# **ANNEX H Dipole Calibration Certificate**

# 750 MHz Dipole Calibration Certificate

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurict	y of		Schweizerischer Kalibrierdie Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service
Accredited by the Swiss Accreditati The Swiss Accreditation Service Multilateral Agreement for the re-	is one of the signatorie		Accreditation No.: SCS 010
Client CTTL Beijing		Certificate No.	D750V3-1017_Jul23
CALIBRATION C	ERTIFICATI	E	
Object	D750V3 - SN:10	17	
Calibration procedure(s)	QA CAL-05.v12 Calibration Proce	edure for SAR Validation Sources	s between 0.7-3 GHz
Calibration date:	July 14, 2023		
The measurements and the uncert All calibrations have been conduct	ainties with confidence p	onal standards, which realize the physical un robability are given on the following pages ar ry facility: environment temperature $(22 \pm 3)^{\circ}$	nd are part of the certificate.
The measurements and the uncert	ainties with confidence p	robability are given on the following pages arry facility: environment temperature $(22 \pm 3)^{\circ}$	nd are part of the certificate. C and humidity < 70%.
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### **Calibration Laboratory of**

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



S Schweizerischer Kalibrierdienst C Service suisse d'étalonnage

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

# 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:

- a) 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.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### Additional Documentation:

c) 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%.

Certificate No: D750V3-1017\_Jul23

Page 2 of 6

#### **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	750 MHz ± 1 MHz	

# Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.1 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

## SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.42 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.49 W/kg ± 16.5 % (k=2)

Certificate No: D750V3-1017\_Jul23

Page 3 of 6

#### Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.4 Ω - 0.3 jΩ
Return Loss	- 29.6 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

Certificate No: D750V3-1017\_Jul23

Page 4 of 6

## **DASY5 Validation Report for Head TSL**

Date: 14.07.2023

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1017

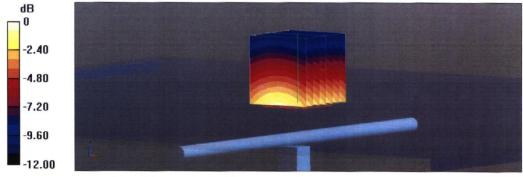
Communication System: UID 0 - CW; Frequency: 750 MHz Medium parameters used: f = 750 MHz;  $\sigma$  = 0.9 S/m;  $\epsilon_r$  = 42.1;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(10.11, 10.11, 10.11) @ 750 MHz; Calibrated: 10.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- 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/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 60.17 V/m; Power Drift = -0.09 dB Peak SAR (extrapolated) = 3.19 W/kg **SAR(1 g) = 2.12 W/kg; SAR(10 g) = 1.38 W/kg** Smallest distance from peaks to all points 3 dB below: Larger than measurement grid (> 15 mm) Ratio of SAR at M2 to SAR at M1 = 66% Maximum value of SAR (measured) = 2.85 W/kg

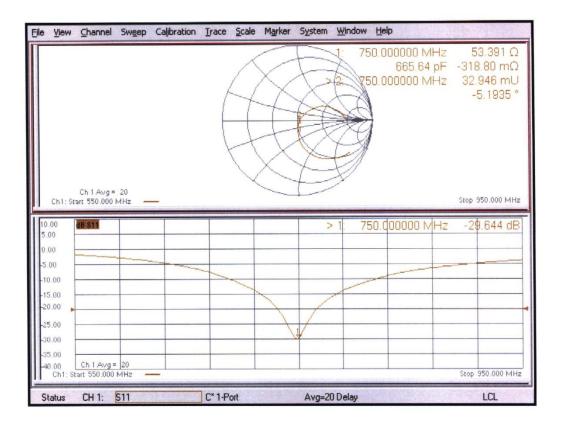


0 dB = 2.85 W/kg = 4.55 dBW/kg

Certificate No: D750V3-1017\_Jul23

Page 5 of 6

# Impedance Measurement Plot for Head TSL



Certificate No: D750V3-1017\_Jul23

Page 6 of 6

1

# 900 MHz Dipole Calibration Certificate

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich	, Switzerland	RACE MEA	Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service
Accredited by the Swiss Accreditation The Swiss Accreditation Service		s to the EA	Accreditation No.: SCS 01
Multilateral Agreement for the rec	ognition of calibration		
Client CTTL		Certificate No.	D900V2-1d051_Jul23
CALIBRATION C	ERTIFICATI		
Object	D900V2 - SN:1d	051	
Calibration procedure(s)	QA CAL-05.v12	dure for SAR Validation Sources	botwoon 0.7.3 GHz
	Calibration Proce	dure for SAN valuation Sources	between 0.7-0 anz
Calibration date:	July 14, 2023		
The measurements and the uncertain	ainties with confidence p	onal standards, which realize the physical un robability are given on the following pages an y facility: environment temperature (22 ± 3)°C	d are part of the certificate.
The measurements and the uncertain	ainties with confidence p ad in the closed laborator	robability are given on the following pages an	d are part of the certificate.
The measurements and the uncertain All calibrations have been conducted	ainties with confidence p ad in the closed laborator	robability are given on the following pages an y facility: environment temperature $(22 \pm 3)^{\circ}$	d are part of the certificate.
The measurements and the uncerta All calibrations have been conducte Calibration Equipment used (M&TE	ainties with confidence p ad in the closed laborator critical for calibration)	robability are given on the following pages an	nd are part of the certificate. C and humidity < 70%.
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Certificate No: D900V2-1d051\_Jul23

Page 1 of 6

#### Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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

### 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:

- a) 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.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

# Additional Documentation:

c) 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%.

Certificate No: D900V2-1d051\_Jul23

Page 2 of 6

# **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	900 MHz ± 1 MHz	

Head TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.97 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.7 ± 6 %	0.95 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

# SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.69 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	10.9 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL SAR measured	condition 250 mW input power	1.74 W/kg

Certificate No: D900V2-1d051\_Jul23

Page 3 of 6

### Appendix (Additional assessments outside the scope of SCS 0108)

#### **Antenna Parameters with Head TSL**

Impedance, transformed to feed point	50.6 Ω + 0.4 jΩ
Return Loss	- 43.4 dB

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.403 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
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Certificate No: D900V2-1d051\_Jul23

Page 4 of 6

## **DASY5 Validation Report for Head TSL**

Date: 14.07.2023

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN: 1d051

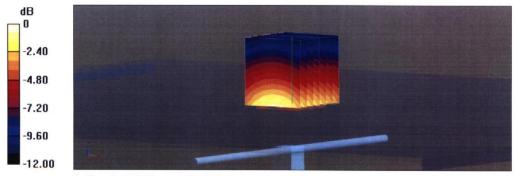
Communication System: UID 0 - CW; Frequency: 900 MHz Medium parameters used: f = 900 MHz;  $\sigma$  = 0.95 S/m;  $\epsilon_r$  = 41.7;  $\rho$  = 1000 kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(9.62, 9.62, 9.62) @ 900 MHz; Calibrated: 10.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- 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/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 65.58 V/m; Power Drift = -0.03 dB Peak SAR (extrapolated) = 4.09 W/kg SAR(1 g) = 2.69 W/kg; SAR(10 g) = 1.74 W/kg Smallest distance from peaks to all points 3 dB below = 18 mm Ratio of SAR at M2 to SAR at M1 = 65.4% Maximum value of SAR (measured) = 3.64 W/kg

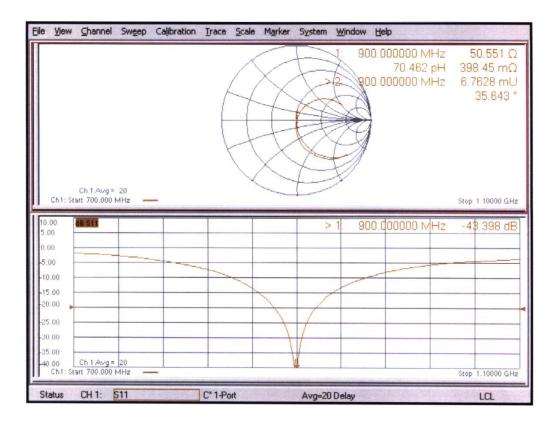


0 dB = 3.64 W/kg = 5.61 dBW/kg

Certificate No: D900V2-1d051\_Jul23

Page 5 of 6

# Impedance Measurement Plot for Head TSL



Certificate No: D900V2-1d051\_Jul23

Page 6 of 6

# 1800 MHz Dipole Calibration Certificate

Calibration Laboratory Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich,			Service suisse d'étalonnage
Accredited by the Swiss Accreditation The Swiss Accreditation Service i Multilateral Agreement for the rec	s one of the signatories		Accreditation No.: SCS 0108
Client CTTL Beljing		Certificate No.	D1800V2-2d145_Jul23
CALIBRATION C	ERTIFICATE	E	
Object	D1800V2 - SN:20	1145	
Calibration procedure(s)	QA CAL-05.v12		
	Calibration Proce	dure for SAR Validation Source	s between 0.7-3 GHz
Calibration date:	July 12, 2023		
	The STATE AND ADDRESS OF THE STATE AND ADDRESS		
The measurements and the uncerta	ainties with confidence pr	onal standards, which realize the physical ur robability are given on the following pages a ry facility: environment temperature (22 ± 3)°	nd are part of the certificate.
The measurements and the uncerta All calibrations have been conducte Calibration Equipment used (M&TE	ainties with confidence pr ad in the closed laborator critical for calibration)	robability are given on the following pages are $y$ facility: environment temperature $(22 \pm 3)^\circ$	nd are part of the certificate. C and humidity < 70%.
The measurements and the uncerta All calibrations have been conducte Calibration Equipment used (M&TE Primary Standards	ainties with confidence pr ad in the closed laborator critical for calibration)	robability are given on the following pages are ry facility: environment temperature (22 ± 3)° Cal Date (Certificate No.)	nd are part of the certificate. C and humidity < 70%. Scheduled Calibration
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# **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 S 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

### 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:

- a) 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.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

## Additional Documentation:

c) 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%.

Certificate No: D1800V2-2d145\_Jul23

Page 2 of 6

# **Measurement Conditions**

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	Sec
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

Head TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	1.37 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

# SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.9 W/kg ± 17.0 % (k=2)
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.90 W/kg

Certificate No: D1800V2-2d145\_Jul23

Page 3 of 6

### Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.4 Ω - 3.2 jΩ
Return Loss	- 28.7 dB

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.212 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
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Certificate No: D1800V2-2d145\_Jul23

Page 4 of 6

### **DASY5 Validation Report for Head TSL**

Date: 12.07.2023

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN:2d145

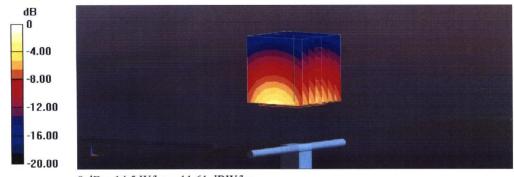
Communication System: UID 0 - CW; Frequency: 1800 MHz Medium parameters used: f = 1800 MHz;  $\sigma = 1.37$  S/m;  $\epsilon_r = 39.9$ ;  $\rho = 1000$  kg/m<sup>3</sup> Phantom section: Flat Section Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(8.63, 8.63, 8.63) @ 1800 MHz; Calibrated: 10.01.2023
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 19.12.2022
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; 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 = 110.2 V/m; Power Drift = -0.05 dB Peak SAR (extrapolated) = 17.2 W/kg SAR(1 g) = 9.35 W/kg; SAR(10 g) = 4.9 W/kg Smallest distance from peaks to all points 3 dB below = 10 mm Ratio of SAR at M2 to SAR at M1 = 54.8% Maximum value of SAR (measured) = 14.5 W/kg

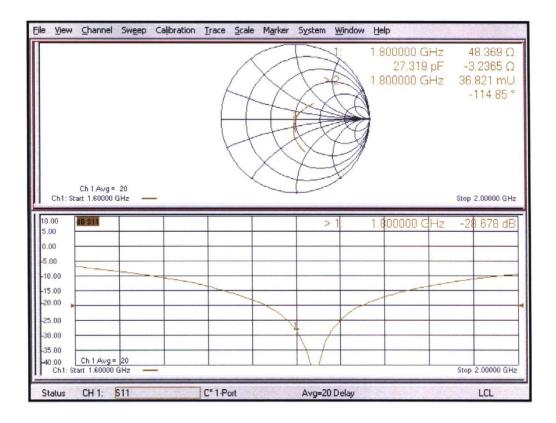


0 dB = 14.5 W/kg = 11.61 dBW/kg

Certificate No: D1800V2-2d145\_Jul23

Page 5 of 6





Certificate No: D1800V2-2d145\_Jul23

Page 6 of 6

# 1900 MHz Dipole Calibration Certificate

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich	y Of		Service suisse d'étalonnage Servizio svizzero di taratura
Accredited by the Swiss Accreditation The Swiss Accreditation Service	is one of the signatorie		Accreditation No.: SCS 01
Multilateral Agreement for the re-	cognition of calibration		D1900V2-5d101_Jul2
Beijing			
CALIBRATION C	ERTIFICATI	E	
Object	D1900V2 - SN:5	d101	
	01 011 05 10		
Calibration procedure(s)	QA CAL-05.v12 Calibration Proce	edure for SAR Validation Sources	s between 0.7-3 GHz
Calibration date:	July 17, 2023		
The measurements and the uncert	ainties with confidence p	onal standards, which realize the physical un robability are given on the following pages ar	and are part of the certificate.
The measurements and the uncert All calibrations have been conducted	ainties with confidence p		and are part of the certificate.
The measurements and the uncert	ainties with confidence p	robability are given on the following pages an	and are part of the certificate.
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Certificate No: D1900V2-5d101\_Jul23

Page 1 of 6

# Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland



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Schweizerischer Kalibrierdienst Service suisse d'étalonnage 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

# 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:

- a) 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.
- b) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### Additional Documentation:

c) 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%.

Certificate No: D1900V2-5d101\_Jul23

Page 2 of 6

# **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	1900 MHz ± 1 MHz	

Head TSL parameters The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.4 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

# SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition		
SAR measured	250 mW input power	9.89 W/kg	
SAR for nominal Head TSL parameters	normalized to 1W	39.8 W/kg ± 17.0 % (k=2)	
SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition		
	OFO mild input neuron	5 47 M//	
SAR measured	250 mW input power	5.17 W/kg	

Certificate No: D1900V2-5d101\_Jul23

Page 3 of 6