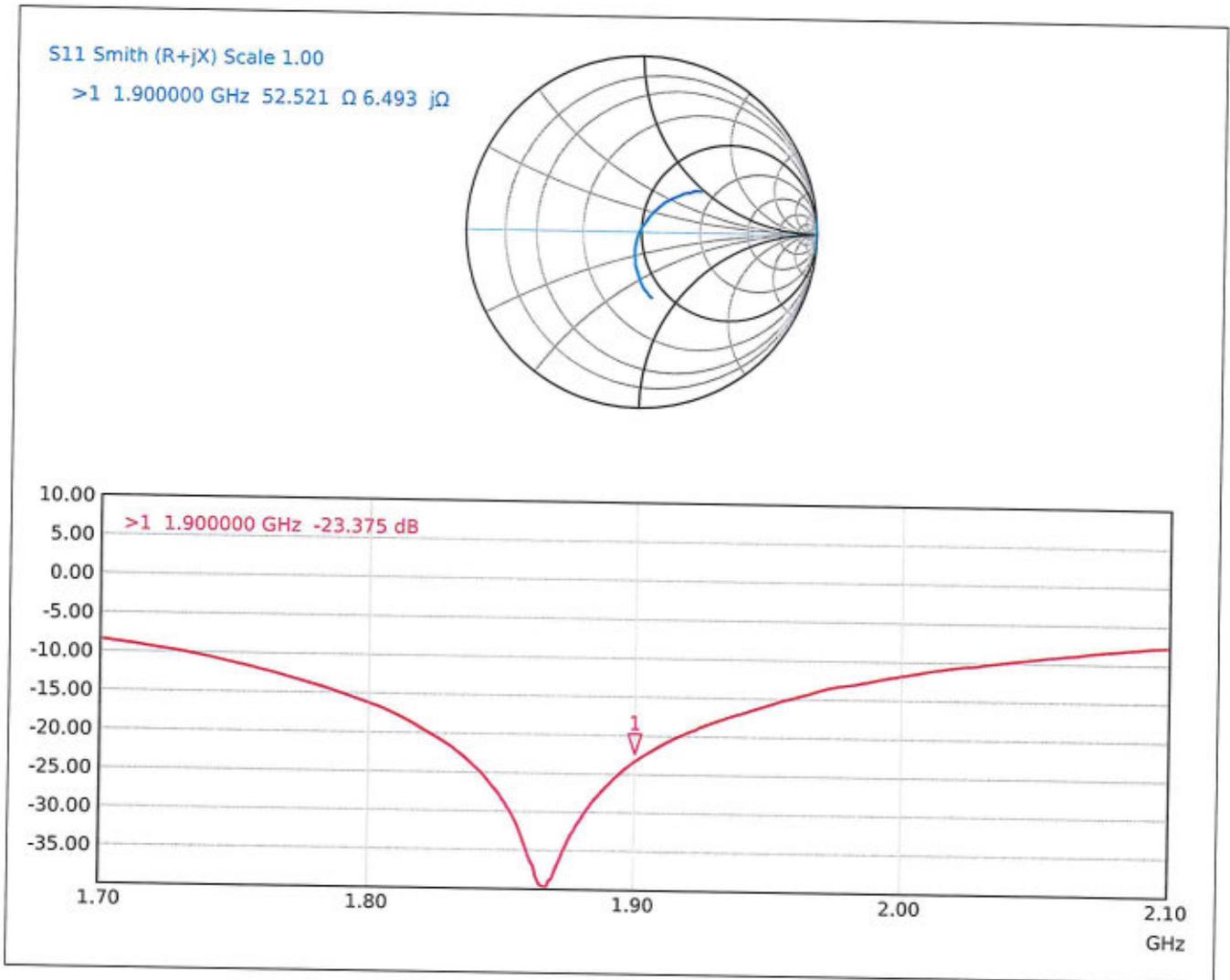


0 dB = 17.4 W/Kg

D1900V2 - SN: 5d170

March 13, 2025

Impedance Measurement Plot for HSL



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Accreditation No.: **SCS 0108**

Client **Sporton**
Kunshan City

Certificate No. **D2450V2-1095_Feb24**

CALIBRATION CERTIFICATE

Object: **D2450V2 - SN:1095**

Calibration procedure(s): **QA CAL-05.v12
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz**

Calibration date: **February 08, 2024**

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|-----------------------------|--------------------|---------------------------------|-----------------------|
| Power meter NRP2 | SN: 104778 | 30-Mar-23 (No. 217-03804/03805) | Mar-24 |
| Power sensor NRP-Z91 | SN: 103244 | 30-Mar-23 (No. 217-03804) | Mar-24 |
| Power sensor NRP-Z91 | SN: 103245 | 30-Mar-23 (No. 217-03805) | Mar-24 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 30-Mar-23 (No. 217-03809) | Mar-24 |
| Type-N mismatch combination | SN: 310982 / 06327 | 30-Mar-23 (No. 217-03810) | Mar-24 |
| Reference Probe EX3DV4 | SN: 7349 | 03-Nov-23 (No. EX3-7349_Nov23) | Nov-24 |
| DAE4 | SN: 601 | 30-Jan-24 (No. DAE4-601_Jan24) | Jan-25 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---------------------------------|----------------|-----------------------------------|------------------------|
| Power meter E4419B | SN: GB39512475 | 30-Oct-14 (in house check Oct-22) | In house check: Oct-24 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-22) | In house check: Oct-24 |
| Power sensor HP 8481A | SN: MY41093315 | 07-Oct-15 (in house check Oct-22) | In house check: Oct-24 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-22) | In house check: Oct-24 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-22) | In house check: Oct-24 |

| | | | |
|----------------|--------------------|-----------------------------------|---------------|
| Calibrated by: | Name Paulo Pina | Function Laboratory Technician | Signature |
| Approved by: | Sven Kühn | Technical Manager | |

Issued: February 9, 2024

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Accreditation No.: **SCS 0108**

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Glossary:

| | |
|-------|---------------------------------|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | not applicable or not measured |

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:** This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|------------------------------|------------------------|-------------|
| DASY Version | DASY52 | V52.10.4 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom | |
| Distance Dipole Center - TSL | 10 mm | with Spacer |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 2450 MHz \pm 1 MHz | |

Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---------------------|----------------|----------------------|
| Nominal Head TSL parameters | 22.0 °C | 39.2 | 1.80 mho/m |
| Measured Head TSL parameters | (22.0 \pm 0.2) °C | 38.2 \pm 6 % | 1.88 mho/m \pm 6 % |
| Head TSL temperature change during test | < 0.5 °C | ---- | ---- |

SAR result with Head TSL

| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
|---|--------------------|--|
| SAR measured | 250 mW input power | 13.5 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | 52.6 W/kg \pm 17.0 % (k=2) |

| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
|---|--------------------|--|
| SAR measured | 250 mW input power | 6.27 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | 24.7 W/kg \pm 16.5 % (k=2) |

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

| | |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 51.3 Ω + 6.1 j Ω |
| Return Loss | - 24.3 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.147 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

| | |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|

DASY5 Validation Report for Head TSL

Date: 08.02.2024

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:1095

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.88$ S/m; $\epsilon_r = 38.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96) @ 2450 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2024
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 116.2 V/m; Power Drift = 0.08 dB

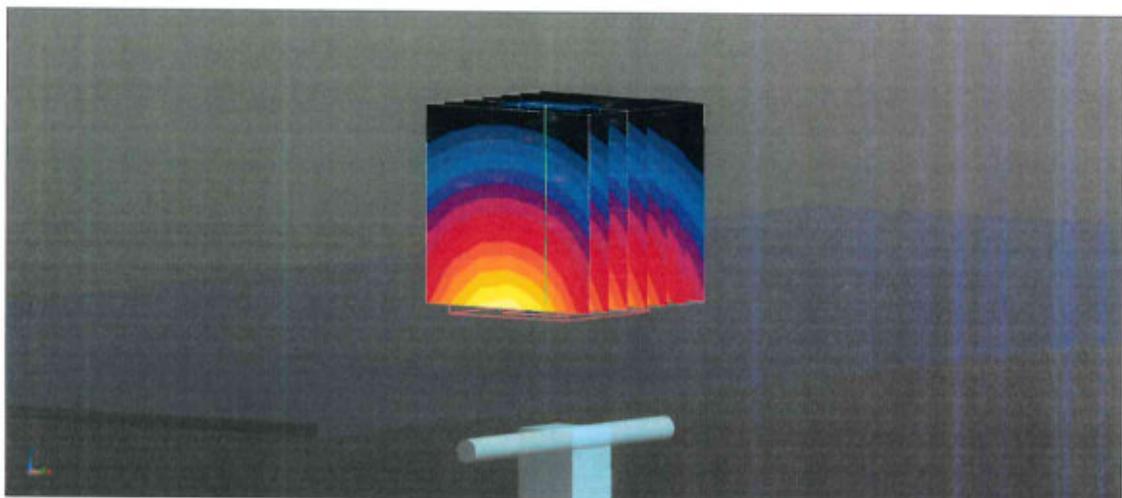
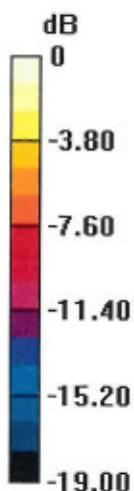
Peak SAR (extrapolated) = 26.7 W/kg

SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.27 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

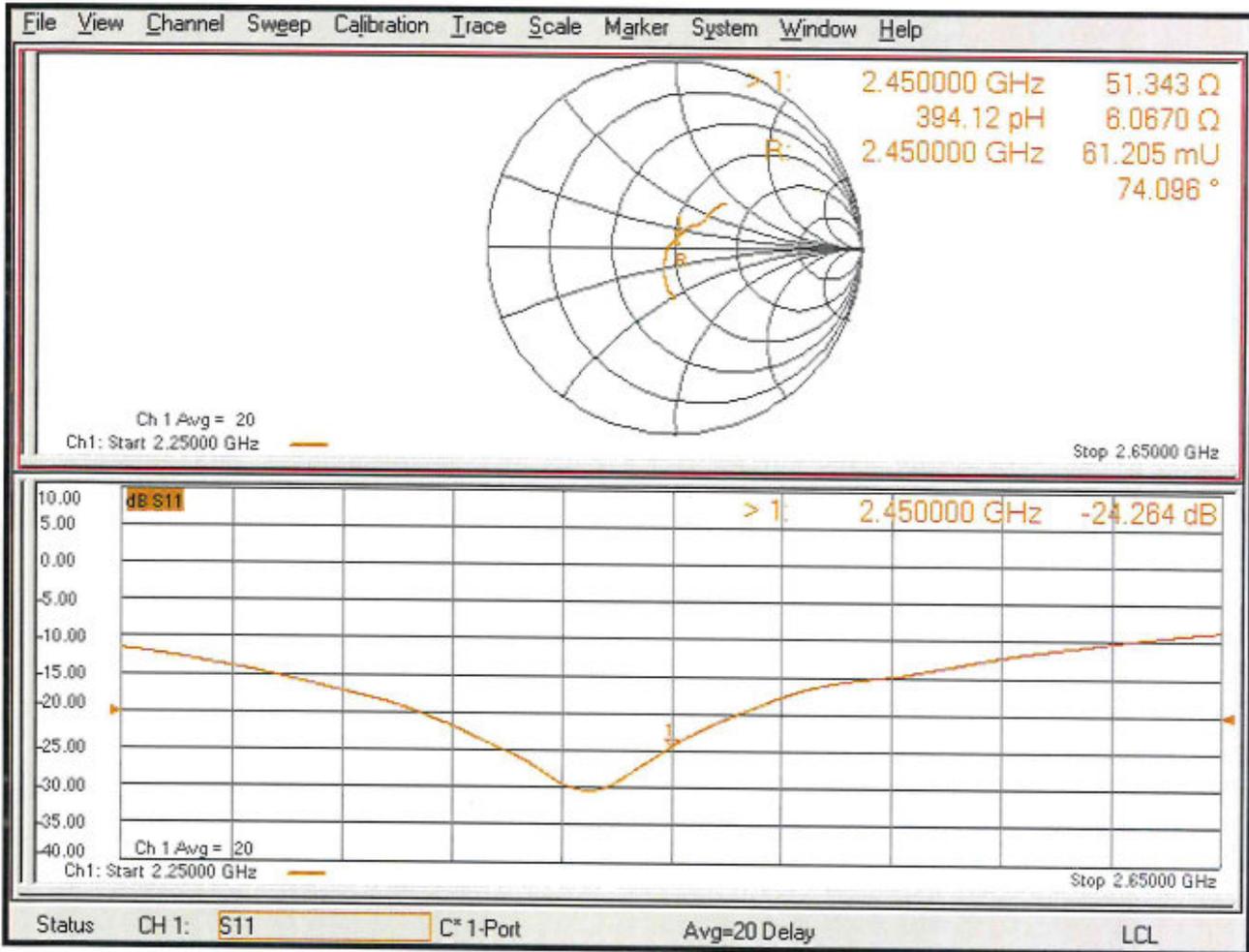
Ratio of SAR at M2 to SAR at M1 = 50.6%

Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

Impedance Measurement Plot for Head TSL



Appendix: Transfer Calibration at Four Validation Locations on SAM Head¹

Evaluation Condition

| | | |
|---------|------------------|-----------------------------|
| Phantom | SAM Head Phantom | For usage with cSAR3DV2-R/L |
|---------|------------------|-----------------------------|

SAR result with SAM Head (Top \cong C0)

| | | |
|---|------------------|------------------------------|
| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 56.1 W/kg \pm 17.5 % (k=2) |

| | | |
|---|------------------|------------------------------|
| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 26.2 W/kg \pm 16.9 % (k=2) |

SAR result with SAM Head (Mouth \cong F90)

| | | |
|---|------------------|------------------------------|
| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 57.2 W/kg \pm 17.5 % (k=2) |

| | | |
|---|------------------|------------------------------|
| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 27.5 W/kg \pm 16.9 % (k=2) |

SAR result with SAM Head (Neck \cong H0)

| | | |
|---|------------------|------------------------------|
| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 53.9 W/kg \pm 17.5 % (k=2) |

| | | |
|---|------------------|------------------------------|
| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 25.1 W/kg \pm 16.9 % (k=2) |

SAR result with SAM Head (Ear \cong D90)

| | | |
|---|------------------|------------------------------|
| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 34.5 W/kg \pm 17.5 % (k=2) |

| | | |
|---|------------------|------------------------------|
| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
| SAR for nominal Head TSL parameters | normalized to 1W | 17.5 W/kg \pm 16.9 % (k=2) |

¹ Additional assessments outside the current scope of SCS 0108

D2450V2, Serial No. 1095 Extended Dipole Calibrations

If dipoles are verified in return loss (<-20dB, within 20% of prior calibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

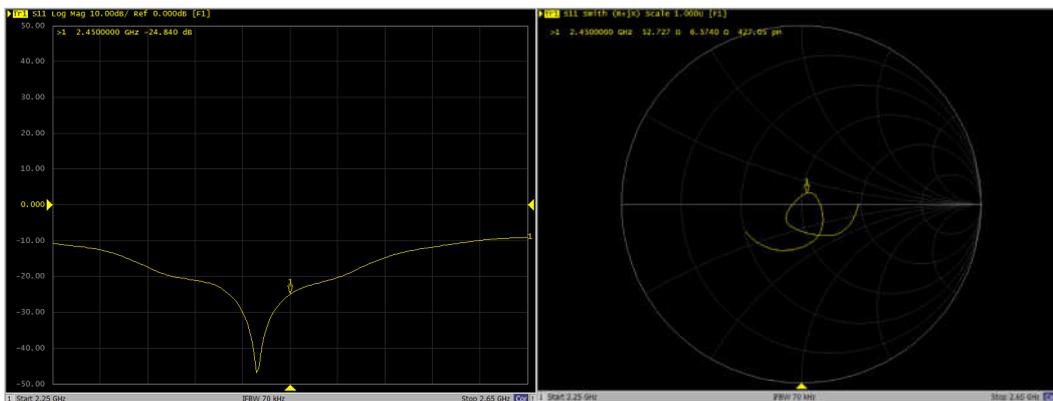
| D2450V2 – serial no. 1095 | | | | | | |
|---------------------------|------------------|-----------|----------------------|-------------|---------------------------|-------------|
| 2450 Head | | | | | | |
| Date of Measurement | Return-Loss (dB) | Delta (%) | Real Impedance (ohm) | Delta (ohm) | Imaginary Impedance (ohm) | Delta (ohm) |
| 2024.2.8 | -24.264 | | 51.343 | | 6.0670 | |
| 2025.2.7 | -24.840 | 2% | 52.727 | 1.384 | 6.5740 | 0.507 |

<Justification of the extended calibration>

The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data> D2450V2, serial no. 1095

2450MHz – Head-2025.2.7



**Calibration Laboratory of
Schmid & Partner
Engineering AG**
Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accreditation No.: **SCS 0108**

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

Client **Sporton**
Kunshan City

Certificate No. **D2600V2-1112_Dec23**

CALIBRATION CERTIFICATE

Object **D2600V2 - SN:1112**

Calibration procedure(s) **QA CAL-05.v12
Calibration Procedure for SAR Validation Sources between 0.7-3 GHz**

Calibration date: **December 18, 2023**

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|-----------------------------|--------------------|---------------------------------|-----------------------|
| Power meter NRP2 | SN: 104778 | 30-Mar-23 (No. 217-03804/03805) | Mar-24 |
| Power sensor NRP-Z91 | SN: 103244 | 30-Mar-23 (No. 217-03804) | Mar-24 |
| Power sensor NRP-Z91 | SN: 103245 | 30-Mar-23 (No. 217-03805) | Mar-24 |
| Reference 20 dB Attenuator | SN: BH9394 (20k) | 30-Mar-23 (No. 217-03809) | Mar-24 |
| Type-N mismatch combination | SN: 310982 / 06327 | 30-Mar-23 (No. 217-03810) | Mar-24 |
| Reference Probe EX3DV4 | SN: 7349 | 03-Nov-23 (No. EX3-7349_Nov23) | Nov-24 |
| DAE4 | SN: 601 | 03-Oct-23 (No. DAE4-601_Oct23) | Oct-24 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---------------------------------|----------------|-----------------------------------|------------------------|
| Power meter E4419B | SN: GB39512475 | 30-Oct-14 (in house check Oct-22) | In house check: Oct-24 |
| Power sensor HP 8481A | SN: US37292783 | 07-Oct-15 (in house check Oct-22) | In house check: Oct-24 |
| Power sensor HP 8481A | SN: MY41093315 | 07-Oct-15 (in house check Oct-22) | In house check: Oct-24 |
| RF generator R&S SMT-06 | SN: 100972 | 15-Jun-15 (in house check Oct-22) | In house check: Oct-24 |
| Network Analyzer Agilent E8358A | SN: US41080477 | 31-Mar-14 (in house check Oct-22) | In house check: Oct-24 |

Calibrated by: **Krešimir Franjić** (Name) / **Laboratory Technician** (Function) / *[Signature]* (Signature)

Approved by: **Sven Kühn** (Name) / **Technical Manager** (Function) / *[Signature]* (Signature)

Issued: December 18, 2023

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

**Calibration Laboratory of
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Engineering AG**
Zeughausstrasse 43, 8004 Zurich, Switzerland



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S Swiss Calibration Service

Accreditation No.: **SCS 0108**

Accredited by the Swiss Accreditation Service (SAS)

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Glossary:

| | |
|-------|---------------------------------|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | not applicable or not measured |

Calibration is Performed According to the Following Standards:

- IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range of 4 MHz to 10 GHz)", October 2020.
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:* The source is mounted in a touch configuration below the center marking of the flat phantom.
- Return Loss:* This parameter is measured with the source positioned under the liquid filled phantom (as described in the measurement condition clause). The Return Loss ensures low reflected power. No uncertainty required.
- SAR measured:* SAR measured at the stated antenna input power.
- SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|------------------------------|------------------------|-------------|
| DASY Version | DASY52 | V52.10.4 |
| Extrapolation | Advanced Extrapolation | |
| Phantom | Modular Flat Phantom | |
| Distance Dipole Center - TSL | 10 mm | with Spacer |
| Zoom Scan Resolution | dx, dy, dz = 5 mm | |
| Frequency | 2600 MHz \pm 1 MHz | |

Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---------------------|----------------|----------------------|
| Nominal Head TSL parameters | 22.0 °C | 39.0 | 1.96 mho/m |
| Measured Head TSL parameters | (22.0 \pm 0.2) °C | 37.6 \pm 6 % | 2.02 mho/m \pm 6 % |
| Head TSL temperature change during test | < 0.5 °C | --- | --- |

SAR result with Head TSL

| SAR averaged over 1 cm ³ (1 g) of Head TSL | Condition | |
|---|--------------------|--|
| SAR measured | 250 mW input power | 14.1 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | 55.1 W/kg \pm 17.0 % (k=2) |

| SAR averaged over 10 cm ³ (10 g) of Head TSL | condition | |
|---|--------------------|--|
| SAR measured | 250 mW input power | 6.28 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | 24.8 W/kg \pm 16.5 % (k=2) |

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

| | |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 47.7 Ω - 7.0 j Ω |
| Return Loss | - 22.5 dB |

General Antenna Parameters and Design

| | |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.149 ns |
|----------------------------------|----------|

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

| | |
|-----------------|-------|
| Manufactured by | SPEAG |
|-----------------|-------|

DASY5 Validation Report for Head TSL

Date: 18.12.2023

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1112

Communication System: UID 0 - CW; Frequency: 2600 MHz

Medium parameters used: $f = 2600$ MHz; $\sigma = 2.02$ S/m; $\epsilon_r = 37.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.84, 7.84, 7.84) @ 2600 MHz; Calibrated: 03.11.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 03.10.2023
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.4(1535); SEMCAD X 14.6.14(7501)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 117.5 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 27.6 W/kg

SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.28 W/kg

Smallest distance from peaks to all points 3 dB below = 8.9 mm

Ratio of SAR at M2 to SAR at M1 = 51%

Maximum value of SAR (measured) = 23.3 W/kg

