Report No.: FA4N0920C

Calibration Laboratory of Schmid & Partner Engineering AG





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

Accreditation No.: SCS 0108

Zeughausstrasse 43, 8004 Zurich, Switzerland

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 Taoyuan City Certificate No.

D750V3-1012\_Aug24

#### CALIBRATION CERTIFICATE

Object

D750V3 - SN: 1012

Calibration procedure(s)

QA CAL-05.v12

Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date

August 22, 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)

ID	Cal Date (Certificate No.)	Scheduled Cal
SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
SN: 101859	21-Mar-24 (No. 4030A315007801)	Mar-25
SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
SN: 1016	05-Oct-23 (No. OCP-DAK12-1016_Oct23)	Oct-24
SN: 1249	05-Oct-23 (No. OCP-DAK3.5-1249_Oct23)	Oct-24
SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
SN: 1836	10-Jan-24 (No. DAE4ip-1836_Jan24)	Jan+25
	SN: 100967 SN: 101859 SN: 101832 SN: 1152 SN: 1016 SN: 1249 SN: 7349	SN: 100967       28-Mar-24 (No. 217-04038)         SN: 101859       21-Mar-24 (No. 4030-315007801)         SN: 101832       25-Jan-24 (No. 4030-315007551)         SN: 1152       28-Mar-24 (No. 217-04050)         SN: 1016       05-Oct-23 (No. OCP-DAK12-1016_Oct23)         SN: 1249       05-Oct-23 (No. OCP-DAK3.5-1249_Oct23)         SN: 7349       03-Jun-24 (No. EX3-7349_Jun24)

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. 0001-300719404)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch SMA-240522)	May-25

Name

Function

Calibrated by

Krešimir Franjič

Laboratory Technician

Approved by

Sven Kühn

Technical Manager

Issued: August 22, 2024

Signature

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Certificate No: D750V3-1012\_Aug24

Report No.: FA4N0920C

Calibration Laboratory of Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland





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S Swiss Calibration Service

Accreditation No.: SCS 0108

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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 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%.

Certificate No: D750V3-1012\_Aug24 Page 2 of 6

D750V3 - SN: 1012 August 22, 2024

#### 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 ±1MHz	

#### Head TSL parameters at 750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.890 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	42.1 ±6%	0.900 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL at 750 MHz

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	2.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.40 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.41 W/kg ±16.5% (k = 2)

Certificate No: D750V3-1012\_Aug24 Page 3 of 6

D750V3 - SN: 1012

August 22, 2024

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

### Antenna Parameters with Head TSL at 750 MHz

Impedance			
Return Loss	-32.1 dB		

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1,037 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: D750V3-1012\_Aug24 Page 4 of 6

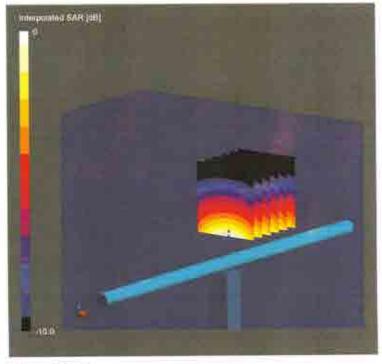
Report No.: FA4N0920C

D750V3 - SN: 1012 August 22, 2024

#### System Performance Check Report

Scan Method

Summary							
Dipole	Fr	equency (MHz)		TSL	Power (dilim)		
D750V3 - SN1012	75	SO HSL		24			
Exposure Condition	os						
Phantom Section, TSL	Test Distance [mm] Band	Group, UID Frequ	ency [MHz], Ch	annel Number	Conversion Factor	TSL Conductivity [5/m]	TSL Permittivity
Flat	35	CW, 0 750.	0.		9.8	0.90	42.1
Hardware Setup							
Phantom -	TSL, Measured Date	Probe, Cal	brellon Date		DAE.	DAE, Calibration Date	
Flat V4.9 mod	HSL, 2024-08-22	EX3DV4 - SN7349, 2024-06-03		DAE4Ip \$11836, 2024-01-10			
Scans Setup				Measuremer	nt Results		
		Zoon	n Scari				Zoom Scan
Grid Extents [mm]		30 × 30 × 30		Date			2024-08-22
Grid Steps [mm]		6.0 × 6.0	x 1.5	psSARTg (W/K	(g)		5(1)
Sensor Surface [mm]		1.4		psSAR10g (W	Kgl		1.36
Graded Grid			Yes	Power Drift  d	8]		0.01
Grading Ratio			1.5	Power Scaling	Fig. 1		Disabled
MAJA			N/A	Scaling Factor	[dB]		
Surface Detection		VM	S = 6p	TSL Correctio	n		Positive / Negative

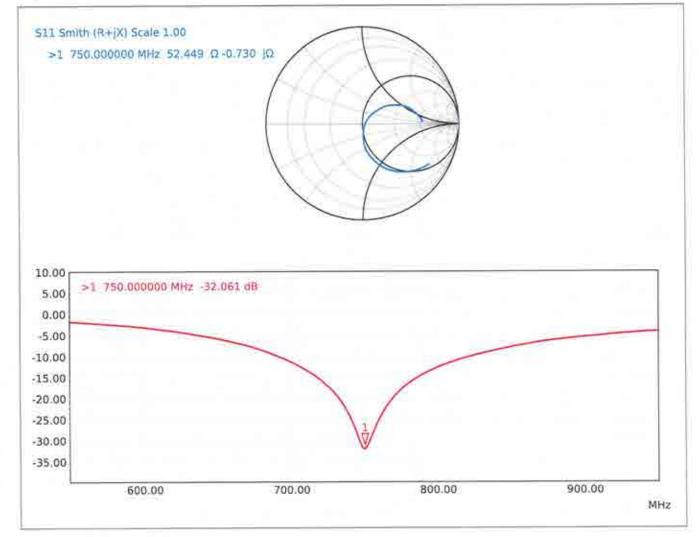


Measured

0 dB = 3.37 W/Kg

D750V3 - SN: 1012 August 22, 2024

### Impedance Measurement Plot for Head TSL



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#### Calibration Laboratory of Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland





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Accreditation No.: SCS 0108

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Client

Sporton Taoyuan City

Certificate No.

D835V2-499 Aug24

#### CALIBRATION CERTIFICATE

Object

D835V2 - SN: 499

Calibration procedure(s)

QA CAL-05.v12

Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date

August 22, 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 Cal
Power Sensor R&S NRP-33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Power Sensor R&S NRP18A	SN: 101859	21-Mar-24 (No. 4030A315007801)	Mar-25
Spectrum Analyzer R&S FSV40	SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
Mismatch; Short [S4188] Attenuator [S4423]	SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
OCP DAK-12	SN: 1016	05-Oct-23 (No. OCP-DAK12-1016_Oct23)	Oct-24
OCP DAK-3.5	SN: 1249	05-Oct-23 (No. OCP-DAK3.5-1249_Oct23)	Oct-24
Reference Probe EX3DV4	SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
DAE4ip	SN: 1836	10-Jan-24 (No. DAE4ip-1836 Jan24)	Jan-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. 0001-300719404)	May-25
Mismatch: SMA	SN: 1102	22-May-24 (No. 675-Mismatch SMA-240522)	May-25

Name

Function

Calibrated by

Krešimir Franjić

Laboratory Technician

Approved by

Sven Kühn

Technical Manager

Issued: August 22, 2024

Signature

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Certificate No: D835V2-499\_Aug24

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Report No.: FA4N0920C

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





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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.
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- 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%.

Certificate No: D835V2-499\_Aug24 Page 2 of 6

August 22, 2024 D835V2 - SN: 499

#### **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	835MHz ±1MHz	

#### Head TSL parameters at 835 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.900 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	41.9 ±6%	0.930 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL at 835 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.44 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	1.52 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.05 W/kg ±16.5% (k = 2)

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D835V2 - SN: 499

August 22, 2024

Report No.: FA4N0920C

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

### Antenna Parameters with Head TSL at 835 MHz

Impedance	50.9 Ω – 5.8 jΩ	
Return Loss	-24.8 dB	

### General Antenna Parameters and Design

Electrical Delay (one direction)	1,391 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: D835V2-499\_Aug24 Page 4 of 6

D835V2 - SN: 499

#### System Performance Check Report

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Summary

Dipole	Frequency (MHz)	TSL	Power (dkm)	
D835V2 - 5N499	895	HSL	24	

#### **Exposure Conditions**

Phantom Section, TSL	Test Distance [mm]	Band	Group, GID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	15		CW, 0-	835, 0	9.61	0.93	41,9

#### Hardware Setup

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE_Calibration Date	
Flat V4.9 mod	HSL, 2024-08-22	EX3DV4 - SN7349, 2024-06-03	DAE4ip Sn1836, 2024-01-10	

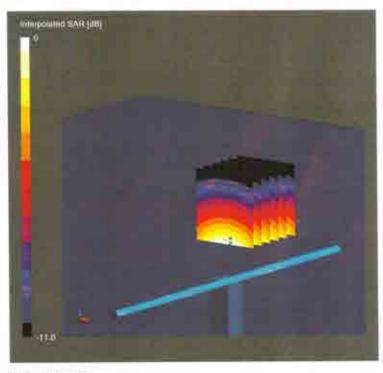
#### Scans Setup

	Zoom Scan
Grid Extents [mm]	30 × 30 × 30
Grid Steps [mm]	6.0 x 6.0 x 1.5
Sensor Surface (/mm)	(1.4
Graded Grid	Yes
Grading Ratio	113
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

#### Measurement Results

Temporary Committee	
	Zoom Stan
Date	2024-08-22
psSAR1g [W/Kg]	2,37
psSAR10g [W/Kg]	1.52
Power Drift (dB)	0.01
Power Scaling	D(sabled
Scaling Factor [d8]	
TSL Correction	Positive / Negative

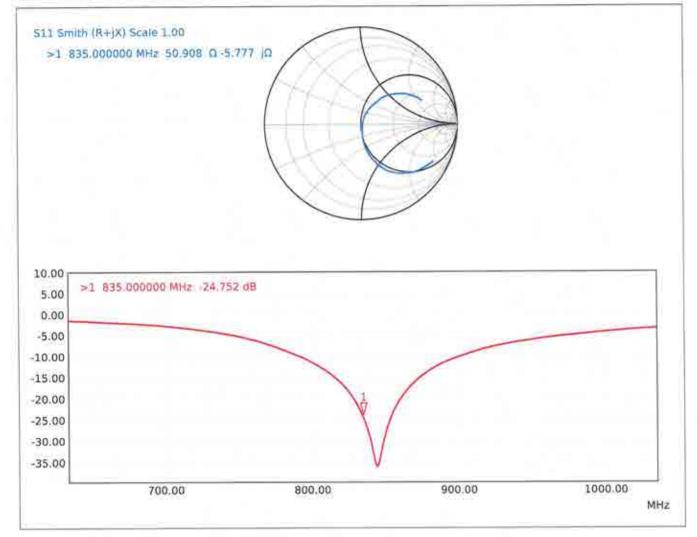
August 22, 2024



0 dB = 3.80 W/Kg

D835V2 - SN: 499 August 22, 2024

### Impedance Measurement Plot for Head TSL



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#### Calibration Laboratory of Schmid & Partner Engineering AG





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Swiss Calibration Service

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Accreditation No.: SCS 0108

Client

Sporton Taoyuan City Certificate No.

D835V2-4d060\_Feb25

#### CALIBRATION CERTIFICATE

Object

D835V2 - SN: 4d060

Calibration procedure(s)

QA CAL-05.v12

Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date

Calibrated by

Approved by

February 17, 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%.

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Mismatch; Short [S4188] Attenuator [S4423]	SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
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OCP DAK-3.5	SN: 1249	23-Sept-24 (No. OCP-DAK3.5-1249_Sep24)	Sep-25
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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

Laboratory Technician

Signature Function Name

Sven Kühn Technical Manager

Lelf Klysner

Issued: February 18, 2025

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Certificate No: D835V2-4d060\_Feb25

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Calibration Laboratory of Schmid & Partner

Engineering AG

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Swiss Calibration Service

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February 17, 2025

D835V2 - SN: 4d060

#### **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	835MHz ±1MHz	

#### Head TSL parameters at 835 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.900 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	41.4 ±6%	0.900 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL at 835 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.28 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	1.51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.01 W/kg ±16.5% (k = 2)

Page 3 of 6 Certificate No: D835V2-4d060\_Feb25

D835V2 - SN: 4d060 February 17, 2025

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

#### Antenna Parameters with Head TSL at 835 MHz

Impedance	52.3 Ω – 2.6 μΩ
Return Loss	-29.4 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.39 ns	
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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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Report No.: FA4N0920C

D835V2 - SN: 4d060

February 17, 2025

#### System Performance Check Report

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Dipole	Frequency (MHz)	TSL	Power [dBm]
D835VZ - SN4d960	835	HSL	74

#### **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-	835,0	9.51	0.96	41.4

#### Hardware Setup

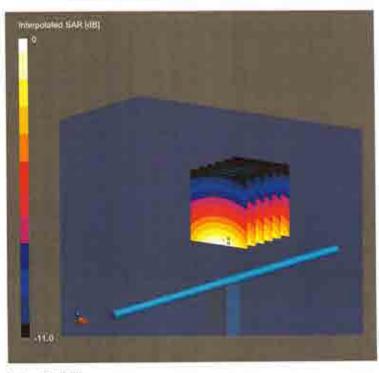
Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date	
Flat V4.9 mod	HSL, 2025-02-17	EX3DV4 - SN7349, 7025-01-10	DAE4Ip Sn1836, 2024-10-28	

#### Scans Setup

	Zoom Scan
Grid Extents [mm]	30 x 30 x 30
Grid Steps [mim]	6.0 × 6.0 × 1.5
Sensor Surface [mm]	1.4
Graded Crid	Yes
Grading Ratio	13
MALA	N/A
Surface Detection	VMS = 6p
Scan Method	Measured

#### Measurement Results

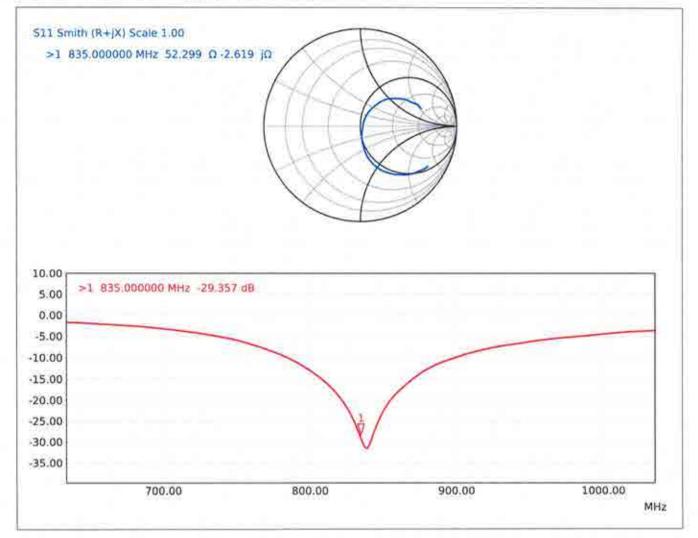
	Zoom Scan
Date	2025-02-17
psSAR1g (W/kg)	2.33
psSAR10g [W/Kg]	1.51
Power Drift (dB)	0.0
Power Scaling	Disabled
Scaling Factor (dB)	
TSL Correction	Positive / Negative



0 d8 = 3.60 W/Kg

D835V2 - SN: 4d060 February 17, 2025

### Impedance Measurement Plot for Head TSL



Certificate No: D835V2-4d060\_Feb25

Report No.: FA4N0920C

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





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Client

Sporton

Certificate No: D1640V2-346\_Aug22

### CALIBRATION CERTIFICATE

Object

D1640V2 - SN:346

Calibration procedure(s)

QA CAL-05.v11

Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date:

August 19, 2022

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22
	Name	Function	Signature
Calibrated by:	Jeffrey Katzman	Laboratory Technician	d. lot
Approved by:	Sven Kühn	Technical Manager	

Issued: August 22, 2022

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Certificate No: D1640V2-346\_Aug22

Page 1 of 6

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





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Accreditation No.: SCS 0108

Report No.: FA4N0920C

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#### Glossary:

TSL

tissue simulating liquid

ConvF N/A sensitivity in TSL / NORM x,y,z 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: D1640V2-346\_Aug22 Page 2 of 6

Report No.: FA4N0920C

#### **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	1640 MHz ± 1 MHz	

### **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.2	1.31 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.6 ± 6 %	1.30 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	8,69 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	34.6 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	4.67 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	18.6 W/kg ± 16.5 % (k=2)

Certificate No: D1640V2-346\_Aug22 Page 3 of 6

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

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	$49.9 \Omega + 5.6 j\Omega$	
Return Loss	- 25.1 dB	

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1,229 ns
Liectifical Delay (offe direction)	11220 110

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

	M	anufactured by	SPEAG
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Certificate No: D1640V2-346\_Aug22 Page 4 of 6

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

Date: 19.08.2022

Report No.: FA4N0920C

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1640 MHz; Type: D1640V2; Serial: D1640V2 - SN: 346

Communication System: UID 0 - CW; Frequency: 1640 MHz

Medium parameters used: f = 1640 MHz;  $\sigma = 1.3 \text{ S/m}$ ;  $\varepsilon_r = 38.6$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

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

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.68, 8.68, 8.68) @ 1640 MHz; Calibrated: 31.12.2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 02.05.2022

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 = 105.4 V/m; Power Drift = 0.06 dB

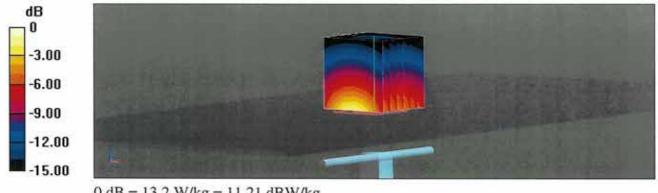
Peak SAR (extrapolated) = 15.9 W/kg

SAR(1 g) = 8.69 W/kg; SAR(10 g) = 4.67 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

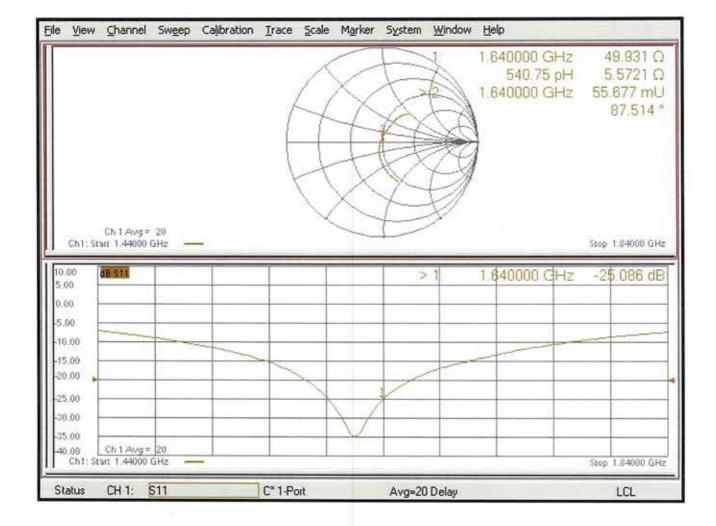
Ratio of SAR at M2 to SAR at M1 = 54.9%

Maximum value of SAR (measured) = 13.2 W/kg



0 dB = 13.2 W/kg = 11.21 dBW/kg

### Impedance Measurement Plot for Head TSL





#### D1640V2, serial no. 346 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.

#### <Justification of the extended calibration>

D1640V2 – serial no. 346						
1640MHZ						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
08.19.2022 (Cal. Report)	-25.086		49.931		5.5721	
08.18.2023 (extended)	-28.406	13.23	48.295	1.636	2.596	2.9761
08.17.2024 (extended)	-24.201	3.528	52.17	2.239	4.1083	-1.4638

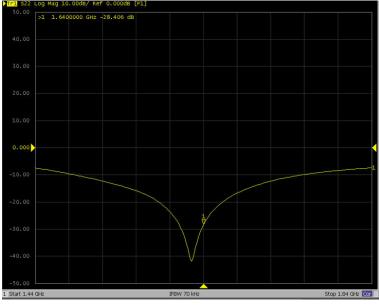
The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

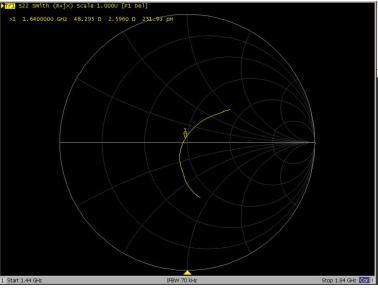
SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978



# <Dipole Verification Data> - D1640V2, serial no. 346 (Data of Measurement : 08.18.2023) D1640V2 MHz - Head



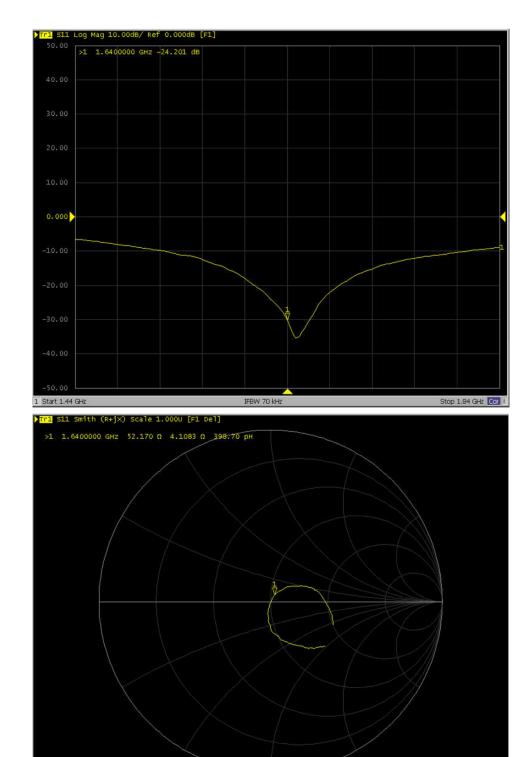


SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978



## <Dipole Verification Data> - D1640V2, serial no. 346 (Data of Measurement : 08.17.2024) D1640V2 MHz - Head



IFBW 70 kHz

#### SPORTON INTERNATIONAL INC.

1 Start 1.44 GHz

TEL: 886-3-327-3456 FAX: 886-3-328-4978 Stop 1.84 GHz Cor

Report No.: FA4N0920C

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Client

Sporton Taoyuan City Certificate No.

D1750V2-1120\_Mar25

#### **CALIBRATION CERTIFICATE**

Object D1750V2 - SN: 1120

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 Franjič Laboratory Technician

Approved by Sven Kühn Technical Manager

Issued: March 13, 2025

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Report No.: FA4N0920C

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Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland





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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 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 tilled 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%.

Certificate No: D1750V2-1120\_Mar25 Page 2 of 6

Report No.: FA4N0920C

Page30/356

D1750V2 - SN: 1120 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 ±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 ±0.2)°C	40.7 ±6%	1.35 mho/m ±6%
HSL temperature change during test	< 0.5 °C		

#### SAR result with HSL at 1750 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	9.25 W/kg
SAR for nominal HSL parameters	normalized to 1W	36.8 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	4.93 W/kg
SAR for nominal HSL parameters	normalized to 1W	19.6 W/kg ±16.5% (k = 2)

Certificate No: D1750V2-1120\_Mar25 Page 3 of 6

Report No.: FA4N0920C

D1750V2 - SN: 1120

March 12, 2025

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

#### Antenna Parameters with HSL at 1750 MHz

Impedance	50.2 Ω – 0.3 jΩ		
Return Loss	-48.4 dB		

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.217 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

Certificate No: D1750V2-1120\_Mar25 Page 4 of 6

Report No.: FA4N0920C

D1750V2 - SN: 1120 March 12, 2025

#### System Performance Check Report

Dipole	Frequency (MHz)	TSL	Power [dBm]	
D1750VZ - SN11Z0	1750	icsi	24	

#### **Exposure Conditions**

Phantom Section, TSL	Test Distance (mm)	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [5/m]	TSL Permuttivity
Flat	10		CW. 0+-	1750.0	7.96	1.35	46,7

#### Hardware Setup

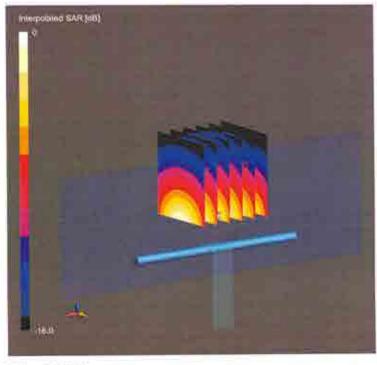
Phantom.	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date	
MFF V8.0 Center	HSL, 2025-03-12	EX3DV4 - SN7349, 2025-01-10	DA64ip Sel 836, 2024-10-28	

Scans Setup

	Zoom Scan
Grid Extents (mm)	10 x 30 x 30
Grid Steps (mm)	6.0 × 6.0 × 1.5
Sensor Surface [mm]	504
Graded Grid	Yes
Crading Ratio	7.5
MAIA	N/A
Surface Datection	VMS = 6p
Scan Method	Measured

#### Measurement Results

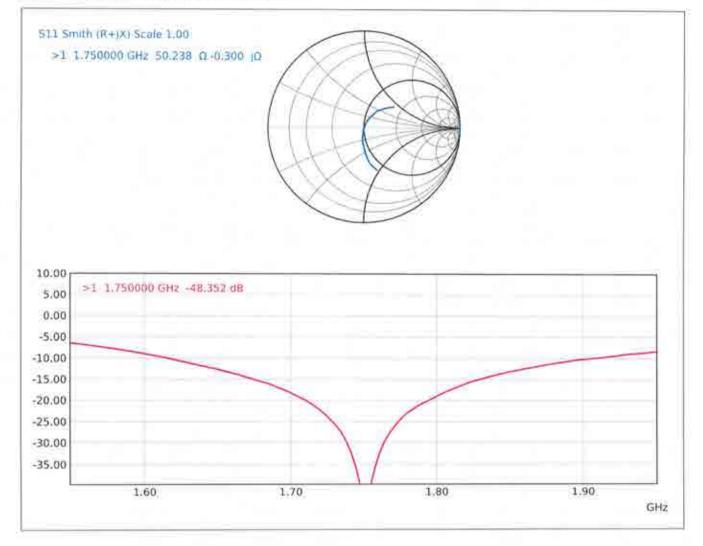
Zoom Scan
2025-03-12
9.25
4.93
-0,02
Disabled
Fositive / Negative



0 d8 = 16.1 W/Kg

D1750V2 - SN: 1120 March 12, 2025

### Impedance Measurement Plot for HSL



Certificate No: D1750V2-1120\_Mar25 Page 6 of 6

Report No.: FA4N0920C

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Accreditation No.: SCS 0108

Client

Sporton

Certificate No: D1750V2-1068\_Nov22

## **CALIBRATION CERTIFICATE**

Object

D1750V2 - SN:1068

Calibration procedure(s)

QA CAL-05.v11

Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date:

November 21, 2022

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	577 BB
DAE4	SN: 601	31-Aug-22 (No. DAE4-601_Aug22)	Dec-22
	#8407590086	5	Aug-23
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)	
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-22)	In house check: Oct-24
		or man 11 (in House Check Oct-22)	In house check: Oct-24
2000 N N N	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	1 1/2
			12 lle
Approved by:	Sven Kühn	Technical Manager	0/
		24	J- (I

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Issued: November 23, 2022

Certificate No: D1750V2-1068\_Nov22

Page 1 of 6

Report No.: FA4N0920C

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





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Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL

tissue simulating liquid

ConvF N/A

sensitivity in TSL / NORM x,y,z 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: D1750V2-1068\_Nov22

Report No.: FA4N0920C

### **Measurement Conditions**

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

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	V32.10,4
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	with Spacer
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		1.54 mild/iii ± 6 %

### SAR result with Head TSL

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	A CHOCAMAN CHOO TO CO
	Hornidized to TVV	36.7 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.80 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	The second second
	normanzed to TVV	19.3 W/kg ± 16.5 % (k=2)

Certificate No: D1750V2-1068\_Nov22

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

# Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω + 2.8 jΩ
Return Loss	- 29.9 dB
	25.5 00

# General Antenna Parameters and Design

Electrical Delay (one direction)	PO-DITOR DE LA CONTRACTOR DEL CONTRACTOR DE LA CONTRACTOR DE LA CONTRACTOR DE LA CONTRACTOR	
Liectrical Delay (one direction)	1.220 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	
ivialitulactured by	SPEAG
	55 X 75 X 75 X

Certificate No: D1750V2-1068\_Nov22 Page 4 of 6

# **DASY5 Validation Report for Head TSL**

Date: 21.11.2022

Report No.: FA4N0920C

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1068

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma = 1.34$  S/m;  $\varepsilon_r = 38.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

## DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.67, 8.67, 8.67) @ 1750 MHz; Calibrated: 31.12.2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 31.08.2022

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 = 109.1 V/m; Power Drift = -0.08 dB

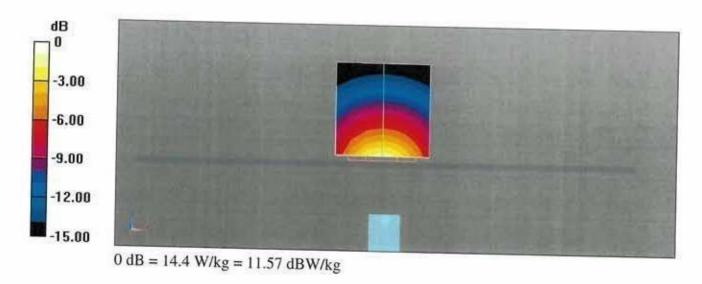
Peak SAR (extrapolated) = 17.2 W/kg

SAR(1 g) = 9.12 W/kg; SAR(10 g) = 4.80 W/kg

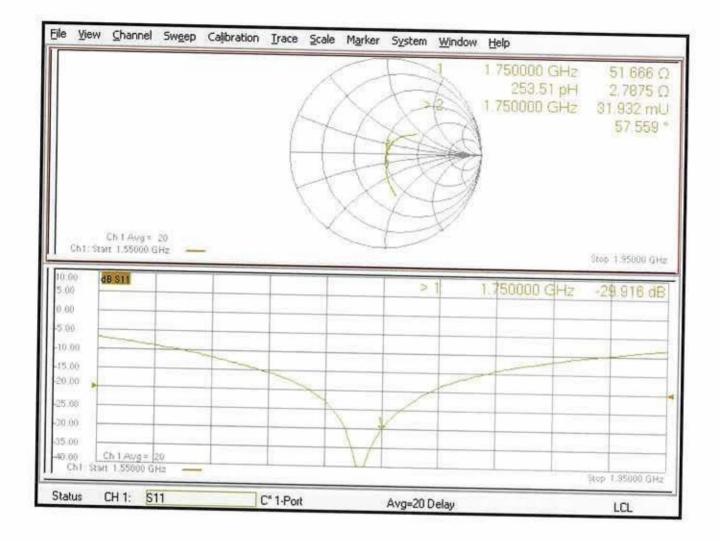
Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 53.5%

Maximum value of SAR (measured) = 14.4 W/kg



# Impedance Measurement Plot for Head TSL





### D1750V2, serial no. 1068 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.

#### <Justification of the extended calibration>

	D <b>1750</b> V2 – serial no. <b>1068</b>					
		1750MHZ				
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
11.21.2022 (Cal. Report)	-29.916		51.686		2.7875	
11.20.2023 (extended)	-32.297	7.959	50.595	-1.09	2.4789	-0.3086
11.19.2024 (extended)	-29.653	0.879	49.173	-2.513	2.6993	-0.0882

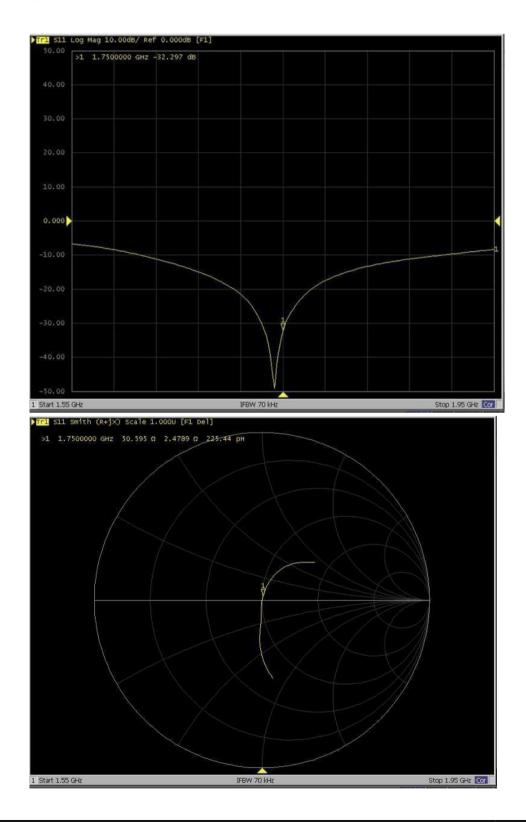
The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

SPORTON INTERNATIONAL INC.

TEL:886-3-327-3456 FAX:886-3-328-4978



# <Dipole Verification Data> - D1750 V2, serial no. 1068 (Data of Measurement : 11.20.2023) 1750 MHz - Head

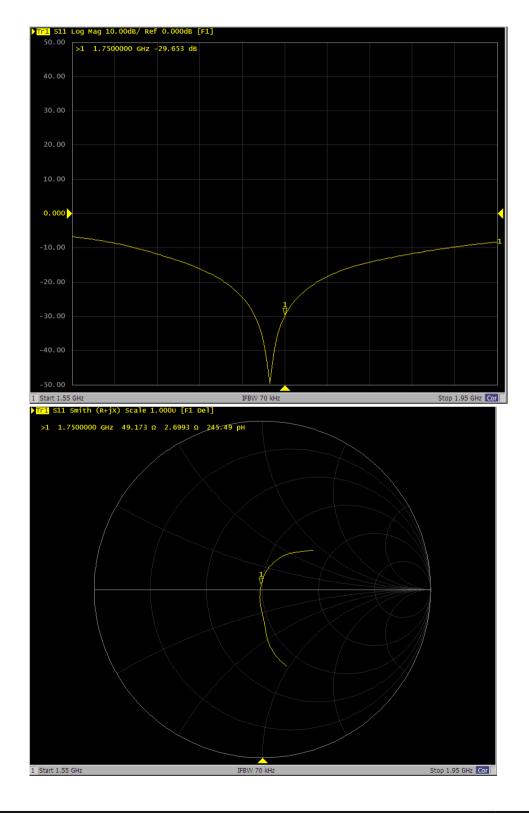


SPORTON INTERNATIONAL INC.

TEL:886-3-327-3456 FAX:886-3-328-4978



# <Dipole Verification Data> - D1750 V2, serial no. 1068 (Data of Measurement : 11.19.2024) 1750 MHz - Head



SPORTON INTERNATIONAL INC.

TEL:886-3-327-3456 FAX:886-3-328-4978

Report No.: FA4N0920C

### Calibration Laboratory of

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland





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Client

Sporton Taoyuan City Certificate No.

D1900V2-5d041\_Aug24

#### **CALIBRATION CERTIFICATE**

Object

D1900V2 - SN: 5d041

Calibration procedure(s)

QA CAL-05.v12

Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date

August 15, 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 Cal
Power Sensor R&S NRP-33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Power Sensor R&S NRP18A	SN: 101859	21-Mar-24 (No. 4030A315007801)	Mar-25
Spectrum Analyzer R&S FSV40	SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
Mismatch; Short [S4188] Attenuator [S4423]	SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
OCP DAK-12	SN: 1016	05-Oct-23 (No. OCP-DAK12-1016_Oct23)	Oct-24
OCP DAK-3.5	SN: 1249	05-Oct-23 (No. OCP-DAK3.5-1249_Oct23)	Oct-24
Reference Probe EX3DV4	SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
DAE4ip	SN: 1836	10-Jan-24 (No. DAE4ip-1836_Jan24)	Jan-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. 0001-300719404)	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: August 16, 2024

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Certificate No: D1900V2-5d041\_Aug24

Page 1 of 6

Report No.: FA4N0920C

#### Calibration Laboratory of

Schmid & Partner Engineering AG

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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 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%.

Certificate No: D1900V2-5d041\_Aug24 Page 2 of 6

August 15, 2024 D1900V2 - SN: 5d041

#### **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	

### Head TSL parameters at 1900 MHz

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	41.2 ±6%	1.40 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

## SAR result with Head TSL at 1900 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	9.84 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	39.2 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	5.21 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.7 W/kg ±16.5% (k = 2)

Page 3 of 6 Certificate No: D1900V2-5d041\_Aug24

D1900V2 - SN: 5d041 August 15, 2024

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

### Antenna Parameters with Head TSL at 1900 MHz

Impedance	51.4 Ω + 6.2 jΩ
Return Loss	-24.1 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1,2 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: D1900V2-5d041\_Aug24 Page 4 of 6

August 15, 2024

Report No.: FA4N0920C

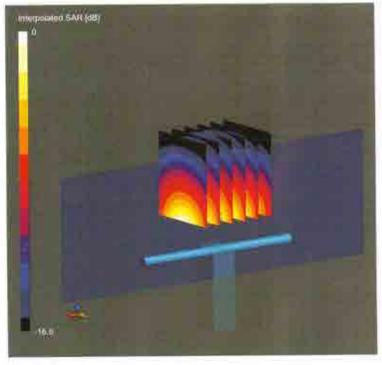
# D1900V2 - SN: 5d041

### System Performance Check Report

Summary								
Dipole			Frequency [8	MH2]	TSL	Power (d8m)	V	
D1900V2 - SNSd041			1900		HSL	24		
Exposure Condition	15							
Phantom Section, TSL	Test Distance (mm)	Band	Group, UID	Frequency (MHz)	Channel Number	Conversion Factor	TSL Conductivity [5/m]	TSL Permittivity
Flat	10		CW, 0	1900, 0		7.73	1240	41.2
Hardware Setup								
Phantom	TSL, Measured	Date	A.	Probe, Calibration C	)ate	270	Calibration Date	
MEP V8.0 Center	HSL, 2024-08	-15	3	X3DV4 - 5N7349,	2024-06-03	DAE	4ip Sn1836, 2024-01-10	
Scans Setup					Measuremen	nt Results		
				Zoom Scan				Zoom Scar
								2024 20 14

cans Setup		
	Zoom Scan	
Grid Extents [mm]	30 x 30 x 30	
Crid Steps (mm)	6.0 x 6.9 x 1,3	
Sensor Surface [mm]	10	
Graded Grid	Yes	
Grading Ratio	1.5	
MAIA	NIA	
Surface Detection	VMS - 6p	
Scan Method	Measured	

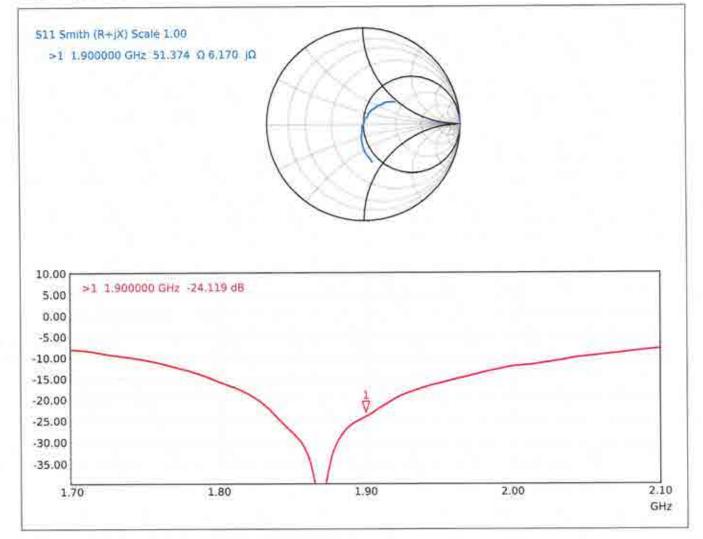
feasurement Results		
	Zoom Scan	
Date	2024-08-15	
psSAR1g [W/Kg]	9.84	
psSAR10g (W/Kg)	5.21	
Power Driff [d8]	0.0)	
Power Scaling	Disabled	
Scaling Factor [dB]		
TSI. Correction	Positive / Negative	



0 d8 = 17,3 W/Kg

D1900V2 - SN: 5d041 August 15, 2024

# Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-5d041\_Aug24 Page 6 of 6

Report No.: FA4N0920C

# Calibration Laboratory of

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





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Accreditation No.: SCS 0108

Client

Sporton

Certificate No: D1900V2-5d185\_Jun22

# **CALIBRATION CERTIFICATE**

Object

D1900V2 - SN:5d185

Calibration procedure(s)

QA CAL-05.v11

Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date:

June 17, 2022

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
ower meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Ower sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
ower sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22
	Name	Function	Signature
Calibrated by:	Jeffrey Katzman	Laboratory Technician	1/A
Approved by:	Cues Vibs	EO PAR NETECANTE COMMONS	O'ay
Alexand Cy.	Sven Kühn	Technical Manager	S.C.

Issued: June 20, 2022

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Certificate No: D1900V2-5d185\_Jun22

Report No.: FA4N0920C

# Calibration Laboratory of

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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: D1900V2-5d185\_Jun22

### **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	38.6 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	2.2	

# SAR result with Head TSL

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.82 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	39.0 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	5.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.4 W/kg ± 16.5 % (k=2)

Certificate No: D1900V2-5d185\_Jun22 Page 3 of 6

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

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.7 Ω + 3.9 jΩ
Return Loss	- 26.7 dB

# General Antenna Parameters and Design

Floatring Delevides all 11	
Electrical Delay (one direction)	1.203 ns
AMADE AND	1.200 110

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**

Manager	
Manufactured by	SPEAG
	SPEAG

Certificate No: D1900V2-5d185\_Jun22 Page 4 of 6

# DASY5 Validation Report for Head TSL

Date: 17.06.2022

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d185

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz;  $\sigma = 1.4$  S/m;  $\epsilon_r = 38.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43) @ 1900 MHz; Calibrated: 31.12.2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 02.05.2022

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 = 108.9 V/m; Power Drift = 0.08 dB

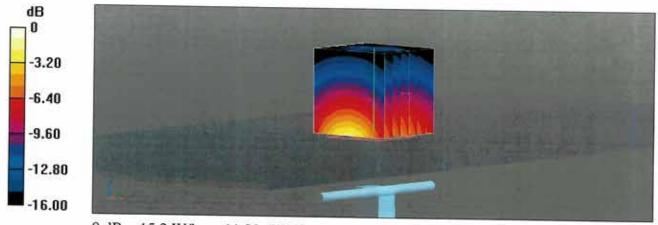
Peak SAR (extrapolated) = 18.1 W/kg

# SAR(1 g) = 9.82 W/kg; SAR(10 g) = 5.12 W/kg

Smallest distance from peaks to all points 3 dB below = 10 mm

Ratio of SAR at M2 to SAR at M1 = 54.7%

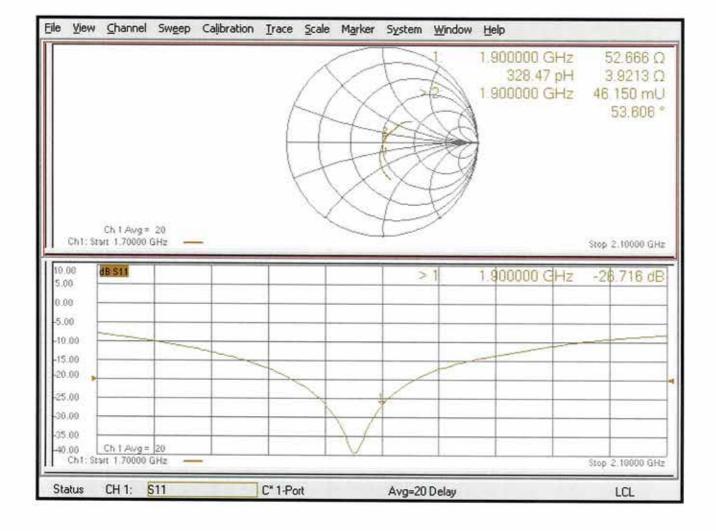
Maximum value of SAR (measured) = 15.2 W/kg



0 dB = 15.2 W/kg = 11.82 dBW/kg

Certificate No: D1900V2-5d185\_Jun22

# Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-5d185\_Jun22



#### D1900V2, serial no. 5d185 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.

#### <Justification of the extended calibration>

D1900V2 – serial no. 5d185								
		1900MHZ						
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)		
06.17.2022 (Cal. Report)	-26.716		52.666		3.9213			
06.16.2023 (extended)	-26.908	0.72 53.715 1.049 3.9028	-0.0185					
06.15.2024 (extended)	-24.876	-6.89	50.698	-1.968	6.2093	2.288		

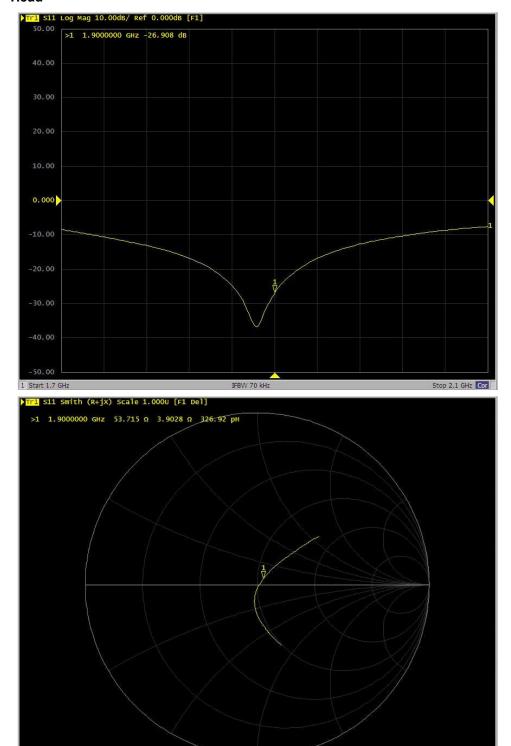
The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978



# <Dipole Verification Data> - D1900 V2, serial no. 5d185(Data of Measurement : 06.16.2023) 1900MHz - Head



IFBW 70 kHz

Stop 2.1 GHz Cor

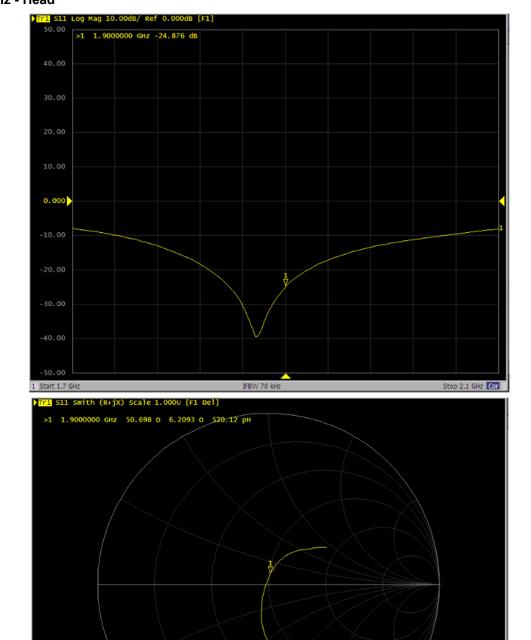
#### SPORTON INTERNATIONAL INC.

1 Start 1.7 GHz

TEL: 886-3-327-3456 FAX: 886-3-328-4978



# <Dipole Verification Data> - D1900 V2, serial no. 5d185 (Data of Measurement : 06.15.2024) 1900MHz - Head



SPORTON INTERNATIONAL INC.

TEL: 886-3-327-3456 FAX: 886-3-328-4978

Report No.: FA4N0920C

#### Calibration Laboratory of

Schmid & Partner 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)

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

Client

Sporton Taoyuan City Certificate No.

D2000V2-1070\_Mar25

#### **CALIBRATION CERTIFICATE**

Object D2000V2 - SN: 1070

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±3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	- ID	Cai Date (Certificate No.)	Scheduled Cal
Power Sensor R&S NAP-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-Sept-24 (No. OCP-DAK12-1016_Sep24)	Sep-25
OCP DAK-3.5	SN: 1249	23-Sept-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 Franjič Laboratory Technician

Approved by Sven Kühn Technical Manager

Issued: March 13, 2025

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

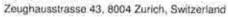
Certificate No: D2000V2-1070\_Mar25

Page 1 of 6

Report No.: FA4N0920C

### Calibration Laboratory of

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Swiss Calibration Service

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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 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 tilled 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 leed 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%.

Certificate No: D2000V2-1070\_Mar25 Page 2 of 6

Report No.: FA4N0920C

D2000V2 - SN: 1070 March 13, 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, $dy = 5mm$ , $dz = 1.5mm$	Graded Ratio = 1.5 mm (Z direction)
Frequency	2000MHz ±1MHz	

### HSL parameters at 2000 MHz

The following parameters and calculations were applied.

Temperature	Permittivity	Conductivity
22.0 °C	40.0	1.40 mho/m
(22.0 ±0.2)°C	39.5 ±6%	1.40 mho/m ±6%
< 0.5 °C		
	22.0 °C (22.0 ±0.2)°C	22.0 °C 40.0 (22.0 ±0.2)°C 39.5 ±6%

#### SAR result with HSL at 2000 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	10.3 W/kg
SAR for nominal HSL parameters	normalized to 1W	41.0 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of HSL	Condition	
SAR for nominal HSL parameters	24 dBm input power	5.35 W/kg
SAR for nominal HSL parameters	normalized to 1W	21.3 W/kg ±16.5% (k = 2)

Certificate No: D2000V2-1070\_Mar25 Page 3 of 6

D2000V2 - SN: 1070 March 13, 2025

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

#### Antenna Parameters with HSL at 2000 MHz

Impedance	49.3 Ω – 1.8 jΩ	
Return Loss	-34.0 dB	

#### General Antenna Parameters and Design

Electrical Delay (one direction)	1.193 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
Manuactured by	SFEAG

Certificate No: D2000V2-1070\_Mar25 Page 4 of 6

Report No.: FA4N0920C

D2000V2 - SN: 1070 March 13, 2025

#### System Performance Check Report

5	u	m	m	a	п
-	_	000		_	-3

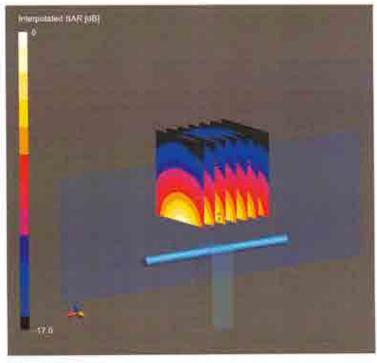
Dibote		Frequency (M)	151	Power (dlim)		
D2000V2 - 5N1070		2000	HSL	24		
Exposure Condition	5					
Phantom Section, TSL.	Yest Distance [mm]   B	and Group, UID	Frequency (MHz), Channel Number	Conversion Factor	TSL Conductivity (5/m)	TSL Permittivity
Flax	16	CW, 0	2000, 4	7,61	1,40	99.3
Hardware Setup						
Phantom:	TSL, Measured Dat	ė	Probe, Calibration Date	DA£,	Calibration Date	
MFP VS.0 Center	enter HSL, 2025-03-13		X3DV4 - SN7349, 2025-01-10	DAE-11p Sn F836; 2024-10-28		

#### Scans Setup

	Zoom Scan
Grid Extents [mm]	30 x 30 x 30
Grid Steps [mm]	5,0 x 5.0 x 1.3
Sensor Surface [mm]	7.8
Craded Grid	Yes
Grading Ratin	(.5
MAIA	N/A
Surface Detection	VMS + 6d
Scan Method	Measured

#### Measurement Results

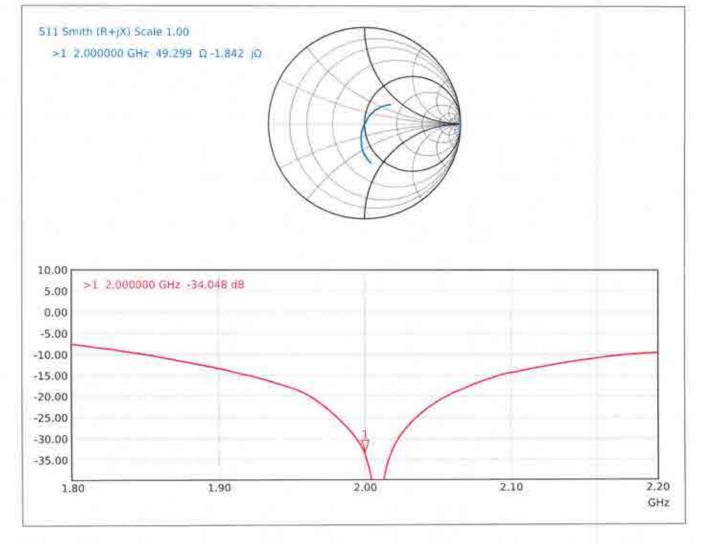
TO SEE STEELS TO	
	Zoom Scan
Date	2025-03-13
psSAR1g [W/Kg]	10.3
psSAR10g [W/Kg)	5.35
Fower Ontt [d8]	0.00
Power Scaling	Oisabled
Scaling Factor (dB)	
TSL Correction	Positive / Negative



0 d8 = 18.9 W/Kg

D2000V2 - SN: 1070 March 13, 2025

# Impedance Measurement Plot for HSL



Certificate No: D2000V2-1070\_Mar25

Report No.: FA4N0920C

#### Calibration Laboratory of Schmid & Partner

Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland





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Client

Sporton Taoyuan City Certificate No.

D2300V2-1088\_Jul24

# **CALIBRATION CERTIFICATE**

Object

D2300V2 - SN: 1088

Calibration procedure(s)

QA CAL-05.v12

Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date

July 10, 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)

ID	Cal Date (Certificate No.)	Scheduled Cal
SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
SN: 101859	21-Mar-24 (No. 4030A315007801)	Mar-25
SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
SN: 1016	05-Oct-23 (No. OCP-DAK12-1016_Oct23)	Oct-24
SN: 1249	05-Oct-23 (No. OCP-DAK3.5-1249_Oct23)	Oct-24
SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
1.05 (1.71 1.15 0.25 2.25)	10-Jan-24 (No. DAE4ip-1836_Jan24)	Jan-25
	SN: 100967 SN: 101859 SN: 101832 SN: 1152 SN: 1016 SN: 1249	SN: 100967       28-Mar-24 (No. 217-04038)         SN: 101859       21-Mar-24 (No. 4030A315007801)         SN: 101832       25-Jan-24 (No. 4030-315007551)         SN: 1152       28-Mar-24 (No. 217-04050)         SN: 1016       05-Oct-23 (No. OCP-DAK12-1016_Oct23)         SN: 1249       05-Oct-23 (No. OCP-DAK3.5-1249_Oct23)         SN: 7349       03-Jun-24 (No. EX3-7349_Jun24)

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. 0001-300719404)	May-25
Mismatch: SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

Name

Function

Signature

Calibrated by

Paulo Pina

Laboratory Technician

Sin

Approved by

Sven Kûhn

Technical Manager

Issued: July 10, 2024

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Certificate No: D2300V2-1088\_Jul24

Page 1 of 6

Report No.: FA4N0920C

#### Calibration Laboratory of

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland





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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

tissue simulating liquid TSL sensitivity in TSL / NORM x,y,z ConvF

not applicable or not measured N/A

### 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%.

Certificate No: D2300V2-1088\_Jul24

Report No.: FA4N0920C

Page66/356

July 10, 2024 D2300V2 - SN: 1088

#### 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 = 5mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	2300MHz ±1MHz	

### Head TSL parameters at 2300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.5	1.67 mho/m
Measured Head TSL parameters	(22.0 ±0.2)°C	38.5 ±6%	1.67 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

### SAR result with Head TSL at 2300 MHz

SAR averaged over 1 cm3 (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	12.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	48.2 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	5.86 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.3 W/kg ±16.5% (k = 2)

Page 3 of 6 Certificate No: D2300V2-1088\_Jul24

D2300V2 - SN: 1088 July 10, 2024

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

## Antenna Parameters with Head TSL at 2300 MHz

Impedance	48.5 Ω – 4.5 jΩ
Return Loss	-26.4 dB

### General Antenna Parameters and Design

Et added Dates (and dispation)	1.169 ns
Electrical Delay (one direction)	1,1,00,110;

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: D2300V2-1088\_Jul24 Page 4 of 6

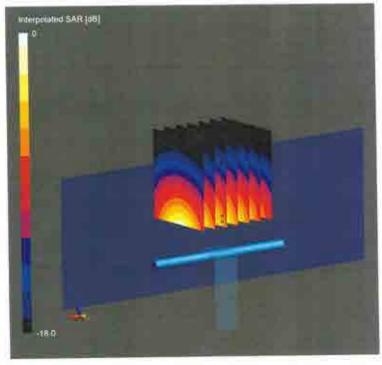
July 10, 2024 D2300V2 - SN: 1088

#### System Performance Check Report

Summary								
Dipole			Frequency (MH	(2)	TSL	Power [d8m]		
D2300V2 - SN1088			2300		HSL	24		
Exposure Condition	15							
Phantom Section, TSL	Test Distance (mm)	Band	Group, UID	Frequency (MHz)	, Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat	10		cw. o-	2300, 0		7.49	1.67	38.5
Hardware Setup								
Phantom	TSL_Measured	Date	Date Probe, Calibration Date		DAE	, Calibration Date		
MFP V8.0 Center	HSL, 2024-07-	-10	EX3DV4 - SN7349, 2024-06-03		DAE	4ip Sn1836, 2024-01-10		
Scans Setup					Measureme	nt Results		
				Zoom Scan				Zoom Scan
Grid Extents (mm)				30 x 30 x 30	Date			2024-07-10
Grid Steps (mm)			5.0 x 5.0 x 1.5 psSAR1g (W/X		Kg		12.1	
Sensor Surface [mm]				1.4	psSAR10g [W	(/Kg)		5.86
- Library Laboratory								

	Zoom Scan
Grid Extents (mm)	30 x 30 x 30
Grid Steps (mm)	5.0 x 5.0 x 1.5
Sensor Surface (mm)	1.4
Graded Grid	Yes
Crading Ratio	1.5
MAIA.	N/A
Surface Detection	VMS = 6p
Scun Method	Measured

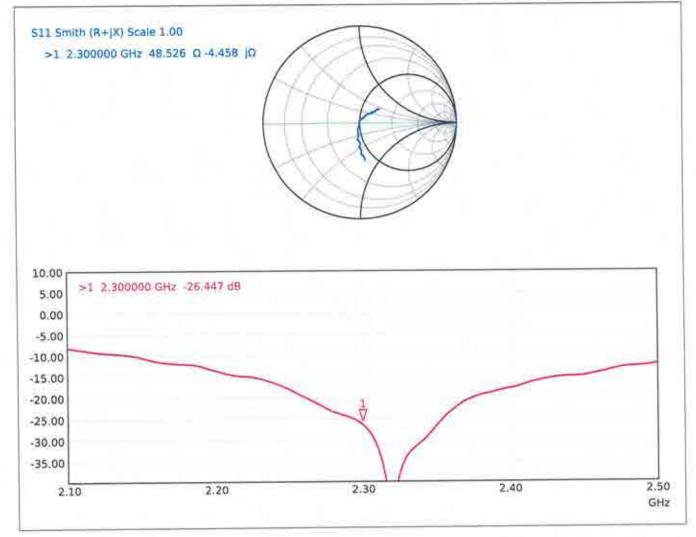
	Zoom Scan
Date	2024-07-10
psSAR1g [W/Kg]	12.1
psSAR10g [W/Kg]	5.86
Power Drift [d8]	-0.01
Power Scaling	Disabled
Sealing Factor (d8)	
TSL Correction	Positive / Negative



0 dB = 23.7 W/Kg

D2300V2 - SN: 1088

# Impedance Measurement Plot for Head TSL



Report No.: FA4N0920C

# Calibration Laboratory of Schmid & Partner

Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland





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Client

Sporton Taoyuan City Certificate No.

D2450V2-736 Aug24

#### CALIBRATION CERTIFICATE

Object

D2450V2 - SN: 736

Calibration procedure(s)

QA CAL-05.v12

Calibration Procedure for SAR Validation Sources between 0.7 - 3 GHz

Calibration date

August 15, 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 Cal
Power Sensor R&S NRP-33T	SN: 100967	28-Mar-24 (No. 217-04038)	Mar-25
Power Sensor R&S NRP18A	SN: 101859	21-Mar-24 (No. 4030A315007801)	Mar-25
Spectrum Analyzer R&S FSV40	SN: 101832	25-Jan-24 (No. 4030-315007551)	Jan-25
Mismatch; Short [S4188] Attenuator [S4423]	SN: 1152	28-Mar-24 (No. 217-04050)	Mar-25
OCP DAK-12	SN: 1016	05-Oct-23 (No. OCP-DAK12-1016_Oct23)	Oct-24
OCP DAK-3.5	SN: 1249	05-Oct-23 (No. OCP-DAK3,5-1249_Oct23)	Oct-24
Reference Probe EX3DV4	SN: 7349	03-Jun-24 (No. EX3-7349_Jun24)	Jun-25
DAE4ip	SN: 1836	10-Jan-24 (No. DAE4ip-1836_Jan24)	Jan-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. 0001-300719404)	May-25
Mismatch; SMA	SN: 1102	22-May-24 (No. 675-Mismatch_SMA-240522)	May-25

Name

Function

Calibrated by

Krešimir Franjič

Laboratory Technician

Approved by

Sven Kühn

Technical Manager

Issued: August 16, 2024

Signature

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Certificate No: D2450V2-736\_Aug24

Page 1 of 6

Report No.: FA4N0920C

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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 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%.

Certificate No: D2450V2-736\_Aug24 Page 2 of 6

August 15, 2024 D2450V2 - SN: 736

#### **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 = 5mm, dz = 1.5mm	Graded Ratio = 1.5 mm (Z direction)
Frequency	2450MHz ±1MHz	

#### Head TSL parameters at 2450 MHz

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 ±0.2)°C	37.8 ±6%	1.84 mho/m ±6%
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL at 2450 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	12,9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	51.4 W/kg ±17.0% (k = 2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR for nominal Head TSL parameters	24 dBm input power	6.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.2 W/kg ±16.5% (k = 2)

Certificate No: D2450V2-736\_Aug24 Page 3 of 6

D2450V2 - SN: 736 August 15, 2024

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

### Antenna Parameters with Head TSL at 2450 MHz

Impedance	54.6 Ω + 2.1 ]Ω
Return Loss	-26.2 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.158 ns
Liectrical belay (one direction)	17.100.110

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	
- 67	Trial landour of		

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Report No.: FA4N0920C

#### System Performance Check Report

D2450V2 - SN: 736

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Dipole	Frequency [MHz]	TSL	Power (dBm)	
D2450V2 ~ 5N736	2450	HSL	24	

#### **Exposure Conditions**

Phantom Section, TSL	Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor	TSE Conductivity [S/m]	TSI. Permittivity	
Flat	10		CW, 0+-	2450.0	7.24	1.84	37.8	

#### Hardware Setup

Scan Method

Phantom	TSL, Measured Date	Probe, Calibration Date	DAE, Calibration Date	
MFP V8.0 Center	HSL_2024-08-15	EX3DV4 - SN7349, 2024-06-03	DAE4ID Sn1836, 2024-01-10	

Measured

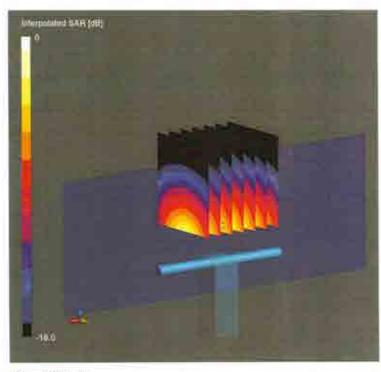
Scans Setup	
	Zeom Scan
Grid Extents [mm]	30 × 30 × 30
Grid Steps [mm]	5.0 x 5.0 x 1.5

9057 907	200 - 200 - 200
Grid Steps [imm]	5.0 x 5.0 x 1.5
Sensor Surface (mm)	103
Graded Grid	Yes
Grading Ratio	16.3
MAIA	.N/A
Surface Detection	VMS + 6p

# Measurement Results

	Zoom Scan
Date	2024-08-15
psSAR1g (W/Kg)	12.9
psSAR1 óg [W/Kg]	6.07
Power Drift [dR]	00.0
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	Positive / Negative

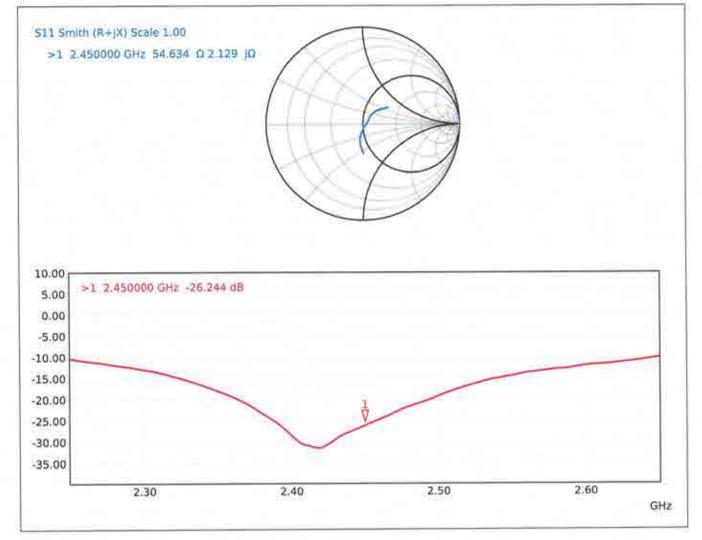
August 15, 2024



0 dB = 26.6 W/Kg

D2450V2 - SN: 736 August 15, 2024

# Impedance Measurement Plot for Head TSL



Certificate No: D2450V2-736\_Aug24

Report No.: FA4N0920C

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





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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

Certificate No: D2600V2-1078\_Jun22

# CALIBRATION CERTIFICATE

Object D2600V2 - SN:1078

Calibration procedure(s) QA CAL-05.v11

Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date: June 23, 2022

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 NRP	SN: 104778	04-Apr-22 (No. 217-03525/03524)	Apr-23
Power sensor NRP-Z91	SN: 103244	04-Apr-22 (No. 217-03524)	Apr-23
Power sensor NRP-Z91	SN: 103245	04-Apr-22 (No. 217-03525)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Type-N mismatch combination	SN: 310982 / 06327	04-Apr-22 (No. 217-03528)	Apr-23
Reference Probe EX3DV4	SN: 7349	31-Dec-21 (No. EX3-7349_Dec21)	Dec-22
DAE4	SN: 601	02-May-22 (No. DAE4-601_May22)	May-23
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
Power sensor HP 8481A	SN: MY41093315	07-Oct-15 (in house check Oct-20)	In house check: Oct-22
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-20)	In house check: Oct-22
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-20)	In house check: Oct-22
	Name	Function	Signature
Calibrated by:	Joanna Lleshaj	Laboratory Technician	Aplany
Approved by:	Sven Kühn	Technical Manager	(/~

Issued: June 24, 2022

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

Certificate No: D2600V2-1078\_Jun22

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





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

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:

- 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%.

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### **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 ± 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 ± 0.2) °C	37.8 ± 6 %	2.01 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	2227	

# 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	14.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	55.4 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	6.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.9 W/kg ± 16.5 % (k=2)

Certificate No: D2600V2-1078\_Jun22 Page 3 of 6

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

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.2 Ω - 7.3 jΩ	
Return Loss	- 22.6 dB	

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.153 ns
	114 11 11 11 11 11 11 11 11 11 11 11 11

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: D2600V2-1078\_Jun22 Page 4 of 6

# DASY5 Validation Report for Head TSL

Date: 23.06.2022

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1078

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

Medium parameters used: f = 2600 MHz;  $\sigma = 2.01$  S/m;  $\varepsilon_r = 37.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

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

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(7.84, 7.84, 7.84) @ 2600 MHz; Calibrated: 31.12.2021

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 02.05.2022

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 = 117.7 V/m; Power Drift = 0.07 dB

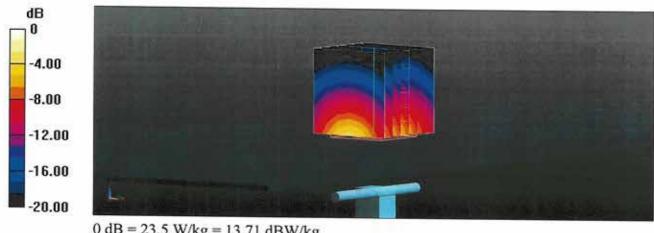
Peak SAR (extrapolated) = 28.0 W/kg

### SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.29 W/kg

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

Ratio of SAR at M2 to SAR at M1 = 50.5%

Maximum value of SAR (measured) = 23.5 W/kg

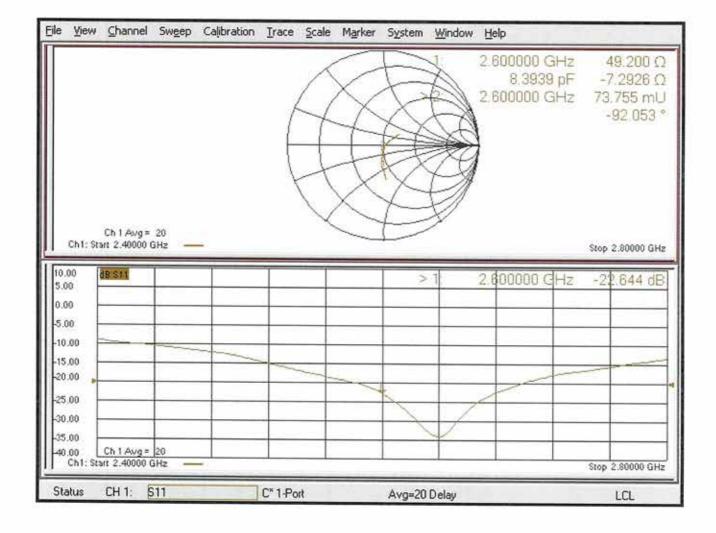


0 dB = 23.5 W/kg = 13.71 dBW/kg

Certificate No: D2600V2-1078\_Jun22

Report No.: FA4N0920C

## Impedance Measurement Plot for Head TSL



Certificate No: D2600V2-1078\_Jun22